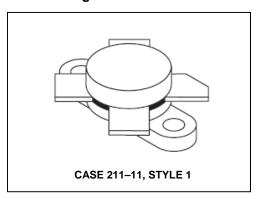


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Designed primarily for high–voltage applications as a high–power linear amplifiers from 2.0 to 30 MHz. Ideal for marine and base station equipment.

- Specified 50 V, 30 MHz characteristics
   Output power = 250 W
   Minimum gain = 12 dB
   Efficiency = 45%
- Intermodulation distortion @ 250 W (PEP) —
   IMD = -30 dB (max)
- 100% tested for load mismatch at all phase angles with 3:1 VSWR

#### **Product Image**



#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit	
Collector–Emitter Voltage	V <sub>CEO</sub>	50	Vdc	
Collector-Base Voltage	V <sub>CBO</sub>	100	Vdc	
Emitter-Base Voltage	V <sub>EBO</sub>	4.0	Vdc	
Collector Current — Continuous	lc	16	Adc	
Withstand Current — 10 s	_	20	Adc	
Total Device Dissipation @ T <sub>C</sub> = 25°C (1) Derate above 25°C	P <sub>D</sub>	290 1.67	Watts W/°C	
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C	

#### THERMAL CHARACTERISTICS

Commitment to produce in volume is not guaranteed.

Characteristic		Max	Unit
Thermal Resistance, Junction to Case		0.6	°C/W

### ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS	•	•			•
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 200 mAdc, I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	50	_	_	Vdc
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 100 mAdc, V <sub>BE</sub> = 0)	V <sub>(BR)CES</sub>	100	_	_	Vdc
Collector-Base Breakdown Voltage (I <sub>C</sub> = 100 mAdc, I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	100	_	_	Vdc
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 10 mAdc, I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	4.0	_	_	Vdc

NOTE: (continued)

1. Pp is a measurement reflecting short term maximum condition. See SOAR curve for operating conditions.

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.

- North America Tel: 800.366.2266 / Fax: 978.366.2266
- **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
- Asia/Pacific Tel: 81.44.844.8296 / Fax: 81.44.844.8298
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### **MRF448**



# The RF Line NPN Silicon Power Transistor 250W, 30MHz, 50V

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#### ELECTRICAL CHARACTERISTICS — continued (T<sub>C</sub> = 25°C unless otherwise noted.)

	aiii000 0ai0i iii	o notou.,			
Characteristic	Symbol	Min	Тур	Max	Unit
ON CHARACTERISTICS					•
DC Current Gain (I <sub>C</sub> = 5.0 Adc, V <sub>CE</sub> = 10 Vdc)	h <sub>FE</sub>	10	30	_	_
DYNAMIC CHARACTERISTICS	•	•	•	•	•
Output Capacitance (V <sub>CB</sub> = 50 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>ob</sub>	_	350	450	pF
FUNCTIONAL TESTS		•	•	•	
Common–Emitter Amplifier Power Gain (V <sub>CC</sub> = 50 Vdc, P <sub>out</sub> = 250 W CW, f = 30 MHz, I <sub>CQ</sub> = 250 mA)	G <sub>PE</sub>	12	14	_	dB
Collector Efficiency (V <sub>CC</sub> = 50 Vdc, P <sub>out</sub> = 250 W, f = 30 MHz, I <sub>CQ</sub> = 250 mA)	η	_	45 65		% (PEP) % (CW)
Intermodulation Distortion (2) (V <sub>CE</sub> = 50 Vdc, P <sub>out</sub> = 250 W (PEP), I <sub>CQ</sub> = 250 mA, f = 30 MHz)	IMD	_	-33	-30	dB
Electrical Ruggedness (V <sub>CC</sub> = 50 Vdc, P <sub>out</sub> = 250 W CW, f = 30 MHz, VSWR 3:1 at all Phase Angles)	Ψ	No Degradation in Output Power			
	-	+			

#### NOTE:

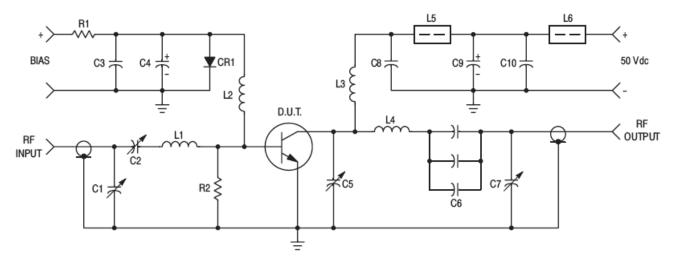
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<sup>2.</sup> To Mil-Std-1311 Version A, Test Method 2204, Two Tone, Reference each Tone.



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C1, C2, C5, C7 — 170-780 pF, Arco 469

C3, C8, C9 - 0.1 µF, 100 V Erie

C4 - 500 µF @ 6.0 V

C6 — 360 pF, 3 x 120 pF 3.0 kV in parallel

C10 - 10 µF, 100 V

R1 — 10  $\Omega$ , 10 Watt

R2 - 10 Ω, 1.0 Watt

CR1 — 1N4997 or equivalent

L1 - 3 Turns, #16 Wire, 0.4" I.D., 0.3" Long

L2 — 0.8 μH, Ohmite Z-235 or equivalent

L3 — 12 Turns, #16 Enameled Wire Closewound 0.25" I.D.

L4 — 4 Turns, 1/8" Copper Tubing, 0.6" I.D., 1.0" Long

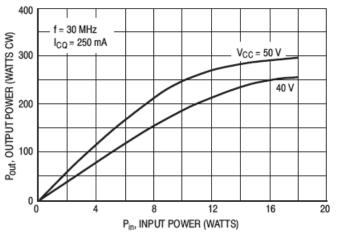
L5, L6 — 2.0 μH, Fair-Rite 2643021801 Ferrite bead each or equivalent

Figure 1. 30 MHz Test Circuit Schematic

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400

f = 30, 30.001 MHz

I<sub>CQ</sub> = 250 mA

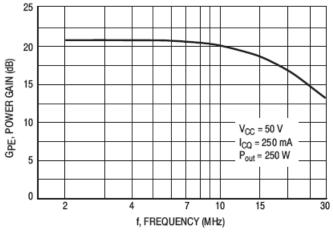
IMD = -30 dB

-35 dB

V<sub>CG</sub> SUPPLY VOLTAGE (VOLTS)

Figure 2. Output Power versus Input Power

Figure 3. Output Power versus Supply Voltage



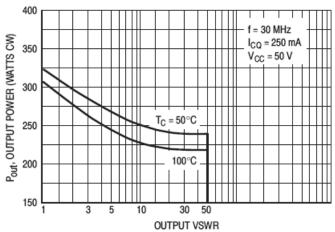


Figure 4. Power Gain versus Frequency

Figure 5. RF SOAR (Class AB)
Pout versus Output VSWR

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### **MRF448**



## The RF Line NPN Silicon Power Transistor 250W, 30MHz, 50V

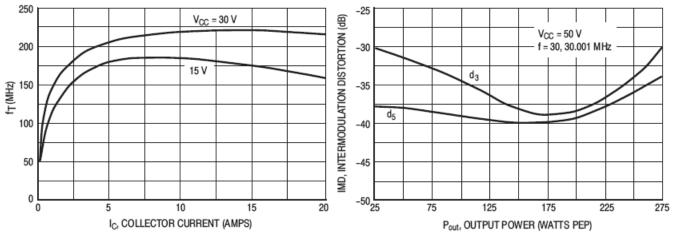


Figure 6. f<sub>T</sub> versus Collector Current

Figure 7. IMD versus Pout

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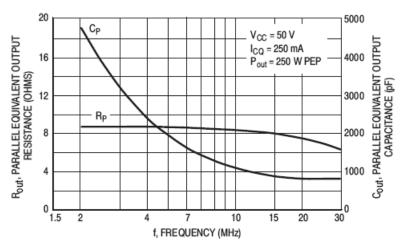
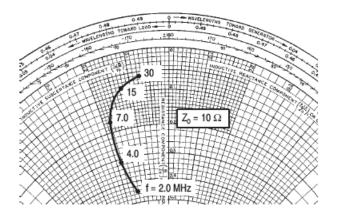


Figure 8. Output Resistance and Capacitance versus Frequency



 $V_{CC}$  = 50 V  $I_{CQ}$  = 150 mA  $P_{out}$  = 250 W PEP

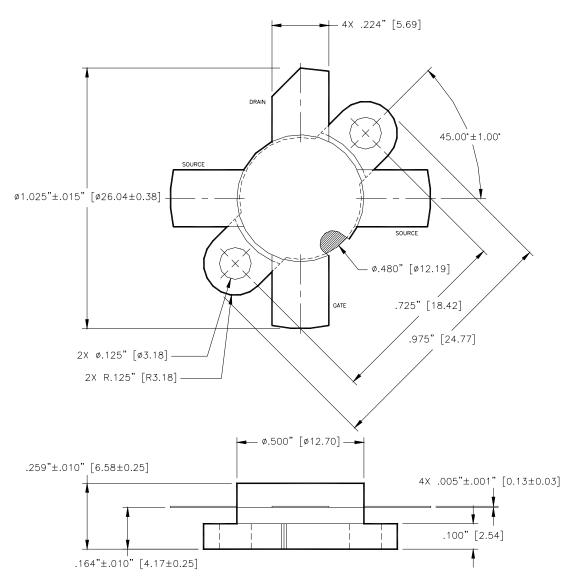
f MHz	Z <sub>in</sub> Ohms	
2.0	4.50 - j1.40	
4.0	3.10 - j1.80	
7.0	1.70 - j1.75	
15	0.80 - j1.25	
30	0.60 - j0.75	

Figure 9. Series Equivalent Impedance

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Unless otherwise noted, tolerances are inches  $\pm .005$ " [millimeters  $\pm 0.13$ mm]

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