BCP020T-70

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

The BeRex BCP060T-70 is a GaAs Power pHEMT in an industry standard, 70 mil. ceramic, 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

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	60.0	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 = 0.2 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

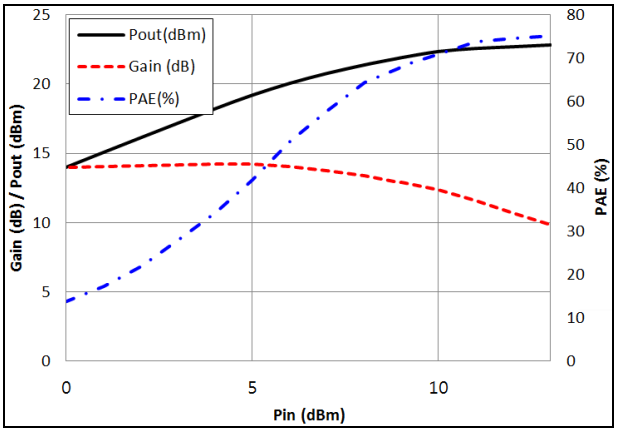
SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	19.0 18.0	20.5 19.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	12.5 9.5	13.5 10.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		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)

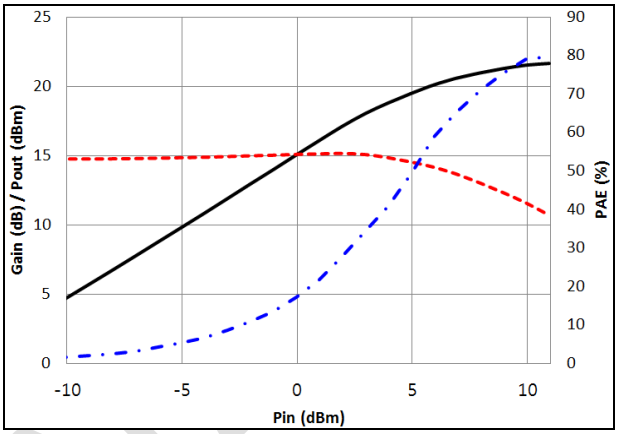
SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	11 mA	2 mA
P_{in}	Input Power	17 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature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

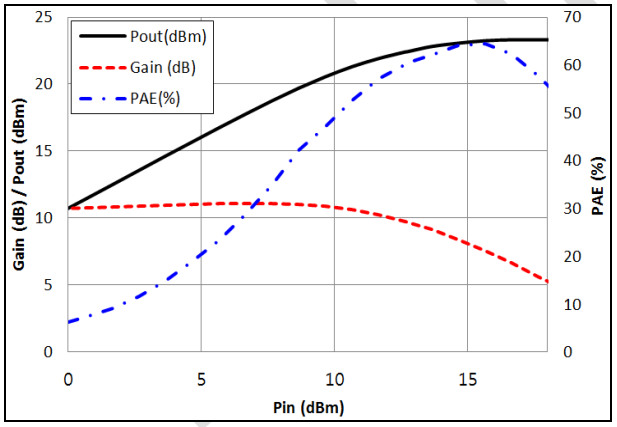


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Power Tune)

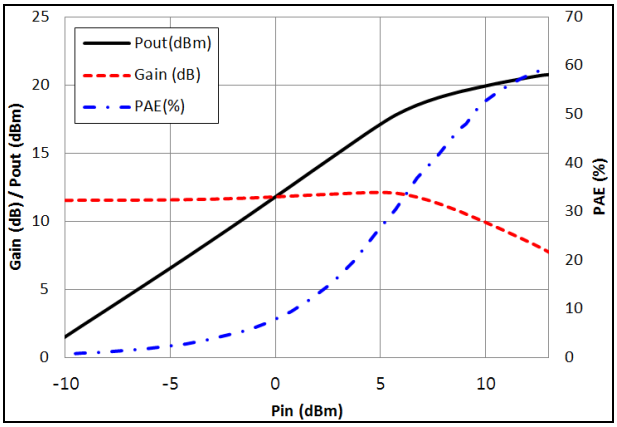


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Gain Tune)

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



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

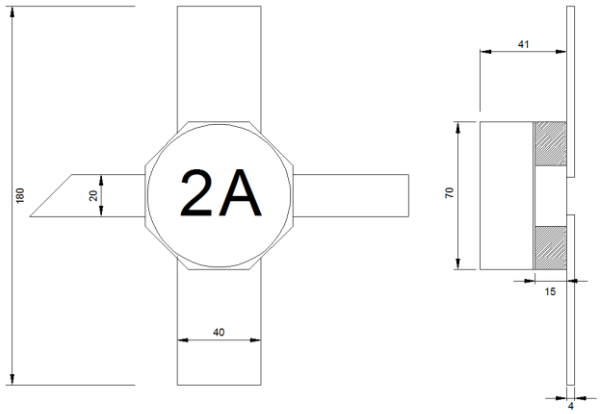


Frequency = 18GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

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

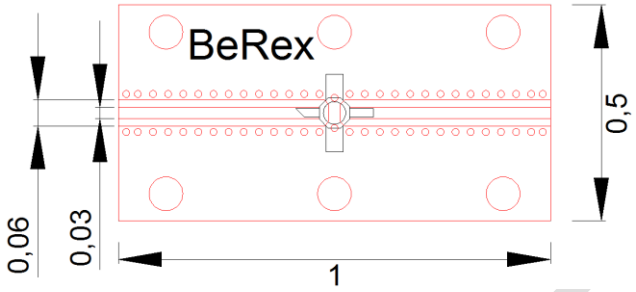
FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.98	-28.41	5.52	153.55	0.014	68.29	0.80	-18.24
2	0.95	-53.08	5.15	130.38	0.026	50.54	0.79	-34.48
3	0.89	-76.01	4.84	108.61	0.037	34.33	0.77	-48.91
4	0.83	-100.67	4.60	86.37	0.045	17.03	0.74	-63.38
5	0.76	-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



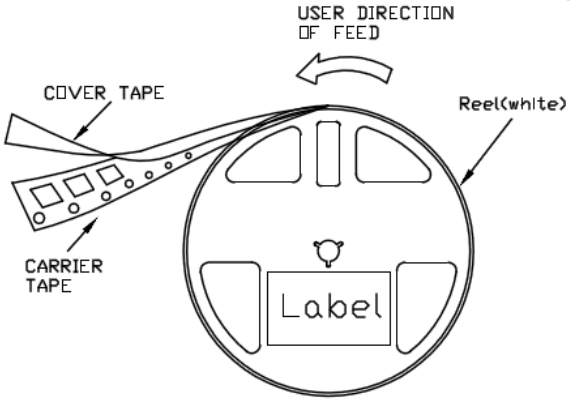
All dimensions in mils.

Suggested PCB layout

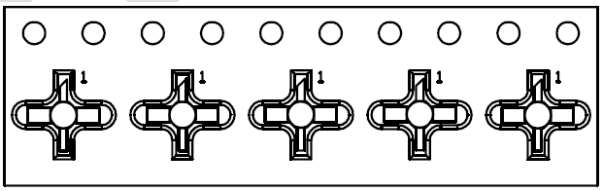


All dimensions in Inches

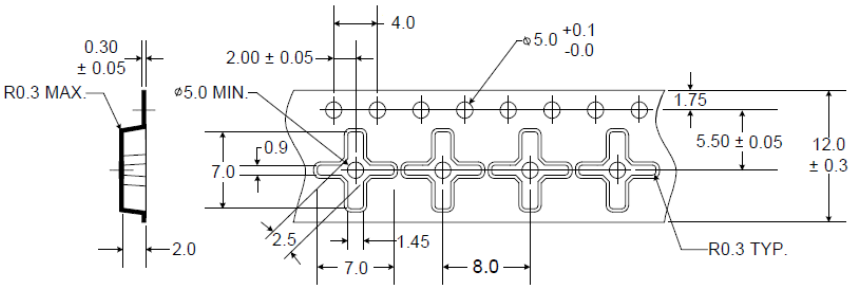
Tape and Reel Dimensions



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.

DISCLAIMER

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