BCP020C-70

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

The BeRex BCP020C-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
- 21.5 dBm P1dB @12 GHz (*typical*)
- 12 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	20.5 20.5	21.5 21.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	11.0 8.5	12.0 9.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		60 55		%
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

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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	18.0 18.0	19.0 19.0		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		46 45		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)		50	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 = 0.2mA, source open)			-15		V
BV_{gs}	Source Breakdown Voltage (I_g = 0.2mA, drain open)			-13		V
R_{th}	Thermal Resistance			460		° C/W

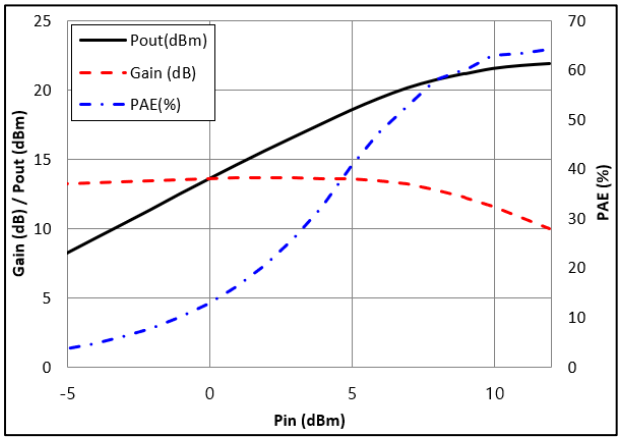
MAXIMUM RATING (T_a = 25° C)

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

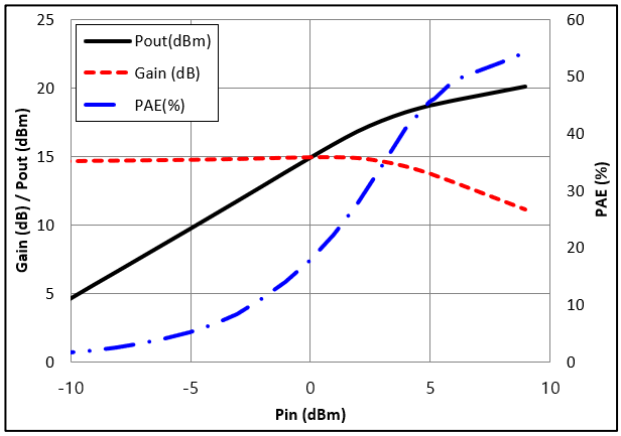
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

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

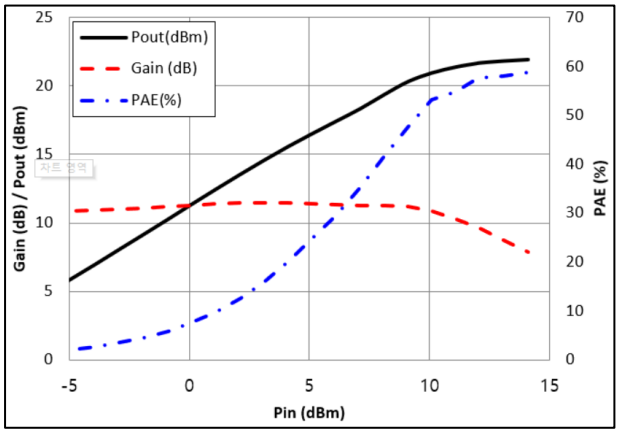


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tune for Power)

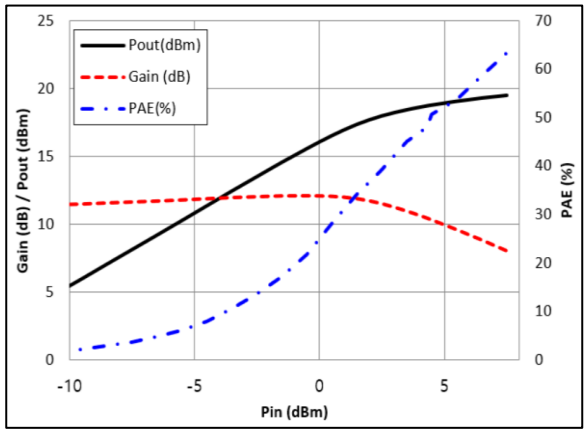


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tune for Gain)

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)

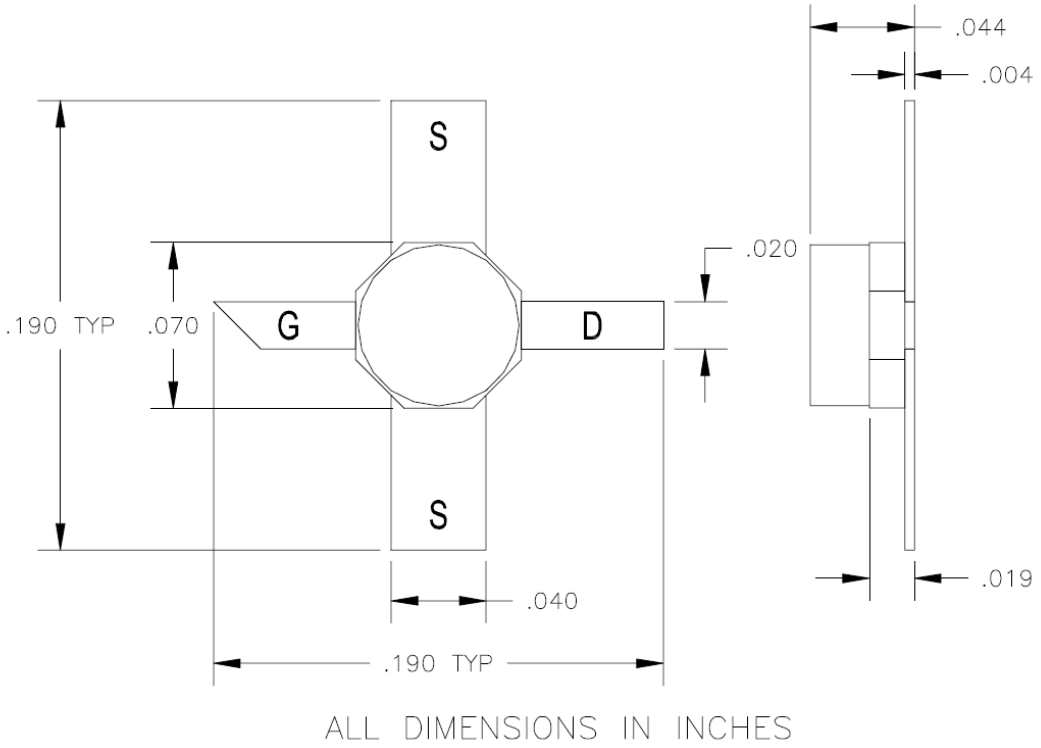
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S-PARAMETER (V_{ds} = 6V, I_{ds} = 50% I_{dss})

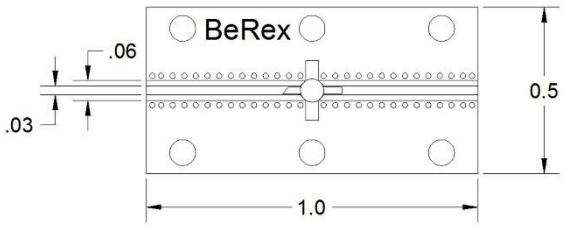
FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	1.00	-22.85	4.11	157.35	0.010	72.94	0.89	-14.50
2	0.95	-51.17	4.34	131.59	0.021	53.05	0.86	-31.94
3	0.90	-79.68	4.36	105.01	0.030	32.05	0.83	-52.45
4	0.84	-106.44	4.10	79.93	0.036	11.77	0.79	-71.62
5	0.79	-129.94	3.80	59.34	0.039	-2.15	0.79	-85.03
6	0.74	-151.83	3.57	41.80	0.039	-12.38	0.79	-92.59
7	0.68	-172.85	3.54	27.20	0.043	-14.88	0.77	-95.67
8	0.62	165.19	3.38	8.04	0.046	-22.04	0.76	-108.87
9	0.62	143.70	2.90	-12.46	0.043	-29.86	0.77	-125.02
10	0.56	125.55	2.77	-30.03	0.045	-35.60	0.78	-138.31
11	0.50	106.28	2.75	-48.35	0.051	-40.85	0.75	-156.37
12	0.46	79.58	2.73	-68.29	0.061	-45.48	0.73	-174.47
13	0.47	51.16	2.64	-88.80	0.069	-54.66	0.73	168.73
14	0.49	27.62	2.49	-106.57	0.077	-60.74	0.72	155.95
15	0.50	5.25	2.46	-123.24	0.094	-67.97	0.73	147.97
16	0.54	-21.68	2.49	-143.31	0.118	-79.05	0.75	135.53
17	0.60	-49.97	2.34	-166.29	0.131	-98.71	0.70	113.09
18	0.67	-69.54	2.11	173.34	0.139	-112.34	0.67	87.12
19	0.75	-84.45	2.04	154.63	0.157	-127.24	0.65	62.37
20	0.76	-92.49	1.88	133.02	0.170	-149.97	0.63	32.15
21	0.86	-108.73	1.79	110.23	0.159	-168.18	0.56	-1.07
22	0.92	-127.86	1.67	85.79	0.165	171.08	0.61	-42.09
23	0.95	-147.45	1.40	60.21	0.150	148.13	0.70	-79.35
24	0.96	-163.84	1.12	39.15	0.123	126.14	0.76	-104.38
25	0.97	-173.79	0.97	19.67	0.109	111.72	0.77	-119.48
26	0.98	176.03	0.96	2.53	0.115	96.10	0.70	-136.84

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Package Outline Dimension



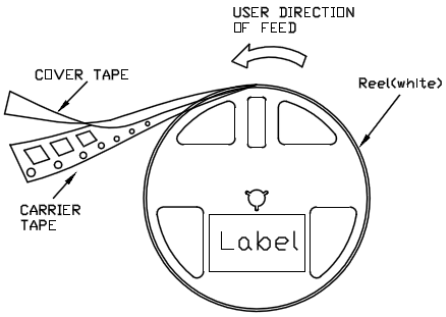
Suggested PCB Layout



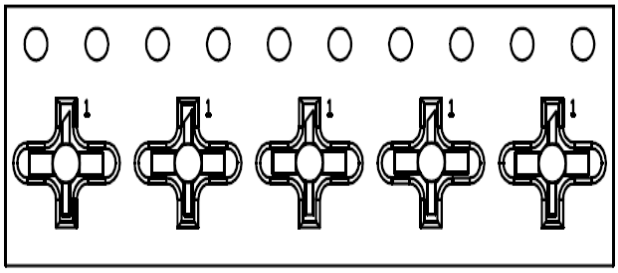
All dimensions in Inches

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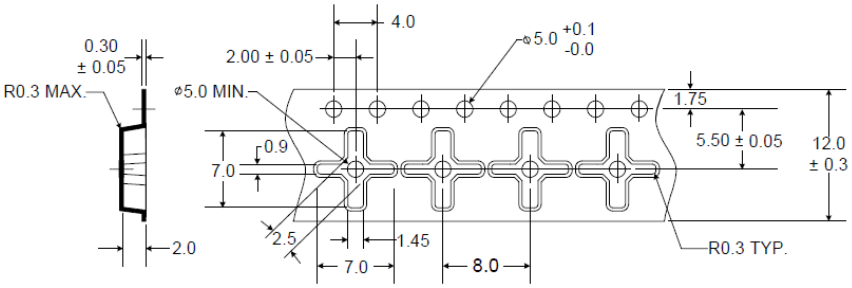
Tape and Reel Dimensions



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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