PH1617-2

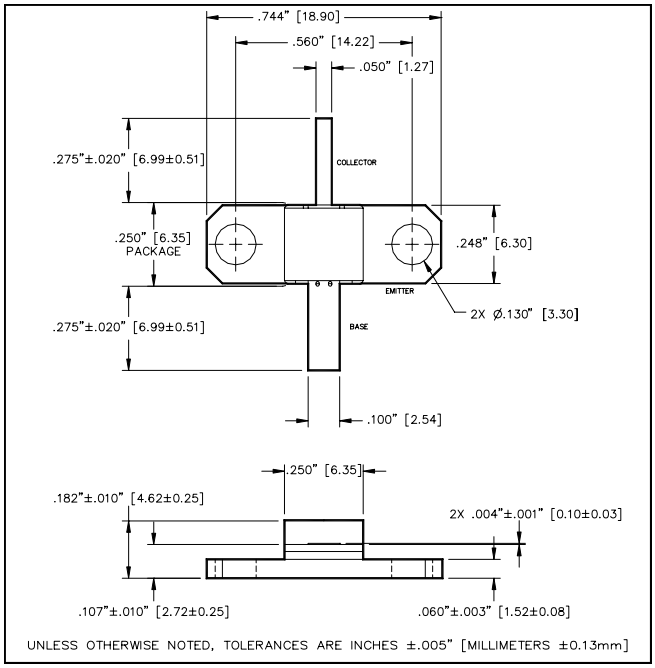
Wireless Bipolar Power Transistor
2W, 16 -1.7 GHz

M/A-COM Products
Released - Rev. 07.07

Features

- Designed for linear amplifier applications
- Class AB: -33 dBc typ. 3rd IMD at 2 W PEP
- Class A: +44 dBm typ. 3rd order intercept point
- Common emitter configuration
- Internal input impedance matching
- Diffused emitter ballasting

Outline Drawing



Notes: (unless otherwise specified)
1. Tolerances are: inches ± .005" (millimeters ± 0.13mm)

ABSOLUTE MAXIMUM RATING AT 25°C

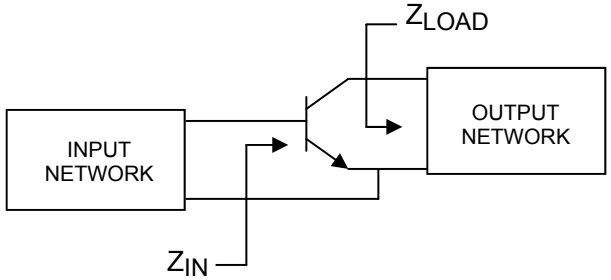
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	65	V
Collector-Emitter Voltage	V_{CES}	65	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	2.0	A
Power Dissipation	P_D	13.5	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to + 150	°C
Thermal Resistance	θ_{JC}	13	°C/W

ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	65	-	V	I_C = 5 mA
Collector-Emitter Leakage Current	I_{CES}	-	1.0	mA	V_{CE} = 25 V
Collector-Base Breakdown Voltage	BV_{CEO}	22	-	V	I_C = 5 mA
Collector-Base Breakdown Voltage	BV_{CER}	30		V	I_C = 5 mA, R_{BE}=220 Ω
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	I_B = 5 mA
DC Forward Current Gain	h_{FE}	15	120	-	V_{CE} = 5 V, I_C = 200 A
Power Gain	G_P	10	-	dB	V_{CC} = 25V, I_{CQ} = 25 mA, P_{out} = 2.0 W, F =1.60, 1.65, 1.70 GHz
Collector Efficiency	ηC	35	-	%	V_{CC} = 25V, I_{CQ} = 25 mA, P_{out} = 2.0 W, F =1.60. 1.65, 1.70 GHz
Input Return Loss	RL	10	-	dB	V_{CC} = 25V, I_{CQ} = 25 mA, P_{out} = 2.0 W, F =1.60. 1.65, 1.70 GHz
Load Mismatch Tolerance	VSWR-T	-	5:1	-	V_{CC} = 25V, I_{CQ} = 25 mA, P_{out} = 2.0 W, F =1.60. 1.65, 1.70 GHz
3rd Order IMD	IMD_3	-	-32	dBc	V_{CC} = 25V, I_{CQ} = 25 mA, P_{out} = 2.0 W PEP F =1650 MHz, Δ F=100kHz

TYPICAL OPTIMUM DEVICE IMPEDANCES

F (GHz)	Z_{IN} (Ω)	Z_{LOAD} (Ω)
1.60	3.5+j8.2	6.6-j13.5
1.65	2.0+j5.0	6.4-j13.1
1.70	4.2+j8.7	6.3-j12.8



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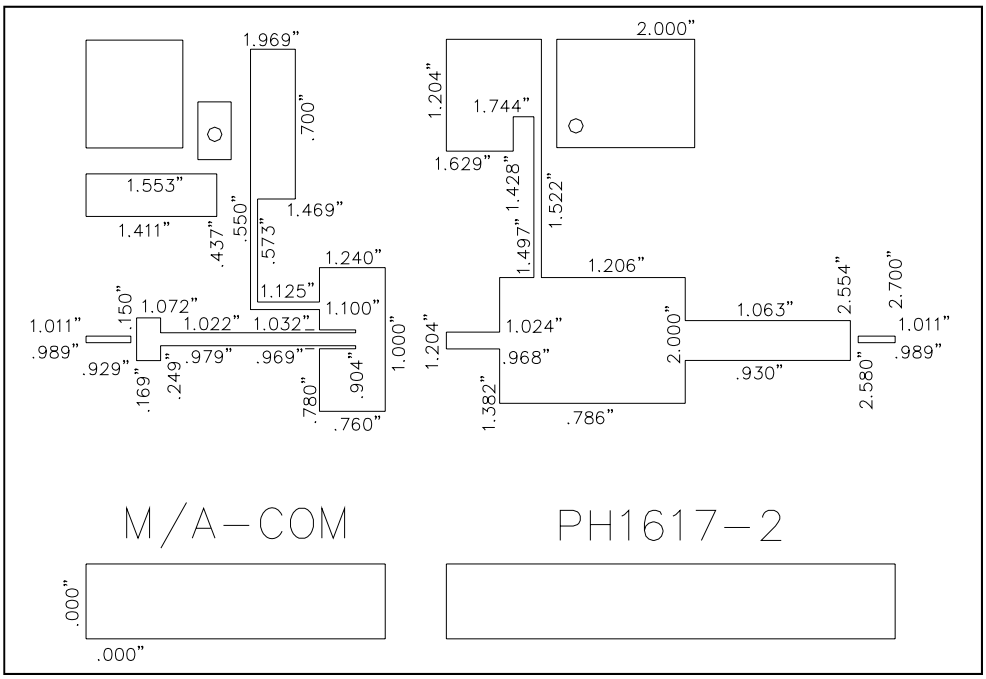
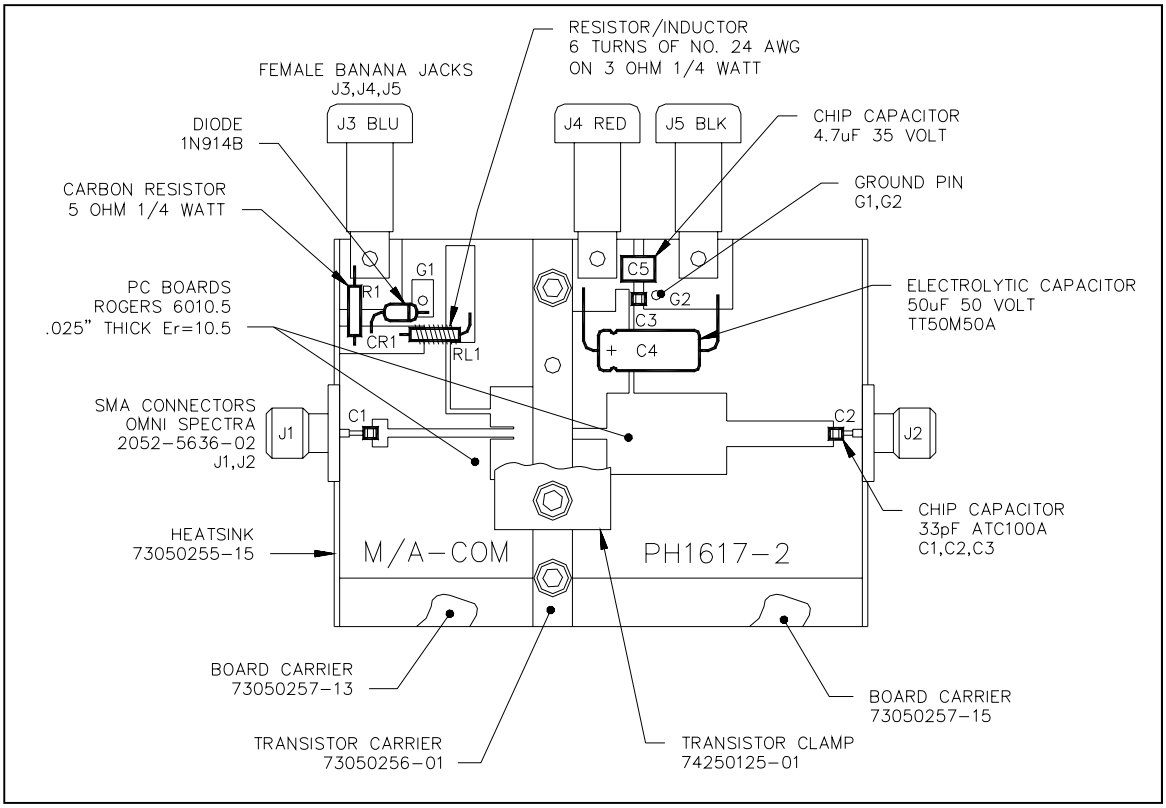
TEST FIXTURE DIMENSIONS



TEST FIXTURE ASSEMBLY



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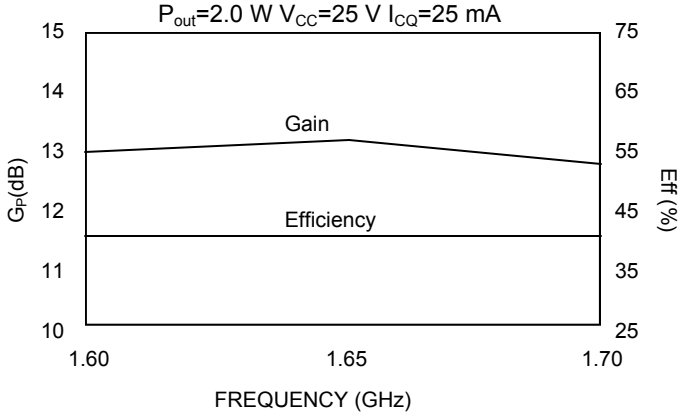
Typical Broadband Performance Curves

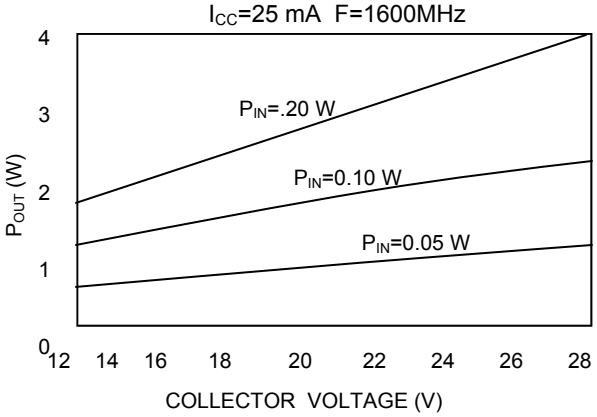
GAIN-EFFICIENCY vs FREQUENCY

P_{out}=2.0 W V_{CC}=25 V I_{CQ}=25 mA



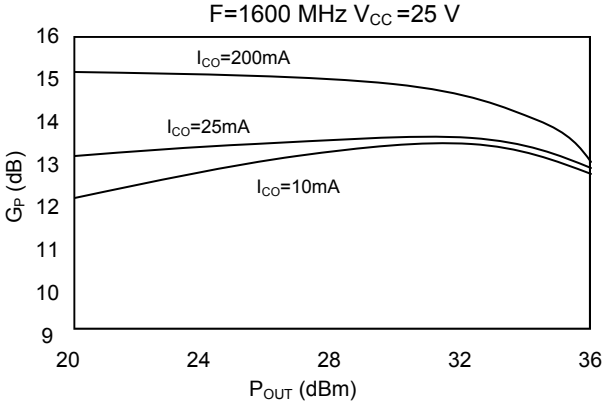
OUTPUT POWER vs COLLECTOR VOLTAGE

I_{CC}=25 mA F=1600MHz



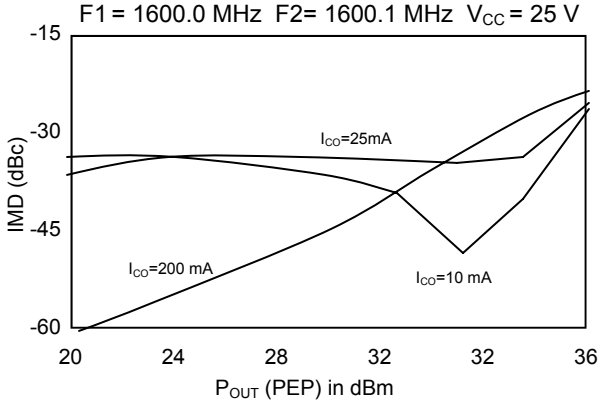
GAIN vs P_{OUT}

F=1600 MHz V_{CC} =25 V



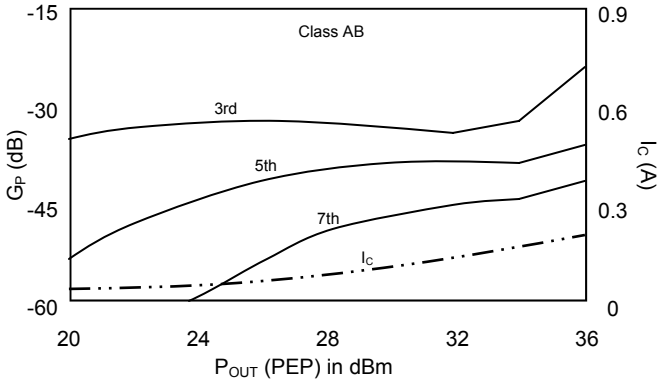
3RD ORDER IMD vs P_{OUT}

F1 = 1600.0 MHz F2= 1600.1 MHz V_{CC} = 25 V



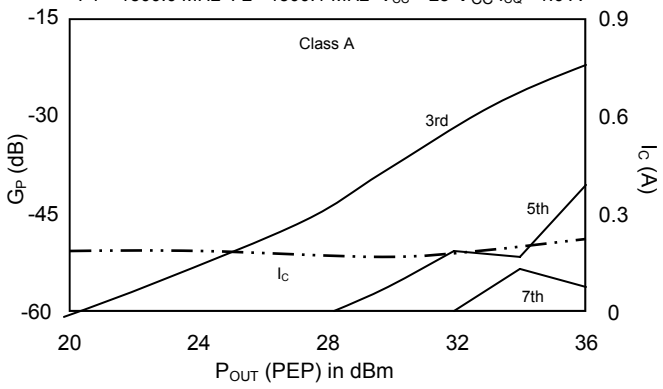
IMD vs P_{OUT}

F1 = 1600.0 MHz F2= 1600.1 MHz V_{CC} = 25 V I_{CQ}= 25 mA



IMD vs P_{OUT}

F1 = 1500.0 MHz F2= 1500.1 MHz V_{CC} = 25 V_{CC} I_{CQ}= 1.0 A



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TYPICAL S-PARAMETERS

V_{CC}= 25 V, I_{CQ}= 200 mA

F(MHz)	S11 MAG	S11 PHASE	S21 MAG	S21 PHASE	S12 MAG	S12 PHASE	S22 MAG	S22 PHASE
100	1.10	171.5	23.80	120.3	0.012	-7.4	0.32	-74.5
200	0.75	175.1	12.15	92.1	0.014	-4.7	0.22	-89.6
300	0.79	-177.9	7.79	81.2	0.016	-4.5	0.20	-95.7
400	0.84	-177.4	5.77	74.4	0.016	-9.8	0.23	-98.7
500	0.87	-178.5	4.65	68.4	0.017	-3.7	0.26	-100.5
600	0.89	179.8	3.96	62.6	0.018	-5.9	0.27	-101.4
700	0.89	178.3	3.49	56.7	0.018	-0.7	0.29	-104.4
800	0.91	177.4	3.08	51.1	0.019	-2.7	0.33	-103.3
900	0.91	175.4	2.89	45.4	0.017	-3.4	0.36	-111.0
1000	0.91	174.1	2.74	38.9	0.019	-0.9	0.40	-114.6
1100	0.89	171.5	2.64	28.9	0.024	-6.1	0.46	-117.3
1200	0.87	171.7	2.45	22.8	0.024	-13.6	0.53	-120.8
1300	0.86	170.8	2.35	15.7	0.023	-18.3	0.57	-122.3
1400	0.86	170.3	2.32	7.6	0.026	-21.1	0.63	-145.5
1450	0.85	170.1	2.30	3.4	0.026	-22.9	0.65	-126.2
1500	0.84	169.9	2.27	-1.2	0.025	-22.3	0.66	-127.6
1550	0.83	169.7	2.26	-6.4	0.026	-31.0	0.68	-129.1
1600	0.82	169.7	2.24	-11.5	0.030	-37.3	0.71	-131.9
1650	0.82	170.0	2.22	-16.6	0.029	-43.2	0.71	-133.6
1700	0.81	170.5	2.19	-22.4	0.027	-48.5	0.73	-137.6
1750	0.80	171.1	2.14	-28.4	0.025	-52.2	0.76	-140.1
1800	0.80	171.5	2.11	-35.5	0.026	-60.2	0.76	-143.9
1850	0.80	171.9	2.05	-40.7	0.027	-60.1	0.81	-147.5
1900	0.81	172.6	1.99	-47.4	0.024	-67.1	0.81	-150.1
2000	0.82	173.6	1.83	-60.7	0.024	-80.8	0.86	-155.5
2100	0.84	174.5	1.61	-74.0	0.020	-94.0	0.88	160.0
2200	0.88	174.2	1.40	-84.6	0.019	104.7	0.87	164.5
2300	0.90	173.6	1.21	-94.7	0.016	-128.7	0.86	168.1

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