BCP120T

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

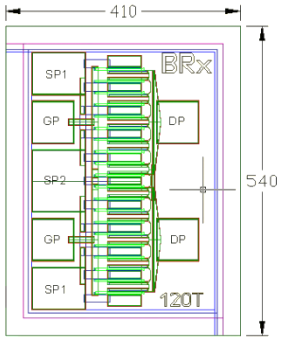
The BeRex BCP120T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 1200 micron gate width making the product ideally suited for applications where high-gain and medium power in the 1000 MHz to 26.5 GHz frequency range are required. The product may be used in either wideband (6-18 GHz) or narrow-band applications. The BCP120T is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 32 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 : 410 X 540 microns
Gate pad(GP) : 75 X 75 microns
Drain pad(DP) : 75 X 75 microns
Source pad1(SP1) : 95 X 75 microns
Source pad2(SP2) : 95 X 110 microns
Chip thickness : 100 microns

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

SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	31.0	32.0 32.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	10.0	11.0 8.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		60 55		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0 V)		240	360	480	mA
G_m	Transconductance (V_{ds} = 2V, V_{gs} = 50% I_{dss})			480		mS
V_p	Pinch-off Voltage (I_{ds} = 1.2 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_{gd} = 1.2 mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 1.2 mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			41		°C/W

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

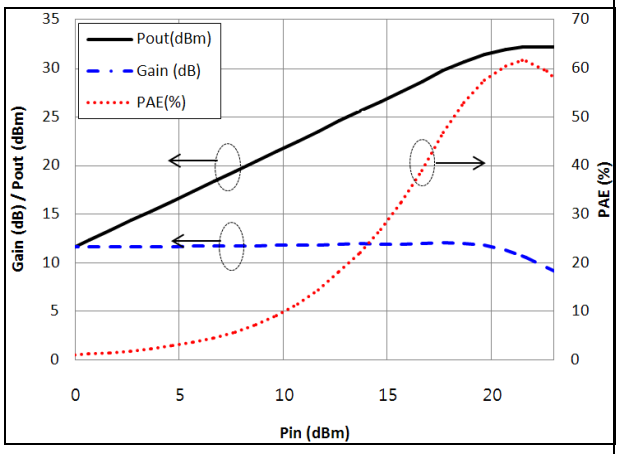
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	29.0	30.0 30.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz	11.0	12.0 9.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		50 45		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)		240	360	480	mA
G_m	Transconductance (V_{ds} = 2V, V_{gs} = 50% I_{dss})			480		mS
V_p	Pinch-off Voltage (I_{ds} = 1.2 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_{gd} = 0.8 mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 0.8 mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			41		°C/W

MAXIMUM RATING (T_a = 25° C)

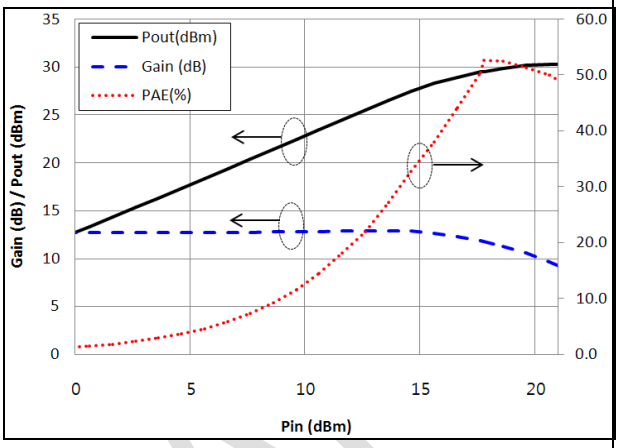
SYMBOL	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	60 mA	10 mA
P_{in}	Input Power	29 dBm	@ 3dB compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	4.9 W	4.1 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)

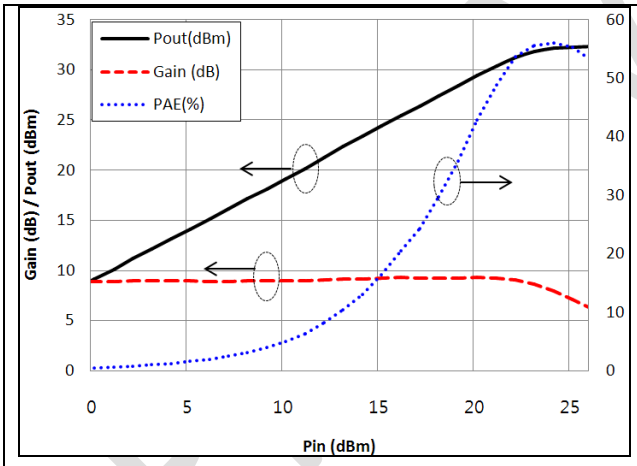


Frequency = 12GHz
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)

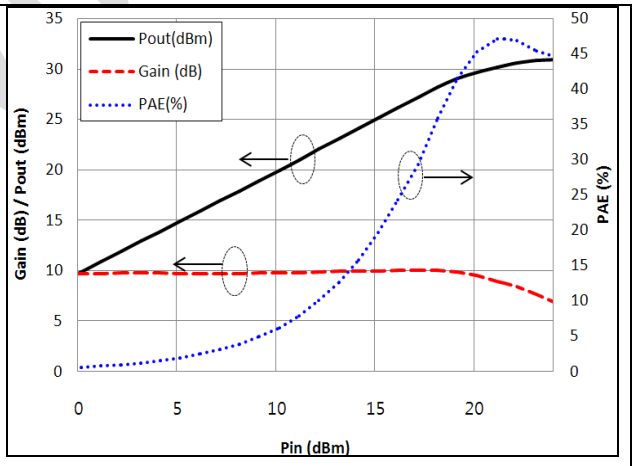


Frequency = 12GHz
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

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



Frequency = 18GHz
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)



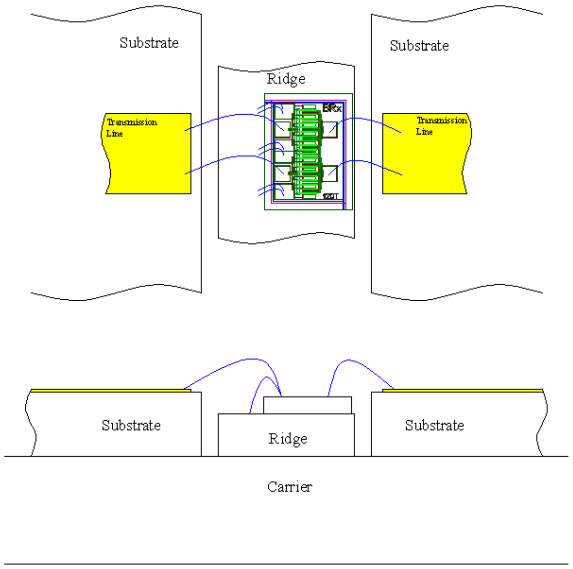
Frequency = 18GHz
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

S-PARAMETER (V_{ds} = 8V, I_{ds} = 50% I_{dss})

FREQ. [GHZ]	S11 [MAG]	S11 [ANG.]	S21 [MAG]	S21 [ANG.]	S12 [MAG]	S12 [ANG.]	S22 [MAG]	S22 [ANG.]
1	0.87	-107.97	14.78	119.26	0.032	41.51	0.27	-114.33
2	0.84	-145.40	8.59	97.61	0.038	33.64	0.28	-143.90
3	0.84	-163.59	5.95	85.22	0.040	30.50	0.30	-155.42
4	0.84	-174.83	4.52	75.95	0.045	31.72	0.31	-160.78
5	0.84	176.68	3.62	67.51	0.045	33.32	0.32	-164.63
6	0.85	169.41	3.01	59.98	0.048	34.78	0.34	-167.42
7	0.86	163.34	2.53	52.95	0.050	36.49	0.36	-170.61
8	0.86	157.55	2.21	46.07	0.051	39.56	0.37	-172.00
9	0.87	152.27	1.95	40.15	0.055	38.30	0.39	-175.10
10	0.88	147.45	1.74	34.08	0.057	39.28	0.41	-177.55
11	0.88	142.20	1.56	27.88	0.062	38.46	0.43	179.73
12	0.89	137.21	1.41	21.58	0.063	36.94	0.45	177.54
13	0.90	132.89	1.28	16.17	0.066	37.28	0.47	174.32
14	0.91	128.43	1.15	10.37	0.066	36.24	0.49	171.27
15	0.92	124.72	1.04	5.09	0.068	34.24	0.52	167.79
16	0.93	121.32	0.96	-0.15	0.070	32.48	0.55	164.44
17	0.93	118.18	0.86	-5.87	0.071	30.66	0.58	160.90
18	0.94	115.66	0.77	-10.08	0.069	26.37	0.60	157.59
19	0.94	114.16	0.69	-14.84	0.071	27.07	0.62	153.96
20	0.94	111.93	0.62	-19.23	0.074	25.55	0.65	151.27
21	0.95	110.61	0.56	-22.40	0.075	23.86	0.67	148.70
22	0.94	110.14	0.50	-26.10	0.078	22.88	0.69	146.17
23	0.94	109.48	0.45	-28.36	0.075	21.58	0.71	143.44
24	0.94	109.46	0.41	-30.96	0.076	20.17	0.74	141.85
25	0.95	109.38	0.37	-32.98	0.075	18.97	0.75	140.00
26	0.94	108.63	0.33	-34.75	0.074	21.22	0.76	139.27

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): 2
2. Drain to output transmission line
   - Length and Height : 400 µm x 250 µm
   - Number of wire(s) : 2
3. Source to ground plate
   - Length and Height : 250 µm x 300 µm
   - Number of wire(s) : 6

Proper ESD procedures should be followed when handling this device.

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