BCP240T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 2400µm)

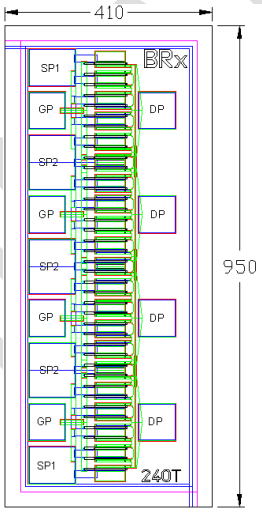
The BeRex BCP240T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 2400 micron gate width making the product ideally suited for applications where high-gain and medium power in the 1000 MHz to 26.5 GHz frequency range are required. The product may be used in either wideband (6-18 GHz) or narrow-band applications. The BCP240T is produced using state of the art metallization with Si_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 34 dBm Typical Output Power
- 10 dB Typical Gain @ 12 GHz
- 0.25 X 2400 Micron Recessed Gate

APPLICATIONS

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



Chip dimensions : 410 X 950 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	33.5	34.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ	9.0	10.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ		55		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.2V)		480	720	960	mA
G_m	Transconductance (V_{ds} = 2V, V_{gs} = 50% I_{dss})			960		mS
V_p	Pinch-off Voltage (I_{ds} = 2.4 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 2.4 mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 2.4 mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			23		°C/W

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

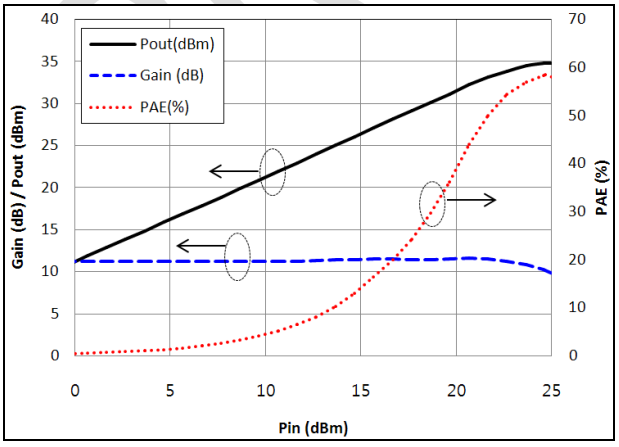
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ	31.0	32.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ	9.5	11.0		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ		36		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.2V)		480	720	960	mA
G_m	Transconductance (V_{ds} = 2V, V_{gs} = 50% I_{dss})			960		mS
V_p	Pinch-off Voltage (I_{ds} = 2.4 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 2.4 mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 2.4 mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			23		° C/W

MAXIMUM RATING (T_a = 25° C)

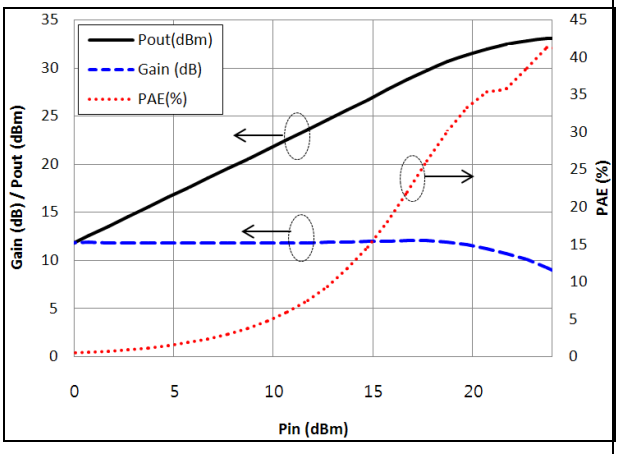
SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	690 mA
I_{gsf}	Forward Gate Current	120 mA	20 mA
P_{in}	Input Power	31 dBm	@ 3dB Compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	8.4 W	6.9 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)



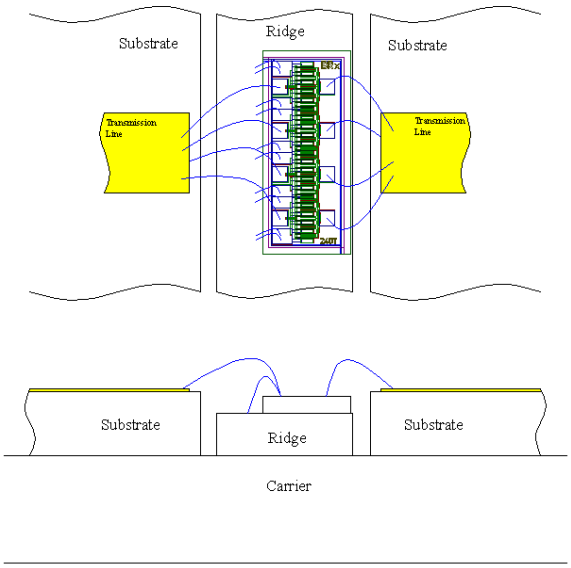
Frequency = 12GHz
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

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	0.90	-147.20	10.68	101.84	0.024	26.83	0.54	-166.95
2	0.90	-166.80	5.52	87.86	0.026	31.25	0.56	-173.49
3	0.91	-175.23	3.72	79.48	0.028	32.71	0.57	-175.76
4	0.92	179.32	2.80	72.74	0.032	38.68	0.58	-176.62
5	0.92	175.65	2.22	66.25	0.033	42.56	0.59	-177.49
6	0.92	172.96	1.84	60.88	0.037	47.19	0.60	-178.08
7	0.92	170.17	1.54	55.39	0.039	49.21	0.61	-178.49
8	0.93	167.87	1.35	50.23	0.040	52.94	0.62	-178.60
9	0.93	165.98	1.21	46.31	0.045	50.65	0.63	-179.68
10	0.92	163.50	1.09	41.28	0.048	53.68	0.64	179.89
11	0.93	161.40	0.99	36.84	0.052	54.32	0.65	179.02
12	0.93	158.76	0.91	32.10	0.054	53.07	0.66	178.15
13	0.93	154.63	0.85	27.43	0.056	53.42	0.67	177.02
14	0.94	151.80	0.78	22.74	0.058	51.40	0.68	175.57
15	0.93	148.54	0.72	17.87	0.061	50.66	0.69	173.37
16	0.94	143.75	0.67	12.61	0.062	47.94	0.71	171.14
17	0.94	140.71	0.62	7.15	0.063	44.66	0.72	168.48
18	0.94	136.72	0.56	2.33	0.065	40.30	0.74	166.01
19	0.95	132.10	0.51	-3.25	0.064	41.04	0.76	163.20
20	0.96	131.00	0.46	-7.07	0.063	37.85	0.77	161.05
21	0.96	128.78	0.41	-10.67	0.064	35.99	0.78	158.85
22	0.96	126.73	0.37	-13.78	0.063	35.56	0.79	157.27
23	0.95	127.90	0.33	-15.97	0.064	32.67	0.80	154.94
24	0.95	126.96	0.30	-17.87	0.064	27.92	0.82	154.34
25	0.96	127.60	0.27	-19.52	0.061	28.05	0.82	153.29
26	0.95	130.57	0.25	-18.60	0.058	37.30	0.83	153.31

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): 4
2. Drain to output transmission line
   - Length and Height : 400 µm x 250 µm
   - Number of wire(s) : 4
3. Source to ground plate
   - Length and Height : 250 µm x 300 µm
   - Number of wire(s) : 10

Proper ESD procedures should be followed when handling this device.

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