

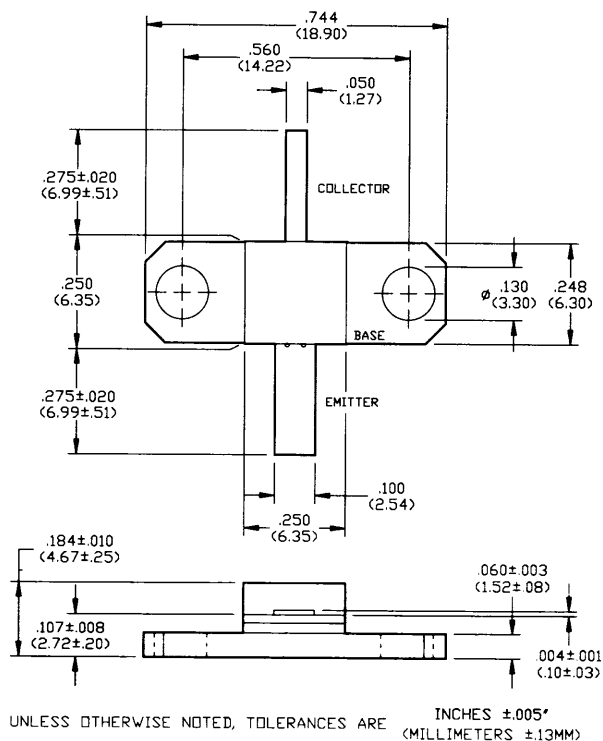
Features

- CW Operation
- Internal Impedance Matching
- Common Base Configuration
- Multilayer Metal / Ceramic Package
- Gold Metallization System

Absolute Maximum Ratings at 25°C

Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CES}	40	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	0.2	A
Power Dissipation	P_D	4	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	36	°C/W

Outline Drawing

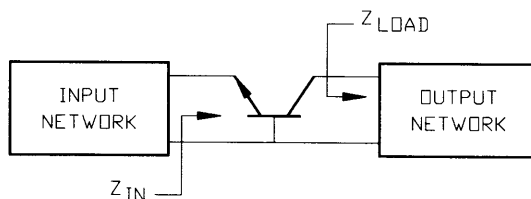


Electrical Characteristics at 25°C

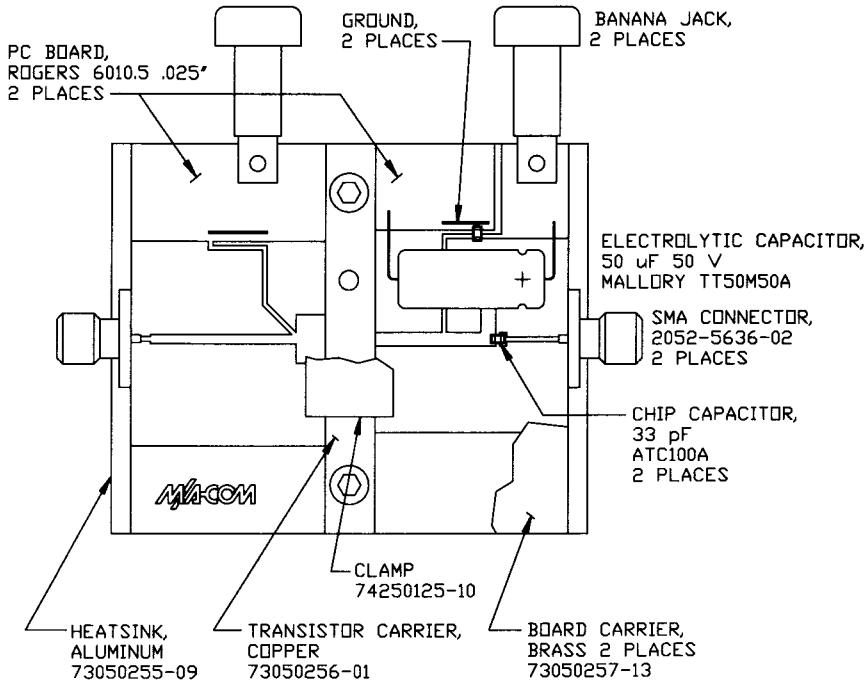
Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	40	-	V	$I_C=5$ mA
Collector-Emitter Leakage Current	I_{CES}	-	0.5	mA	$V_{CE}=20$ V
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	$I_B=5$ mA
DC Forward Current Gain	h_{FE}	15	120	-	$V_{CE}=5$ V, $I_C=200$ mA
Power Gain	G_P	8.8	-	dB	$V_{CC}=20$ V, $P_{OUT}=1.5$ W, $F=1.55, 1.60, 1.65$ GHz
Collector Efficiency	η_C	40	-	%	$V_{CC}=20$ V, $P_{OUT}=1.5$ W, $F=1.55, 1.60, 1.65$ GHz
Input Return Loss	RL	10	-	dB	$V_{CC}=20$ V, $P_{OUT}=1.5$ W, $F=1.55, 1.60, 1.65$ GHz
Load Mismatch Tolerance	VSWR-T	-	5.0:1	-	$V_{CC}=20$ V, $P_{OUT}=1.5$ W, $F=1.55, 1.60, 1.65$ GHz

Typical Device Impedances

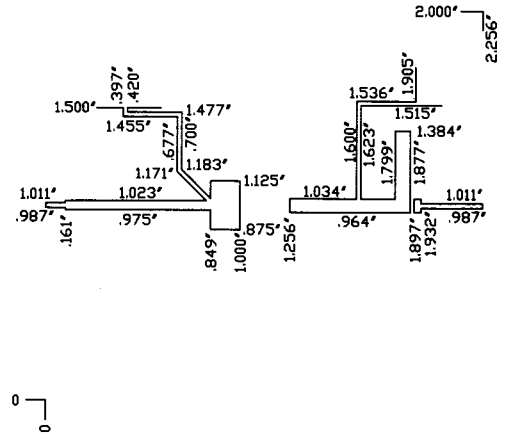
F(GHz)	$Z_{IN}(\Omega)$	$Z_{LOAD}(\Omega)$
1.55	$14 + j8.5$	$10.0 + j20.5$
1.60	$14 + j8.5$	$10.5 + j23$
1.65	$14 + j8.5$	$11 + j25.5$



Broadband Test Fixture Electrical Schematic



TOP VIEW



CIRCUIT DIMENSIONS



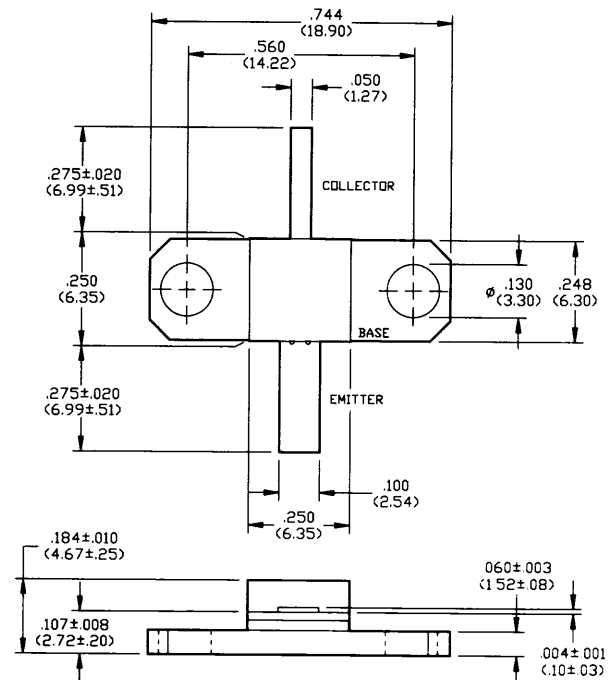
Features

- CW Operation
- Internal Impedance Matching
- Common Base Configuration
- Multilayer Metal / Ceramic Package
- Gold Metallization System

Absolute Maximum Ratings at 25°C

Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	56	V
Collector-Emitter Voltage	V_{CES}	56	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	.53	A
Power Dissipation	P_D	13.6	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	11	°C/W

Outline Drawing



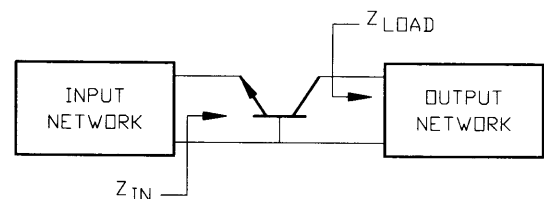
UNLESS OTHERWISE NOTED, TOLERANCES ARE INCHES ±.005* (MILLIMETERS ±.13MM)

Electrical Characteristics at 25°C

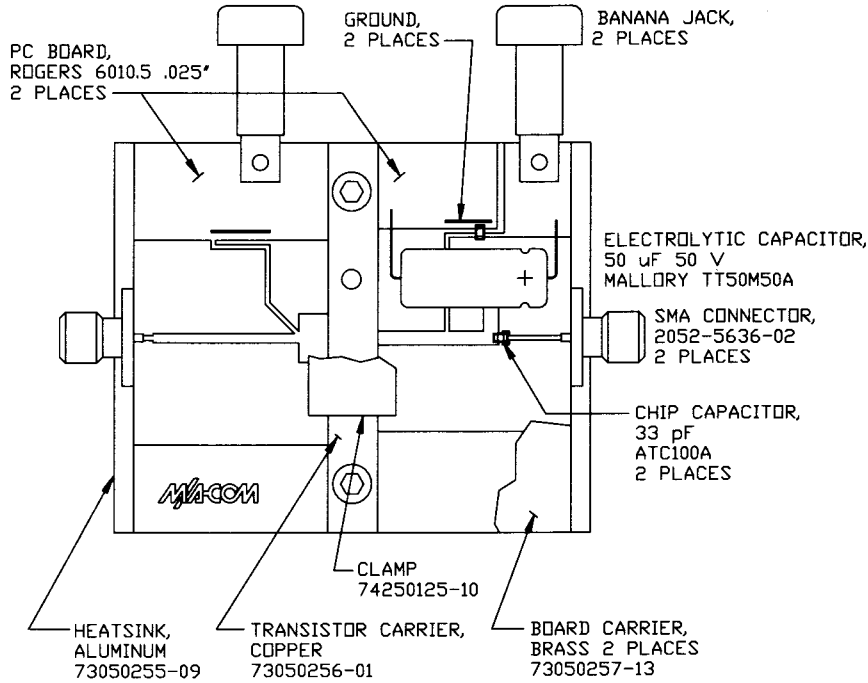
Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	56	-	V	$I_C=5$ mA
Collector-Emitter Leakage Current	I_{CES}	-	0.5	mA	$V_{CE}=20$ V
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	$I_B=5$ mA
DC Forward Current Gain	h_{FE}	15	120	-	$V_{CE}=5$ V, $I_C=200$ mA
Power Gain	G_p	7	-	dB	$V_{CC}=20$ V, $P_{OUT}=1.5$ W, $F=1.55, 1.60, 1.65$ GHz
Collector Efficiency	η_C	45	-	%	$V_{CC}=20$ V, $P_{OUT}=1.5$ W, $F=1.55, 1.60, 1.65$ GHz
Input Return Loss	RL	10	-	dB	$V_{CC}=20$ V, $P_{OUT}=1.5$ W, $F=1.55, 1.60, 1.65$ GHz
Load Mismatch Tolerance	VSWR-T	-	5.0:1	-	$V_{CC}=20$ V, $P_{OUT}=1.5$ W, $F=1.55, 1.60, 1.65$ GHz

Typical Device Impedances

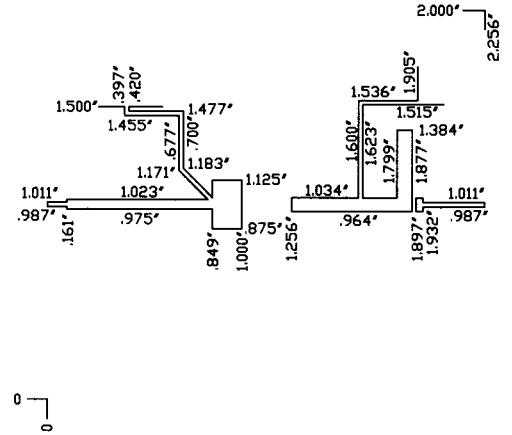
F(GHz)	$Z_{IN}(\Omega)$	$Z_{LOAD}(\Omega)$
1.55	$14 + j8.5$	$10.0 + j20.5$
1.60	$14 + j8.5$	$10.5 + j23$
1.65	$14 + j8.5$	$11 + j25.5$



Broadband Test Fixture Electrical Schematic



TOP VIEW

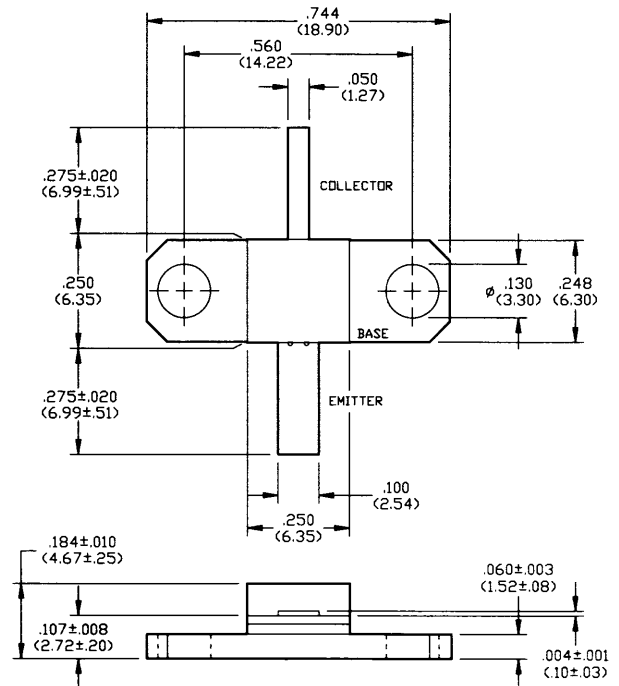


CIRCUIT DIMENSIONS

Features

- CW Operation
- Internal Impedance Matching
- Common Base Configuration
- Multilayer Metal / Ceramic Package
- Gold Metallization System

Outline Drawing



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

Absolute Maximum Ratings at 25°C

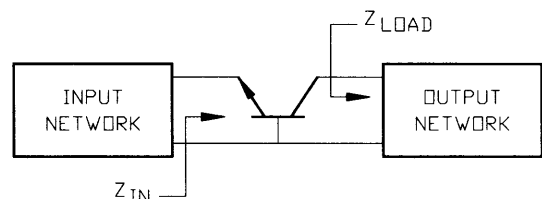
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	56	V
Collector-Emitter Voltage	V_{CES}	56	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	0.96	A
Power Dissipation	P_D	25	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	6	°C/W

Electrical Characteristics at 25°C

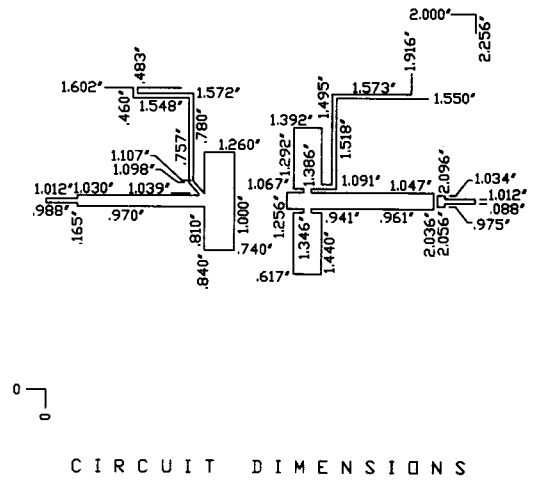
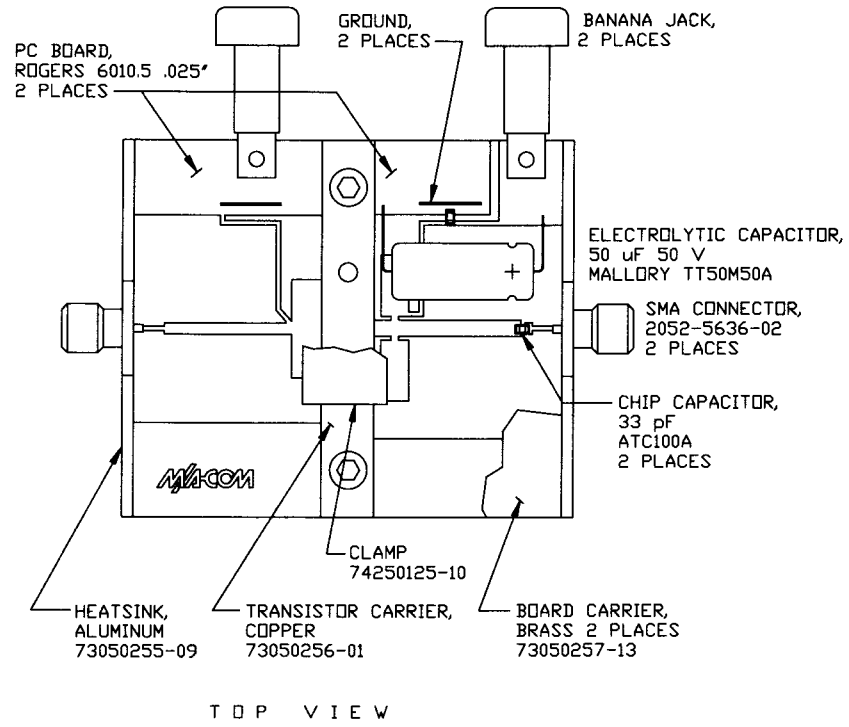
Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	56	-	V	$I_C=10$ mA
Collector-Emitter Leakage Current	I_{CES}	-	2.0	mA	$V_{CE}=28$ V
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	$I_B=2.5$ mA
DC Forward Current Gain	h_{FE}	15	120	-	$V_{CE}=5$ V, $I_C=200$ mA
Power Gain	G_P	6.5	-	dB	$V_{CC}=28$ V, $P_{OUT}=14$ W, $F=1.55, 1.60, 1.65$ GHz
Collector Efficiency	η_C	45	-	%	$V_{CC}=28$ V, $P_{OUT}=14$ W, $F=1.55, 1.60, 1.65$ GHz
Input Return Loss	RL	10	-	dB	$V_{CC}=28$ V, $P_{OUT}=14$ W, $F=1.55, 1.60, 1.65$ GHz
Load Mismatch Tolerance	VSWR-T	-	5.0:1	-	$V_{CC}=28$ V, $P_{OUT}=14$ W, $F=1.55, 1.60, 1.65$ GHz

Typical Device Impedances

F(GHz)	$Z_{IN}(\Omega)$	$Z_{LOAD}(\Omega)$
1.55	$5.9 + j6.7$	$3.7 + j0.7$
1.60	$5.7 + j6.7$	$3.5 + j0.9$
1.65	$5.7 + j6.8$	$3.4 + j1.0$



Broadband Test Fixture Electrical Schematic





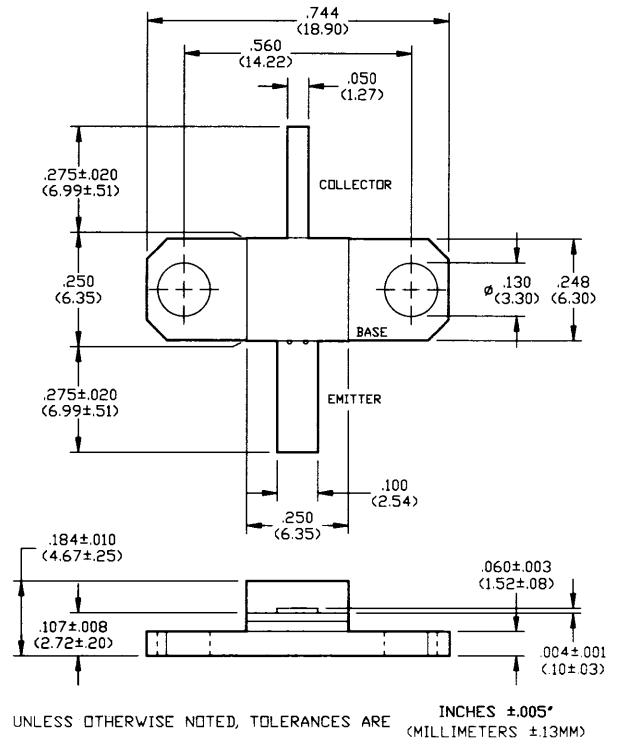
Features

- CW Operation
- Internal Impedance Matching
- Common Base Configuration
- Multilayer Metal / Ceramic Package
- Gold Metallization 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	3	A
Power Dissipation	P_D	80	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	2.5	°C/W

Outline Drawing

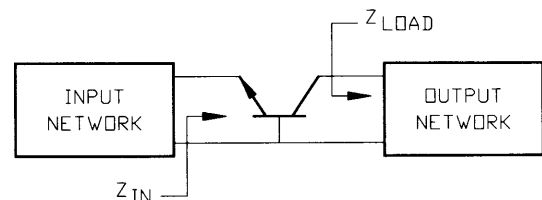


Electrical Characteristics at 25°C

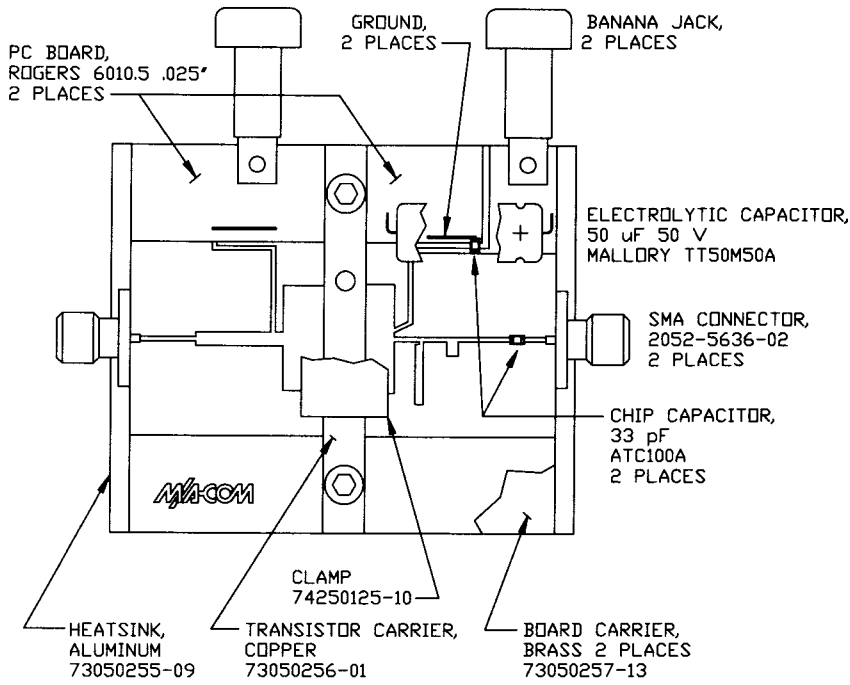
Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	60	-	V	$I_C=30$ mA
Collector-Emitter Leakage Current	I_{CES}	-	3.0	mA	$V_{CE}=28$ V
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	$I_B=2.5$ mA
DC Forward Current Gain	h_{FE}	15	120	-	$V_{CE}=5$ V, $I_C=500$ mA
Power Gain	G_P	7	-	dB	$V_{CC}=28$ V, $P_{OUT}=30$ W, $F=1.55, 1.60, 1.65$ GHz
Collector Efficiency	η_C	45	-	%	$V_{CC}=28$ V, $P_{OUT}=30$ W, $F=1.55, 1.60, 1.65$ GHz
Input Return Loss	RL	10	-	dB	$V_{CC}=28$ V, $P_{OUT}=30$ W, $F=1.55, 1.60, 1.65$ GHz
Load Mismatch Tolerance	VSWR-T	-	5.0:1	-	$V_{CC}=28$ V, $P_{OUT}=30$ W, $F=1.55, 1.60, 1.65$ GHz

Typical Device Impedances

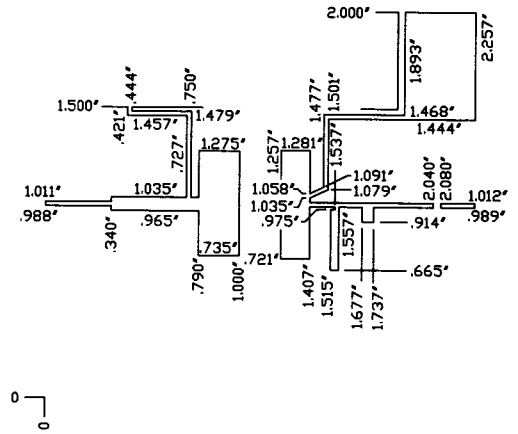
F(GHz)	$Z_{IN}(\Omega)$	$Z_{LOAD}(\Omega)$
1.55	$3.3 + j4.8$	$5.8 - j6.0$
1.60	$3.3 + j4.6$	$5.8 - j5.8$
1.65	$3.3 + j4.3$	$6.0 - j5.6$



Broadband Test Fixture Electrical Schematic



TOP VIEW

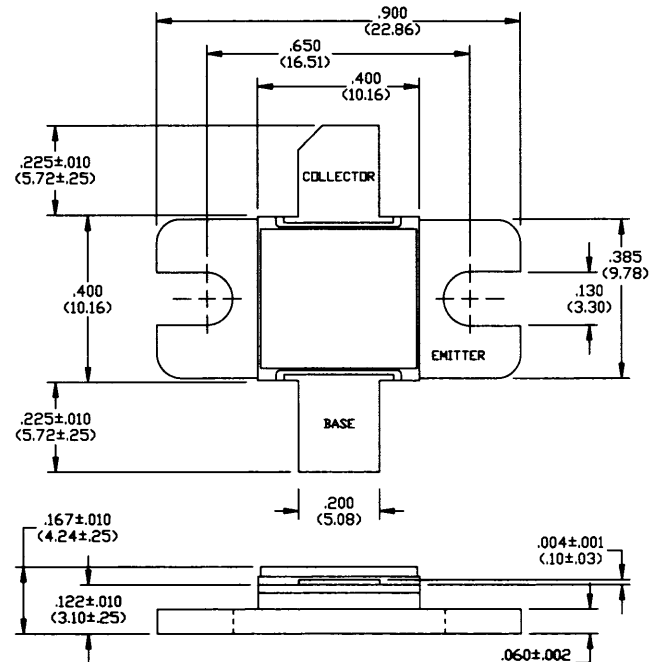


CIRCUIT DIMENSIONS

Features

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

Outline Drawing



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

Absolute Maximum Ratings at 25°C

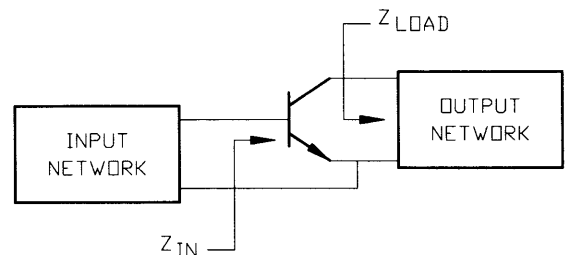
Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	65	V
Collector-Emitter Voltage	V_{CES}	65	V
Emitter-Base Voltage	V_{EBO}	3.0	V
Collector Current	I_C	10	A
Power Dissipation	P_D	109	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	1.6	°C/W

Electrical Characteristics at 25°C

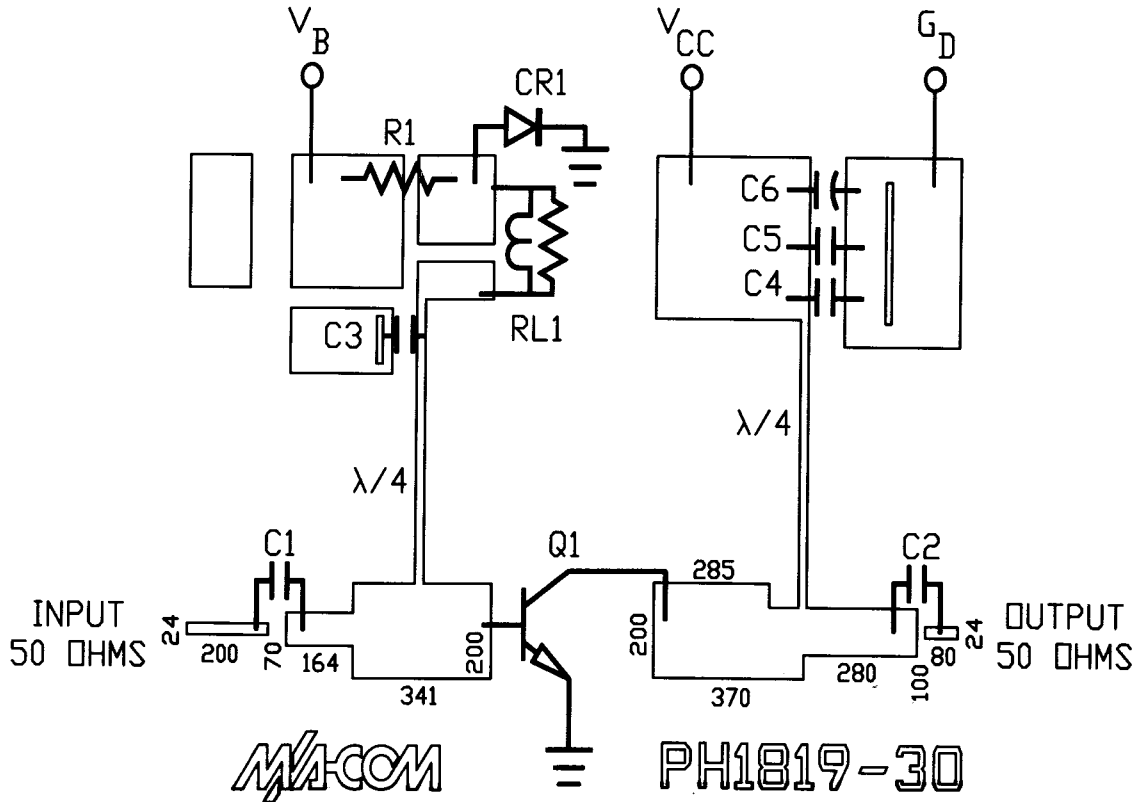
Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Emitter Breakdown Voltage	BV_{CES}	65	-	V	$I_C=40$ mA
Collector-Emitter Leakage Current	I_{CES}	-	8.0	mA	$V_{CE}=25.0$ V
Collector-Emitter Breakdown Voltage	BV_{CEO}	20	-	V	$I_C=40$ mA
Collector-Emitter Breakdown Voltage	BV_{CER}	30	-	V	$I_C=40$ mA, $R_{BE}=220\Omega$
Emitter-Base Breakdown Voltage	BV_{EBO}	3.0	-	V	$I_B=40$ mA
DC Forward Current Gain	h_{FE}	15	120	-	$V_{CE}=5.0$ V, $I_C=2.0$ A
Power Gain	G_p	9.0	-	dB	$V_{CC}=25$ V, $I_{CO}=200$ mA, $P_{OUT}=30$ W, $F=1.78-1.90$ GHz
Collector Efficiency	η_c	40	-	%	$V_{CC}=25$ V, $I_{CO}=200$ mA, $P_{OUT}=30$ W, $F=1.78-1.90$ GHz
Input Return Loss	RL	10	-	dB	$V_{CC}=25$ V, $I_{CO}=200$ mA, $P_{OUT}=30$ W, $F=1.78-1.90$ GHz
Load Mismatch Tolerance	VSWR-T	-	2.5:1	-	$V_{CC}=25$ V, $I_{CO}=200$ mA, $P_{OUT}=30$ W, $F=1.78-1.90$ GHz
3rd Order IMD	IMD_3	-	-28	dBc	$V_{CC}=25$ V, $I_{CO}=200$ mA, $P_{OUT}=30$ W PEP, $F=1850$ MHz, $\Delta F=100$ kHz

Typical Optimum Device Impedances

F(GHz)	$Z_{IN}(\Omega)$	$Z_{LOAD}(\Omega)$
1.78	$3.6 + j5.5$	$5.2 - j1.1$
1.85	$3.1 + j5.0$	$4.4 - j0.9$
1.90	$2.7 + j3.4$	$4.0 - j0.1$



Broadband Test Fixture Electrical Schematic



ARTWORK DIMENSIONS IN MILS

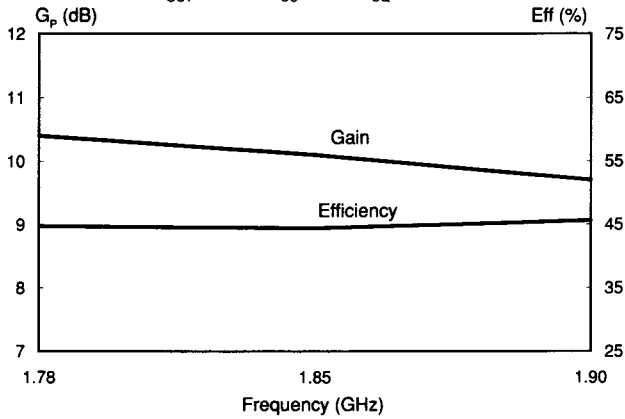
PARTS LIST

- | | | | | | | |
|--|----|----|----|-----------|-----------------|----------|
| C1 | C2 | C3 | C4 | 33 pF | ATC | SIZE A |
| C5 | | | | 4.7 uF | 35 VOLTS | CHIP |
| C6 | | | | 50 uF | 50 VOLTS | |
| CR1 | | | | 1N4245 | DIODE | |
| Q1 | | | | PH1819-30 | | |
| R1 | | | | 5.1 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

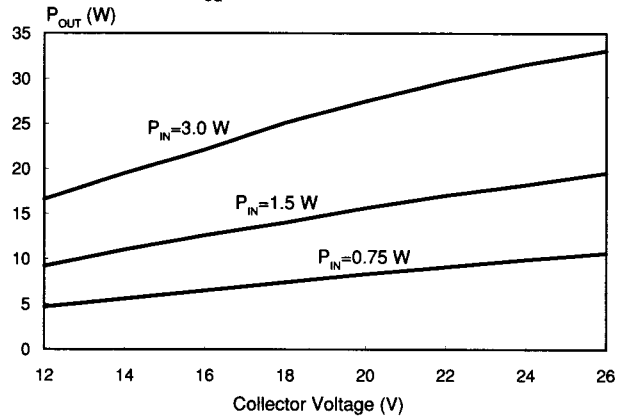
Gain-Efficiency vs Frequency

$P_{OUT}=30\text{ W}$ $V_{CC}=25\text{ V}$ $I_{CO}=200\text{ mA}$



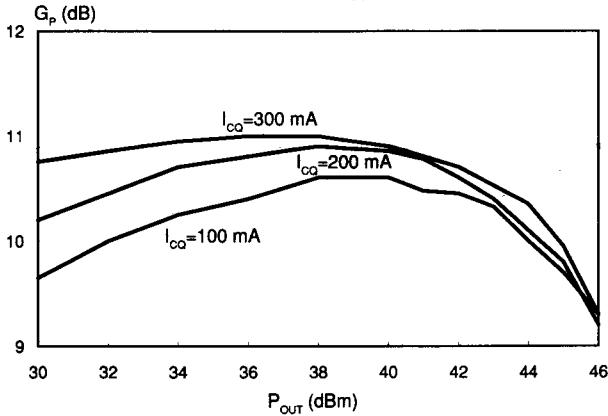
Output Power vs Collector Voltage

$I_{CO}=200\text{ mA}$ $F=1850\text{ MHz}$



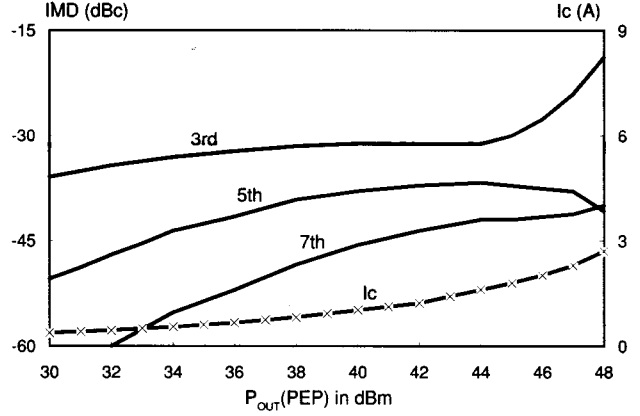
Gain vs P_{OUT}

$F=1850\text{ MHz}$ $V_{CC}=25\text{ V}$



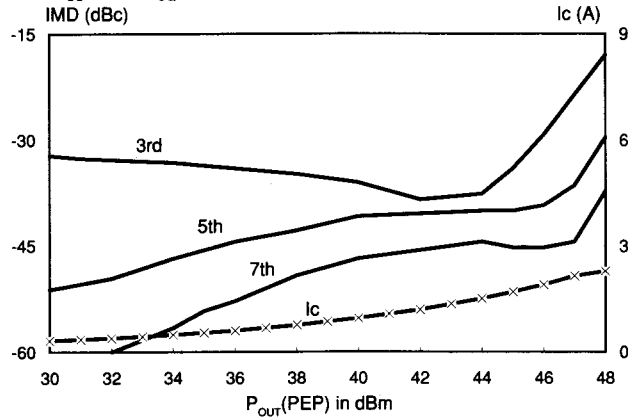
IMD vs P_{OUT}

$V_{CC}=25\text{ V}$ $I_{CO}=200\text{ mA}$ $F1=1850.0\text{ MHz}$ $F2=1850.1\text{ MHz}$



IMD vs P_{OUT}

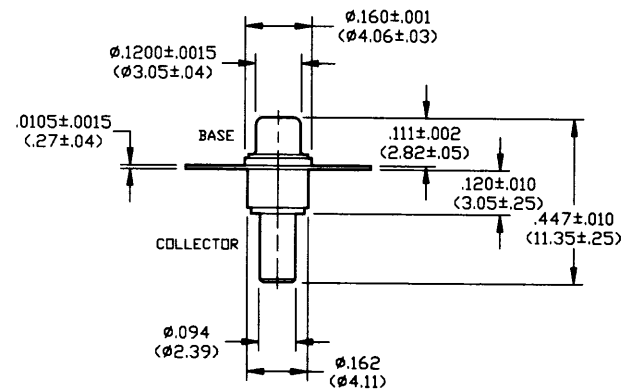
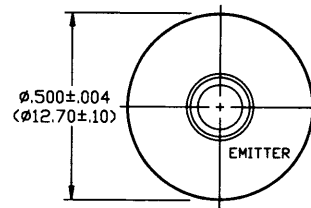
$V_{CC}=25\text{ V}$ $I_{CO}=100\text{ mA}$ $F1=1850.0\text{ MHz}$ $F2=1850.1\text{ MHz}$



Features

- NPN Silicon Microwave Power Transistor
- Common Emitter Configuration
- Designed for S-Band Applications
- Interdigitated Geometry
- Diffused Emitter Ballasting Resistors
- Gold Metallization System
- Hermetic Metal/Ceramic Package
- For Coaxial, Stripline, and Lumped Elements Circuits

Outline Drawing



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

Absolute Maximum Ratings at 25°C

Parameter	Symbol	Rating	Units
Collector-Base Voltage	V_{CBO}	40	V
Collector-Emitter Voltage	V_{CEO}	14.0	V
Collector Current (Peak)	I_C	0.22	A
Power Dissipation	P_D	8.5	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-65 to +200	°C

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Collector-Base Breakdown Voltage	BV_{CBO}	40	-	V	$I_C=100 \mu A$
Collector-Emitter Breakdown Voltage	BV_{CEO}	14	-	V	$I_C=500 \mu A$
Collector-Base Leakage Current	I_{CBO}	-	1.0	μA	$V_{CB}=36 V$
Thermal Resistance	$R_{TH(JC)}$	-	20	°C/W	$V_{CC}=28 V, F=2.0 GHz, P_{OUT}=1.0 W$
Collector-Base Capacitance	C_{ob}	2.0	-	pF	$f=1MHz, V_{CE}=30 V$
Power Output	P_{OUT}	1.0	-	W	$V_{CC}=28 V, F=2.0 GHz$
Collector Efficiency	η_C	24	-	%	$V_{CC}=28 V, F=2.0 GHz$
Oscillation Frequency	f_{OSC}	2.0	2.2	GHz	$V_{CC}=28 V$

Impedance and Matching Circuitry Information Available on Request