



BCP160T

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

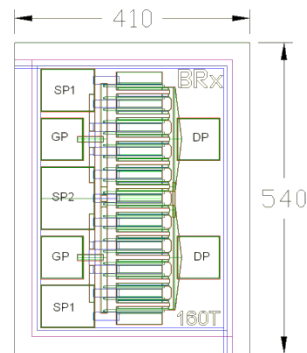
The BeRex BCP160T is a GaAs Power pHEMT with a nominal 0.25 micron gate length and 1600 micron gate width making the product ideally suited for amplifier applications where high-gain and medium power in the S to K bands is required. The product may be used in either wideband (6-18 GHz) or narrow-band applications. The BCP020T is produced using state of the art metallization with Si₃N₄ passivation and is screened to assure reliability.

PRODUCT FEATURES

- 33 dBm Typical Output Power
- 10.5 dB Typical Gain @ 12 GHz
- 60% PAE Typical @12 GHz
- 0.25 X 1600 μ m 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

DC CHARACTERISTICS $T_a = 25^\circ \text{C}$

SYMBOL	PARAMETER/TEST CONDITIONS	MIN.	TYPICAL	MAX.	UNIT
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 ($I_{ds} = 1.6 \text{ mA}, V_{ds} = 2V$)	-2.5	-1.1	-0.5	V
BV_{gd}	Drain Breakdown Voltage ($I_{gd} = 1.6 \text{ mA}, \text{source open}$)		-15	-12	V
BV_{gs}	Source Breakdown Voltage ($I_g = 1.6 \text{ mA}, \text{drain open}$)		-13		V
R_{th}	Thermal Resistance (Au-Sn Eutectic Attach)		33		$^\circ \text{C/W}$

ELECTRICAL CHARACTERISTICS (TUNED FOR POWER) $T_a = 25^\circ \text{C}$

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	32.0	33.2 33.0		dBm
G_{1dB}	Gain @ P_{1dB} ($V_{ds} = 8V, I_{ds} = 50\% I_{dss}$)	12 GHz 18 GHz	9.5	10.4 6.7		dB
PAE	PAE @ P_{1dB} ($V_{ds} = 8V, I_{ds} = 50\% I_{dss}$)	12 GHz 18 GHz		63 47		%

ELECTRICAL CHARACTERISTICS (TUNED FOR GAIN) $T_a = 25^\circ\text{C}$

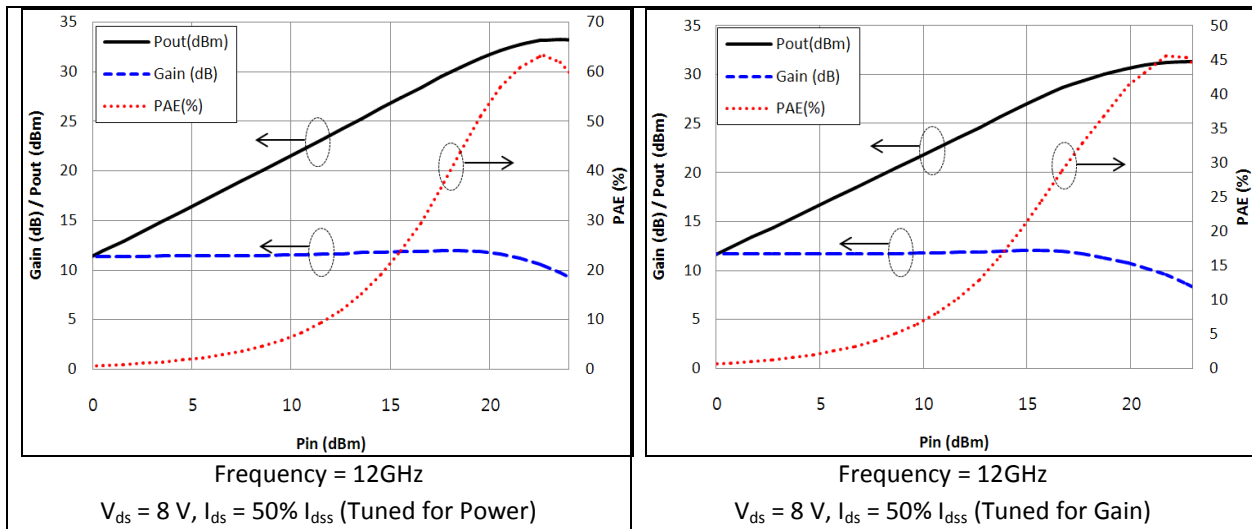
SYMBOL	PARAMETER/TEST CONDITIONS	TEST FREQ.	MIN.	TYPICAL	MAX.	UNIT
P_{1dB}	Output Power @ P_{1dB} ($V_{ds} = 8\text{V}$, $I_{ds} = 50\% I_{dss}$)	12 GHz 18 GHz	29.5	30.7 30.1		dBm
G_{1dB}	Gain @ P_{1dB} ($V_{ds} = 8\text{V}$, $I_{ds} = 50\% I_{dss}$)	12 GHz 18 GHz	10.0	10.8 6.4		dB
PAE	PAE @ P_{1dB} ($V_{ds} = 8\text{V}$, $I_{ds} = 50\% I_{dss}$)	12 GHz 18 GHz		41.0 26.5		%

MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

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)

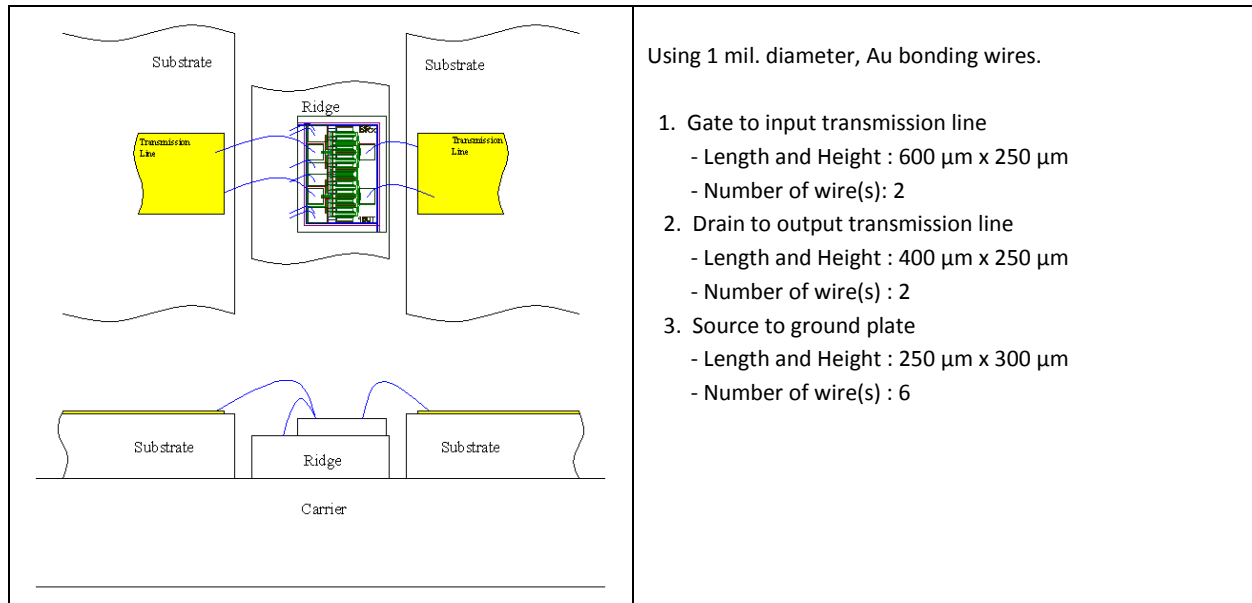


S-PARAMETERS ($V_{ds} = 8V$, $I_{ds} = 50\% I_{dss}$)

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



Proper ESD procedures should be followed when handling this device.

CAUTION

THIS PRODUCT USES GALLIUM ARSENIDE (GaAs). GaAs VAPOR AND POWDER ARE HAZARDOUS TO HUMAN HEALTH IF INHALED OR INGESTED. DO NOT BURN, DESTROY, CUT, CRUSH OR CHEMICALLY DISSOLVE THE PRODUCT. DO NOT LICK THE PRODUCT OR IN ANY WAY ALLOW IT TO ENTER THE MOUTH. EXCLUDE THE PRODUCT FROM GENERAL INDUSTRIAL WASTE OR GARBAGE AND DISPOSE OF ONLY IN ACCORDANCE TO APPLICABLE LAWS AND/OR ORDINANCES.

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