BCP060T

HIGH EFFICIENCY pHEMT POWER FET CHIP (.25µm x 600µm)

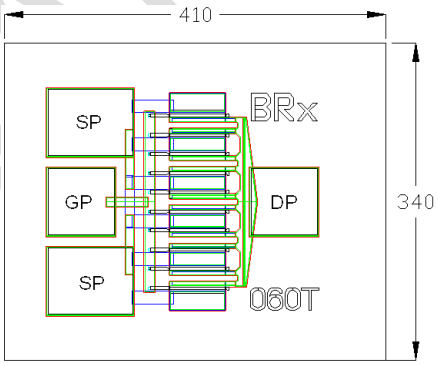
The BeRex BCP060T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 600 micron gate width making the product ideally suited for applications where high-gain and medium power in the 1000 MHz to 26.5 GHz frequency range are required. The product may be used in either wideband (6-18 GHz) or narrow-band applications. The BCP060T is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 28 dBm Typical Output Power
- 12 dB Typical Gain @ 12 GHz
- 0.25 X 600 Micron Recessed Gate

APPLICATIONS

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



Chip dimensions : 410 X 340 microns
Gate pad(GP) : 75 X 75 microns
Drain pad(DP) : 75 X 75 microns
Source pad(SP) : 95 X 75 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	27.0	28.0 28.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, Ids = 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		55 55		%
NF	50 Ohm Noise Figure (V_{ds}=2V, I_{dss}=15 mA)	12 GHz		1.34		dB
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2V)		120	180	240	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})			240		mS
V_p	Pinch-off Voltage (I_{ds} = 0.6 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (Ig = 0.6 mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (Ig = 0.6 mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			75		°C/W

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

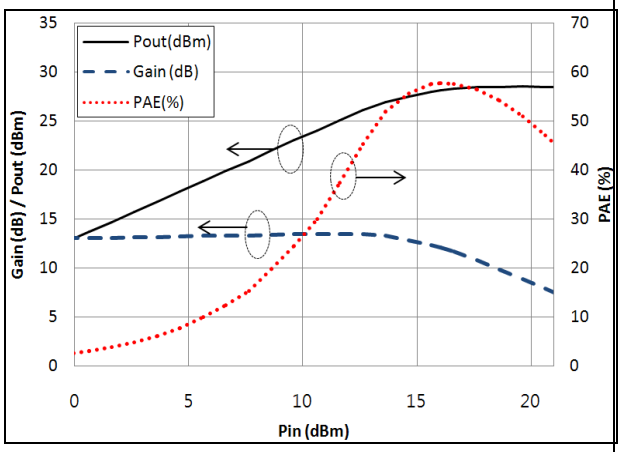
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		27.5 27.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, Ids = 50% I_{dss})	12 GHz 18 GHz	11.0	12.5 9.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHz 18 GHz		55 50		%
NF	50 Ohm Noise Figure (V_{ds}=2V, I_{dss}=15 mA)	12 GHz		1.34		dB
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 2V)		120	180	240	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})			240		mS
V_p	Pinch-off Voltage (I_{ds} = 0.6 mA, V_{ds} = 2V)		- 2.5	-1.1	- 0.5	V
BV_{gd}	Drain Breakdown Voltage (Ig = 0.6 mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (Ig = 0.6 mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			75		°C/W

MAXIMUM RATING (T_a = 25° C)

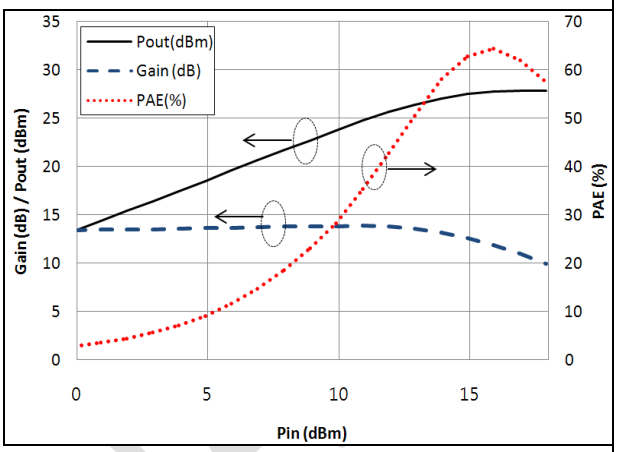
SYMBOLS	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	30 mA	10 mA
P_{in}	Input Power	25 dBm	@3dB Compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	2.6 W	2.2 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)

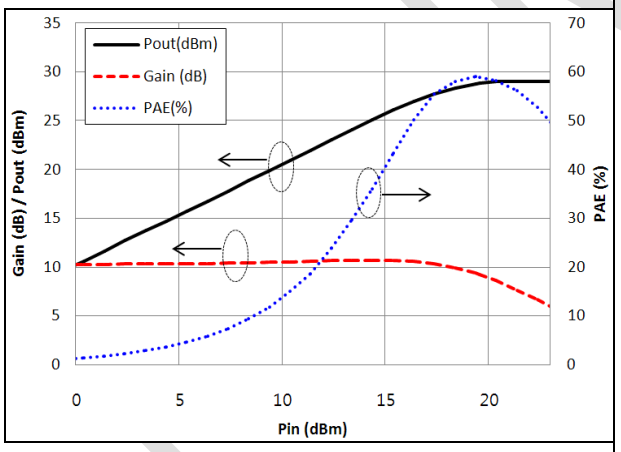


Frequency = 12GHz
V_{ds}= 8 V, I_{ds} = 50% I_{dss} (Tuned for Power)

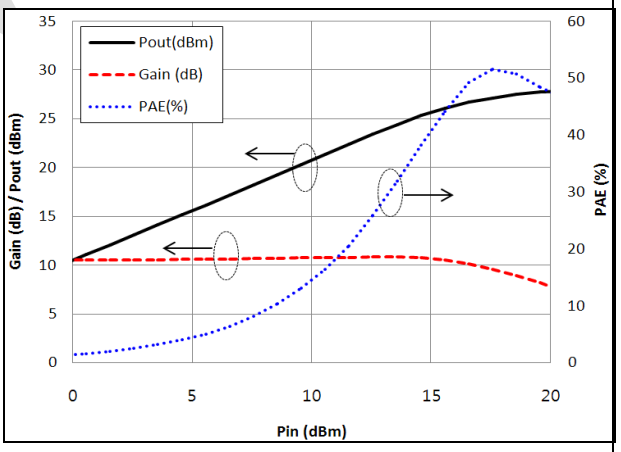


Frequency = 12GHz
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

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



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



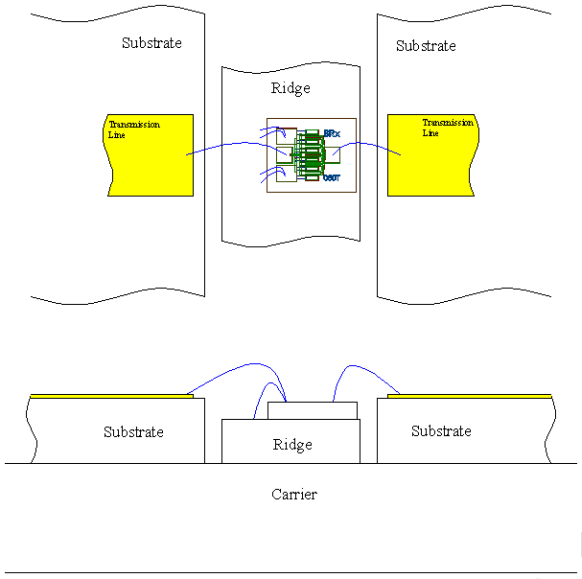
Frequency = 18GHz
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

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	0.92	-57.91	13.83	142.64	0.017	62.75	0.45	-30.63
2	0.83	-100.13	10.45	117.12	0.032	43.42	0.34	-49.55
3	0.79	-129.58	7.98	99.76	0.047	34.74	0.25	-62.90
4	0.77	-150.61	6.32	86.33	0.061	28.79	0.19	-72.26
5	0.77	-165.65	5.18	75.24	0.073	27.32	0.15	-86.36
6	0.77	-178.11	4.35	65.56	0.084	26.36	0.13	-101.81
7	0.78	172.13	3.69	56.72	0.094	25.99	0.12	-123.94
8	0.79	163.81	3.25	48.59	0.103	25.03	0.12	-137.66
9	0.80	156.81	2.88	41.33	0.108	23.59	0.12	-155.22
10	0.81	150.09	2.58	34.01	0.114	24.54	0.14	-169.25
11	0.82	143.11	2.34	26.33	0.120	23.14	0.16	178.07
12	0.83	136.61	2.12	18.59	0.124	22.92	0.19	168.01
13	0.85	130.15	1.94	11.44	0.130	19.85	0.22	157.74
14	0.86	123.54	1.77	3.60	0.134	16.06	0.25	148.31
15	0.88	117.87	1.60	-4.01	0.139	14.39	0.30	140.13
16	0.89	112.39	1.45	-11.27	0.144	10.53	0.35	132.31
17	0.90	106.79	1.29	-19.37	0.148	7.58	0.41	126.29
18	0.91	103.05	1.13	-26.14	0.153	6.07	0.46	120.85
19	0.92	100.04	1.00	-32.93	0.155	3.45	0.51	115.68
20	0.92	97.13	0.88	-38.54	0.156	0.94	0.57	111.97
21	0.93	96.22	0.76	-43.13	0.150	0.17	0.61	109.56
22	0.93	96.46	0.66	-46.19	0.149	0.71	0.65	107.33
23	0.92	96.55	0.57	-49.34	0.147	-0.34	0.68	106.11
24	0.92	97.66	0.51	-51.56	0.145	-0.02	0.71	106.08
25	0.94	98.95	0.46	-53.03	0.144	2.76	0.74	105.60
26	0.93	99.53	0.41	-54.01	0.145	3.92	0.76	106.41

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.

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