BCP040C

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 400µm)

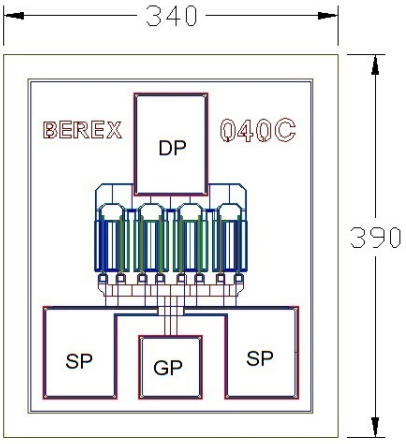
The BeRex BCP040C is a GaAs Power pHEMT with a nominal 0.25-micron by 400-micron gate making this product ideally suited for applications where high-gain and medium power in the DC to 26.5 GHz frequency range are required. The product may be used in either wideband (6-18 GHz) or narrow-band applications. The BCP040C is produced using state of the art metallization with Si_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 25.5 dBm Typical Output Power
- 13.5 dB Typical Gain @ 12 GHz
- 0.25 X 400 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

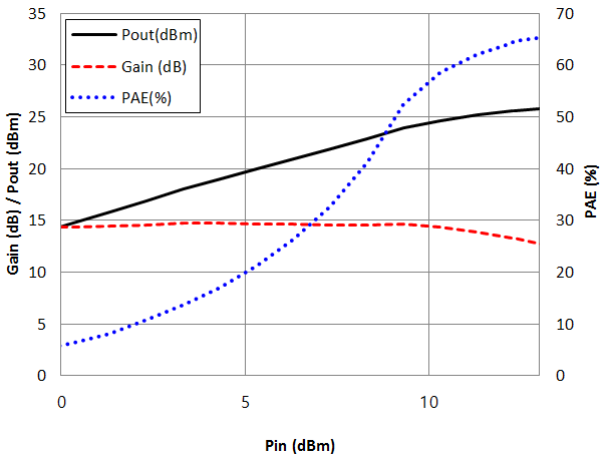
PARAMETER/TEST CONDITIONS		TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 60mA)	12 GHZ 18 GHz	24.0 23.5	25.5 25.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_d = 60mA)	12 GHZ 18 GHz	12.0 8.5	13.5 10		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_d = 60mA)	12 GHZ 18 GHz		60 50		%
NF	Noise figure (Vds = 2V, I_d = 20 mA)	12 GHz		1.05		dB
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2.0V)		70	110	150	mA
G_m	Transconductance (V_{ds} = 2V, I_d = 60mA)			155		mS
V_p	Pinch-off Voltage (I_{ds} = 0.4mA, V_{ds} = 2V)		-2.5	-1.2		V
BV_{gd}	Drain Breakdown Voltage (I_g = -0.4mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = -0.4mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			104		°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_{gsf}	Forward Gate Current	20 mA	4 mA
P_{in}	Input Power	21 dBm	@ 3 dB 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	1.4 W	1.2 W

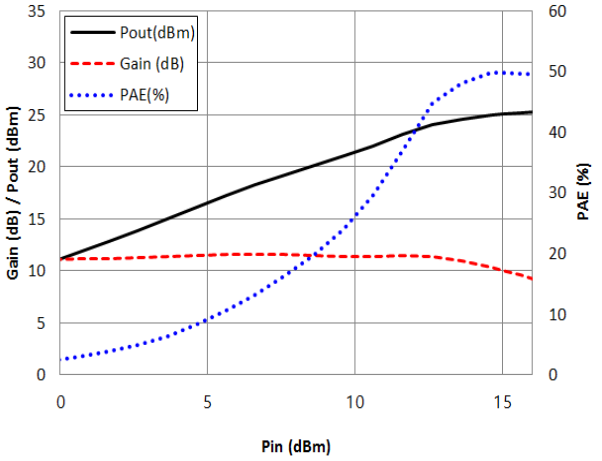
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

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



Frequency = 12 GHz
V_{ds} = 8V, I_{ds} = 60mA (Tuned for Power)

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



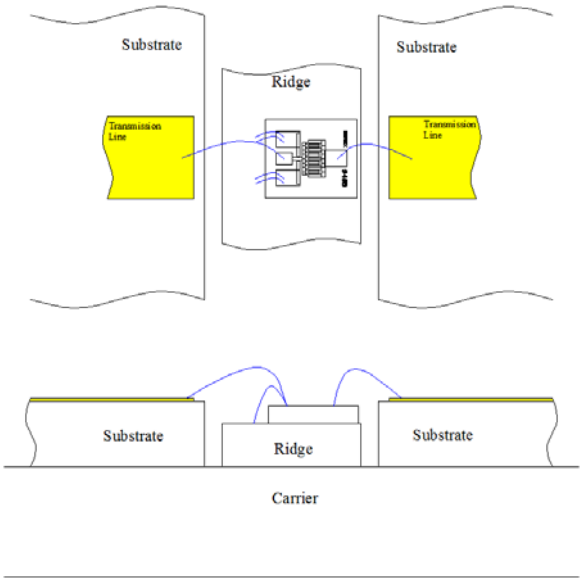
Frequency = 18 GHz
V_{ds} = 8V, I_{ds} = 60mA (Tuned for Power)

S-PARAMETERS (V_{ds} = 8V, I_{ds} = 60mA)

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1.0	0.96	-32.77	9.22	157.08	0.019	74.39	0.75	-10.91
2.0	0.91	-62.35	8.30	137.43	0.033	58.12	0.70	-20.57
3.0	0.85	-89.11	7.32	120.10	0.044	46.81	0.65	-28.37
4.0	0.80	-113.74	6.38	105.13	0.050	37.96	0.60	-33.06
5.0	0.77	-135.76	5.56	91.69	0.054	29.52	0.56	-37.20
6.0	0.75	-155.44	4.86	79.41	0.056	23.50	0.52	-41.51
7.0	0.75	-173.01	4.28	68.68	0.056	18.04	0.49	-45.00
8.0	0.76	172.05	3.76	58.61	0.055	15.33	0.47	-47.88
9.0	0.77	158.74	3.32	48.98	0.051	10.95	0.46	-52.71
10.0	0.79	147.46	2.94	40.38	0.050	8.65	0.44	-56.78
11.0	0.81	138.51	2.61	32.53	0.049	8.67	0.42	-62.62
12.0	0.83	130.46	2.34	24.50	0.047	8.83	0.40	-68.79
13.0	0.85	123.26	2.12	17.44	0.045	4.84	0.39	-75.41
14.0	0.86	117.71	1.91	10.71	0.047	8.38	0.37	-83.12
15.0	0.88	111.89	1.73	3.69	0.047	6.82	0.36	-91.10
16.0	0.89	107.81	1.57	-2.51	0.048	5.16	0.36	-100.53
17.0	0.91	104.38	1.45	-8.61	0.050	5.99	0.36	-112.60
18.0	0.91	99.79	1.33	-15.34	0.050	5.85	0.37	-122.80
19.0	0.91	97.32	1.19	-21.75	0.053	5.47	0.39	-133.49
20.0	0.92	94.84	1.09	-27.79	0.052	3.02	0.42	-145.15
21.0	0.92	93.48	0.98	-33.30	0.055	3.69	0.45	-154.23
22.0	0.91	92.03	0.90	-38.62	0.055	3.83	0.49	-162.65
23.0	0.90	90.59	0.81	-44.51	0.058	2.69	0.53	-171.11
24.0	0.90	89.92	0.73	-49.47	0.061	0.24	0.56	-178.63
25.0	0.90	89.62	0.66	-53.64	0.057	-0.17	0.59	174.88
26.0	0.93	87.29	0.59	-58.58	0.062	6.04	0.62	168.70

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.