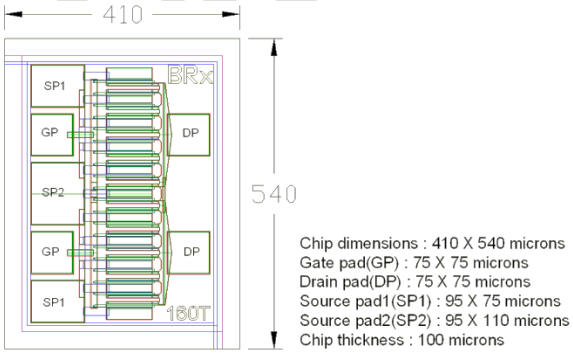
BCP160T

HIGH EFFICIENCY HETEROJUNCTION POWER FET CHIP (.25µm x 1600µm)

The BeRex BCP160T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 1600 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 BCP160T is produced using state of the art metallization with SI_3N_4 passivation and is screened to assure reliability.

PRODUCT FEATURES

- 33 dBm Typical Output Power
- 10.5 dB Typical Gain @ 12 GHz
- 0.25 X 1600 Micron Recessed Gate



APPLICATIONS

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

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	32.0	33.0		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ	9.5	10.5		dB
PAE	PAE @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ		60		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)		320	480	640	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})			640		mS
V_p	Pinch-off Voltage (I_{ds} = 1.6 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_g = 1.6 mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 1.6 mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			33		°C/W

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

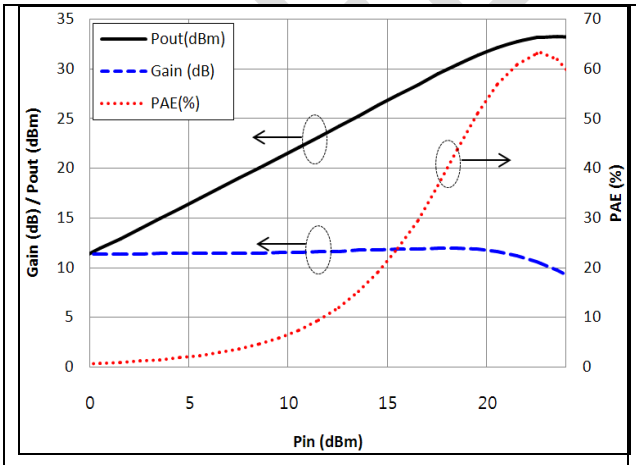
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ	29.5	30.5		dBm
G_{1dB}	Gain @ P_{1dB} (V_{ds} = 8V, I_{ds} = 50% I_{dss})	12 GHZ	10.0	11.0		dB
PAE	PAE @ P_{1dB} (Vds = 8V, Ids = 50% Idss)	12 GHZ		40.0		%
I_{dss}	Saturated Drain Current (V_{gs} = 0V, V_{ds} = 1.0V)		320	480	640	mA
G_m	Transconductance (V_{ds} = 3V, V_{gs} = 50% I_{dss})			640		mS
V_p	Pinch-off Voltage (I_{ds} = 1.6 mA, V_{ds} = 2V)		-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage (I_{gd} = 1.6 mA, source open)			-15	-12	V
BV_{gs}	Source Breakdown Voltage (I_g = 1.6 mA, drain open)			-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)			33		° C/W

MAXIMUM RATING (T_a = 25° C)

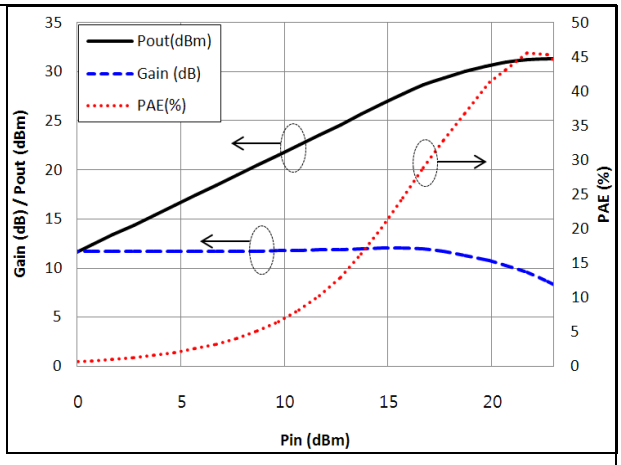
SYMBOL	PARAMETERS	ABSOLUTE	CONTINUOUS
V_{ds}	Drain-Source Voltage	12 V	8 V
V_{gs}	Gate-Source Voltage	-6 V	-3 V
I_{ds}	Drain Current	I_{dss}	I_{dss}
I_{gsf}	Forward Gate Current	80 mA	14 mA
P_{in}	Input Power	30 dBm	@ 3 dB Compression
T_{ch}	Channel Temperature	175° C	150° C
T_{stg}	Storage Temperature	-60° C - 150° C	-60° C - 150° C
P_t	Total Power Dissipation	6.0 W	5.0 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)



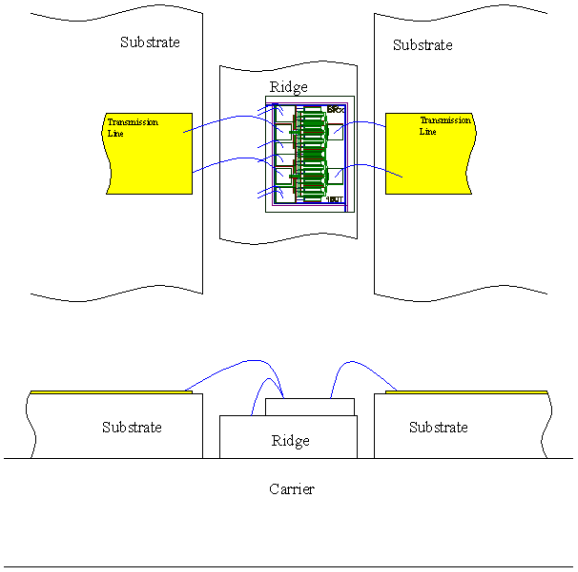
Frequency = 12GHz
V_{ds} = 8 V, I_{ds} = 50% I_{dss} (Tuned for Gain)

S-PARAMETERS (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	-125.38	13.67	111.02	0.029	37.07	0.34	-144.18
2	0.85	-156.37	7.50	92.04	0.034	32.44	0.36	-161.51
3	0.86	-171.07	5.11	80.78	0.036	33.73	0.37	-168.21
4	0.86	-179.89	3.86	72.20	0.040	34.70	0.38	-172.01
5	0.87	173.17	3.08	64.03	0.043	38.64	0.40	-174.55
6	0.87	167.14	2.55	56.79	0.047	40.81	0.42	-177.15
7	0.88	162.28	2.14	50.07	0.048	40.71	0.44	-179.70
8	0.88	157.56	1.88	43.01	0.050	45.15	0.45	178.62
9	0.89	152.94	1.65	37.28	0.055	45.37	0.47	175.28
10	0.89	148.80	1.48	31.07	0.060	44.07	0.49	172.74
11	0.89	143.76	1.33	24.59	0.062	42.96	0.51	169.96
12	0.90	138.90	1.20	18.21	0.066	41.21	0.53	167.35
13	0.91	134.97	1.09	12.85	0.070	39.95	0.55	163.90
14	0.91	129.80	0.99	6.58	0.071	38.03	0.58	161.41
15	0.92	125.36	0.89	0.82	0.073	35.59	0.61	158.02
16	0.93	121.84	0.81	-4.31	0.075	32.10	0.64	154.68
17	0.93	117.69	0.72	-10.60	0.073	29.92	0.66	151.79
18	0.95	115.85	0.63	-14.17	0.076	28.56	0.68	149.05
19	0.94	113.69	0.57	-18.70	0.076	27.06	0.71	145.91
20	0.94	110.54	0.52	-22.86	0.077	24.13	0.73	143.57
21	0.95	109.76	0.46	-26.30	0.077	24.61	0.75	141.51
22	0.94	110.02	0.41	-28.17	0.079	22.75	0.76	139.28
23	0.94	108.99	0.36	-31.53	0.080	22.44	0.77	136.86
24	0.94	110.06	0.33	-33.06	0.082	19.77	0.79	135.47
25	0.95	110.74	0.30	-34.59	0.077	20.11	0.80	133.59
26	0.95	110.24	0.27	-33.68	0.079	23.85	0.81	133.29

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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