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- Low Noise Amplifier
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- Wide Band RF Switch
- Digital Variable Gain Amplifier
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- pHEMT LNA
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Low Noise Amplifier

Part No.	BW (MHz)	Freq. (MHz)	Gs (dB)	P1 (dBm)	OIP3/tone (dBm)		NF (dB)	Vd (V)	Id (mA)	PKG	Application Note	S-Parameter
BL011	5-4000	900	22.0	20.5	33.5	5dBm	0.91	5.0	75	SOT89		BL011.S2P
		1900	17.0	20.5	36.0		1.13				011_App	
		2140	16.5	20.5	35.5		1.17				BL011_LTE2600_App	
		2450	15.5	20.0	38.0		1.30					
BL022	50-3000	70	26.0	22.0	33.0	5dBm	1.00	5.0	70	SOT89		BL022.S2P
		900	22.0	22.0	33.5		0.90					
		1900	17.0	22.0	36.0		0.95					
		2140	16.0	22.0	36.0		1.05					
		2650	14.5	22.0	36.5		1.25					
BL081	5-4000	900	21.0	17.0	28.0	5dBm	0.95	5.0	25	SOT89		BL081.S2P
		1900	17.0	17.0	29.0		1.13				081_App	
		2140	16.0	16.5	28.0		1.15				BL081_LTE2600_App	
		2450	15.5	16.5	28.0		1.25				BL081_3.5G_3.7G_App	
		3500	13.4	18.5	31.1		1.40				-	
BL082	5-4000	900	20.9	18.8	28.0	5dBm	0.88	5.0	27	BL082-SOT363		-
		1900	17.1	19.2	30.3		1.00					BL082-3.3V.S2P
		2140	16.2	19.5	30.6		1.08				BL082_3.5G_3.7G_App	BL082-5V.S2P
		2350	15.6	19.3	31.6		1.14					-
		2650	14.6	19.0	31.4		1.14					-
		3500	12.5	18.6	29.9		1.30					-
BNT01	1500-3000	1900	15.5	22.0	37.0	5dBm	1.60	4.4	68	SOT89		BNT01-3.3V.S2P
		2140	14.5	22.0	37.0		1.70				BNT01_App	BNT01-4.4V.S2P
		2650	13.0	22.0	36.0		1.80					

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Wide Band Gain Block

Part No.	BW (MHz)	Freq. (MHz)	Gs (dB)	P1 (dBm)	OIP3/tone (dBm)		NF (dB)	Vc (V)	Ic (mA)	PKG	Application Note	S-Parameter
BG11C	50-4000	70	22.8	15.9	29.9	6dBm	4.3	5.0	48	SOT89		BG11C.S2P
		500	22.3	15.8	28.0		4.5				-	
		900	21.9	16.4	29.5		3.9					
		1900	20.8	17.3	30.0		4.0					
		2450	19.9	16.5	28.0		4.2					
	50-4000	70	22.3	13.0	25.6	6dBm	4.1	4.5	35	SOT89	BG11C_LTE2600_App	
		500	21.8	12.9	23.0		4.4					
		900	21.5	13.0	24.0		3.8					
		1900	20.5	14.3	26.0		3.9					
		2450	19.7	15.0	23.0		4.1					
BG12B	50-4000	70	18.6	20.1	36.5	5dBm	2.8	5.0	77	SOT89		BG12B.S2P
		500	17.5	20.6	38.0		3.0				-	
		900	17.1	20.9	37.0		2.9				-	
		1900	15.0	20.0	34.5		3.1				-	
		2450	13.9	18.3	33.0		3.2				BG12B_LTE2600_App	
	50-4000	70	18.5	18.0	35.0	5dBm	2.6	4.5	58	SOT89	-	
		500	17.4	18.3	34.5		2.9					
		900	17.0	18.5	34.0		2.8					
		1900	14.9	18.1	30.5		3.0					
		2450	13.8	17.0	31.0		3.1				-	
BG12C	50-4000	70	21.5	20.0	36.0	7dBm	2.6	5.0	67	SOT89		BG12C.S2P
		500	20.5	21.0	35.5		2.6					
		900	20.5	21.0	35.0		2.6				-	
		1900	18.5	20.0	33.0		2.7				-	
		2450	17.5	18.0	31.0		2.8				-	
		3500	16.1	15.5	27.2		2.8				BG12C_LTE2600_App	
	50-4000	70	21.0	18.0	31.0	7dBm	2.5	4.5	49	SOT89	BG12C_3.5G_3.7G_App	
		500	20.5	18.0	31.0		2.5				-	
		900	20.2	17.5	30.5		2.5				-	
		1900	18.5	17.5	30.5		2.5				-	
		2450	17.5	16.5	29.0		2.6				-	
BG13B	5-6000	70	13.8	18.4	38.0	7dBm	8.1	5.0	70	SOT89		BG13B.S2P
		120	13.8	18.6	37.5		8.1					
		900	13.5	18.5	37.0		8.1					
		1900	13.3	18.5	35.0		8.3					
		2140	13.0	18.5	35.0		8.3					
		2450	12.5	18.5	35.0		8.4				BG13B_App	
		3500	12.1	17.7	30.0		8.5				-	
		5800	10.8	15.2	26.0		9.4				-	
	5-4000	70	13.7	16.0	35.0	7dBm	8.1	4.5	58	SOT89	BG13B_LTE2600_App	
		120	13.7	15.9	34.0		8.1				BG13B_3.5G_3.7G_App	
		900	13.4	15.8	32.0		8.1					
		1900	13.2	15.9	31.5		8.3					
		2140	12.9	15.9	31.0		8.3					
		2450	12.5	16.1	32.5		8.4					
BG13D	5-6000	70	26.5	18.8	36.0	7dBm	4.0	5.0	65	SOT89		BG13D.S2P
		900	24.5	19.0	32.0		4.0					
		1900	21.5	19.0	32.0		4.2					
		2140	21.4	19.0	31.5		4.3					
		2450	20.0	19.0	31.5		4.5				BG13D_App	

		3500	18.0	17.6	29.5		5.3				_	
		5800	14.0	15.4	26.5		7.5				_	
	5-4000	70	24.8	14.4	26.0	7dBm	4.0	4.5	34	SOT89	BG13D_LTE2600_App	
		900	23.1	14.1	23.0		4.0				BG13D_3.5G_3.7G_App	
		1900	20.6	13.8	23.5		4.2					
		2140	20.5	13.8	23.0		4.3					
		2450	19.3	15.2	23.5		4.5					
BG14A	5-6000	5	16.0	19.0	36.0	9dBm	5.4	5.0	85	SOT89		BG14A.S2P
		70	17.0	19.7	38.5		5.4					
		900	16.7	19.7	37.5		5.5					
		1900	16.0	19.7	35.5		6.0					
		2450	15.4	19.7	34.5		6.3				BG14A_App	
		3500	14.1	17.9	29.5		7.3				_	
		5800	11.7	15.7	25.7		9.2				_	
	5-4000	5	15.9	17.2	35.0		5.4	4.5	69	SOT89	BG14A_LTE2600_App	
		70	16.9	17.9	37.5		5.4				BG14A_3.5G_3.7G_App	
		900	16.5	17.4	33.5		5.5					
		1900	15.9	17.5	32.5		6.0					
		2450	15.3	17.3	32.5		6.3					
BG14B	5-6000	70	17.3	19.5	37.0	9dBm	5.0	5.0	75	SOT89		BG14B.S2P
		120	17.7	19.5	37.0		5.0					
		900	17.0	19.5	36.5		5.0					
		1900	16.0	19.5	35.0		5.2					
		2450	15.2	19.5	33.5		5.5				BG14B_App	
		3500	14.3	17.6	29.0		7.0				_	
		5800	11.9	15.5	25.5		9.5				_	
	5-4000	70	16.6	17.2	33.0		4.8	4.5	58	SOT89	BG14B_LTE2600_App	
		120	17.0	17.2	33.0		4.9				BG14B_3.5G_3.7G_App	
		900	16.8	16.6	32.0		5.0					
		1900	15.8	16.7	31.5		5.0					
		2450	15.1	16.8	30.5		5.5					
BG15A	50-4000	70	23.0	18.7	33.0	2dBm	2.8	5.0	55	SOT89		BG15A.S2P
		500	21.5	18.3	33.2		2.9					
		900	21.2	17.8	32.7		2.9				_	
		1900	19.2	17.4	31.2		2.9				_	
		2140	18.7	17.1	30.5		2.9				_	
		2450	18.0	16.7	29.6		3.1				_	
		3500	16.6	15.3	28.0		3.3				BG15A_LTE2600_App	
	50-4000	70	22.2	14.5	25.3		2.6	4.5	34	SOT89	BG15A_3.5G_3.7G_App	
		500	20.7	14.6	25.5		2.8				_	
		900	20.6	13.9	25.1		2.8				_	
		1900	18.8	14.4	25.3		2.8				_	
		2140	18.3	14.5	25.2		2.8				_	
		2450	17.5	14.8	25.0		3.0				_	
		3500	16.3	14.2	25.4		3.0				_	
BG16C	5-4000	70	20.2	17.8	31.0	3dBm	4.5	5.0	40	SOT89		BG16C.S2P
		120	18.9	17.3	31.0		4.5					
		900	17.0	16.1	28.5		4.5					
		1900	16.0	15.2	27.0		4.6					
		2140	15.7	15.5	28.0		4.6					
		2450	15.3	15.0	27.5		4.7				BG16C_App	
	5-4000	70	19.4	13.3	23.5		4.5	4.5	29	SOT89	BG16C_LTE2600_App	
		120	18.1	12.8	23.5		4.5					
		900	16.3	11.8	22.0		4.6					
		1900	15.4	12.0	20.0		4.5					
		2140	15.2	12.2	22.0		4.6					
		2450	14.8	13.0	22.0		4.7					
BG17A	5-4000	70	21.0	18.3	37.0	5dBm	4.7	5.0	65	SOT89		BG17A.S2P
		120	20.3	18.9	37.0		4.7					
		900	18.8	19.2	35.0		4.8					
		1900	17.0	19.2	33.0		4.9					

		2140	16.8	19.0	32.5		4.9					
		2450	16.2	18.0	31.0		4.9				BG17A_App	
		3500	14.8	16.1	28.6		5.5				-	
	5-4000	70	20.6	15.0	31.0	5dBm	4.7	4.5	45	SOT89	BG17A_LTE2600_App	
		120	19.9	15.6	31.0		4.7				BG17A_3.5G_3.7G_App	
		900	18.5	15.3	29.0		4.8					
		1900	16.7	16.1	29.0		4.9					
		2140	16.5	15.9	28.5		4.9					
		2450	16.0	17.0	27.5		4.9					
BG17C	5-6000	70	20.4	17.8	34.0	2dBm	3.8	5.0	55	SOT89		BG17C.S2P
		120	19.3	18.5	33.5		3.8					
		900	17.8	17.5	31.0		3.9					
		1900	16.4	17.0	30.0		4.0					
		2450	15.6	16.1	29.0		4.0				BG17C_App	
		5800	11.0	12.3	24.5		6.6				-	
	5-4000	70	19.5	13.6	27.5	2dBm	3.8	4.5	37	SOT89	BG17C_LTE2600_App	
		120	18.6	14.3	27.0		3.8					
		900	17.4	14.3	24.5		3.9					
		1900	15.9	13.7	24.5		4.0					
		2450	15.3	12.7	24.0		4.0					
BG18A	50-4000	70	17.5	18.0	36.0	7dBm	4.2	5.0	70	SOT89		BG18A.S2P
		500	16.0	18.7	37.5		4.2					
		900	15.5	19.1	36.0		4.2					
		1900	15.0	18.9	32.5		4.2					
		2100	14.7	18.7	31.5		4.2					
		2450	14.3	17.8	30.5		4.4				-	
	50-4000	70	17.3	16.9	33.5	7dBm	4.2	4.5	57	SOT89	BG18A_LTE2600_App	
		500	15.9	16.4	33.0		4.2					
		900	15.4	16.8	32.5		4.2					
		1900	14.9	17.1	30.5		4.2					
		2100	14.6	17.4	30.5		4.2					
		2450	14.2	16.2	29.0		4.4					
BG18B	50-4000	70	22.0	18.0	35.0	7dBm	3.6	5.0	72	SOT89		BG18B.S2P
		500	20.7	18.8	35.0		3.6					
		900	20.3	19.0	34.0		3.4					
		1900	18.5	18.9	31.5		3.2					
		2100	18.3	18.6	31.0		3.4					
		2450	17.5	17.8	30.5		3.4					
		3500	15.1	15.8	27.0		4.6				BG18B_App	
	50-4000	70	21.7	14.1	31.5	7dBm	3.6	4.5	53	SOT89	BG18B_LTE2600_App	
		500	20.5	16.8	32.0		3.6				BG18B_3.5G_3.7G_App	
		900	20.1	16.5	30.5		3.4					
		1900	18.4	16.2	29.5		3.2					
		2100	18.1	16.8	30.5		3.4					
		2450	17.4	15.7	29.0		3.4					
BG18C	50-4000	70	23.5	19.0	35.0	7dBm	3.8	5.0	73	SOT89		BG18C.S2P
		500	22.4	20.0	36.0		3.8					
		900	22.2	20.1	35.5		3.6					
		1900	20.9	18.8	32.5		3.7					
		2100	20.6	18.3	31.5		3.7					
		2450	19.9	17.3	32.0		3.9				BG18C_App	
	50-4000	70	23.1	17.3	32.0	7dBm	3.8	4.5	52	SOT89	BG18C_LTE2600_App	
		500	22.2	17.2	32.0		3.8					
		900	21.9	16.7	31.0		3.6					
		1900	20.7	16.8	30.0		3.7					
		2100	20.5	17.2	29.5		3.7					
		2450	19.8	15.4	29.0		3.9					
BG18D	50-4000	500	24.3	19.5	36.0	7dBm	4.2	5.0	83	SOT89		BG18D.S2P
		900	24.1	19.5	35.0		4.2				BG18D_App	
		1900	22.2	19.0	32.0		4.3				BG18D_LTE2600_App	
		2450	20.8	17.3	30.5		4.5					

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3.0~3.3V Supply Amplifier

Part No.	BW (MHz)	Freq. (MHz)	Gs (dB)	P1 (dBm)	OIP3/tone (dBm)		NF (dB)	Vc (V)	Ic (mA)	PKG	Application Note	S-Parameter
BGS1	50-4000	70	25.3	16.7	27.0	0dBm	3.0	3.2	26	SOT363	BGS1_LTE2600_App	BGS1.S2P
		900	21.8	16.0	26.0		2.9				BGS1_3.5G_3.7G_App	
		1900	18.4	13.9	24.9		3.0					
		2140	17.6	13.3	24.0		3.0					
		2450	16.3	12.3	23.8		3.3					
		3500	14.9	9.9	19.2		3.0					
BGS2	50-4000	70	26.5	15.4	31.0	0dBm	2.7	3.0	34	SOT363	BGS2_LTE2600_App	BGS2.S2P
		900	23.2	13.1	24.8		2.3				BGS2_3.5G_3.7G_App	
		1900	19.1	12.1	23.4		2.2					
		2140	18.3	11.7	23.1		2.2					
		2450	17.3	10.6	22.5		2.3					
		3500	15.0	8.7	19.2		2.7					
BGS3	30-4000	30	28.8	16.0	30.0	0dBm	1.9	3.0	52	SOT363		BGS3.S2P
		70	28.0	16.7	30.5		1.8					
		900	25.4	17.4	30.5		1.7				BGS3_3.5G_3.7G_App	
		1900	21.6	16.9	30.5		1.8					
		2140	20.8	16.0	29.0		1.9					
		2450	20.0	16.0	28.5		1.9					
		2650	19.5	15.9	28.5		2.0					
		3500	18.0	14.5	27.2		2.0					
BGS4	50~4000	70	24.7	20.4	31.0	-3dBm	2.2	3.3	26	SOT363		BGS4.S2P
		500	22.0	20.3	28.0		2.6					
		900	19.7	19.9	28.0		2.1				BGS4_3.5G_3.7G_App	
		1900	14.2	18.8	30.0		2.1					
		2140	13.2	19.0	29.5		2.2					
		2450	11.1	19.0	30.0		2.3					
		3500	10.3	18.9	30.8		2.6					
BGS5	40-4000	40	19.0	15.0	32.5	0dBm	2.2	3.0	55	SOT363		BGS5.S2P
		70	17.3	15.5	32.5		2.2					
		900	16.5	16.2	31.5		2.5				BGS5_3.5G_3.7G_App	
		1900	15.0	15.4	28.5		2.7					
		2140	14.6	15.0	28.0		2.8					
		2450	14.1	14.4	27.0		2.9					
		2650	13.8	14.5	27.0		3.0					
		3500	13.3	13.7	24.6		2.7					
BGS6	50-4000	400	23.3	16.5	26.0	0dBm	3.0	3.3	27	SOT343		
		900	21.8	17.0	26.0		2.9				BGS6_3.5G_3.7G_App	
		1900	18.0	14.0	26.0		3.0					BGS6.S2P
		2450	16.2	12.5	24.0		3.3					
		2650	15.6	12.0	23.0		3.5					
BNT01	1500-3000	1900	15.5	22.0	37.0	5dBm	1.6	4.4	68	SOT89		
		2140	14.5	22.0	37.0		1.7					
		2650	13.0	22.0	36.0		1.8				BNT01_App	BNT01-3.3V.S2P
		1900	15.0	19.5	35.5	3dBm	1.6	3.3	47	SOT89		BNT01-4.4V.S2P
		2140	14.0	20.0	36.0		1.6					
		2650	12.5	20.0	35.0		1.7					

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- Advantages
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Internally Matched IF Amplifier

Part No.	BW (MHz)	Freq. (MHz)	Gs (dB)	P1 (dBm)	OIP3/tone (dBm)		NF (dB)	Vc (V)	Ic (mA)	PKG	Application Note	S-Parameter
BG20A	5-800	70	24.0	20.5	39.0	10dBm	3.4	5.0	90	SOT89	BG20A_App	BG20A.S2P
		140	23.9	20.5	37.0		3.4					
		250	23.7	20.5	37.0		3.5					
		500	23.1	20.5	36.0		3.6					
	5-800	70	23.8	18.3	33.5	10dBm	3.4	4.5	64	SOT89		
		140	23.7	18.3	31.0		3.4					
		250	23.5	18.3	32.0		3.5					
		500	22.9	18.3	32.0		3.6					
BG20B	5-800	70	22.0	21.0	41.0	13dBm	4.6	5.0	105	SOT89	BG20B_App	BG20B.S2P
		140	21.9	21.0	39.5		4.7					
		250	21.7	21.0	38.5		4.7					
		500	21.0	21.0	36.0		4.8					
	5-800	70	21.8	19.8	34.0	13dBm	4.6	4.5	79	SOT89		
		140	21.8	19.3	37.0		4.7					
		250	21.6	19.2	35.5		4.7					
		500	20.9	19.6	33.5		4.8					
BIF1	50-800	70	15.2	20.0	44.0	10dBm	4.2	5.0	105	SOT89	BIF1_App	BIF1.S2P
		140	15.2	20.8	42.0		4.3					
		250	15.1	20.9	40.5		4.3					
		500	15.0	21.0	40.0		4.4					
		800	15.0	20.7	37.5		4.5					
	50-800	70	15.1	18.6	42.4	10dBm	4.2	4.5	79	SOT89		
		140	15.1	19.3	42.0		4.3					
		250	15.0	19.4	38.0		4.3					
		500	14.9	19.3	38.0		4.4					
		800	14.9	19.4	36.0		4.5					
BIF3	50-800	70	20.3	23.5	43.0	8dBm	5.1	5.0	85	SOT89	BIF3_App	BIF3.S2P
		140	20.2	24.5	41.5		5.2					
		250	19.9	24.5	40.5		5.2					
		500	19.0	24.2	40.5		5.3					
		800	17.9	24.0	39.5		5.3					
	50-800	70	20.2	22.1	34.5	8dBm	5.1	4.5	54	SOT89		
		140	20.2	23.0	37.5		5.2					
		250	19.8	23.1	34.5		5.2					
		500	18.7	22.6	35.5		5.3					
		800	17.5	22.2	34.5		5.3					
BIF5	50-1200	70	17.5	20.5	43.0	10dBm	4.0	5.0	107	SOT89	BIF5_APP	BIF5.S2P
		140	17.5	20.5	42.5		4.1					
		250	17.5	20.5	41.0		4.2					
		500	17.5	21.0	40.0		4.3					
	50-1200	70	17.4	19.2	40.0	10dBm	4.0	4.5	85	SOT89		
		140	17.4	19.0	41.0		4.1					
		250	17.5	19.2	38.5		4.2					
		500	17.4	19.4	36.5		4.3					
BIF7	50-1200	70	27.0	21.0	40.0	10dBm	2.9	5.0	95	SOT89	BIF7_APP	BIF7.S2P
		140	27.0	21.5	38.5		2.9					
		250	26.5	21.5	38.0		3.0					
		500	25.5	21.0	36.0		3.0					
	50-1200	70	26.7	18.8	34.5	10dBm	2.9	4.5	67	SOT89		
		140	26.6	19.2	34.0		2.9					

		250	26.2	19.5	33.0		3.0					
		500	25.1	19.6	31.5		3.0					
BIG2	50-600	70	15.6	20.3	40.0	8dBm	3.3	5.0	83	SOT89	BIG2_APP	BIG2.S2P
		140	15.8	20.7	41.5		3.3					
		200	15.9	20.9	40.1		3.3					
		500	15.9	20.0	38.2		3.2					
	50-600	70	15.6	18.6	38.0	8dBm	3.2	4.5	68	SOT89		
		140	15.7	18.8	38.5		3.2					
		200	15.8	18.9	37.5		3.1					
		500	15.8	18.6	35.5		3.1					
BIG4	50-600	70	20.9	21.0	40.5	8dBm	2.7	5.0	85	SOT89	BIG4_APP	BIG4.S2P
		140	20.7	20.6	41.0		2.9					
		200	20.2	20.4	41.0		3.0					
		500	19.5	20.3	41.3		3.1					
	50-600	70	20.8	19.3	38.9	8dBm	2.6	4.5	69	SOT89		
		140	20.5	19.1	39.1		2.8					
		200	20.0	18.9	39.0		2.9					
		500	19.2	18.8	39.0		3.0					
BIG8	50-600	70	27.0	20.7	40.5	8dBm	2.7	5.0	94	SOT89	BIG8_APP	BIG8.S2P
		140	27.1	21.0	40.2		2.9					
		200	26.9	21.0	39.0		3.0					
		500	26.0	20.2	41.6		3.2					
	50-600	70	26.7	19.1	34.8	8dBm	2.8	4.5	66	SOT89		
		140	26.7	19.2	34.9		2.8					
		200	26.5	19.1	33.7		2.8					
		500	25.7	18.4	34.5		2.9					

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Wide Band Drive Amplifier

Part No.	BW (MHz)	Freq. (MHz)	Gs (dB)	P1 (dBm)	OIP3/tone (dBm)		NF (dB)	Vc (V)	Ic (mA)	PKG	Application Note	S-Parameter
BT05AG	5-4000	70	24.5	23.0	38.0	10dBm	4.6	5.0	85	SOT89	BT05AG_App	BT05AG.S2P
		900	20.8	22.4	37.0		4.5				BT05AG_738_793_App	
		1900	16.3	19.5	40.0		4.4				-	
		2450	14.3	23.0	37.5		4.3				-	
BT05CV	5-4000	70	23.4	24.2	39.5	9dBm	4.6	5.0	85	SOT89	BT05CV_App	BT05CV.S2P
		900	21.5	23.9	43.5		4.4				BT05CV_738_793_App	
		1900	17.5	23.6	42.0		4.2				BT05CV_LTE2600_App	
		2450	15.0	24.1	40.5		4.3				BT05CV_3.5G_3.7G_App	
		3500	12.3	23.1	40.0		5.4				-	
BT05VG	1500-4000	1900	18.0	22.5	39.0	10dBm	4.6	5.0	85	SOT89		BT05VG.S2P
		2100	16.5	22.5	39.0		5.0				BT05VG_App	
		2450	15.0	23.5	39.0		4.6				-	
BT05VG2	1500-4000	1900	19.0	22.7	40.5	11dBm	3.9	5.0	88	SOT89	BT05VG2_App	BT05VG2.S2P
		2100	18.0	22.0	38.0		4.0				BT05VG2_LTE2600_App	
		2450	16.5	23.2	38.0		4.2				BT05VG2_3.5G_3.7G_App	

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Wide Band Medium Power Amplifier

Part No.	BW (MHz)	Freq. (MHz)	Gs (dB)	P1 (dBm)	OIP3/tone (dBm)		NF (dB)	Vc (V)	Ic (mA)	PKG	Application Note	S-Parameter
BT09AG	5-4000	70	25.0	24.5	39.0	14dBm	3.7	5.0	160	SOT89		BT09AG.S2P
		170	25.0	25.5	40.0		3.8					
		240	24.8	25.0	40.0		3.9				BT09AG_App	
		500	23.0	24.5	41.5		3.8				BT09AG_738_793_App	
		900	20.0	24.5	42.0		4.2				BT09AG_LTE2600_App	
		1900	14.5	24.2	42.0		4.2					
		2450	12.5	26.0	42.0		4.3					
BT09VG	5-4000	900	21.5	24.5	39.0	13dBm	3.7	5.0	160	SOT89	BT09VG_App	BT09VG.S2P
											BT09VG_738_793_App	
		1900	15.5	25.5	41.0		4.0				BT09VG_LTE2600_App	
		2450	13.5	27.0	41.5		4.7				BT09VG_3.5G_3.7G_App	
BT09E	500-4000	900	22.8	25.8	40.5	10dBm	4.3	5.0	85	SOT89	-	BT09E.S2P
		1900	18.7	25.2	37.0		4.4				BT09E_App	
		2140	17.7	25.2	37.0		4.5				BT09E_OIP3_App	
		2650	16.1	25.1	36.5		4.7				-	
		3500	13.7	24.9	36.5		5.1				-	
BT013	1500-4000	1900	15.0	27.5	45.0	13dBm	6.8	5.0	135	SOT89	BT013_App	BT013.S2P
		2140	14.0	27.2	45.0		6.8				BT013_LTE2600_App	
		2400	13.2	27.0	43.0		6.8				BT013_3.5G_3.7G_App	

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High Power Amplifier

Part No.	BW (MHz)	Freq. (MHz)	Gs (dB)	P1 (dBm)	OIP3/tone (dBm)		NF (dB)	Vc (V)	Ic (mA)	PKG	Application Note	S-Parameter
BT301	500-4000	900	18.5	29.5	49.0	16dBm	8.5	5.0	350	SOIC8	BT301_APP	BT301.S2P
		1900	12.5	30.3	49.0		8.6				BT301_3.5G__App	
		2100	11.5	30.3	47.0		7.5					
		2400	10.5	30.3	49.0		7.5					
		3500	7.6	27.9	42.5		7.3					
BT331	700-2700	900	19.8	32.0	49.0	20dBm	4.8	5.0	410	SOIC8	BT331_App	BT331.S2P
		1900	14.0	33.2	52.0		5.0				BT331_738_793_App	
		2140	13.2	32.6	52.0		5.0				BT331_3.5G__App	
		2600	12.1	31.2	47.0		5.4					
		3500	10.7	29.5	45.8		6.2					
BT33L	200-1000	200	25.7	31.8	43.0	20dBm	8.6	5.0	400	QFN 4x4	BT33L_App	-
		540	23.4	32.4	47.5		6.5					BT33L.S2P
		700	22.0	33.0	48.5		6.8					-
		900	21.3	32.7	47.5		6.8					-
BMT321	1500-2800	1700	27.8	32.4	50.0	17dBm	5.8	5.0	376	QFN 3x3		-
		1800	27.4	32.4	50.0		5.3				BMT321_App	BMT321.S2P
		1900	27.0	32.5	50.0		5.0					-
		2140	26.0	32.4	50.0		5.2					-
		2650	23.8	32.0	50.0		5.0					-
BMT332	700-2400	850	33.7	33.8	50.0	23dBm	6.9	5.0	680	QFN 5x5	BMT332_App	BMT332.S2P
		1750	28.0	33.5	49.0		6.0				BMT332_738_793_App	
		1850	27.3	33.3	48.0		6.0				BMT332_500mA_App	
		1960	26.7	33.1	48.0		5.6					
		2140	26.0	33.1	47.0		5.5					
		2350	24.0	33.1	48.0		5.4					
BMT333	1800-2700	1800	29.7	32.9	45.1	23dBm	5.9	5.0	550	QFN 5x5	BMT333_App	BMT333.S2P
		2350	27.4	34.1	50.0		5.3					
		2550	26.2	33.3	48.3		5.0					
		2650	25.5	33.5	48.2		5.1					

BT301 Art work information	BT331 Art work information
BT301_SOIC8_900MHz_Rev1	BT331_SOIC8_900MHz_Rev1
BT301_SOIC8_1900MHz_Rev1	BT331_SOIC8_1900MHz_Rev1
BT301_SOIC8_2140MHz_Rev1	BT331_SOIC8_2140MHz_Rev1
BT301_SOIC8_2450MHz_Rev1	BT331_SOIC8_2450MHz_Rev1
BMT332 Art work information	BMT333 Art work information
BMT332_QFN_850MHz_Rev2	BMT333_QFN_1800MHz_Rev1
BMT332_QFN_1750MHz_Rev2	BMT333_QFN_2350MHz_Rev1
BMT332_QFN_1850MHz_Rev2	BMT333_QFN_2550MHz_Rev1
BMT332_QFN_1960MHz_Rev2	BMT333_QFN_2650MHz_Rev1
BMT332_QFN_2140MHz_Rev2	-
BMT332_QFN_2350MHz_Rev2	-

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Digital Variable Gain Amplifier

Part No.	Freq. (MHz)	Gain(dB) at 1900MHz	OP1dB(dBm) at 1900MHz	OIP3(dBm) at 1900MHz	ATT Range/ Step Size(dB)	Control Interface	Vc(V)	Icc(mA)	NF(dB)	PKG
BVA303	30-4000	21.0	16.0	30.0	31.5 / 0.5	Serial/Parallel	3.0	54	2.9	QFN 4x4
BVA304	50-4000	12.3	19.3	31.5	31.5 / 0.5	Serial/Parallel	3.3	26	3.6	QFN 4x4
BVA305	40-4000	14.0	14.8	29.0	31.5 / 0.5	Serial/Parallel	3.0	54	4.1	QFN 4x4
BVA518	5-4000	19.1	18.6	32.2	31.5 / 0.5	Serial/Parallel	5.0	73	5.8	QFN 4x4
BVA2140	700-4000	30.2	25.1	40.0	31.5 / 0.5	Serial	5.0	150	2.9	QFN 4x4
#. DVGA Evaluation Software										
#. DVGA User Manual										

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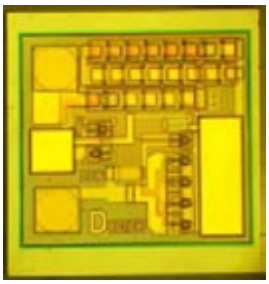
Dividers

Part No.	BW(MHz)	Freq. (MHz)	I/L (dB)	Iso. (dB)	Phase Diff.		Amplitude Diff.		*Solder	*PKG	Application Note	Impedance
BD09B	700-1000 Cellular, GSM900	750	0.49	20.2	0.5	Deg	0.02	dB	with	SOIC8		50 Ohm
		850	0.49	28.3	0.5		0.02					
		950	0.58	20.1	0.6		0.03					
		750	0.5	20.6	0.2	Deg	0.01	dB	without			
		850	0.52	27	0.2		0.01					
		950	0.59	19.5	0.4		0.01					
BD0926	700-1000 Cellular,GSM900	750	0.55	22	0.2	Deg	0.01	dB	without	SOT26		50 Ohm
		850	0.57	31.4	0.2		0.01					
		950	0.63	19	0.4		0.01					
BD19B	1700-2300 PCS, WCDMA	1700	0.35	20.4	0.2	Deg	0.03	dB	with	SOIC8		50 Ohm
		1900	0.38	24.4	0.3		0.04					
		2075	0.47	30.1	0.5		0.06					
		1700	0.38	20	1	Deg	0.06	dB	without			
		1900	0.43	24.1	1		0.06					
		2075	0.54	25.4	0.9		0.05					
BD1926	1700-2300 PCS, WCDMA	1700	0.51	20.1	1.4	Deg	0.04	dB	without	SOT26		50 Ohm
		1900	0.55	24.8	1.5		0.07					
		2075	0.63	21.6	1.5		0.06					
BD23B	1900-2500 PCS, WCDMA, WiBro, TD-SCDMA	1900	0.38	18.7	0.1	Deg	0.03	dB	with	SOIC8		50 Ohm
		2075	0.39	21.6	0.2		0.04					
		2350	0.46	28.5	0.5		0.06					
		1900	0.36	19.2	1.7	Deg	0.07	dB	without			
		2075	0.38	22.2	1.7		0.06					
		2350	0.49	25.8	1.7		0.06					
BD2326	1900-2500 PCS, WCDMA, WiBro, TD-SCDMA	1900	0.58	23.3	0.7	Deg	0.03	dB	without	SOT26		50 Ohm
		2075	0.59	27.5	0.7		0.04					
		2350	0.69	19.5	0.6		0.06					
BD25B	1700-2500 PCS, PCS, USPCS, WCDMA, WiBro, TD-SCDMA	1800	0.38	20.8	0.2	Deg	0.07	dB	with	SOIC8		50 Ohm
		2075	0.42	25.7	0.4		0.09					
		2350	0.6	22.2	0.7		0.12					
		1800	0.41	21.1	1.5	Deg	0.08	dB	without			
		2075	0.49	26.3	1.7		0.11					
		2350	0.75	19	1.7		0.1					
BD2626	2400-2900 WCDMA,WiBro,LTE	2400	0.61	23.3	0.75	Deg	0.07	dB	without	SOT26		50 Ohm
		2500	0.59	25.1	0.75		0.07					
		2650	0.61	28.2	0.75		0.07					
		2800	0.66	25.8	0.75		0.09					
		2900	0.64	22	0.75		0.09					

5-4000 MHz Cascadeable InGaP HBT Gain Block

Device Features



- 33 dBm Output IP3 at 5dBm/tone
- 24.9 dB Gain at 900 MHz
- 18 dBm P1dB
- Highly Reliable InGaP/GaAs HBT Technology
- 50 ohm Cascadeable
- Application: commercial wireless system

Target Device Performance (T_a = 25°C)

Symbols	Test Conditions	Min	Typ	Max	Unit
Frequency Range		5		4000	MHz
Gain	900 MHz 1900 MHz 2450 MHz	23.9 22.0 20.6	24.9 23.0 21.6	25.9 24.0 22.6	dB
S11	900 MHz 1900 MHz 2450 MHz		-11.7 -10.4 -11.9		dB
S22	900 MHz 1900 MHz 2450 MHz		-7.6 -13.4 -12.0		dB
OIP3	900 MHz 1900 MHz 2450 MHz	31.0 30.7 29.5	33.0 32.7 31.5		dBm
P1dB	900 MHz 1900 MHz 2450 MHz	17.3 17.2 16.4	18.3 18.2 17.4		dBm
Ic	Vc = 5.0V	59	69	79	mA
Vc			5.0		V
dG/dT			-0.007		dB/°C
Rth	Thermal Resistance		85		°C/W

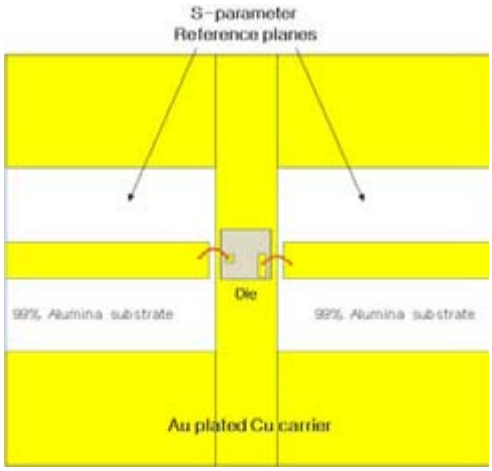
Test conditions unless otherwise noted.

1. Device performance is measured on BeRex evaluation board at 25C, 50 ohm system
2. OIP3 measured with two tones at an output power of 5 dBm/tone separated by 1 MHz.

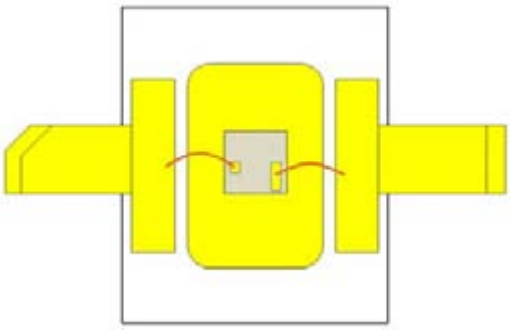
Absolute Maximum Ratings

Parameter	Rating
Operating Case temperature	-40 to +85°C
Storage Temperature	-40 to +155°C
Operating Voltage	+5.5V
Supply Current	150 mA
Input RF Power	23dBm

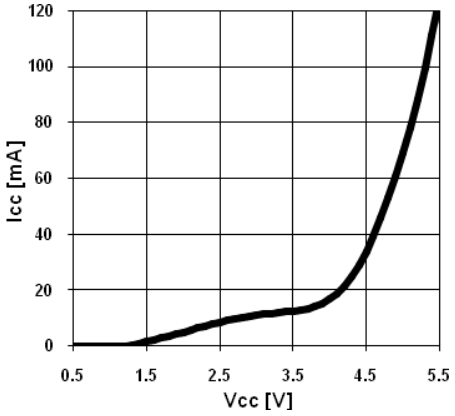
Operation of this device above any of these parameters may result in permanent damage.



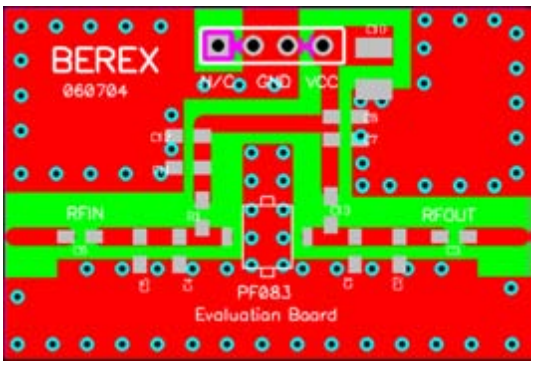
S-parameter test circuit



Chip attachment on PF083



I-V characteristics

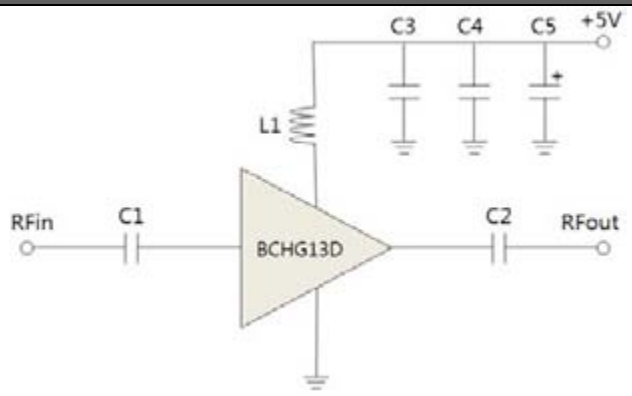


Generic PF083 Evaluation Board
(31mil thick FR4)

Application Circuit: 5-4000 MHz

Typical Performance (Vc = 5V, Ic = 69mA, T = 25°C)

Freq	MHz	900	1900	2450
S21	dB	24.9	23.0	22.5
S11	dB	-11.7	-10.4	-11.9
S22	dB	-7.6	-13.4	-12.0
P1	dBm	19.0	19.0	19.0
OIP3	dBm	32.0	32.0	31.0

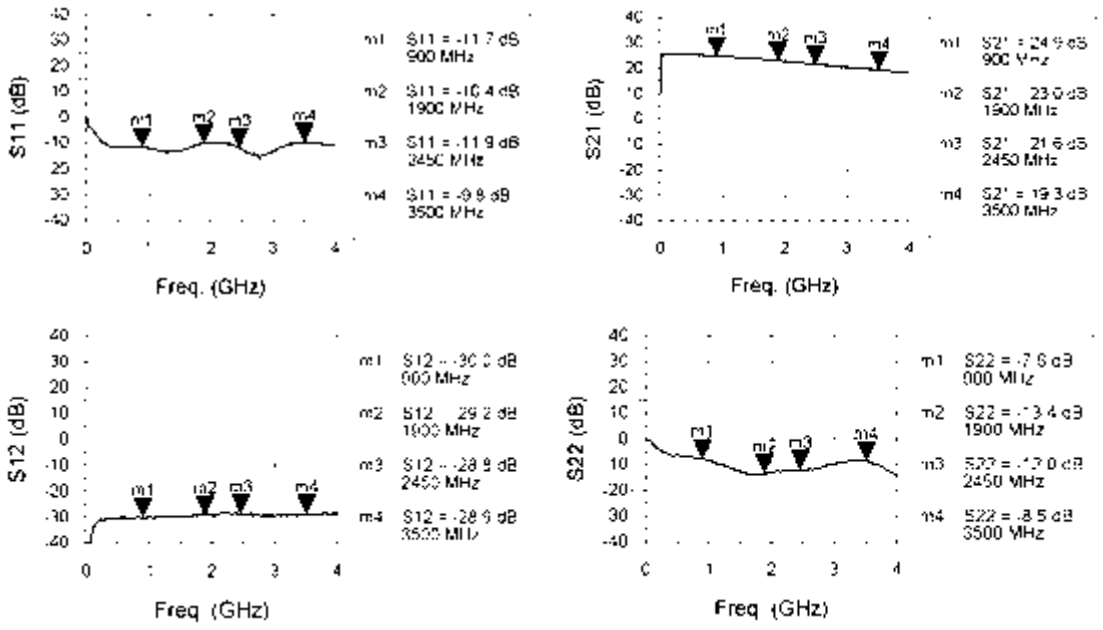
Schematic Diagram	BOM		Tolerance
	C1	100pF	±5%
	C2	100pF	±5%
	C3	100pF	±5%
	C4	1000pF	±5%
	C5	10uF	±20%
	L1*	39nH	5%

*Note:

1. Chip is mounted on the PF083 open PKG, and bonded with 2-wires at both input and output.
2. Less than 20nH improves RF performance at frequencies over 1.9GHz.
3. 40nH or higher value L1 improves RF performance at frequencies under 500MHz.
4. Optimum value of L1 may vary with board design.

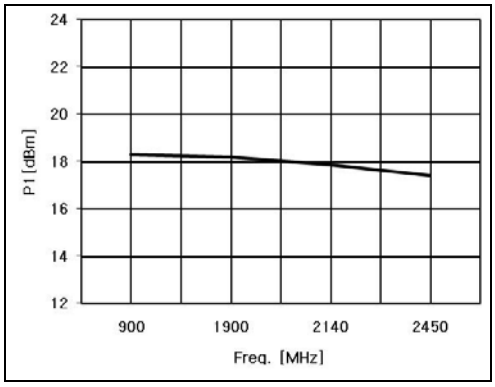
Typical Device Data

S-parameters (Vc=5V, Ic=65mA, T=25°C)

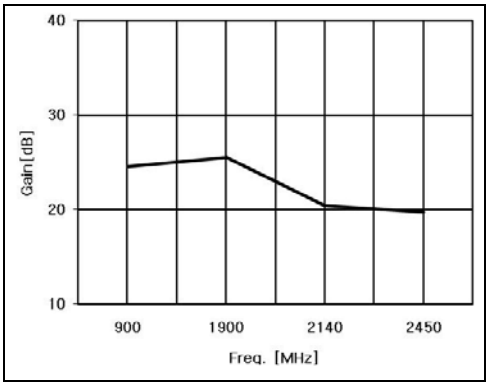


Device Performance

P1dB-Gain

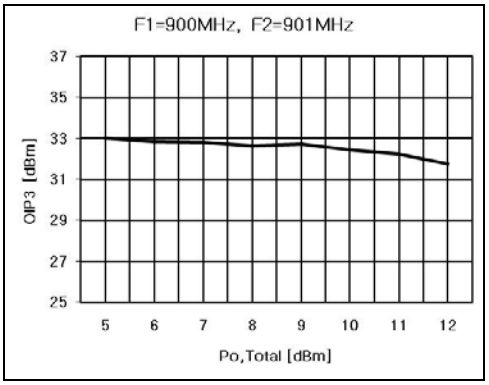


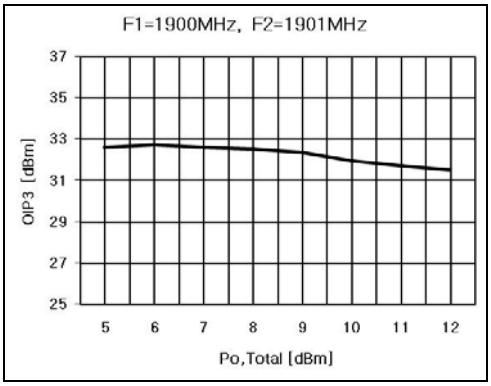
P1

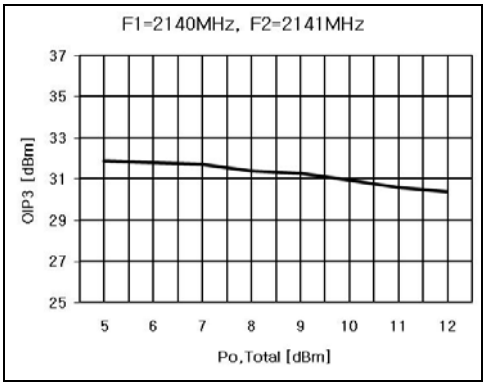


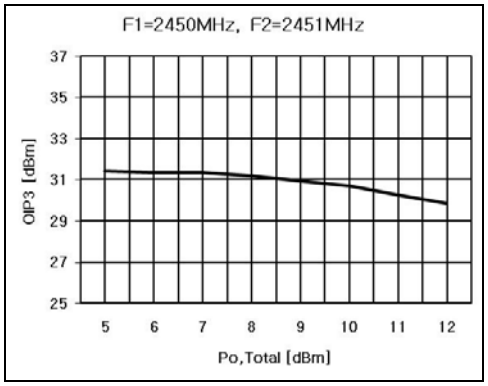
Gain

OIP3

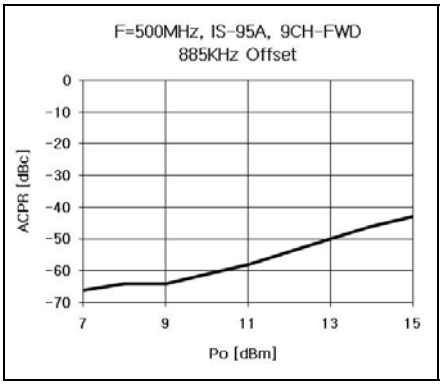


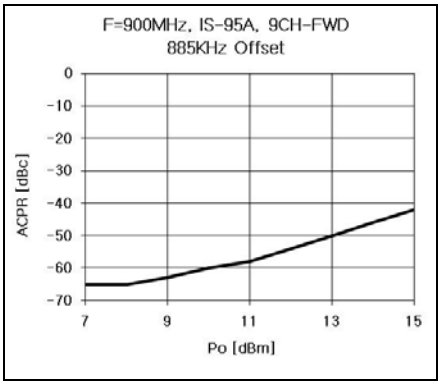


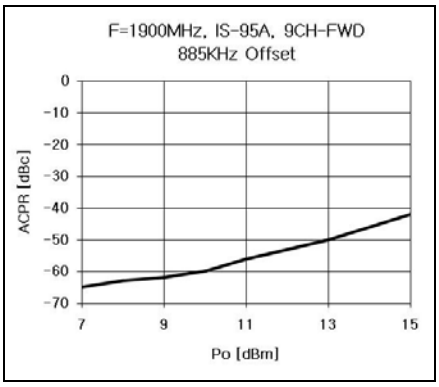


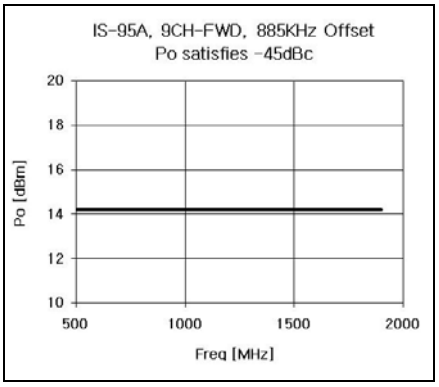


ACPR









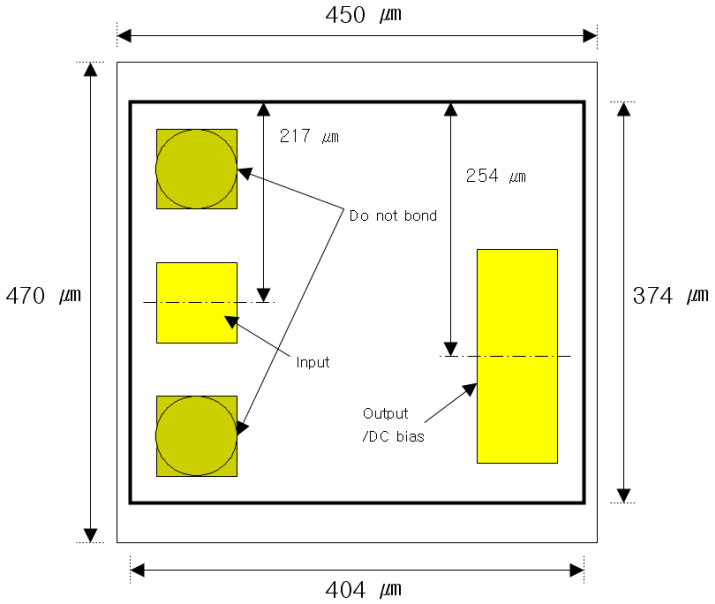
S-Parameter

(Vdevice = 5.0V, Icc = 69mA, T = 25 °C, calibrated to device leads)

Freq [MHz]	S11 [dB]	S11 [Ang]	S21 [dB]	S21 [Ang]	S12 [dB]	S12 [Ang]	S22 [dB]	S22 [Ang]
100	-4.678	-25.54	25.672	176.84	-35.909	77.16	-1.418	173.59
500	-11.610	-16.90	25.427	159.35	-30.250	-25.07	-6.267	29.56
1000	-12.057	-12.98	24.828	141.93	-29.445	50.31	-8.236	-7.08
1500	-13.053	16.38	23.968	124.40	-30.025	-114.05	-12.494	-26.17
2000	-9.849	17.27	22.767	109.52	-29.185	-159.59	-12.806	-17.49
2500	-12.146	-27.86	21.639	96.24	-28.649	158.92	-11.873	-64.24
3000	-13.490	-123.12	20.413	84.08	-29.741	116.90	-9.756	-130.88
3500	-9.805	-167.89	19.346	73.06	-28.948	77.73	-8.579	-170.03
4000	-11.035	-160.29	18.256	63.61	-24.947	32.85	-14.089	-165.34

* Note : S-parameter includes 1 mil thick and 16-mil long Au wire

Die Outline



NOTES:

1) DIE THICKNESS 100um

2) BONDPAD METAL THICKNESS 2.8um

3) BACKSIDE METAL Au, 5um

4) DEVICE IS GROUNDED THROUGH VIA HOLES

ESD Rating

ESD Rating:	Class 1C
Value:	**Passes <2000V**
Test:	Human Body Model (HBM)
Standard:	JEDEC Standard JESD22-A114B

NATO CAGE code:

2	**N**	**9**	**6**	**F**

NOTICE

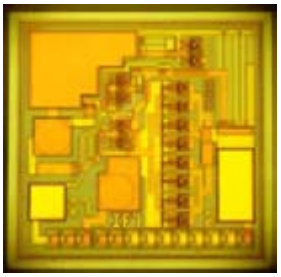
BeRex Corporation reserves the right to make changes of product specification or to discontinue product at any time without notice.

Proper ESD procedures should be followed when handling this device.

50-800 MHz Internally Matched IF Amplifier

Device Features

- 40 dBm Output IP3 at 70MHz, 14dBm/tone
- 27.0 dB Gain at 70MHz
- 21.0 dBm P1dB at 70 MHz
- Highly Reliable InGaP/GaAs HBT Technology
- Patented over voltage protection circuit
- Application: commercial wireless system



Target Device Performance (T_a = 25°C)

Symbols	Parameters Test Conditions	Min	Typ	Max	Unit
Gain	70MHz 140MHz 250MHz 500MHz	26.0 25.8 25. 24.9	27.0 26.8 26.7 25.9		dB
S11	70MHz 140MHz 250MHz 500MHz		-30.8 -32.4 -29.4 -27.8		dB
S22	70MHz 140MHz 250MHz 500MHz		-12.5 -12.5 -11.6 -8.6		dB
OIP3	70MHz 140MHz 250MHz 500MHz	39.2 38.5 41.6 39.4	41.2 40.8 43.6 41.4		dBm
P1dB	70MHz 140MHz 250MHz 500MHz	20.3 20.8 20.7 19.2	21.3 21.8 21.7 20.2		dBm
Ic	Vc = 5.0V	85	95	105	mA
Vc			5.0		V
dG/dT			-0.003		°C
Rth	Thermal Resistance		50		°C/W

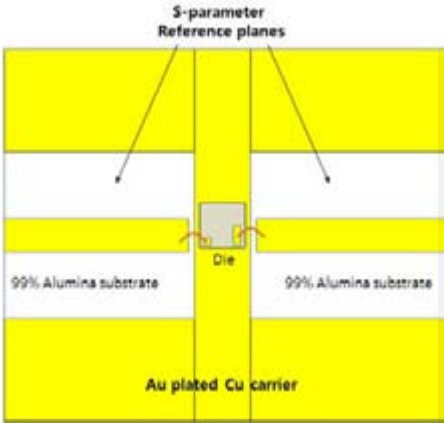
Test conditions unless otherwise noted.

1. Device performance is measured on BeRex evaluation board at 25°C, 50 ohm system.
2. OIP3 is measured on an eval-board with two tones separated by 1 MHz.

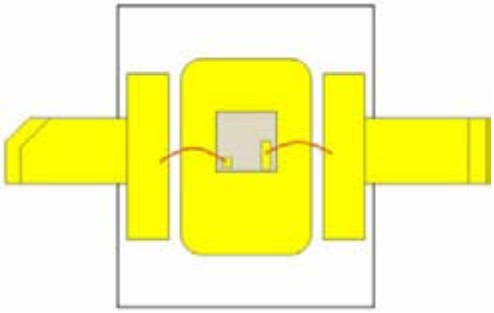
Absolute Maximum Ratings

Parameter	Rating
Operating Case temperature	-40 to +85°C
Storage Temperature	-40 to +155°C
Supply Voltage	6.0V
Max. Device Current	160mA
Input RF Power	23dBm

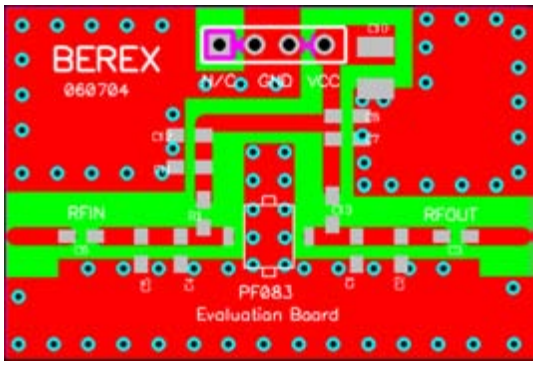
Operation of this device above any of these parameters may result in permanent damage.



S-parameter test circuit

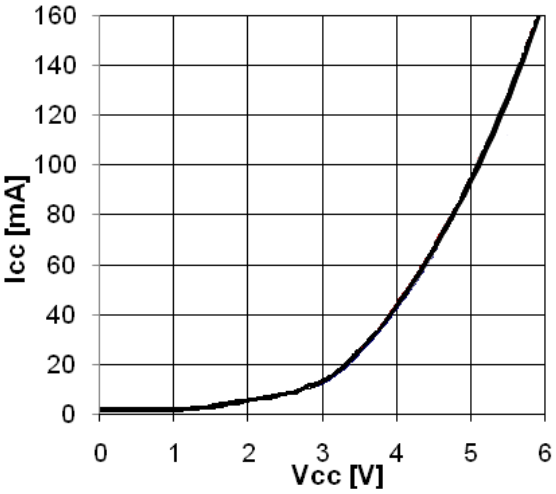


Chip attachment on PF083



31mil thick FR4 PCB

Generic PF083 Evaluation Board

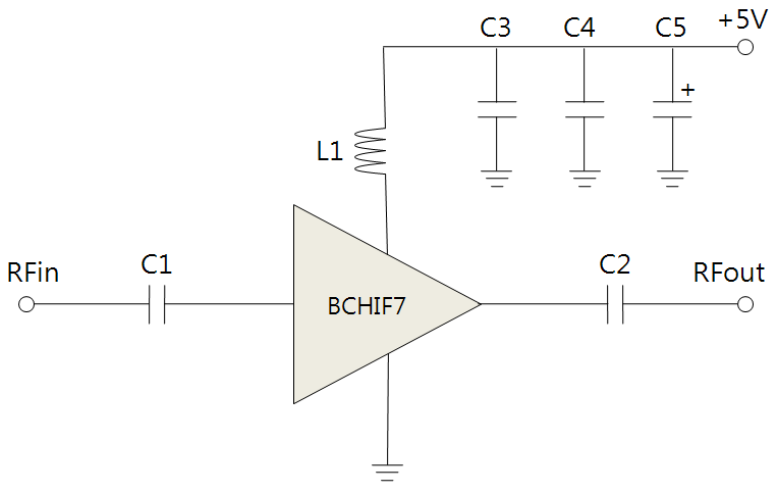


I-V Characteristics

Application Circuit: 50-800 MHz

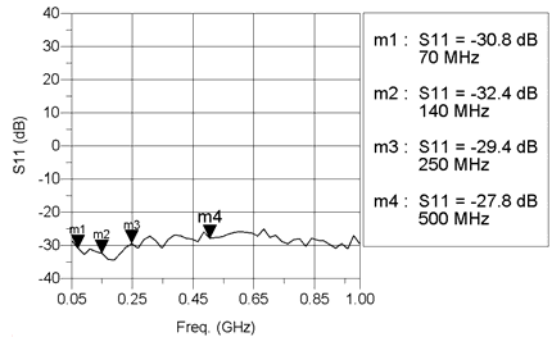
Typical Performance (Vdevice = 5V, Ic = 95 mA, Ta = 25°C)

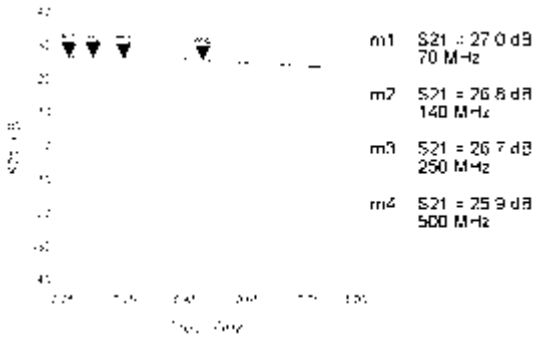
Freq	MHz	70	140	250	500
S21	dB	27.0	26.8	26.7	25.9
S11	dB	-30.8	-32.4	-29.4	-27.8
S22	dB	-12.5	-12.5	-11.6	-8.64
P1	dBm	21.3	21.8	21.7	20.2
OIP3	dBm	41.2	40.8	43.6	41.4

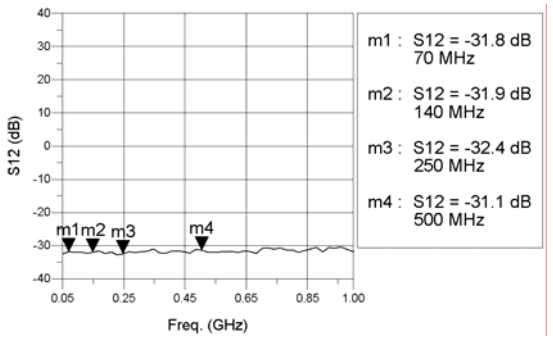
Schematic Diagram	BOM		Tolerance
	C1	100nF *100pF	± 5%
	C2	100nF *100pF	± 5%
	C3	100pF	± 5%
	C4	1000pF	± 5%
	C5	10uF	± 20%
	L1	1uH *12nH	±5%
*Application for RF Bandwidth			

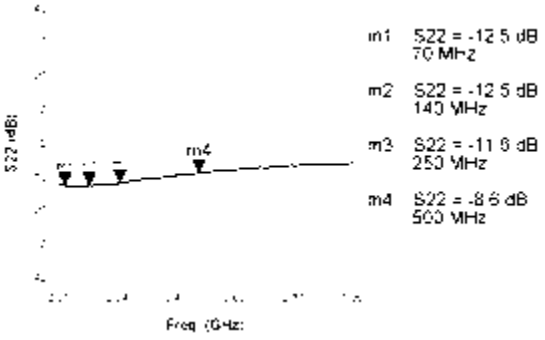
Typical Device Data

S-parameters (Vc=5V, Ic=95mA, T=25°C)



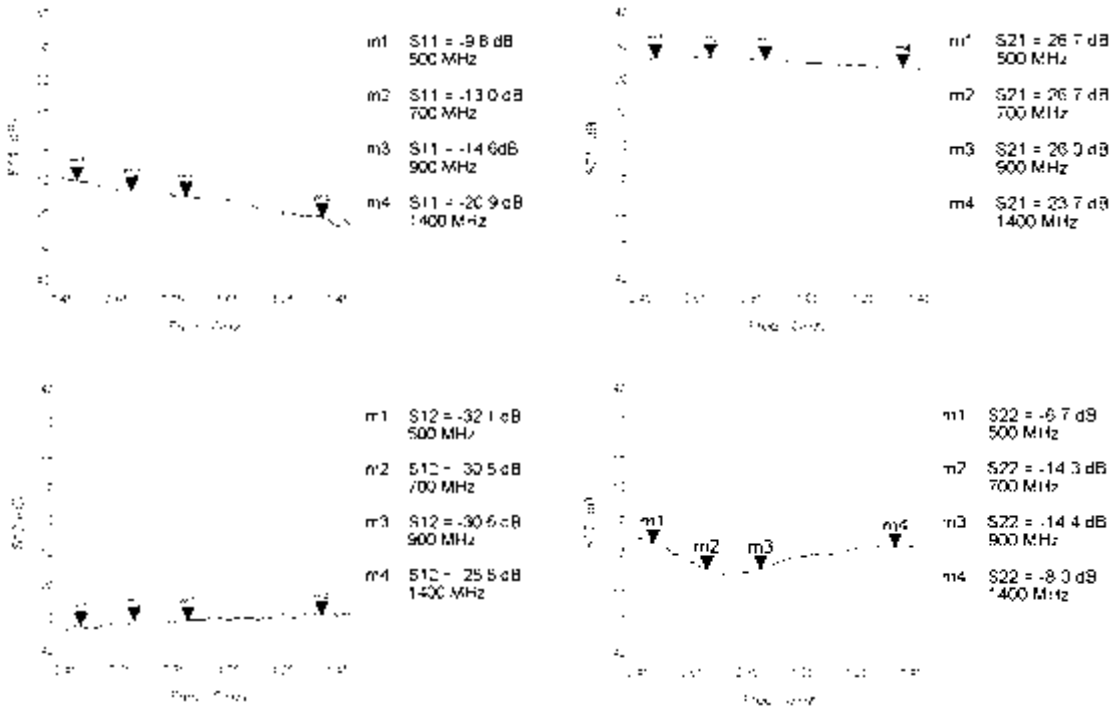






IF Bandwidth Application

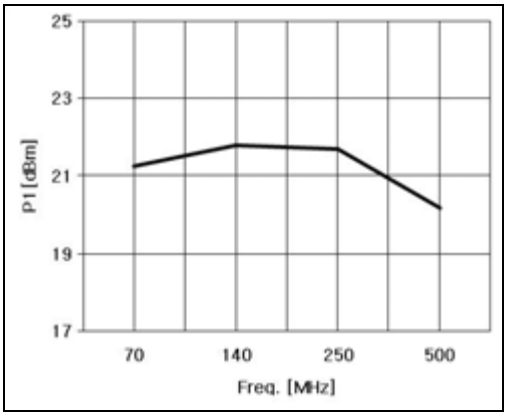
S-parameters (Vc=5V, Ic=95mA, T=25°C)



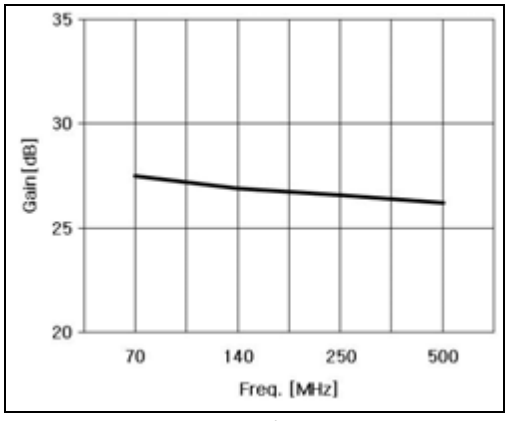
RF Bandwidth Application

Device Performance

P1dB-Gain

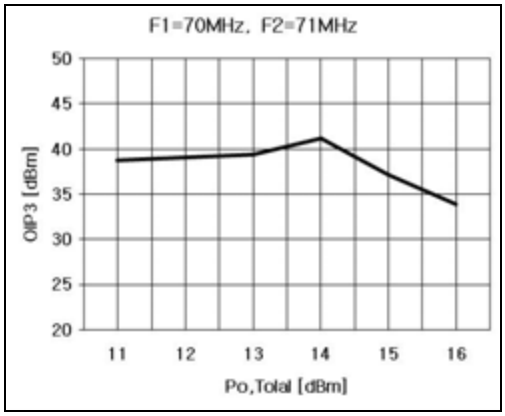


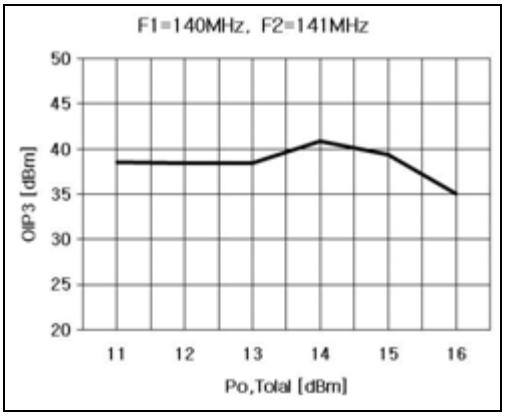
P1

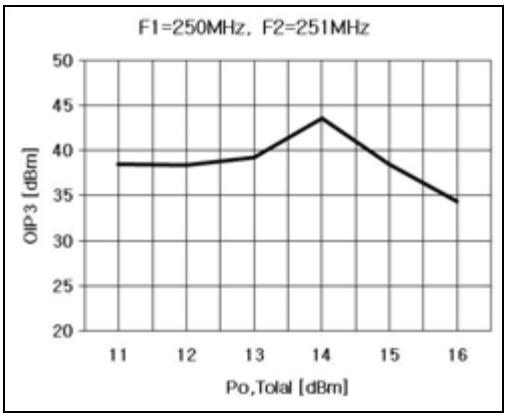


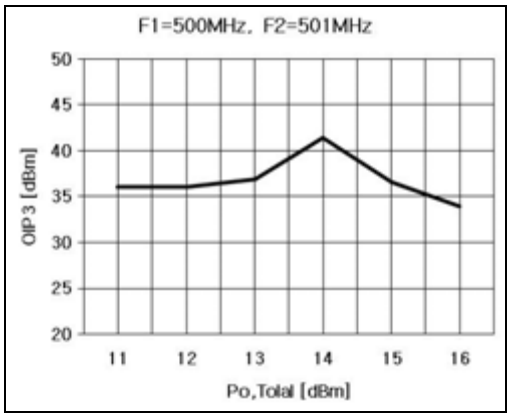
Gain

OIP3









S-Parameter

IF Bandwidth Application (Vc=5V, Ic=95mA, T=25°C)

Freq [MHz]	S11 [dB]	S11 [Ang]	S21 [dB]	S21 [Ang]	S12 [dB]	S12 [Ang]	S22 [dB]	S22 [Ang]
50	-28.586	-106.642	27.021	176.006	-32.384	2.863	-12.028	22.476
150	-32.368	153.226	26.801	156.233	-31.914	-7.256	-12.467	-21.072
250	-29.436	103.952	26.672	135.931	-32.394	-13.069	-11.622	-41.718
350	-30.806	74.122	26.319	119.315	-30.952	-23.766	-10.324	-58.0256
450	-28025	57.612	26.102	102.363	-31.721	-36.896	-9.144	-72.792
550	-27.358	39.511	25.497	850.096	-31.882	-41.929	-8.246	-.58.005
650	-26.156	34.536	25.184	69.233	-31.562	-51.528	-7.420	-94.494
750	-28.741	16.783	24.699	56.366	-30.987	-55.955	-6.775	102.541
850	-28.388	26.499	23.915	36.370	-30.922	-65.779	-6.329	-113.462

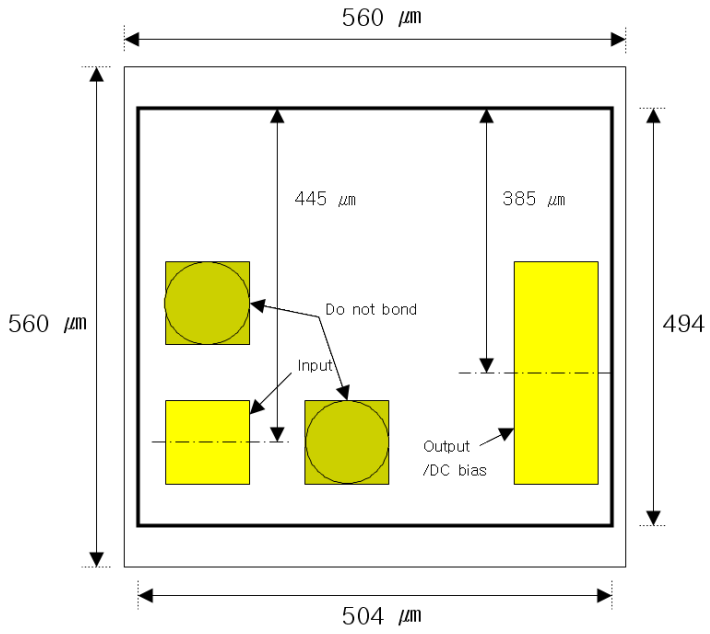
* Note : S-parameter includes 1 mil thick and 16-mil long Au wire

RF Bandwidth Application (Vc=5V, Ic=95mA, T=25°C)

Freq [MHz]	S11 [dB]	S11 [Ang]	S21 [dB]	S21 [Ang]	S12 [dB]	S12 [Ang]	S22 [dB]	S22 [Ang]
500	-9.933	-62.036	26.655	140.862	-32.054	5.690	-6.741	95.975
600	-11.592	-69.083	27.012	114.561	-30.891	-10.142	-10.421	66.190
700	-12.970	-75.467	26.862	90.690	-30.452	-21.447	-14.326	28.112
800	-13.821	-81.199	26.486	70.988	-31.196	-39.664	-16.186	-31.310
900	-14.577	-89.643	26.003	51.737	-30.634	-47.501	-14.438	-74.036
1000	-15.849	-105.713	25.350	31.493	-29.676	-65.002	-11.274	-101.616
1100	-16.947	-116.273	25.174	17.566	-29.279	-73.650	-9.931	-115.456
1200	-18.847	-127.822	24.486	3.151	-29.542	-89.241	-8.173	-139.546
1300	-19.853	-145.186	23.909	-13.503	-29.542	-89.241	-8.173	-139.546
1400	-20.891	-168.828	23.719	-27.530	-28.848	-96.767	-7.982	-149.506
1500	-22.903	162.772	23.175	-42.466	-28.517	-107.766	-7.466	-156.464

* Note : S-parameter includes 1 mil thick and 16-mil long Au wire

Die Outline



NOTES:

1) DIE THICKNESS 100um

2) BONDPAD METAL THICKNESS 2.8um

3) BACKSIDE METAL Au, 5um

4) DEVICE IS GROUNDED THROUGH VIA HOLES

ESD Rating

ESD Rating	Class 1C
Value	Passes <2000V
Test	Human Body Model (HBM)
Standard	JEDEC Standard JESD22-A114B

NATO CAGE code:

2	**N**	**9**	**6**	**F**

NOTICE

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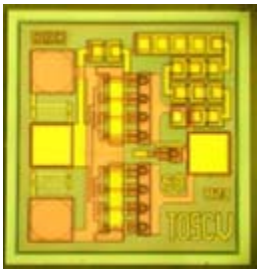
Proper ESD procedures should be followed when handling this device.

5-4000 MHz Wideband Drive Amplifier

Device Features

- 43.5 dBm Output IP3 at 9dBm/tone
- 22 dB Gain at 900MHz
- 24 dBm P1dB at 2450 MHz
- Highly Reliable InGaP/GaAs HBT Technology
- Application: commercial wireless system



Target Device Performance (T_a = 25°C)

Symbols	Parameters Test Conditions	Min	Typ	Max	Unit
Gain	900MHz 1900MHz 2450MHz	20.7 16.6 14.3	21.7 17.6 15.3	22.7 18.6 16.3	dB
S11	900MHz 1900MHz 2450MHz		-18.6 -15.3 -17.2		dB
S22	900MHz 1900MHz 2450MHz		-15.1 -39.7 -15.3		dB
OIP3	900MHz 1900MHz 2450MHz	41.6 41.3 39.7	43.6 42.3 40.7		dBm
P1dB	900MHz 1900MHz 2450MHz	23.0 22.8 23.2	24.0 23.8 24.2		dBm
IS-95 CH Power @-45dBc ACPR	900MHz 1900MHz 2450MHz		16.0 16.0 16.5		dBm
NF	900MHz 1900MHz 2450MHz		4.4 4.2 4.3		dB
Ic	Vc = 5.0V	77	87	97	mA
Vc			5.0		V
Rth	Thermal Resistance		50		°C/W

Test conditions unless otherwise noted.

1. Device performance is measured on BeRex evaluation board at 25C, 50 ohm system
2. OIP3 is measured on an eval-board with two tones separated by 1 MHz.

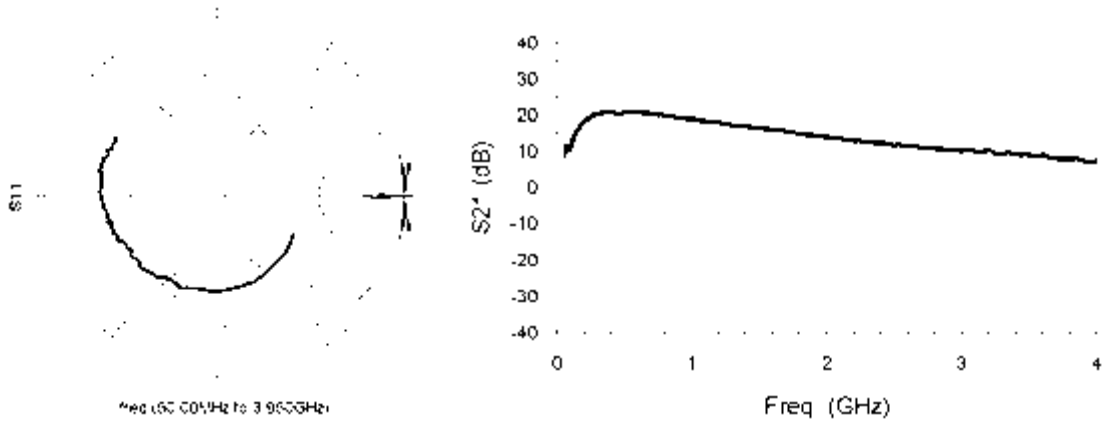
Absolute Maximum Ratings

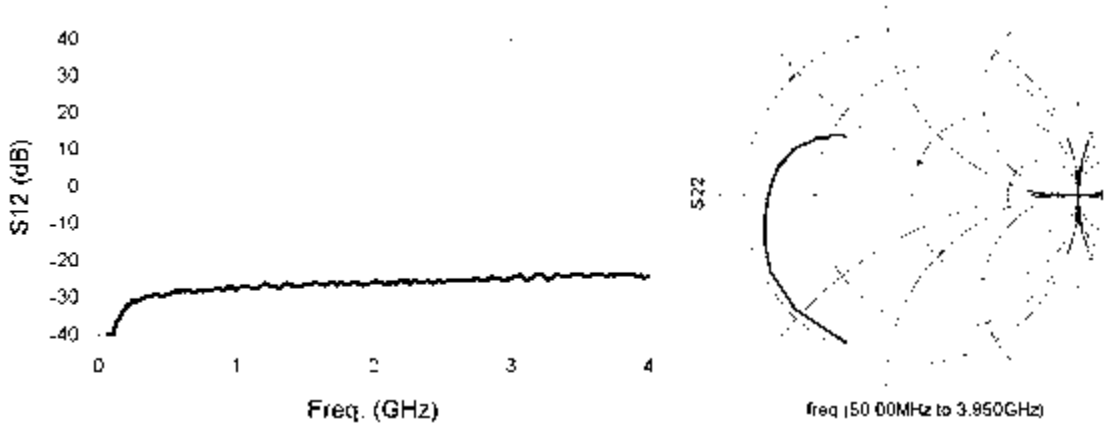
Parameter	Rating
Operating Case temperature	-40 to +85°C
Storage Temperature	-55 to +155°C
Supply Voltage	6.5V
Max. Device Current	180mA
Input RF Power	23dBm

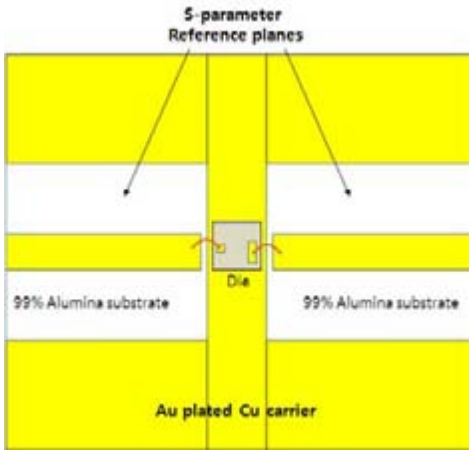
Operation of this device above any of these parameters may result in permanent damage.

Typical Device Data

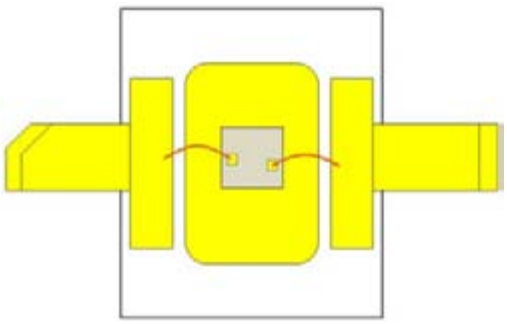
S-parameters (Vc=5V, Ic=87mA, T=25°C)



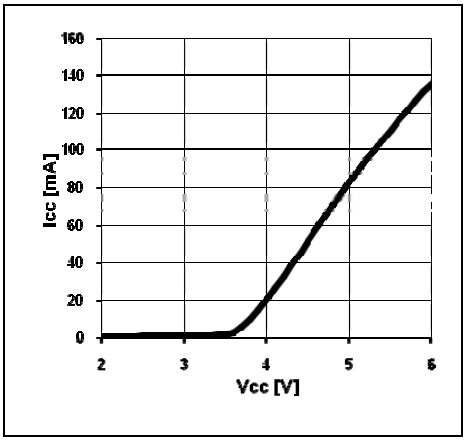




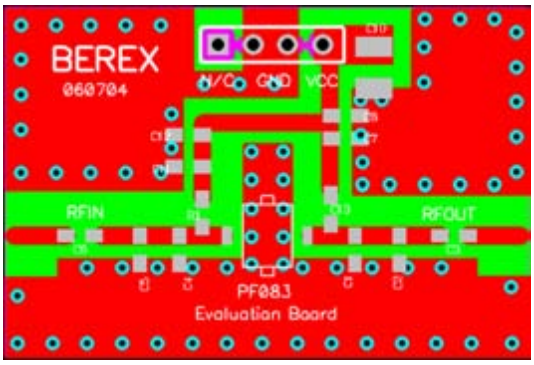
S-parameter test circuit



Chip attachment on PF083



I-V characteristics



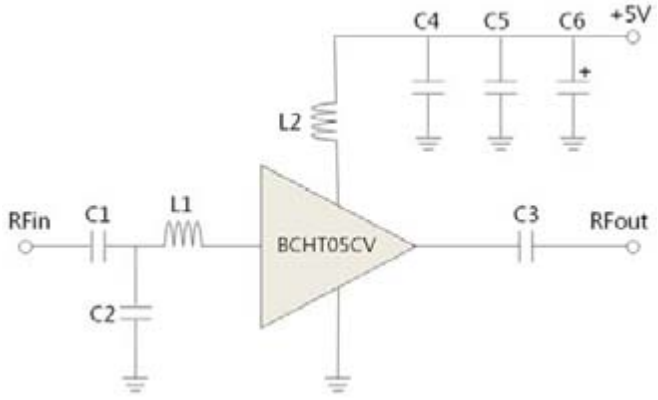
Generic PF083 Evaluation Board
(31mil thick FR4)

S-Parameter
(5V/87mA)

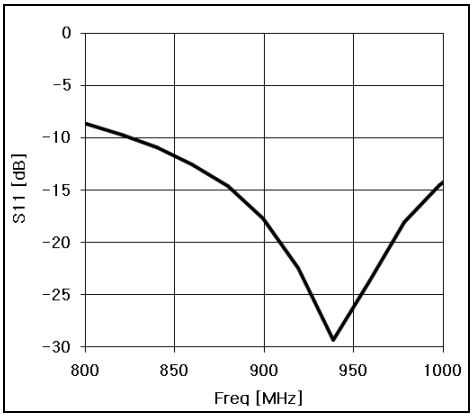
Freq [MHz]	S11 [Mag]	S11 [Ang]	S12 [Mag]	S12 [Ang]	S21 [Mag]	S21 [Ang]	S22 [Mag]	S22 [Ang]
100	0.465	-48.427	0.010	85.919	3.827	-99.799	0.929	-153.159
500	0.645	-128.468	0.034	7.967	9.952	141.528	0.602	144.177
1000	0.690	-171.254	0.045	-48.963	8.810	48.139	0.315	148.430
1500	0.748	159.059	0.051	-102.372	6.588	-24.785	0.376	144.485
2000	0.778	141.185	0.053	-144.526	4.794	-81.488	0.455	138.017
2500	0.748	138.006	0.055	172.951	3.889	-135.293	0.418	142.841
3000	0.841	142.443	0.059	130.929	3.046	176.260	0.541	154.681
3500	0.934	139.011	0.056	84.638	2.464	127.419	0.638	149.921
4000	0.899	132.888	0.067	40.623	2.301	75.436	0.591	143.868

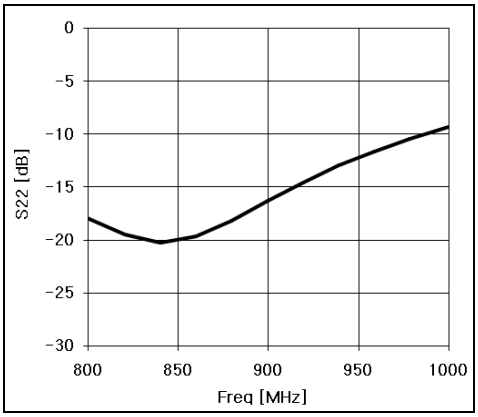
* Note : S-parameter includes 1 mil thick and 16-mil long Au wire

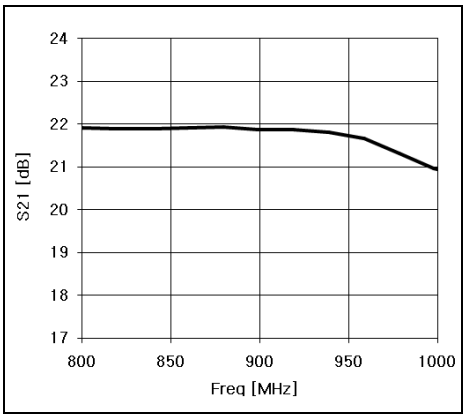
Application Circuit: 900 MHz

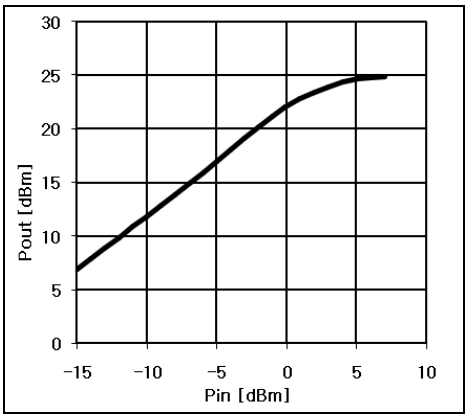
Schematic Diagram	BOM		Tolerance
	C1	100pF	± 5%
	C2	6.8pF	±5%
	C3	100pF	± 5%
	C4	100pF	± 5%
	C5	1000pF	± 10%
	C6	10uF	±10%
	L1	2nH	±5%
	L2	12nH	± 5%

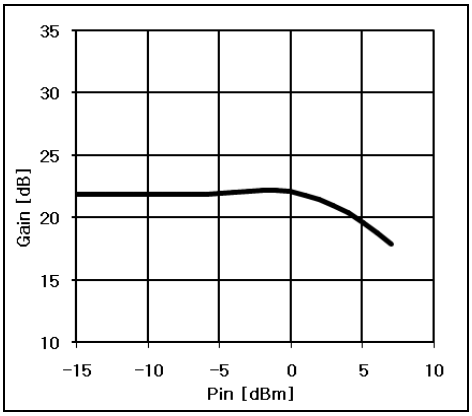
Typical Performance

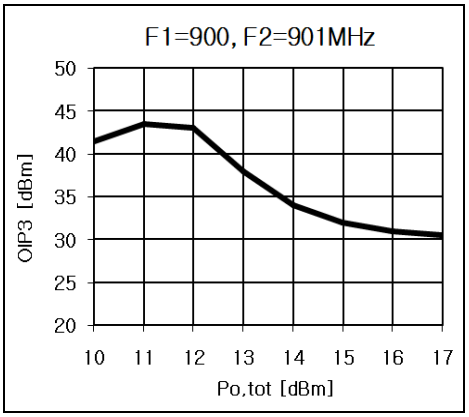




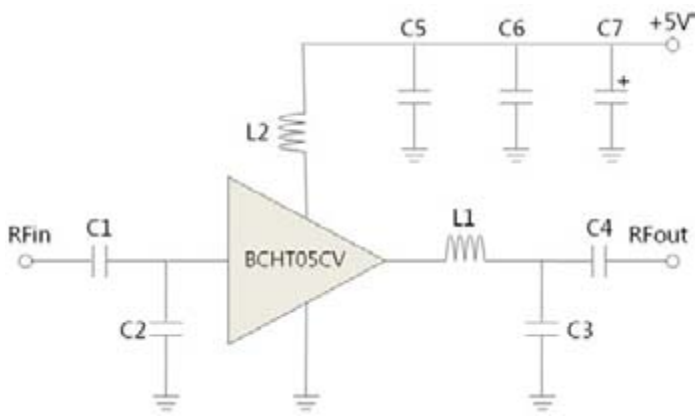




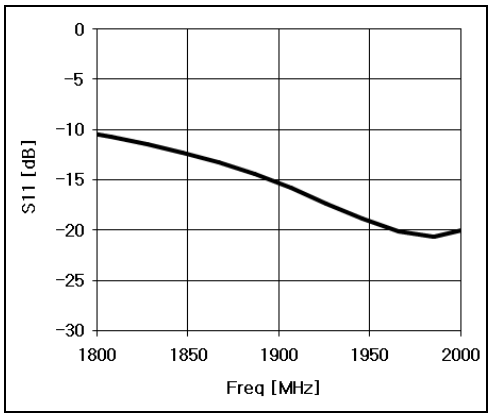


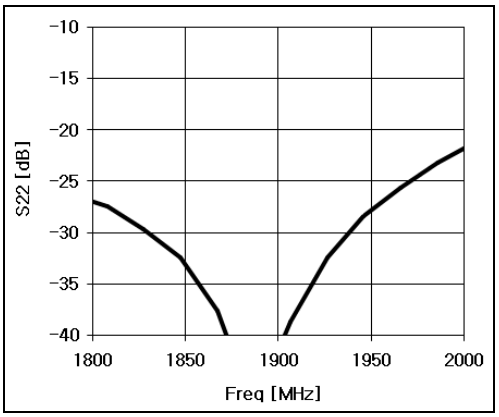


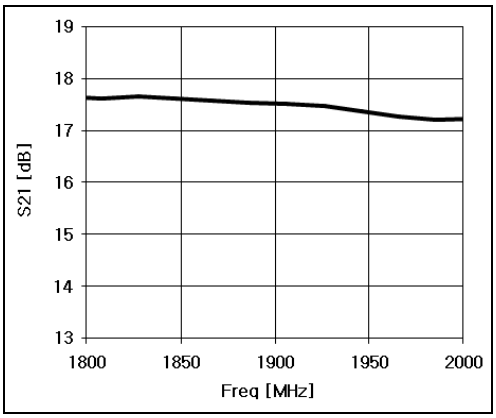
Application Circuit: 1900 MHz

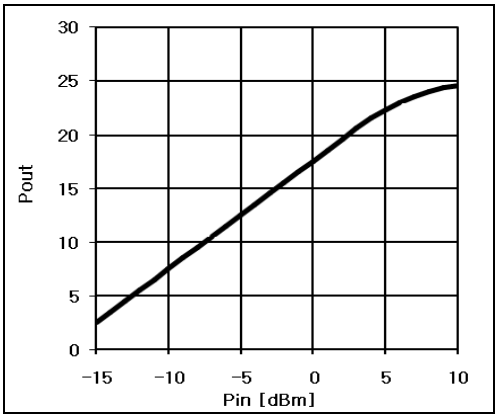
Schematic Diagram	BOM		Tolerance
	C1	100pF	± 5%
	C2	2pF	±5%
	C3	1.2pF	±5%
	C4	100pF	± 5%
	C5	100pF	± 5%
	C6	1000pF	± 10%
	C7	10uF	±10%
	L1	1.8nH	±5%
	L2	6.8nH	± 5%

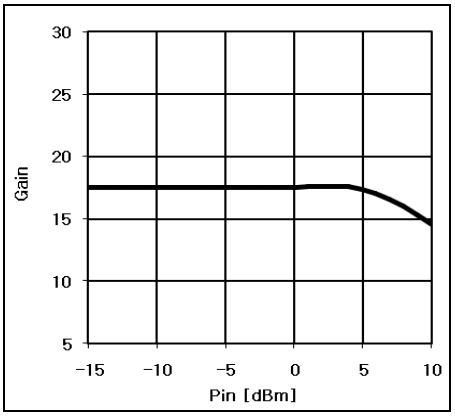
Typical Performance

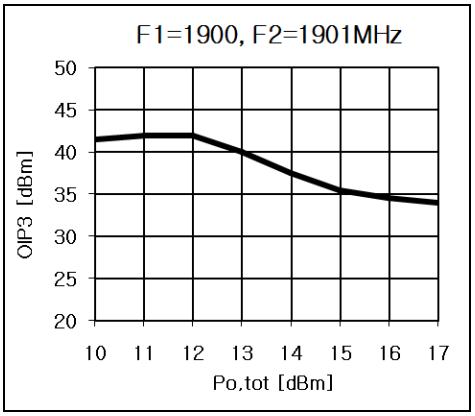




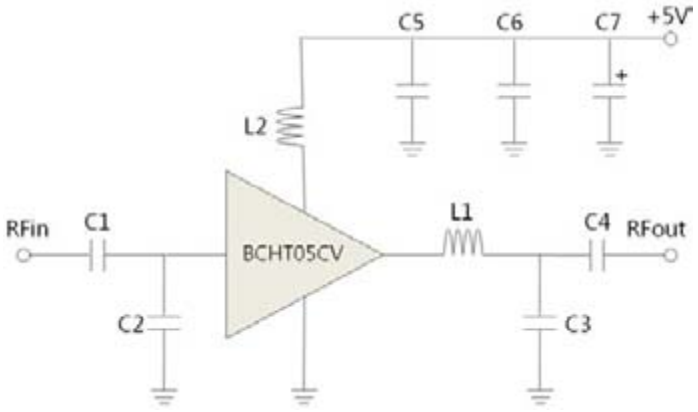




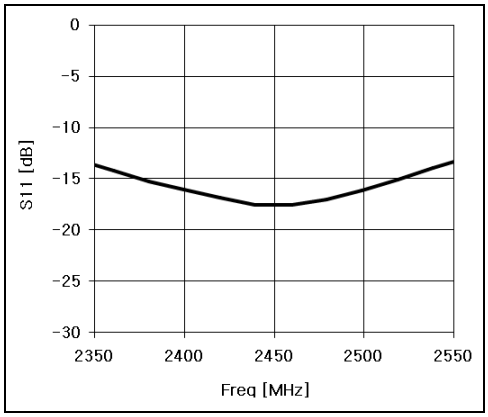


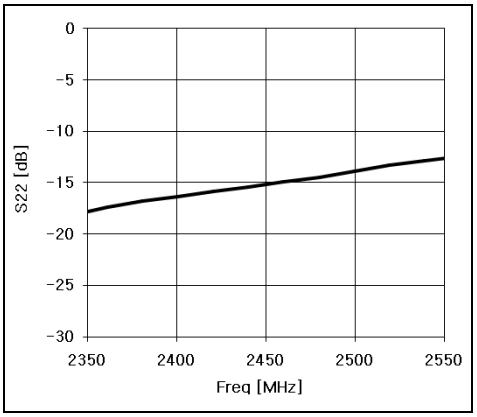


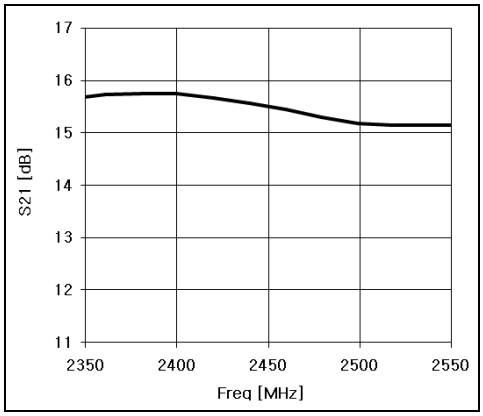
Application Circuit: 2450MHz

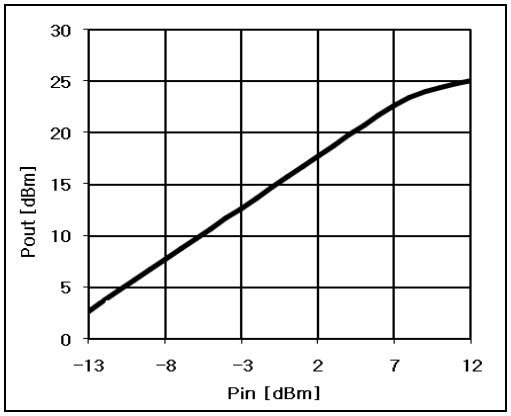
Schematic Diagram	BOM		Tolerance
	C1	1.5pF	±5%
	C2	1.8pF	±5%
	C3	0.8pF	±5%
	C4	100pF	± 5%
	C5	100pF	± 5%
	C6	1000pF	± 10%
	C7	10uF	± 10%
	L1	1nH	±5%
	L2	6.8nH	±5%

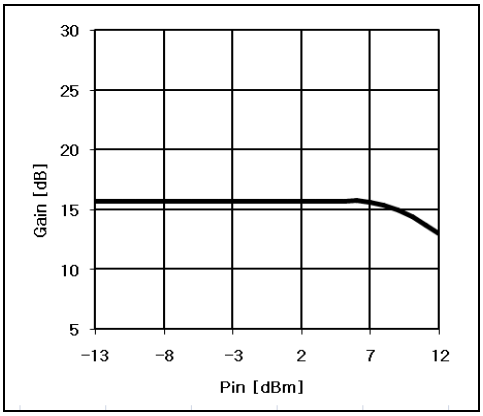
Typical Performance

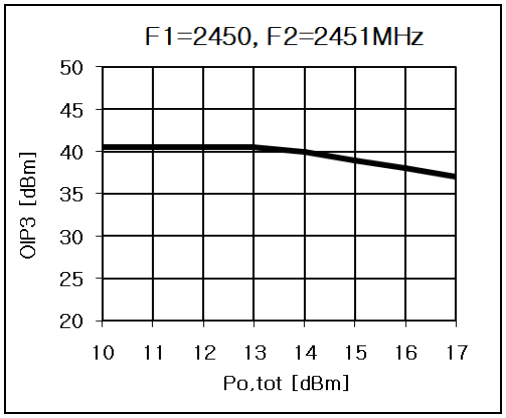




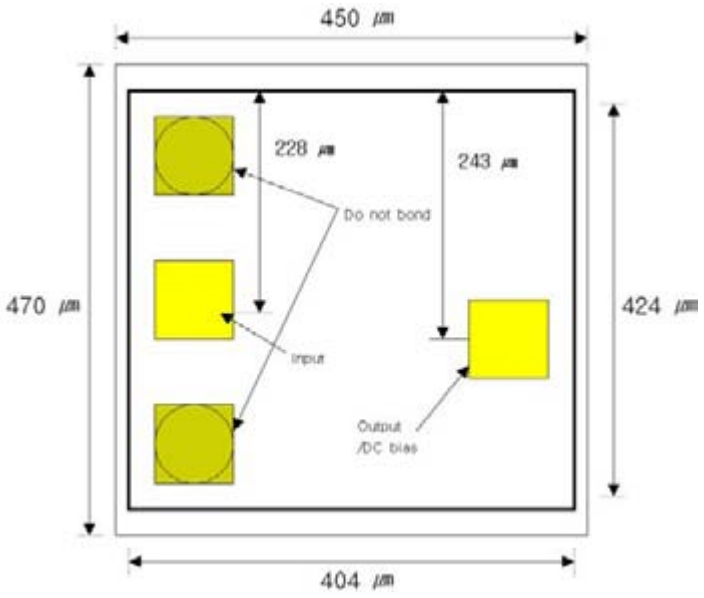








Die Outline



NOTES:

1) DIE THICKNESS 100um

2) BONDPAD METAL THICKNESS 2.8um

3) BACKSIDE METAL Au, 5um

4) DEVICE IS GROUNDED THROUGH VIA HOLES

ESD Rating

ESD Rating	Class 1B
Value	Passes <1000V
Test	Human Body Model (HBM)
Standard	JEDEC Standard JESD22-A114B

NATO CAGE code:

2	**N**	**9**	**6**	**F**

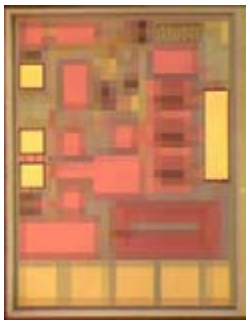
NOTICE

BeRex Corporation reserves the right to make changes of product specification or to discontinue product at any time without notice.

Proper ESD procedures should be followed when handling this device.

1500-4000 MHz Medium Power Amplifier

Device Features



- 45.0 dBm Output IP3 at 13dBm/tone
- 15.0 dB Gain at 1900MHz
- 27.5 dBm P1dB at 1900 MHz
- Patented Over Voltage Protection Circuit
- Application: commercial

Target Device Performance (T_a = 25°C)

Symbols	Parameters Test Conditions	Min	Typ	Max	Unit
Gain	1900MHz 2140MHz 2400MHz 3500MHz	14.0 13.0 12.2 9.7	15.1 14.0 13.3 10.7		dB
S11	1900MHz 2140MHz 2400MHz 3500MHz		-17.3 -12.0 -12.8 -25.3		dB
S22	1900MHz 2140MHz 2400MHz 3500MHz		-12.8 -12.0 -12.9 -25.3		dB
OIP3	1900MHz 2140MHz 2400MHz 3500MHz	42 42 40 37	45.0 45.2 43.1 40.2		dBm
P1dB	1900MHz 2140MHz 2400MHz 3500MHz	26.5 26.2 26.0 25.0	27.5 27.1 27.2 25.9		dBm
NF	1900MHz 2140MHz 2400MHz 3500MHz		6.8		dB
Ic	Vc = 5.0V	118	138	158	mA
Vc			5.0		V
Rth	Thermal Resistance		50		°C/W

Test conditions unless otherwise noted.

1. T = 25°C, Vdevice = 5.0V, 50 ohm system.
2. OIP3 is measured on an eval-board with two tones separated by 1 MHz.

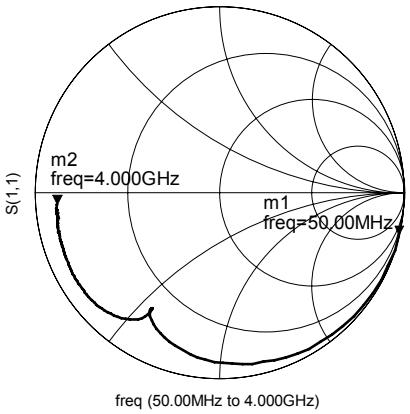
Absolute Maximum Ratings

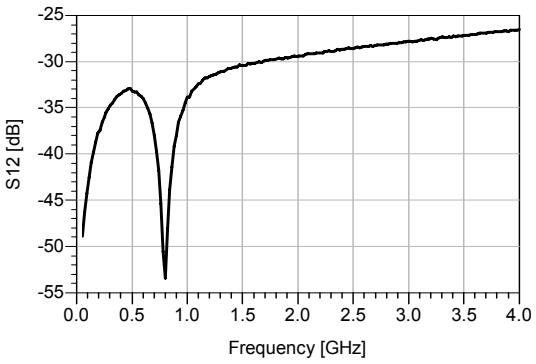
Parameter	Rating
Operating Case temperature	-40 to +85°C
Storage Temperature	-40 to +155°C
Junction Temperature	+250°C
Supply Voltage	7 V
Input RF Power	23dBm

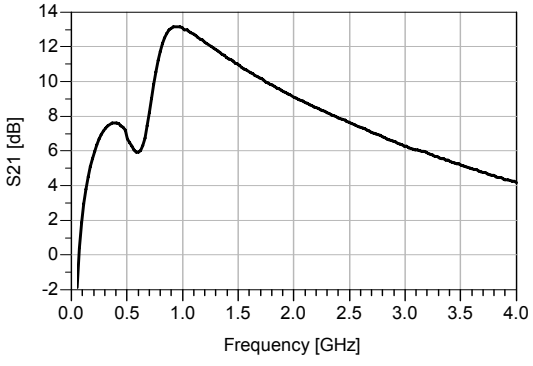
Operation of this device above any of these parameters may result in permanent damage.

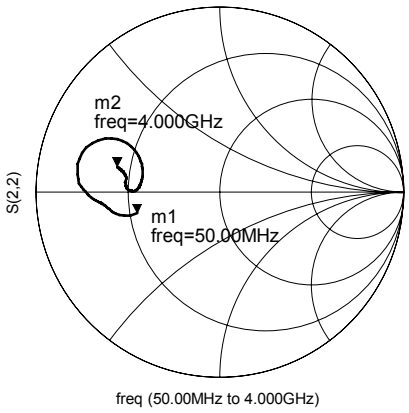
Typical Device Data

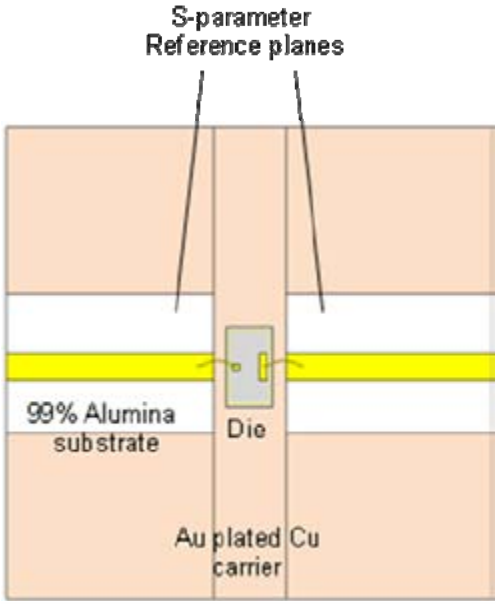
S-parameters (Vc=5V, Ic=138mA, T=25°C)





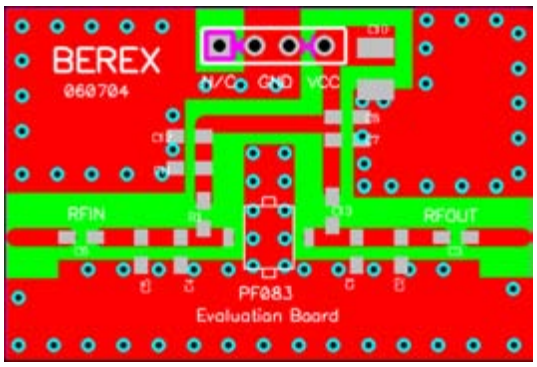






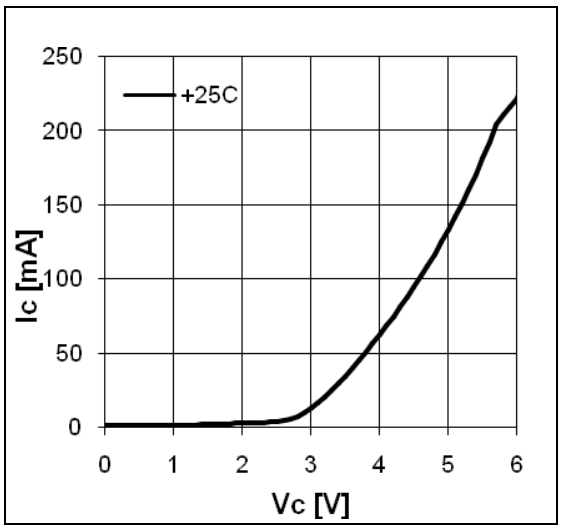
S-parameter test circuit

Generic PF083 Evaluation Board



PCB 31mil thick FR-4

I-V Characteristics



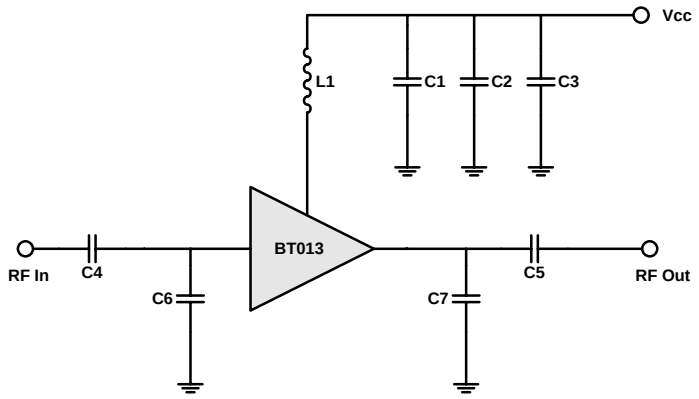
• Current drop in between 5~6V is due to patented protection circuit.

S-Parameter
(5V/135mA)

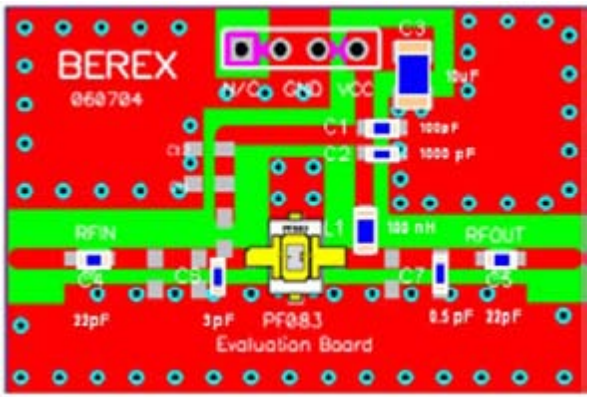
Freq [MHz]	S11 [Mag]	S11 [Ang]	S21 [Mag]	S21 [Ang]	S12 [Mag]	S12 [Ang]	S22 [Mag]	S22 [Ang]
100	-0.046	-30.149	2.219	-128.4	-41.958	66.107	-3.497	165.97
500	-0.952	-116.77	6.737	-174.18	-32.703	25.318	-3.457	162.64
1000	-1.111	-162.01	13.26	161.56	-32.513	76.255	-7.557	117.5
1500	-0.928	157.99	10.718	121.35	-30.171	46.516	-7.780	127.17
2000	-1.240	129.31	9.181	101.55	-28.599	42.527	-7.262	116.25
2500	-1.390	104.6	8.334	81.201	-26.76	37.808	-7.180	97.537
3000	-1.669	82.694	6.491	66.725	-26.706	32.623	-7.38	74.648
3500	-1.989	60.455	6.124	51.795	-25.792	26.141	-7.336	50.666
4000	-2.281	37.752	5.024	33.795	-24.653	20.698	-6.823	32.131

Application Circuit: 1900 MHz

Schematic Diagram



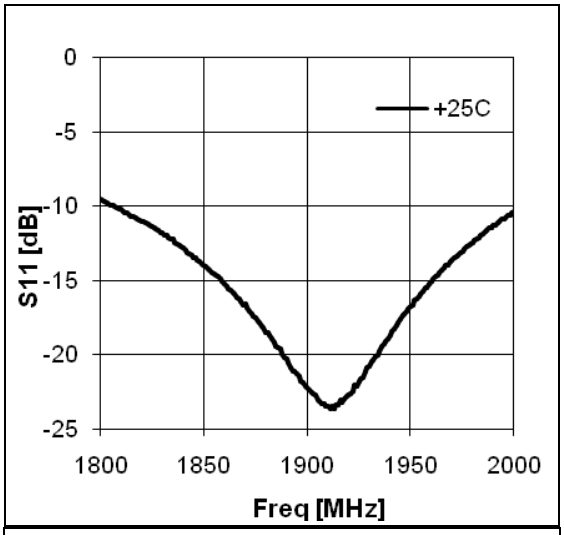
BOM		Tolerance
C1	100pF	±5%
C2	1000pF	±5%
C3	10uF	±15%
C4	22pF	±5%
C5	22pF	±5%
C6	3.0pF	±5%
C7	0.5pF	±5%
L1	100nH	±5%

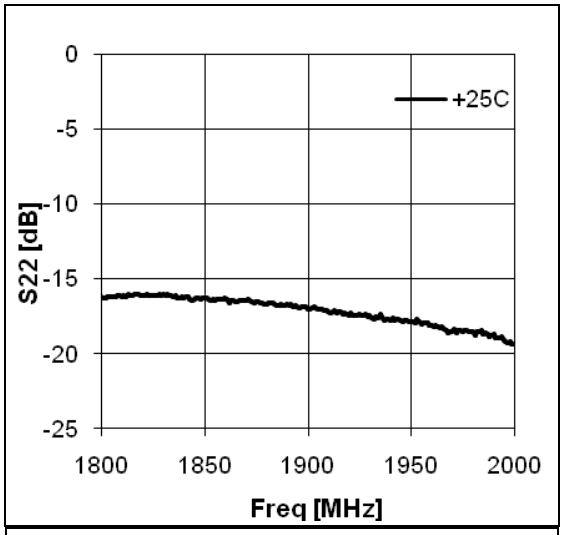


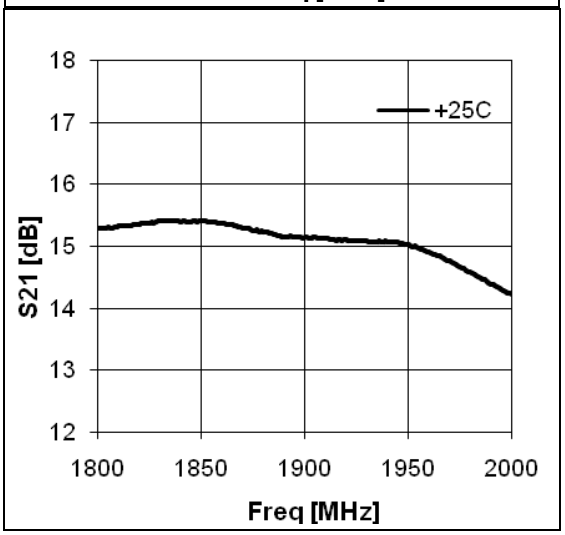
Note:

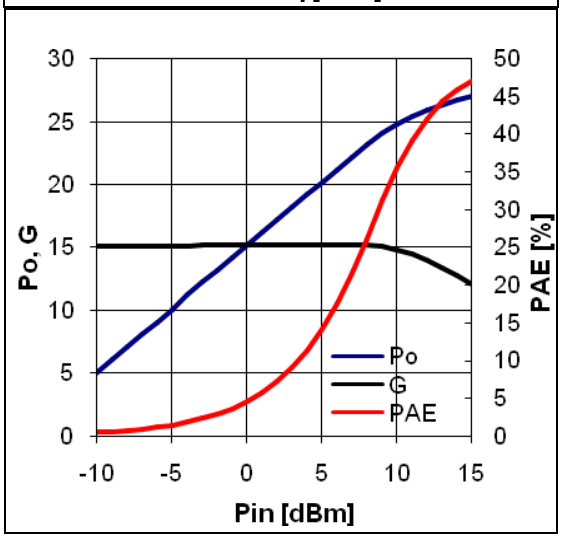
1. Chip is mounted on the PF083 open PKG, and bonded with 2-wires at both input and output.
2. PCB: 31mil thick FR4
3. Distance between the center of the shunt cap(C6) and the input pin of BT013 is 3.2mm
4. Distance between the center of the shunt cap(C7) and the output pin of BT03 is 8.3mm

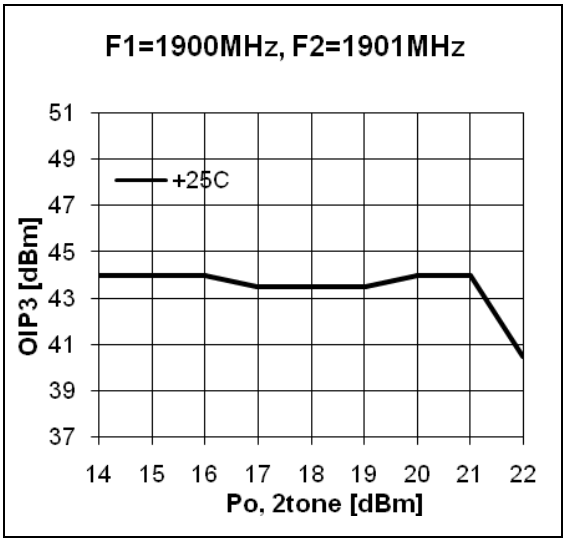
Typical Performance

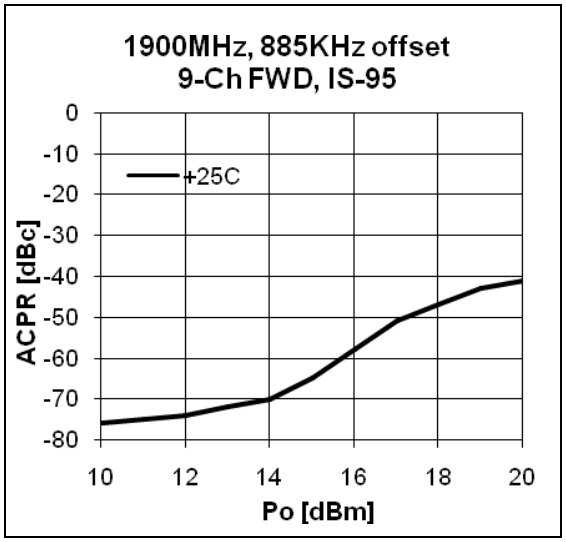






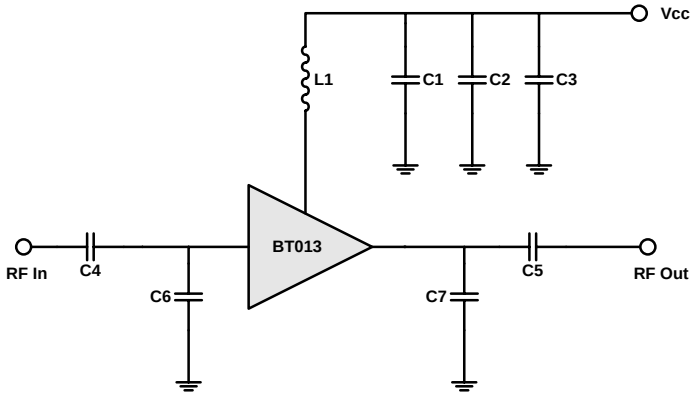




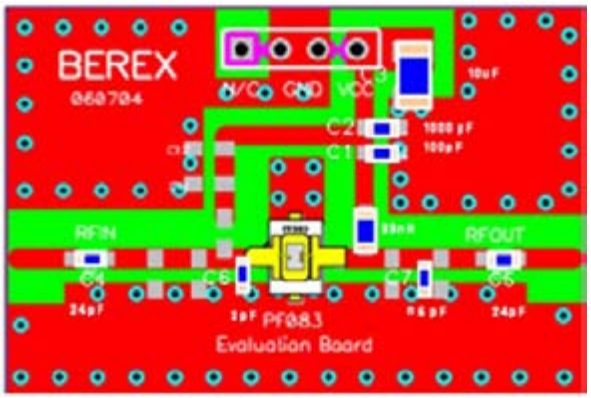


Application Circuit: 2100 MHz

Schematic Diagram



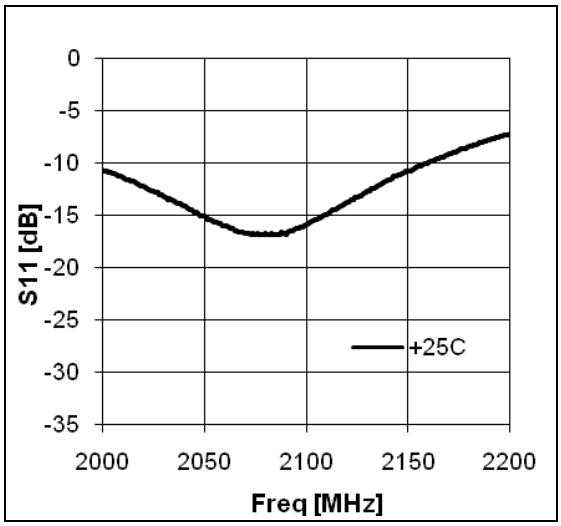
BOM		Tolerance
C1	100pF	±5%
C2	1000pF	±5%
C3	10uF	±15%
C4	24pF	±5%
C5	24pF	±5%
C6	3pF	±5%
C7	0.5pF	±5%
L1	33nH	±5%

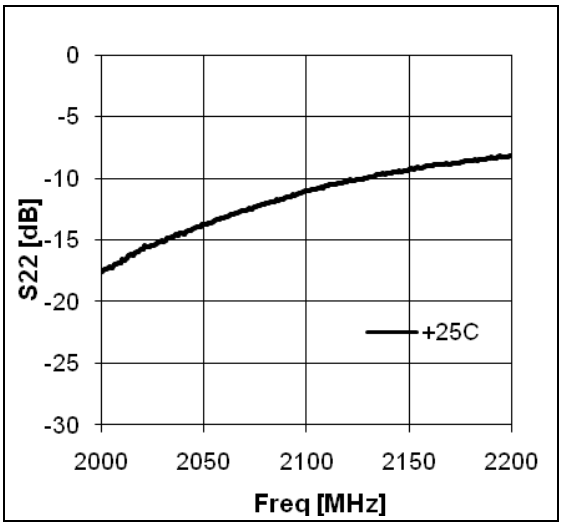


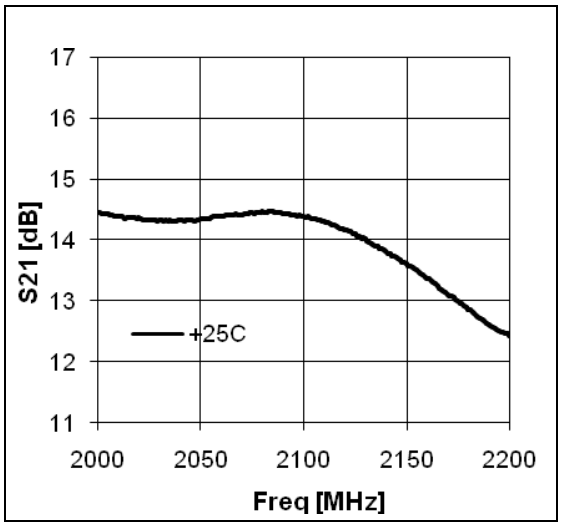
Note:

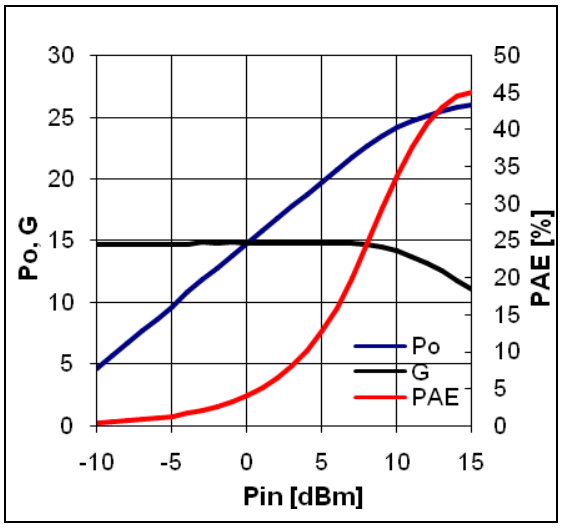
1. Chip is mounted on the PF083 open PKG, and bonded with 2-wires at Both input and output.
2. PCB: 31mil thick FR4
3. Distance between the center of the shunt cap(C6) and the input pin of BT013 is 1.5mm
4. Distance between the center of the shunt cap(C7) and the output pin of BT03 is 6.4mm

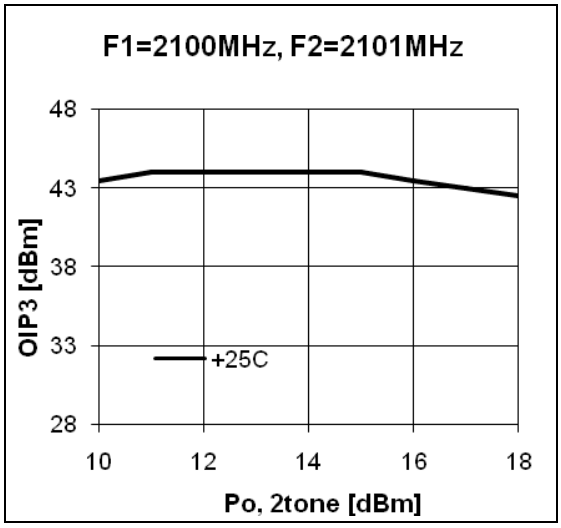
Typical Performance

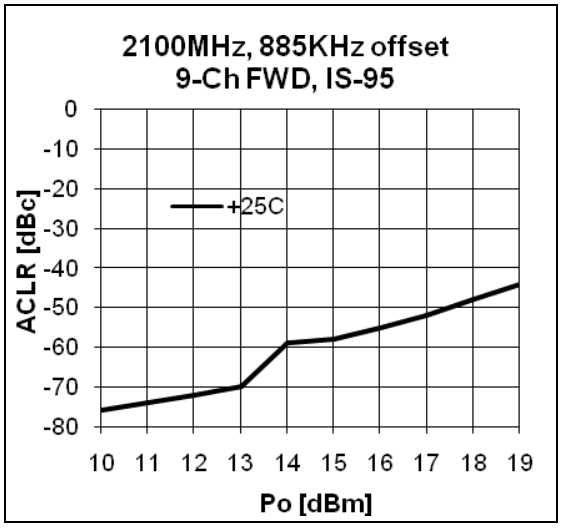




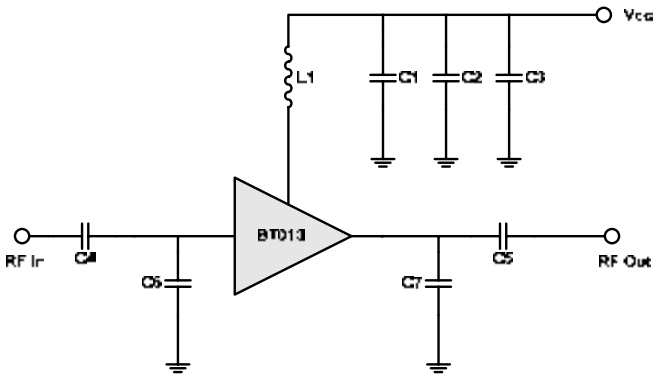


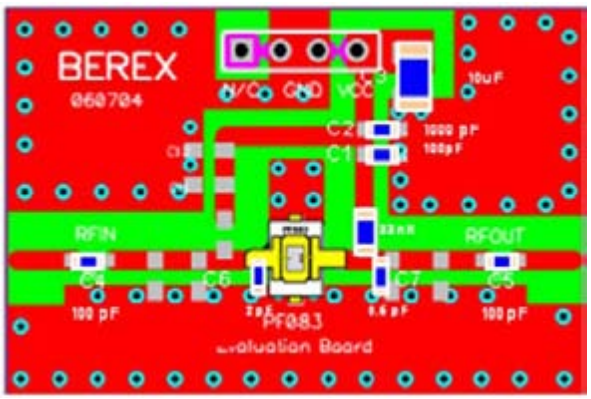






Application Circuit: 2400MHz

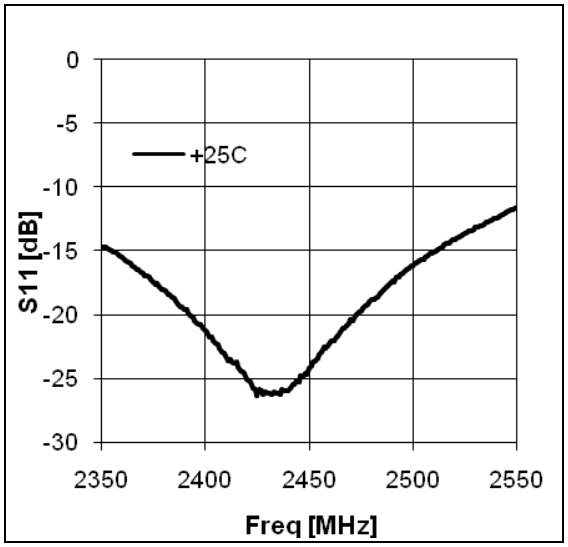
Schematic Diagram	BOM		Tolerance
	C1	100pF	±5%
	C2	1000pF	±5%
	C3	10uF	±15%
	C4	100pF	±5%
	C5	100pF	±5%
	C6	2pF	±5%
	C7	0.5pF	±5%
	L1	33nH	±5%

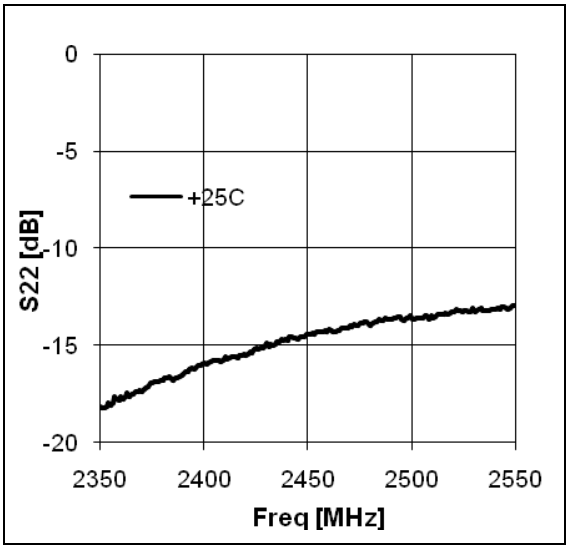


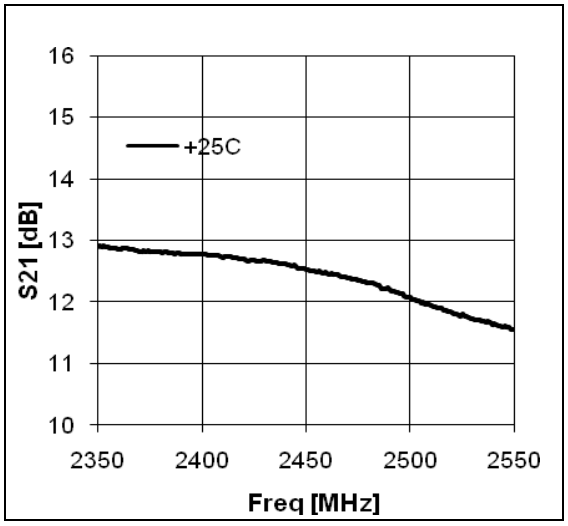
Note:

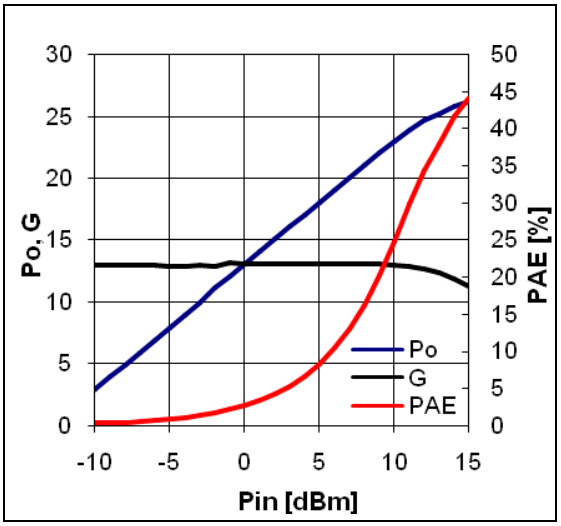
1. Chip is mounted on the PF083 open PKG, and bonded with 2-wires at Both input and output.
2 PCB: 31mil thick FR4
3 Distance between the center of the shunt cap(C6) and the input pin of BT013 is 0.7mm
4 Distance between the center of the shunt cap(C7) and the output pin of BT03 is 3.2mm

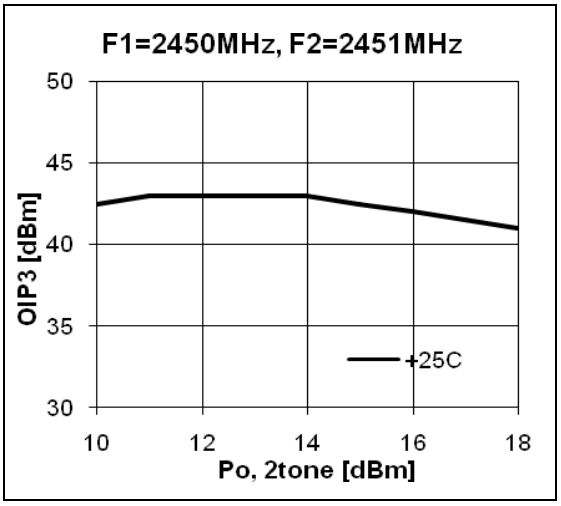
Typical Performance

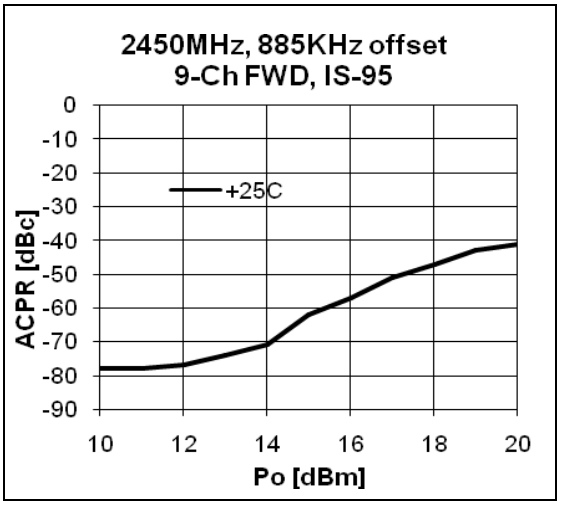




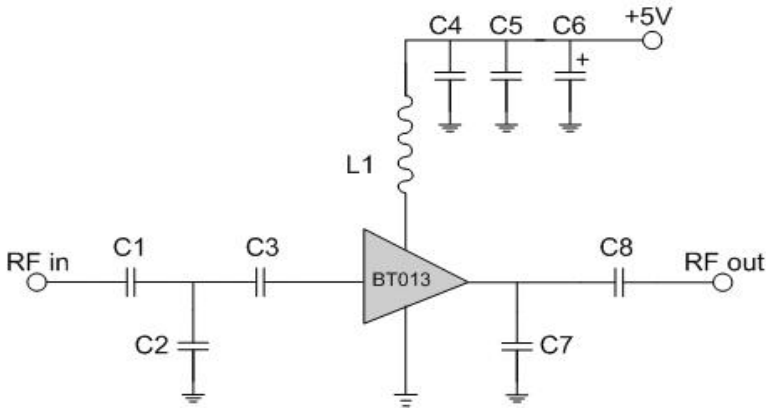


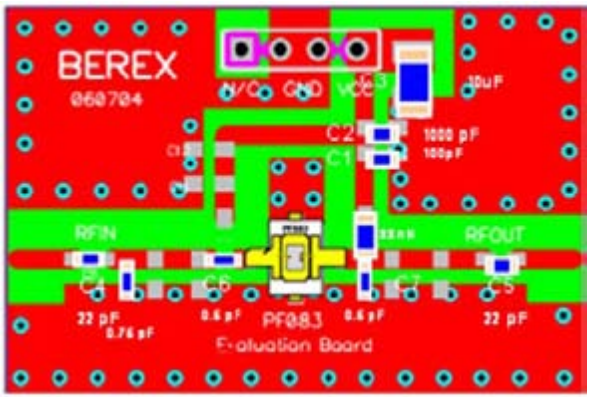






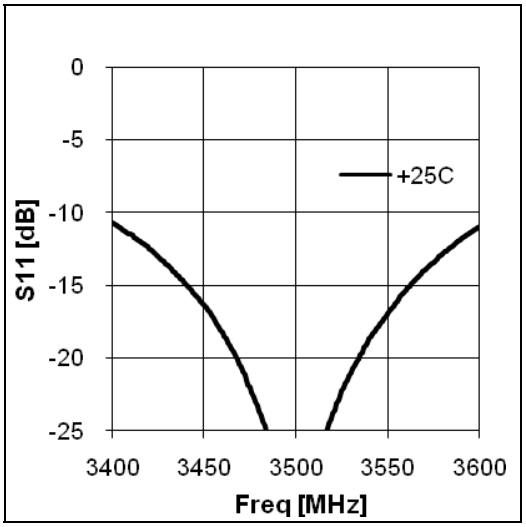
Application Circuit: 3500MHz

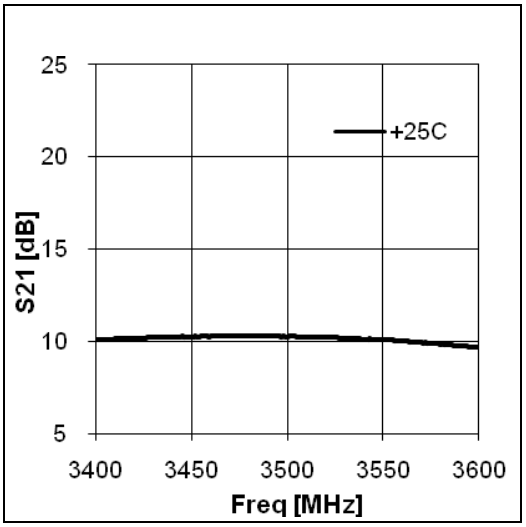
Schematic Diagram	BOM		Tolerance
	C1	22pF	±5%
	C2	0.75pF	±5%
	C3	0.5pF	±5%
	C4	100pF	±5%
	C5	1000pF	±5%
	C6	10uF	±20%
	C7	0.5pF	±5%
	C8	22pF	±5%
	L1	33nH	±5%

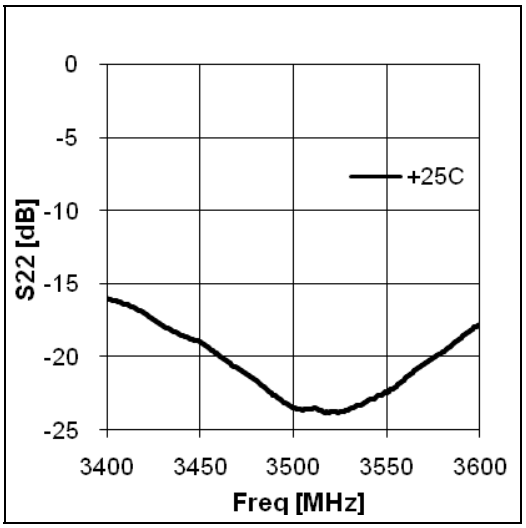


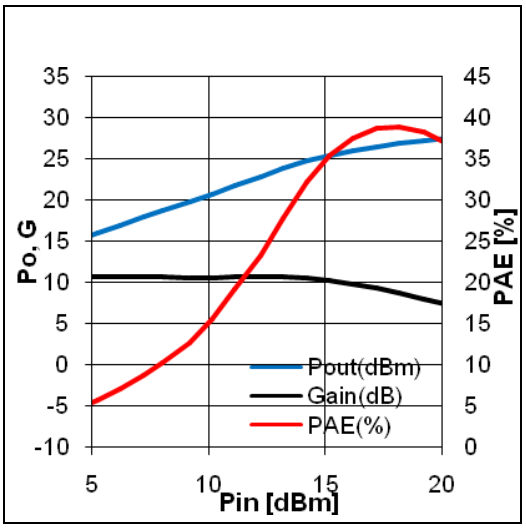
Note:
1. Chip is mounted on the PF083 open PKG, and bonded with 2-wires at both input and output.
2 PCB: 31mil thick FR4
3 Distance between the center of the shunt cap(C2) and the input pin of BT013 is 10mm
4 Distance between the center of the series cap(C3) and the input pin of BT013 is 4mm
5 Distance between the center of the shunt cap(C7) and the output pin of BT03 is 3mm

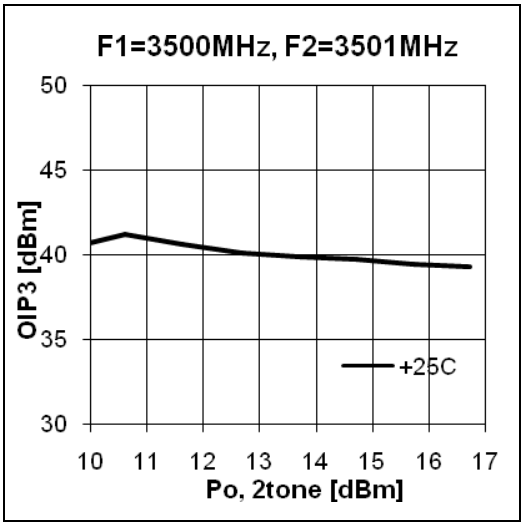
Typical Performance



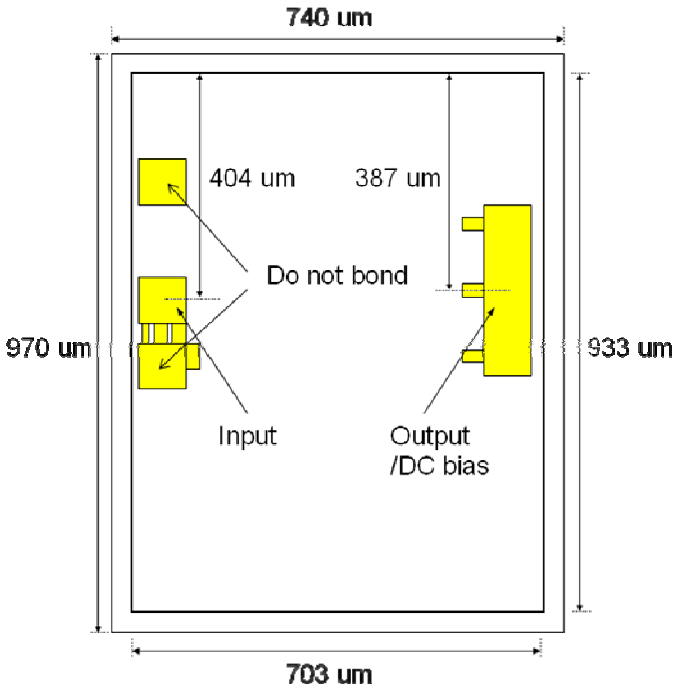








Die Outline



NOTES:

1) DIE THICKNESS 100um

2) BONDPAD METAL THICKNESS 2.8um

3) BACKSIDE METAL Au, 5um

4) DEVICE IS GROUNDED THROUGH VIA HOLES

MSL / ESD Rating

ESD Rating	Class 1
Value	Passes <1000V
Test	Human Body Model (HBM)
Standard	JEDEC Standard JESD22-A114B
MSL Rating	**Level 1** at +265°C convection reflow
Standard	JEDEC Standard J-STD-020

NATO CAGE code:

2	**N**	**9**	**6**	**F**

NOTICE

BeRex Corporation reserves the right to make changes of product specification or to discontinue product at any time without notice.

Proper ESD procedures should be followed when handling this device.

BCL016B

SUPER LOW NOISE PHEMT CHIP (.15µm x 160µm)

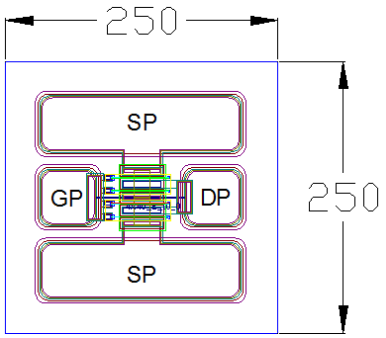
The BeRex BCL016B is a GaAs super low noise pHEMT with a nominal 0.15 micron gate length and 160 micron gate width making the product ideally suited for applications requiring very low noise and high associated gain. The BCL016B offers high insertion gain and a low noise figure for broadband applications. The BCL016B is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability

PRODUCT FEATURES

- Low 0.4dB typical noise figure @12 GHz
- High 13.5dB Typical associated Gain @12 GHz
- High P_{in} of up to 20dBm
- 0.15 X 160 Micron Recessed Gate

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement



Chip dimensions : 250 X 250 microns
Gate pad(GP) : 48 X 48 microns
Drain pad(DP) : 48 X 48 microns
Source pad(SP) : 180 X 48 microns
Chip thickness : 100 microns

ELECTRICAL CHARACTERISTICS (T_a = 25° C)

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
NF	Noise Figure (Vds = 2V, Id = 10mA)	12 GHz 18 GHz		0.4 0.6		dB
G_A	Associated Gain (Vds = 2V, Id = 10mA)	12 GHz 18 GHz	12.5 10.5	13.5 11.5		dB
P1dB	Output Power @ p1dB (Vds = 2V, Id = 10mA)	12 GHz	13	14.5		dBm
I_{DSS}	Saturated Drain Current (Vgs = 0V, Vds = 2V)			50		mA
G_M	Transconductance (Vds = 2V, Vgs = -0.3V)			120		mS
V_P	Pinch-off Voltage (Vds = 2V, Id = 200µA)			-0.7		V
BV_{GD}	Gate-Drain Breakdown Voltage, (Ig = -200 µA, source open)			9		V
BV_{GS}	Gate-Source Breakdown Voltage, (Ig = -200 µA, drain open)			6		V
R_{TH}	Thermal Resistance, junction to back side (Au-Sn Eutectic Attach)			270		° C/W

MAXIMUM RATING (T_a = 25° C)

SYMBOLS	PARAMETERS	ABSOLUTE MAX.
V_{DS}	Drain-Source Voltage	5 V
V_{GS}	Gate-Source Voltage	-3 V
I_{DS}	Drain Current	50 mA
I_{GSF}	Forward Gate Current	30 mA
P_{IN}	Input Power	20 dBm
T_{CH}	Channel Temperature	150° C
T_{STG}	Storage Temperature	-60° C - 150° C
P_T	Total Power Dissipation	200 mW

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

S-PARAMETERS (V_{ds} = 2 V, I_{ds} = 10 mA)

FREQUENCY [GHz]	S11 [MAG]	S11 [Ang]	S21 [MAG]	S21 [Ang]	S12 [MAG]	S12 [Ang]	S22 [MAG]	S22 [Ang]
1	0.99	-11.25	5.95	169.63	0.017	83.73	0.54	-5.90
2	0.98	-22.22	5.93	160.06	0.033	76.58	0.53	-11.65
3	0.97	-32.54	5.68	151.26	0.048	70.53	0.51	-17.14
4	0.95	-44.55	5.73	142.08	0.062	64.57	0.48	-21.53
5	0.93	-54.26	5.52	133.35	0.076	58.37	0.44	-27.50
6	0.91	-65.76	5.59	124.70	0.089	53.16	0.40	-32.21
7	0.88	-79.02	5.45	114.83	0.101	45.48	0.33	-42.00
8	0.85	-90.99	5.42	106.08	0.113	40.18	0.28	-45.56
9	0.82	-101.41	5.31	97.75	0.125	33.41	0.23	-58.00
10	0.78	-116.54	5.22	87.78	0.133	26.50	0.15	-73.89
11	0.74	-131.03	5.13	78.33	0.143	19.24	0.11	-103.09
12	0.68	-150.07	5.00	66.81	0.151	10.38	0.13	-157.16
13	0.66	-169.47	4.69	56.28	0.153	2.15	0.18	164.27
14	0.63	168.75	4.46	45.46	0.157	-6.54	0.26	148.69
15	0.64	145.31	4.10	33.81	0.154	-16.06	0.36	135.43
16	0.66	124.37	3.70	23.23	0.148	-24.06	0.44	126.12
17	0.69	102.63	3.30	11.86	0.141	-32.66	0.51	119.95
18	0.73	88.34	2.85	3.09	0.130	-38.61	0.57	111.43
19	0.76	75.06	2.48	-5.82	0.120	-43.78	0.62	106.03
20	0.80	59.85	2.12	-15.00	0.109	-48.60	0.65	101.91
21	0.82	52.72	1.80	-21.27	0.100	-50.84	0.67	98.55
22	0.84	42.62	1.52	-28.44	0.093	-53.53	0.69	96.42
23	0.86	35.06	1.23	-34.89	0.084	-57.23	0.71	92.69
24	0.89	32.73	1.04	-38.66	0.076	-60.50	0.73	90.55
25	0.91	24.09	0.86	-43.76	0.062	-61.13	0.76	89.32
26	0.93	19.10	0.69	-48.13	0.054	-60.20	0.77	88.42

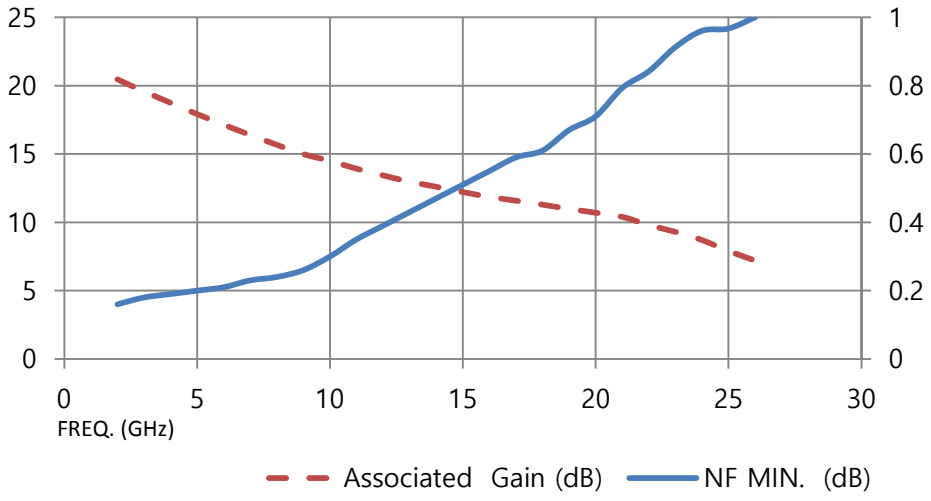
NOTE: S-parameters include 12 mil gold bond wires: 1 gate wire, 1 drain wire, 4 source wires. Reference planes are at the edge of substrates shown in the "Wire Bonding Information".

NOISE PARAMETERS (V_{ds} = 2 V, I_{ds} = 10 mA)

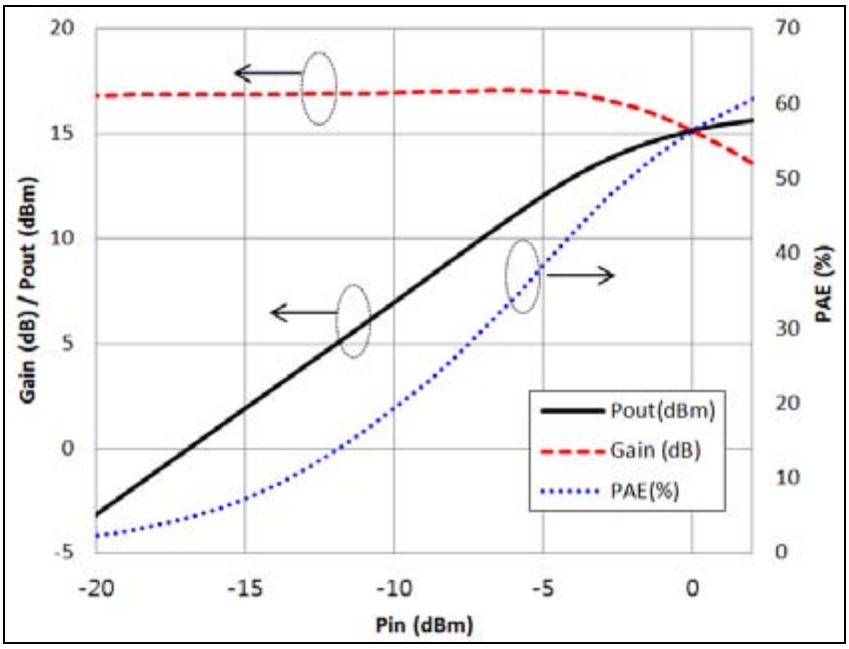
FREQUENCY (GHz)	NF MIN. (dB)	GAMMA OPT. (Mag.)	GAMMA OPT. (Ang.)	ASSOCIATED GAIN (dB)	NORMALIZED Rn
2	0.16	0.827	3.65	20.46	0.19
3	0.18	0.810	15.55	19.58	0.18
4	0.19	0.783	27.38	18.74	0.17
5	0.20	0.752	30.67	17.92	0.16
6	0.21	0.712	34.53	17.14	0.16
7	0.23	0.668	36.60	16.39	0.15
8	0.24	0.623	37.40	15.67	0.14
9	0.26	0.582	33.31	14.99	0.14
10	0.30	0.519	37.28	14.49	0.13
11	0.35	0.449	37.26	13.92	0.12
12	0.39	0.395	39.95	13.43	0.11
13	0.43	0.318	44.86	12.97	0.10
14	0.47	0.228	55.71	12.60	0.09
15	0.51	0.105	88.03	12.21	0.07
16	0.55	0.113	-164.03	11.86	0.06
17	0.59	0.287	-126.82	11.58	0.06
18	0.61	0.461	-106.23	11.29	0.10
19	0.67	0.606	-89.02	10.98	0.20
20	0.71	0.703	-73.51	10.70	0.30
21	0.79	0.763	-71.97	10.40	0.47
22	0.84	0.799	-66.64	9.80	0.51
23	0.91	0.825	-62.25	9.30	0.55
24	0.96	0.833	-58.63	8.70	0.61
25	0.97	0.845	-55.61	7.90	0.67
26	1.00	0.849	-52.18	7.20	0.79

NOTE: NF data includes 12 mil gold bond wires: 1 gate wire, 1 drain wire, 4 source wires. Reference planes are at the edge of substrates shown in the "Wire Bonding Information".

ASSOCIATE GAIN / NOISE FIGURE



P_{IN}_P_{OUT}/Gain, PAE (12 GHz)

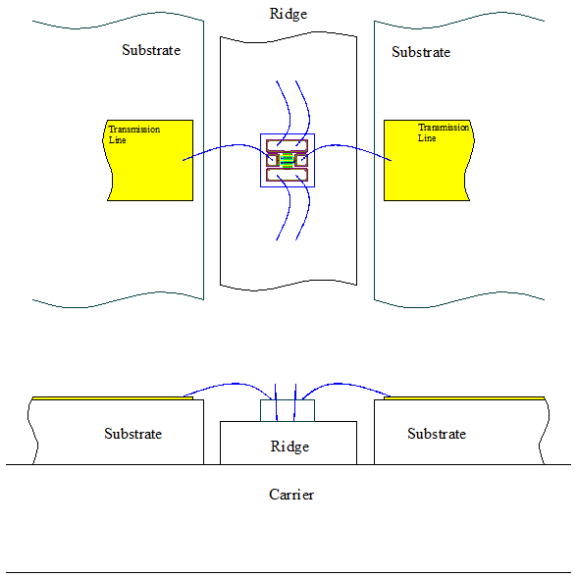


Frequency = 12GHz

V_{DS} = 2 V, I_{DS} = 10 mA

WIRE BONDING INFORMATION

Always follow wire bonding diagrams recommended by BeRex for each device to achieve optimum device performance and reliability. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires.



Using 1 mil. Diameter, Au bonding wires.

1. Gate to input transmission line
- Length and Height : 500 µm x 250 µm
- Number of wire(s): 1
2. Drain to output transmission line
- Length and Height : 500 µm x 250 µm
- Number of wire(s) : 1
3. Source to ground plate
- Length and Height : 350 µm x 200 µm
- Number of wire(s) : 4

Proper ESD procedures should be followed when handling this device.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au/Sn (80/20) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2/10% H_2) or clean, dry N_2 should be used.

Use of conductive epoxy (gold or silver filled) may also be acceptable for die-attaching low power devices.

SHIPPING & STORAGE:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed metallized bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:

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LIFE SUPPORT POLICY

BEREX PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES WITHOUT THE EXPRESS WRITTEN APPROVAL OF BEREX.

1. Life support devices or systems are devices or systems which (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

BCP020T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 200µm)

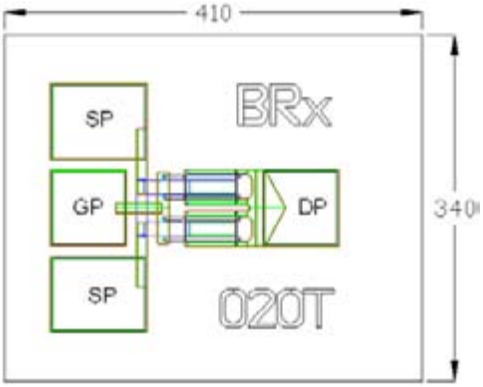
The BeRex BCP020T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 200 micron gate width making the product ideally suited for amplifier applications where high-gain and medium power from DC to 26 GHz. The product may be used in either wideband or narrow-band applications. The BCP020T is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 24 dBm Typical Output Power @12 GHz
- 14 dB Typical Gain @12 GHz
- 60% PAE Typical @12 GHz
- 0.25 X 200 µm Recessed Gate
- Also available in 70 mil. ceramic package (BCP020T-70)

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement



Chip dimensions : 410 X 340 microns
Gate pad(GP) : 75 X 75 microns
Drain pad(DP) : 75 X 75 microns
Source pad(SP) : 95 X 75 microns
Chip thickness : 100 microns

DC CHARACTERISTICS T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)	40	60	80	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})		80		mS
V_p	Pinch-off Voltage (I_{ds} = 0.3 mA, V_{ds} = 3V)	-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.6 mA, source open)		-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 0.6 mA, drain open)		-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		160		°C/W

ELECTRICAL CHARACTERISTICS (TUNED FOR POWER) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	22.5	24.0 24.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	12.0	14.0 12.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		60 55		%
NF	50 Ohm Noise Figure (V_{ds}=2V, I_{ds}=10 mA)	12 GHz		1.09		dB

ELECTRICAL CHARACTERISTICS (TUNED FOR GAIN) T_a = 25° C

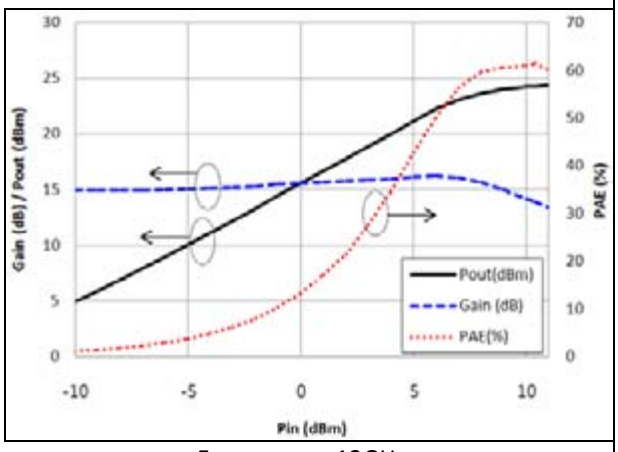
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	20.0	21.0 21.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	15.5	17.0 13.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		45 45		%
NF	50 Ohm Noise Figure (V_{ds}=2V, I_{ds}=10 mA)	12 GHz		1.09		dB

MAXIMUM RATINGS (T_a = 25° C)

SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	11 mA	2 mA
P_{in}	Input Power	17 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	1.0 W	0.8 W

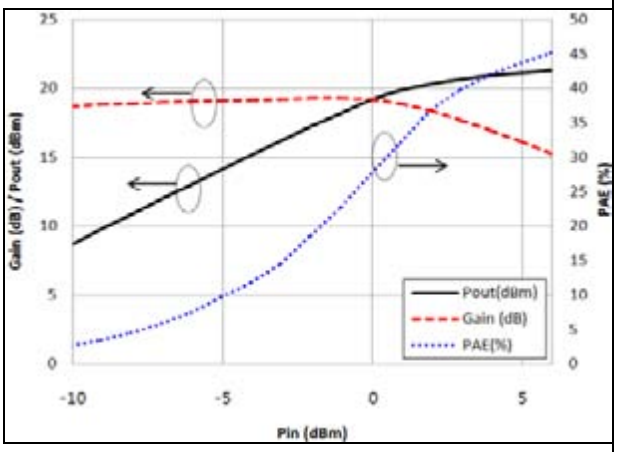
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

P_{IN}_P_{OUT}/Gain, PAE (12 GHz)



Frequency = 12GHz

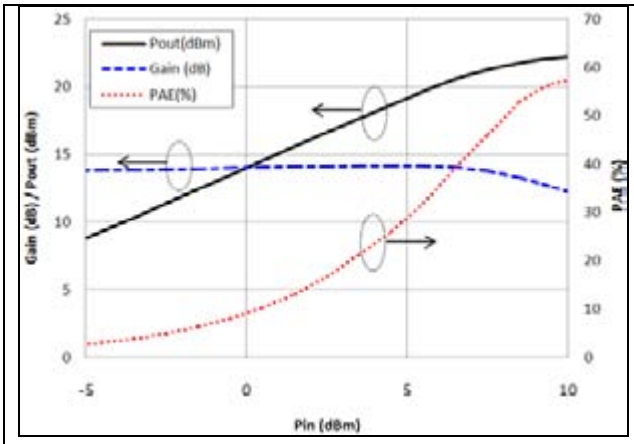
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 12GHz

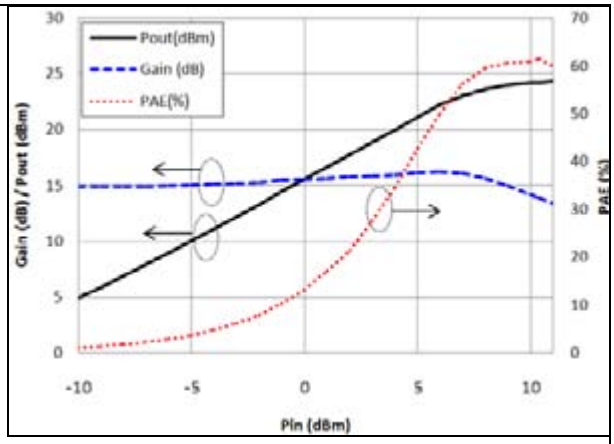
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

P_{IN}_P_{OUT}/Gain, PAE (18 GHz)



Frequency = 18GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 18GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

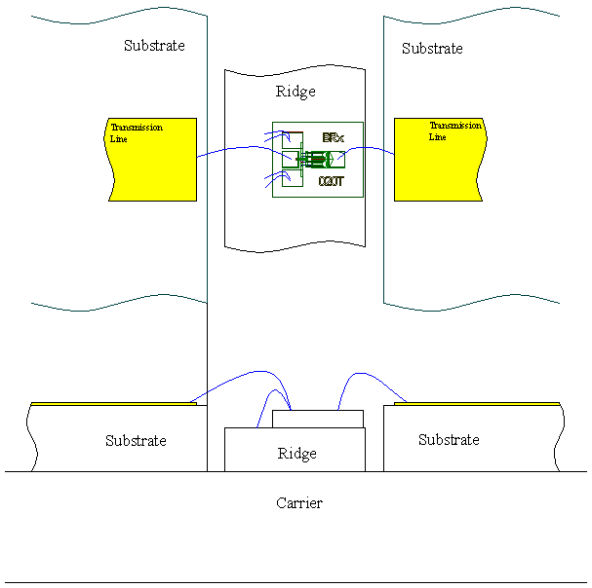
S-PARAMETERS (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.98	-17.63	6.54	165.56	0.014	81.13	0.80	-5.99
2	0.95	-35.11	6.35	152.34	0.027	70.37	0.78	-11.31
3	0.90	-52.87	6.08	140.12	0.039	64.06	0.75	-15.78
4	0.85	-69.99	5.77	127.94	0.048	53.79	0.71	-20.09
5	0.80	-88.24	5.43	116.00	0.054	47.49	0.67	-24.42
6	0.76	-105.52	5.04	104.87	0.058	40.26	0.63	-27.88
7	0.72	-122.72	4.68	93.83	0.063	33.49	0.59	-32.54
8	0.71	-138.65	4.33	84.53	0.064	29.01	0.56	-34.82
9	0.69	-152.44	3.97	75.99	0.063	25.78	0.53	-36.61
10	0.68	-166.12	3.69	67.53	0.064	22.40	0.51	-38.64
11	0.69	-178.47	3.38	59.72	0.064	18.97	0.47	-39.57
12	0.70	170.61	3.17	51.75	0.067	17.78	0.46	-42.35
13	0.71	158.55	2.94	44.52	0.061	12.25	0.43	-43.48
14	0.73	149.14	2.73	37.18	0.062	12.90	0.40	-45.06
15	0.74	140.53	2.57	30.17	0.063	10.83	0.37	-47.57
16	0.78	131.12	2.40	22.71	0.064	8.80	0.33	-49.99
17	0.81	125.12	2.23	15.52	0.062	6.82	0.29	-55.76
18	0.82	117.90	2.06	8.53	0.066	2.23	0.24	-62.01
19	0.84	111.86	1.89	0.82	0.065	0.95	0.19	-72.70
20	0.86	109.58	1.74	-5.04	0.066	-1.33	0.14	-89.32
21	0.87	105.71	1.60	-11.40	0.068	-0.98	0.11	-123.58
22	0.88	103.28	1.45	-17.65	0.068	-3.31	0.13	-160.51
23	0.88	103.13	1.32	-22.86	0.070	-5.10	0.18	174.94
24	0.88	101.01	1.20	-28.51	0.070	-5.63	0.25	162.82
25	0.90	100.91	1.08	-33.17	0.066	-6.26	0.32	154.30
26	0.90	102.38	1.00	-36.21	0.070	-2.08	0.38	150.28

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on "Wire Bonding Information" figure below.

WIRE BONDING INFORMATION

Follow the wire bonding diagrams recommended by BeRex below to achieve optimum device performance. BeRex recommends thermo-compression wedge bonding. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires. Ultrasonic bonding is not recommended.



Using 1 mil. diameter, Au bonding wires.

1. Gate to input transmission line
   - Length and Height : 600 µm x 250 µm
   - Number of wire(s): 1
2. Drain to output transmission line
   - Length and Height : 400 µm x 250 µm
   - Number of wire(s) : 1
3. Source to ground plate
   - Length and Height : 250 µm x 300 µm
   - Number of wire(s) : 4

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

Use of conductive epoxy (gold or silver filled) may also be acceptable for die-attaching low power devices.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:

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RoHS COMPLIANT

For complete specifications, S-parameters and information on bonding and handling, visited our website; *www.berex.com*

BCP030T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 300µm)

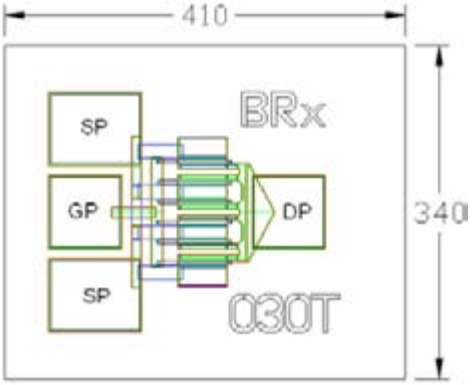
The BeRex BCP030T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 300 micron gate width making the product ideally suited for amplifier applications where high-gain and medium power from DC to 26 GHz. The product may be used in either wideband or narrow-band applications. The BCP030T is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 25 dBm Typical Output Power
- 14 dB Typical Gain @12 GHz
- 65% PAE Typical @12 GHz
- 0.25 X 300 µm Recessed Gate
- Also available in 70 mil. ceramic package (BCP030T-70)

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement



Chip dimensions : 410 X 340 microns
Gate pad(GP) : 75 X 75 microns
Drain pad(DP) : 75 X 75 microns
Source pad(SP) : 95 X 75 microns
Chip thickness : 100 microns

DC CHARACTERISTICS T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)	60	90	120	mA
G_m	Transconductance (V_{ds} = 2V, Vgs = 50% I_{dss})		120		mS
V_p	Pinch-off Voltage (I_{ds} = 0.3 mA, V_{ds} = 2V)	-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.3 mA, source open)		-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 0.3 mA, drain open)		-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		121		°C/W

ELECTRICAL CHARACTERISTICS (TUNED FOR POWER) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	24.5	25.5 25.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	13.0	14.0 10.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		65 60		%
NF	50 Ohm Noise Figure (V_{ds}=2V, I_{ds}=15 mA)	12 GHz		1.14		dB

ELECTRICAL CHARACTERISTICS (TUNED FOR GAIN) T_a = 25° C

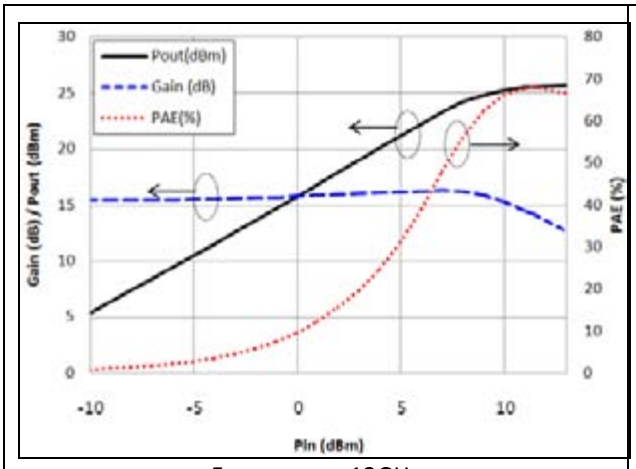
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	22.0	23.0 23.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	14.5	15.5 11.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		45 45		%
NF	50 Ohm Noise Figure (V_{ds}=2V, I_{ds}=15 mA)	12 GHz		1.14		dB

MAXIMUM RATINGS (T_a = 25° C)

SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	18 mA	3 mA
P_{in}	Input Power	22 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	1.4 W	1.2 W

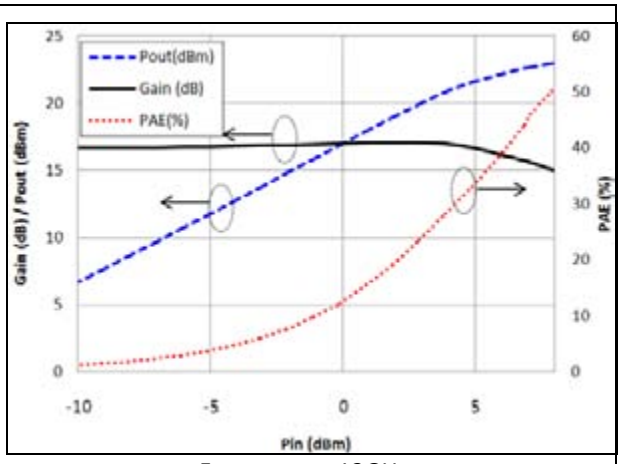
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

P_{IN}_P_{OUT}/GAIN, PAE (12 GHz)



Frequency = 12GHz

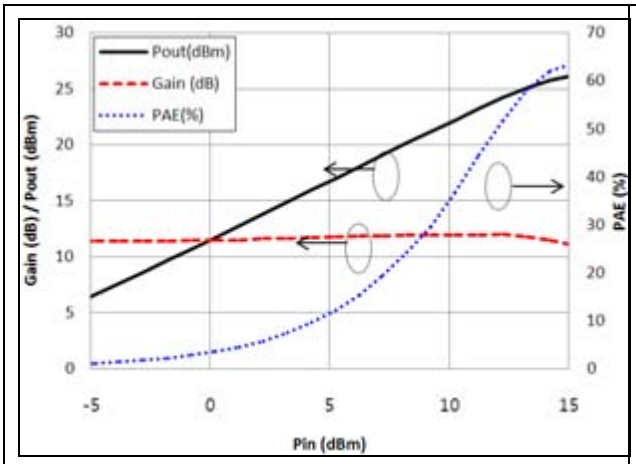
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 12GHz

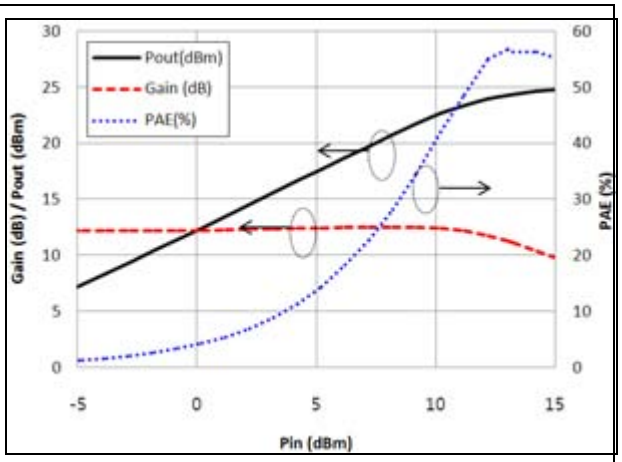
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

P_{IN}_P_{OUT}/GAIN, PAE (18 GHz)



Frequency = 18GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 18GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

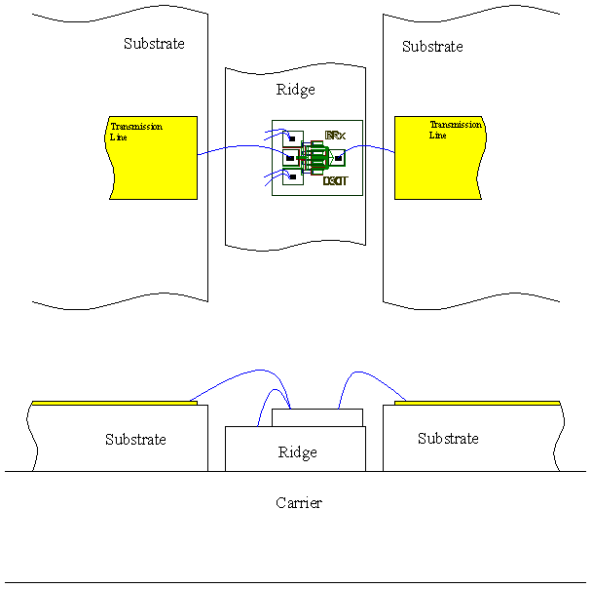
S-PARAMETER (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.97	-27.72	9.10	159.71	0.019	74.59	0.71	-10.54
2	0.91	-53.85	8.41	141.85	0.036	61.30	0.66	-19.37
3	0.85	-78.65	7.57	126.23	0.048	50.31	0.59	-26.23
4	0.79	-100.97	6.73	112.12	0.055	41.94	0.54	-32.00
5	0.75	-121.90	5.95	99.32	0.061	35.64	0.48	-37.41
6	0.73	-139.47	5.24	88.30	0.062	30.97	0.44	-41.98
7	0.72	-155.99	4.62	77.67	0.062	24.97	0.40	-48.43
8	0.72	-168.99	4.14	68.95	0.063	21.67	0.38	-51.15
9	0.72	-179.97	3.71	61.22	0.060	19.65	0.36	-54.78
10	0.72	169.20	3.37	53.50	0.060	18.02	0.34	-58.30
11	0.74	160.38	3.04	46.46	0.060	16.99	0.33	-60.45
12	0.75	151.34	2.81	39.07	0.059	13.84	0.32	-63.94
13	0.76	142.18	2.58	32.32	0.059	14.91	0.30	-65.39
14	0.79	135.08	2.37	25.60	0.059	12.56	0.28	-67.17
15	0.80	128.26	2.21	19.05	0.060	12.24	0.25	-70.97
16	0.82	120.51	2.05	12.14	0.061	10.92	0.21	-75.16
17	0.85	116.46	1.88	5.62	0.060	8.30	0.17	-84.42
18	0.86	110.04	1.73	-1.49	0.064	5.45	0.13	-99.08
19	0.88	104.87	1.57	-9.16	0.065	3.39	0.10	-131.69
20	0.89	103.82	1.43	-14.39	0.066	3.64	0.11	-175.84
21	0.90	100.91	1.30	-20.35	0.069	1.83	0.17	160.35
22	0.90	99.40	1.15	-25.89	0.068	1.36	0.24	149.32
23	0.90	100.87	1.04	-30.07	0.067	-0.48	0.31	142.60
24	0.90	98.38	0.93	-34.99	0.066	-1.84	0.39	139.62
25	0.92	99.27	0.83	-38.62	0.068	-0.48	0.45	137.44
26	0.92	101.85	0.76	-40.47	0.064	4.76	0.49	137.87

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on "Wire Bonding Information" figure below.

WIRE BONDING INFORMATION

Follow the wire bonding diagrams recommended by BeRex below to achieve optimum device performance. BeRex recommends thermo-compression wedge bonding. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires. Ultrasonic bonding is not recommended.



Using 1 mil. diameter, Au bonding wires.

1. Gate to input transmission line
   - Length and Height : 600 µm x 250 µm
   - Number of wire(s): 1
2. Drain to output transmission line
   - Length and Height : 400 µm x 250 µm
   - Number of wire(s) : 1
3. Source to ground plate
   - Length and Height : 250 µm x 300 µm
   - Number of wire(s) : 4

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

Use of conductive epoxy (gold or silver filled) may also be acceptable for die-attaching low power devices.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:
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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

For complete specifications, S-parameters and information on bonding and handling, visited our website; *www.berex.com*

3.

BCP040T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 400µm)

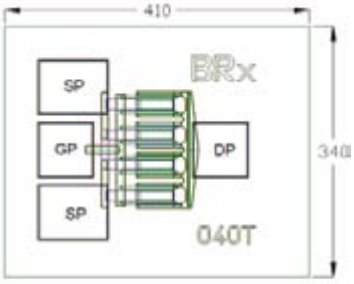
The BeRex BCP040T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 400 micron gate width making the product ideally suited for applications requiring high-gain and medium power from DC to 26 GHz. The product may be used in either wideband or narrow-band applications. The BCP040T is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability

PRODUCT FEATURES

- 26 dBm Typical Output Power
- 14 dB Typical Power Gain @ 12 GHz
- 0.25 X 400 Micron Recessed Gate

APPLICATIONS

- Commercial
- Military / Hi-Rel
- Test & Measurement



Chip dimensions : 410 X 340 microns
Gate pad(GP) : 75 X 75 microns
Drain pad(DP) : 75 X 75 microns
Source pad(SP) : 95 X 75 microns
Chip thickness : 100 microns

DC CHARACTERISTICS T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)	80	120	160	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})		160		mS
V_p	Pinch-off Voltage (I_{ds} = 400 µA, V_{ds} = 2V)		-1.1		V
BV_{gd}	Drain Breakdown Voltage (I_{gd} = 0.4 mA, source open)		-16		V
BV_{gs}	Source Breakdown Voltage (I_g = 0.4 mA, drain open)		-14		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		120		°C/W

ELECTRICAL CHARACTERISTIC (TUNED FOR POWER) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	24.5 23.5	26.0 25.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	13.0 9.0	14.0 10.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		65 65		%
NF	Noise Figure (V_{ds} = 2V, I_{ds} = 10mA)	12 GHz		1.0		dB

ELECTRICAL CHARACTERISTIC (TUNED FOR GAIN) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	23.0 23.5	24.5 25.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	13.5 9.5	14.5 10.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		55 50		%
NF	Noise Figure (V_{ds} = 2V, I_{ds} = 10mA)	12 GHz		1.0		dB

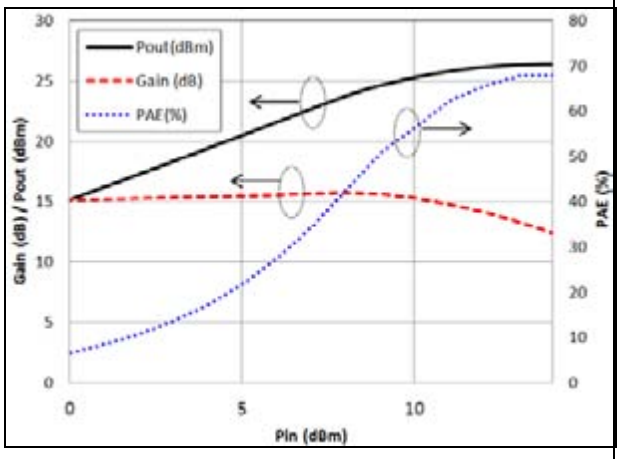
MAXIMUM RATING (T_a = 25° C)

SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-8 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	20 mA	3 mA
P_{in}	Input Power	21 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	1.3 W	1.1 W

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

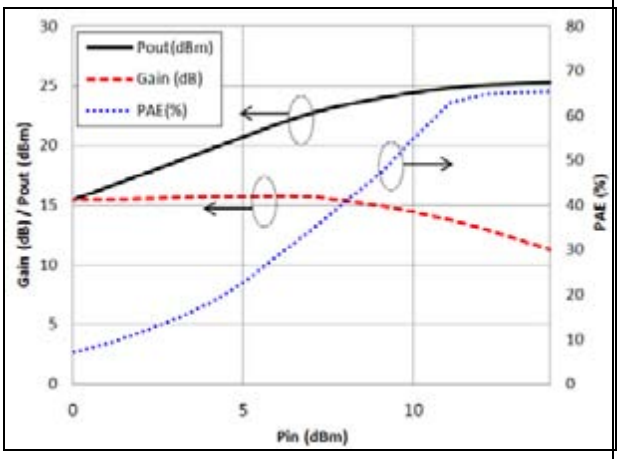
P_{IN}_P_{OUT}/Gain, PAE (12 GHz)

Frequency = 12GHz



V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)

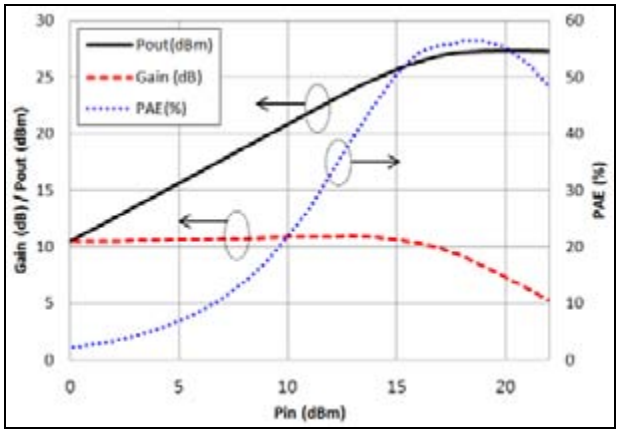
Frequency = 12GHz



V_{ds} = 8 V, I_{ds} = 50% Id_{ss} (Tuned for Gain)

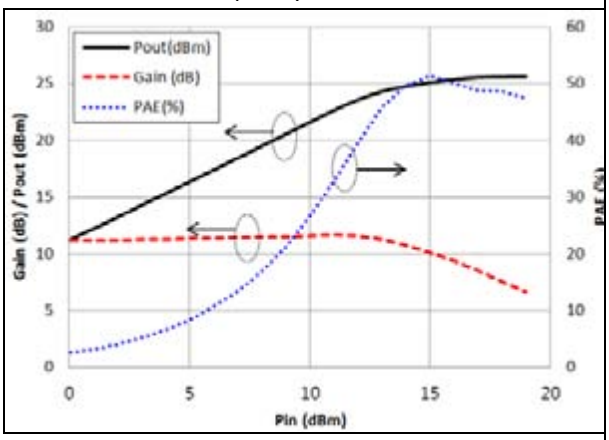
P_{IN}_P_{OUT}/Gain, PAE (18 GHz)

Frequency = 18GHz



V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)

Frequency = 18GHz



V_{ds} = 8 V, I_{ds} = 50% Id_{ss} (Tuned for Gain)

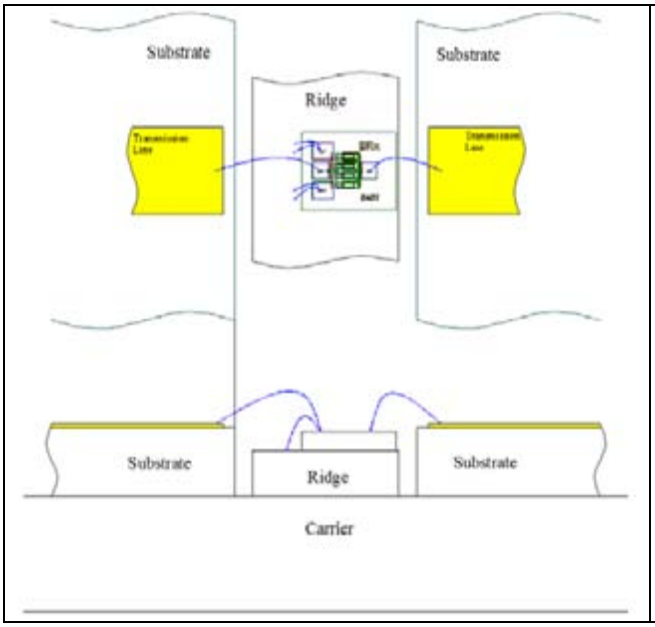
S-PARAMETER (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.96	-38.95	10.74	154.03	0.024	67.870	0.63	-16.38
2	0.90	-72.73	9.35	132.90	0.041	51.922	0.56	-28.82
3	0.84	-100.58	7.93	115.40	0.052	40.124	0.49	-38.66
4	0.80	-124.51	6.72	100.84	0.058	30.602	0.43	-45.59
5	0.79	-144.07	5.75	88.09	0.060	22.712	0.38	-51.83
6	0.77	-160.36	4.94	77.17	0.061	17.573	0.34	-56.32
7	0.77	-175.12	4.30	67.14	0.061	13.087	0.31	-60.95
8	0.78	172.50	3.77	57.90	0.060	8.273	0.29	-66.49
9	0.79	161.60	3.33	49.47	0.058	5.197	0.27	-71.96
10	0.80	151.54	2.95	41.38	0.056	2.259	0.25	-78.38
11	0.82	143.51	2.62	33.87	0.055	0.457	0.23	-86.25
12	0.84	137.56	2.35	27.30	0.054	-1.309	0.22	-93.90
13	0.85	131.64	2.11	20.76	0.052	-2.402	0.21	-103.35
14	0.87	126.69	1.91	14.58	0.052	-3.289	0.20	-116.08
15	0.88	122.78	1.76	9.18	0.052	-4.234	0.20	-125.70
16	0.89	118.31	1.61	3.27	0.052	-4.521	0.20	-137.48
17	0.90	114.15	1.50	-2.94	0.053	-6.342	0.21	-150.51
18	0.91	111.19	1.37	-8.97	0.054	-7.516	0.23	-162.04
19	0.92	106.48	1.25	-15.31	0.055	-8.383	0.24	-170.91
20	0.92	104.43	1.16	-21.21	0.057	-10.277	0.27	178.56
21	0.92	102.30	1.06	-26.28	0.057	-8.773	0.31	169.29
22	0.91	99.92	0.97	-31.27	0.059	-9.308	0.34	161.39
23	0.92	98.63	0.89	-35.98	0.060	-10.045	0.38	154.95
24	0.91	96.95	0.81	-40.77	0.059	-10.944	0.42	148.51
25	0.92	95.77	0.73	-45.07	0.058	-8.730	0.45	143.09
26	0.92	95.87	0.66	-48.56	0.058	-3.981	0.48	138.86

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on "Wire Bonding Information" figure below.

WIRE BONDING INFORMATION

Follow the wire bonding diagrams recommended by BeRex below to achieve optimum device performance. BeRex recommends thermo-compression wedge bonding. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires. Ultrasonic bonding is not recommended.



Bonding Wire information

1. Gate to input transmission line
   - Length and Height : 400 um and 250 um
   - Number of wire : 1 wire
2. Drain to output transmission line
   - Length and Height : 350 um and 250 um
   - Number of wire : 1 wire
3. Source to ground plate
   - Length and Height : 200 um and 250 um
   - Number of wire : 4 wires

※ The diameter of bonding wires : 1 mil

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

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STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

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RoHS COMPLIANT

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BCP060T

HIGH EFFICIENCY pHEMT POWER FET CHIP (.25µm x 600µm)

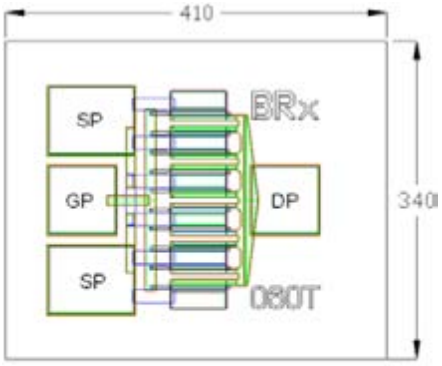
The BeRex BCP060T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 600 micron gate width making the product ideally suited for amplifier applications where high-gain and medium power from DC to 26 GHz. The product may be used in either wideband or narrow-band applications. The BCP060T is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 28 dBm Typical Output Power
- 12 dB Typical Gain @ 12 GHz
- 55% PAE Typical @12 GHz
- 0.25 X 600 µm Recessed Gate
- Also available in 70 mil. ceramic package (BCP060T-70)

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement



Chip dimensions : 410 X 340 microns
Gate pad(GP) : 75 X 75 microns
Drain pad(DP) : 75 X 75 microns
Source pad(SP) : 95 X 75 microns
Chip thickness : 100 microns

DC CHARACTERISTICS T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2V)	120	180	240	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})		240		mS
V_p	Pinch-off Voltage (I_{ds} = 0.6 mA, V_{ds} = 2V)	- 2.5	-1.1	- 0.5	V
BV_{gd}	Drain Breakdown Voltage (Ig = 0.6 mA, source open)		-15	-12	V
BV_{gs}	Source Breakdown Voltage (Ig = 0.6 mA, drain open)		-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		75		°C/W

ELECTRICAL CHARACTERISTIC (TUNED FOR POWER) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	27.0	28.0 28.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, Ids = 50% I_{dss})	12 GHz 18 GHz	11.0	12.0 9.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		55 55		%
NF	50 Ohm Noise Figure (V_{ds}=2V, I_{dss}=15 mA)	12 GHz		1.34		dB

ELECTRICAL CHARACTERISTIC (TUNED FOR GAIN) T_a = 25° C

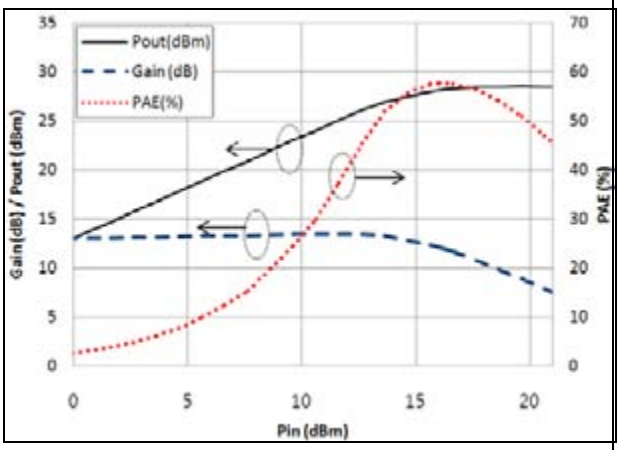
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		27.5 27.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, Ids = 50% I_{dss})	12 GHz 18 GHz	11.0	12.5 9.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		55 50		%
NF	50 Ohm Noise Figure (V_{ds}=2V, I_{dss}=15 mA)	12 GHz		1.34		dB

MAXIMUM RATING (T_a = 25° C)

SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	30 mA	10 mA
P_{in}	Input Power	25 dBm	@3dB Compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	2.6 W	2.2 W

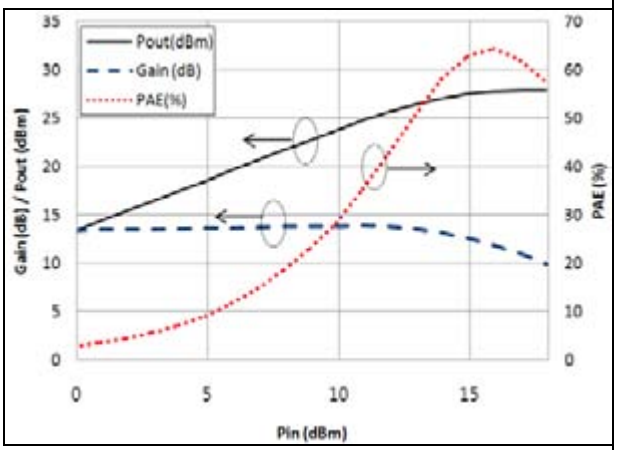
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

P_{IN}_P_{OUT}/Gain, PAE (12 GHz)



Frequency = 12GHz

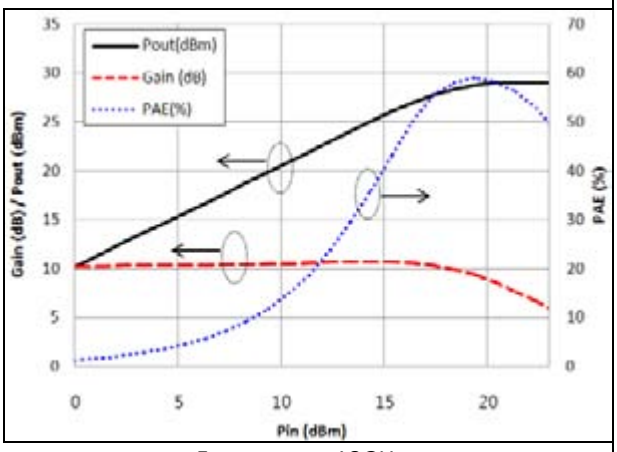
V_{ds}= 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 12GHz

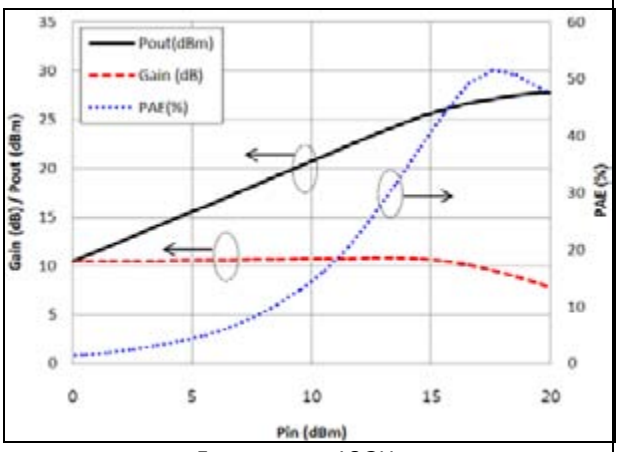
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

P_{IN}_P_{OUT}/Gain, PAE (18 GHz)



Frequency = 18GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 18GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

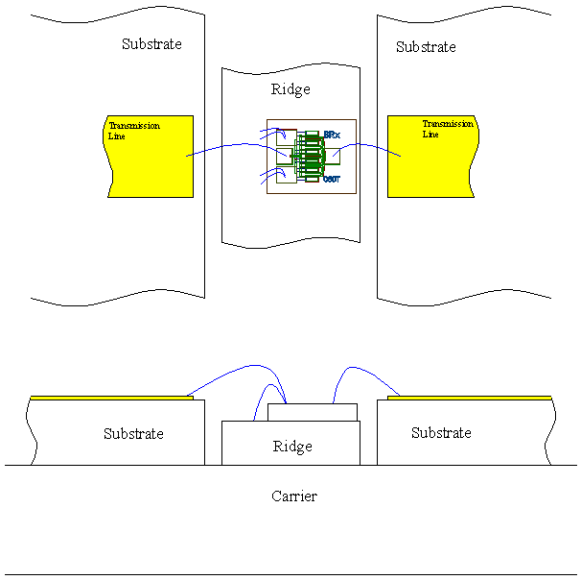
S-PARAMETER (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.92	-57.91	13.83	142.64	0.017	62.75	0.45	-30.63
2	0.83	-100.13	10.45	117.12	0.032	43.42	0.34	-49.55
3	0.79	-129.58	7.98	99.76	0.047	34.74	0.25	-62.90
4	0.77	-150.61	6.32	86.33	0.061	28.79	0.19	-72.26
5	0.77	-165.65	5.18	75.24	0.073	27.32	0.15	-86.36
6	0.77	-178.11	4.35	65.56	0.084	26.36	0.13	-101.81
7	0.78	172.13	3.69	56.72	0.094	25.99	0.12	-123.94
8	0.79	163.81	3.25	48.59	0.103	25.03	0.12	-137.66
9	0.80	156.81	2.88	41.33	0.108	23.59	0.12	-155.22
10	0.81	150.09	2.58	34.01	0.114	24.54	0.14	-169.25
11	0.82	143.11	2.34	26.33	0.120	23.14	0.16	178.07
12	0.83	136.61	2.12	18.59	0.124	22.92	0.19	168.01
13	0.85	130.15	1.94	11.44	0.130	19.85	0.22	157.74
14	0.86	123.54	1.77	3.60	0.134	16.06	0.25	148.31
15	0.88	117.87	1.60	-4.01	0.139	14.39	0.30	140.13
16	0.89	112.39	1.45	-11.27	0.144	10.53	0.35	132.31
17	0.90	106.79	1.29	-19.37	0.148	7.58	0.41	126.29
18	0.91	103.05	1.13	-26.14	0.153	6.07	0.46	120.85
19	0.92	100.04	1.00	-32.93	0.155	3.45	0.51	115.68
20	0.92	97.13	0.88	-38.54	0.156	0.94	0.57	111.97
21	0.93	96.22	0.76	-43.13	0.150	0.17	0.61	109.56
22	0.93	96.46	0.66	-46.19	0.149	0.71	0.65	107.33
23	0.92	96.55	0.57	-49.34	0.147	-0.34	0.68	106.11
24	0.92	97.66	0.51	-51.56	0.145	-0.02	0.71	106.08
25	0.94	98.95	0.46	-53.03	0.144	2.76	0.74	105.60
26	0.93	99.53	0.41	-54.01	0.145	3.92	0.76	106.41

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on "Wire Bonding Information" figure below.

Wire Bonding Information

Follow the wire bonding diagrams recommended by BeRex below to achieve optimum device performance. BeRex recommends thermo-compression wedge bonding. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires. Ultrasonic bonding is not recommended.



Using 1 mil. diameter, Au bonding wires.

1. Gate to input transmission line
   - Length and Height : 600 µm x 250 µm
   - Number of wire(s): 1
2. Drain to output transmission line
   - Length and Height : 400 µm x 250 µm
   - Number of wire(s) : 1
3. Source to ground plate
   - Length and Height : 250 µm x 300 µm
   - Number of wire(s) : 4

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:
BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:
GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:
BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:
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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

For complete specifications, S-parameters and information on bonding and handling, visited our website; *www.berex.com*

BCP060T2

HIGH EFFICIENCY pHEMT POWER FET CHIP (.25µm x 600µm)

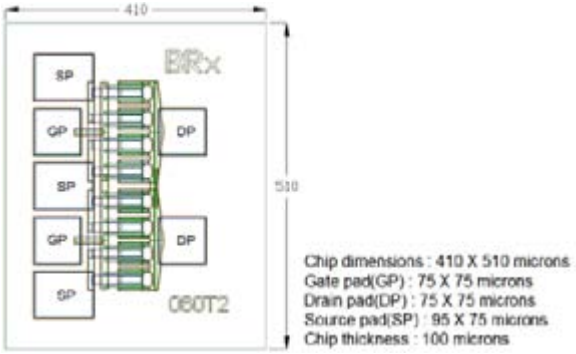
The BeRex BCP060T2 is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 600 micron gate width making it ideally suited for applications requiring high-gain and medium power in the 1000 MHz to 26.5 GHz frequency range. The product may be used in either wideband (6-18 GHz) or narrow-band applications. The BCP060T2 is produced using state of the art metallization with Si_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 29 dBm Typical Output Power
- 12 dB Typical Power Gain @ 12 GHz
- 0.25 X 600 Micron Recessed Gate
- 2 Gate Pads / 2 Drain Pads

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement



DC CHARACTERISTICS T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2V)	120	180	240	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})		240		mS
V_p	Pinch-off Voltage (I_{ds} = 0.6 mA, V_{ds} = 2V)	- 2.5	-1.1	- 0.5	V
BV_{gd}	Drain Breakdown Voltage (Ig = 0.6 mA, source open)		-16	-12	V
BV_{gs}	Source Breakdown Voltage (Ig = 0.6 mA, drain open)		-14		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		65		°C/W

ELECTRICAL CHARACTERISTIC (TUNED FOR POWER) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	27.5 27.5	29.0 29.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, Ids = 50% I_{dss})	12 GHz 18 GHz	11.0 8.0	12.0 9.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		65 60		%

ELECTRICAL CHARACTERISTIC (TUNED FOR GAIN) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	25.5 26.0	27.0 28.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, Ids = 50% I_{dss})	12 GHz 18 GHz	12.5 9.5	13.5 10.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		60 60		%

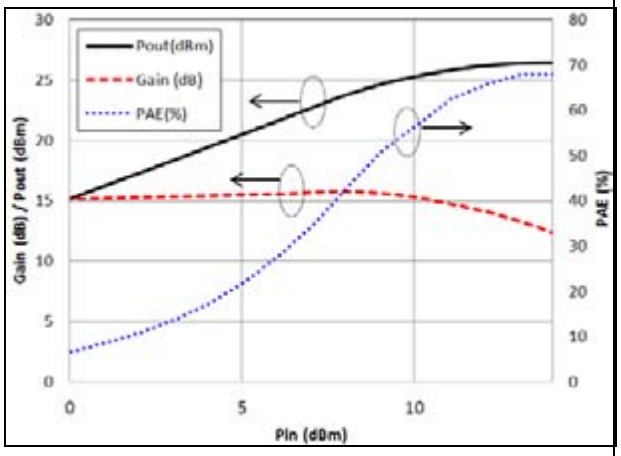
MAXIMUM RATING (T_a = 25° C)

SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-8 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	30 mA	5 mA
P_{in}	Input Power	24 dBm	@3dB Compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	2.1 W	1.7 W

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

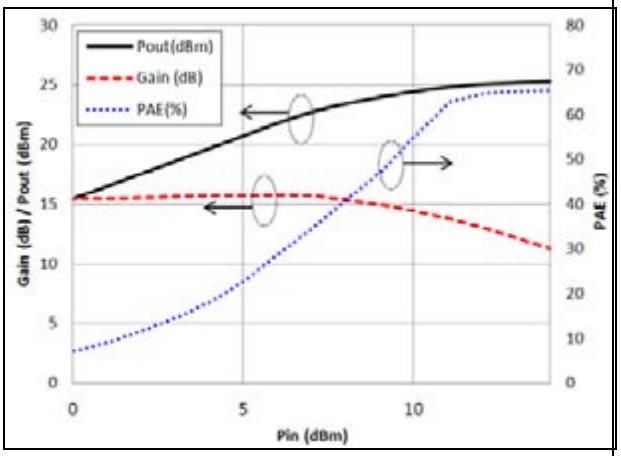
P_{IN}_P_{OUT}/Gain, PAE (12 GHz)

Frequency = 12GHz



V_{ds}= 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)

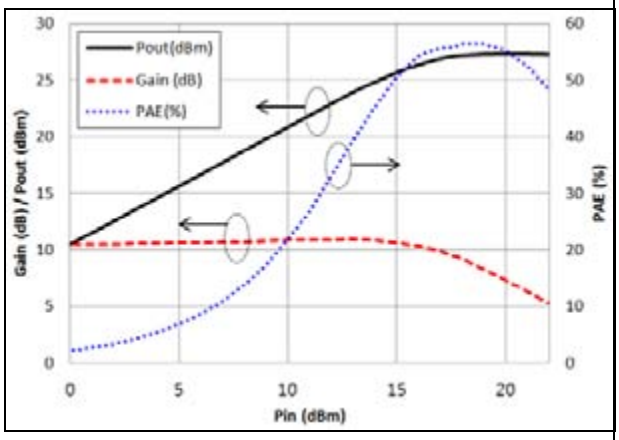
Frequency = 12GHz



V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

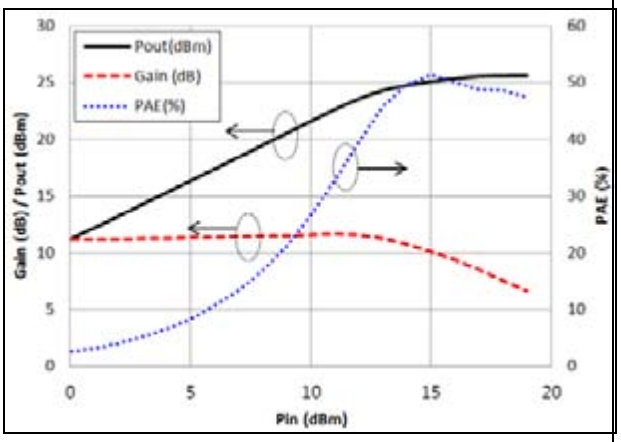
P_{IN}_P_{OUT}/Gain, PAE (18 GHz)

Frequency = 18GHz



V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)

Frequency = 18GHz



V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

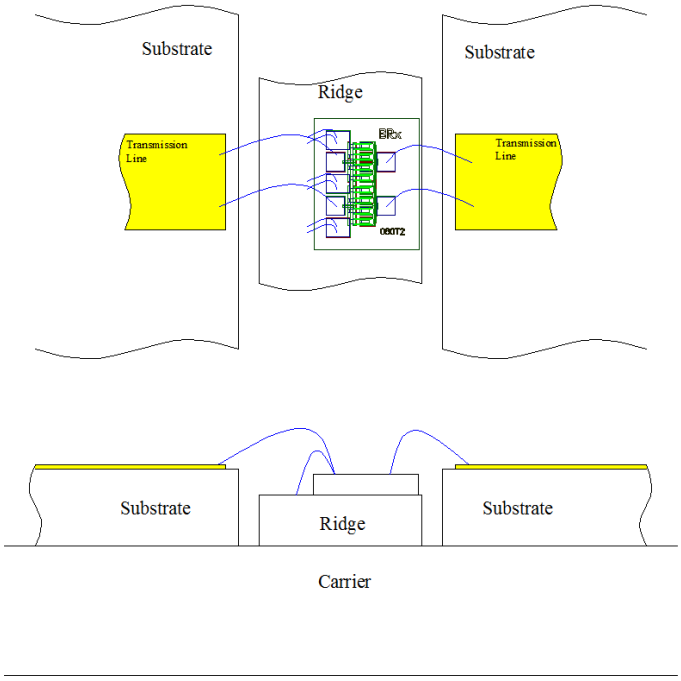
S-PARAMETER (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.92	-64.25	13.19	141.20	0.033	56.560	0.46	-36.52
2	0.87	-105.65	9.68	117.34	0.048	37.422	0.37	-58.58
3	0.84	-131.06	7.33	101.49	0.053	27.876	0.32	-72.07
4	0.83	-149.30	5.79	89.56	0.055	21.285	0.29	-80.80
5	0.82	-162.29	4.75	79.77	0.055	17.345	0.28	-88.81
6	0.82	-172.56	4.00	71.40	0.055	14.429	0.28	-93.34
7	0.82	177.98	3.44	63.68	0.054	12.980	0.29	-97.85
8	0.83	170.03	2.99	56.43	0.053	11.367	0.29	-103.15
9	0.83	162.91	2.64	49.71	0.051	10.094	0.30	-106.98
10	0.84	155.83	2.33	43.12	0.049	8.831	0.31	-111.51
11	0.85	150.15	2.08	37.02	0.048	9.020	0.33	-116.26
12	0.86	146.03	1.86	31.78	0.046	9.038	0.34	-119.38
13	0.87	141.12	1.67	26.35	0.045	9.686	0.35	-123.53
14	0.89	137.47	1.52	21.34	0.045	9.837	0.37	-128.98
15	0.90	134.65	1.39	17.24	0.045	11.047	0.38	-131.05
16	0.91	131.13	1.28	12.51	0.046	11.134	0.40	-134.67
17	0.92	127.82	1.19	7.56	0.047	10.856	0.42	-138.64
18	0.92	125.14	1.10	2.79	0.047	9.956	0.44	-141.24
19	0.93	120.98	1.02	-2.09	0.049	9.789	0.45	-143.25
20	0.93	119.34	0.95	-6.78	0.051	7.389	0.47	-147.74
21	0.93	117.00	0.88	-10.66	0.051	8.789	0.48	-150.89
22	0.92	114.60	0.81	-14.89	0.054	8.633	0.49	-154.89
23	0.93	113.16	0.76	-18.59	0.055	9.580	0.52	-158.03
24	0.92	111.43	0.70	-22.44	0.056	9.195	0.52	-161.04
25	0.92	109.91	0.64	-25.94	0.055	11.221	0.54	-165.44
26	0.93	109.66	0.59	-28.89	0.056	15.488	0.55	-168.02

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on "Wire Bonding Information" figure below.

Wire Bonding Information

Follow the wire bonding diagrams recommended by BeRex below to achieve optimum device performance. BeRex recommends thermo-compression wedge bonding. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires. Ultrasonic bonding is not recommended.



Bonding Wire information

1. Gate to input transmission line
   - Length and Height : 400 um and 250 um
   - Number of wire : 2 wire
2. Drain to output transmission line
   - Length and Height : 350 um and 250 um
   - Number of wire : 2 wire
3. Source to ground plate
   - Length and Height : 200 um and 250 um
   - Number of wire : 6 wires

※ The diameter of bonding wires : 1 mil

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:
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RoHS COMPLIANT

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BCP080T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 800µm)

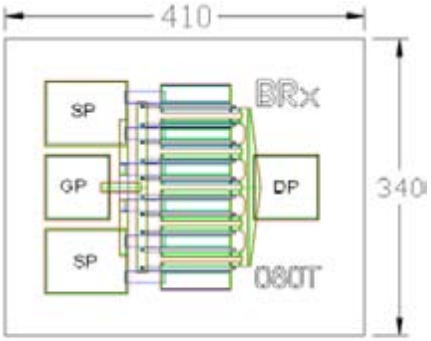
The BeRex BCP080T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 800 micron gate width making the product ideally suited for amplifier applications where high-gain and medium power from DC to 26 GHz. The product may be used in either wideband or narrow-band applications. The BCP080T is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 30 dBm Typical Output Power
- 10.5 dB Typical Gain @ 12 GHz
- 60% PAE Typical @12 GHz
- 0.25 X 800 µm Recessed Gate
- Also available in 70 mil. ceramic package (BCP080T-70)

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement



Chip dimensions : 410 X 340 microns
Gate pad(GP) : 75 X 75 microns
Drain pad(DP) : 75 X 75 microns
Source pad(SP) : 95 X 75 microns
Chip thickness : 100 microns

DC CHARACTERISTICS T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)	160	240	320	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})		320		mS
V_p	Pinch-off Voltage (I_{ds} = 800 µA, V_{ds} = 2V)	-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_{gd} = 0.8 mA, source open)		-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 0.8 mA, drain open)		-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		61		°C/W

ELECTRICAL CHARACTERISTIC (TUNED FOR POWER) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	29.0	30.0 30.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	9.5	10.5 7.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		60 55		%

ELECTRICAL CHARACTERISTIC (TUNED FOR GAIN) T_a = 25° C

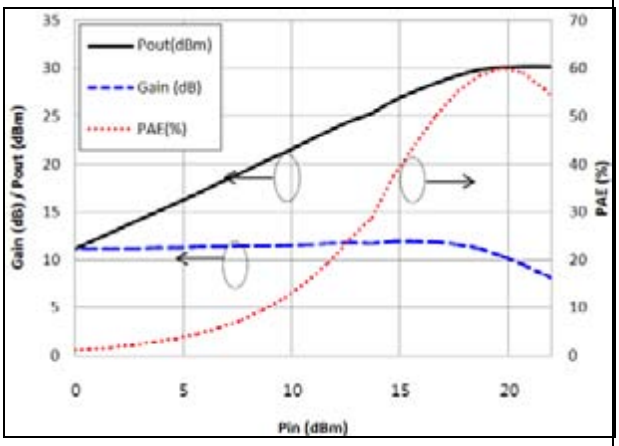
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	27.5	28.5 28.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	10.5	11.5 8.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		58 45		%

MAXIMUM RATING (T_a = 25° C)

SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	40 mA	7 mA
P_{in}	Input Power	27 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	3.0 W	2.5 W

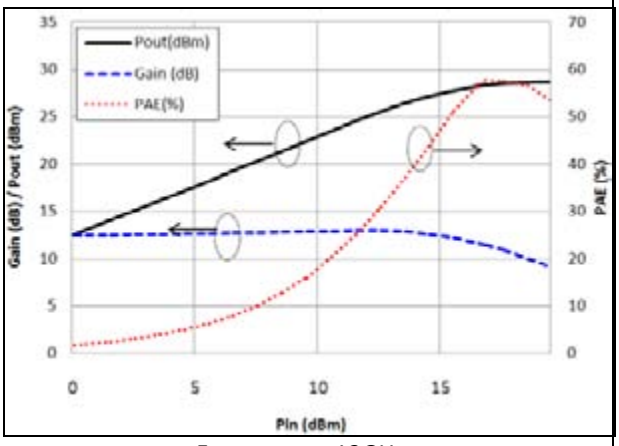
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

P_{IN}_P_{OUT}/Gain, PAE (12 GHz)



Frequency = 12GHz

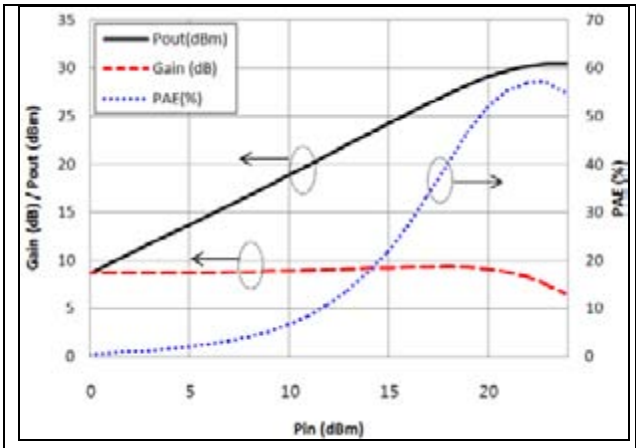
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 12GHz

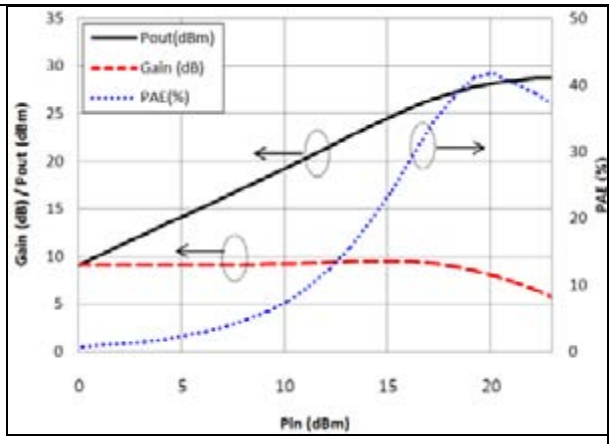
V_{ds} = 8 V, I_{ds} = 50% Id_{ss} (Tuned for Gain)

P_{IN}_P_{OUT}/Gain, PAE (18 GHz)



Frequency = 18GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 18GHz

V_{ds} = 8 V, I_{ds} = 50% Id_{ss} (Tuned for Gain)

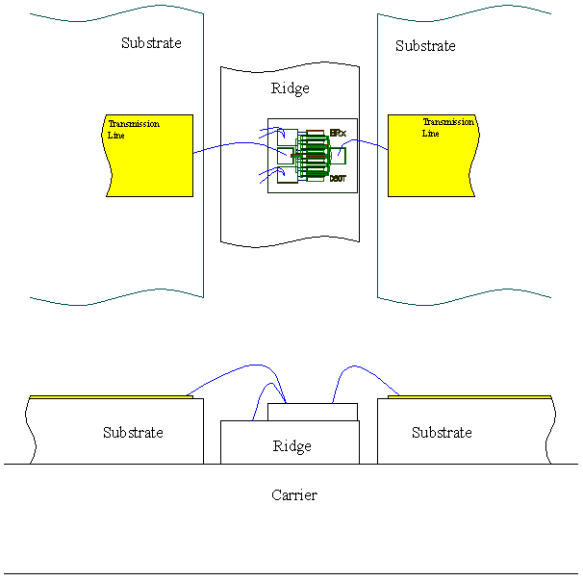
S-PARAMETER (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.88	-76.19	15.20	133.42	0.024	52.92	0.33	-48.85
2	0.80	-122.05	10.28	107.10	0.026	39.88	0.23	-79.11
3	0.78	-150.41	7.46	90.51	0.028	32.53	0.18	-100.71
4	0.78	-169.11	5.73	78.17	0.032	27.33	0.15	-118.62
5	0.78	177.02	4.62	67.37	0.033	26.98	0.15	-135.40
6	0.79	165.27	3.82	57.85	0.037	26.66	0.16	-148.85
7	0.81	156.52	3.20	49.39	0.039	26.35	0.18	-160.17
8	0.82	147.81	2.79	41.06	0.040	27.57	0.20	-167.44
9	0.84	140.62	2.44	33.85	0.045	26.68	0.22	-176.73
10	0.84	134.26	2.17	26.58	0.048	26.40	0.24	177.83
11	0.86	126.33	1.94	18.60	0.052	24.32	0.26	171.10
12	0.87	119.77	1.73	10.95	0.054	22.92	0.29	165.39
13	0.89	114.17	1.56	4.42	0.056	20.74	0.32	158.94
14	0.89	107.48	1.41	-3.40	0.058	17.25	0.35	152.81
15	0.90	102.39	1.24	-10.36	0.061	15.12	0.39	146.64
16	0.92	98.18	1.12	-16.82	0.062	12.32	0.44	140.53
17	0.93	93.38	0.99	-24.48	0.063	7.68	0.48	135.58
18	0.93	92.33	0.86	-28.98	0.065	8.39	0.52	130.41
19	0.93	90.25	0.76	-34.74	0.064	6.46	0.56	125.87
20	0.94	86.43	0.67	-40.26	0.063	6.69	0.61	122.41
21	0.95	87.08	0.57	-43.33	0.064	4.00	0.64	119.62
22	0.94	88.18	0.51	-46.45	0.063	3.40	0.66	117.23
23	0.94	87.44	0.44	-49.43	0.064	2.63	0.70	115.29
24	0.94	90.11	0.39	-50.10	0.064	1.51	0.73	114.62
25	0.94	91.60	0.35	-52.21	0.061	4.83	0.75	113.64
26	0.95	90.36	0.31	-52.11	0.058	10.58	0.76	114.36

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on "Wire Bonding Information" figure below.

WIRE BONDING INFORMATION

Follow the wire bonding diagrams recommended by BeRex below to achieve optimum device performance. BeRex recommends thermo-compression wedge bonding. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires. Ultrasonic bonding is not recommended.



Using 1 mil. diameter, Au bonding wires.

1. Gate to input transmission line
- Length and Height : 600 µm x 250 µm
- Number of wire(s): 1
2. Drain to output transmission line
- Length and Height : 400 µm x 250 µm
- Number of wire(s) : 1
3. Source to ground plate
- Length and Height : 250 µm x 300 µm
- Number of wire(s) : 4

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:

THIS PRODUCT CONTAINS GALLIUM ARSENIDE (GaAs) WHICH CAN BE HAZARDOUS TO THE HUMAN BODY AND THE ENVIRONMENT. THEREFORE, IT MUST BE HANDLED WITH CARE AND IN ACCORDANCE WITH ALL GOVERNMENTAL AND COMPANY REGULATIONS FOR THE SAFE HANDLING AND DISPOSAL OF HAZARDOUS WASTE. DO NOT BURN, DESTROY, CUT, CRUSH OR CHEMICALLY DISSOLVE THE PRODUCT. DO NOT LICK THE PRODUCT OR IN ANY WAY ALLOW IT TO ENTER THE MOUTH. EXCLUDE THE PRODUCT FROM GENERAL INDUSTRIAL WASTE OR GARBAGE AND DISPOSE OF ONLY IN ACCORDANCE TO APPLICABLE LAWS AND/OR ORDINANCES.

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LIFE SUPPORT POLICY

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1. Life support devices or systems are devices or systems which (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

RoHS COMPLIANT

For complete specifications, S-parameters and information on bonding and handling, visited our website; *www.berex.com*

BCP080T2

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 800µm)

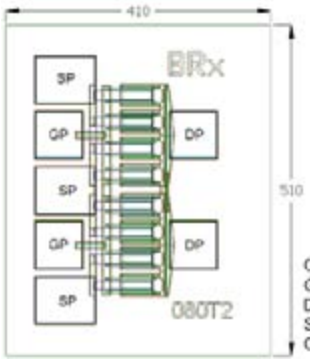
The BeRex BCP080T2 is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 800 micron gate width making it ideally suited for applications requiring high-gain and medium power in the 1000 MHz to 27.5 GHz frequency range. The product may be used in either wideband (6-18 GHz) or narrow-band applications. The BCP080T2 is produced using state of the art metallization with Si_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 30 dBm Typical Output Power
- 11.5 dB Typical Power Gain @ 12 GHz
- 0.25 X 800 Micron Recessed Gate
- 2 Gate Pads / 2 Drain Pads

APPLICATIONS

- Commercial
- Military / Hi-Rel
- Test & Measurement



Chip dimensions : 410 X 510 microns
Gate pad(GP) : 75 X 75 microns
Drain pad(DP) : 75 X 75 microns
Source pad(SP) : 95 X 75 microns
Chip thickness : 100 microns

DC CHARACTERISTICS T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)	160	240	320	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})		320		mS
V_p	Pinch-off Voltage (I_{ds} = 800 µA, V_{ds} = 2V)	-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_{gd} = 0.8 mA, source open)		-16	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 0.8 mA, drain open)		-14		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		55		°C/W

ELECTRICAL CHARACTERISTIC (TUNED FOR POWER) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	28.5 28.0	30.0 29.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	10.5 8.5	11.5 9.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		65 60		%

ELECTRICAL CHARACTERISTIC (TUNED FOR GAIN) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	26.0 27.5	27.5 29.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	12.0 9.0	13.0 10.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		50 55		%

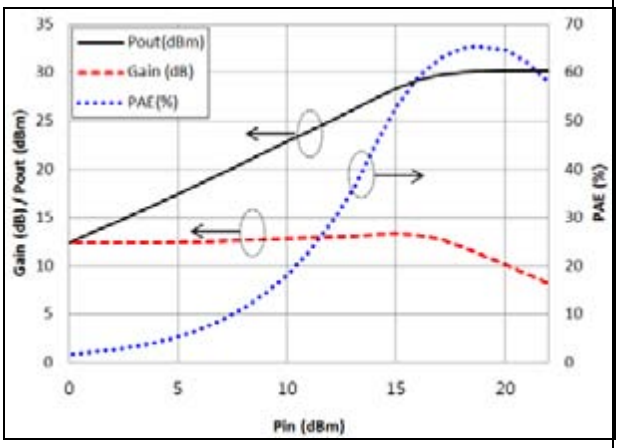
MAXIMUM RATING (T_a = 25° C)

SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-8 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	40 mA	7 mA
P_{in}	Input Power	27 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	2.5 W	2.1 W

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

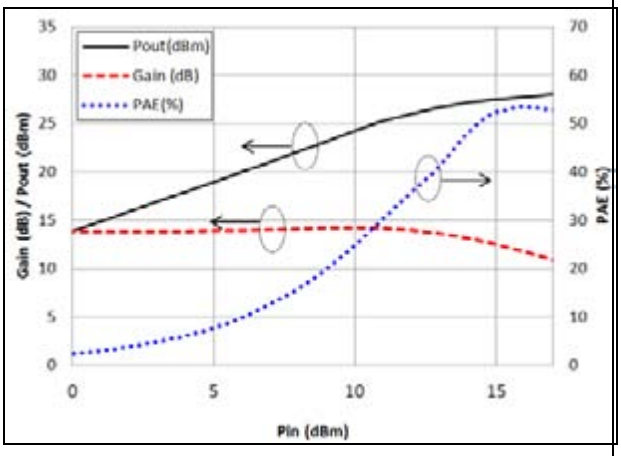
P_{IN}_P_{OUT}/Gain, PAE (12 GHz)

Frequency = 12GHz



V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)

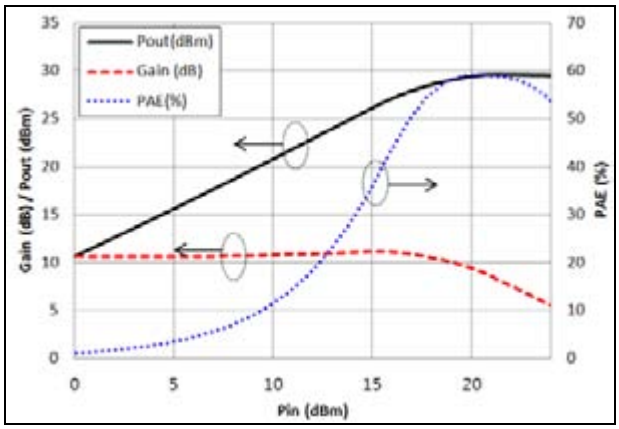
Frequency = 12GHz



V_{ds} = 8 V, I_{ds} = 50% Id_{ss} (Tuned for Gain)

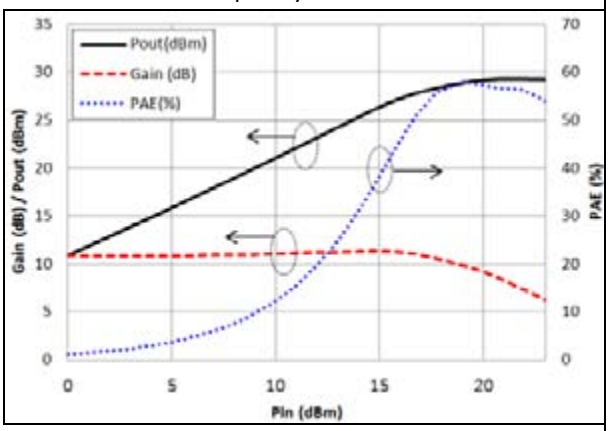
P_{IN}_P_{OUT}/Gain, PAE (18 GHz)

Frequency = 18GHz



V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)

Frequency = 18GHz



V_{ds} = 8 V, I_{ds} = 50% Id_{ss} (Tuned for Gain)

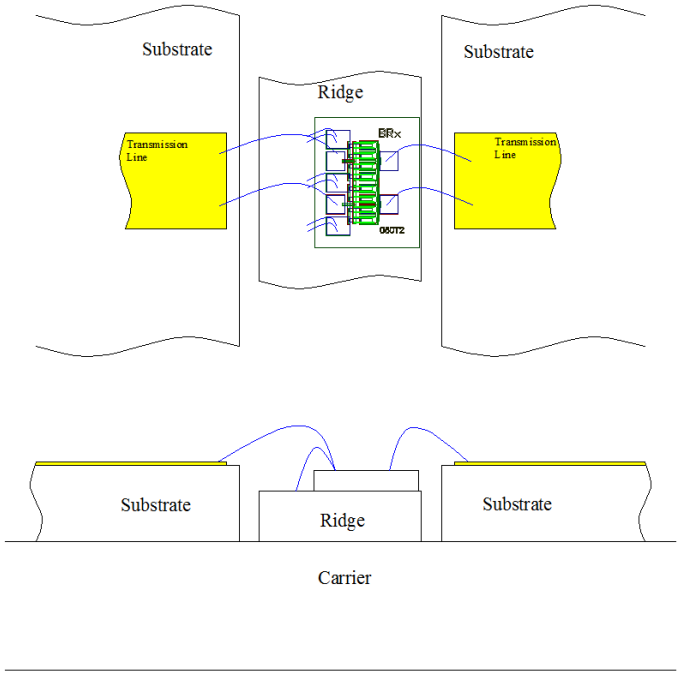
S-PARAMETER (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.90	-80.81	14.18	132.87	0.034	48.617	0.35	-53.62
2	0.86	-122.78	9.47	109.07	0.045	31.997	0.27	-81.38
3	0.84	-145.71	6.86	94.32	0.048	24.841	0.24	-97.12
4	0.84	-161.07	5.31	83.42	0.049	20.743	0.22	-106.56
5	0.84	-171.88	4.31	74.30	0.049	19.202	0.22	-115.48
6	0.84	179.59	3.61	66.44	0.049	18.561	0.22	-120.27
7	0.84	172.04	3.09	59.24	0.049	17.423	0.23	-125.61
8	0.85	165.30	2.69	52.08	0.049	18.330	0.24	-131.87
9	0.85	159.07	2.37	45.42	0.049	18.362	0.26	-136.95
10	0.86	152.97	2.10	38.83	0.048	18.850	0.27	-143.16
11	0.87	147.86	1.87	32.61	0.047	19.849	0.30	-148.66
12	0.88	144.05	1.67	27.23	0.047	20.641	0.32	-152.94
13	0.89	140.19	1.51	21.68	0.047	19.988	0.34	-158.21
14	0.90	136.46	1.37	16.47	0.048	20.783	0.38	-163.20
15	0.91	133.41	1.25	11.89	0.049	21.641	0.40	-165.72
16	0.92	129.89	1.14	6.67	0.049	20.932	0.43	-169.28
17	0.93	125.68	1.06	1.22	0.052	20.105	0.47	-172.45
18	0.93	123.10	0.97	-3.65	0.052	19.082	0.50	-174.65
19	0.94	119.63	0.89	-8.89	0.054	17.318	0.51	-177.15
20	0.94	117.10	0.81	-14.03	0.056	16.112	0.54	179.71
21	0.94	115.14	0.75	-17.90	0.058	17.116	0.56	176.92
22	0.93	113.43	0.68	-21.85	0.060	16.972	0.58	173.39
23	0.94	111.85	0.63	-25.51	0.062	15.759	0.61	170.90
24	0.93	110.84	0.58	-29.25	0.062	13.961	0.62	167.56
25	0.93	110.43	0.52	-32.33	0.062	16.654	0.63	163.31
26	0.94	109.70	0.48	-34.96	0.063	20.335	0.65	160.51

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on "Wire Bonding Information" figure below.

WIRE BONDING INFORMATION

Follow the wire bonding diagrams recommended by BeRex below to achieve optimum device performance. BeRex recommends thermo-compression wedge bonding. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires. Ultrasonic bonding is not recommended.



Bonding Wire information

1. Gate to input transmission line
   - Length and Height : 400 um and 250 um
   - Number of wire : 2 wire
2. Drain to output transmission line
   - Length and Height : 300 um and 250 um
   - Number of wire : 2 wire
3. Source to ground plate
   - Length and Height : 200 um and 250 um
   - Number of wire : 6 wires

※ The diameter of bonding wires : 1 mil.

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:

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www.berex.com

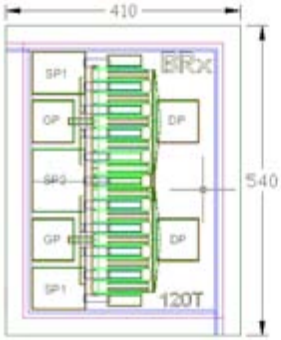
BCP120T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 1200µm)

The BeRex BCP120T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 1200 micron gate width making the product ideally suited for amplifier applications where high-gain and medium power from DC to 26 GHz. The product may be used in either wideband or narrow-band applications. The BCP120T is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 32 dBm Typical Output Power
- 11 dB Typical Gain @ 12 GHz
- 60% PAE Typical @12 GHz
- 0.25 X 1200 µm Recessed Gate



Chip dimensions : 410 X 540 microns
Gate pad(GP) : 75 X 75 microns
Drain pad(DP) : 75 X 75 microns
Source pad1(SP1) : 95 X 75 microns
Source pad2(SP2) : 95 X 110 microns
Chip thickness : 100 microns

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement

DC CHARACTERISTICS T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)	240	360	480	mA
G_m	Transconductance (V_{ds} = 2V, V_{gs} = 50% I_{dss})		480		mS
V_p	Pinch-off Voltage (I_{ds} = 1.2 mA, V_{ds} = 2V)	-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_{gd} = 0.8 mA, source open)		-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 0.8 mA, drain open)		-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		41		°C/W

ELECTRICAL CHARACTERISTICS (TUNED FOR POWER) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	31.0	32.0 32.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	10.0	11.0 8.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		60 55		%

ELECTRICAL CHARACTERISTICS (TUNED FOR GAIN) T_a = 25° C

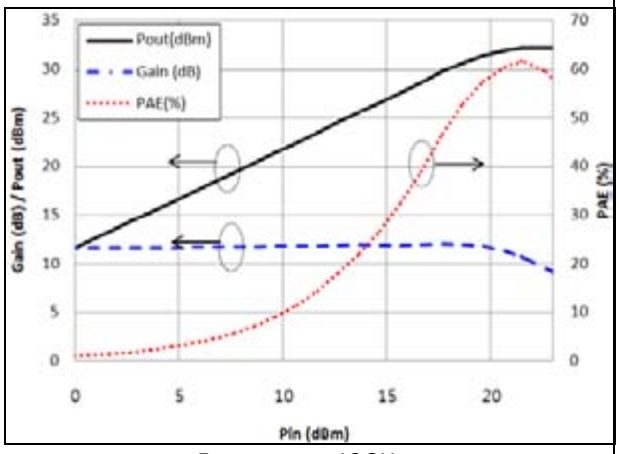
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	29.0	30.0 30.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	11.0	12.0 9.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		50 45		%

MAXIMUM RATINGS (T_a = 25° C)

SYMBOL	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	60 mA	10 mA
P_{in}	Input Power	29 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	4.9 W	4.1 W

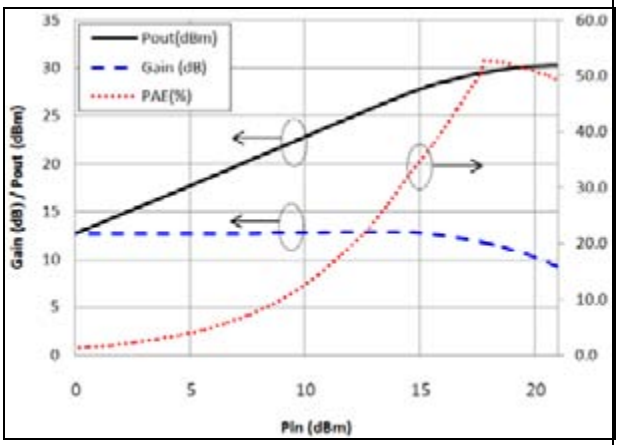
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

P_{IN}_P_{OUT}/Gain, PAE (12 GHz)



Frequency = 12GHz

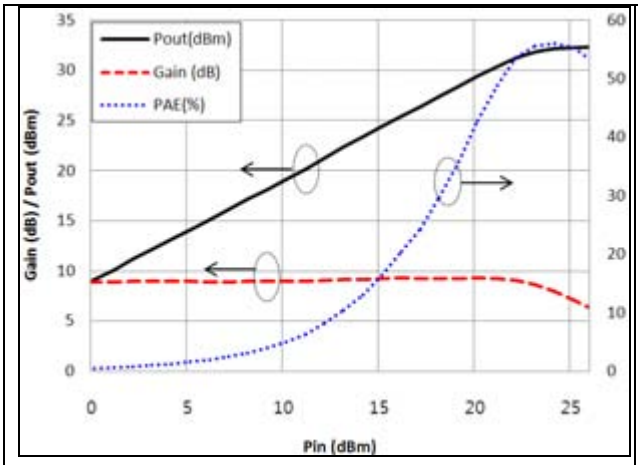
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 12GHz

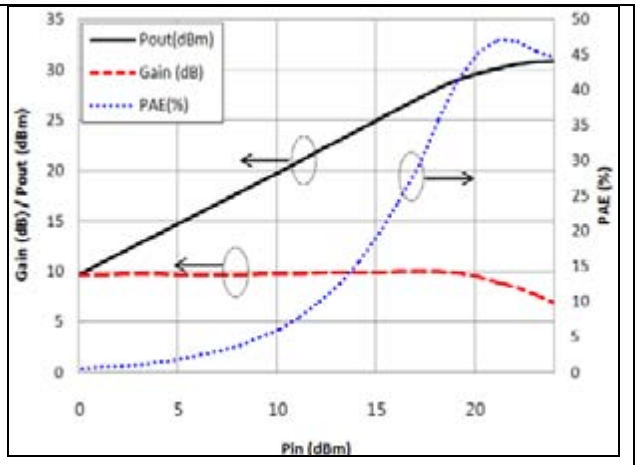
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

P_{IN}_P_{OUT}/Gain, PAE (18 GHz)



Frequency = 18GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 18GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

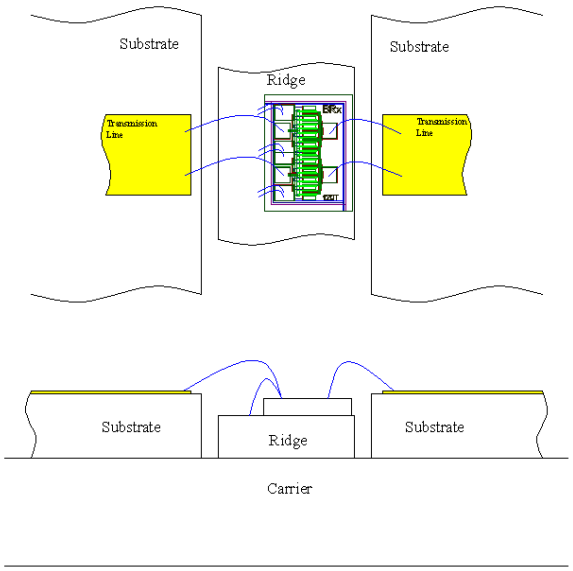
S-PARAMETER (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.87	-107.97	14.78	119.26	0.032	41.51	0.27	-114.33
2	0.84	-145.40	8.59	97.61	0.038	33.64	0.28	-143.90
3	0.84	-163.59	5.95	85.22	0.040	30.50	0.30	-155.42
4	0.84	-174.83	4.52	75.95	0.045	31.72	0.31	-160.78
5	0.84	176.68	3.62	67.51	0.045	33.32	0.32	-164.63
6	0.85	169.41	3.01	59.98	0.048	34.78	0.34	-167.42
7	0.86	163.34	2.53	52.95	0.050	36.49	0.36	-170.61
8	0.86	157.55	2.21	46.07	0.051	39.56	0.37	-172.00
9	0.87	152.27	1.95	40.15	0.055	38.30	0.39	-175.10
10	0.88	147.45	1.74	34.08	0.057	39.28	0.41	-177.55
11	0.88	142.20	1.56	27.88	0.062	38.46	0.43	179.73
12	0.89	137.21	1.41	21.58	0.063	36.94	0.45	177.54
13	0.90	132.89	1.28	16.17	0.066	37.28	0.47	174.32
14	0.91	128.43	1.15	10.37	0.066	36.24	0.49	171.27
15	0.92	124.72	1.04	5.09	0.068	34.24	0.52	167.79
16	0.93	121.32	0.96	-0.15	0.070	32.48	0.55	164.44
17	0.93	118.18	0.86	-5.87	0.071	30.66	0.58	160.90
18	0.94	115.66	0.77	-10.08	0.069	26.37	0.60	157.59
19	0.94	114.16	0.69	-14.84	0.071	27.07	0.62	153.96
20	0.94	111.93	0.62	-19.23	0.074	25.55	0.65	151.27
21	0.95	110.61	0.56	-22.40	0.075	23.86	0.67	148.70
22	0.94	110.14	0.50	-26.10	0.078	22.88	0.69	146.17
23	0.94	109.48	0.45	-28.36	0.075	21.58	0.71	143.44
24	0.94	109.46	0.41	-30.96	0.076	20.17	0.74	141.85
25	0.95	109.38	0.37	-32.98	0.075	18.97	0.75	140.00
26	0.94	108.63	0.33	-34.75	0.074	21.22	0.76	139.27

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on "Wire Bonding Information" figure below.

WIRE BONDING INFORMATION

Follow the wire bonding diagrams recommended by BeRex below to achieve optimum device performance. BeRex recommends thermo-compression wedge bonding. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires. Ultrasonic bonding is not recommended.



Using 1 mil. diameter, Au bonding wires.

1. Gate to input transmission line
   - Length and Height : 600 µm x 250 µm
   - Number of wire(s): 2
2. Drain to output transmission line
   - Length and Height : 400 µm x 250 µm
   - Number of wire(s) : 2
3. Source to ground plate
   - Length and Height : 250 µm x 300 µm
   - Number of wire(s) : 6

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:

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LIFE SUPPORT POLICY

BEREX PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES WITHOUT THE EXPRESS WRITTEN APPROVAL OF BEREX.

1. Life support devices or systems are devices or systems which (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

RoHS COMPLIANT

For complete specifications, S-parameters and information on bonding and handling, visited our website; *www.berex.com*

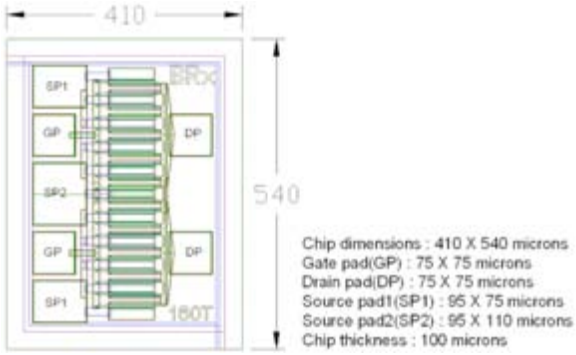
BCP160T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 1600µm)

The BeRex BCP160T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 1600 micron gate width making the product ideally suited for amplifier applications where high-gain and medium power from DC to 26 GHz. The product may be used in either wideband or narrow-band applications. The BCP160T is produced using state of the art metallization with Si_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 33 dBm Typical Output Power
- 10.5 dB Typical Gain @ 12 GHz
- 60% PAE Typical @12 GHz
- 0.25 X 1600 µm Recessed Gate



APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement

DC CHARACTERISTICS T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)	320	480	640	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})		640		mS
V_p	Pinch-off Voltage (I_{ds} = 1.6 mA, V_{ds} = 2V)	-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_{gd} = 1.6 mA, source open)		-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 1.6 mA, drain open)		-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		33		° C/W

ELECTRICAL CHARACTERISTICS (TUNED FOR POWER) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	32.0	33.2 33.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	9.5	10.4 6.7		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		63 47		%

ELECTRICAL CHARACTERISTICS (TUNED FOR GAIN) T_a = 25° C

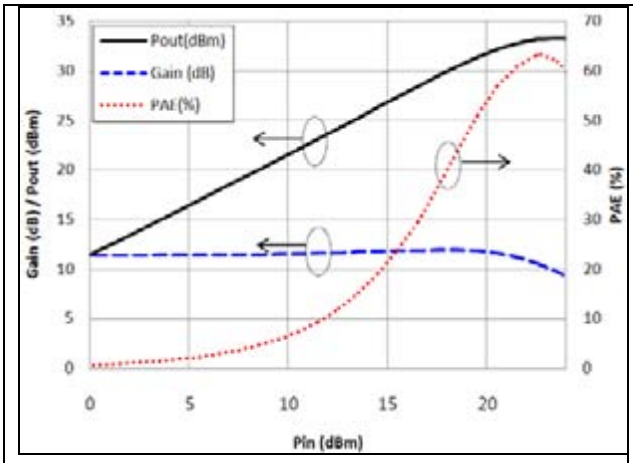
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	29.5	30.7 30.1		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	10.0	10.8 6.4		dB
PAE	PAE @ P_{1dB} (Vds = 8V, Ids = 50% Idss)	12 GHz 18 GHz		41.0 26.5		%

MAXIMUM RATINGS (T_a = 25° C)

SYMBOL	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	80 mA	14 mA
P_{in}	Input Power	30 dBm	@ 3 dB Compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	6.0 W	5.0 W

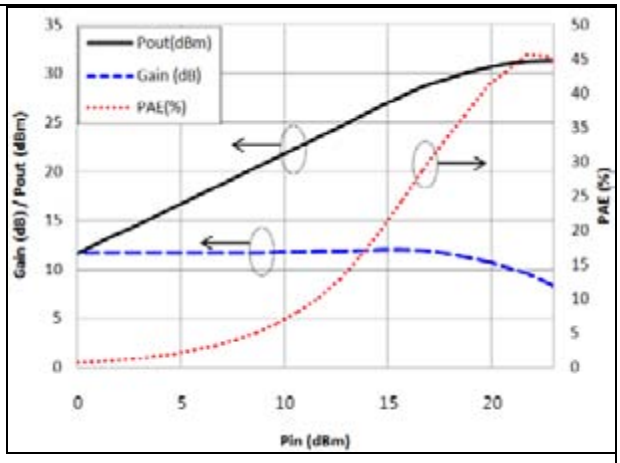
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

P_{IN}_P_{OUT}/Gain, PAE (12 GHz)



Frequency = 12GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 12GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

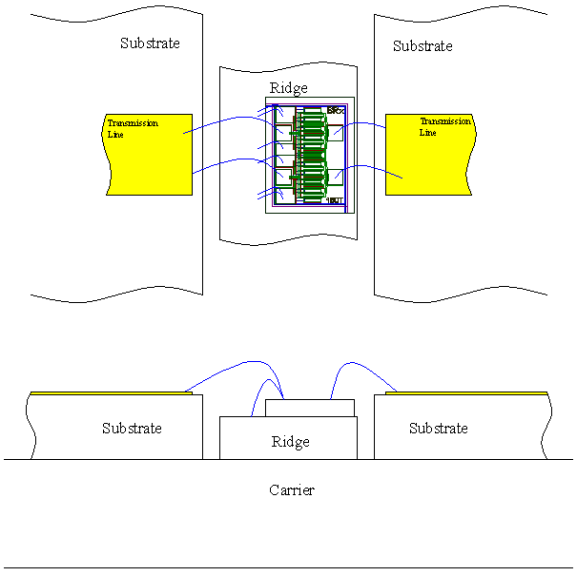
S-PARAMETERS (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.87	-125.38	13.67	111.02	0.029	37.07	0.34	-144.18
2	0.85	-156.37	7.50	92.04	0.034	32.44	0.36	-161.51
3	0.86	-171.07	5.11	80.78	0.036	33.73	0.37	-168.21
4	0.86	-179.89	3.86	72.20	0.040	34.70	0.38	-172.01
5	0.87	173.17	3.08	64.03	0.043	38.64	0.40	-174.55
6	0.87	167.14	2.55	56.79	0.047	40.81	0.42	-177.15
7	0.88	162.28	2.14	50.07	0.048	40.71	0.44	-179.70
8	0.88	157.56	1.88	43.01	0.050	45.15	0.45	178.62
9	0.89	152.94	1.65	37.28	0.055	45.37	0.47	175.28
10	0.89	148.80	1.48	31.07	0.060	44.07	0.49	172.74
11	0.89	143.76	1.33	24.59	0.062	42.96	0.51	169.96
12	0.90	138.90	1.20	18.21	0.066	41.21	0.53	167.35
13	0.91	134.97	1.09	12.85	0.070	39.95	0.55	163.90
14	0.91	129.80	0.99	6.58	0.071	38.03	0.58	161.41
15	0.92	125.36	0.89	0.82	0.073	35.59	0.61	158.02
16	0.93	121.84	0.81	-4.31	0.075	32.10	0.64	154.68
17	0.93	117.69	0.72	-10.60	0.073	29.92	0.66	151.79
18	0.95	115.85	0.63	-14.17	0.076	28.56	0.68	149.05
19	0.94	113.69	0.57	-18.70	0.076	27.06	0.71	145.91
20	0.94	110.54	0.52	-22.86	0.077	24.13	0.73	143.57
21	0.95	109.76	0.46	-26.30	0.077	24.61	0.75	141.51
22	0.94	110.02	0.41	-28.17	0.079	22.75	0.76	139.28
23	0.94	108.99	0.36	-31.53	0.080	22.44	0.77	136.86
24	0.94	110.06	0.33	-33.06	0.082	19.77	0.79	135.47
25	0.95	110.74	0.30	-34.59	0.077	20.11	0.80	133.59
26	0.95	110.24	0.27	-33.68	0.079	23.85	0.81	133.29

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on “Wire Bonding Information” figure below.

WIRE BONDING INFORMATION

Follow the wire bonding diagrams recommended by BeRex below to achieve optimum device performance. BeRex recommends thermo-compression wedge bonding. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires. Ultrasonic bonding is not recommended.



Using 1 mil. diameter, Au bonding wires.

1. Gate to input transmission line
   - Length and Height : 600 µm x 250 µm
   - Number of wire(s): 2
2. Drain to output transmission line
   - Length and Height : 400 µm x 250 µm
   - Number of wire(s) : 2
3. Source to ground plate
   - Length and Height : 250 µm x 300 µm
   - Number of wire(s) : 6

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

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STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

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RoHS COMPLIANT

For complete specifications, S-parameters and information on bonding and handling, visited our website; *www.berex.com*

BCP240T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 2400µm)

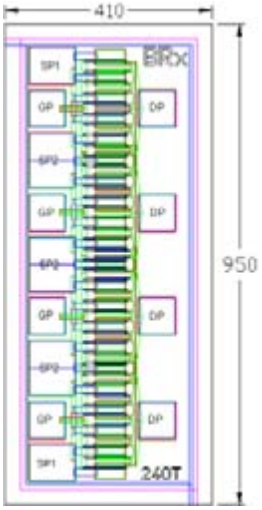
The BeRex BCP240T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 2400 micron gate width making the product ideally suited for amplifier applications where high-gain and medium power from DC to 26 GHz. The product may be used in either wideband or narrow-band applications. The BCP240T is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 34 dBm Typical Output Power
- 10 dB Typical Gain @12 GHz
- 58% PAE Typical @12 GHz
- 0.25 X 2400 µm Recessed Gate

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement



Chip dimensions : 410 X 950 microns
Gate pad(GP) : 75 X 75 microns
Drain pad(DP) : 75 X 75 microns
Source pad1(SP1) : 95 X 75 microns
Source pad2(SP2) : 95 X 110 microns
Chip thickness : 100 microns

DC CHARACTERISTICS T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.2V)	480	720	960	mA
G_m	Transconductance (V_{ds} = 2V, V_{gs} = 50% I_{dss})		960		mS
V_p	Pinch-off Voltage (I_{ds} = 2.4 mA, V_{ds} = 2V)	-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 2.4 mA, source open)		-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 2.4 mA, drain open)		-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		23		° C/W

ELECTRICAL CHARACTERISTICS (TUNED FOR POWER) T_a = 25° C

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	33.5	34.8 33.7		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	9.0	10.2 7.7		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		58 42		%

ELECTRICAL CHARACTERISTICS (TUNED FOR GAIN) T_a = 25° C

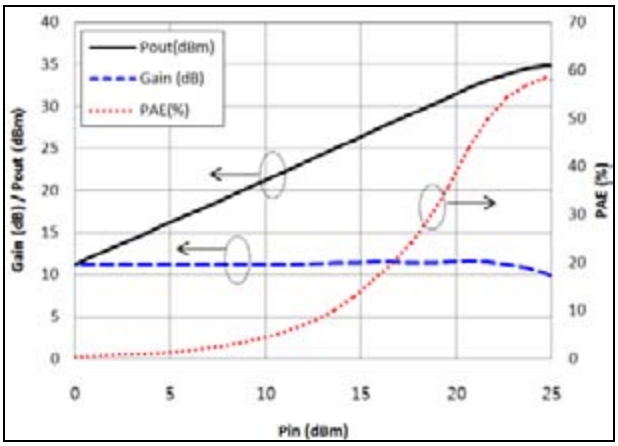
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	31.0	32.5 31.2		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	9.5	11.0 8.7		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		36 27		%

MAXIMUM RATINGS (T_a = 25° C)

SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	690 mA
I_{gsf}	Forward Gate Current	120 mA	20 mA
P_{in}	Input Power	31 dBm	@ 3dB Compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	8.4 W	6.9 W

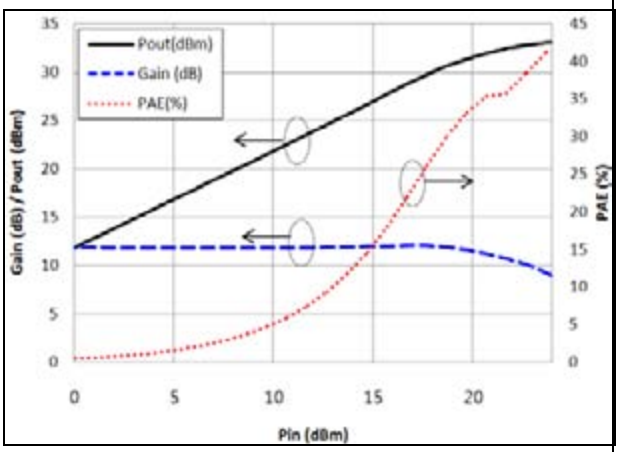
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

P_{IN}_P_{OUT}/Gain, PAE (12 GHz)



Frequency = 12GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



Frequency = 12GHz

V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

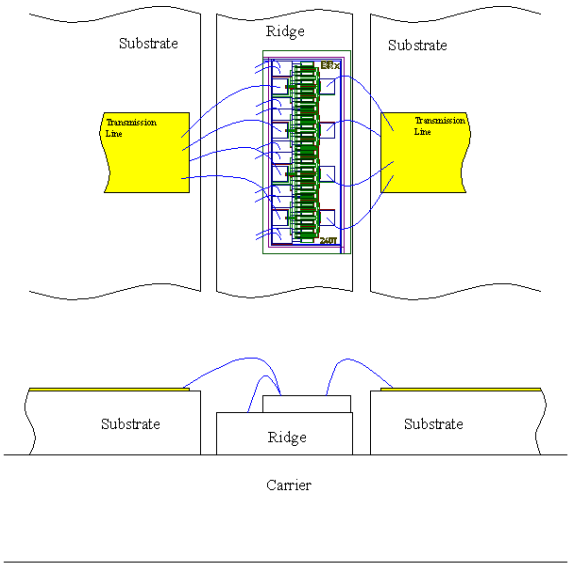
S-PARAMETER (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.90	-147.20	10.68	101.84	0.024	26.83	0.54	-166.95
2	0.90	-166.80	5.52	87.86	0.026	31.25	0.56	-173.49
3	0.91	-175.23	3.72	79.48	0.028	32.71	0.57	-175.76
4	0.92	179.32	2.80	72.74	0.032	38.68	0.58	-176.62
5	0.92	175.65	2.22	66.25	0.033	42.56	0.59	-177.49
6	0.92	172.96	1.84	60.88	0.037	47.19	0.60	-178.08
7	0.92	170.17	1.54	55.39	0.039	49.21	0.61	-178.49
8	0.93	167.87	1.35	50.23	0.040	52.94	0.62	-178.60
9	0.93	165.98	1.21	46.31	0.045	50.65	0.63	-179.68
10	0.92	163.50	1.09	41.28	0.048	53.68	0.64	179.89
11	0.93	161.40	0.99	36.84	0.052	54.32	0.65	179.02
12	0.93	158.76	0.91	32.10	0.054	53.07	0.66	178.15
13	0.93	154.63	0.85	27.43	0.056	53.42	0.67	177.02
14	0.94	151.80	0.78	22.74	0.058	51.40	0.68	175.57
15	0.93	148.54	0.72	17.87	0.061	50.66	0.69	173.37
16	0.94	143.75	0.67	12.61	0.062	47.94	0.71	171.14
17	0.94	140.71	0.62	7.15	0.063	44.66	0.72	168.48
18	0.94	136.72	0.56	2.33	0.065	40.30	0.74	166.01
19	0.95	132.10	0.51	-3.25	0.064	41.04	0.76	163.20
20	0.96	131.00	0.46	-7.07	0.063	37.85	0.77	161.05
21	0.96	128.78	0.41	-10.67	0.064	35.99	0.78	158.85
22	0.96	126.73	0.37	-13.78	0.063	35.56	0.79	157.27
23	0.95	127.90	0.33	-15.97	0.064	32.67	0.80	154.94
24	0.95	126.96	0.30	-17.87	0.064	27.92	0.82	154.34
25	0.96	127.60	0.27	-19.52	0.061	28.05	0.82	153.29
26	0.95	130.57	0.25	-18.60	0.058	37.30	0.83	153.31

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on "Wire Bonding Information" figure below.

WIRE BONDING INFORMATION

Follow the wire bonding diagrams recommended by BeRex below to achieve optimum device performance. BeRex recommends thermo-compression wedge bonding. As a general rule, bonding temperature should be kept to a maximum of 280°C for no longer than 2 minutes for all bonding wires. Ultrasonic bonding is not recommended.



Using 1 mil. diameter, Au bonding wires.

1. Gate to input transmission line
   - Length and Height : 600 µm x 250 µm
   - Number of wire(s): 4
2. Drain to output transmission line
   - Length and Height : 400 µm x 250 µm
   - Number of wire(s) : 4
3. Source to ground plate
   - Length and Height : 250 µm x 300 µm
   - Number of wire(s) : 10

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:

THIS PRODUCT CONTAINS GALLIUM ARSENIDE (GaAs) WHICH CAN BE HAZARDOUS TO THE HUMAN BODY AND THE ENVIRONMENT. THEREFORE, IT MUST BE HANDLED WITH CARE AND IN ACCORDANCE WITH ALL GOVERNMENTAL AND COMPANY REGULATIONS FOR THE SAFE HANDLING AND DISPOSAL OF HAZARDOUS WASTE. DO NOT BURN, DESTROY, CUT, CRUSH OR CHEMICALLY DISSOLVE THE PRODUCT. DO NOT LICK THE PRODUCT OR IN ANY WAY ALLOW IT TO ENTER THE MOUTH. EXCLUDE THE PRODUCT FROM GENERAL INDUSTRIAL WASTE OR GARBAGE AND DISPOSE OF ONLY IN ACCORDANCE TO APPLICABLE LAWS AND/OR ORDINANCES.

DISCLAIMER

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1. Life support devices or systems are devices or systems which (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

RoHS COMPLIANT

For complete specifications, S-parameters and information on bonding and handling, visited our website; *www.berex.com*

BCP020T-70

HIGH EFFICIENCY HETEROJUNCTION POWER FET (0.25µm x 200µm gate)

The BeRex BCP020T-70 is a GaAs Power pHEMT in an industry standard, 70 mil. ceramic, Micro-X, low parasitic, surface-mountable package. It's 0.25µm by 200µm recessed gate architecture provides low noise, high gain and excellent PAE over a broad frequency range of 1000 MHz to 26 GHz.

PRODUCT FEATURES

- 70 mil. surface-mountable ceramic package
- 0.8dB Noise Figure @12 GHz (*typical*)
- 10.5 dB Associated Gain @12 GHz (*typical*)
- 21.5 dBm P1dB @12 GHz (*typical*)
- 13 dB Power Gain @12 GHz (*typical*)
- RoHS-compliant/lead-free

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement

A indicates the lot tracking code

2 indicates this is a BCP020T-70

ELECTRICAL CHARACTERISTIC (TUNED FOR POWER) T_a = 25° C

SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	Max	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	20.0 21.0	21.5 22.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	12.0 8.5	13.0 9.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		65 60		%
NF	Noise Figure (V_{ds}=2V, I_{ds}=15mA)	12 GHz		0.8		dB
G_a	Associated Gain (V_{ds}=2V, I_{ds}=15mA)	12 GHz		10.5		dB
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2.0V)		40	60	80	mA
G_m	Transconductance (V_{ds} = 3V, Vgs = 50% I_{dss})			80		mS
V_p	Pinch-off Voltage (I_{ds} = 0.2 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2 mA, source open)			-15		V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2 mA, drain open)			-13		V
R_{th}	Thermal Resistance			460		° C/W

ELECTRICAL CHARACTERISTIC (TUNED FOR GAIN) T_a = 25° C

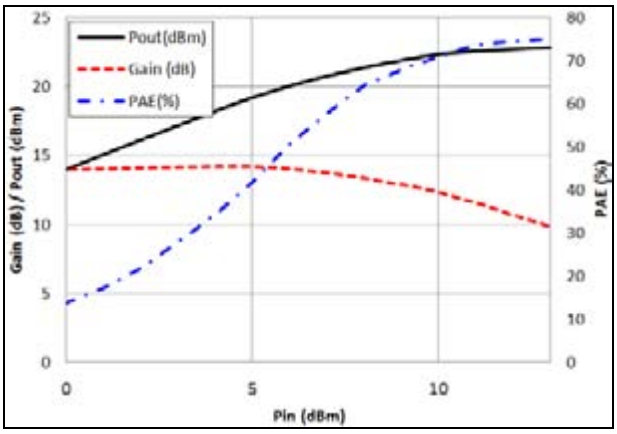
SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	19.0 18.0	20.5 19.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	12.5 9.5	13.5 10.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		65 45		%
NF	Noise Figure (V_{ds}=2V, I_{ds}=15mA)	12 GHz		0.8		dB
Ga	Associated Gain (V_{ds}=2V, I_{ds}=15mA)	12 GHz		10.5		dB
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)		50	60.0	80	mA
G_m	Transconductance (V_{ds} = 3V, Vgs = 50% I_{dss})			80.0		mS
V_p	Pinch-off Voltage (I_{ds} = 0.2 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2mA, source open)			-15		V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2mA, drain open)			-13		V
R_{th}	Thermal Resistance			460		° C/W

MAXIMUM RATING (T_a = 25° C)

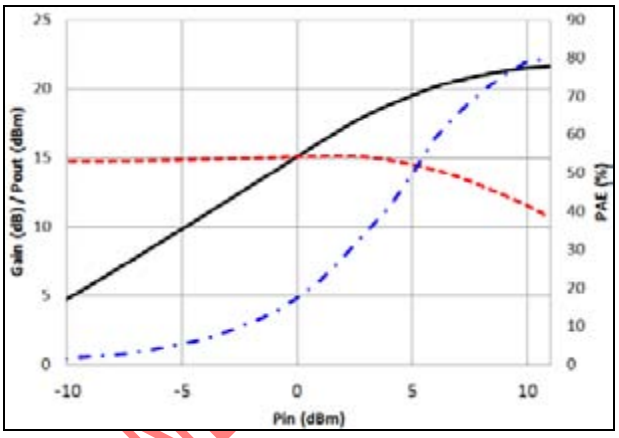
SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	11 mA	2 mA
P_{in}	Input Power	17 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	295 mW	245 mW

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

P_{IN}_P_{OUT}/Gain, PAE (12 GHz)

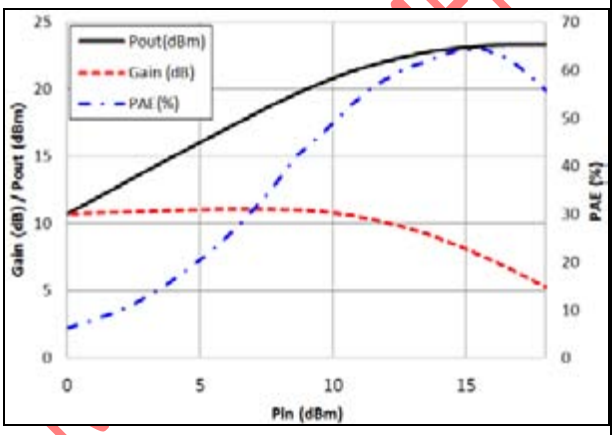


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Power Tune)

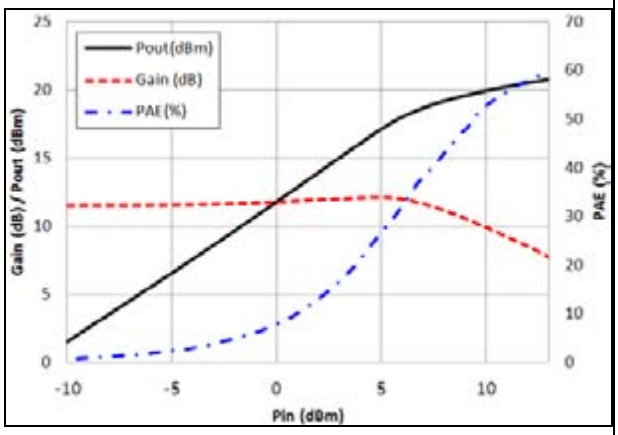


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Gain Tune)

P_{IN}_P_{OUT}/Gain, PAE (18 GHz)



Frequency = 18GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tuned for Power)

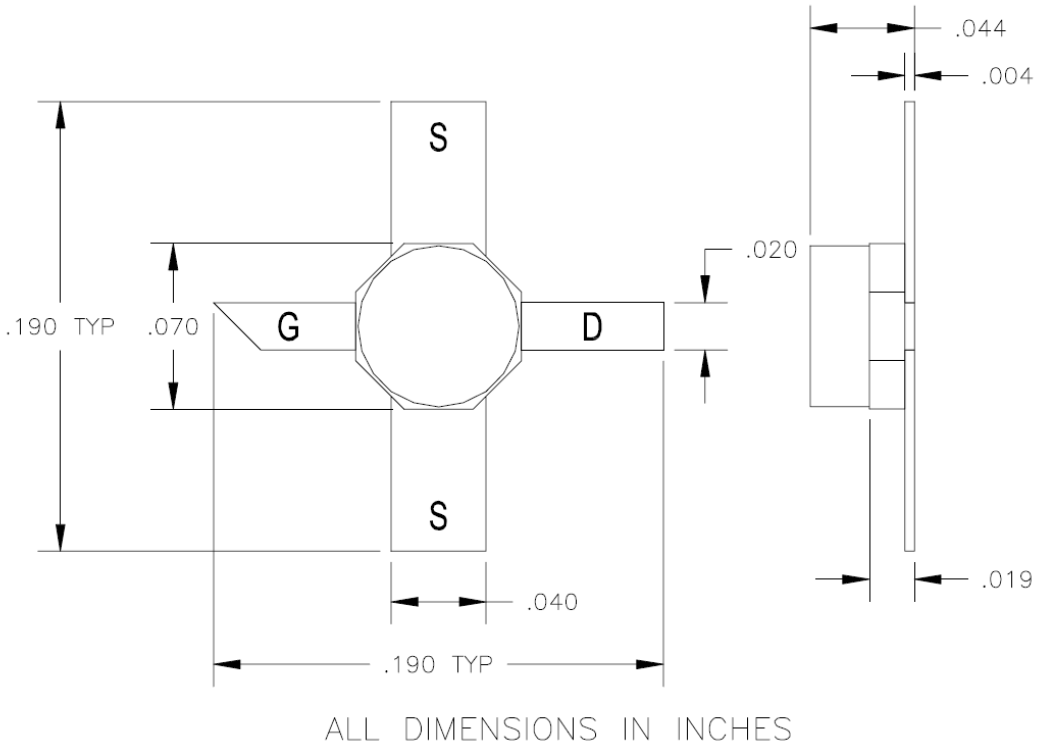


Frequency = 18GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

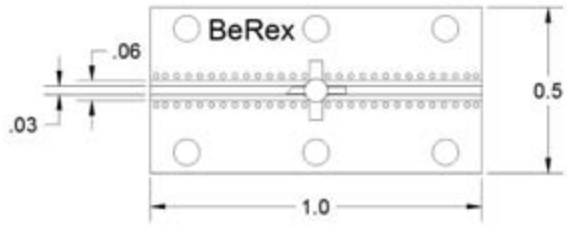
S-PARAMETER (V_{ds} = 6V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.98	-28.41	5.52	153.55	0.014	68.29	0.80	-18.24
2	0.95	-53.08	5.15	130.38	0.026	50.54	0.79	-34.48
3	0.89	-76.01	4.84	108.61	0.037	34.33	0.77	-48.91
4	0.83	-100.67	4.60	86.37	0.045	17.03	0.74	-63.38
5	0.76	-126.87	4.33	63.60	0.050	1.10	0.71	-79.05
6	0.71	-152.22	3.97	41.28	0.054	-13.88	0.69	-95.46
7	0.65	-173.65	3.66	21.60	0.056	-26.31	0.69	-108.86
8	0.61	161.19	3.40	3.23	0.057	-35.93	0.69	-115.38
9	0.57	139.41	3.25	-14.09	0.061	-44.80	0.67	-123.11
10	0.51	116.94	3.28	-31.91	0.067	-53.74	0.62	-133.88
11	0.47	88.66	3.26	-51.90	0.074	-64.62	0.56	-150.58
12	0.45	58.95	3.14	-73.25	0.078	-75.93	0.53	-173.21
13	0.45	30.90	2.91	-93.46	0.081	-86.57	0.54	168.83
14	0.46	5.57	2.71	-111.70	0.086	-97.18	0.57	160.19
15	0.48	-20.84	2.57	-129.85	0.090	-107.29	0.56	155.92
16	0.54	-45.94	2.53	-148.15	0.099	-118.14	0.48	153.32
17	0.62	-69.71	2.53	-167.47	0.111	-132.81	0.34	143.21
18	0.69	-88.94	2.44	170.41	0.116	-148.48	0.24	96.04
19	0.74	-98.80	2.18	150.67	0.112	-162.37	0.27	48.37
20	0.80	-106.42	1.93	131.16	0.111	-176.59	0.29	26.70
21	0.85	-114.60	1.70	111.32	0.106	166.87	0.17	15.60
22	0.88	-137.55	1.53	87.58	0.103	146.60	0.10	-113.33
23	0.89	-176.75	1.38	62.31	0.102	123.84	0.38	-116.73
24	0.91	144.84	1.20	40.58	0.094	104.36	0.55	-102.34
25	0.94	123.43	1.15	22.35	0.096	89.48	0.57	-99.83
26	1.01	124.43	1.22	2.86	0.111	71.91	0.46	-129.11

Package Outline Dimension

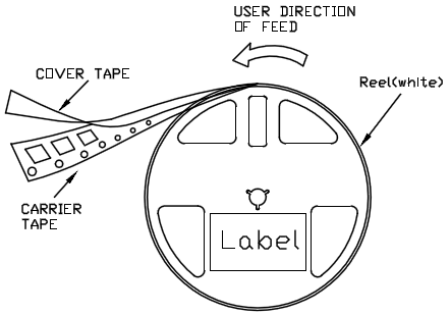


Suggested PCB Layout

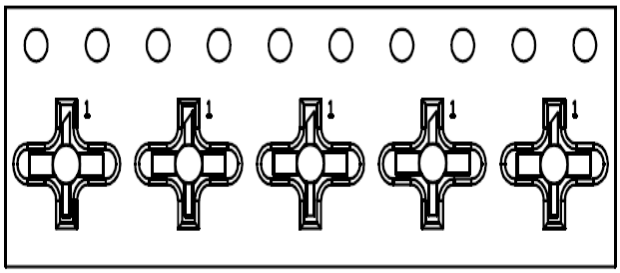


All dimensions in Inches

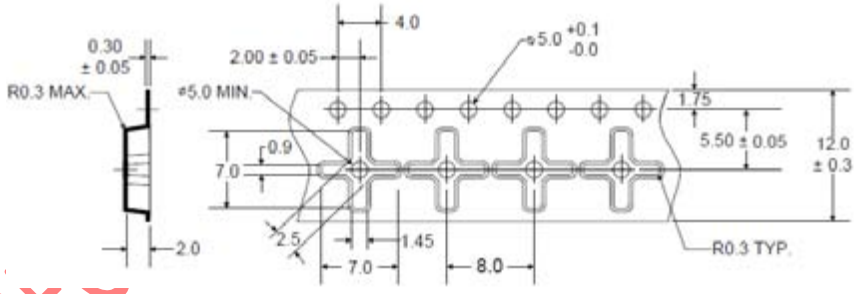
Tape and Reel Dimensions



PKG TYPE	Tape Width (mm)	Reel Size	Devices Per Reel
Ceramic 70mils	12	7"	1000



User Direction of Feed



Dimensions in *mm*

Proper ESD procedures should be followed when handling this device.

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Proper ESD procedures should be followed when handling this device.

BCP030T-70

HIGH EFFICIENCY HETEROJUNCTION POWER FET (0.25µm x 300µm gate)

The BeRex BCP030T-70 is a GaAs power pHEMT in an industry standard, 70 mil. ceramic, Micro-X, low parasitic, surface-mountable package. It's ideally suited for applications requiring low noise with high gain and excellent PAE over a broad frequency range of 1000 MHz to 26 GHz.

PRODUCT FEATURES

- 70 mil. surface-mountable ceramic package
- 24 dBm P1dB @12 GHz (*typical*)
- 12 dB Gain @12 GHz (*typical*)
- 0.25µm X 300µm recessed gate
- RoHS-compliant/lead-free

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement

A indicates the lot tracking code

3 indicates this is a BCP030T-70

ELECTRICAL CHARACTERISTIC (TUNED FOR POWER) T_a = 25° C

SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	Max	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	23.0 22.5	24.0 23.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	10.5 7.0	12.0 8.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		70 60		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2.0V)		60	90	120	mA
G_m	Transconductance (V_{ds} = 3V, Vgs = 50% I_{dss})			120		mS
V_p	Pinch-off Voltage (I_{ds} = 0.2 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2 mA, source open)			-15		V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2 mA, drain open)			-13		V
R_{th}	Thermal Resistance			320		° C/W

ELECTRICAL CHARACTERISTIC (TUNED FOR GAIN) T_a = 25° C

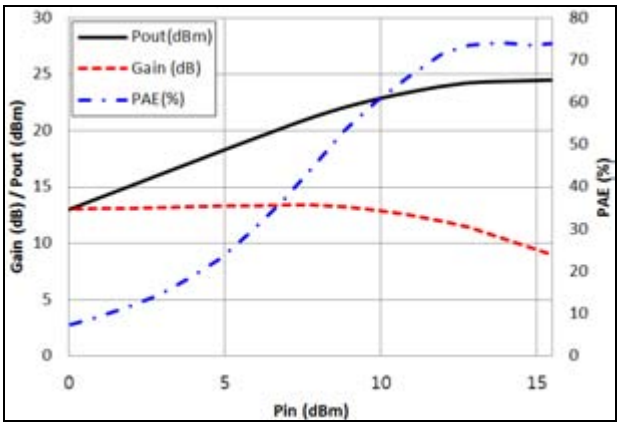
SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	21.0 19.5	22.0 20.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	11.5 8.5	13.0 10.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		65 40		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)		60	90	120	mA
G_m	Transconductance (V_{ds} = 3V, Vgs = 50% I_{dss})			120		mS
V_p	Pinch-off Voltage (I_{ds} = 0.2 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2mA, source open)			-15		V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2mA, drain open)			-13		V
R_{th}	Thermal Resistance			320		° C/W

MAXIMUM RATING (T_a = 25° C)

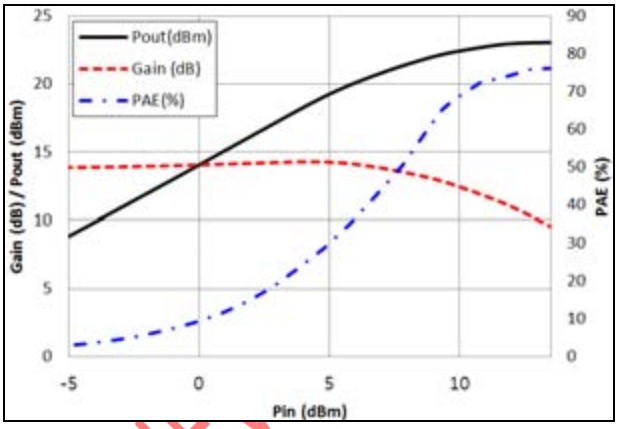
SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	18 mA	3 mA
P_{in}	Input Power	22 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	420 mW	350 mW

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

P_{IN}_P_{OUT}/Gain, PAE (12 GHz)

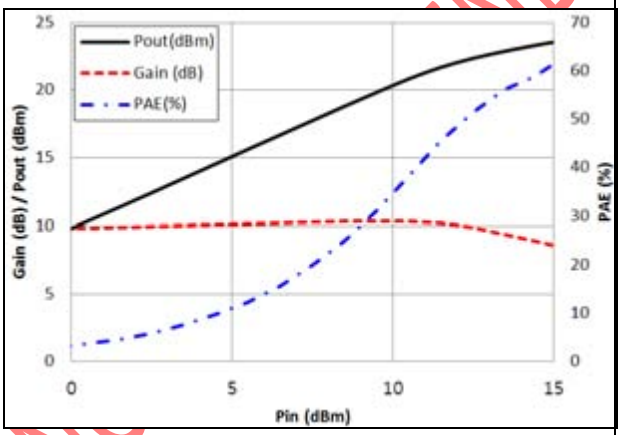


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Power Tune)

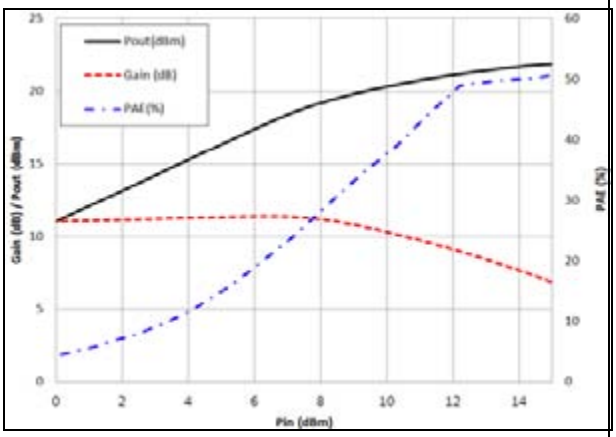


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Gain Tune)

P_{IN}_P_{OUT}/Gain, PAE (18 GHz)



Frequency = 18GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tuned for Power)

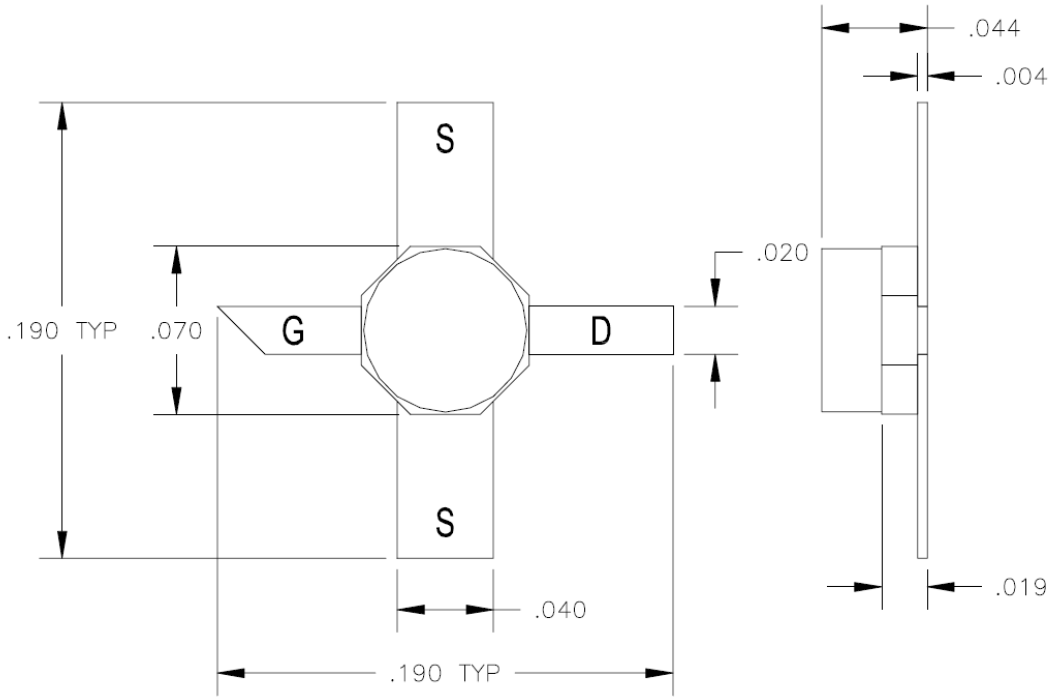


Frequency = 18GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

S-PARAMETER (V_{ds} = 6V, I_{ds} = 50% I_{dss})

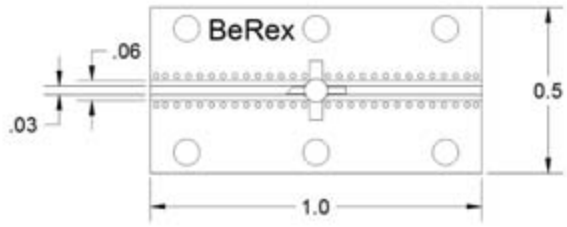
FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.97	-36.44	7.62	148.34	0.019	63.96	0.71	-21.45
2	0.90	-67.46	6.84	121.35	0.034	45.01	0.68	-39.50
3	0.82	-95.78	6.15	96.63	0.045	27.50	0.65	-54.83
4	0.74	-125.41	5.56	72.34	0.054	10.39	0.60	-69.56
5	0.68	-154.85	4.97	48.89	0.059	-4.58	0.56	-85.10
6	0.63	178.26	4.38	26.69	0.062	-18.02	0.54	-101.36
7	0.58	154.89	3.96	6.77	0.065	-29.24	0.54	-114.44
8	0.55	127.75	3.61	-12.25	0.068	-38.65	0.54	-120.05
9	0.53	104.20	3.39	-30.48	0.073	-48.20	0.52	-127.27
10	0.51	78.00	3.32	-49.64	0.081	-58.64	0.45	-138.50
11	0.52	48.90	3.19	-70.35	0.089	-70.65	0.37	-157.17
12	0.54	22.14	2.97	-91.64	0.095	-83.55	0.33	176.26
13	0.57	-1.26	2.73	-111.58	0.100	-95.31	0.34	157.26
14	0.58	-24.01	2.53	-130.78	0.107	-107.75	0.36	150.45
15	0.62	-47.46	2.38	-150.22	0.112	-121.53	0.32	148.96
16	0.69	-70.66	2.28	-170.04	0.120	-135.53	0.20	152.45
17	0.76	-93.74	2.18	169.98	0.129	-151.58	0.03	167.92
18	0.82	-111.56	2.00	149.41	0.130	-167.71	0.13	-23.66
19	0.84	-119.05	1.78	131.52	0.123	177.97	0.21	-33.71
20	0.89	-123.28	1.57	112.15	0.119	163.47	0.17	-62.80
21	0.92	-128.87	1.33	91.48	0.110	145.63	0.19	-143.94
22	0.92	-151.02	1.10	69.08	0.099	126.72	0.41	-163.08
23	0.91	169.76	0.94	47.99	0.092	107.48	0.59	-145.80
24	0.93	131.71	0.82	29.94	0.086	91.39	0.66	-126.41
25	0.98	109.36	0.81	12.15	0.091	76.80	0.62	-125.11
26	1.03	107.39	0.84	-10.05	0.104	56.98	0.50	-162.86

Package Outline Dimension



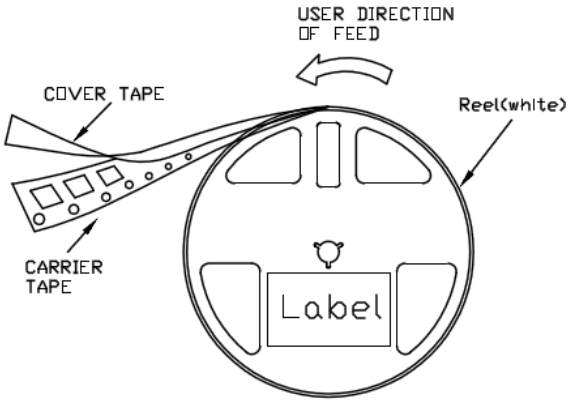
ALL DIMENSIONS IN INCHES

Suggested PCB layout

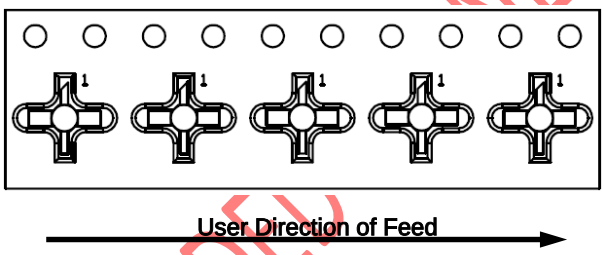


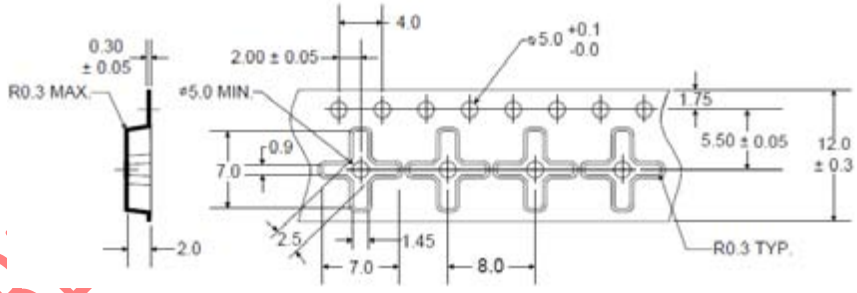
All dimensions in Inches

Tape and Reel Dimensions



PKG TYPE	Tape Width (mm)	Reel Size	Devices Per Reel
Ceramic 70mils	12	7"	1000





Dimensions in *mm*

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LIFE SUPPORT POLICY

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1. Life support devices or systems are devices or systems which (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Proper ESD procedures should be followed when handling this device.

BCP060T-70

HIGH EFFICIENCY HETEROJUNCTION POWER FET (0.25µm x 600µm gate)

The BeRex BCP060T-70 is a GaAs power pHEMT in an industry standard, 70 mil. ceramic, Micro-X, low parasitic, surface-mountable package. It's 0.25µm by 600 µm recessed gate architecture provides high gain, high power and excellent PAE over a broad frequency range of 1000 MHz to 26 GHz.

PRODUCT FEATURES

- 70 mil. surface-mountable ceramic package
- 26.5 dBm P1dB @12 GHz (*typical*)
- 10.5dB Gain @ 12 GHz (*typical*)
- 70% PAE @12 GHz (*typical*)
- RoHS-compliant/lead-free

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement

A indicates the lot tracking code

6 indicates this is a BCP060T-70

ELECTRICAL CHARACTERISTIC (TUNED FOR POWER) T_a = 25° C

SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	Max	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	25.5 25.0	26.5 26.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	9.0 4.0	10.5 5.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		70 50		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2.0V)		120	180	240	mA
G_m	Transconductance (V_{ds} = 3V, Vgs = 50% I_{dss})			240		mS
V_p	Pinch-off Voltage (I_{ds} = 0.2 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2 mA, source open)			-15		V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2 mA, drain open)			-13		V
R_{th}	Thermal Resistance			175		° C/W

ELECTRICAL CHARACTERISTIC (TUNED FOR GAIN) T_a = 25° C

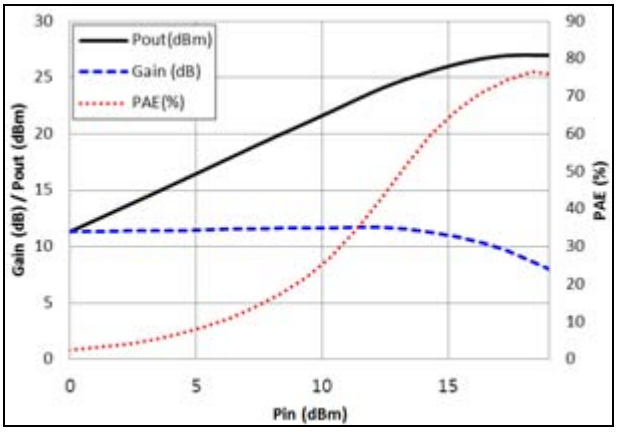
SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	23.5 24.0	24.5 25.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	9.5 4.0	11.0 6.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		50 45		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)		120	180	240	mA
G_m	Transconductance (V_{ds} = 3V, Vgs = 50% I_{dss})			240		mS
V_p	Pinch-off Voltage (I_{ds} = 0.2 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2mA, source open)			-15		V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2mA, drain open)			-13		V
R_{th}	Thermal Resistance			175		° C/W

MAXIMUM RATING (T_a = 25° C)

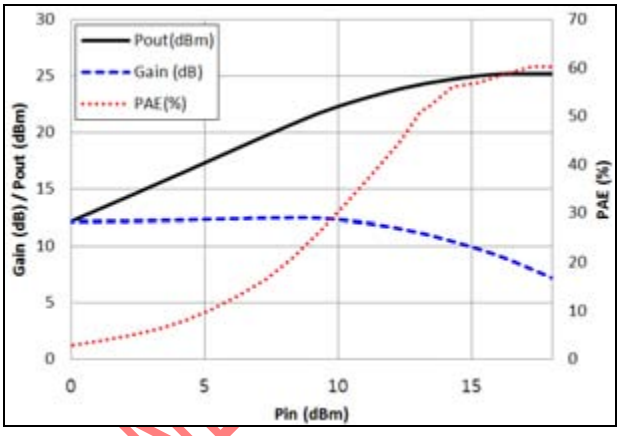
SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	30 mA	10 mA
P_{in}	Input Power	25 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	770 mW	640 mW

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

$P_{IN}\_P_{OUT}$/Gain, PAE (12 GHz)

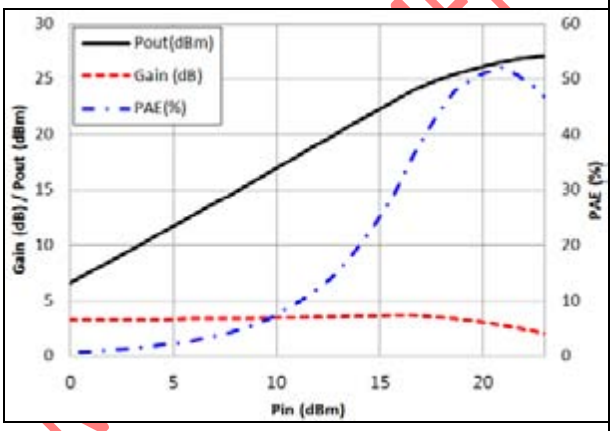


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Power Tune)

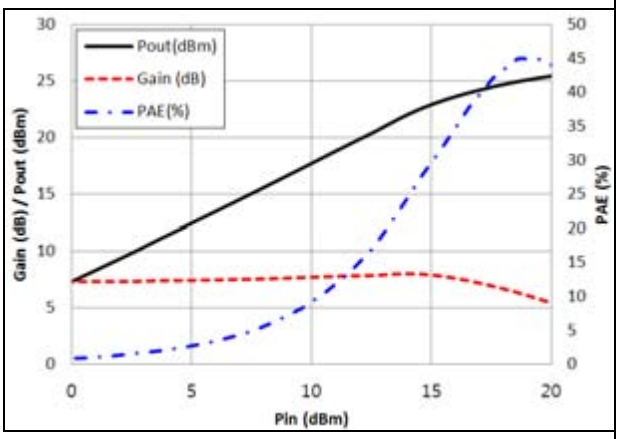


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Gain Tune)

$P_{IN}\_P_{OUT}$/Gain, PAE (18 GHz)



Frequency = 18GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tuned for Power)

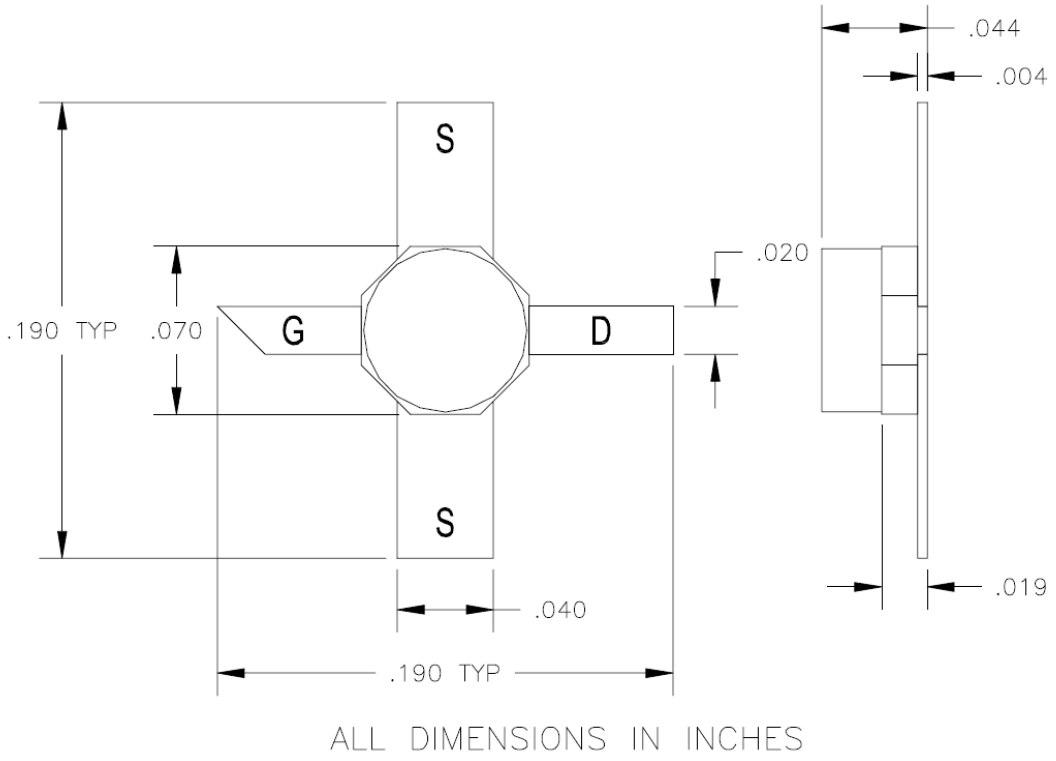


Frequency = 18GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

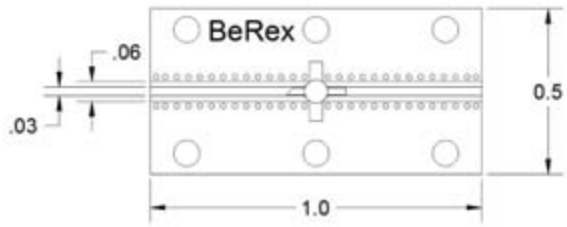
S-PARAMETER (V_{ds} = 6V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.90	-60.76	11.78	133.20	0.029	54.41	0.48	-36.53
2	0.78	-105.90	9.06	99.27	0.045	33.13	0.41	-59.74
3	0.68	-142.83	7.14	71.51	0.055	17.59	0.35	-76.29
4	0.62	-176.75	5.78	46.88	0.062	4.08	0.30	-91.49
5	0.61	154.54	4.79	24.72	0.067	-7.08	0.27	-108.97
6	0.59	130.07	4.06	4.18	0.073	-17.33	0.27	-126.88
7	0.57	106.73	3.58	-15.67	0.081	-28.01	0.27	-139.27
8	0.58	81.95	3.20	-35.12	0.089	-38.65	0.26	-141.79
9	0.59	60.08	2.94	-54.62	0.099	-50.49	0.21	-147.95
10	0.63	36.00	2.73	-75.51	0.111	-64.55	0.11	-169.68
11	0.68	12.41	2.47	-96.75	0.119	-79.29	0.07	98.82
12	0.72	-8.35	2.21	-117.31	0.125	-94.00	0.13	58.07
13	0.75	-27.14	2.01	-137.10	0.130	-108.47	0.14	43.21
14	0.76	-47.14	1.85	-157.75	0.140	-123.66	0.10	14.57
15	0.80	-68.43	1.68	-179.26	0.144	-141.90	0.15	-49.75
16	0.86	-90.92	1.49	159.58	0.143	-159.60	0.31	-68.95
17	0.90	-112.82	1.31	141.19	0.141	-174.96	0.45	-70.56
18	0.93	-127.84	1.16	124.88	0.138	171.07	0.53	-74.01
19	0.93	-132.78	1.04	109.39	0.128	156.10	0.53	-88.99
20	0.96	-134.05	0.91	90.24	0.121	141.47	0.51	-126.25
21	0.96	-137.60	0.72	69.33	0.104	122.78	0.60	-169.56
22	0.94	-158.04	0.55	50.76	0.086	107.35	0.75	-179.70
23	0.92	164.01	0.46	35.25	0.080	93.18	0.83	-162.41
24	0.94	127.13	0.41	21.26	0.076	80.62	0.83	-143.57
25	0.99	105.00	0.42	4.82	0.084	65.84	0.76	-146.28
26	1.03	102.73	0.44	-19.39	0.092	45.71	0.66	170.63

Package Outline Dimension

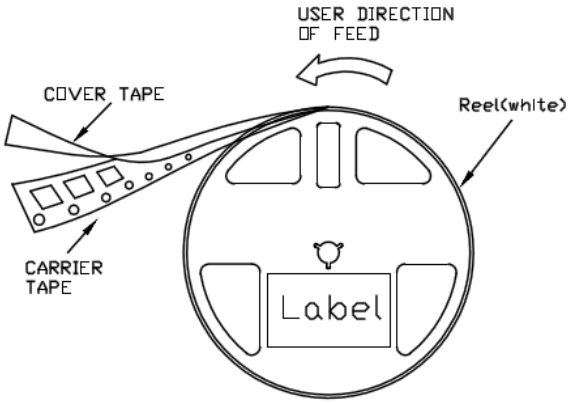


Suggested PCB layout

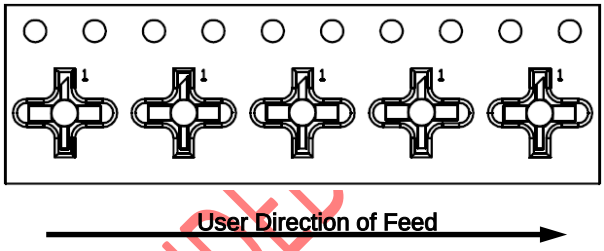


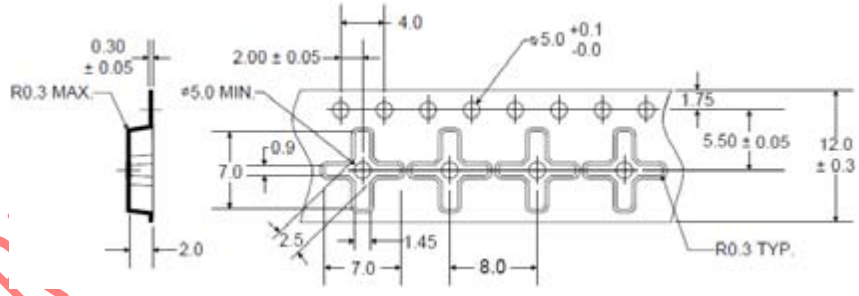
All dimensions in Inches

Tape and Reel Dimensions



PKG TYPE	Tape Width (mm)	Reel Size	Devices Per Reel
Ceramic 70mils	12	7"	1000





Dimensions in *mm*

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Proper ESD procedures should be followed when handling this device.

BCP080T-70

HIGH EFFICIENCY HETEROJUNCTION POWER FET (0.25µm x 800µm gate)

The BeRex BCP080T-70 is a GaAs power pHEMT in an industry standard, 70 mil. ceramic, Micro-X, low parasitic, surface-mountable package. It's 0.25µm by 800 µm recessed gate architecture provides high gain, high power and excellent PAE over a broad frequency range of 1000 MHz to 26 GHz.

PRODUCT FEATURES

- 70 mil. surface-mount ceramic package
- 27.5dBm P1dB @12 GHz (*typical*)
- 9.5dB Gain @12 GHz (*typical*)
- 65% PAE @12 GHz (*typical*)
- RoHS-compliant/lead-free

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement

A indicates the lot tracking code

8 indicates this is a BCP080T-70

ELECTRICAL CHARACTERISTIC (TUNED FOR POWER) T_a = 25° C

SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	Max	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	26.0 26.0	27.5 27.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	9.0 4.0	9.5 5.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		65 50		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2.0V)		160	240	320	mA
G_m	Transconductance (V_{ds} = 3V, Vgs = 50% I_{dss})			320		mS
V_p	Pinch-off Voltage (I_{ds} = 0.2 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2 mA, source open)			-15		V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2 mA, drain open)			-13		V
R_{th}	Thermal Resistance			135		° C/W

ELECTRICAL CHARACTERISTIC (TUNED FOR GAIN) T_a = 25° C

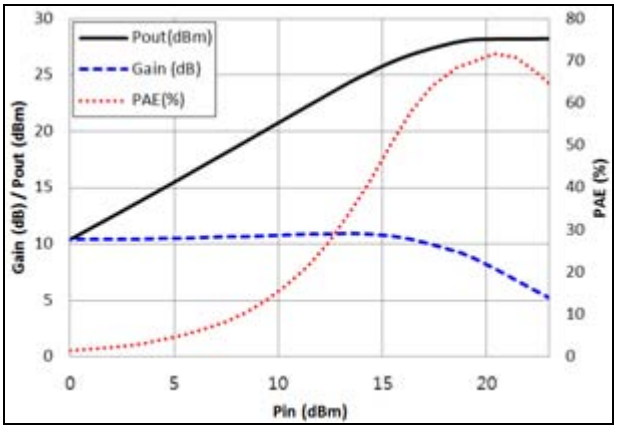
SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	23.5 24.0	24.5 25.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	9.0 4.0	10.5 5.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		50 45		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)		160	240	320	mA
G_m	Transconductance (V_{ds} = 3V, Vgs = 50% I_{dss})			320		mS
V_p	Pinch-off Voltage (I_{ds} = 0.2 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2mA, source open)			-15		V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2mA, drain open)			-13		V
R_{th}	Thermal Resistance			135		° C/W

MAXIMUM RATING (T_a = 25° C)

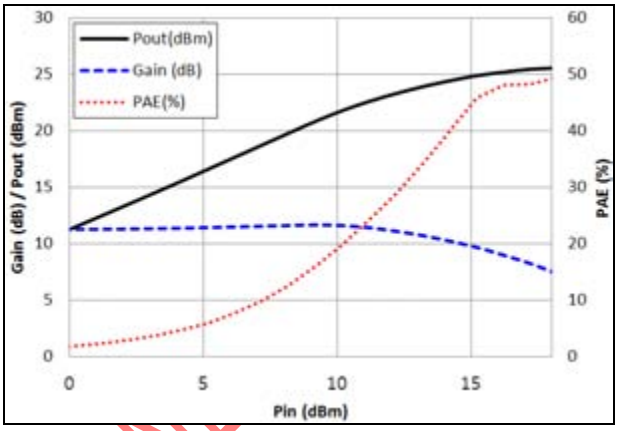
SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	40 mA	7 mA
P_{in}	Input Power	27 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	1.0 W	835 mW

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

$P_{IN}\_P_{OUT}$/Gain, PAE (12 GHz)

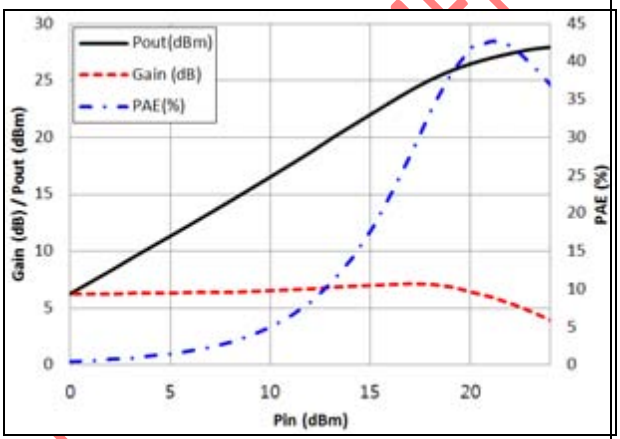


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Power Tune)

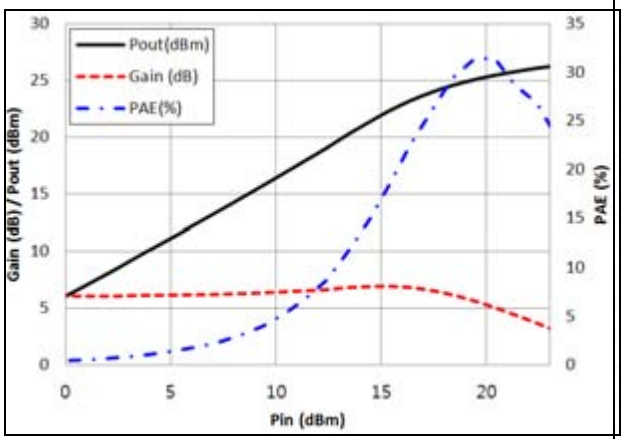


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Gain Tune)

$P_{IN}\_P_{OUT}$/Gain, PAE (18 GHz)



Frequency = 18GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tuned for Power)

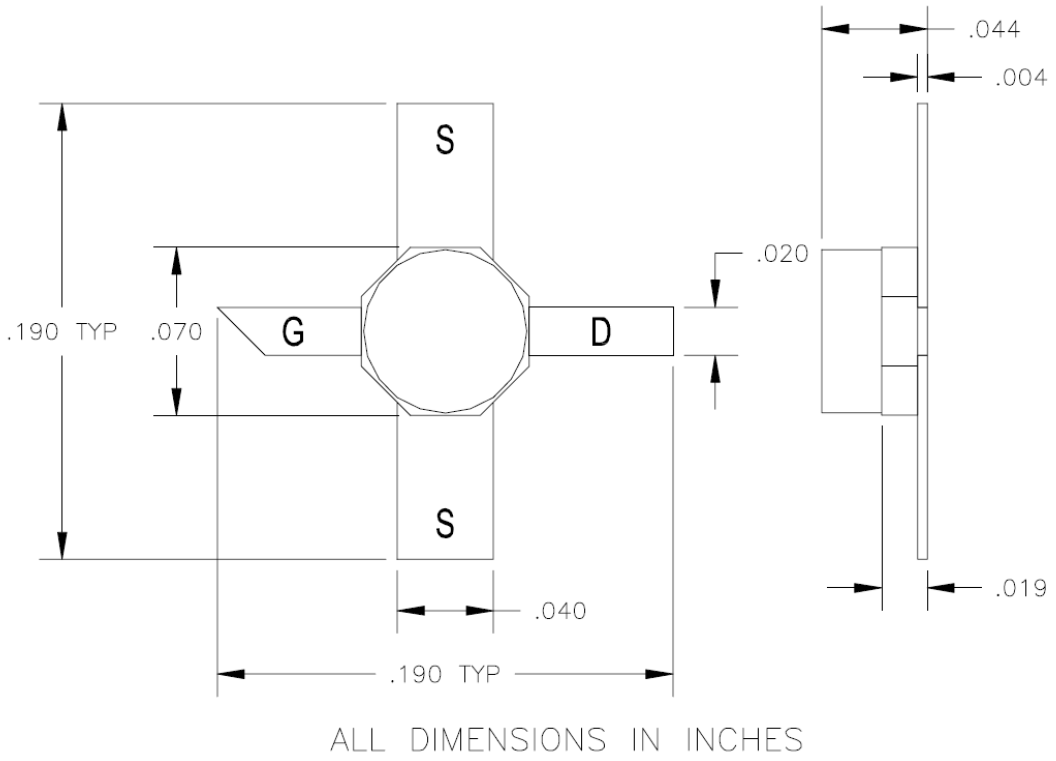


Frequency = 18GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

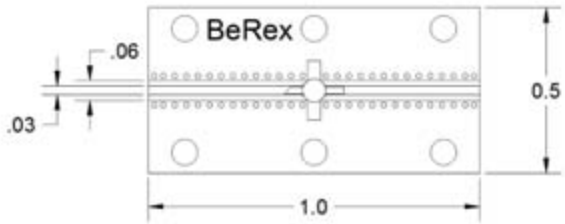
S-PARAMETER (V_{ds} = 6V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.86	-75.90	12.72	124.40	0.031	49.04	0.37	-48.85
2	0.73	-125.12	9.06	89.52	0.045	29.42	0.29	-74.05
3	0.66	-161.95	6.79	62.24	0.055	16.03	0.23	-90.96
4	0.63	166.59	5.34	38.46	0.063	4.50	0.18	-108.26
5	0.63	141.16	4.37	17.17	0.070	-5.18	0.16	-130.79
6	0.62	119.15	3.69	-2.76	0.078	-15.42	0.17	-150.96
7	0.61	97.38	3.25	-22.60	0.088	-26.11	0.17	-163.48
8	0.62	74.35	2.90	-42.48	0.099	-38.30	0.14	-165.32
9	0.64	53.76	2.65	-62.68	0.111	-51.60	0.07	179.06
10	0.68	30.82	2.41	-84.30	0.122	-66.91	0.08	51.04
11	0.73	8.48	2.14	-105.66	0.129	-82.82	0.19	27.25
12	0.77	-11.33	1.90	-126.13	0.134	-98.23	0.27	15.44
13	0.80	-29.36	1.72	-146.13	0.140	-113.49	0.28	-1.04
14	0.81	-49.08	1.58	-167.77	0.148	-129.95	0.28	-29.71
15	0.85	-70.34	1.40	169.89	0.150	-149.97	0.37	-60.91
16	0.89	-92.81	1.20	149.00	0.143	-167.89	0.51	-75.62
17	0.91	-114.04	1.02	132.15	0.136	178.31	0.62	-78.27
18	0.94	-128.03	0.90	117.66	0.132	164.97	0.67	-83.00
19	0.93	-132.41	0.81	102.69	0.123	149.84	0.66	-99.29
20	0.96	-133.36	0.71	83.23	0.114	134.62	0.65	-136.54
21	0.96	-136.80	0.55	62.32	0.095	115.93	0.73	-176.39
22	0.93	-156.75	0.41	45.29	0.077	101.75	0.84	175.30
23	0.91	165.99	0.35	31.62	0.071	89.54	0.90	-166.91
24	0.93	129.64	0.32	18.97	0.070	78.11	0.89	-148.46
25	0.98	108.05	0.34	2.86	0.078	63.42	0.82	-152.69
26	1.02	106.49	0.35	-22.11	0.082	43.20	0.72	162.75

Package Outline Dimension

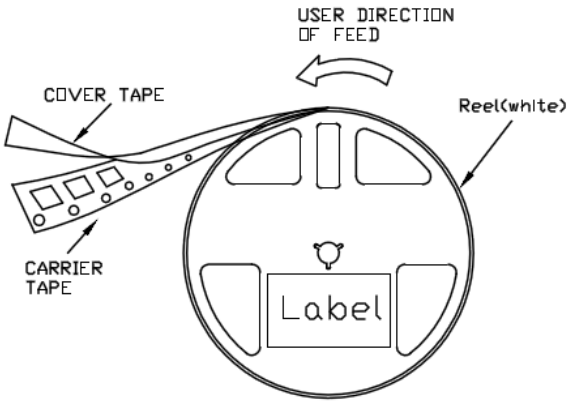


Suggested PCB layout

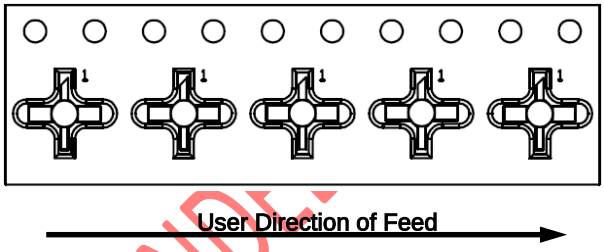


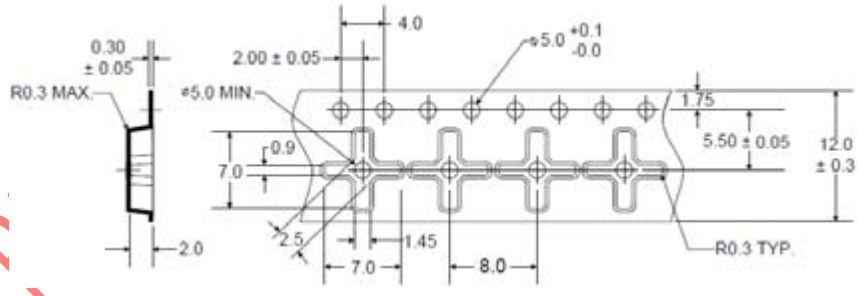
All dimensions in Inches

Tape and Reel Dimensions



PKG TYPE	Tape Width (mm)	Reel Size	Devices Per Reel
Ceramic 70mils	12	7"	1000





Dimensions in *mm*

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LIFE SUPPORT POLICY

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1. Life support devices or systems are devices or systems which (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Proper ESD procedures should be followed when handling this device.

BCF020T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.3 µm x 200 µm)

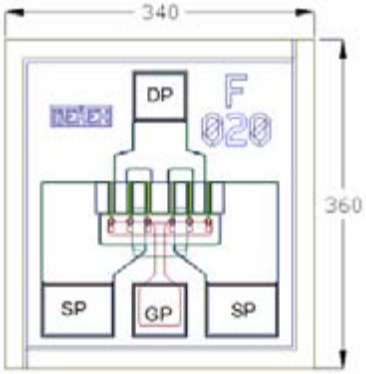
The BeRex BCF020T is a GaAs Power MESFET whose nominal 0.3 micron gate length and 200 micron gate width make the product ideally suited to applications requiring high OIP3 linearity and low phase noise while providing high-gain and medium power from DC to 26.5 GHz. This product is well suited for either wideband or narrow-band applications. The BCF020T is produced using state of the art metallization and each wafer is screened to insure compliance with specifications. These chips utilize SI_3N_4 passivation for increased reliability.

Product Features

- 20 dBm Typical Output Power
- 13.5 dB Typical Power Gain @ 12 GHz
- Low Phase Noise
- 0.3 X 200 Micron Recessed Gate

Applications

- Commercial
- Military / Hi-Rel
- Test & Measurement



Chip dimensions : 340 X 360 microns
Gate pad(GP) : 60 X 55 microns
Drain pad(DP) : 60 X 50 microns
Source pad(SP) : 90 X 65 microns
Chip thickness : 100 microns

DC CHARACTERISTIC (T_a = 25° C)

PARAMETER/TEST CONDITIONS		MINIMUM	TYPICAL	MAXIMUM	MINIMUM
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2V)	40	60	80	mA
Gm	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})	25	35		mS
Vp	Pinch-off Voltage (I_{ds} = 300 µA, V_{ds} = 3V)	-3.5	-2.0	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2 mA, source open)		-15	-11	V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2 mA, drain open)		-10	-7	V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		160		° C/W

ELECTRICAL CHARACTERISTIC (V_{ds} = 8V, T_a = 25° C)

PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	18.0 18.2	20.0 20.2		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	11.5 9.2	13.5 12.1		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz		31 34		%
NF	Noise figure (V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		1.1		dB
Ga	Associated Gain ((V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		11		dB

ELECTRICAL CHARACTERISTIC (V_{ds} = 6V, T_a = 25° C)

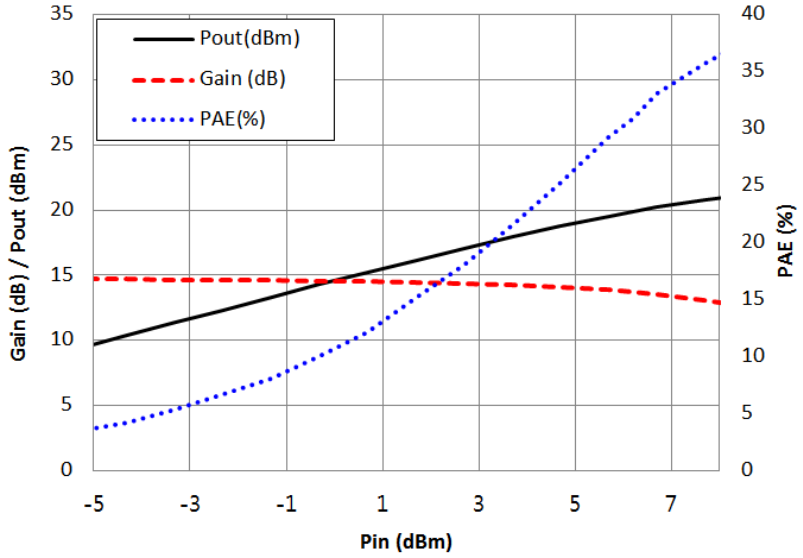
PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	17.2 17.6	19.2 19.6		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	11.2 9.8	13.2 11.8		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz		37 42		%
NF	Noise figure (V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		1.1		dB
Ga	Associated Gain ((V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		11		dB

MAXIMUM RATINGS (T_a = 25° C)

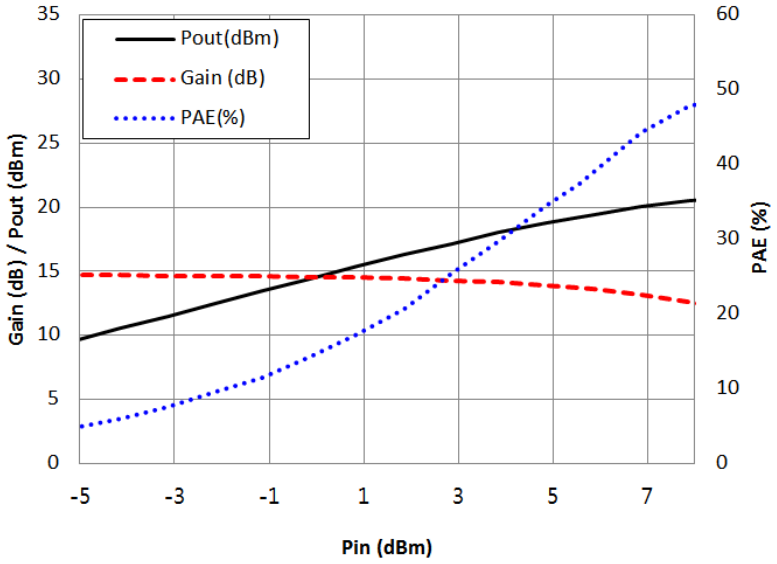
PARAMETERS		ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-8 V	-4V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	5 mA	0.8 mA
P_{in}	Input Power	15 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	0.9 W	0.8 W

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

P_{in}_P_{out}/Gain, PAE (12 GHz)

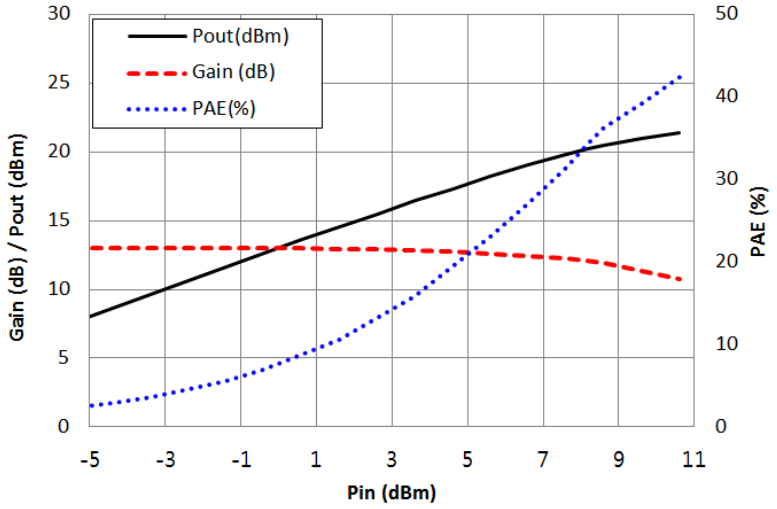


Freq. = 12 GHz, V_{ds} = 8V, I_{ds} = 50% I_{dss}

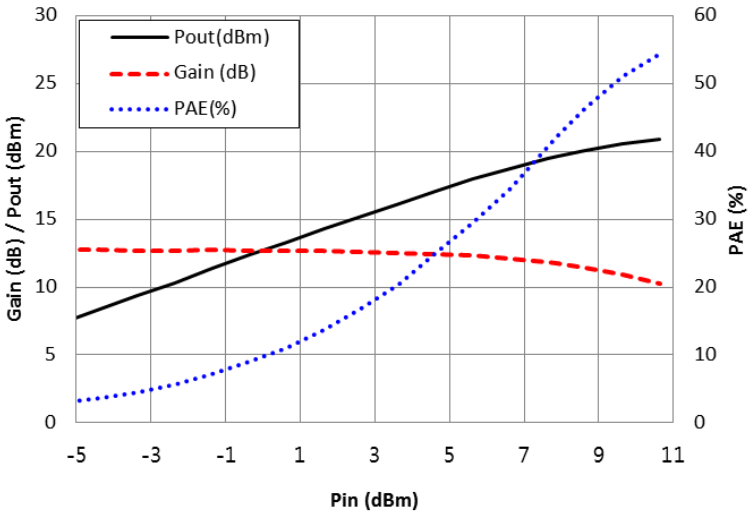


Freq. = 12 GHz, V_{ds} = 6V, I_{ds} = 50% I_{dss}

P_{in}_P_{out}/Gain, PAE (18 GHz)

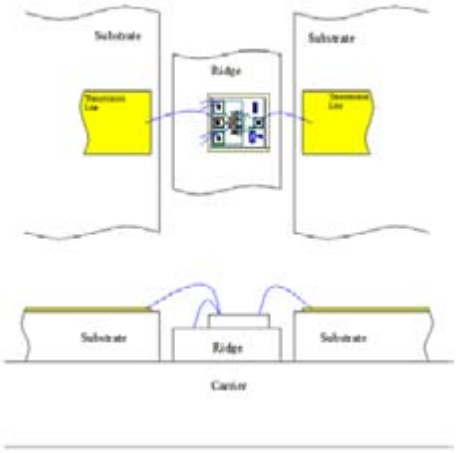


Freq. = 18 GHz, V_{ds} = 8V, I_{ds} = 50% I_{dss}



Freq. = 18 GHz, V_{ds} = 6V, I_{ds} = 50% I_{dss}

Wire Bonding Options



- Gold Bonding Wire information

1. Gate to input transmission line
   - Length and Height : 400 um and 250 um
   - Number of wires: 1
2. Drain to output transmission line
   - Length and Height : 350 um and 250 um
   - Number of wires: 1
3. Source to ground plate
   - Length and Height : 200 um x 250 um
   - Number of wires: 4

Note: The diameter of bonding wires: 1 mil

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

BCF030T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.3 µm x 300 µm)

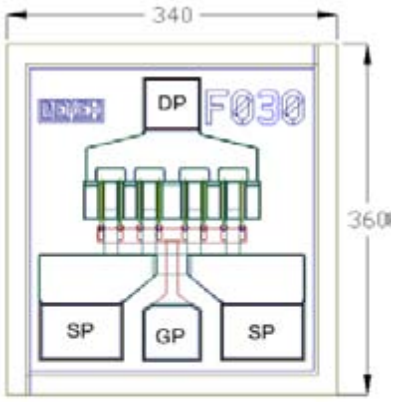
The BeRex BCF030T is a GaAs Power MESFET whose nominal 0.3 micron gate length and 300 micron gate width make the product ideally suited to applications requiring high OIP3 linearity and low phase noise while providing high-gain and medium power from DC to 26.5 GHz frequency range. This product is well suited for either wideband or narrow-band applications. The BCF030T is produced using state of the art metallization and devices from each wafer are screened to insure reliability. These chips utilize SI_3N_4 passivation for increased reliability.

Product Features

- 21.5 dBm Typical Output Power
- 13.5 dB Typical Power Gain @ 12 GHz
- Low Phase Noise
- 0.3 X 300 Micron Recessed Gate

Applications

- Commercial
- Military / Hi-Rel
- Test & Measurement



Chip dimensions : 340 X 360 microns
Gate pad(GP) : 60 X 55 microns
Drain pad(DP) : 60 X 50 microns
Source pad(SP) : 90 X 65 microns
Chip thickness : 100 microns

DC CHARACTERISTIC (T_a = 25° C)

PARAMETER/TEST CONDITIONS		MINIMUM	TYPICAL	MAXIMUM	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2V)	60	90	120	mA
Gm	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})	35	50		mS
Vp	Pinch-off Voltage (I_{ds} = 300 µA, V_{ds} = 3V)	-3.5	-2.0	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2 mA, source open)		-15	-11	V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2 mA, drain open)		-10	-7	V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		120		° C/W

ELECTRICAL CHARACTERISTIC (V_{ds} = 8V, T_a = 25° C)

PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	19.5 19.7	21.5 21.7		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	11.5 9.5	13.5 11.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz		30.0 32.5		%
NF	Noise figure (V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		1.45		dB
Ga	Associated Gain ((V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		11		dB

ELECTRICAL CHARACTERISTIC (V_{ds} = 6V, T_a = 25° C)

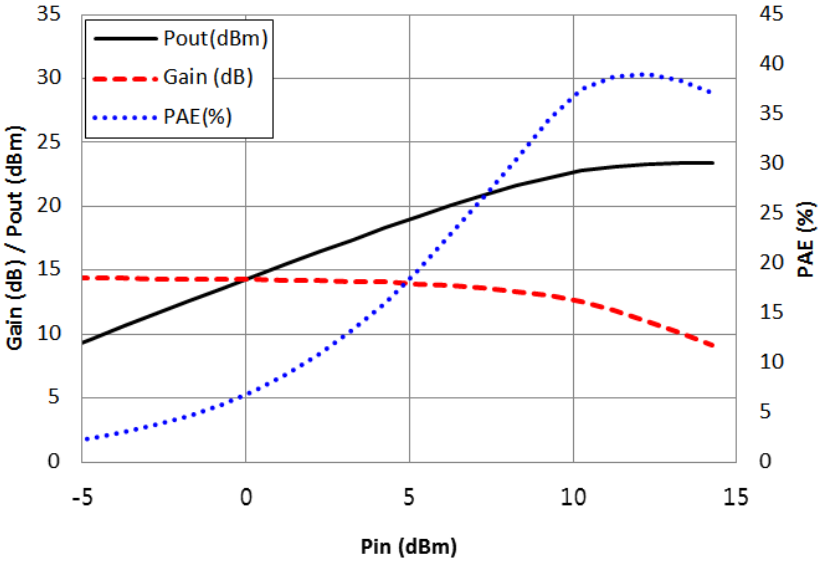
PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	19 19.5	21.0 21.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	11.2 8.9	13.2 10.9		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz		38 40		%
NF	Noise figure (V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		1.45		dB
Ga	Associated Gain ((V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		11		dB

MAXIMUM RATINGS (T_a = 25° C)

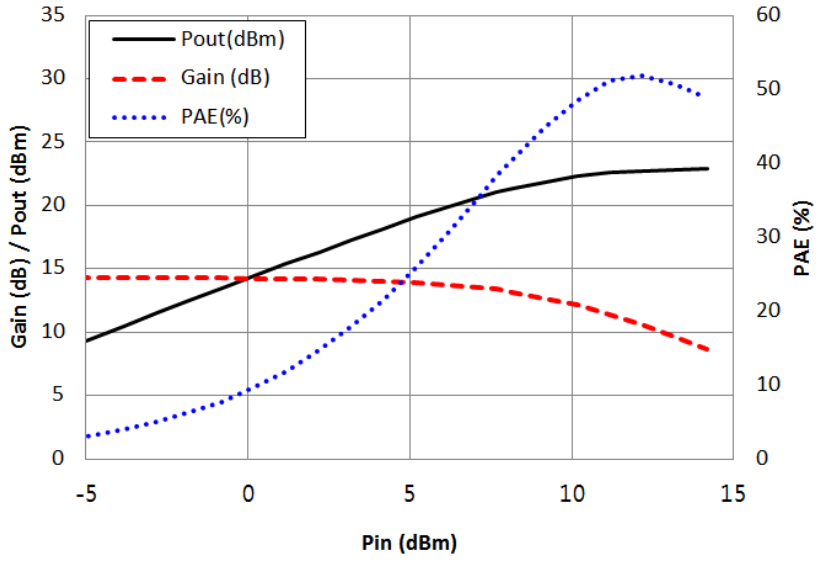
PARAMETERS		ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-8 V	-4V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	7.5 mA	1.2 mA
P_{in}	Input Power	16 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	1.2 W	1.0 W

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device

P_{in}_P_{out}/Gain, PAE (12 GHz)

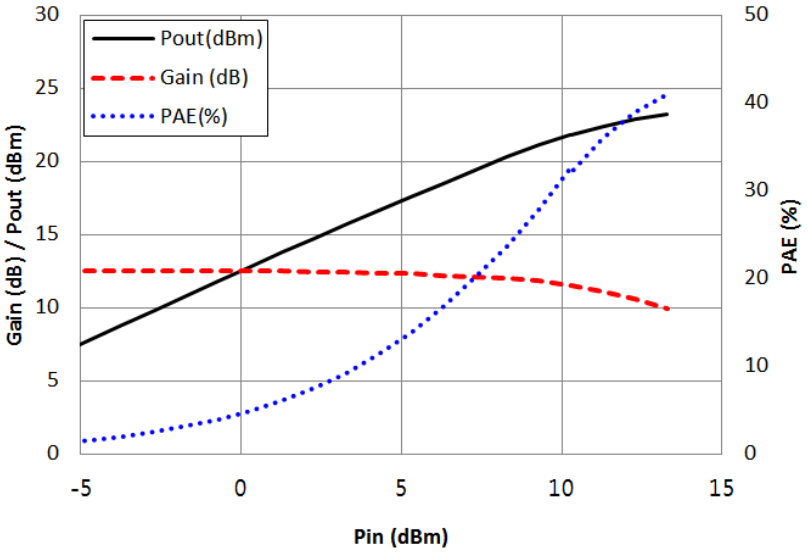


Freq. = 12 GHz, V_{ds} = 8 V, I_{ds} = 50% I_{dss}

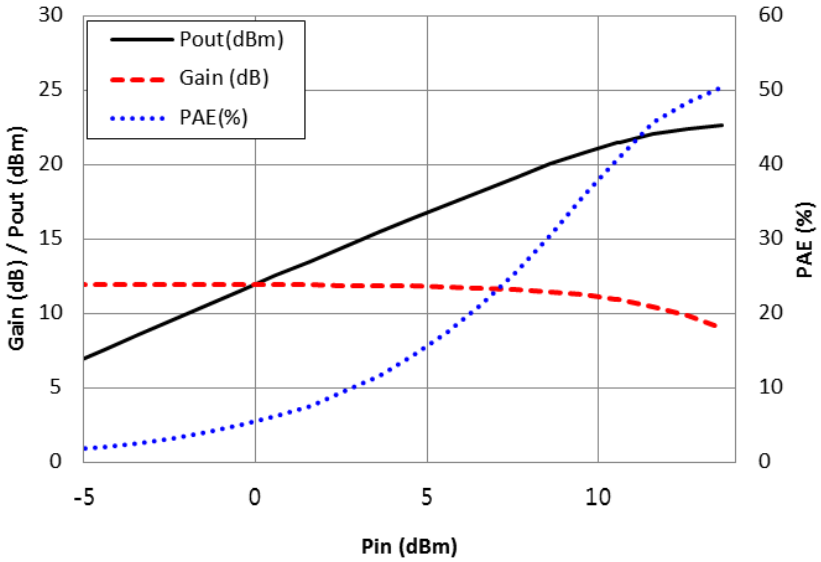


Freq. = 12 GHz, V_{ds} = 6V, I_{ds} = 50% I_{dss}

P_{in}_P_{out}/Gain, PAE (18 GHz)

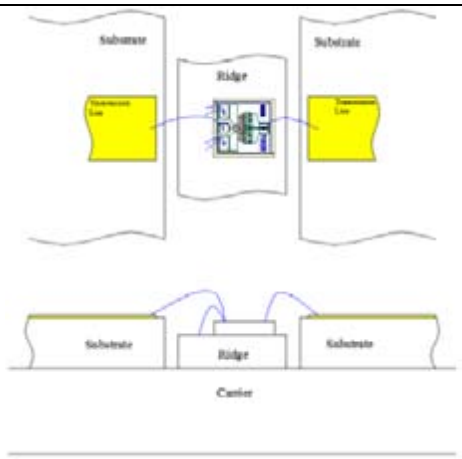


Freq. = 18 GHz, V_{ds} = 8 V, I_{ds} = 50% I_{dss}



Freq. = 18 GHz, V_{ds} = 6 V, I_{ds} = 50% I_{dss}

Wire Bonding Options



- Gold Bonding Wire information

1. Gate to input transmission line
   - Length and Height : 400 um and 250 um
   - Number of wires: 1
2. Drain to output transmission line
   - Length and Height : 350 um and 250 um
   - Number of wires: 1
3. Source to ground plate
   - Length and Height : 200 um x 250 um
   - Number of wires: 4

Note: The diameter of bonding wires: 1 mil

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

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BCF040T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.3 µm x 400 µm)

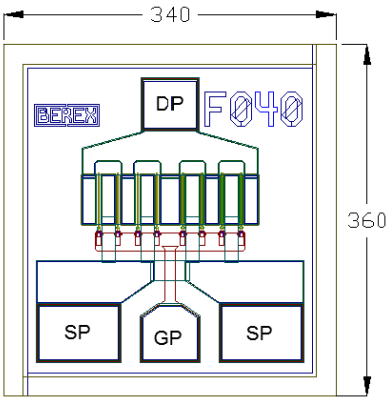
The BeRex BCF040T is a GaAs Power MESFET whose nominal 0.3 micron gate length and 400 micron gate width make the product ideally suited to applications requiring high OIP3 linearity and low phase noise while providing high-gain and medium power from DC to 26.5 GHz. This product is well suited for either wideband or narrow-band applications. The BCF040T is produced using state of the art metallization and devices from each wafer are screened to insure reliability. These chips utilize SI_3N_4 passivation for increased reliability.

Product Features

- 23.0 dBm Typical Output Power
- 13 dB Typical Power Gain @ 12 GHz
- Low Phase Noise
- 0.3 X 400 Micron Recessed Gate

Applications

- Commercial
- Military / Hi-Rel
- Test & Measurement



Chip dimensions : 340 X 360 microns
Gate pad(GP) : 60 X 55 microns
Drain pad(DP) : 60 X 50 microns
Source pad(SP) : 90 X 65 microns
Chip thickness : 100 microns

DC CHARACTERISTIC (T_a = 25° C)

PARAMETER/TEST CONDITIONS		MINIMUM	TYPICAL	MAXIMUM	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2V)	80	120	160	mA
Gm	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})	50	70		mS
Vp	Pinch-off Voltage (I_{ds} = 300 µA, V_{ds} = 3V)	-3.5	-2.0	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2 mA, source open)	-15	-11	V	
BV_{gs}	Source Breakdown Voltage (I_g = 0.2 mA, drain open)	-10	-7	V	
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		100		° C/W

ELECTRICAL CHARACTERISTIC (V_{ds} = 8V, T_a = 25° C)

PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	21.0 20.5	23.0 22.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	11.0 8.4	13.0 10.4		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz		32 30		%
NF	Noise figure (V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		1.65		dB
Ga	Associated Gain (V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		10		dB

ELECTRICAL CHARACTERISTIC (V_{ds} = 6V, T_a = 25° C)

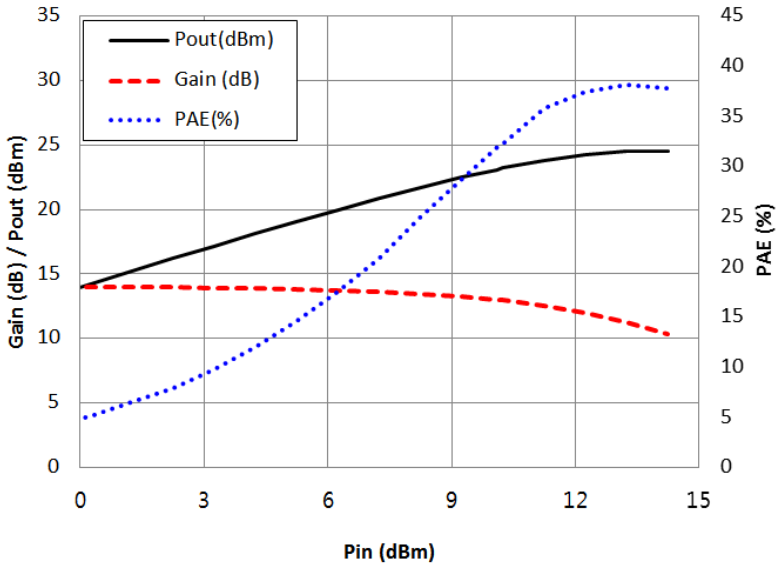
PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	20.5 202	22.5 22.2		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	10.8 8.3	12.8 10.3		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz		39 37		%
NF	Noise figure (V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		1.65		dB
Ga	Associated Gain (V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		10		dB

MAXIMUM RATINGS (T_a = 25° C)

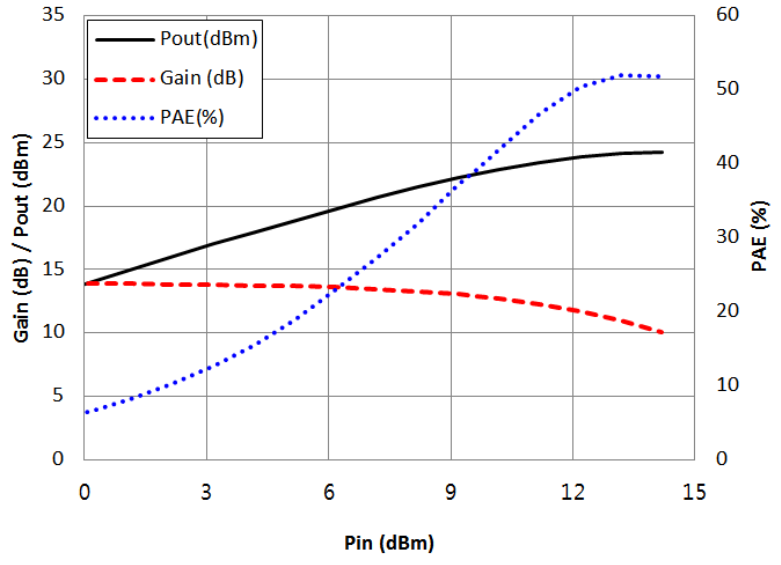
PARAMETERS		ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-8 V	-4V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	10 mA	1.6 mA
P_{in}	Input Power	18 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	1.4 W	1.2 W

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device

P_{in}_P_{out}/Gain, PAE (12 GHz)

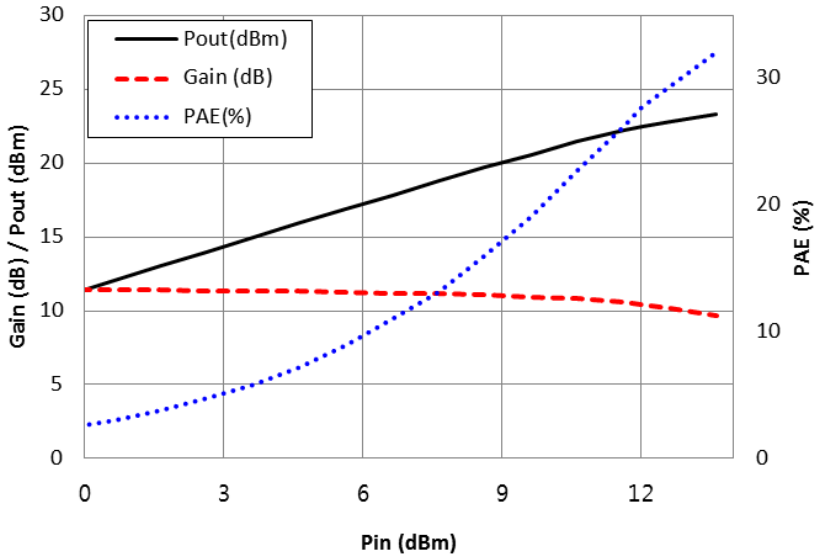


Freq. = 12 GHz, V_{ds} = 8 V, I_{ds} = 50% I_{dss}

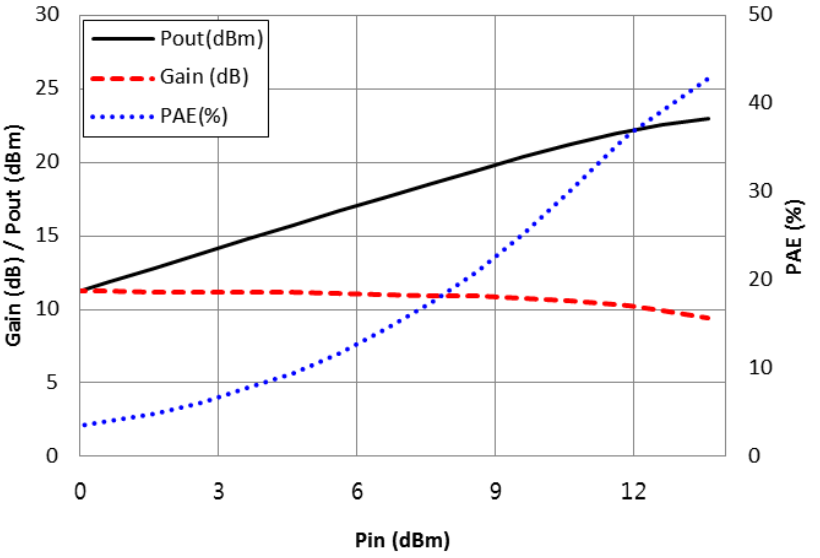


Freq. = 12 GHz, V_{ds} = 6 V, I_{ds} = 50% I_{dss}

P_{in}_P_{out}/Gain, PAE (18 GHz)

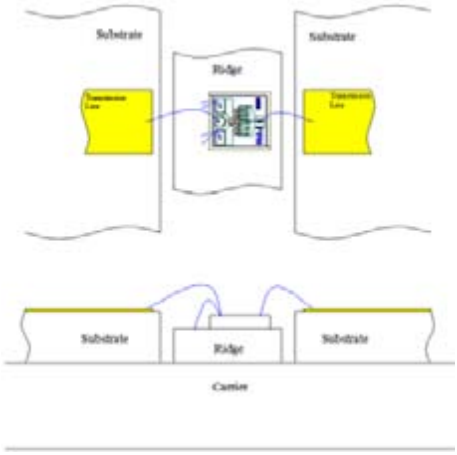


Freq. = 18 GHz, V_{ds} = 8V, I_{ds} = 50% I_{dss}



Freq. = 18 GHz, V_{ds} = 6V, I_{ds} = 50% I_{dss}

Wire Bonding Options



- Gold Bonding Wire information

1. Gate to input transmission line
   - Length and Height : 400 um and 250 um
   - Number of wires: 1
2. Drain to output transmission line
   - Length and Height : 350 um and 250 um
   - Number of wires: 1
3. Source to ground plate
   - Length and Height : 200 um x 250 um
   - Number of wires: 4

Note: The diameter of bonding wires: 1 mil

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:

THIS PRODUCT CONTAINS GALLIUM ARSENIDE (GaAs) WHICH CAN BE HAZARDOUS TO THE HUMAN BODY AND THE ENVIRONMENT. THEREFORE, IT MUST BE HANDLED WITH CARE AND IN ACCORDANCE WITH ALL GOVERNMENTAL AND COMPANY REGULATIONS FOR THE SAFE HANDLING AND DISPOSAL OF HAZARDOUS WASTE. DO NOT BURN, DESTROY, CUT, CRUSH OR CHEMICALLY DISSOLVE THE PRODUCT. DO NOT LICK THE PRODUCT OR IN ANY WAY ALLOW IT TO ENTER THE MOUTH. EXCLUDE THE PRODUCT FROM GENERAL INDUSTRIAL WASTE OR GARBAGE AND DISPOSE OF ONLY IN ACCORDANCE TO APPLICABLE LAWS AND/OR ORDINANCES.

DISCLAIMER

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LIFE SUPPORT POLICY

BEREX PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES WITHOUT THE EXPRESS WRITTEN APPROVAL OF BEREX.

1. Life support devices or systems are devices or systems which (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

BCF060T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.3 µm x 600 µm)

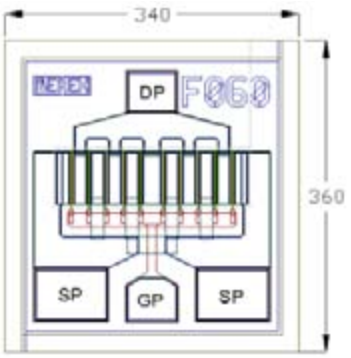
The BeRex BCF060T is a GaAs Power MESFET whose nominal 0.3 micron gate length and 600 micron gate width make the product ideally suited to applications requiring high OIP3 linearity and low phase noise while providing high-gain and medium power from DC to 26.5 GHz. This product is well suited for either wideband or narrow-band applications. The BCF060T is produced using state of the art metallization and devices from each wafer are screened to insure reliability. These chips utilize SI_3N_4 passivation for increased reliability.

Product Features

- 25.0 dBm Typical Output Power
- 12.5 dB Typical Power Gain @ 12 GHz
- Low Phase Noise
- 0.3 X 600 Micron Recessed Gate

Applications

- Commercial
- Military / Hi-Rel
- Test & Measurement



Chip dimensions : 340 X 360 microns
Gate pad(GP) : 60 X 55 microns
Drain pad(DP) : 60 X 50 microns
Source pad(SP) : 90 X 65 microns
Chip thickness : 100 microns

DC CHARACTERISTIC (T_a = 25° C)

PARAMETER/TEST CONDITIONS		MINIMUM	TYPICAL	MAXIMUM	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2V)	100	170	240	mA
Gm	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})	70	100		mS
Vp	Pinch-off Voltage (I_{ds} = 300 µA, V_{ds} = 3V)	-3.5	-2.0		V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.2 mA, source open)		-15	-11	V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2 mA, drain open)		-10	-7	V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		75		° C/W

ELECTRICAL CHARACTERISTIC (V_{ds} = 8V, T_a = 25° C)

PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	23.0 22.6	25.0 24.6		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	10.5 8.0	12.5 10.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz		32 31		%
NF	Noise figure (V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		1.85		dB
Ga	Associated Gain ((V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		9.5		dB

ELECTRICAL CHARACTERISTIC (V_{ds} = 6V, T_a = 25° C)

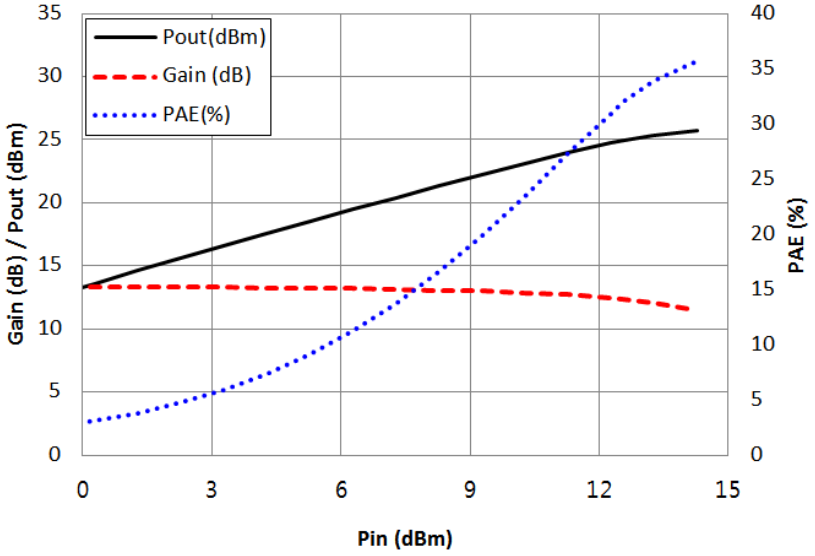
PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	22.5 22.3	24.5 24.3		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz	10.2 7.8	12.2 9.8		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHz		37 39		%
NF	Noise figure (V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		1.85		dB
Ga	Associated Gain ((V_{ds} = 2V, I_{ds} = 10 mA)	12 GHz		9.5		dB

MAXIMUM RATINGS (T_a = 25° C)

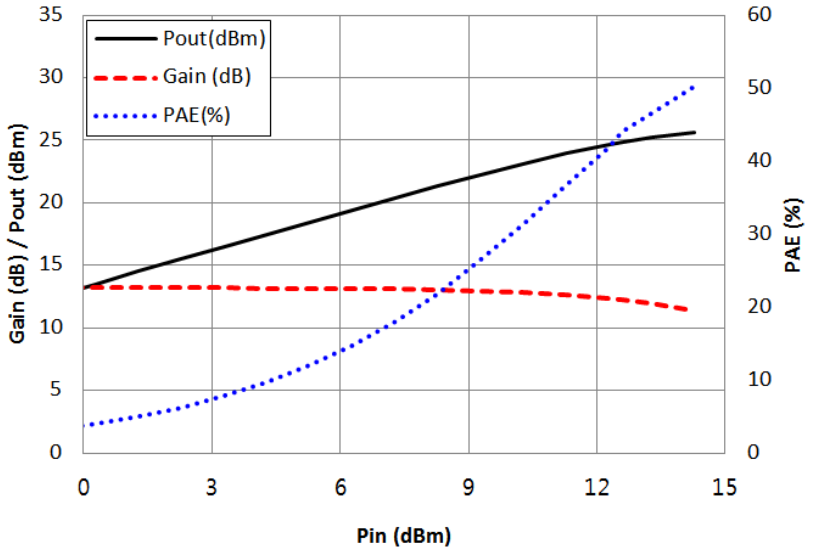
PARAMETERS		ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-8 V	-4V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	15 mA	2.4 mA
P_{in}	Input Power	21 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	1.9 W	1.6 W

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device

P_{in}_P_{out}/Gain, PAE (12 GHz)

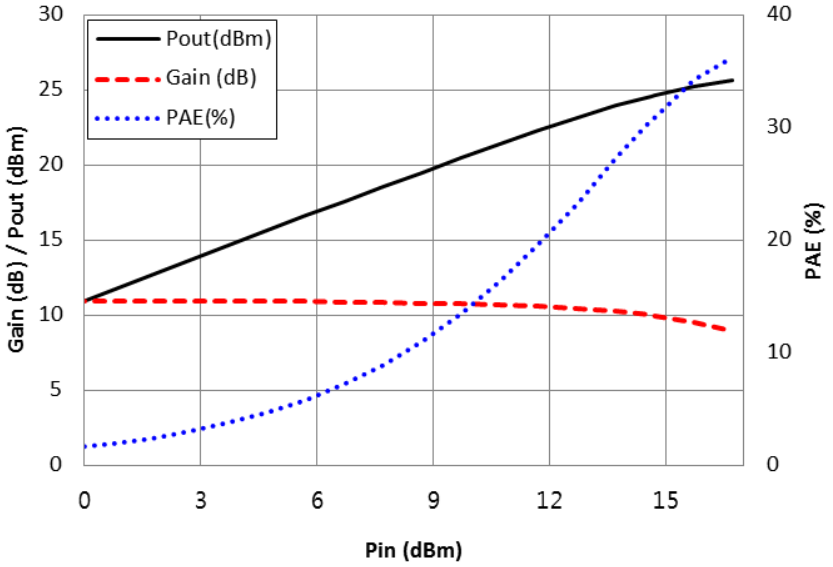


Freq. = 12 GHz, V_{ds} = 8 V, I_{ds} = 50% Idss

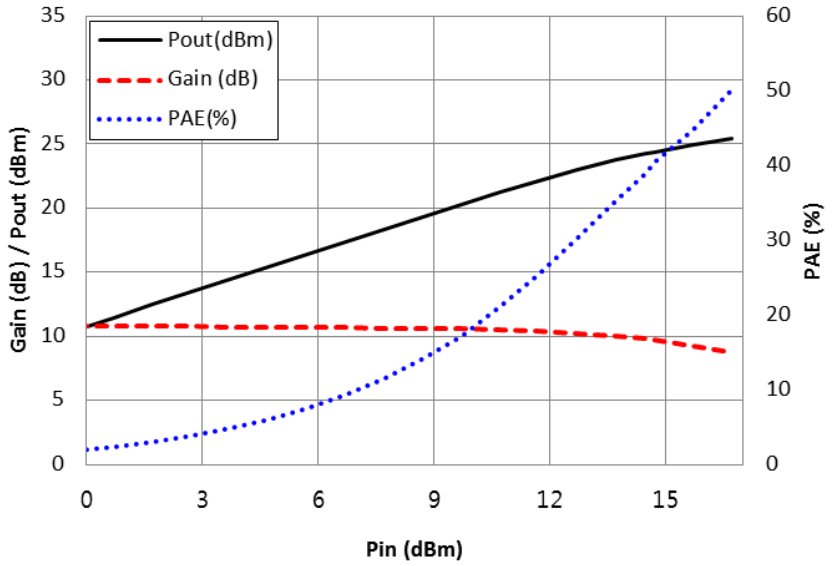


Freq. = 12 GHz, V_{ds} = 6 V, I_{ds} = 50% I_{dss}

P_{in}_P_{out}/Gain, PAE (18 GHz)

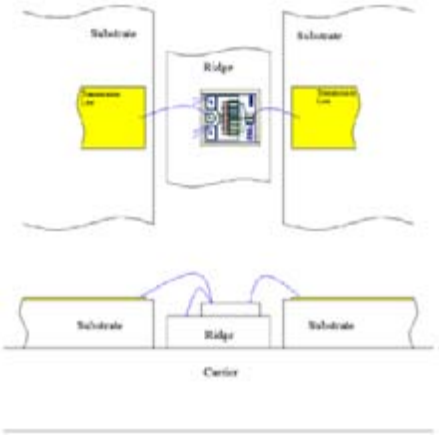


Freq. = 18 GHz, V_{ds} = 8V, I_{ds} = 50% I_{dss}



Freq. = 18 GHz, V_{ds} = 6V, I_{ds} = 50% I_{dss}

Wire Bonding Options



- Gold Bonding Wire information

1. Gate to input transmission line
   - Length and Height : 400 um and 250 um
   - Number of wires: 1
2. Drain to output transmission line
   - Length and Height : 350 um and 250 um
   - Number of wires: 1
3. Source to ground plate
   - Length and Height : 200 um x 250 um
   - Number of wires: 4

Note: The diameter of bonding wires: 1 mil

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

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BCF080T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.3 µm x 800 µm)

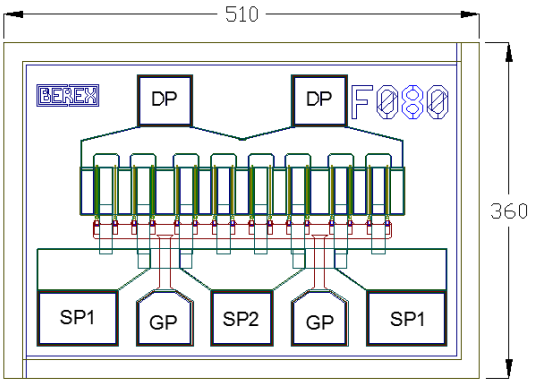
The BeRex BCF080T is a GaAs Power MESFET whose nominal 0.3 micron gate length and 800 micron gate width make the product ideally suited to applications requiring high OIP3 linearity and low phase noise while providing high-gain and medium power from DC to 26.5 GHz. This product is well suited for either wideband or narrow-band applications. The BCF080T is produced using state of the art metallization and devices from each wafer are screened to insure reliability. These chips utilize Si_3N_4 passivation for increased reliability.

Product Features

- 26.0 dBm Typical Output Power
- 11.0 dB Typical Power Gain @ 12 GHz
- Low Phase Noise
- 0.3 X 800 Micron Recessed Gate

Applications

- Commercial
- Military / Hi-Rel
- Test & Measurement



Chip dimensions : 510 X 360 microns
Gate pad(GP) : 60 X 55 microns
Drain pad(DP) : 60 X 50 microns
Source pad1(SP1) : 90 X 65 microns
Source pad2(SP2) : 70 X 65 microns
Chip thickness : 100 microns

DC CHARACTERISTIC (T_a = 25° C)

PARAMETER/TEST CONDITIONS		MINIMUM	TYPICAL	MAXIMUM	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2V)	160	240	320	mA
Gm	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})	100	130		mS
Vp	Pinch-off Voltage (I_{ds} = 800 µA, V_{ds} = 3V)	-3.5	-2.0		V
BV_{gd}	Drain Breakdown Voltage (I_g = 0.8 mA, source open)		-15	-11	V
BV_{gs}	Source Breakdown Voltage (I_g = 0.8 mA, drain open)		-10	-7	V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		61		° C/W

ELECTRICAL CHARACTERISTIC (V_{ds} = 8V, T_a = 25° C)

PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	24.0 23.8	26.0 25.8		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	9.2 7.7	11.2 9.7		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ		27 30		%

ELECTRICAL CHARACTERISTIC (V_{ds} = 6V, T_a = 25° C)

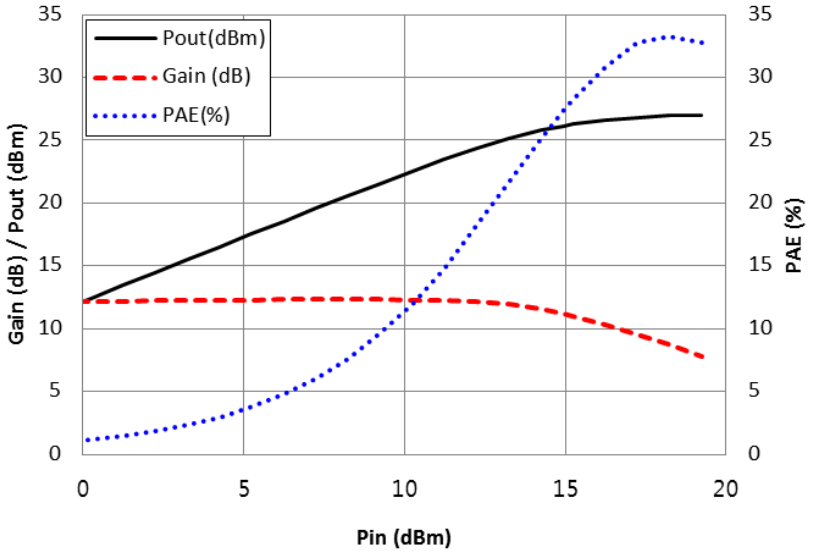
PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	23.5 23.7	25.5 25.7		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	9.0 7.3	11.0 9.3		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ		33 40		%

MAXIMUM RATINGS (T_a = 25° C)

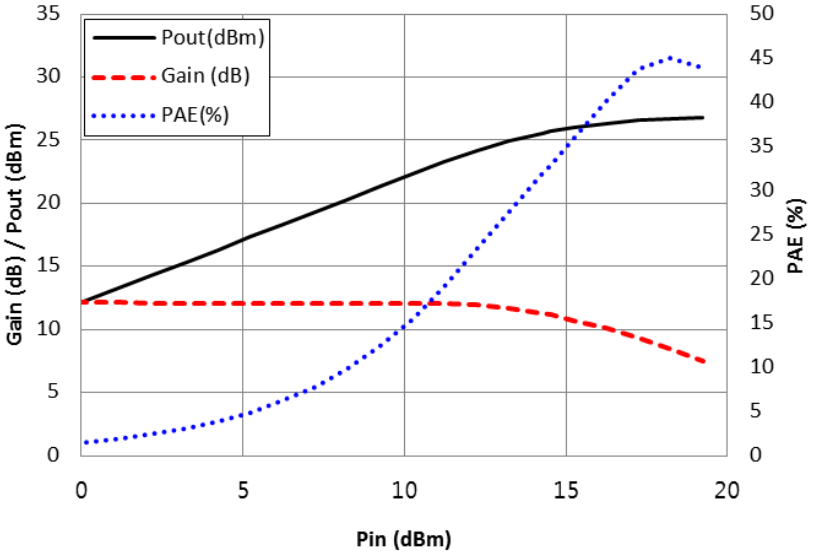
PARAMETERS		ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-8 V	-4V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	20 mA	3.2 mA
P_{in}	Input Power	23 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	2.3 W	1.9 W

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device

P_{in}_P_{out}/Gain, PAE (12 GHz)

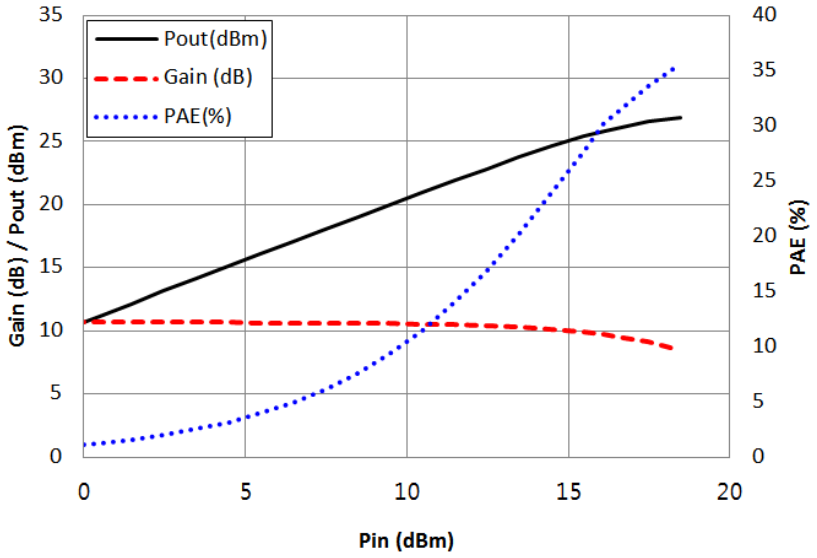


Freq. = 12 GHz, V_{ds} = 8 V, I_{ds} = 50% I_{dss}

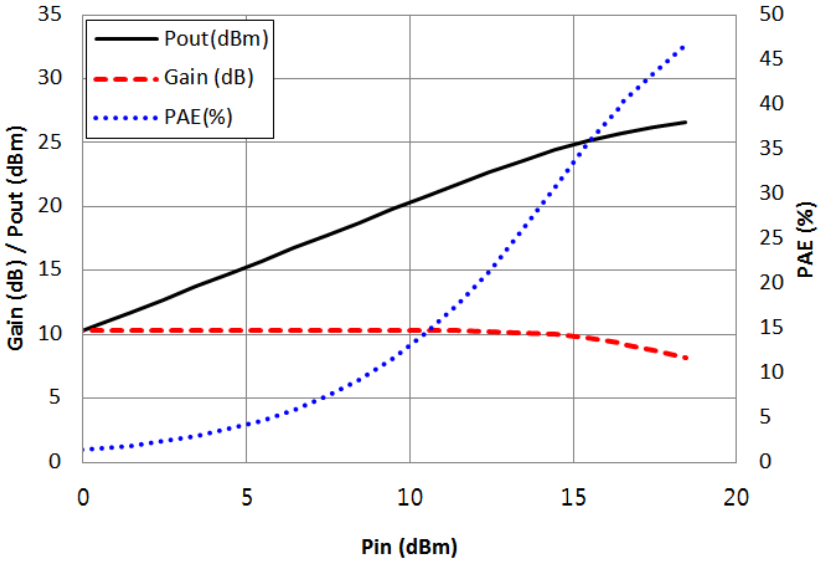


Freq. = 12 GHz, V_{ds} = 6 V, I_{ds} = 50% I_{dss}

P_{in}_P_{out}/Gain, PAE (18GHz)

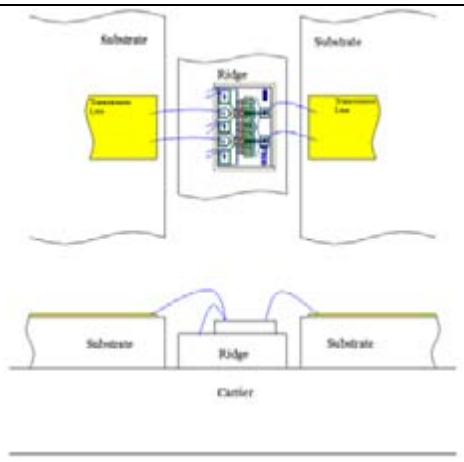


Freq. = 18 GHz, V_{ds} = 8 V, I_{ds} = 50% I_{dss}



Freq. = 18 GHz, V_{ds} = 6 V, I_{ds} = 50% I_{dss}

Wire Bonding Options



- Bonding Wire information

1. Gate to input transmission line
   - Length and Height : 400 um and 250 um
   - Number of wires: 2
2. Drain to output transmission line
   - Length and Height : 350 um and 250 um
   - Number of wires: 2
3. Source to ground plate
   - Length and Height : 200 um x 250 um
   - Number of wires: 6

Note: The diameter of bonding wires: 1 mil

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

GaAs FETs are very sensitive to and may be damaged by Electrostatic Discharge (ESD). Therefore, proper ESD precautions must be taken whenever you are handling these devices. It is critically important that all work surfaces, and assembly equipment, as well as the operator be properly grounded when handling these devices to prevent ESD damage.

STORAGE & SHIPPING:

BeRex's standard chip device shipping package consists of an antistatic "Gel-Pak", holding the chips, placed inside a sealed antistatic and moisture barrier bag. This packaging is designed to provide a reasonable measure of protection from both mechanical and ESD damage.

Chip devices should be stored in a clean, dry Nitrogen gas environment at room temperature until they are required for assembly. Only open the shipping package or perform die assembly in a work area with a class 10,000 or better clean room environment to prevent contamination of the exposed devices.

CAUTION:

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BCF120T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.3 µm x 1200 µm)

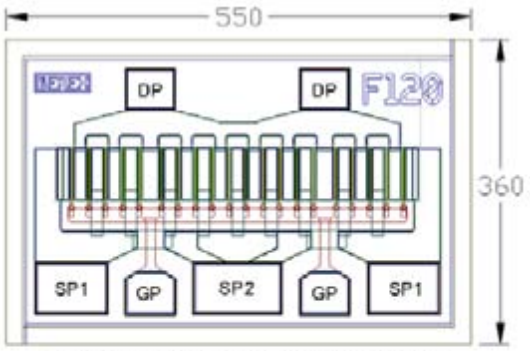
The BeRex BCF120T is a GaAs Power MESFET whose nominal 0.3 micron gate length and 1200 micron gate width make the product ideally suited to applications requiring high OIP3 linearity and low phase noise while providing high-gain and medium power from DC to 26.5 GHz. This product is well suited for either wideband or narrow-band applications. The BCF120T is produced using state of the art metallization and devices from each wafer are screened to insure reliability. These chips utilize Si_3N_4 passivation for increased reliability.

Product Features

- 28.0 dBm Typical Output Power
- 11.0 dB Typical Power Gain @ 12 GHz
- Low Phase Noise
- 0.3 X 1200 Micron Recessed Gate

Applications

- Commercial
- Military / Hi-Rel
- Test & Measurement



Chip dimensions : 550 X 360 microns
Gate pad(GP) : 60 X 55 microns
Drain pad(DP) : 60 X 50 microns
Source pad1(SP1) : 90 X 65 microns
Source pad2(SP2) : 110 X 63 microns
Chip thickness : 100 microns

ELECTRICAL CHARACTERISTIC (T_a = 25° C)

PARAMETER/TEST CONDITIONS		MINIMUM	TYPICAL	MAXIMUM	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 3V)	200	340	440	mA
Gm	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})	140	200		mS
Vp	Pinch-off Voltage (I_{ds} = 300 µA, V_{ds} = 3V)	-3.5	-2.0		V
BV_{gd}	Drain Breakdown Voltage (I_g = 1.2 mA, source open)		-15	-11	V
BV_{gs}	Source Breakdown Voltage (I_g = 1.2 mA, drain open)		-11	-7	V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		40		° C/W

ELECTRICAL CHARACTERISTIC (V_{ds} = 8V, T_a = 25° C)

PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	26.0 25.9	28.0 27.9		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	9.2 7.3	11.2 9.3		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ		31 32		%

ELECTRICAL CHARACTERISTIC (V_{ds} = 6V, T_a = 25° C)

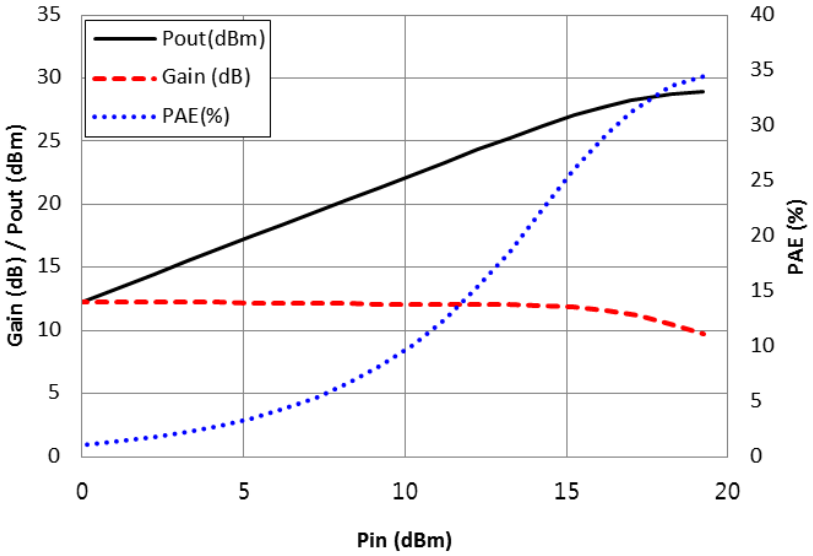
PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	25.5 25.4	27.5 27.4		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	9.0 7.2	11.0 9.2		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ		41 39		%

MAXIMUM RATINGS (T_a = 25° C)

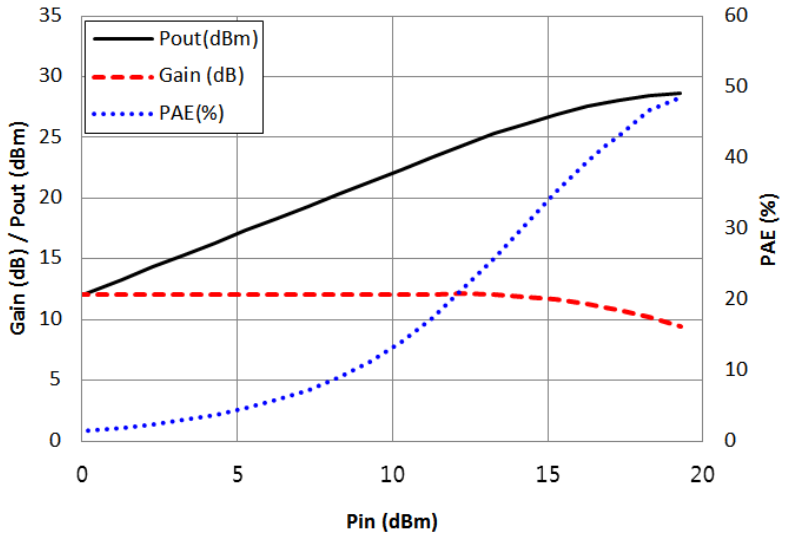
PARAMETERS		ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-8 V	-4V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	30 mA	4.8 mA
P_{in}	Input Power	25 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	3.3 W	2.8 W

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device

P_{in}_P_{out}/Gain, PAE (12 GHz)

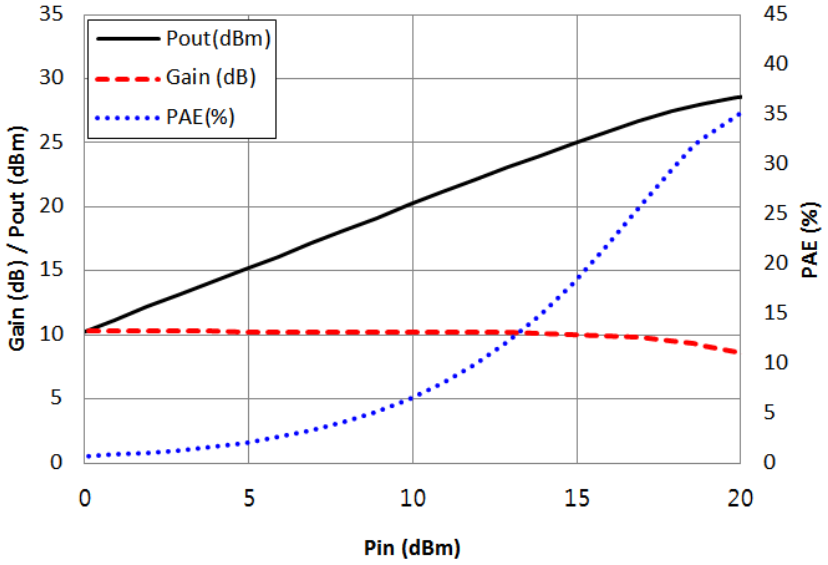


Freq. = 12 GHz, V_{ds} = 8 V, I_{ds} = 50% I_{dss}

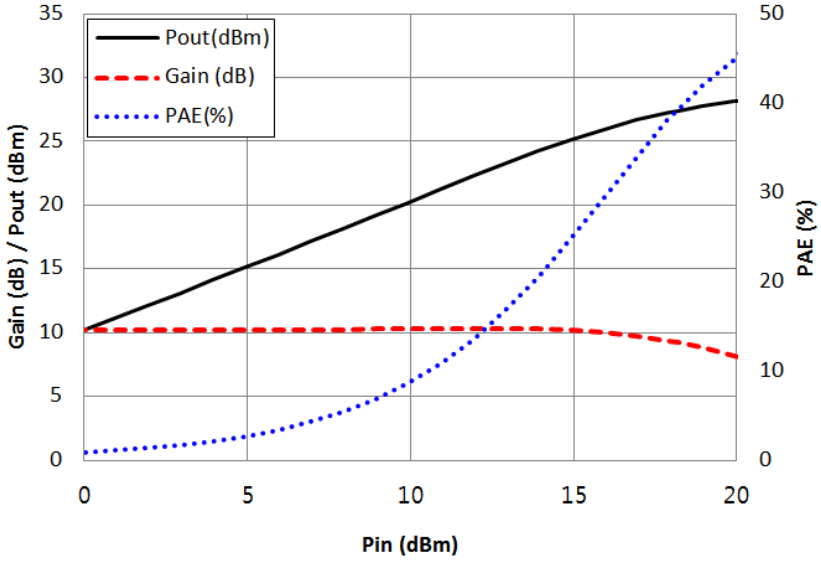


Freq. = 12 GHz, V_{ds} = 6 V, I_{ds} = 50% I_{dss}

P_{in}_P_{out}/Gain, PAE (18 GHz)

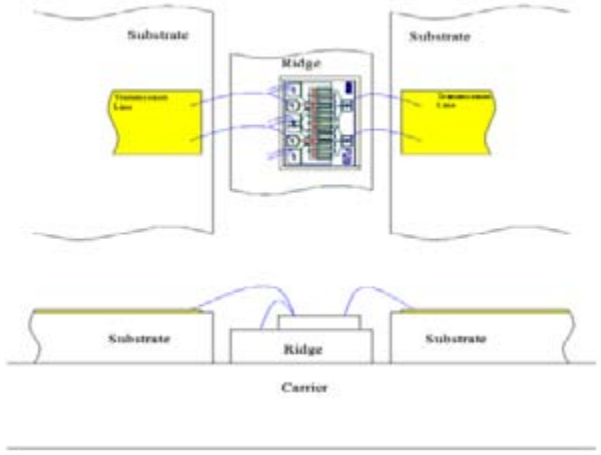


Freq. = 18 GHz, V_{ds} = 8 V, I_{ds} = 50% I_{dss}



Freq. = 18 GHz, V_{ds} = 6 V, I_{ds} = 50% I_{dss}

Wire Bonding Options



- Gold Bonding Wire information

1. Gate to input transmission line
   - Length and Height : 400 um and 250 um
   - Number of wires: 2
2. Drain to output transmission line
   - Length and Height : 350 um and 250 um
   - Number of wires: 2
3. Source to ground plate
   - Length and Height : 200 um x 250 um
   - Number of wires: 6

Note: The diameter of bonding wires: 1 mil

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

HANDLING PRECAUTIONS:

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STORAGE & SHIPPING:

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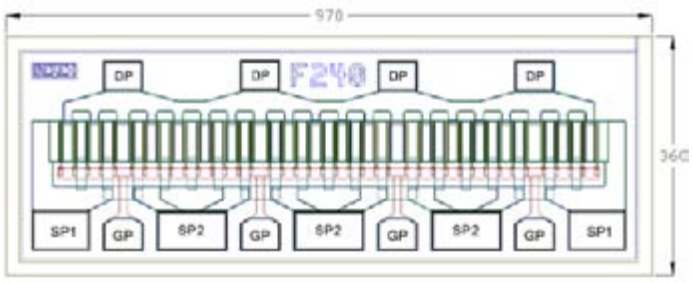
BCF240T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.3 µm x 2400 µm)

The BeRex BCF240T is a GaAs Power MESFET whose nominal 0.3 micron gate length and 2400 micron gate width make the product ideally suited to applications requiring high OIP3 linearity and low phase noise while providing high-gain and medium power from DC to 26.5 GHz. This product is well suited for either wideband or narrow-band applications. The BCF240T is produced using state of the art metallization and devices from each wafer are screened to insure reliability. These chips utilize Si_3N_4 passivation for increased reliability.

Product Features

- 30.4 dBm Typical Output Power
- 9.8 dB Typical Power Gain @ 12 GHz
- Low Phase Noise
- 0.3 X 2400 Micron Recessed Gate



Chip dimensions : 970 X 360 microns
Gate pad(GP) : 60 X 55 microns
Drain pad(DP) : 60 X 50 microns
Source pad1(SP1) : 90 X 65 microns
Source pad2(SP2) : 110 X 65 microns
Chip thickness : 100 microns

Applications

- Commercial
- Military / Hi-Rel
- Test & Measurement

DC CHARACTERISTIC (T_a = 25° C)

PARAMETER/TEST CONDITIONS		MINIMUM	TYPICAL	MAXIMUM	UNIT
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2V)	480	720	960	mA
Gm	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})		400		mS
Vp	Pinch-off Voltage (I_{ds} = 2400 µA, V_{ds} = 3V)	-3.5	-2.0		V
BV_{gd}	Drain Breakdown Voltage (I_g = 2.4 mA, source open)		-15	-11	V
BV_{gs}	Source Breakdown Voltage (I_g = 2.4 mA, drain open)		-10	-7	V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		23		°C/W

ELECTRICAL CHARACTERISTIC (V_{ds} = 8V, T_a = 25° C)

PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	28.4 28.1	30.4 30.1		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	7.8 5.7	9.8 7.7		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ		26.7 25.5		%

ELECTRICAL CHARACTERISTIC (V_{ds} = 6V, T_a = 25° C)

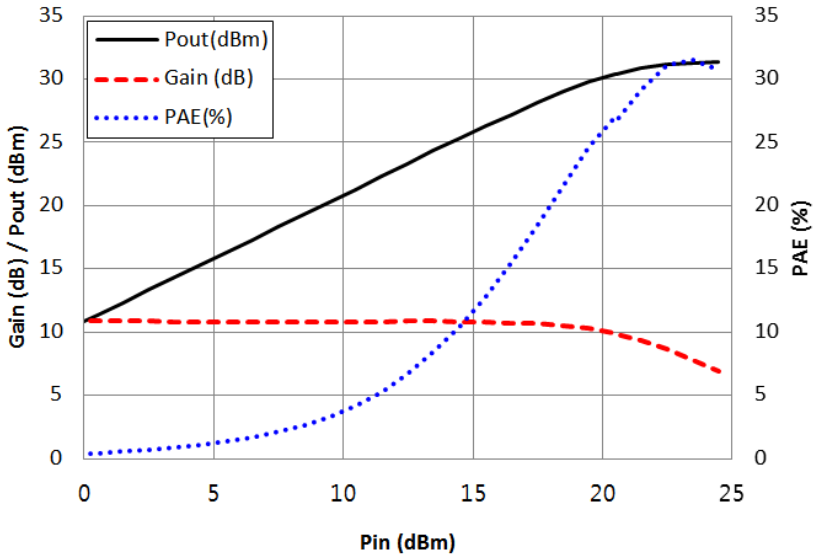
PARAMETER/TEST CONDITIONS		TEST FREQUENCY	MINIMUM	TYPICAL	MAXIMUM	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	28.8 28.1	30.8 30.1		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ	7.1 5.4	9.1 7.4		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHZ 18 GHZ		40 33		%

MAXIMUM RATINGS (T_a = 25° C)

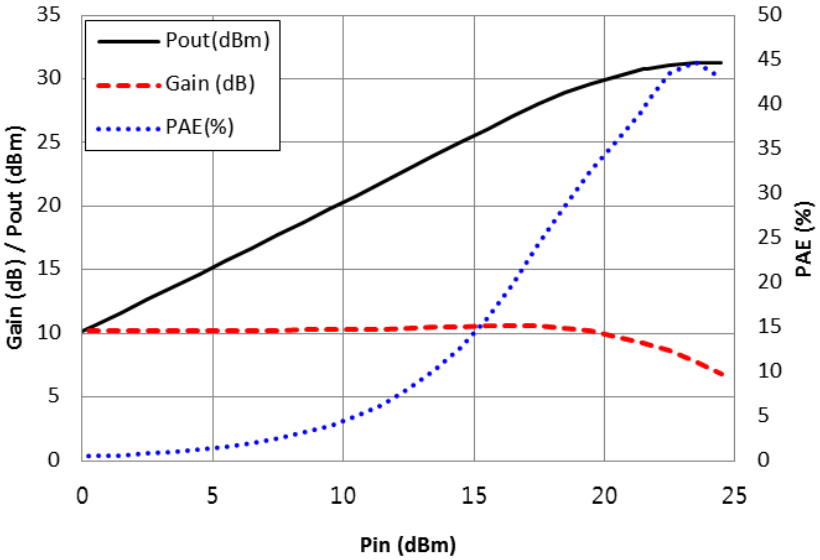
PARAMETERS		*ABSOLUTE*	*CONTINUOUS*
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-8 V	-4V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	60 mA	9.6 mA
P_{in}	Input Power	29 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	5.4 W	4.5 W

Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device

P_{in}_P_{out}/Gain, PAE (12 GHz)

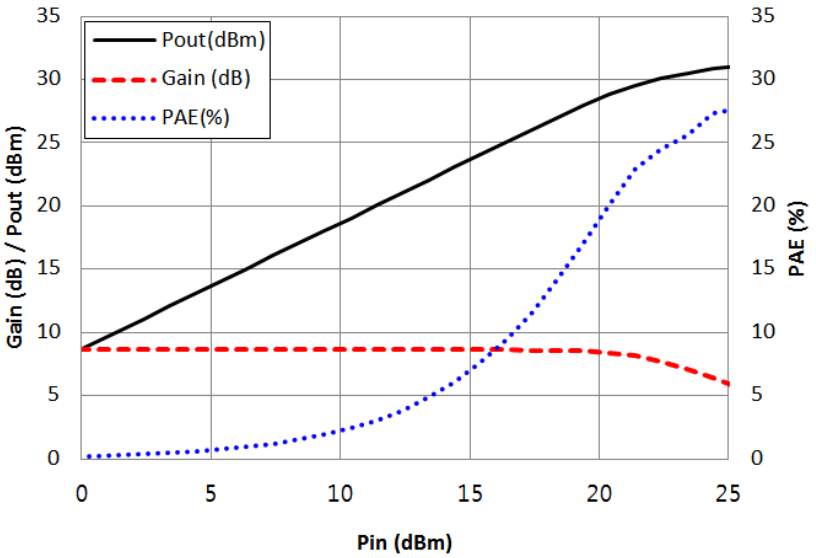


Freq. = 12 GHz, V_{ds} = 8 V, I_{ds} = 50% I_{dss}

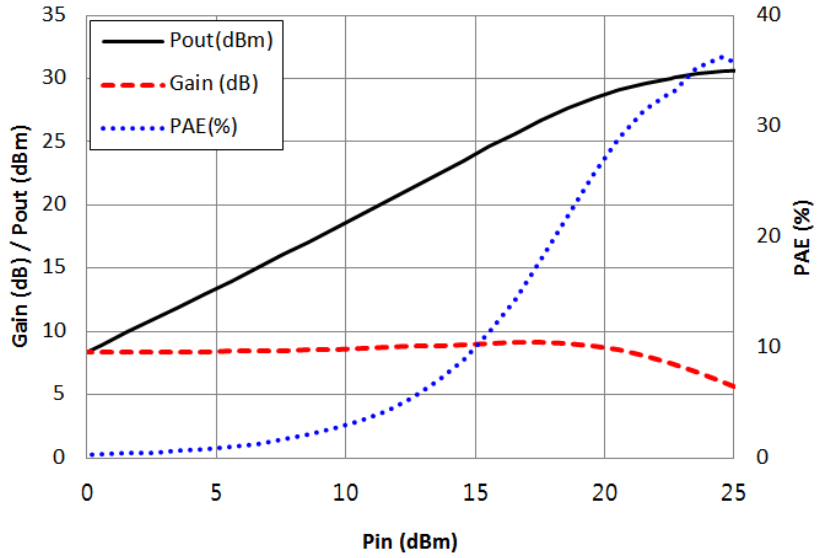


Freq. = 12 GHz, V_{ds} = 6 V, I_{ds} = 50% I_{dss}

P_{in}_P_{out}/Gain, PAE (18 GHz)



Freq. = 18 GHz, V_{ds} = 8 V, I_{ds} = 50% I_{dss}



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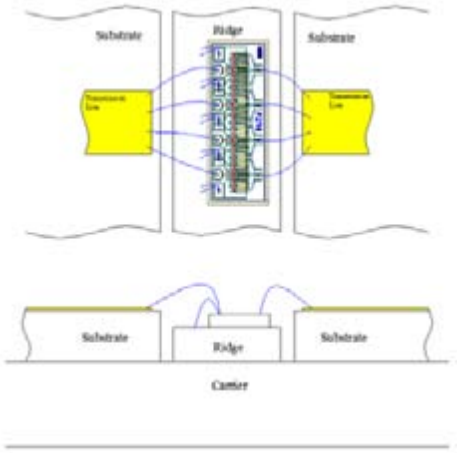
Wire Bonding Options



- Gold Bonding Wire information

1. Gate to input transmission line
   - Length and Height : 400 um and 250 um
   - Number of wires: 4
2. Drain to output transmission line
   - Length and Height : 350 um and 250 um
   - Number of wires: 4
3. Source to ground plate
   - Length and Height : 200 um x 250 um
   - Number of wires: 10

Note: The diameter of bonding wires: 1 mil

Caution: ESD Sensitive
Appropriate precautions in handling, packaging and testing devices must be observed.

Proper ESD procedures should be followed when handling this device.

DIE ATTACH RECOMMENDATIONS:

BeRex recommends the "Eutectic" die attach using Au-Sn (80%-20%) pre-forms. The die attach station must have accurate temperature control, and the operation should be performed with parts no hotter than 300°C for less than 10 seconds. An inert forming gas (90% N_2-10% H_2) or clean, dry N_2 should be used.

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RF MMIC Innovator www.berex.com

Classification: Reflow Soldering

Document Number: Reflow61110

Revision code: 0.1

Reflow Soldering Guide

for Surface Mount Devices

	Name	Date	Signature
Writer	BY KIM		
Checked	JH Bae		OK
Approval	Dr. Yoo		OK

Contents

1. Reflow Soldering Guide for Surface Mount Devices

This technical note provides general guidelines for a solder reflow process for BeRex surface mount products. The data used in this document is based on IPC/JEDEC standards. The reflow process consists of applying a Pb-free solder paste to a circuit board, placing devices onto the paste, and then conveying the board through an oven with successive heating elements of varying temperatures. In the oven, each board typically goes through the following stages:

- Gradual preheating
- Flux activation
- Reflow
- Controlled cooling process

The maximum temperature, the rate of heating, the time a device spends at each temperature, controlled heating, and controlled cooling are critical parameters for effective soldering.

Figure 1 and Table 1 show a sample temperature profile compliant to JEDEC standards. Different board designs use different number and types of devices, solder paste, reflow ovens, and circuit boards. No single temperature profile works for all possible combinations. One can use this example as a generic target to set up its own reflow process. Reflow process should adhere to the JEDEC profile limits as well as specifications and recommendations from solder paste manufacturer to avoid damaging the device and create a reliable solder joint.

2. Figure 1. Temperature Profile for Infrared or Convection Reflow

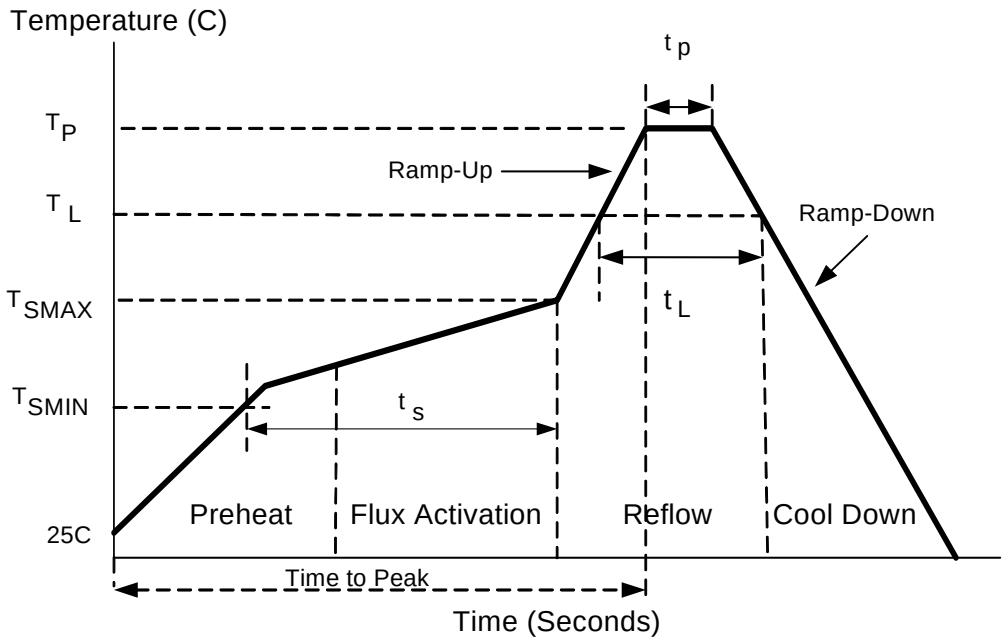

Figure 1. Temperature Profile for Infrared or Convection Reflow

3. Table 1. Reflow Profile

Parameter	Description	Pb-Free Package
Ramp-Up	Average Ramp-Up Rate (T_{SMAX} to T_p)	3 ºC/second max.
T_{SMIN}	Preheat Peak Min. Temperature	150 ºC
T_{SMAX}	Preheat Peak Max. Temperature	200 ºC
Tp	Max. Reflow Temperature	260 (+0/-5) ºC
T_s	Time between T_{SMIN} and T_{SMAX}	60-180 seconds
T_L	Solder Melting Point	218 ºC
t_L	Time Maintained above T_L	60-150 seconds
t_p	Time within 5C of Peak Temperature	20-40 seconds
Ramp-Down	Ramp-down Rate	6 ºC/second max.
Time to Peak	Time from 25 ºC to Peak Temperature	8 minutes max.