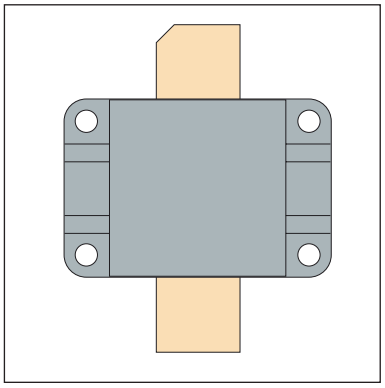
VRF154FL

50V 600W 80MHz

RF POWER VERTICAL MOSFET

The VRF154FL is a gold metallized silicon, n-channel RF power transistor designed for broadband commercial and military applications requiring high power and gain without compromising reliability, ruggedness, and inter-modulation distortion.



FEATURES

- **Designed For 2 - 100MHz Operation**
- **600W with 17dB Typical Gain @ 30MHz, 50V**
- **Excellent Stability & Low IMD**
- **Common Source Configuration**
- **Economical Flangeless Package**
- **Nitride Passivated**
- **Refractory Gold Metallization**

Maximum Ratings

All Ratings: T_C = 25°C unless otherwise specified

Symbol	Parameter	VRF154FL	Unit
V_{DD}	Drain-Source Voltage	160	Volts
V_{DGO}	Drain-Gate Voltage	160	
I_D	Continuous Drain Current @ T_C = 25°C	60	Amps
V_{GS}	Gate-Source Voltage	±40	Volts
P_D	Total Device Dissipation @ T_C = 25°C	1350	Watts
T_{STG}	Storage Temperature Range	-65 to 150	°C
T_J	Operating Junction Temperature	200	

Static Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 100mA)	160	180		Volts
$V_{DS(ON)}$	On State Drain Voltage ($I_{D(ON)}$ = 40A, V_{GS} = 10V)		3.0	5.0	
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 50V, V_{GS} = 0V)			20	mA
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±20V, V_{DS} = 0V)			5.0	µA
g_{fs}	Forward Transconductance (V_{DS} = 10V, I_D = 20A)	16			mhos
$V_{GS(TH)}$	Gate Threshold Voltage (V_{DS} = 10V, I_D = 100mA)	2		5	Volts

Thermal Characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction to Case Thermal Resistance			0.13	°C/W

050-4939 Rev A 11-2006

DYNAMIC CHARACTERISTICS

VRF154FL

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	V_{GS} = 0V		1600		pF
C_{oss}	Output Capacitance	V_{DS} = 50V		1000		
C_{rss}	Reverse Transfer Capacitance	f = 1MHz		200		

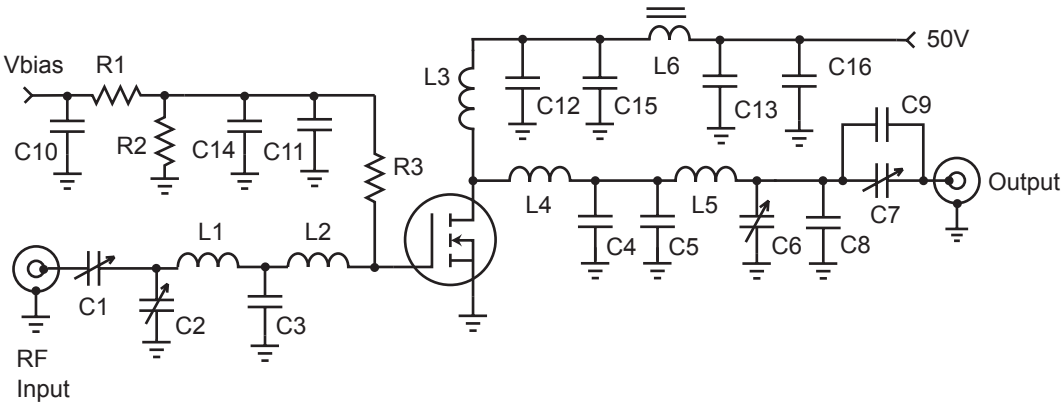
FUNCTIONAL CHARACTERISTICS

Symbol	Test Conditions	Min	Typ	Max	Unit
G_{PS}	f = 30MHz, V_{DD} = 50V, I_{DQ} = 800mA, P_{out} = 600W		17		dB
η_D	f = 30MHz, V_{DD} = 50V, I_{DQ} = 800mA, P_{out} = 600W		45		%
$IMD_{(d3)}$	f1 = 30MHz, f2 = 30.001MHz, V_{DD} = 50V, I_{DQ} = 800mA, P_{out} = 600W_{PEP} ①		-25		dBc

NOTE:
① To MIL-STD-1311 Version A, test method 2204B, Two Tone, Reference Each Tone

Microsemi reserves the right to change, without notice, the specifications and information contained herein.

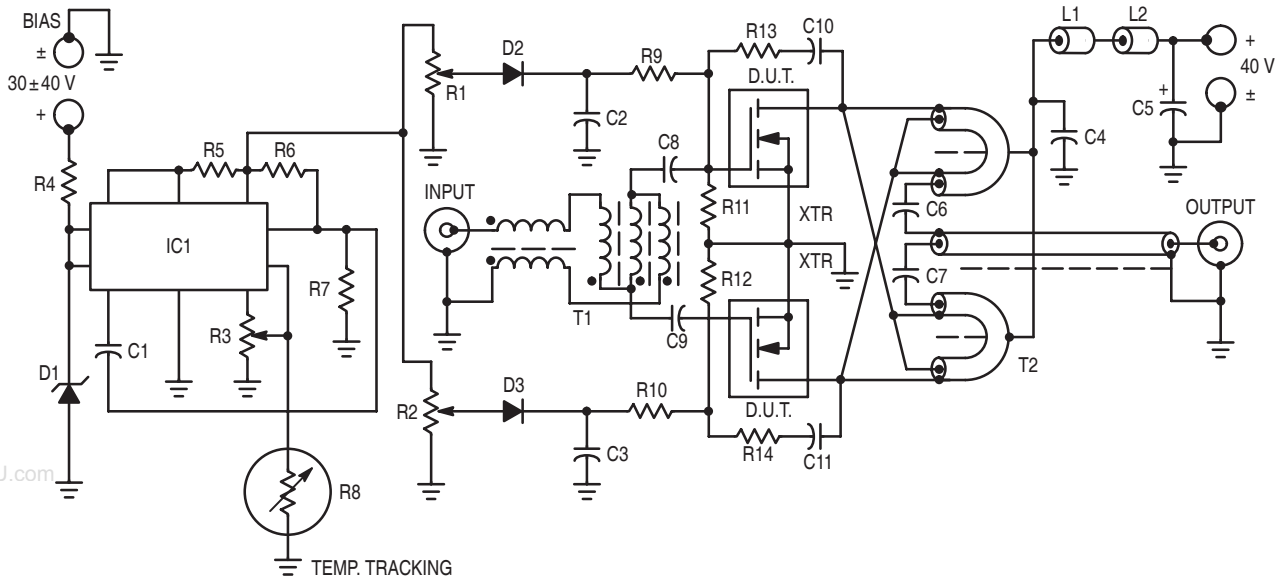
30MHz Test Circuit



C1, C2, C6, C7 ARCO 465 mica trimmer
C3 1800pF ATC700B ceramic
C4 680pF metal clad 500V mica
C5 390pF metal clad 500V mica
C8 100pF ATC 700E ceramic
C9 120pF ATC 700E ceramic
C10 - C13 .01uF 100V ceramic SMT
C14 - C16 .1uF 100V ceramic SMT

L1 110nH 4t #22 0.312"d .30"l
L2 29nH 2t #22 .188" dia .10" l
L3 0.3uH - 6t #16 enam. .5" dia.
L4 22nH - 1t #16 enam. .375" dia.
L5 117nH - 3t #16 enam. .5" dia. .3"l
L6 1t #16 on 2x 267300081 .5" bead
R1-R2 1kW 1/4W
R3 10W 1/4W

20±80MHz 1.0kW Broadband Amplifier



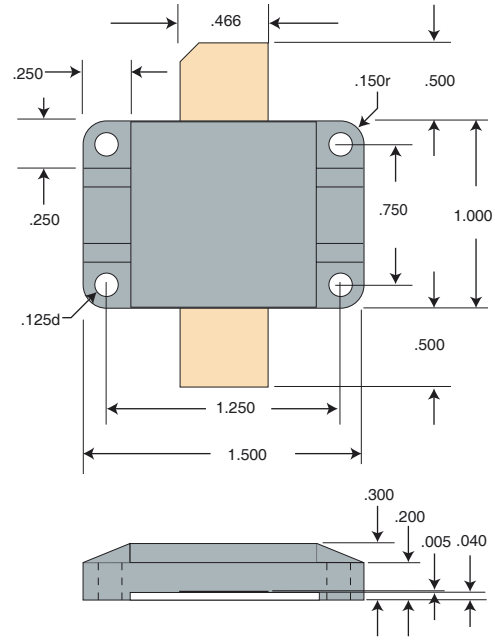
C1 - 1000pF Ceramic
C2, C3, C4, C8, C9, C10, C11 - 0.1µF Ceramic
C5 - 10µF/100 V Electrolytic
C6, C7 - 0.1µF Ceramic, (ATC 200/823 or Equivalent)
D1 - 28V Zener, 1N5362 or Equivalent
D3 - 1N4148
IC1 - MC1723
L1, L2 - Fair±Rite Products Corp. Ferrite Beads #2673000801
R1, R2, R3 - 10kTrimpot
R4 - 1.0 k/1.0W
R5 - 10 Ohms
R6 - 2.0k
R7 - 10k
R8 - Thermistor, 10k (25 5C), 2.5k (75 5C)
R9, R10 -100 Ohms
R11, R12 -1.0k
R13, R14 -50 ±100 Ohms, 4.0 x 2.0 W Carbon in Parallel
T1 - 9:1 Transformer, Trifilar and Balun Wound on Separate Fair±Rite Products Corp. Balun Cores #286100012, 5 Turns Each.
T2 - 1:9 Transformer, Balun 50 Ohm CO±AX Cable RG±188, Low Impedance Lines W.L. Gore 16 Ohms CO±AX Type CXN 1837. Each Winding Threaded Through Two Fair±Rite Products Corp. #2661540001 Ferrite Sleeves (6 Each).
XTR - MRF154

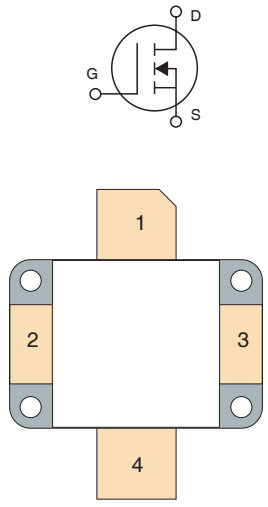
Thermal Considerations and Package Mounting:

The rated 1350W power dissipation is only available when the package mounting surface is at 25°C and the junction temperature is 200°C. The thermal resistance between junctions and case mounting surface is 0.12°C/W. When installed, an additional thermal impedance of 0.1°C/W between the package base and the mounting surface is typical. Insure that the mounting surface is smooth and flat. Thermal joint compound must be used to reduce the effects of small surface irregularities. The heatsink should incorporate a copper heat spreader to obtain best results. Use 4-40 or M3 screws torqued to 1.2 Nm.

HAZARDOUS MATERIAL WARNING

The ceramic portion of the device between leads and mounting surface is beryllium oxide-BeO. B eryllium oxide dust is toxic when inhaled. C are must be taken during handling and mounting to avoid damage to this area These devices must never be thrown away with general industrial or domestic waste.





1 Drain
2 Source
3 Source
4 Gate