PH1516-10

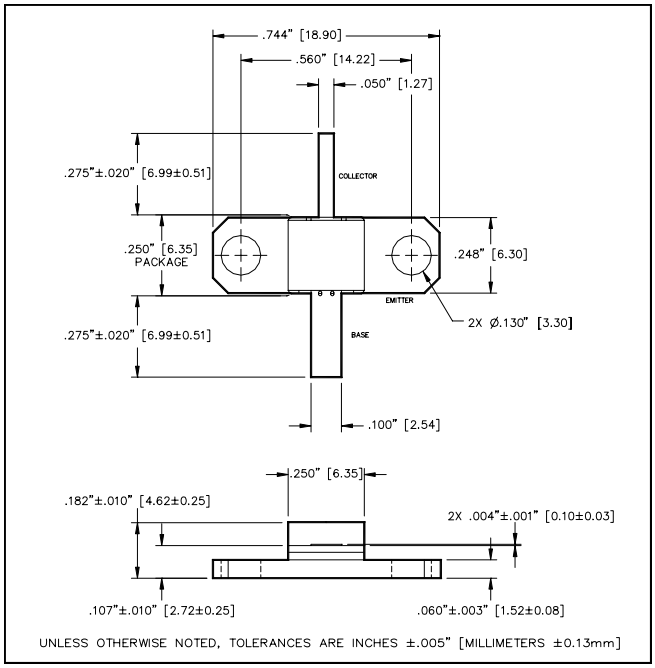
Wireless Bipolar Power Transistor
10W, 1.45-1.60 GHz

M/A-COM Products
Released - Rev. 07.07

Features

- Designed for cellular base station applications
- Class AB: -33 dBc typ. 3rd IMD at 10 W PEP
- Class A: +49 dBm typ. 3rd order intercept point
- Common emitter configuration
- Internal input impedance matching
- Diffused emitter ballasting

Outline Drawing[1]



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

ABSOLUTE MAXIMUM RATING AT 25°C

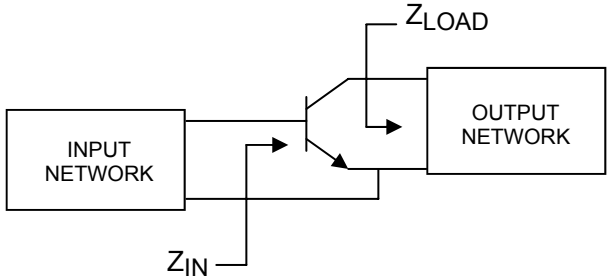
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CES}	60	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	2.0	A
Total Power Dissipation	P_{TOT}	58	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to + 200	°C
Thermal Resistance	θ_{JC}	3.0	°C/W

ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	60	-	V	I_C = 20mA
Collector-Emitter Leakage Current	I_{CES}	-	2.0	mA	V_{CE} = 25V
Collector-Base Breakdown Voltage	BV_{CEO}	20	-	V	I_C = 20mA
Collector-Base Breakdown Voltage	BV_{CER}	30		V	I_C = 20mA, R_{BE}=220 Ω
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	I_B = 20mA
DC Forward Current Gain	h_{FE}	15	120	-	V_{CE} = 5V, I_C = 1 A
Power Gain	G_P	10	-	dB	V_{CC} = 25V, I_{CQ} = 100 mA, P_{out} = 10 W, F =1.50-1.60 GHz
Collector Efficiency	ηC	40	-	%	V_{CC} = 25V, I_{CQ} = 100 mA, P_{out} = 10 W, F =1.50-1.60 GHz
Input Return Loss	RL	10	-	dB	V_{CC} = 25V, I_{CQ} = 100 mA, P_{out} = 10 W, F =1.50-1.60 GHz
Load Mismatch Tolerance	VSWR	-	3.0:1	-	V_{CC} = 25V, I_{CQ} = 100 mA, P_{out} = 10 W, F =1.50-1.60 GHz
3rd Order IMD	IMD_3	-	-30	dBc	V_{CC} = 25V, I_{CQ} = 100 mA, P_{out} = 10 W PEP F =1500 MHz, Δ F=100kHz

TYPICAL OPTIMUM DEVICE IMPEDANCES

F (GHz)	Z_{IN} (Ω)	Z_{LOAD} (Ω)
1.50	1.4+j4.8	2.1-j0.3
1.55	2.0+j5.0	2.0-j0.4
1.60	2.5+j4.9	2.0-j0.5



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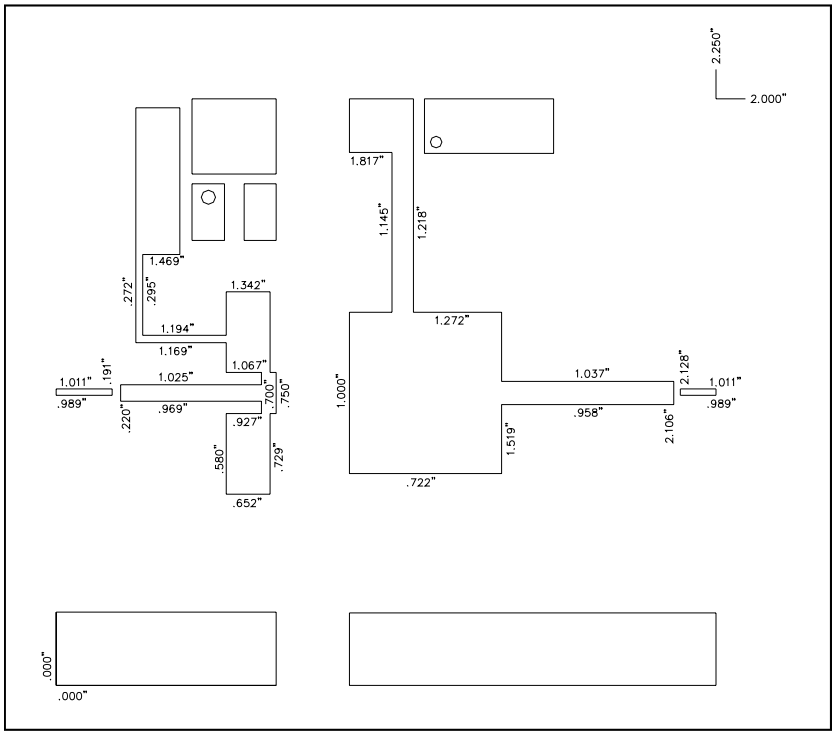
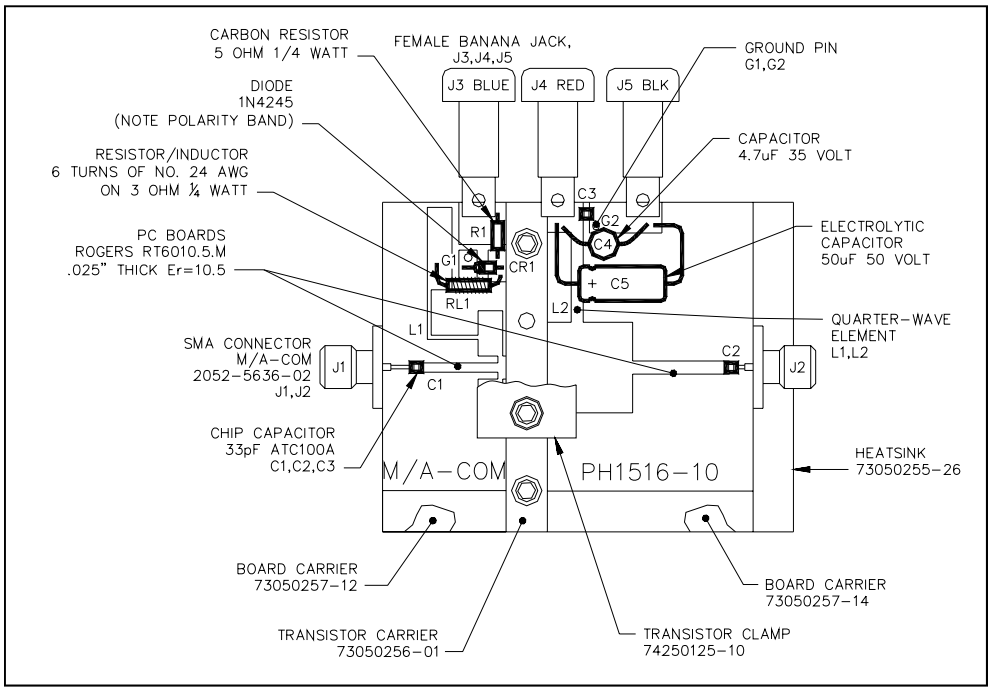
TEST FIXTURE CIRCUIT DIMENSIONS



TEST FIXTURE ASSEMBLY



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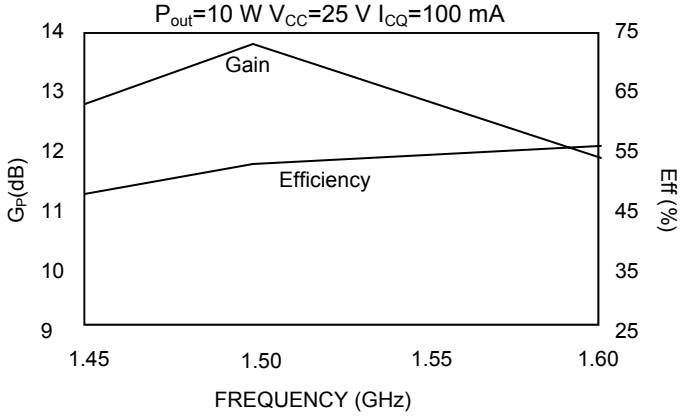
Typical Broadband Performance Curves

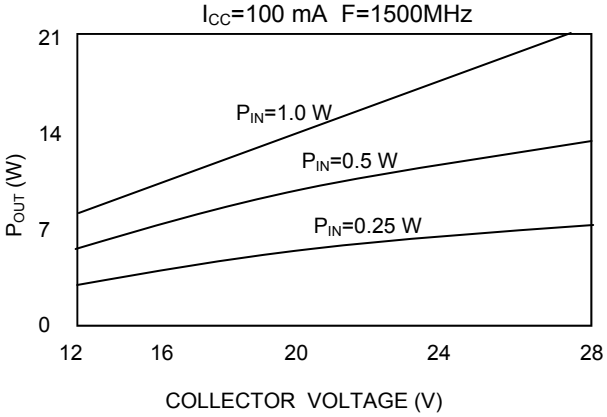
GAIN-EFFICIENCY vs FREQUENCY

P_{out}=10 W V_{CC}=25 V I_{CQ}=100 mA



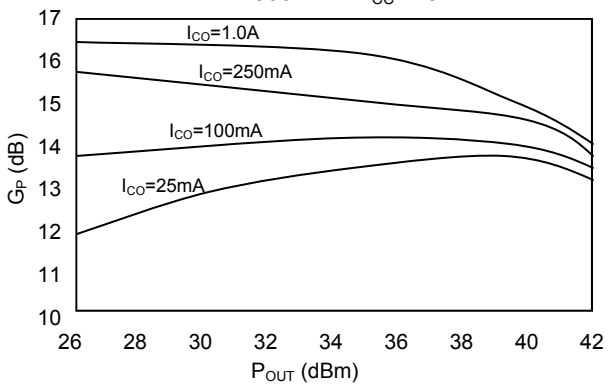
OUTPUT POWER vs COLLECTOR VOLTAGE

I_{CC}=100 mA F=1500MHz



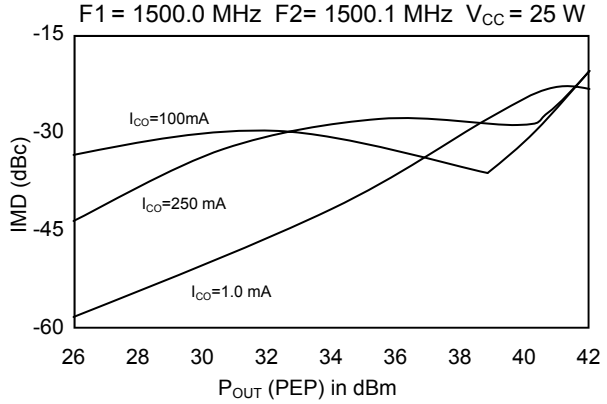
Gain vs P_{OUT}

F=1500 MHz V_{CC} =25 V



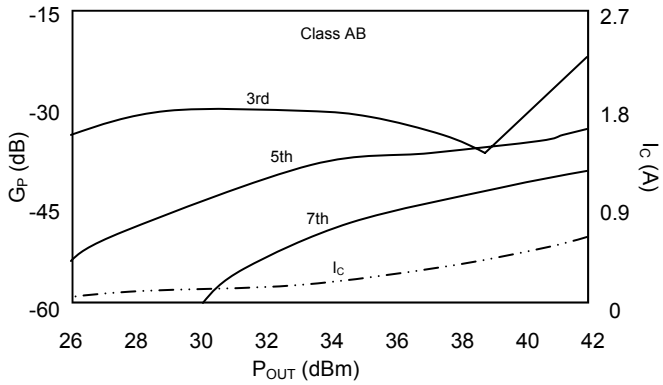
3RD ORDER IMD vs P_{OUT}

F1 = 1500.0 MHz F2= 1500.1 MHz V_{CC} = 25 W



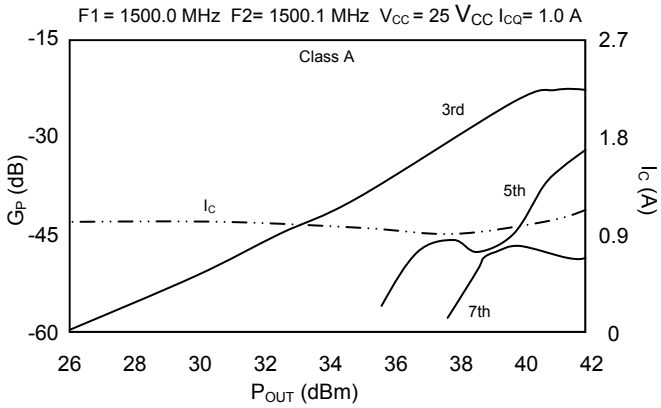
IMD vs P_{OUT}

F1 = 1500.0 MHz F2= 1500.1 MHz V_{CC} = 25 V I_{CQ}= 100 mA



IMD vs P_{OUT}

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



ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product M/A-COM Technology Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

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TYPICAL S-PARAMETERS

V_{CC}=25 V, I_{CQ}=1.0A

F(MHz)	S11 MAG	S11 PHASE	S21 MAG	S21 PHASE	S12 MAG	S12 PHASE	S22 MAG	S22 PHASE
100	0.85	177.3	6.57	92.2	0.0066	6.74	0.73	-179.3
200	0.94	179.4	2.96	79.9	0.0073	4.33	0.73	-179.0
300	0.96	-179.4	1.95	75.5	0.0075	4.04	0.72	-178.8
400	0.97	-170.0	1.51	70.6	0.0077	0.91	0.72	-178.2
500	0.97	178.5	1.27	65.2	0.0081	-0.99	0.72	-177.6
600	0.97	178.1	1.12	59.5	0.0085	-2.6	0.73	-177.1
700	0.96	177.7	1.09	52.7	0.0088	-6.8	0.72	-176.1
800	0.97	178.0	0.93	39.5	0.0094	-12.0	0.73	-174.5
900	0.96	177.3	0.88	34.6	0.0093	-13.3	0.75	-173.4
1000	0.97	176.7	0.87	27.8	0.0102	-17.8	0.76	-172.3
1100	0.95	175.9	0.96	20.7	0.0126	-24.5	0.76	-170.1
1200	0.93	176.0	0.93	4.1	0.0118	-40.0	0.81	-169.0
1300	0.92	176.3	0.96	-9.2	0.0118	-51.4	0.86	-168.9
1400	0.91	176.9	0.98	-25.3	0.0120	-68.5	0.91	-169.8
1450	0.91	177.1	0.97	-34.4	0.0118	-79.3	0.94	-171.1
1500	0.91	177.6	0.95	-43.8	0.0117	-91.4	0.97	-172.7
1550	0.91	177.9	0.91	-53-8	0.0114	-104.9	0.98	-174.6
1600	0.92	178.1	0.87	-63.4	0.0107	-119.8	0.99	-176.7
1650	0.92	178.3	0.81	-72.7	0.0094	-135.3	0.99	-178.9
1700	0.9.	178.1	0.74	-81.2	0.0094	-146.9	0.01	179.0
1750	0.94	178.0	0.67	-89.1	0.0084	-161.9	0.99	177.4
1800	0.95	177.6	0.61	-96.7	0.0080	-174.5	0.98	175.8
1850	0.95	177.1	0.55	-103.2	0.0079	-172.2	0.96	174.7
1900	0.95	176.7	0.49	-108.6	0.0077	-155.4	0.95	173.8
1950	0.96	176.1	0.44	-113.4	0.0071	145.8	0.94	173.1
2000	0.96	175.6	0.40	-117.3	0.0070	134.9	0.92	172.2
2100	0.96	174.3	0.34	-125.5	0.0081	123.6	0.97	171.0
2200	0.96	173.1	0.28	-133.5	0.0087	104.9	0.84	169.3
2300	0.96	171.1	0.23	-140.0	0.0092	89.0	0.88	168.7
2400	0.96	170.5	0.20	-144.5	0.0075	80.1	0.86	168.0

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