



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, V _{gs} = 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) $T_a = 25^\circ\text{C}$

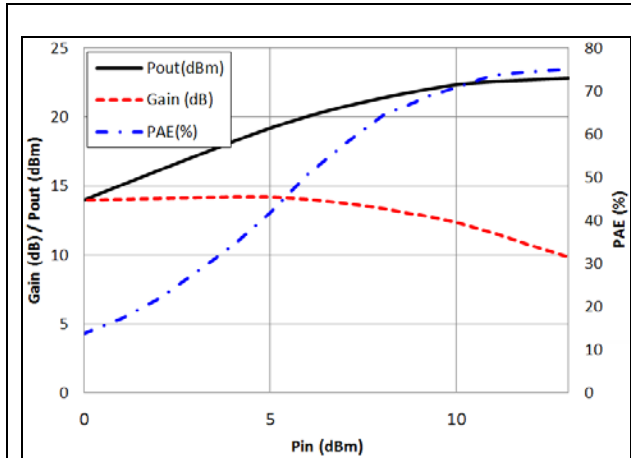
SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	MAX.	UNIT
P _{1dB}	Output Power @ P _{1dB} ($V_{ds} = 6\text{V}$, $I_{ds} = 50\% I_{dss}$)	12 GHz	19.0	20.5		dBm
		18 GHz	18.0	19.5		
G _{1dB}	Gain @ P _{1dB} ($V_{ds} = 6\text{V}$, $I_{ds} = 50\% I_{dss}$)	12 GHz	12.5	13.5		dB
		18 GHz	9.5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

MAXIMUM RATING ($T_a = 25^\circ\text{C}$)

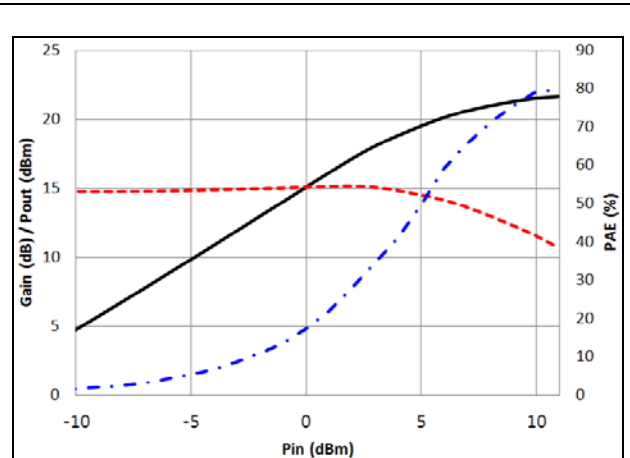
SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V _{ds}	Drain-Source Voltage	12 V	8 V
V _{gs}	Gate-Source Voltage	-6 V	-3 V
I _{ds}	Drain Current	I _{dss}	I _{dss}
I _{gsf}	Forward Gate Current	11 mA	2 mA
P _{in}	Input Power	17 dBm	@ 3dB compression
T _{ch}	Channel Temperature	175° C	150° C
T _{stg}	Storage Temperature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

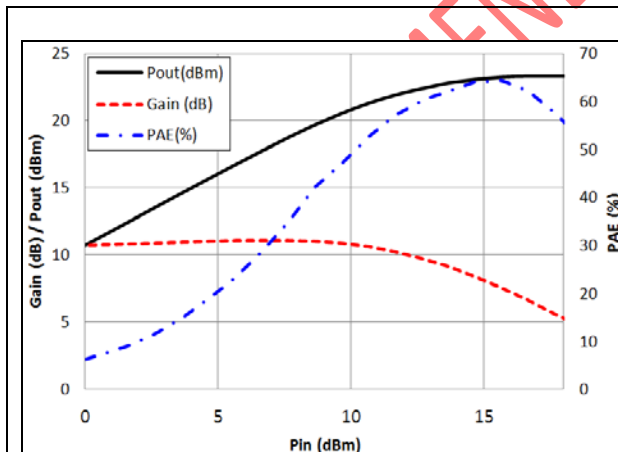


Frequency = 12GHz
 $V_{ds} = 6\text{ V}$, $I_{ds} = 50\% I_{dss}$ (Power Tune)

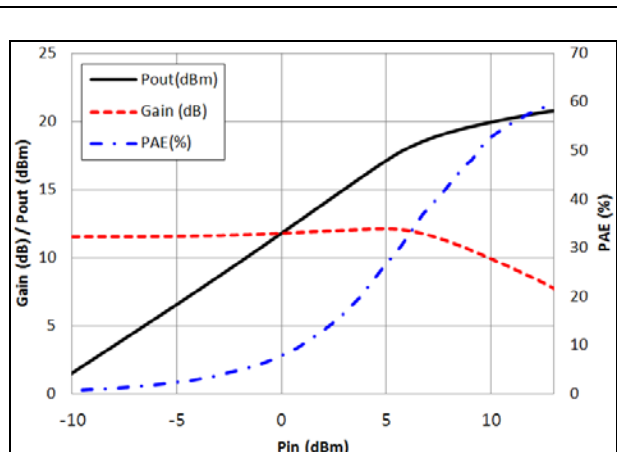


Frequency = 12GHz
 $V_{ds} = 6\text{ V}$, $I_{ds} = 50\% I_{dss}$ (Gain Tune)

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



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

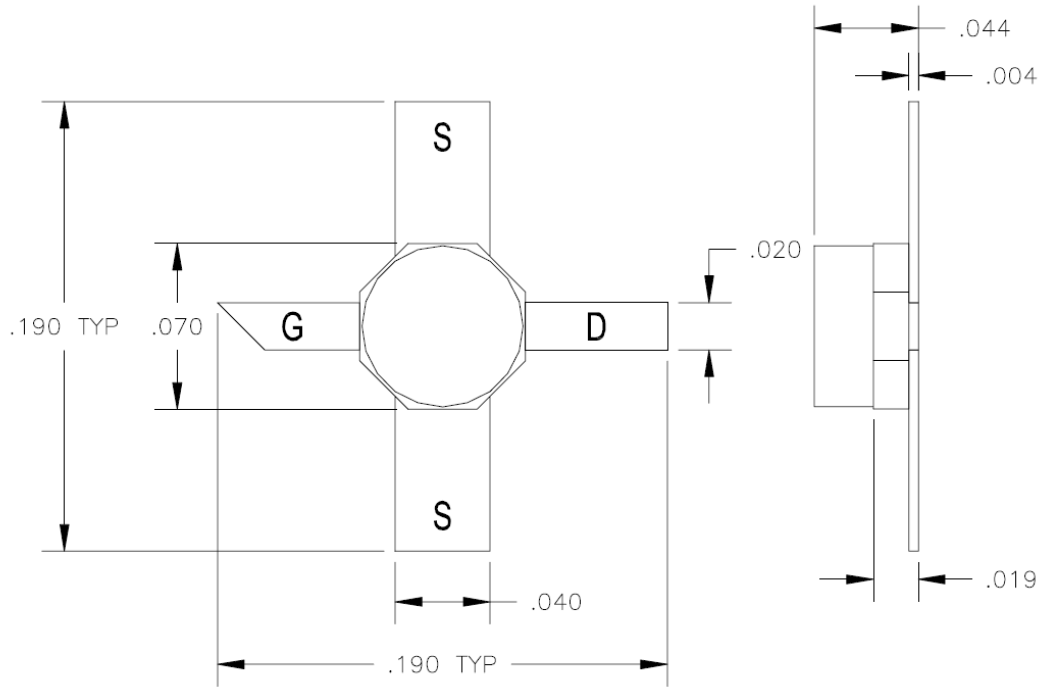


Frequency = 18GHz
 $V_{ds} = 6\text{ V}$, $I_{ds} = 50\% I_{dss}$ (Tuned for Gain)

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

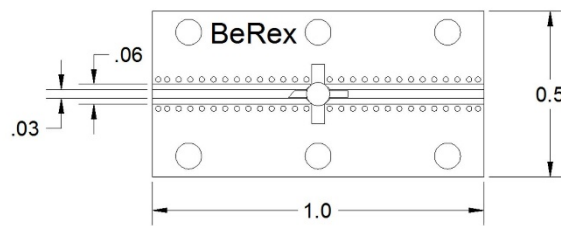
FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.98	-28.41	5.52	153.55	0.014	68.29	0.80	-18.24
2	0.95	-53.08	5.15	130.38	0.026	50.54	0.79	-34.48
3	0.89	-76.01	4.84	108.61	0.037	34.33	0.77	-48.91
4	0.83	-100.67	4.60	86.37	0.045	17.03	0.74	-63.38
5	0.76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



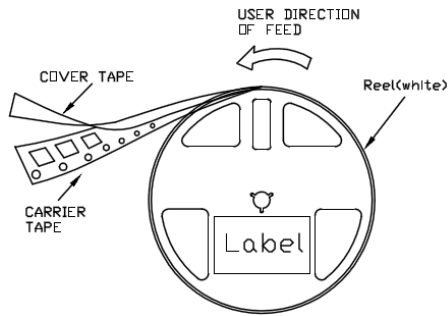
ALL DIMENSIONS IN INCHES

Suggested PCB Layout

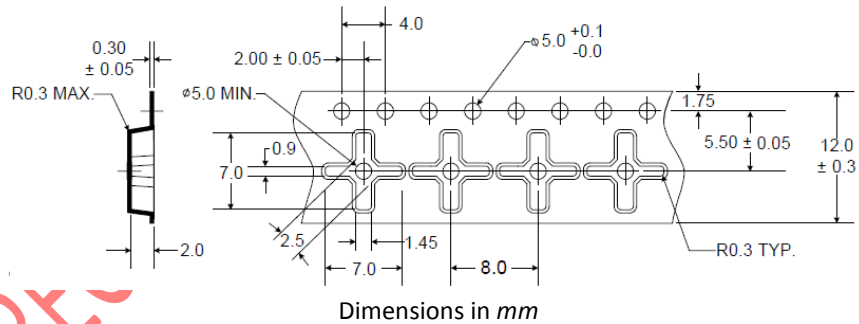
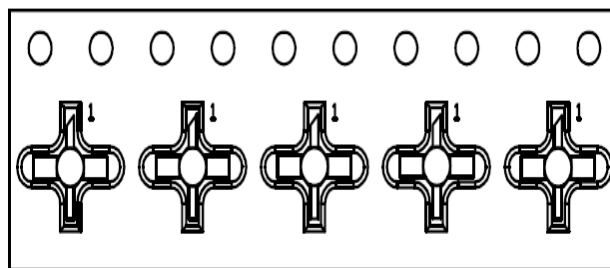


All dimensions in Inches

Tape and Reel Dimensions



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



Proper ESD procedures should be followed when handling this device.

DISCLAIMER

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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.