BCP020C

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 200µm)

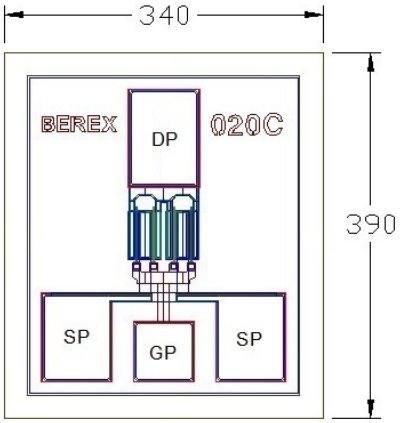
The BeRex BCP020C is a GaAs Power pHEMT with a nominal 0.25-micron by 200-micron gate making this product ideally suited for applications where high-gain and medium power in the DC to 26.5 GHz frequency range are required. The product may be used in either wideband (6-18 GHz) or narrow-band applications. The BCP020C is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 22 dBm Typical Output Power
- 14 dB Typical Gain @ 12 GHz
- 0.25 X 200 Micron Recessed Gate

APPLICATIONS

- Commercial
- Military / Hi-Rel.
- Test & Measurement



Chip dimensions : 340 X 390 microns
Gate pad(GP) : 60 X 60 microns
Drain pad(DP) : 70 X 100 microns
Source pad(SP) : 70 X 95 microns
Chip thickness : 75 microns

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

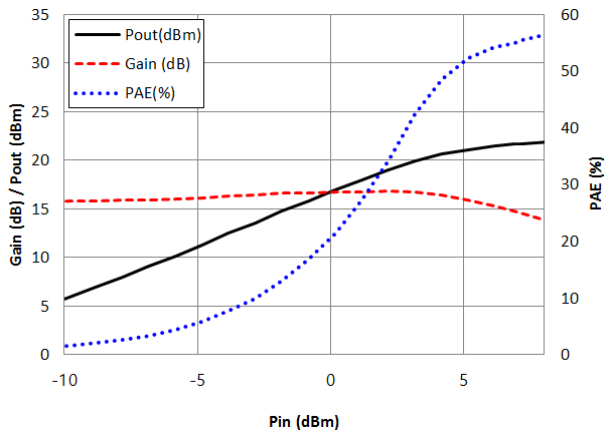
PARAMETER/TEST CONDITIONS		TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_d = 30mA)	12 GHZ 18 GHz	20.5 20.5	22.0 22.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_d = 30mA)	12 GHZ 18 GHz	12.5 9.5	14.0 11.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_d = 30mA)	12 GHZ 18 GHz		55 55		%
NF	Noise figure (Vds = 2V, I_d = 10 mA)	12 GHz		1.05		dB
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2.0V)		40	60	80	mA
G_m	Transconductance (V_{ds} = 2V, I_d = 30mA)			78		mS
V_p	Pinch-off Voltage (I_{ds} = 0.2mA, V_{ds} = 2V)		-2.5	-1.2		V
BV_{gd}	Drain Breakdown Voltage (I_g =- 0.2mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = -0.2mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			155		°C/W

MAXIMUM RATING (T_a = 25° C)

PARAMETERS		ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12V	8 V
V_{gs}	Gate-Source Voltage	-6V	-3 V
I_d	Drain Current	I_{dss}	I_{dss}
I_{gf}	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	1.0 W	0.8 W

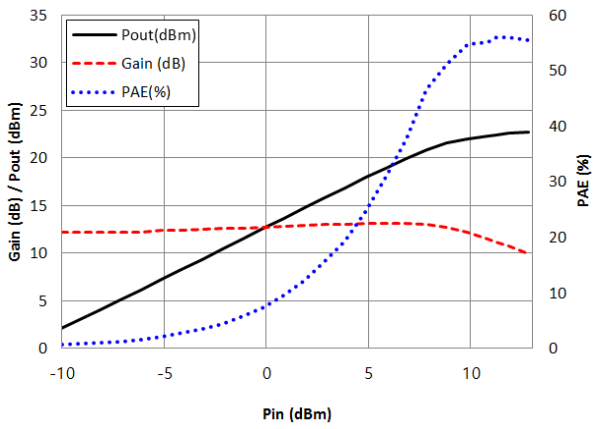
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

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



Frequency = 12 GHz
V_{ds} = 8V, I_{ds} = 30mA (Tuned for Power)

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



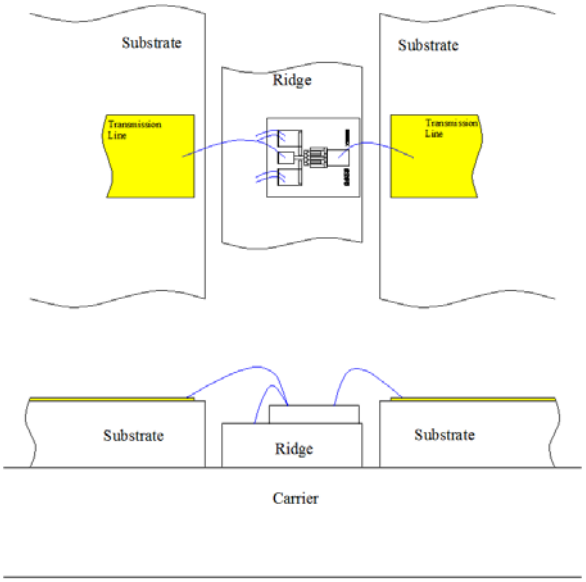
Frequency = 18 GHz
V_{ds} = 8V, I_{ds} = 30mA (Tuned for Power)

S-PARAMETERS (V_{ds} = 8V, I_{ds} = 30mA)

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1.0	0.99	-15.31	4.97	167.46	0.012	81.67	0.88	-4.21
2.0	0.97	-29.80	4.85	156.22	0.020	72.74	0.87	-8.78
3.0	0.94	-44.22	4.73	145.14	0.030	68.00	0.85	-13.28
4.0	0.90	-60.25	4.60	134.20	0.037	62.14	0.84	-16.02
5.0	0.86	-76.06	4.47	123.09	0.044	52.91	0.82	-19.39
6.0	0.82	-92.31	4.32	111.94	0.048	44.59	0.79	-23.31
7.0	0.78	-109.93	4.13	101.26	0.055	39.19	0.77	-25.87
8.0	0.74	-126.99	3.93	90.75	0.056	32.28	0.75	-28.39
9.0	0.71	-144.87	3.70	80.05	0.058	25.93	0.72	-31.61
10.0	0.70	-162.63	3.44	70.00	0.059	19.00	0.71	-34.00
11.0	0.70	-179.42	3.17	60.31	0.057	16.14	0.68	-36.81
12.0	0.72	165.74	2.92	50.94	0.056	9.46	0.66	-39.98
13.0	0.74	152.86	2.69	42.87	0.056	6.43	0.64	-41.91
14.0	0.76	142.52	2.47	35.44	0.055	3.83	0.62	-44.64
15.0	0.79	132.78	2.28	27.88	0.053	2.00	0.60	-47.32
16.0	0.80	125.13	2.10	21.28	0.053	2.02	0.58	-50.59
17.0	0.83	118.62	1.97	14.85	0.054	-1.25	0.57	-55.47
18.0	0.84	111.90	1.83	8.08	0.054	-2.67	0.56	-60.16
19.0	0.85	107.02	1.69	1.45	0.056	-5.19	0.55	-67.17
20.0	0.86	101.87	1.56	-5.08	0.059	-8.40	0.54	-75.07
21.0	0.86	98.40	1.46	-11.21	0.060	-10.88	0.53	-82.70
22.0	0.85	95.28	1.35	-17.15	0.062	-11.32	0.53	-90.96
23.0	0.84	92.18	1.25	-23.39	0.058	-12.62	0.53	-99.81
24.0	0.85	90.39	1.16	-28.76	0.060	-13.27	0.53	-109.02
25.0	0.86	88.89	1.08	-33.55	0.058	-10.59	0.53	-117.73
26.0	0.87	85.43	0.99	-39.26	0.058	-4.61	0.54	-125.41

Note: S-parameters include bond wires. Reference planes are at edge of substrates shown on “Wire Bonding Information” figure below.

WIRE BONDING INFORMATION



Using 1 mil. diameter, Au bonding wires.

1. Gate to input transmission line
   - Length and Height : 600 µm x 250 µm
   - Number of wire(s): 1
2. Drain to output transmission line
   - Length and Height : 400 µm x 250 µm
   - Number of wire(s) : 1
3. Source to ground plate
   - Length and Height : 250 µm x 300 µm
   - Number of wire(s) : 4

Proper ESD procedures should be followed when handling this device.