BCP120C

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 1200µm)

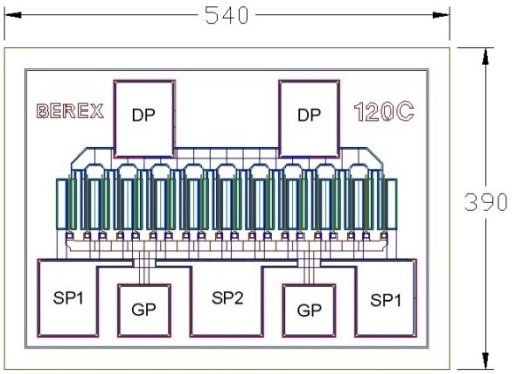
The BeRex BCP120C is a GaAs Power pHEMT with a nominal 0.25-micron by 1200-micron gate making this product ideally suited for applications where high-gain and medium power in the DC to 26.5 GHz frequency range are required. The product may be used in either wideband (6-18 GHz) or narrow-band applications. The BCP120C is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 30.5 dBm Typical Output Power
- 11 dB Typical Gain @ 12 GHz
- 0.25 X 1200 Micron Recessed Gate

APPLICATIONS

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



Chip dimensions : 540 X 390 microns
Gate pad(GP) : 60 X 60 microns
Drain pad(DP) : 70 X 90 microns
Source pad1(SP1) : 70 X 90 microns
Source pad2(SP2) : 80 X 90 microns
Chip thickness : 75 microns

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

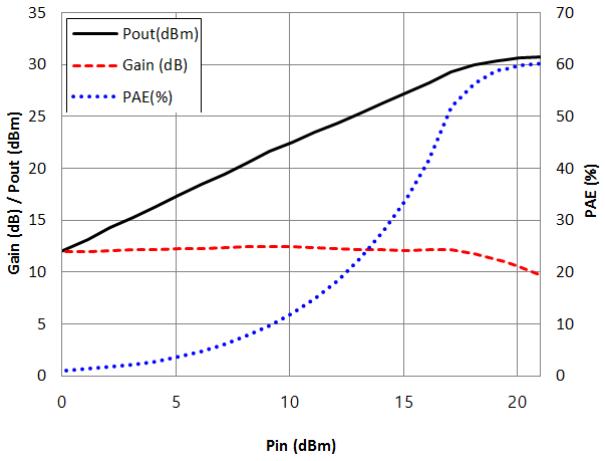
PARAMETER/TEST CONDITIONS		TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_d = 180mA)	12 GHZ 18 GHz	29.0 28.0	30.5 29.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_d = 180mA)	12 GHZ 18 GHz	9.5 6.5	11.0 8.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_d = 180mA)	12 GHZ 18 GHz		60 45		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, I_d = 1.0V)		260	380	500	mA
G_m	Transconductance (V_{ds} = 2V, Vgs = 180mA)			470		mS
V_p	Pinch-off Voltage (I_d = 1.2mA, V_{ds} = 2V)		-2.5	-1.2		V
BV_{gd}	Drain Breakdown Voltage (I_{gd} = 1.2mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 1.2mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			37		°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	60 mA	10 mA
P_{in}	Input Power	29 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	4.1 W	3.4 W

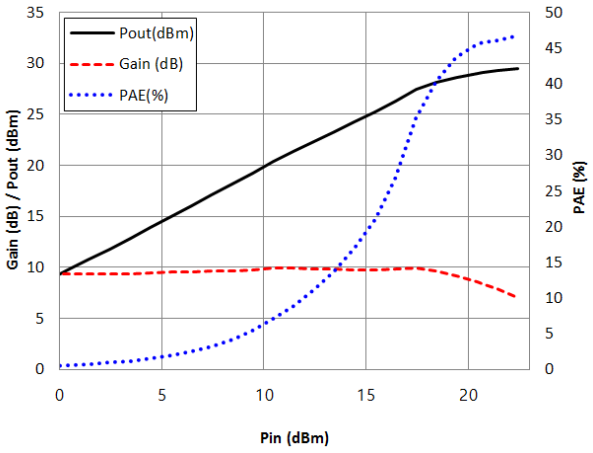
Exceeding any of the above Maximum Ratings will result in reduced MTTF and may cause permanent damage to the device.

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



Frequency = 12 GHz
V_{ds} = 8V, I_{ds} = 180mA (Tuned for Power)

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



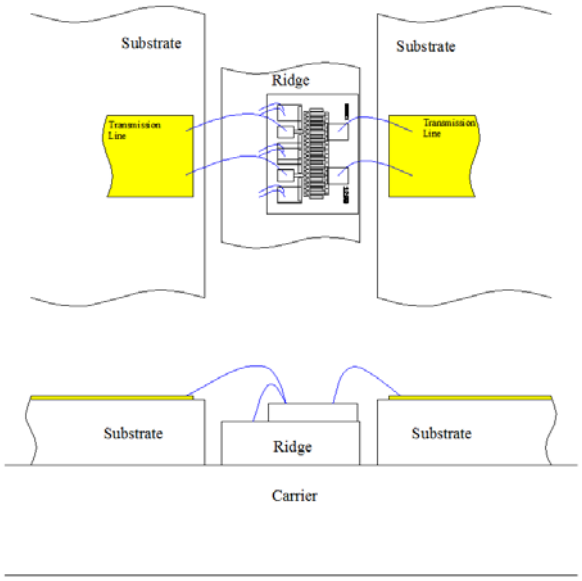
Frequency = 18 GHz
V_{ds} = 8V, I_{ds} = 180mA (Tuned for Power)

S-PARAMETERS (V_{ds} = 8V, I_{ds} = 180mA)

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1.0	0.89	-96.37	14.58	124.56	0.031	41.61	0.32	-59.57
2.0	0.86	-135.03	8.94	101.11	0.037	28.72	0.26	-84.06
3.0	0.85	-154.35	6.30	87.04	0.039	24.32	0.25	-96.48
4.0	0.85	-166.92	4.82	76.51	0.039	23.30	0.25	-104.53
5.0	0.85	-176.70	3.89	67.06	0.039	25.12	0.26	-110.74
6.0	0.86	175.03	3.24	58.26	0.041	25.20	0.29	-116.71
7.0	0.86	167.52	2.76	50.23	0.040	28.71	0.31	-122.84
8.0	0.87	161.16	2.39	42.43	0.040	29.58	0.33	-128.07
9.0	0.88	155.07	2.08	34.71	0.040	30.55	0.36	-133.66
10.0	0.89	149.79	1.83	27.63	0.040	31.41	0.39	-138.71
11.0	0.89	145.66	1.61	21.04	0.043	34.48	0.42	-145.31
12.0	0.90	141.61	1.42	14.39	0.044	36.56	0.45	-150.89
13.0	0.91	138.47	1.27	8.44	0.045	37.21	0.49	-156.42
14.0	0.92	135.64	1.13	2.84	0.046	35.22	0.52	-161.10
15.0	0.93	132.70	1.02	-2.73	0.050	36.77	0.56	-165.49
16.0	0.93	130.92	0.92	-7.66	0.051	36.01	0.59	-169.36
17.0	0.94	129.56	0.83	-12.31	0.056	36.28	0.63	-172.90
18.0	0.94	126.87	0.77	-17.21	0.055	33.51	0.66	-176.39
19.0	0.94	125.28	0.70	-21.95	0.059	34.15	0.69	-179.10
20.0	0.94	122.60	0.64	-26.82	0.058	32.57	0.72	178.04
21.0	0.93	121.02	0.58	-30.45	0.064	31.89	0.75	175.64
22.0	0.92	118.80	0.54	-34.76	0.067	30.36	0.78	173.29
23.0	0.91	115.04	0.50	-39.90	0.076	28.09	0.79	170.43
24.0	0.91	111.50	0.46	-44.45	0.076	23.74	0.81	167.25
25.0	0.90	107.90	0.41	-49.08	0.078	23.62	0.81	163.82
26.0	0.91	101.67	0.37	-52.23	0.079	21.55	0.81	160.37

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.