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

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

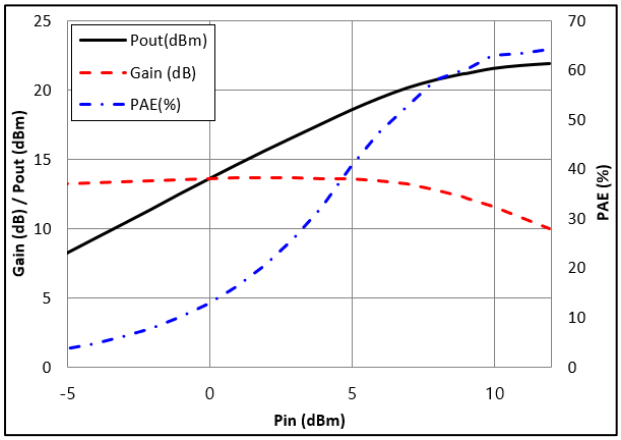
SYMBOLS	PARAMETER/TEST CONDITIONS	TEST FREQUENCY	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	18.0 18.0	19.0 19.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 6V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	12.5 9.5	13.5 10.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 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)

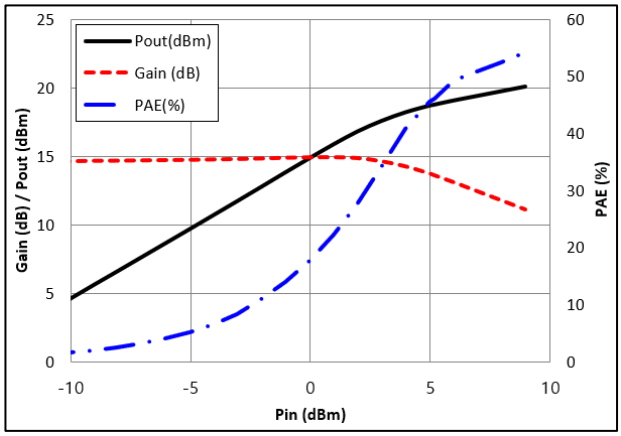
SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	11 mA	2 mA
P_{in}	Input Power	17 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature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

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

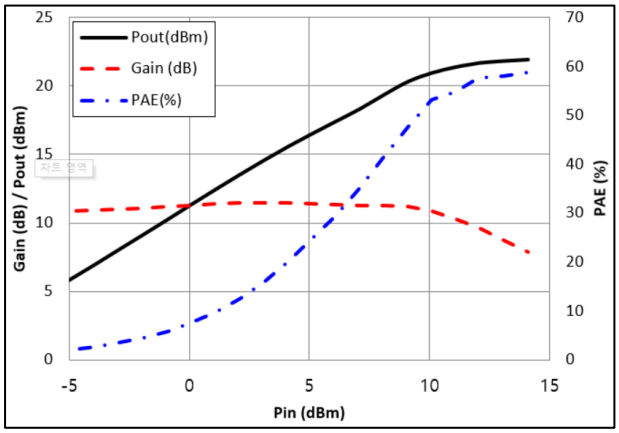


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tune for Power)

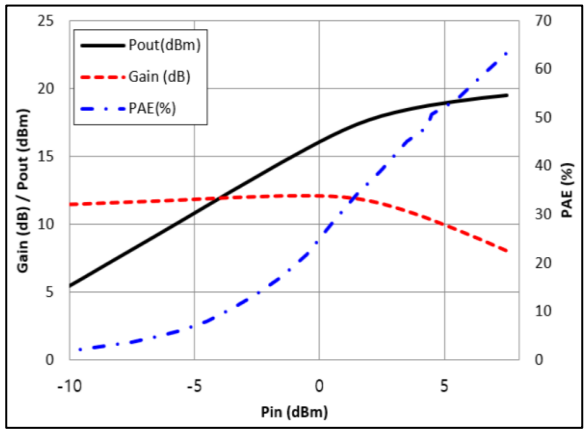


Frequency = 12GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tune for Gain)

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



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

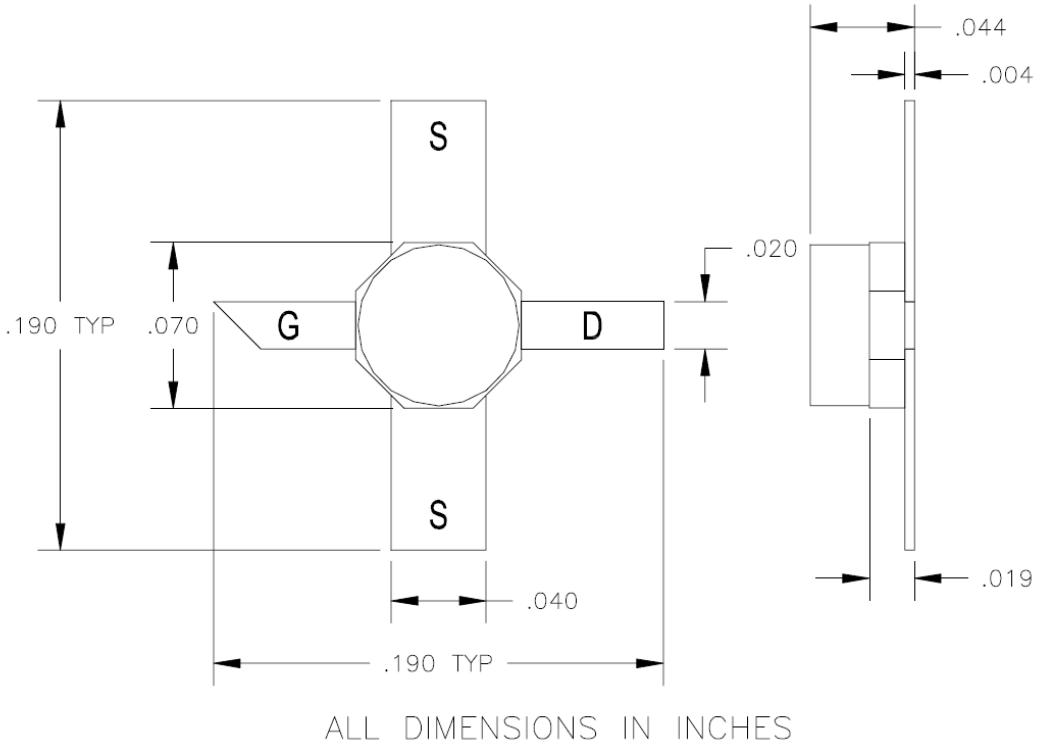


Frequency = 18GHz
V_{ds} = 6 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

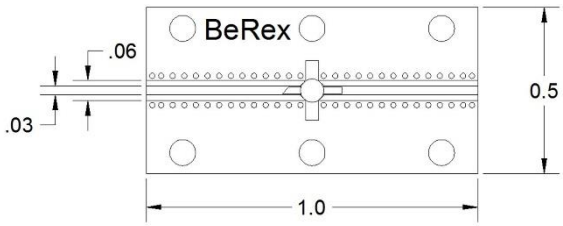
S-PARAMETER (V_{ds} = 6V, I_{ds} = 50% I_{dss})

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

Package Outline Dimension

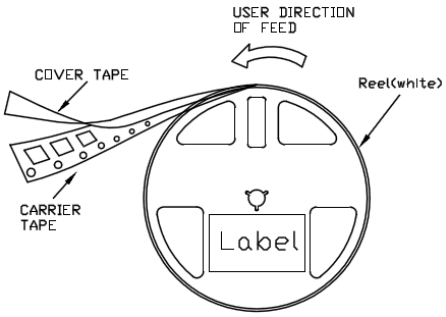


Suggested PCB Layout

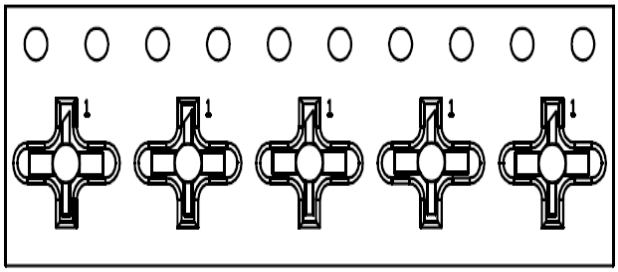


All dimensions in Inches

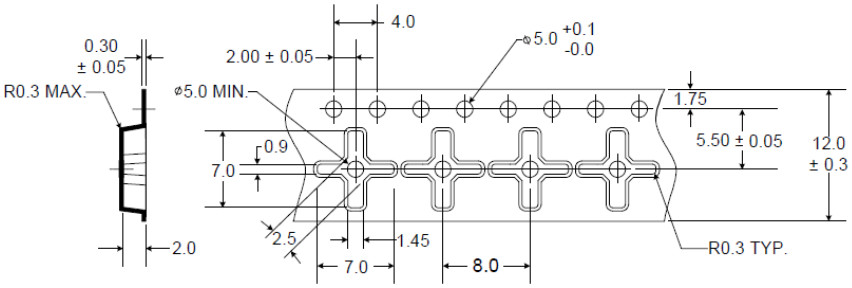
Tape and Reel Dimensions



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.

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.