MOTOROLA SEMICONDUCTOR TECHNICAL DATA

MRF754

The RF Line

NPN SILICON HIGH FREQUENCY TRANSISTOR

... designed for 5.0 to 10 Volt UHF large-signal amplifier applications in industrial and commercial FM equipment operating in the 407 to 512 MHz range. Ideally suited for handheld radios and other equipment where high packaging density is required.

- Specified 7 5 Volt, 470 MHz Characteristics -Output Power = 8.0 Watts
 - Minimum Gain = 6.0 dB
 - Minimum Efficiency = 55%
- Capable of Withstanding Load Mismatch at Highline and RF Overdrive

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MAXIMUM RATINGS				
Rating	Symbol	Value	Unit	
Collector-Emitter Voltage	VCEO	13	Vdc	
Emitter-Base Voltage	VEBO	4.0	Vdc	
Collector-Current — Continuous	IC.	3.0	Adc	
Total Device Dissipation @ T _C = 25°C (1) Derate Above 25°C	PD	37.0 214	Watts mW∕°C	
Storage Temperature Range	T _{stg}	-65 to +150°C	°C	

Island Labs

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (2)	R ₀ JC	4.7	°C/W

This device is designed for RF operation. The total device dissipation rating applies only when the device is operated as an RF amplifier.
Thermal Resistance is determined under specified RF operating conditions by infrared

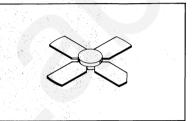
measurement techniques.

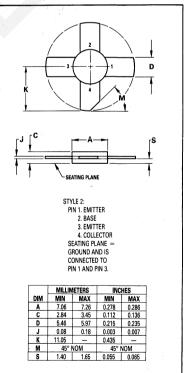


8.0 W - 470 MHz - 7.5 V

HIGH FREQUENCY TRANSISTOR

NPN SILICON





CASE 249-05

MOTOROLA RF DEVICE DATA 2-840

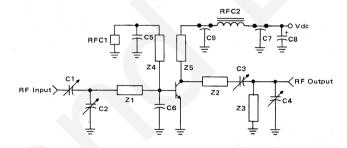
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ELECTRICAL CHARACTERISTICS (Tc = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS			4		
Collector-Emitter Breakdown Voltage (I _C = 50 mAdc, I _B = 0)	V(BR)CEO	13	10 1 1 <u>-</u> 1 1 1		Vdc
Collector-Emitter Breakdown Voltage (I _C = 50 mAdc, V _{BE} = 0)	V(BR)CES	25		in the second se	Vdc
Emitter-Base Breakdown Voltage (I _E = 3.0 mAdc, I _C = 0)	V(BR)EBO	4.0	-		Vdc
Collector Cutoff Current (V _{CB} = 9.0 Vdc, I _E = 0)	СВО			1.0	mAdc
ON CHARACTERISTICS				and the second sec	
DC Current Gain (I _C = 200 mAdc, V _{CE} = 5.0 Vdc)	hFE	20	85		
DYNAMIC CHARACTERISTICS					
Output Capacitance (V _{CB} = 7.5 Vdc, I _E = O, f = 1.0 MHz)	Cob	—	50	65	pF
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain (V _{CC} = 7.5 Vdc, P _{out} = 8.0 W, f = 470 MHz)	GPE	6.0	7.0		dB
Collector Efficiency (V _{CC} = 7.5 Vdc, P _{out} = 8.0 W, f = 470 MHz)	η	55	<u> </u>		%

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FIGURE 1 - 470 MHz TEST CIRCUIT



C1, C2, C3, C4 – Johanson Trimmer JMC#5501 C5 – J101, 100 pF Unelco C6 – J101, 15 pF Unelco

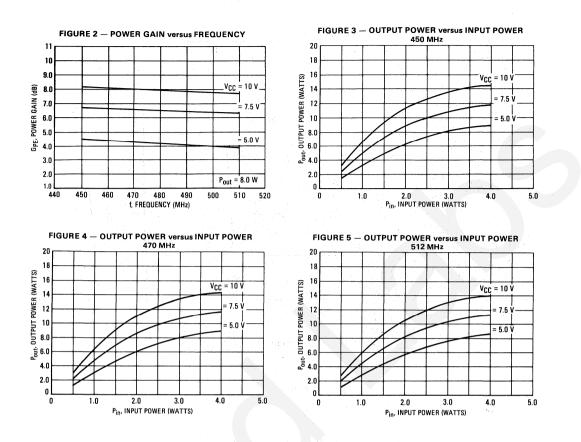
C7, C9 – 680 pF Allen Bradley Feedthru $C8 - 1.0 \,\mu\text{F}$ Tantalum

Z1, Z2 - Microstrip W = 0.26", L = 2.9" Z3 - Microstrip W = 0.5", L = 1.2" Z4 - Microstrip W = 0.055", L = 3.9" Z5 - Microstrip W = 0.055", L = 2.9"

RFC1 - Ferroxcube Bead, 56-590-65-3B RFC2 - Choke, VK 200/48

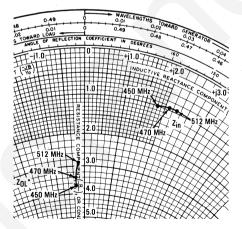
Board Material – Glass Teflon t = 0.062 $\epsilon_r = 2.5$

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2-842



$P_{out} = 8.0 \text{ W}, V_{CC} = 7.5 \text{ V}$			
f MHz	Z _{in} Ohms	Z _{OL} * Ohms	
450	1.0 + j1.8	3.7 - j0.3	
470	0.9 + j2.1	3.4 – j0.3	
512	0.9 + j2.3	2.9 – j0.2	

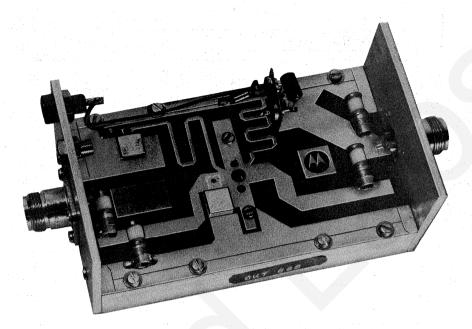
Z_{OL}* = Conjugate of the optimum load impedance into which the device operates at a given output power, voltage, and frequency.

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FIGURE 7 - 470 MHz TEST CIRCUIT

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MOTOROLA RF DEVICE DATA