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

NOT RECOMMENDED FOR NEW DESIGNS

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

Specifications are subject to change without notice. ©BeRex 2015
NOT RECOMMENDED FOR NEW DESIGNS

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

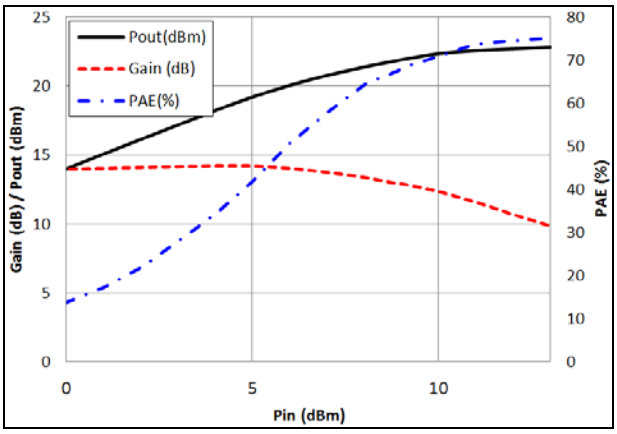
MAXIMUM RATING (T_a = 25° C)

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

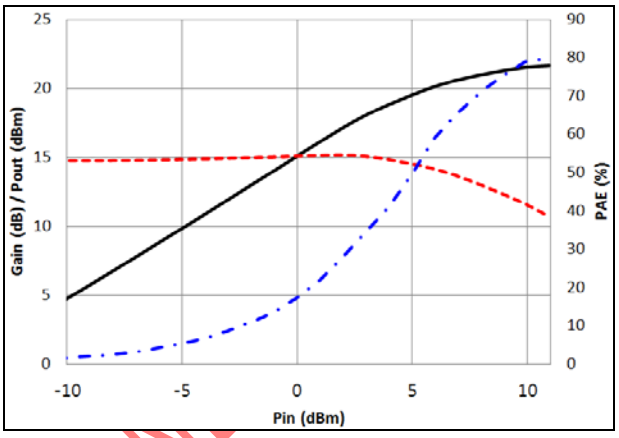
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

NOT RECOMMENDED FOR NEW DESIGNS

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

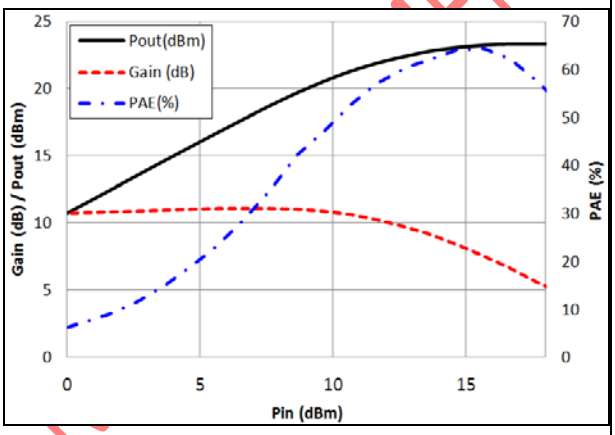


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Power Tune)

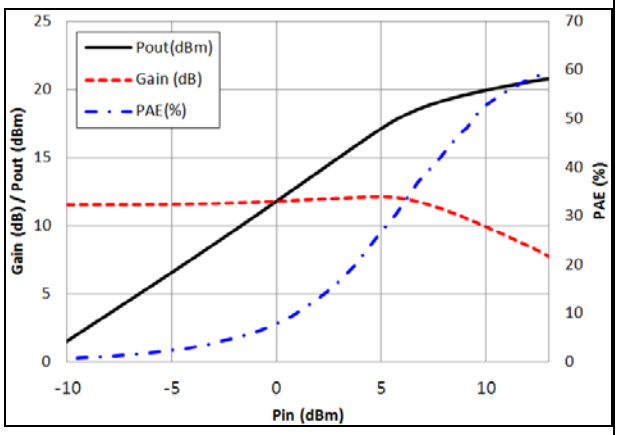


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Gain Tune)

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)

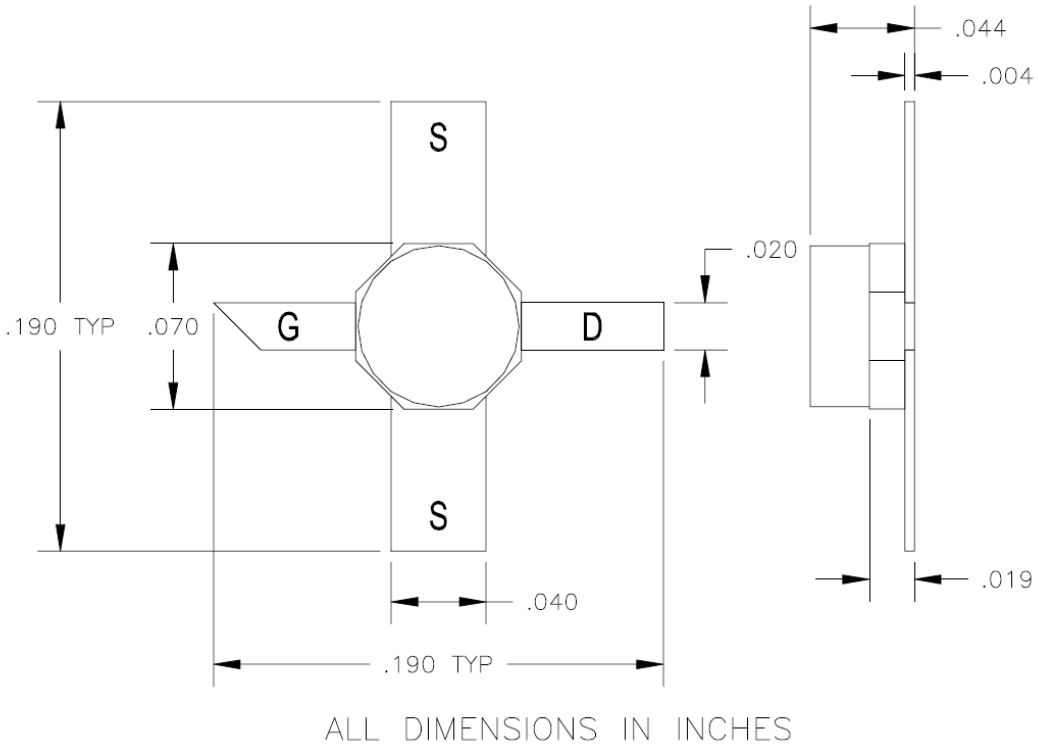
NOT RECOMMENDED FOR NEW DESIGNS

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

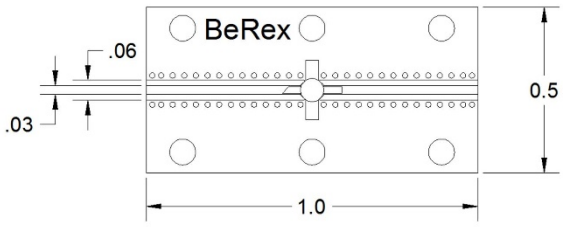
FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.98	-28.41	5.52	153.55	0.014	68.29	0.80	-18.24
2	0.95	-53.08	5.15	130.38	0.026	50.54	0.79	-34.48
3	0.89	-76.01	4.84	108.61	0.037	34.33	0.77	-48.91
4	0.83	-100.67	4.60	86.37	0.045	17.03	0.74	-63.38
5	0.76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

NOT RECOMMENDED FOR NEW DESIGNS

Package Outline Dimension



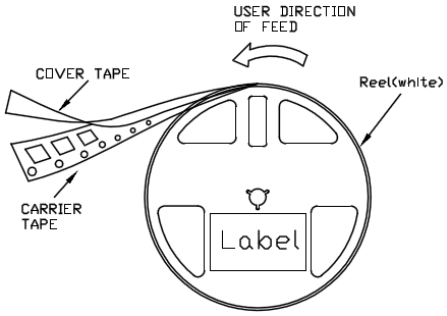
Suggested PCB Layout



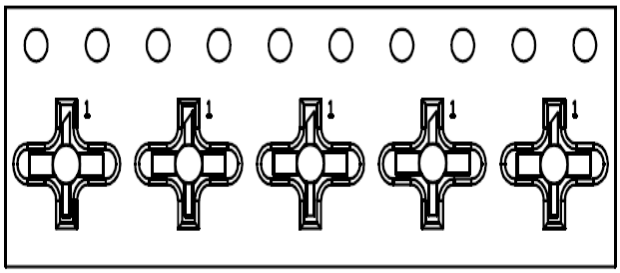
All dimensions in Inches

NOT RECOMMEN

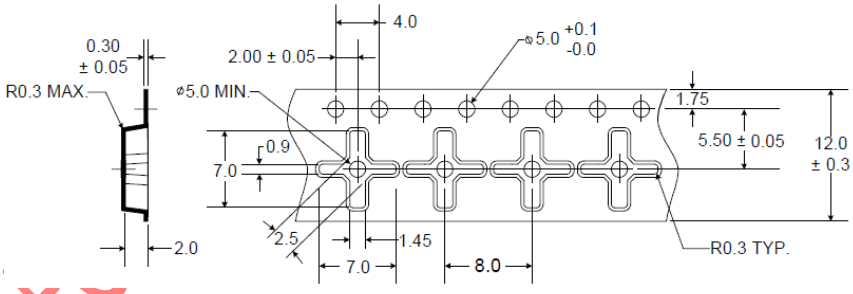
Tape and Reel Dimensions



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



User Direction of Feed



Dimensions in *mm*

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

Proper ESD procedures should be followed when handling this device.

NOT RECOMMENDED FOR NEW DESIGNS

DISCLAIMER

BEREX RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. BEREX DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN.

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.

Proper ESD procedures should be followed when handling this device.

NOT RECOMMENDED FOR NEW DESIGNS