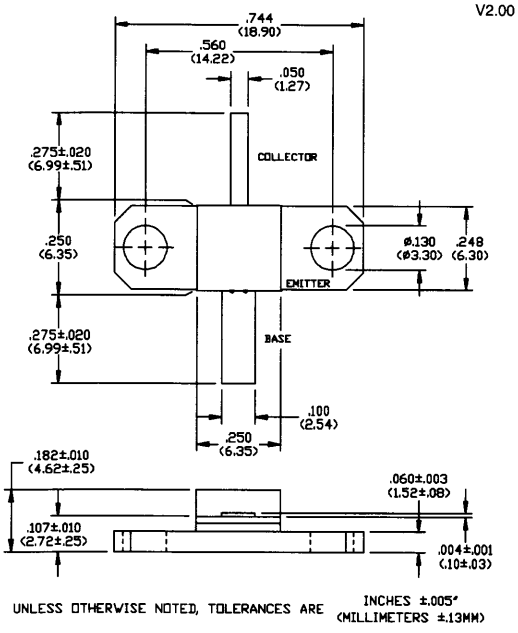
Wireless Bipolar Power Transistor, 2W
1.45 - 1.60 GHz

PH1516-2

V2.00

Features

- Designed for Cellular Base Station Applications
- Class AB: -33 dBc Typ 3rd IMD at 2 Watts PEP
- Class A: +44 dBm Typ 3rd Order Intercept Point
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting



Absolute Maximum Ratings at 25°C

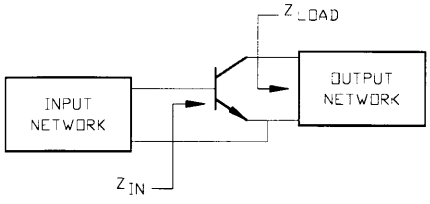
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	65	V
Collector-Emitter Voltage	V_{CES}	65	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	2.0	A
Total Power Dissipation	P_{TOT}	13.5	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance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

Electrical Characteristics 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-Emitter Breakdown Voltage	BV_{CEO}	22	-	V	I_C=5 mA
Collector-Emitter 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 mA
Power Gain	G_P	10	-	dB	V_{CC}=25 V, I_{CQ}=25 mA, P_{OUT}=2.0 W, F=1.50 - 1.60 GHz
Collector Efficiency	η_C	35	-	%	V_{CC}=25 V, I_{CQ}=25 mA, P_{OUT}=2.0 W, F=1.50 - 1.60 GHz
Input Return Loss	RL	10	-	dB	V_{CC}=25 V, I_{CQ}=25 mA, P_{OUT}=2.0 W, F=1.50 - 1.60 GHz
Load Mismatch Tolerance	VSWR	-	5.0:1	-	V_{CC}=25 V, I_{CQ}=25 mA, P_{OUT}=2.0 W, F=1.50 - 1.60 GHz
3rd Order IMD	IMD_3	-	-32	dBc	V_{CC}=25 V, I_{CQ}=25 mA, P_{OUT}=2.0 W PEP F=1.5 MHz, ΔF=100 kHz

Typical Device Impedances

F(GHz)	Z_{IN}(Ω)	Z_{LOAD}(Ω)
1.45	2.5 + j7.3	7.3 + j15.0
1.50	2.7 + j7.6	7.0 + j14.2
1.60	3.5 + j8.2	6.6 + j13.5



Specifications Subject to Change Without Notice.

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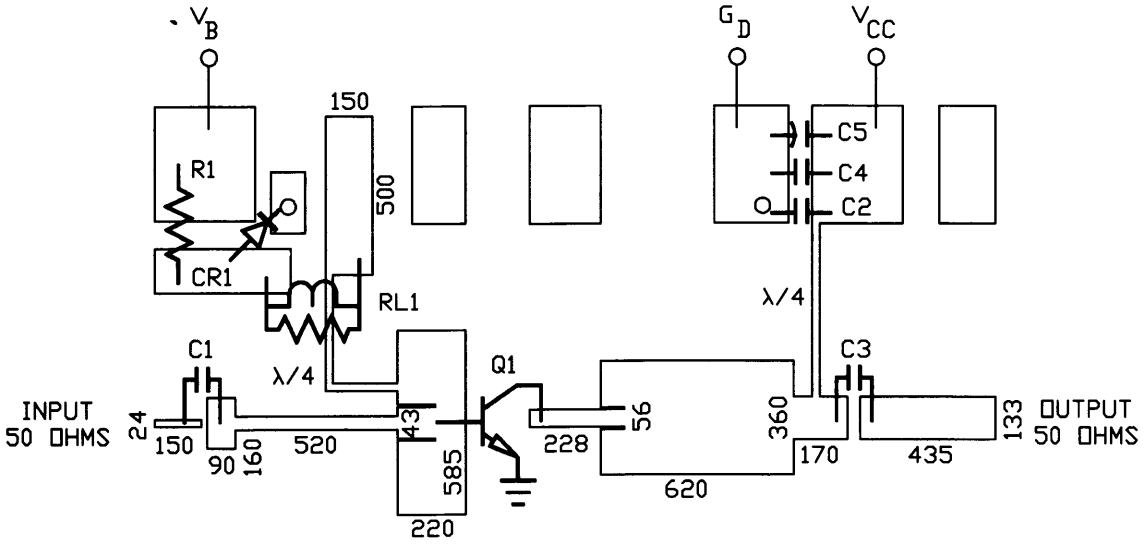
RF Test Fixture



ARTWORK DIMENSIONS IN MILS

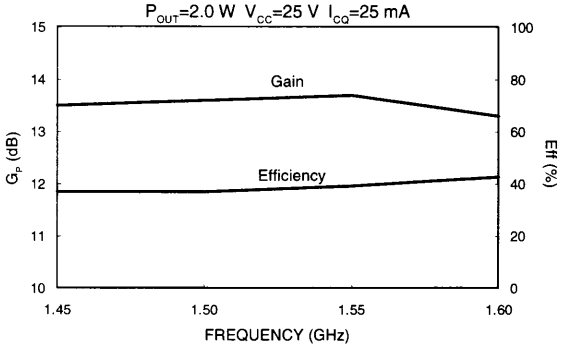
PARTS LIST

C1 C2 C3	33 pF ATC SIZE A
C4	5000 pF
C5	4.7 uF 63 VOLTS
CR1	1N914B DIODE
Q1	PH1516-2
R1	5 OHMS 1/4 WATT
RL1	6T/NO. 24 AWG ON 3 OHM 1/4 WATT
BOARD TYPE:	ROGERS 6010.5 25 THICK, E_R = 10.5

Typical Broadband Performance Curves

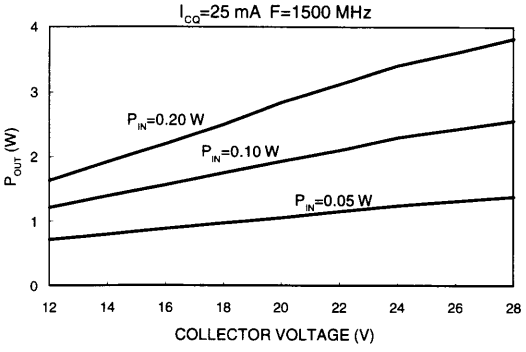
GAIN-EFFICIENCY vs FREQUENCY

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



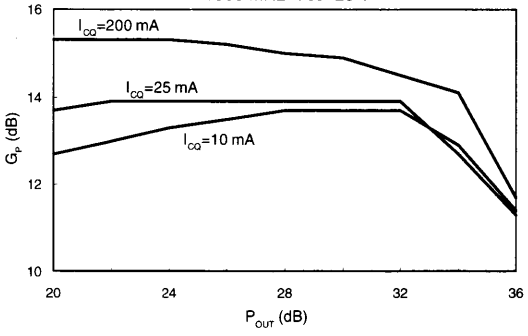
OUTPUT POWER vs COLLECTOR VOLTAGE

I_{CQ}=25 mA F=1500 MHz



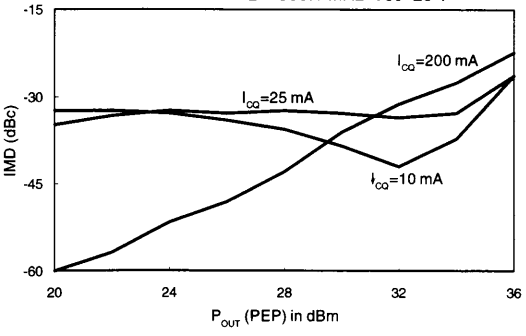
GAIN vs P_{OUT}

F=1500 MHz Vcc=25 V



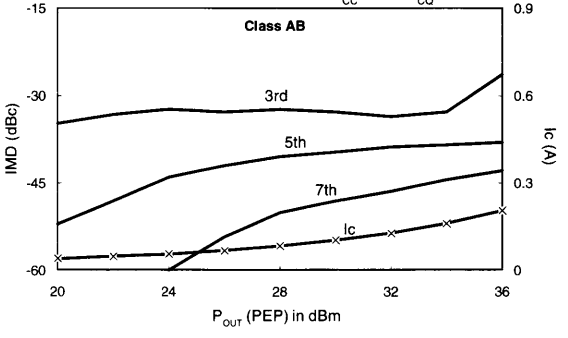
3RD ORDER IMD vs P_{OUT}

F1=1500.0 MHz F2=1500.1 MHz Vcc=25 V



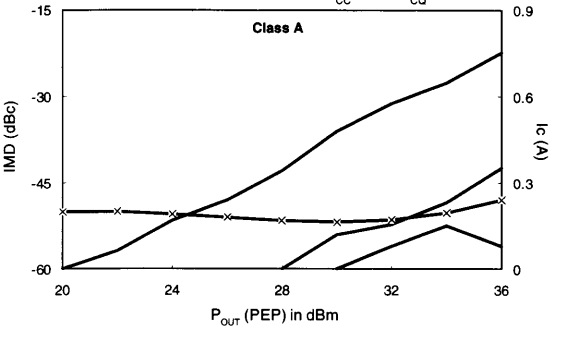
IMD vs P_{OUT}

F1=1500.0 MHz F2=1500.1 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 I_{CQ}=200 mA



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Typical S-Parameters

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

	S11		S21		S12		S22	
f(MHz)	Mag	Phase	Mag	Phase	Mag	Phase	Mag	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	0.72	-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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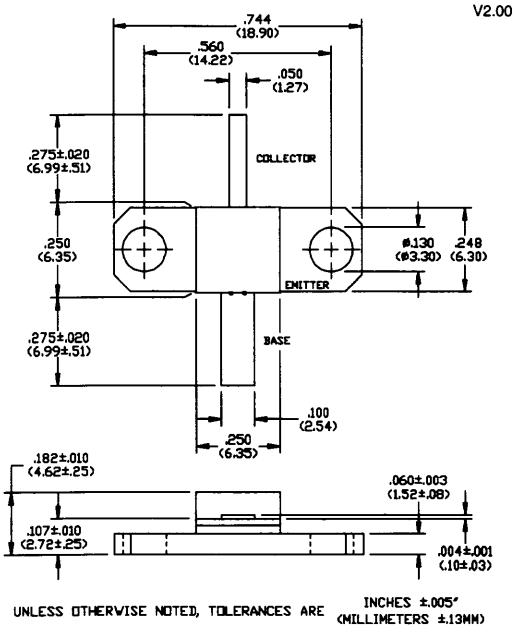
Wireless Bipolar Power Transistor, 10W
1.45 - 1.60 GHz

PH1516-10

V2.00



Features

- Designed for Cellular Base Station Applications
- Class AB: -33 dBc Typ 3rd IMD at 10 Watts PEP
- Class A: +49 dBm Typ 3rd Order Intercept Point
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting

Absolute Maximum Ratings at 25°C

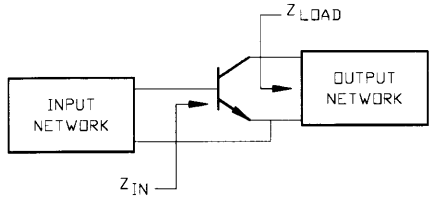
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CES}	60	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	2.0	A
Total Power Dissipation	P_{TOT}	58	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	3.0	°C/W

Electrical Characteristics at 25°C

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

Typical 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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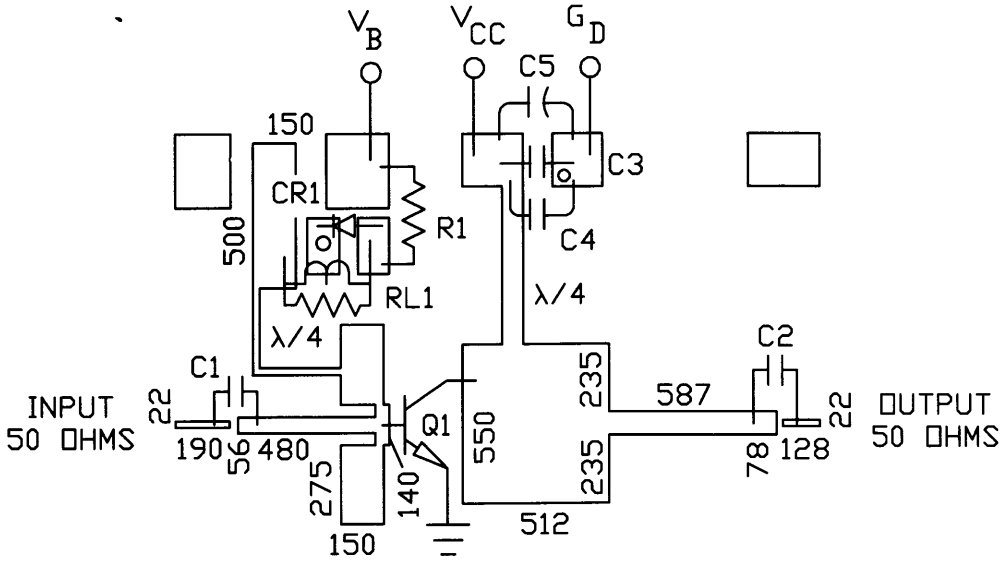
RF Test Fixture



ARTWORK DIMENSIONS IN MILS

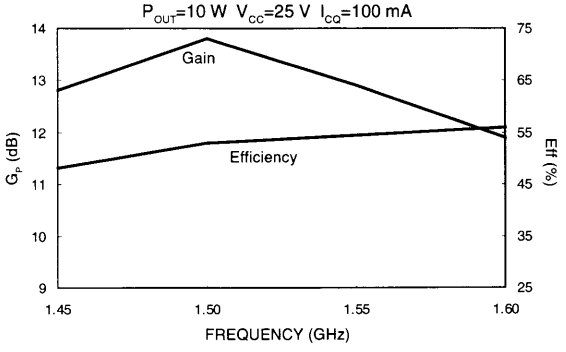
PARTS LIST

C1 C2 C3	33 pF ATC SIZE A
C4	4.7 uF 35 VOLT CHIP
C5	50 uF 50 VOLTS
CR1	1N4245 DIODE
Q1	PH1516-10
R1	5 OHMS 1/4 WATT
RL1	6T/NO. 24 AWG ON 3 OHM 1/4 WATT
BOARD TYPE:	ROGERS 6010.5 .025" THICK, E_R = 10.5

Typical Broadband Performance Curves

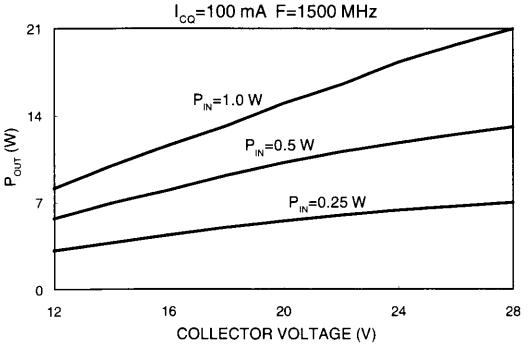
GAIN-EFFICIENCY vs FREQUENCY

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



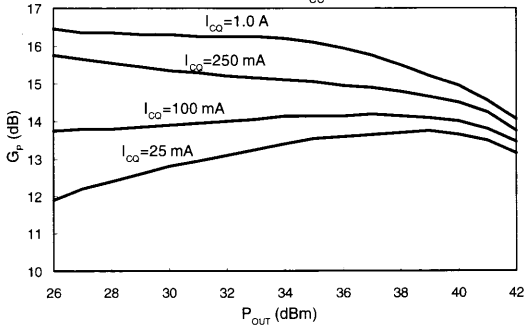
OUTPUT POWER vs COLLECTOR VOLTAGE

I_{CQ}=100 mA F=1500 MHz



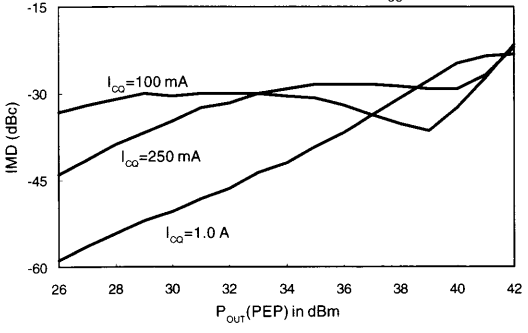
GAIN vs P_{OUT}

F=1500 MHz V_{CC}=25 V



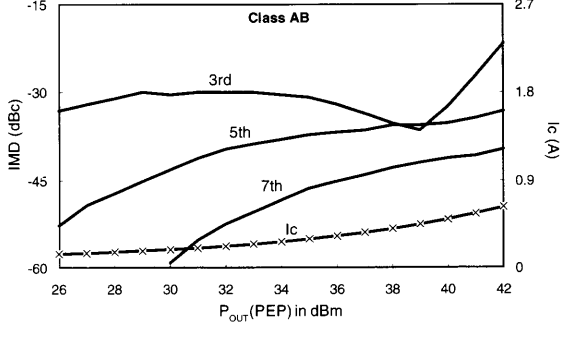
3RD ORDER IMD vs P_{OUT}

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



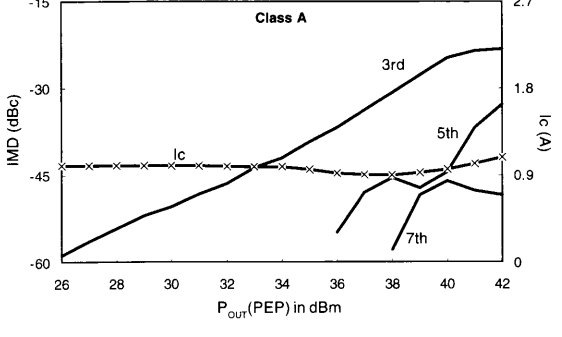
IMD vs P_{OUT}

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 I_{CQ}=1.0 A



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Typical S-Parameters

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

	S11		S21		S12		S22	
f(MHz)	Mag	Phase	Mag	Phase	Mag	Phase	Mag	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	0.93	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	0.91	171.0
2200	0.96	173.1	0.28	-133.5	0.0087	104.9	0.84	169.3
2300	0.96	171.7	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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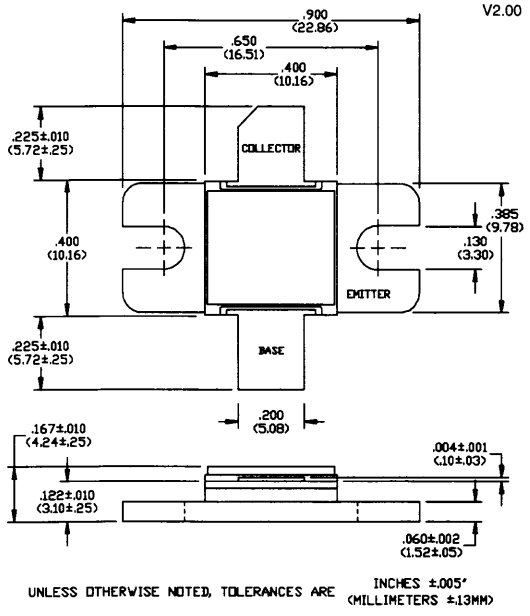
Wireless Bipolar Power Transistor, 30W
1.45 - 1.60 GHz

PH1516-30

V2.00

Features

- Designed for Cellular Base Station Applications
- -30 dBc Typical 3rd IMD at 30 Watts PEP
- Common Emitter Class AB Operation
- Internal Input Impedance Matching
- Diffused Emitter Ballasting



Absolute Maximum Ratings at 25°C

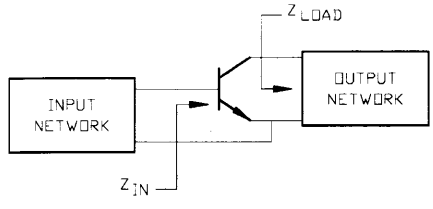
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CES}	60	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	10	A
Total Power Dissipation	P_{TOT}	109	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	1.6	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	60	-	V	I_C=40 mA
Collector-Emitter Leakage Current	I_{CES}	-	4.0	mA	V_{CE}=25 V
Collector-Emitter Breakdown Voltage	BV_{CEO}	20	-	V	I_C=40 mA
Collector-Emitter Breakdown Voltage	BV_{CER}	30	-	V	I_C=40 mA, R_{BE}=220 Ω
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	I_B=40 mA
DC Forward Current Gain	h_{FE}	15	120	-	V_{CE}=5 V, I_C=2 A
Power Gain	G_P	10	-	dB	V_{CC}=25 V, I_{CQ}=200 mA, P_{OUT}=30 W, F=1.50 - 1.60 GHz
Collector Efficiency	η_C	40	-	%	V_{CC}=25 V, I_{CQ}=200 mA, P_{OUT}=30 W, F=1.50 - 1.60 GHz
Input Return Loss	RL	10	-	dB	V_{CC}=25 V, I_{CQ}=200 mA, P_{OUT}=30 W, F=1.50 - 1.60 GHz
Load Mismatch Tolerance	VSWR	-	3.0:1	-	V_{CC}=25 V, I_{CQ}=200 mA, P_{OUT}=30 W, F=1.50 - 1.60 GHz
3rd Order IMD	IMD_3	-	-28	dBc	V_{CC}=25 V, I_{CQ}=200 mA, P_{OUT}=30 W PEP F=1500 MHz, ΔF=100 kHz

Typical Device Impedances

F(GHz)	Z_{IN}(Ω)	Z_{LOAD}(Ω)
1.45	1.7 + j4.8	1.4 + j0.2
1.50	1.9 + j5.0	1.4 + j0.1
1.60	2.1 + j4.9	1.3 - j0.1



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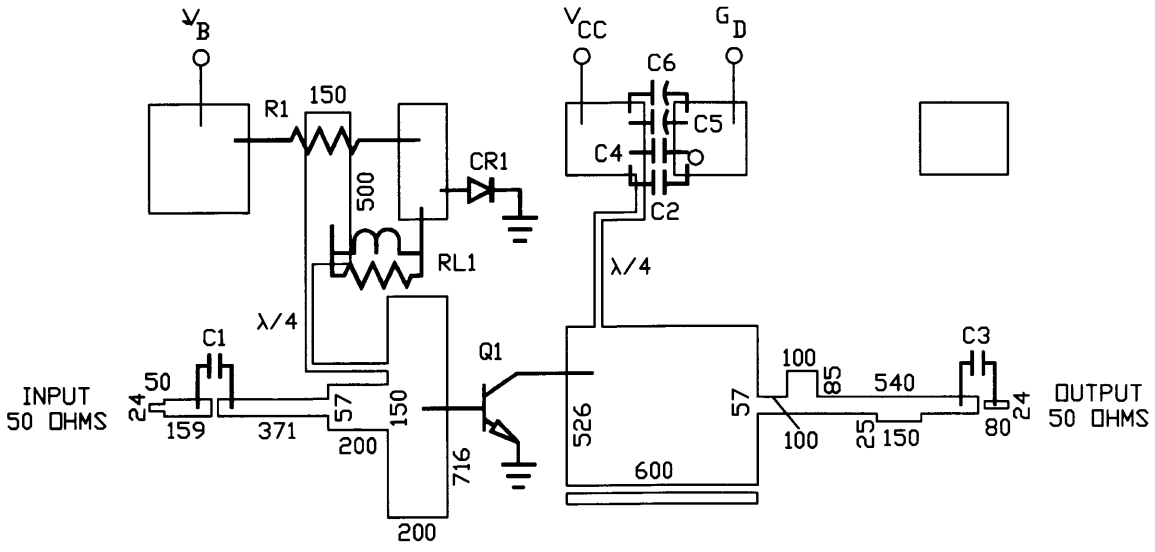
RF Test Fixture



ARTWORK DIMENSIONS IN MILS

PARTS LIST

C1 C2 C3	33 pF ATC SIZE A
C4	5000 pF
C5	4.7 uF 63 VOLTS
C6	50 uF 50 VOLTS
CR1	1N4245 DIODE
Q1	PH1516-30
R1	5 OHMS 1/4 WATT
RL1	6T/NO. 24 AWG ON 3 OHM 1/4 WATT
BOARD TYPE:	ROGERS 6010.5 25 THICK, E_R = 10.5

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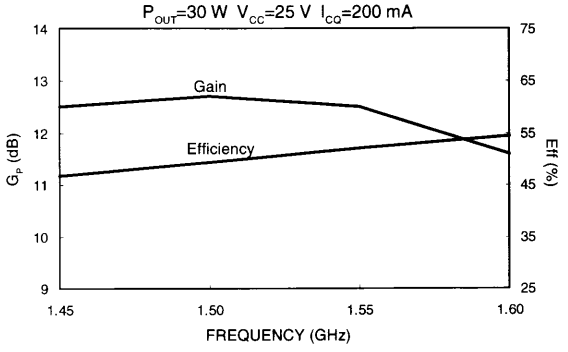
Typical Broadband Performance Curves

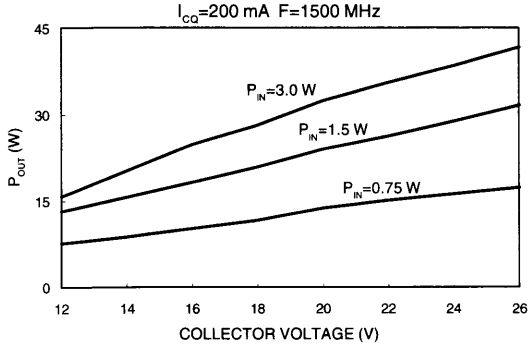
GAIN-EFFICIENCY vs FREQUENCY

P_{OUT}=30 W V_{CC}=25 V I_{CQ}=200 mA



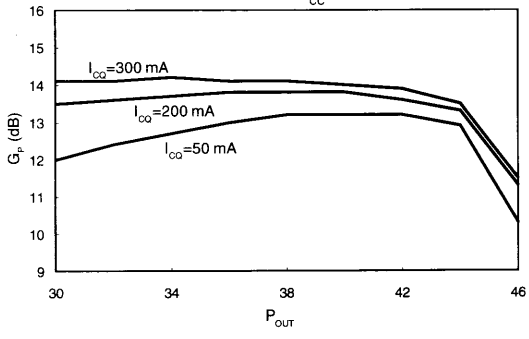
OUTPUT POWER vs COLLECTOR VOLTAGE

I_{CQ}=200 mA F=1500 MHz



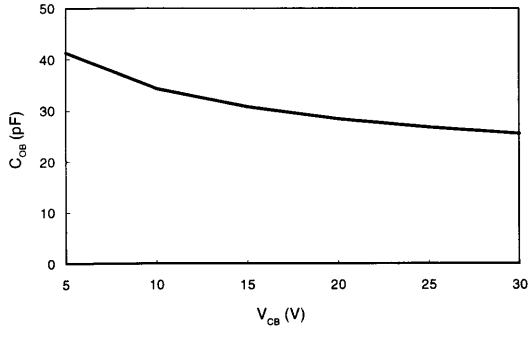
GAIN vs P_{OUT}

F=1500 MHz V_{CC}=25 V



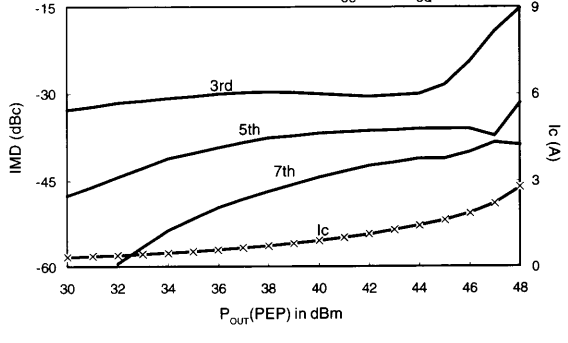
C_{OB} vs COLLECTOR VOLTAGE

F=1.0 MHz



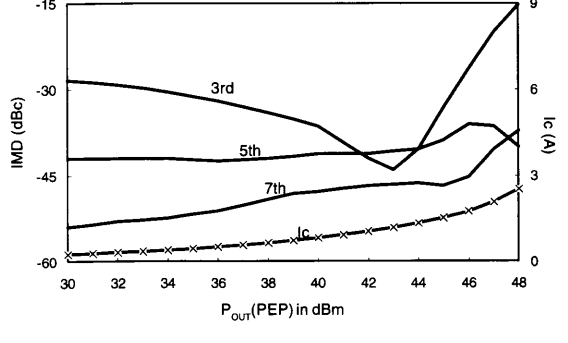
IMD vs P_{OUT}

F1=1500.0 MHz F2=1500.1 MHz V_{CC}=25 V I_{CQ}=200 mA



IMD vs P_{OUT}

F1=1500.0 MHz F2=1500.1 MHz V_{CC}=25 V I_{CQ}=50 mA



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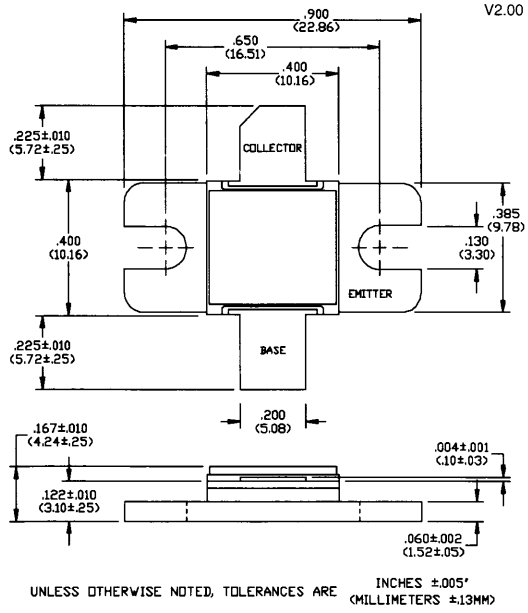
Wireless Bipolar Power Transistor, 60W 1450 - 1550 MHz

PH1516-60

V2.00

Features

- Designed for Linear Amplifier Applications
- Class AB: -30 dBc Typ 3rd IMD at 60 Watts PEP
- Class A: +53 dBm Typ 3rd Order Intercept Point
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting



Absolute Maximum Ratings at 25°C

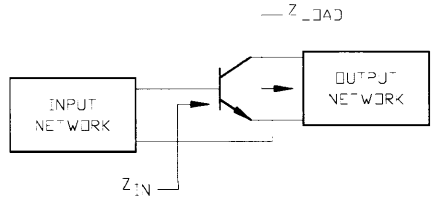
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	65	V
Collector-Emitter Voltage	V_{CES}	65	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	10	A
Power Dissipation	P_D	116	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	1.5	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	60	-	V	I_C=40 mA
Collector-Emitter Leakage Current	I_{CES}	-	10	mA	V_{CE}=26 V
Collector-Emitter Breakdown Voltage	BV_{CEO}	24	-	V	I_C=40 mA
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	I_B=40 mA
DC Forward Current Gain	h_{FE}	15	120	-	V_{CE}=5 V, I_C=1 A
Power Gain	G_P	8	-	dB	V_{CC}=26 V, I_{CQ}=50 mA, P_{OUT}=60 W PEP F=1500 MHz, ΔF=100 kHz
Collector Efficiency	η_C	30	-	%	V_{CC}=26 V, I_{CQ}=50 mA, P_{OUT}=60 W PEP F=1500 MHz, ΔF=100 kHz
Input Return Loss	RL	10	-	dB	V_{CC}=26 V, I_{CQ}=50 mA, P_{OUT}=60 W PEP F=1500 MHz, ΔF=100 kHz
Load Mismatch Tolerance	VSWR-T	-	5.0:1	-	V_{CC}=26 V, I_{CQ}=50 mA, P_{OUT}=60 W PEP F=1500 MHz, ΔF=100 kHz
3rd Order IMD	IMD_3	-	-28	dBc	V_{CC}=26 V, I_{CQ}=50 mA, P_{OUT}=60 W PEP F=1500 MHz, ΔF=100 kHz

Typical Optimum Device Impedances

F(MHz)	$Z_{IN}(\Omega)$	$Z_{LOAD}(\Omega)$
1450	2.2 + j5.0	3.0 - j3.8
1500	2.7 + j4.5	2.2 - j4.0
1550	2.1 + j3.7	1.5 - j4.1



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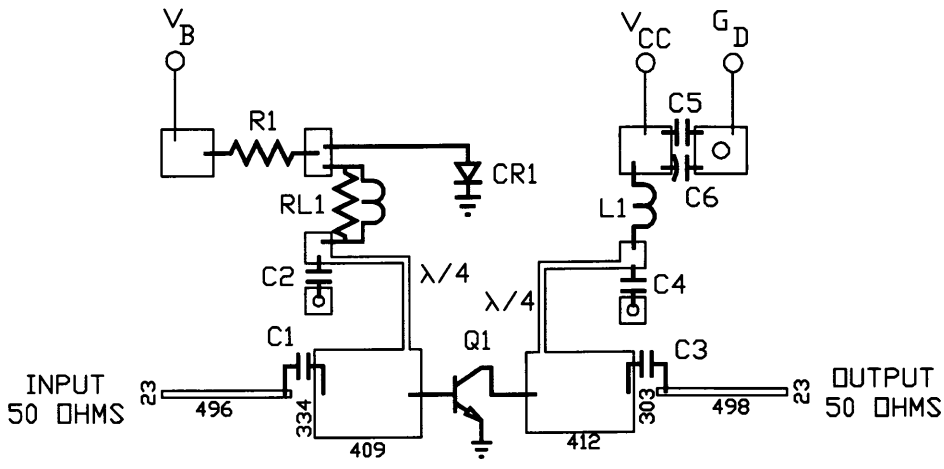
RF Test Fixture



ARTWORK DIMENSIONS IN MILS

PARTS LIST

C1 C2 C3 C4	18pF ATC SIZE B CAPACITOR
C5	5000pF CHIP CAPACITOR
C6	50 VOLT 50uF ELECTROLYTIC CAPACITOR
CR1	1N5417 DIODE
L1	7 TURNS OF NO. 22 AWG ON .125" DIA
Q1	PH1516-60
R1	4.7 OHM 1/2 WATT RESISTOR
RL1	10 TURNS OF NO. 26 AWG ON 3 OHM 1/4 WATT RESISTOR
BOARD TYPE:	ROGERS 6010.5 .025" THICK, E_R = 10.5

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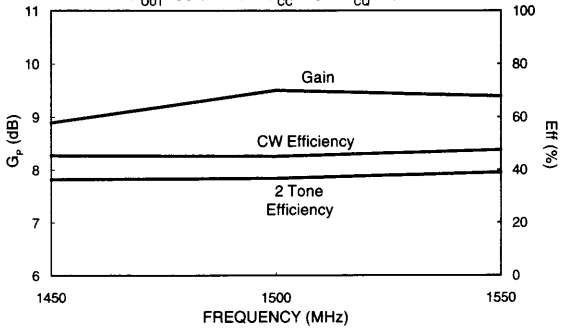
Typical Broadband Performance Curves

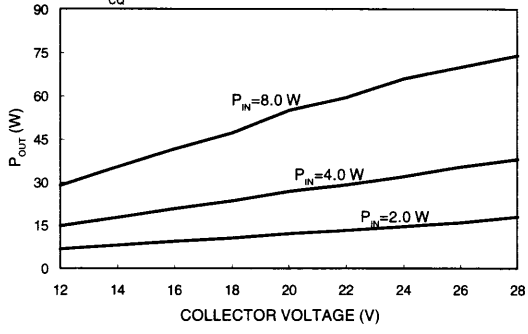
GAIN-EFFICIENCY vs FREQUENCY

P_{OUT}=60 W PEP V_{CC}=26 V I_{CQ}=25 mA



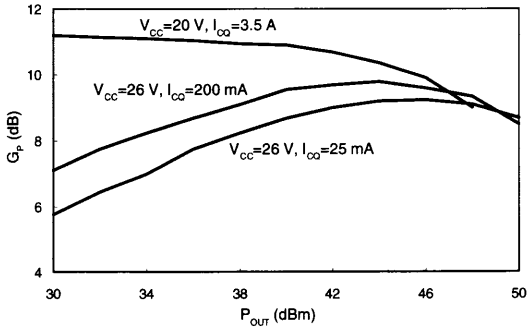
OUTPUT POWER vs COLLECTOR VOLTAGE

I_{CQ}=25 mA F1=1500.0 MHz F2=1500.1 MHz



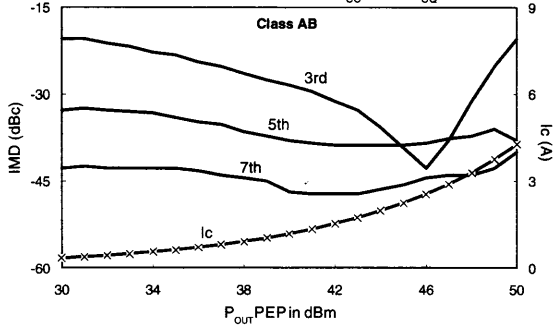
GAIN vs P_{OUT}

F1=1500.0 MHz F1=1500.1 MHz



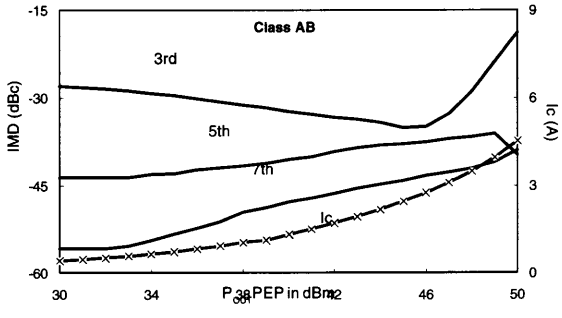
IMD vs P_{OUT}

F1=1500.0 MHz F2=1500.1 MHz V_{CC}=26 V I_{CQ}=25 mA



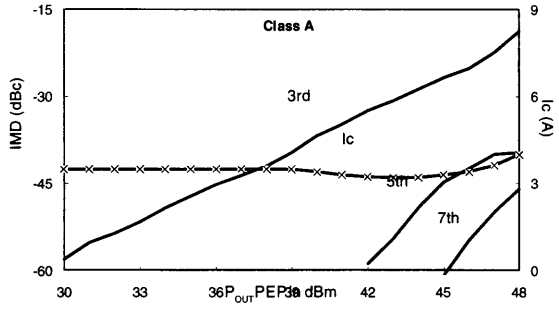
IMD vs P_{OUT}

F1=1500.0 MHz F2=1500.1 MHz V_{CC}=26 V I_{CQ}=200 mA



IMD vs P_{OUT}

F1=1500.0 MHz F2=1500.1 MHz V_{CC}=20 V I_{CQ}=3.5 A



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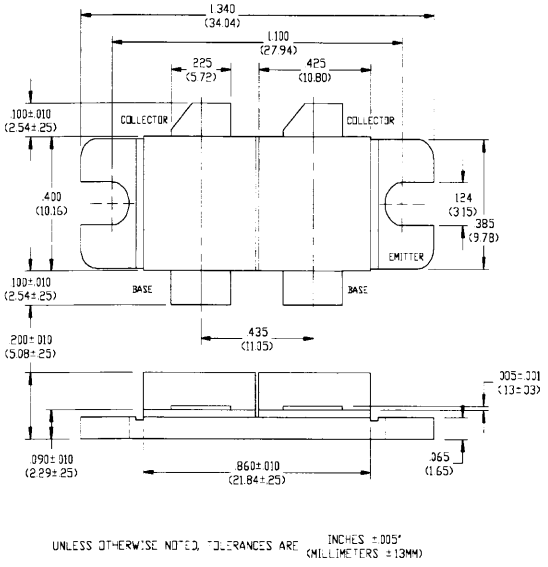
Wireless Bipolar Power Transistor, 100W 1450 - 1550 MHz

PH1516-100

V2.00

Features

- Designed for Linear Amplifier Applications
- Class AB: -32 dBc Typ 3rd IMD at 100 Watts PEP
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting



Absolute Maximum Ratings at 25°C

Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	63	V
Collector-Emitter Voltage	V_{CES}	65	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	20	A
Power Dissipation	P_D	233	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	.75	°C/W

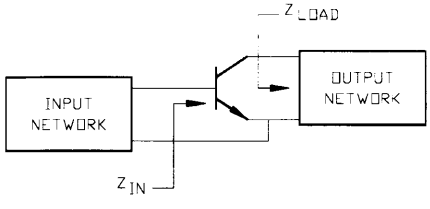
Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	65	-	V	I_C=60 mA*
Collector-Emitter Leakage Current	I_{CES}	-	4.0	mA	V_{CE}=30 V*
Collector-Emitter Breakdown Voltage	BV_{CEO}	22	-	V	I_C=60 mA*
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	I_B=8 mA*
DC Forward Current Gain	h_{FE}	15	120	-	V_{CE}=5 V, I_C=1 A*
Power Gain	G_P	10	-	dB	V_{CC}=26 V, I_{CQ}=100mA, P_{OUT}=100W PEP F=1500 MHz, ΔF=100 kHz
Collector Efficiency	η_C	30	-	%	V_{CC}=26 V, I_{CQ}=100mA, P_{OUT}=100W PEP F=1500 MHz, ΔF=100 kHz
Input Return Loss	RL	10	-	dB	V_{CC}=26 V, I_{CQ}=100mA, P_{OUT}=100W PEP F=1500 MHz, ΔF=100 kHz
Load Mismatch Tolerance	VSWR-T	-	5.0:1	-	V_{CC}=26 V, I_{CQ}=100mA, P_{OUT}=100W PEP F=1500 MHz, ΔF=100 kHz
3rd Order IMD	IMD_3	-	-30	dBc	V_{CC}=26 V, I_{CQ}=100mA, P_{OUT}=100W PEP F=1500 MHz, ΔF=100 kHz

* Per Side

Typical Optimum Device Impedances

F(MHz)	$Z_{IN}(\Omega)$	$Z_{LOAD}(\Omega)$
1450	4.4 + j10.0	6.0 - j7.6
1500	5.4 + j9.0	4.4 - j8.0
1550	4.2 + j7.4	3.0 - j8.2



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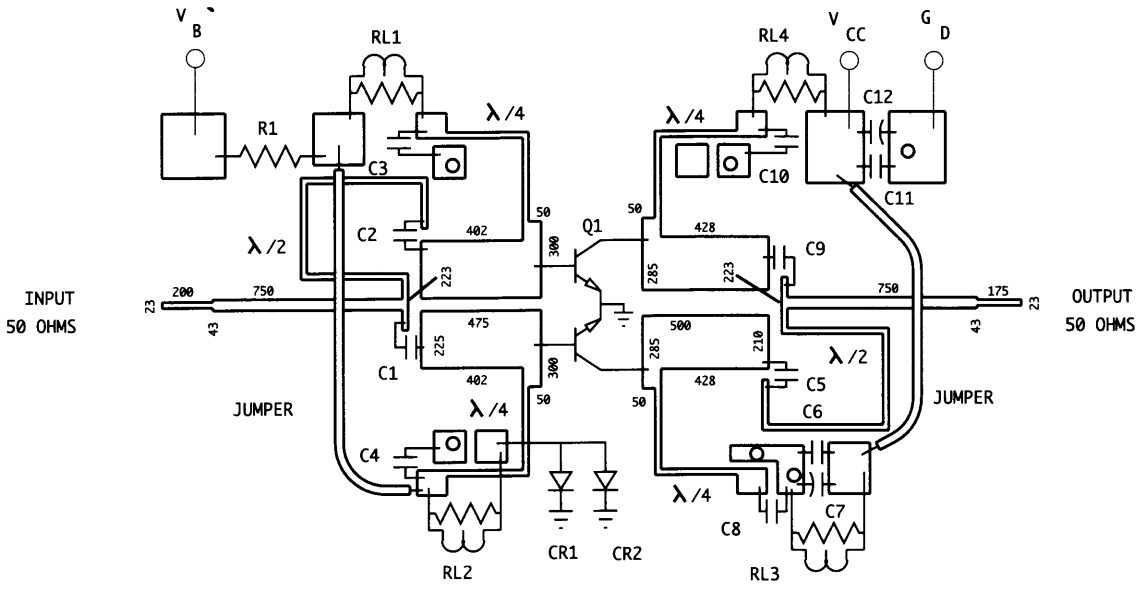
RF Test Fixture



ARTWORK DIMENSIONS IN MILS

PARTS LIST

C1 C2 C3 C4 C5 C8 C9 C10	18pF ATC SIZE B CAPACITOR
C6 C11	5000pF CHIP CAPACITOR
C7 C12	50 VOLT 50uF ELECTOLYTIC CAPACITOR
CR1 CR2	1N5417 DIODE
Q1	PH1516-100
R1	4.7 OHM 1/2 WATT METAL FILM RESISTOR
RL1 RL2	12 TURNS OF NO. 22 AWG ON 4.7 OHM 1/2 WATT METAL FILM RESISTOR
RL3 RL4	6 TURNS OF NO. 22 AWG ON 4.7 OHM 1/2 WATT METAL FILM RESISTOR
BOARD TYPE	ROGERS 6010.5 .025" THICK, E_R = 10.5

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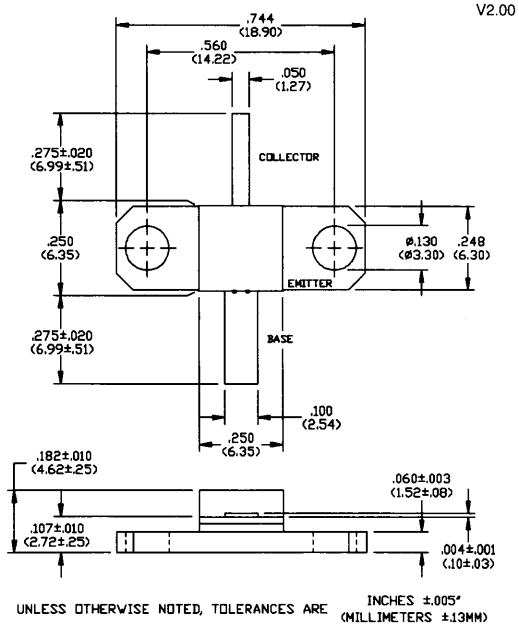
Wireless Bipolar Power Transistor, 2W
1.6 - 1.7 GHz

PH1617-2

V2.00

Features

- Designed for Linear Amplifier Applications
- Class AB: -33 dBc Typ 3rd IMD at 2 Watts PEP
- Class A: +44 dBm Typ 3rd Order Intercept Point
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting



Absolute Maximum Ratings at 25°C

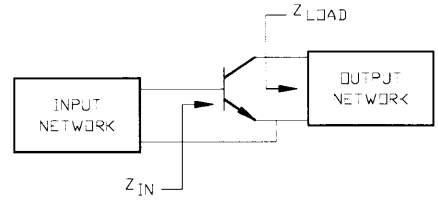
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	65	V
Collector-Emitter Voltage	V_{CES}	65	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	2.0	A
Power Dissipation	P_D	13.5	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	13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

Electrical Characteristics 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-Emitter Breakdown Voltage	BV_{CEO}	22	-	V	I_C=5 mA
Collector-Emitter Breakdown Voltage	BV_{CER}	30	-	V	I_C=5 mA, R_{BE}=220Ω
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 mA
Power Gain	G_P	10	-	dB	V_{CC}=25 V, I_{CQ}=25 mA, P_{OUT}=2.0 W, F=1.60, 1.65, 1.70 GHz
Collector Efficiency	η_C	35	-	%	V_{CC}=25 V, 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}=25 V, 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}=25 V, 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}=25 V, I_{CQ}=25 mA, P_{OUT}=2.0 W, PEP F=1650 MHz, ΔF=100 kHz

Typical Optimum Device Impedances

F(GHz)	Z_{IN}(Ω)	Z_{LOAD}(Ω)
1.60	3.5 + j8.2	6.6 + j13.5
1.65	3.9 + j8.5	6.4 + j13.1
1.70	4.2 + j8.7	6.3 + j12.8



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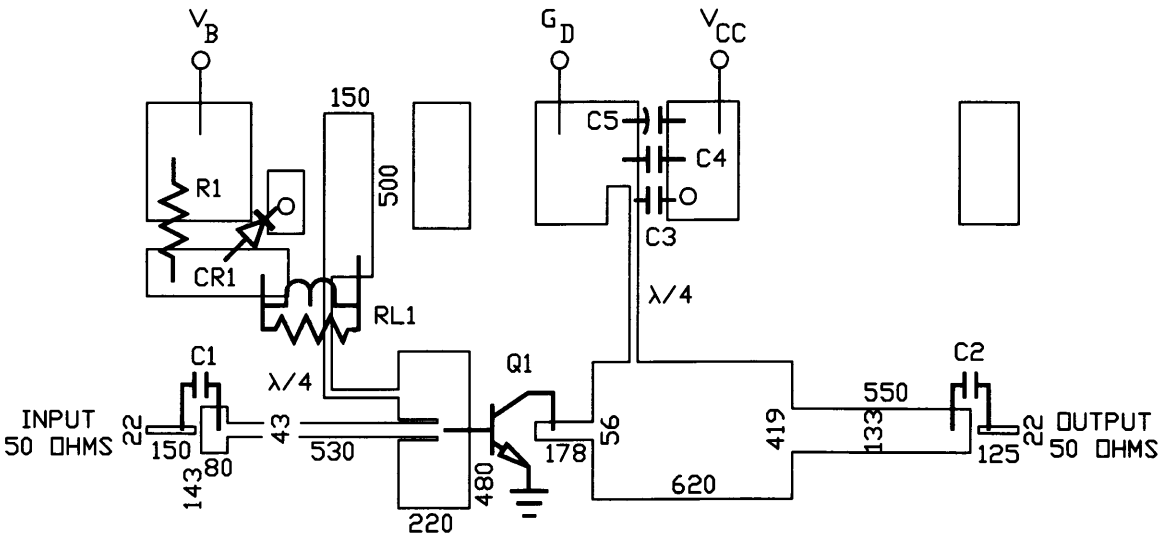
RF Test Fixture



ARTWORK DIMENSIONS IN MILS

PARTS LIST

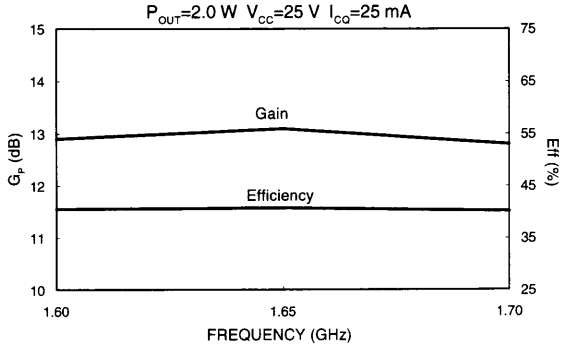
C1 C2 C3	33 pF ATC SIZE A
C4	4.7 uF 35 VOLTS CHIP
C5	50 uF 50 VOLTS
CR1	1N914B DIODE
Q1	PH1617-2
R1	5Ω 1/4 WATT
RL1	6T/NO. 24 AWG ON 3Ω 1/4WATT
BOARD TYPE:	ROGERS 6010.5 25 MILS THICK, E_R = 10.5

North America: Tel. (800) 366-2266 Fax (800) 618-8883 ■ Asia/Pacific: Tel. +81 (03) 3226-1671 Fax +81 (03) 3226-1451 ■ Europe: Tel. +44 (1344) 869 595 Fax +44 (1344) 300 020

Typical Broadband Performance Curves

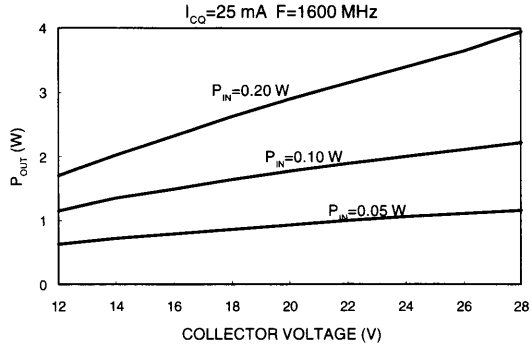
GAIN-EFFICIENCY vs FREQUENCY

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



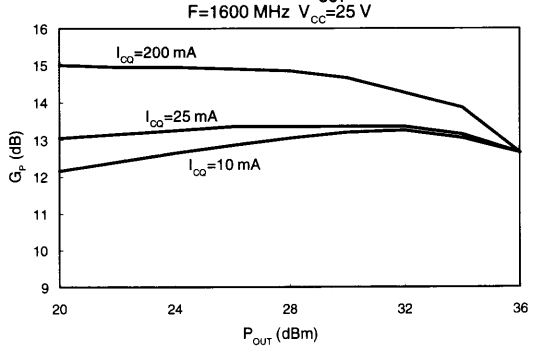
OUTPUT POWER vs COLLECTOR VOLTAGE

I_{CQ}=25 mA F=1600 MHz



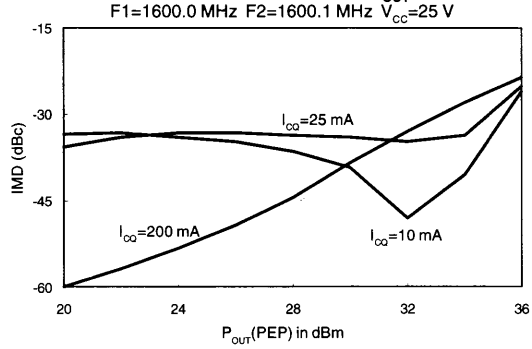
GAIN vs P_{OUT}

F=1600 MHz V_{CC}=25 V



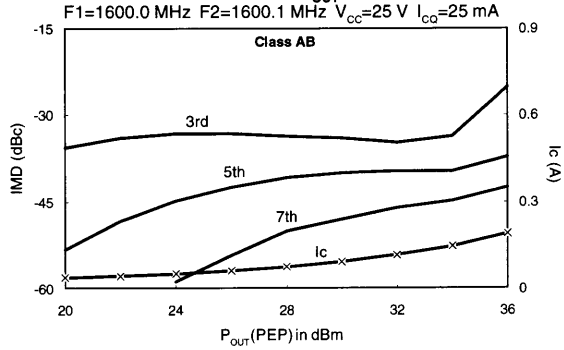
3RD ORDER IMD vs P_{OUT}

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



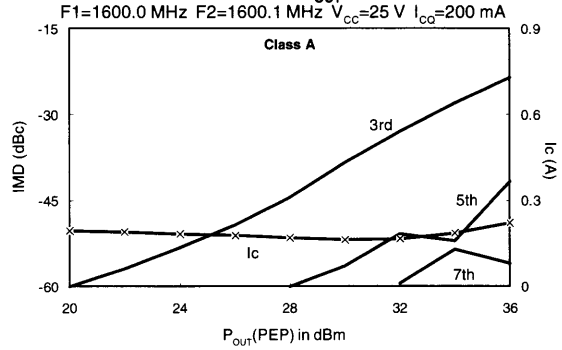
IMD vs P_{OUT}

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



IMD vs P_{OUT}

F1=1600.0 MHz F2=1600.1 MHz V_{CC}=25 V I_{CQ}=200 mA



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Typical S-Parameters

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

	S11		S21		S12		S22	
f(MHz)	Mag	Phase	Mag	Phase	Mag	Phase	Mag	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	0.72	-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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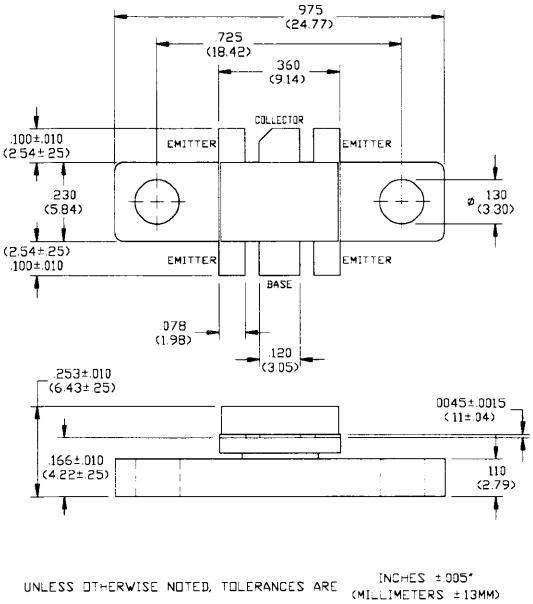
Wireless Bipolar Power Transistor, 4W
1.6 - 1.7 GHz

PH1617-4N

V2.00

Features

- NPN Silicon Microwave Power Transistor
- Designed for Linear Amplifier Applications
- Class AB: -33 dBc Typ 3rd IMD at 4 Watts PEP
- Class A: +44 dBm Typ 3rd Order Intercept Point
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting Resistors
- Gold Metalization System



Absolute Maximum Ratings at 25°C

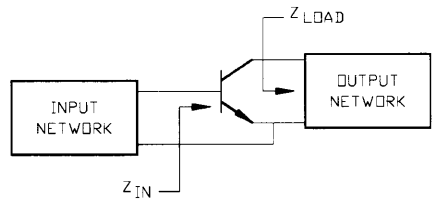
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CES}	60	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	0.7	A
Power Dissipation	P_D	19.5	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	7.5	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	60	-	V	I_C=5 mA
Collector-Emitter Leakage Current	I_{CES}	-	2.0	mA	V_{CE}=24 V
Collector-Emitter Breakdown Voltage	BV_{CEO}	20	-	V	I_C=5 mA
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	I_B=2.5 mA
DC Forward Current Gain	h_{FE}	15	120	-	V_{CE}=5 V, I_C=0.1 A
Power Gain	G_P	12	-	dB	V_{CC}=26 V, I_{CQ}=20 mA, P_{OUT}=4 W PEP, F=1650 MHz, ΔF=100 kHz
Collector Efficiency	η_C	35	-	%	V_{CC}=26 V, I_{CQ}=20 mA, P_{OUT}=4 W PEP, F=1650 MHz, ΔF=100 kHz
Input Return Loss	RL	10	-	dB	V_{CC}=26 V, I_{CQ}=20 mA, P_{OUT}=4 W PEP, F=1650 MHz, ΔF=100 kHz
Load Mismatch Tolerance	VSWR-T	-	10:1	-	V_{CC}=26 V, I_{CQ}=20 mA, P_{OUT}=4 W PEP, F=1650 MHz, ΔF=100 kHz
3rd Order IMD	IMD_3	-	-30	dBc	V_{CC}=26 V, I_{CQ}=20 mA, P_{OUT}=4 W PEP, F=1650 MHz, ΔF=100 kHz

Typical Optimum Device Impedances

F(MHz)	$Z_{IN}(\Omega)$	$Z_{LOAD}(\Omega)$
1600	2.5 + j8.7	4.2 + j9.3
1650	3.2 + j6.6	4.3 + j9.1
1700	3.5 + j8.5	4.4 + j9.0



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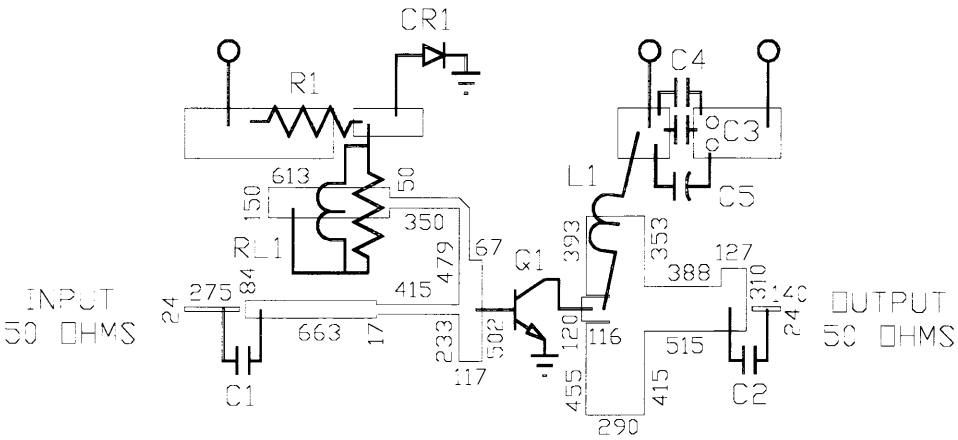
RF Test Fixture



ARTWORK DIMENSIONS IN MILS

P A R T S L I S T

C1 C2 C3	33pF ATC SIZE A
C4	5000pF CHIP
C5	50uF 50 VOLTS
CR1	1N4245
L1	5 TURNS OF NO. 24 AWG ON Ø.160"
R1	4.7 OHMS .25 WATT
RL1	7 TURNS OF NO. 24 AWG ON 3 OHM .25 WATT
Q1	PH1617-4N
BOARD TYPE	ROGERS 6010.5 .025" THICK, E_R=10.5

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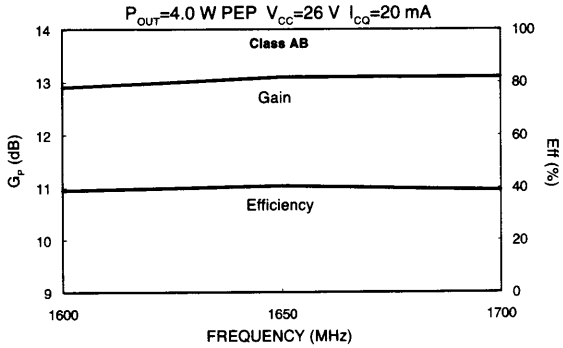
Typical Broadband Performance Curves

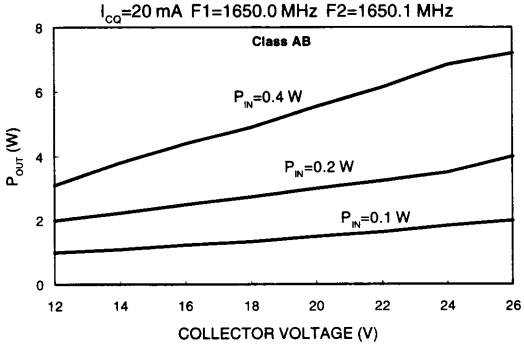
GAIN-EFFICIENCY vs FREQUENCY

P_{OUT}=4.0 W PEP V_{CC}=26 V I_{CQ}=20 mA



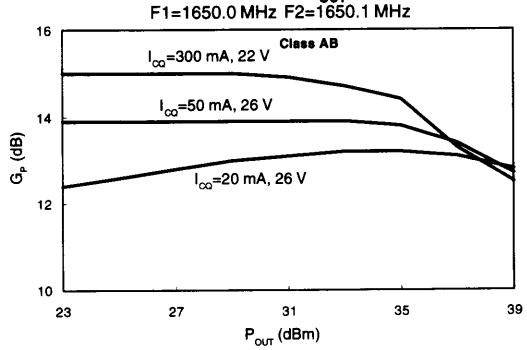
OUTPUT POWER vs COLLECTOR VOLTAGE

I_{CQ}=20 mA F1=1650.0 MHz F2=1650.1 MHz



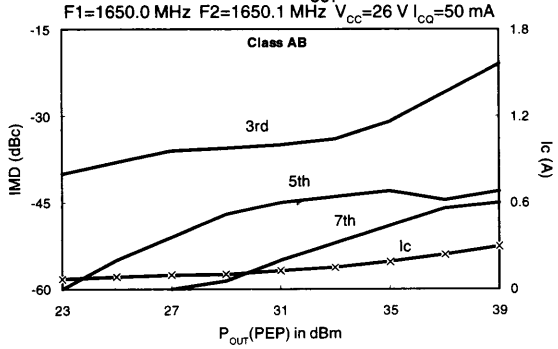
GAIN vs P_{OUT}

F1=1650.0 MHz F2=1650.1 MHz



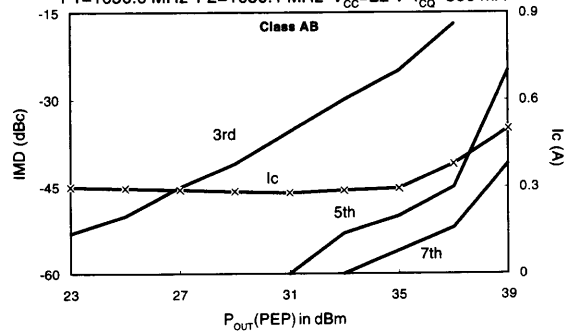
IMD vs P_{OUT}

F1=1650.0 MHz F2=1650.1 MHz V_{CC}=26 V I_{CQ}=50 mA



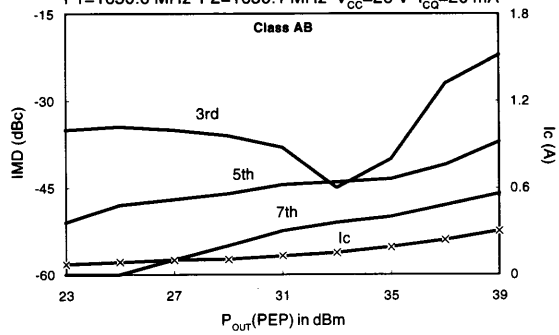
IMD vs P_{OUT}

F1=1650.0 MHz F2=1650.1 MHz V_{CC}=22 V I_{CQ}=300 mA



IMD vs P_{OUT}

F1=1650.0 MHz F2=1650.1 MHz V_{CC}=26 V I_{CQ}=20 mA



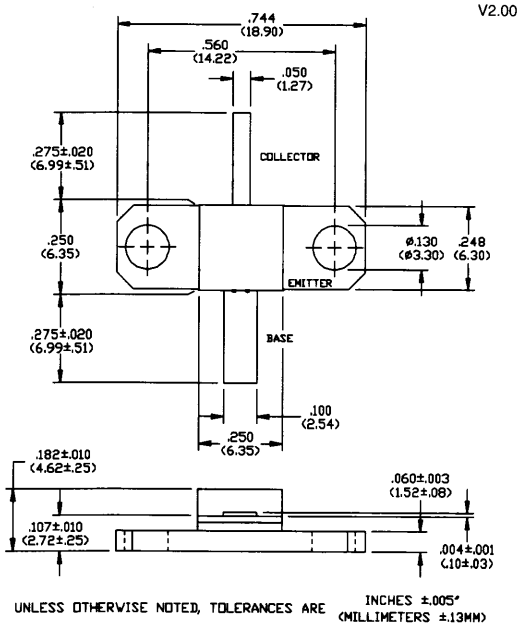
Wireless Bipolar Power Transistor, 10W
1.6 - 1.7 GHz

PH1617-10

V2.00

Features

- Designed for Linear Amplifier Applications
- Class AB: -33 dBc Typ 3rd IMD at 10 Watts PEP
- Class A: +49 dBm Typ 3rd Order Intercept Point
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting



Absolute Maximum Ratings at 25°C

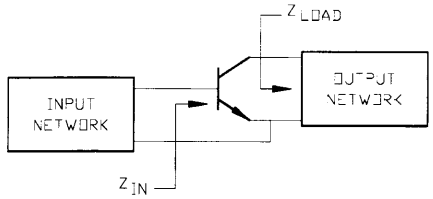
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CES}	60	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	2.0	A
Power Dissipation	P_D	58	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	3.0	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	60	-	V	I_C=20 mA
Collector-Emitter Leakage Current	I_{CES}	-	2.0	mA	V_{CE}=25 V
Collector-Emitter Breakdown Voltage	BV_{CEO}	20	-	V	I_C=20 mA
Collector-Emitter Breakdown Voltage	BV_{CER}	30	-	V	I_C=20 mA, R_{BE}=220 Ω
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	I_B=20 mA
DC Forward Current Gain	h_{FE}	15	120	-	V_{CE}=5 V, I_C=1 A
Power Gain	G_P	10	-	dB	V_{CC}=25 V, I_{CQ}=100 mA, P_{OUT}=10 W, F=1.60, 1.65, 1.70 GHz
Collector Efficiency	η_C	40	-	%	V_{CC}=25 V, I_{CQ}=100 mA, P_{OUT}=10 W, F=1.60, 1.65, 1.70 GHz
Input Return Loss	RL	10	-	dB	V_{CC}=25 V, I_{CQ}=100 mA, P_{OUT}=10 W, F=1.60, 1.65, 1.70 GHz
Load Mismatch Tolerance	VSWR-T	-	3.0:1	-	V_{CC}=25 V, I_{CQ}=100 mA, P_{OUT}=10 W, F=1.60, 1.65, 1.70 GHz
3rd Order IMD	IMD_3	-	-30	dBc	V_{CC}=25 V, I_{CQ}=100 mA, P_{OUT}=10 W PEP, F=1650 MHz, ΔF=100 kHz

Typical Optimum Device Impedances

F(GHz)	Z_{IN}(Ω)	Z_{LOAD}(Ω)
1.60	2.6 + j4.9	2.0 + j0.5
1.65	3.5 + j3.7	1.95 - j0.6
1.70	3.3 + j2.3	1.9 - j0.7



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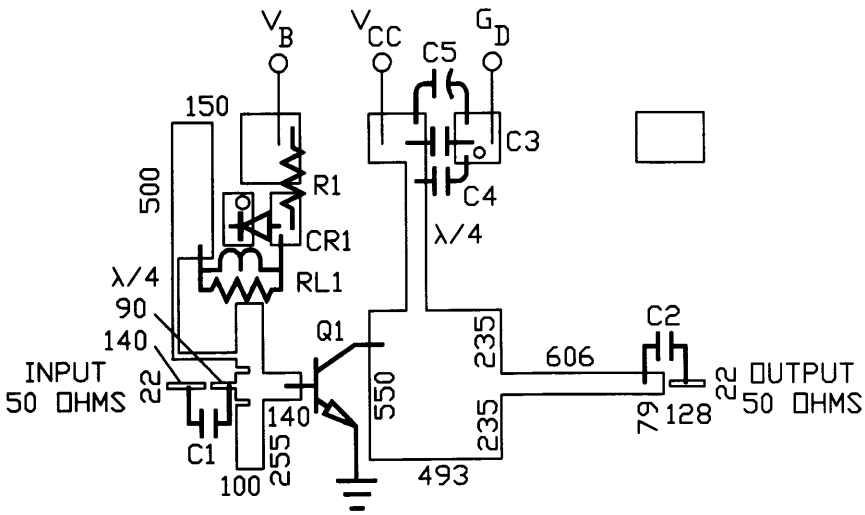
RF Test Fixture



ARTWORK DIMENSIONS IN MILS

PARTS LIST

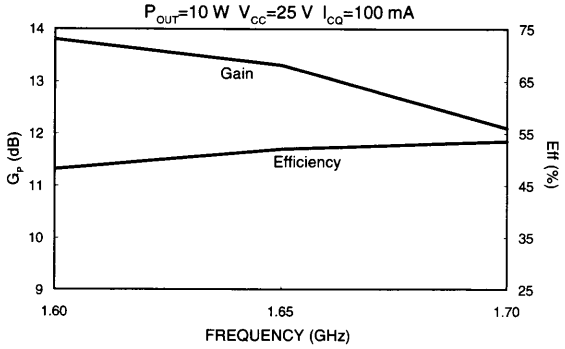
C1 C2 C3	33 pF ATC SIZE A
C4	4.7 uF 35 VOLTS CHIP
C5	50 uF 50 VOLTS
CR1	1N4245 DIODE
Q1	PH1617-10
R1	5 OHMS 1/4 WATT
RL1	6T/NO. 24 AWG ON 3 OHM 1/4 WATT
BOARD TYPE:	ROGERS 6010.5 .025" THICK, E_R = 10.5

North America: Tel. (800) 366-2266 Fax (800) 618-8883 ■ Asia/Pacific: Tel. +81 (03) 3226-1671 Fax +81 (03) 3226-1451 ■ Europe: Tel. +44 (1344) 869 595 Fax +44 (1344) 300 020

Typical Broadband Performance Curves

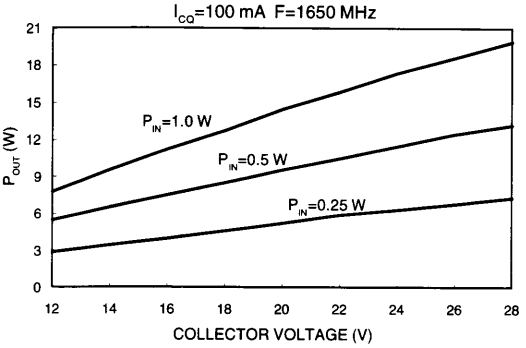
GAIN-EFFICIENCY vs FREQUENCY

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



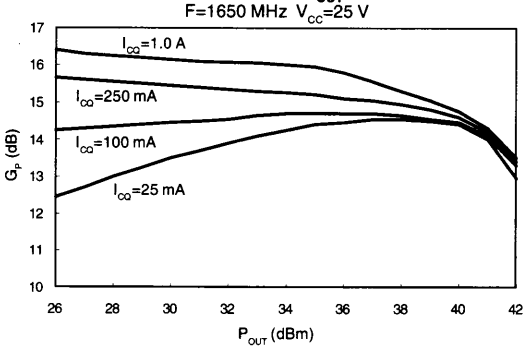
OUTPUT POWER vs COLLECTOR VOLTAGE

I_{CQ}=100 mA F=1650 MHz



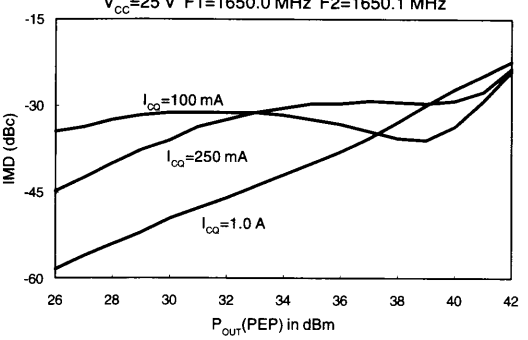
GAIN vs P_{OUT}

F=1650 MHz V_{CC}=25 V



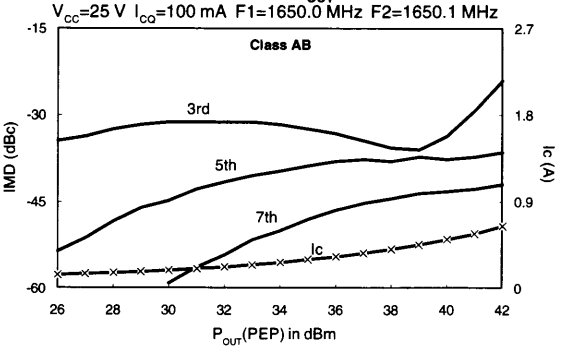
3RD ORDER IMD vs P_{OUT}

V_{CC}=25 V F1=1650.0 MHz F2=1650.1 MHz



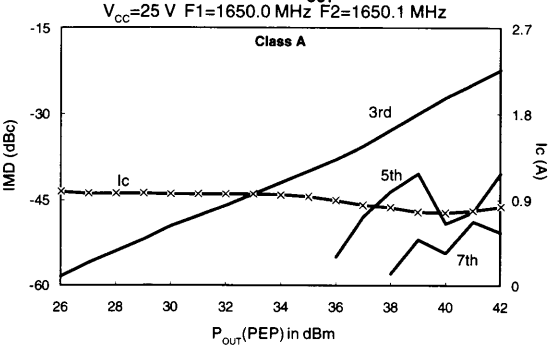
IMD vs P_{OUT}

V_{CC}=25 V I_{CQ}=100 mA F1=1650.0 MHz F2=1650.1 MHz



IMD vs P_{OUT}

V_{CC}=25 V F1=1650.0 MHz F2=1650.1 MHz



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Typical S-Parameters

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

	S11		S21		S12		S22	
f(MHz)	Mag	Phase	Mag	Phase	Mag	Phase	Mag	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	0.01	-178.9
1700	0.93	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	0.91	171.0
2200	0.96	173.1	0.28	-133.5	0.0087	104.9	0.84	169.3
2300	0.96	171.7	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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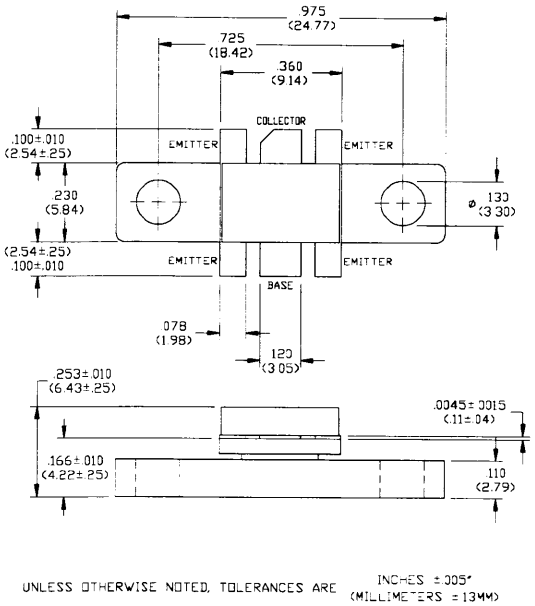
Wireless Bipolar Power Transistor, 12W
1.6 - 1.7 GHz

PH1617-12N

V2.00

Features

- NPN Silicon Microwave Power Transistor
- Designed for Linear Amplifier Applications
- Class AB: -30 dBc Typ 3rd IMD at 12 Watts PEP
- Common Emitter Configuration
- Internal Input Impedance Matching
- Diffused Emitter Ballasting Resistors
- Gold Metalization System



UNLESS OTHERWISE NOTED, TOLERANCES ARE INCHES ±.005"
(MILLIMETERS ±.13MM)

Absolute Maximum Ratings at 25°C

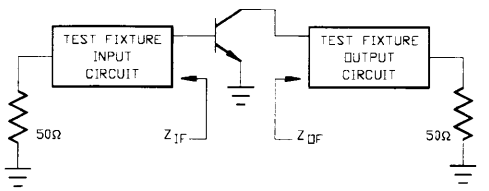
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CES}	60	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	2.0	A
Power Dissipation	P_D	58	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	3.0	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	60	-	V	I_C=15 mA
Collector-Emitter Leakage Current	I_{CES}	-	1.25	mA	V_{CE}=26 V
Collector-Emitter Breakdown Voltage	BV_{CEO}	24	-	V	I_C=10 mA
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	I_B=10 mA
DC Forward Current Gain	h_{FE}	15	120	-	V_{CE}=5 V, I_C=0.5 A
Power Gain	G_P	8.5	-	dB	V_{CC}=26 V, I_{CQ}=25 mA, P_{OUT}=13.5 W PEP, F=1660 MHz, ΔF=100kHz
Collector Efficiency	η_C	25	-	%	V_{CC}=26 V, I_{CQ}=25 mA, P_{OUT}=13.5 W PEP, F=1660 MHz, ΔF=100kHz
Input Return Loss	RL	10	-	dB	V_{CC}=26 V, I_{CQ}=25 mA, P_{OUT}=13.5 W PEP, F=1660 MHz, ΔF=100kHz
Load Mismatch Tolerance	VSWR-T	-	10:1	-	V_{CC}=26 V, I_{CQ}=25 mA, P_{OUT}=13.5 W PEP, F=1660 MHz, ΔF=100kHz
3rd Order IMD	IMD_3	-	-28	dBc	V_{CC}=26 V, I_{CQ}=25 mA, P_{OUT}=13.5 W PEP, F=1660 MHz, ΔF=100kHz

Broadband Test Fixture Impedances

F(MHz)	$Z_{IN}(\Omega)$	$Z_{LOAD}(\Omega)$
1600	9.2 - j5.1	0.76 - j2.3
1650	7.7 - j3.1	0.82 - j1.7
1700	6.9 - j1.6	0.84 - j1.3



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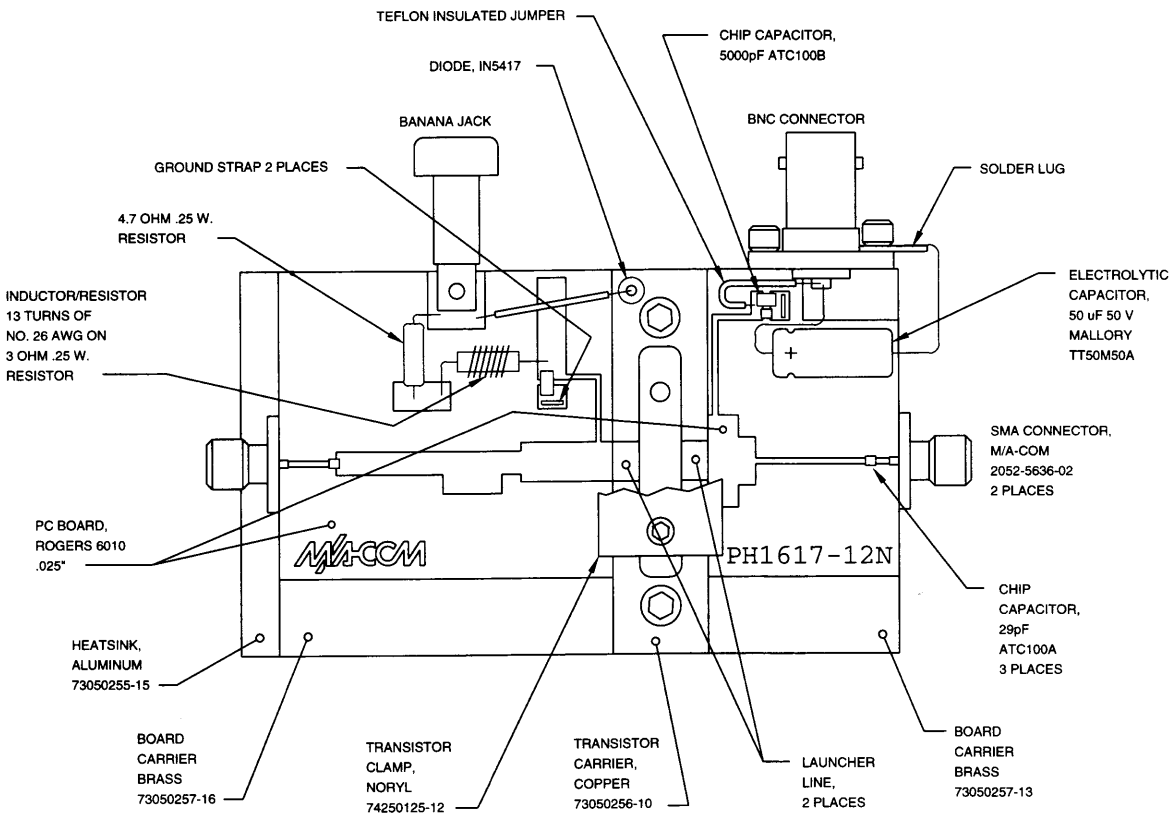
RF Test Fixture

V2.00



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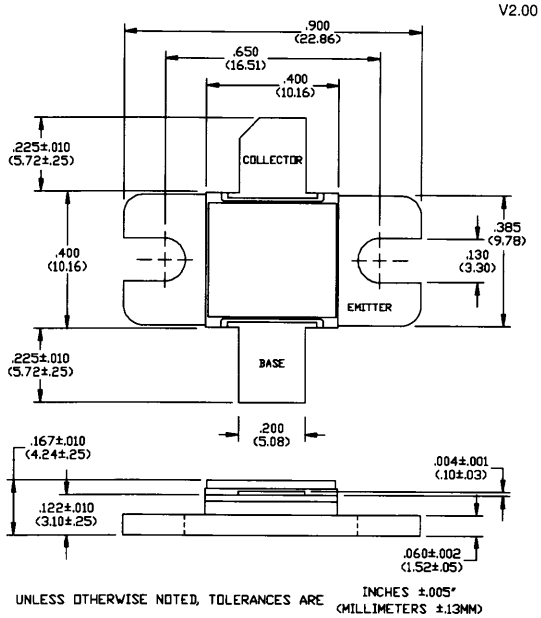
Wireless Bipolar Power Transistor, 30W 1.6 - 1.7 GHz

PH1617-30

V2.00

Features

- Designed for Linear Amplifier Applications
- -30 dBc Typ 3rd IMD at 30 Watts PEP
- Common Emitter Class AB Operation
- Internal Input Impedance Matching
- Diffused Emitter Ballasting



Absolute Maximum Ratings at 25°C

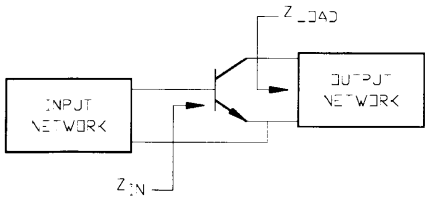
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	60	V
Collector-Emitter Voltage	V_{CES}	60	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	10	A
Power Dissipation	P_D	109	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	1.6	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	60	-	V	I_C=40 mA
Collector-Emitter Leakage Current	I_{CES}	-	4.0	mA	V_{CE}=25 V
Collector-Emitter Breakdown Voltage	BV_{CEO}	20	-	V	I_C=40 mA
Collector-Emitter Breakdown Voltage	BV_{CER}	30	-	V	I_C=40 mA, R_{BE}=220 Ω
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	I_B=40 mA
DC Forward Current Gain	h_{FE}	15	120	-	V_{CE}=5 V, I_C=2 A
Power Gain	G_P	10	-	dB	V_{CC}=25 V, I_{CQ}=200 mA, P_{OUT}=30 W PEP, F=1.6, 1.65, 1.70 GHz
Collector Efficiency	η_C	40	-	%	V_{CC}=25 V, I_{CQ}=200 mA, P_{OUT}=30 W PEP, F=1.6, 1.65, 1.70 GHz
Input Return Loss	RL	10	-	dB	V_{CC}=25 V, I_{CQ}=200 mA, P_{OUT}=30 W PEP, F=1.6, 1.65, 1.70 GHz
Load Mismatch Tolerance	VSWR-T	-	3.0:1	-	V_{CC}=25 V, I_{CQ}=200 mA, P_{OUT}=30 W PEP, F=1.6, 1.65, 1.70 GHz
3rd Order IMD	IMD_3	-	-28	dBc	V_{CC}=25 V, I_{CQ}=020 mA, P_{OUT}=30 W PEP, F=1650 MHz, ΔF=100 kHz

Typical Optimum Device Impedances

F(GHz)	Z_{IN}(Ω)	Z_{LOAD}(Ω)
1.60	2.1 + j4.9	1.3 - j0.7
1.65	3.1 + j3.8	1.2 - j0.8
1.70	2.1 + j3.5	1.2 - j0.9



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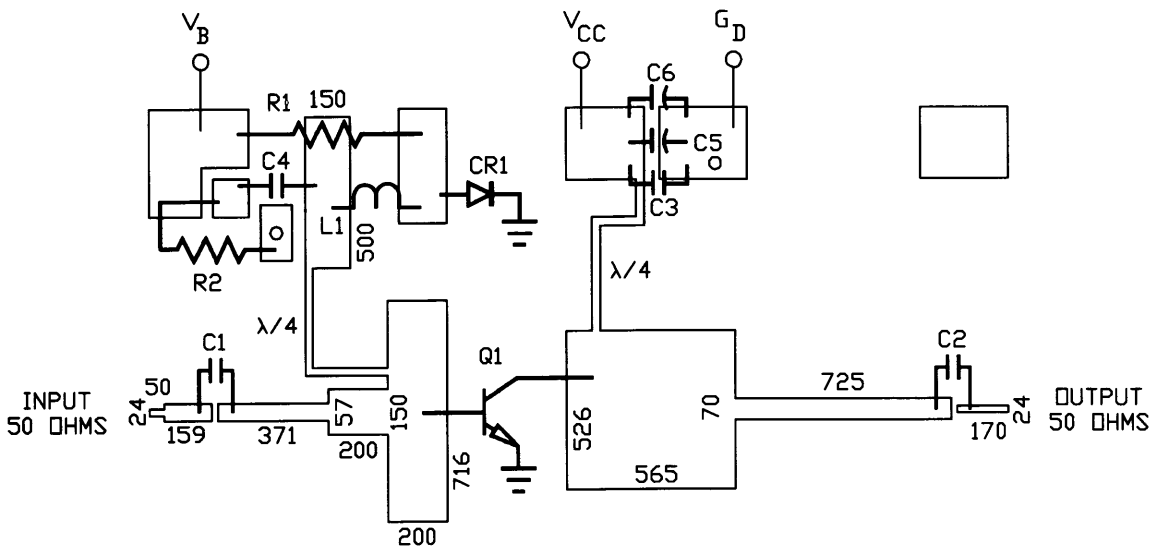
RF Test Fixture



ARTWORK DIMENSIONS IN MILS

PARTS LIST

C1 C2 C3	33 pF ATC SIZE A
C4	6.8 uF 35 VOLTS CHIP
C5	4.7 uF 35 VOLTS CHIP
C6	50 uF 50 VOLTS
CR1	1N4245 DIODE
Q1	PH1617-30
R1	5Ω 1/4 WATT
R2	2.2Ω 1/8 WATT CHIP
L1	10 T/NO. 24 AWG ON 1/8" DIAMETER

BOARD TYPE: ROGERS 6010.5 25 MILS THICK, E_R = 10.5

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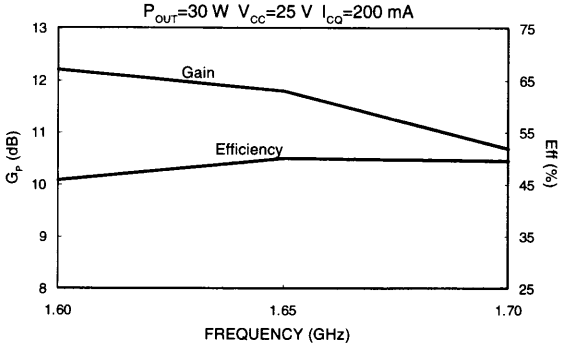
Typical Broadband Performance Curves

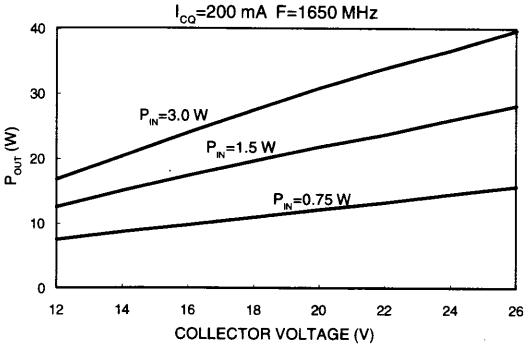
GAIN-EFFICIENCY vs FREQUENCY

P_{OUT}=30 W V_{CC}=25 V I_{CQ}=200 mA



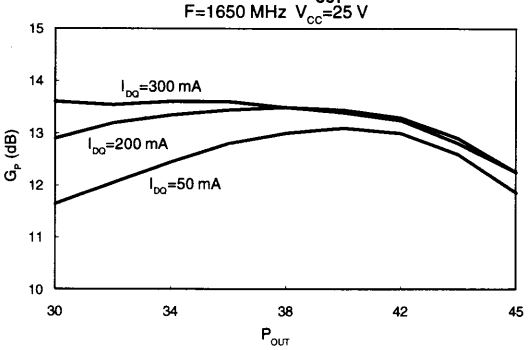
OUTPUT POWER vs COLLECTOR VOLTAGE

I_{CQ}=200 mA F=1650 MHz



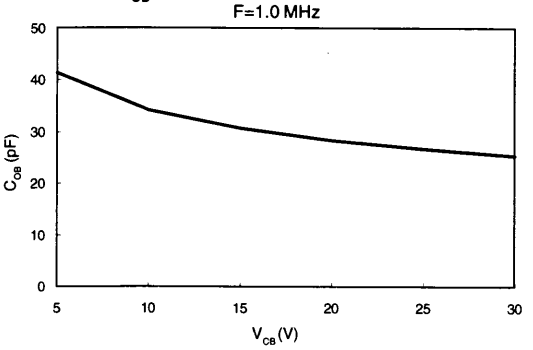
GAIN vs P_{OUT}

F=1650 MHz V_{CC}=25 V



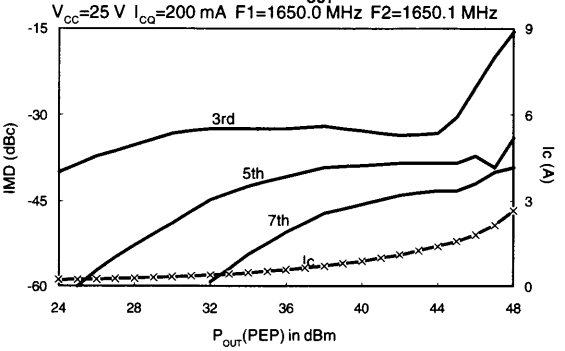
C_{OB} vs COLLECTOR VOLTAGE

F=1.0 MHz



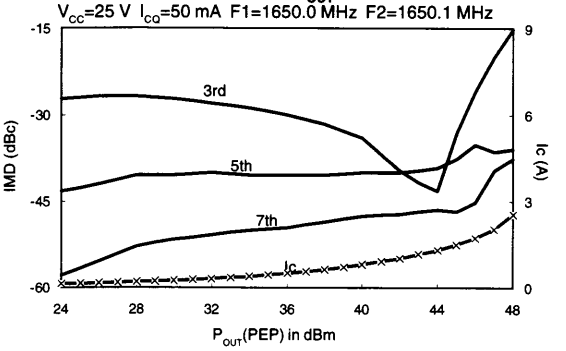
IMD vs P_{OUT}

V_{CC}=25 V I_{CQ}=200 mA F1=1650.0 MHz F2=1650.1 MHz



IMD vs P_{OUT}

V_{CC}=25 V I_{CQ}=50 mA F1=1650.0 MHz F2=1650.1 MHz



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