



# BCP020C

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

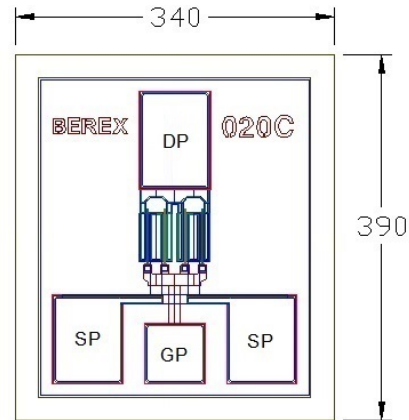
The BeRex BCP020C is a GaAs Power pHEMT with a nominal 0.25-micron by 200-micron gate making this product ideally suited for applications where high-gain and medium power in the DC to 26.5 GHz frequency range are required. The product may be used in either wideband (6-18 GHz) or narrow-band applications. The BCP020C is produced using state of the art metallization with  $\text{Si}_3\text{N}_4$  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

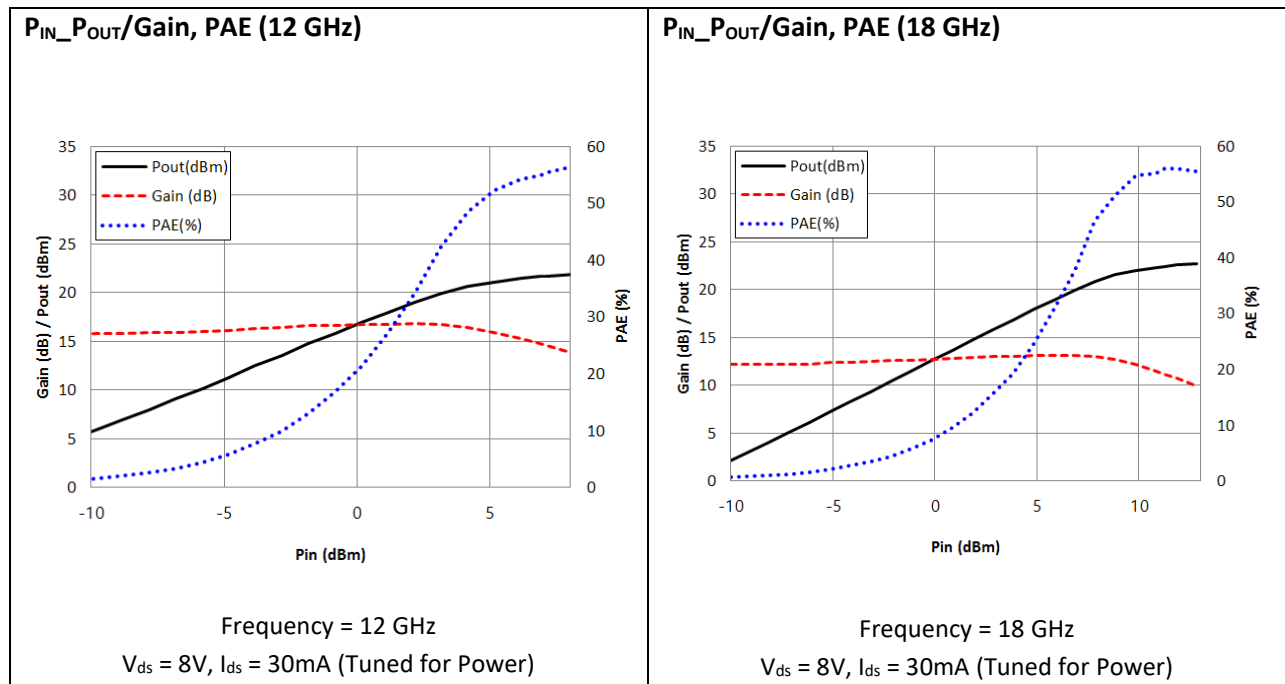
### ELECTRICAL CHARACTERISTIC (TUNED FOR POWER) $T_a = 25^\circ \text{C}$

PARAMETER/TEST CONDITIONS		TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P <sub>1dB</sub>	Output Power @ P <sub>1dB</sub> (V <sub>ds</sub> = 8V, I <sub>d</sub> = 30mA)	12 GHZ	20.5	22.0		dBm
		18 GHZ	20.5	22.0		
G <sub>1dB</sub>	Gain @ P <sub>1dB</sub> (V <sub>ds</sub> = 8V, I <sub>d</sub> = 30mA)	12 GHZ	12.5	14.0		dB
		18 GHZ	9.5	11.0		
PAE	PAE @ P <sub>1dB</sub> (V <sub>ds</sub> = 8V, I <sub>d</sub> = 30mA)	12 GHZ		55		%
		18 GHZ		55		
NF	Noise figure (V <sub>ds</sub> = 2V, I <sub>d</sub> = 10 mA)	12 GHZ		1.05		dB
I <sub>dss</sub>	Saturated Drain Current (V <sub>gs</sub> = 0V, V <sub>ds</sub> = 2.0V)		40	60	80	mA
G <sub>m</sub>	Transconductance (V <sub>ds</sub> = 2V, I <sub>d</sub> = 30mA)			78		mS
V <sub>p</sub>	Pinch-off Voltage (I <sub>ds</sub> = 0.2mA, V <sub>ds</sub> = 2V)		-2.5	-1.2		V
BV <sub>gd</sub>	Drain Breakdown Voltage (I <sub>g</sub> = -0.2mA, source open)			-15	-12	V
BV <sub>gs</sub>	Source Breakdown Voltage (I <sub>g</sub> = -0.2mA, drain open)			-13		V
R <sub>th</sub>	Thermal Resistance (Au-Sn Eutectic Attach)			155		°C/W

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

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.

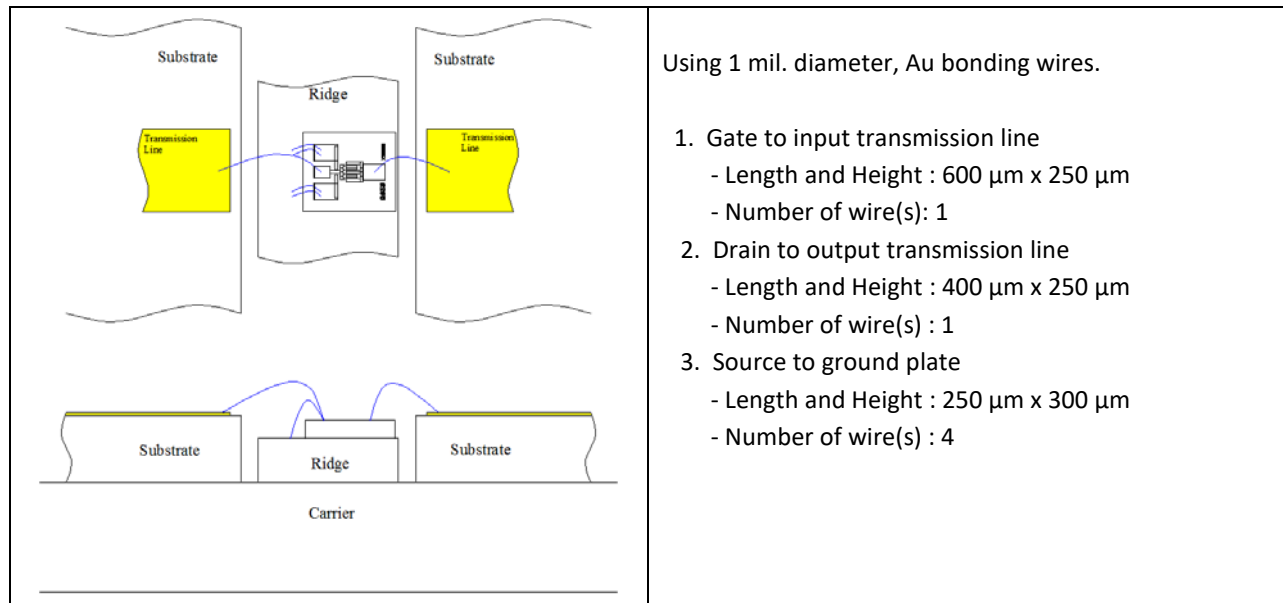


S-PARAMETERS ( $V_{ds} = 8V$ ,  $I_{ds} = 30mA$ )

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



Proper ESD procedures should be followed when handling this device.

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