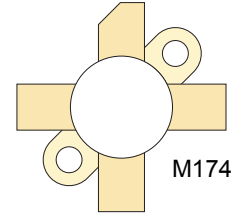



RF POWER VERTICAL MOSFET

The VRF152 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, or inter-modulation distortion.



FEATURES

- Improved Ruggedness $V_{(BR)DSS} = 130V$
- 150W with 22dB Typical Gain @ 30MHz, 50V
- 150W with 14dB Typical Gain @ 175MHz, 50V
- Excellent Stability & Low IMD
- Common Source Configuration
- Available in Matched Pairs
- 70:1 Load VSWR Capability at Specified Operating Conditions
- Nitride Passivated
- Refractory Gold Metallization
- Low Rds Replacement for MRF151/ BLF177/ SD2941
- RoHS Compliant 

Maximum Ratings

All Ratings: $T_c = 25^\circ C$ unless otherwise specified

Symbol	Parameter	VRF152(MP)	Unit
V_{DSS}	Drain-Source Voltage	130	V
I_D	Continuous Drain Current @ $T_c = 25^\circ C$	20	A
V_{GS}	Gate-Source Voltage	± 40	V
P_D	Total Device dissipation @ $T_c = 25^\circ C$	300	W
T_{STG}	Storage Temperature Range	-65 to 150	$^\circ C$
T_J	Operating Junction Temperature	200	

Static Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 50mA$)	130			V
$R_{DS(ON)}$	Drain-Source On-State Resistance ¹ ($V_{GS} = 10V, I_D = 10A$)		0.13	0.20	Ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 50V, V_{GS} = 0V$)			50	μA
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 20V, V_{DS} = 0V$)			1.0	μA
g_{fs}	Forward Transconductance ($V_{DS} = 10V, I_D = 5A$)	5.0	6.2		mhos
$V_{GS(TH)}$	Gate Threshold Voltage ($V_{DS} = 10V, I_D = 100mA$)	2.9	3.6	4.4	V

Thermal Characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction to Case Thermal Resistance			0.60	$^\circ C/W$



CAUTION: These Devices are Sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

Dynamic Characteristics

VRF152(MP)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		383		pF
C_{oss}	Output Capacitance	$V_{DS} = 50V$		215		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		20		

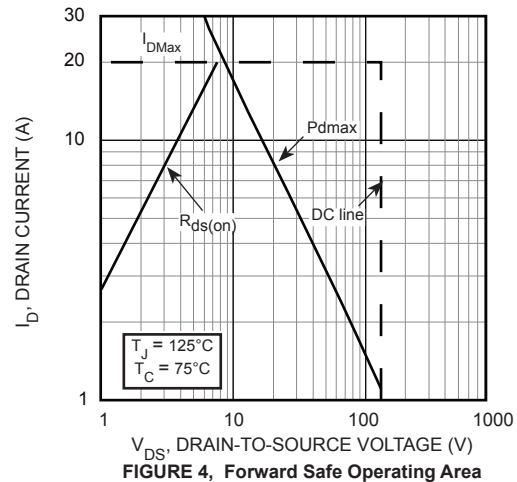
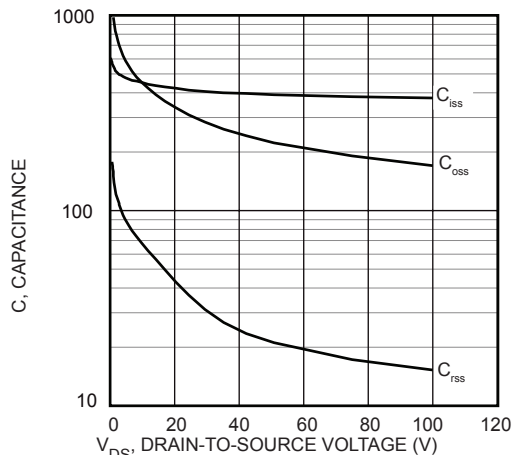
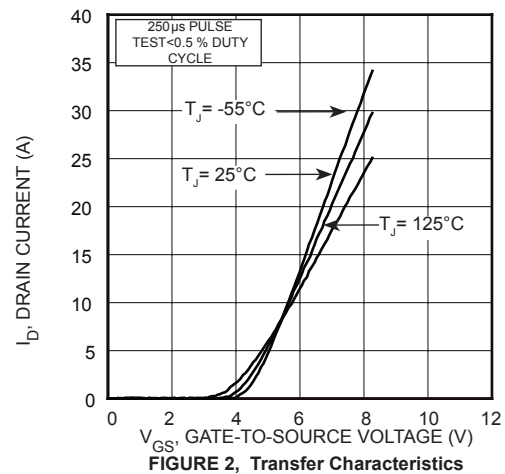
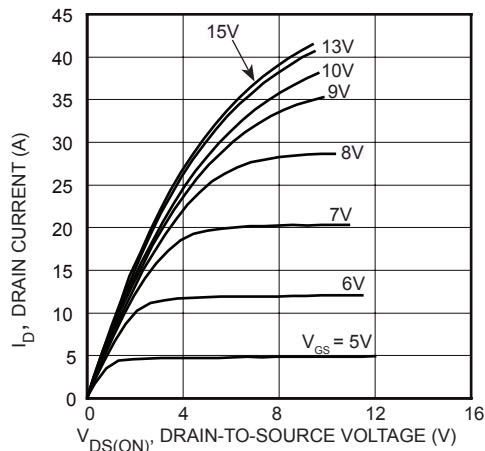
Functional Characteristics

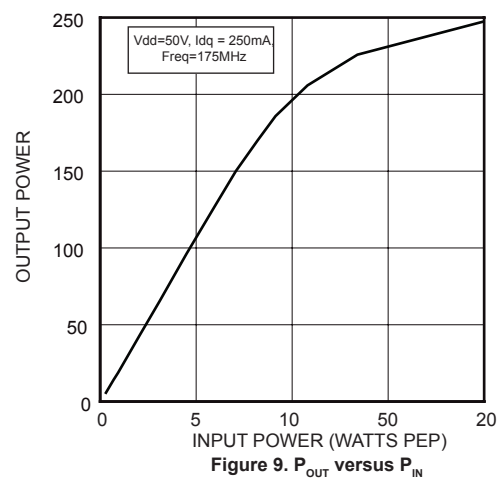
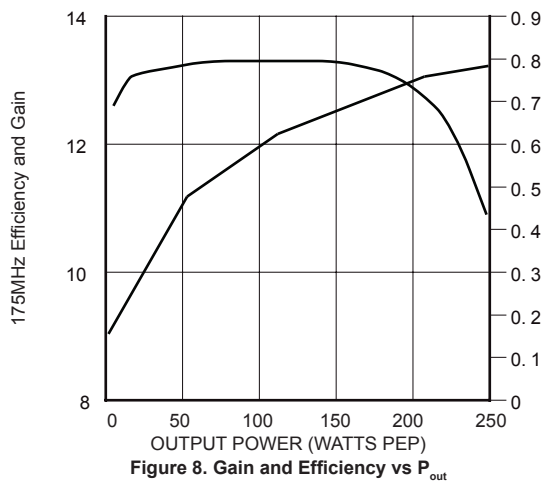
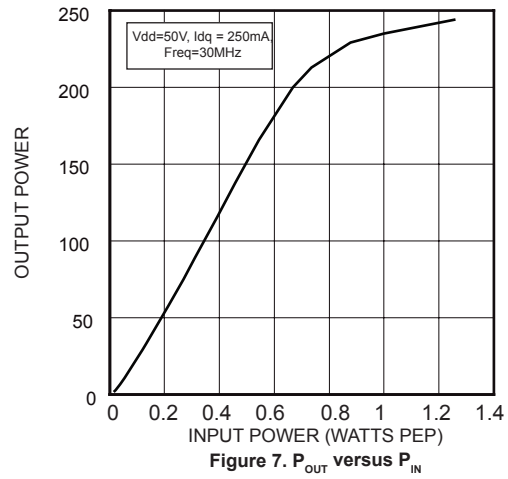
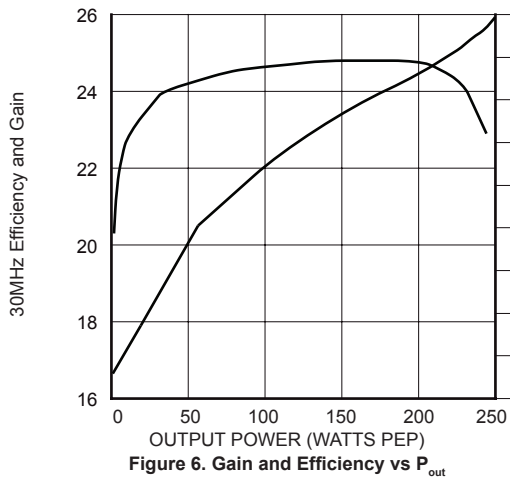
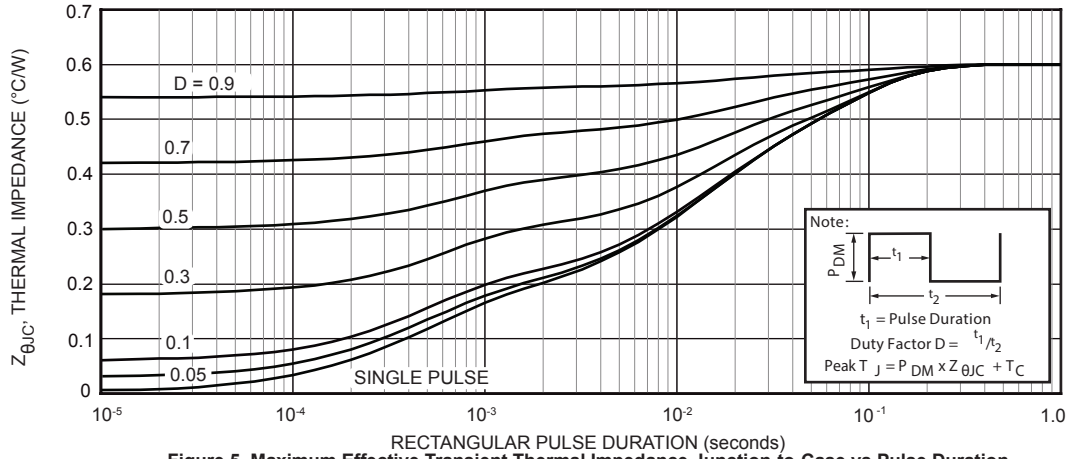
Symbol	Parameter	Min	Typ	Max	Unit
G_{PS}	$f_1 = 30MHz, f_2 = 30.001MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W_{PEP}^1$	18	22		dB
G_{PS}	$f = 175MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W$		14		
η_D	$f_1 = 30MHz, f_2 = 30.001MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W_{PEP}^1$		50		%
IMD _(d3)	$f_1 = 30MHz, f_2 = 30.001MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W_{PEP}^1$		-30		dBc
ψ	$f = 30MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W$ CW 70:1 VSWR - All Phase Angles, 0.2mSec X 20% Duty Factor	No Degradation in Output Power			

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

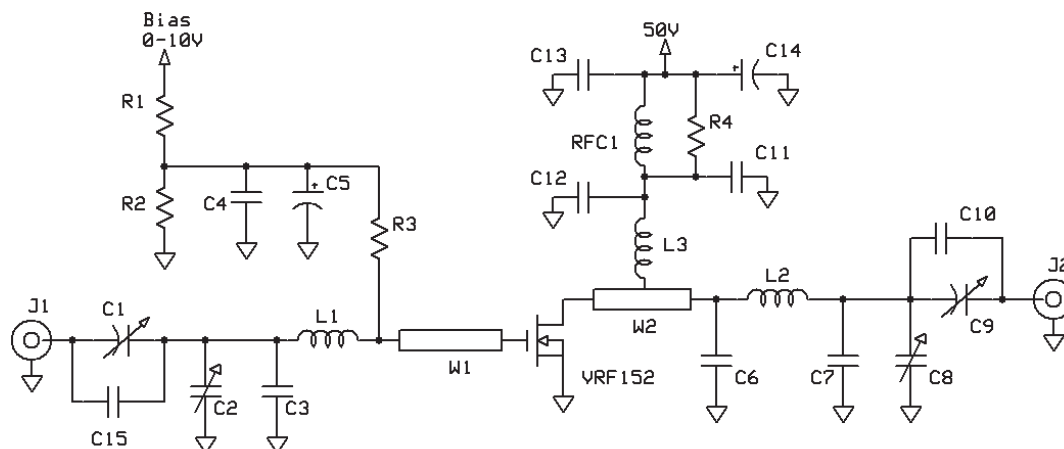
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Typical Performance Curves





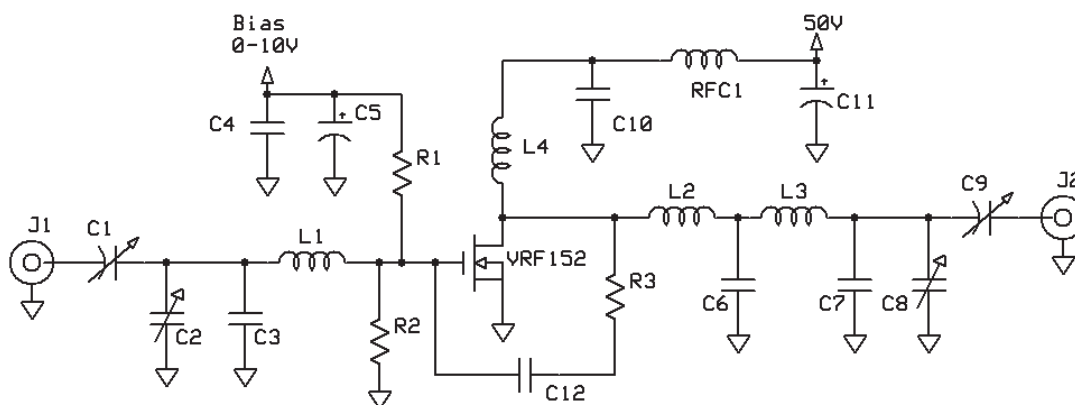
30 MHz test Circuit



C1,2,8,9 - ARCO 463 20-180pF
 C3,7 - 120 pF ATC 100B
 C4,11-13 - 0.1uF 100V SMT
 C5 - 1 uF 15WV tant
 C6, C15 - 47pF ATC 100B
 C10 - 150pF ATC 100B
 C14 - 15uF 100V Elect
 W1 W2 - printed line 0.23"x 0.7"

L1 - 4t #20 ga .25"d x .16"L ~120nH
 L2 - 5t #14 ga .312" dia x .45" ~135nH
 L3 -7 turns #16 ga 5/16" ID tight. ~250nH
 R1 R2 - 2.2k ohm 1/4W
 R3 - 22 ohm 1W SMT
 R4 - 2.2 ohm 2W
 RFC1 Fair-Rite 2961666631 (VK200-4B)
 PCB = FR-4 fiberglass-epoxy er = 4.6

175 MHz test Circuit



C1 C2 C8 - ARCO 463
 C3 C7 - 25 pF ATC 100B
 C4 C10 C12 - 0.1uF 100V SMT
 C5 - 1 uF 15WV tant
 C6 - 250 pF ATC 100B
 C9 - ARCO 462
 C11 - 15uF 100V Elect

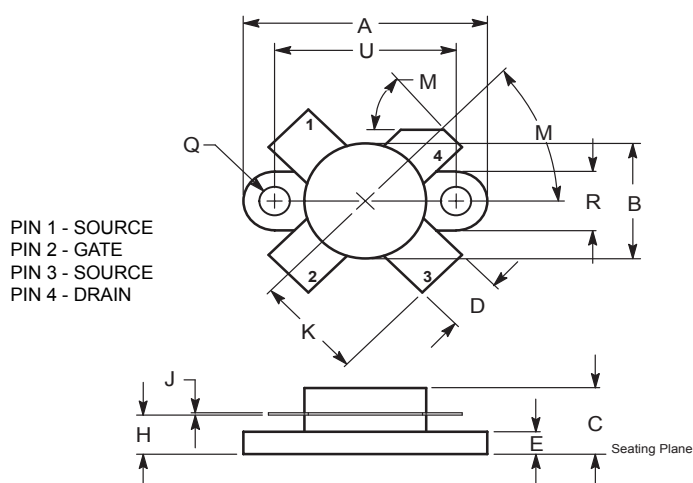
L1 - 3/4" #18 ga into Hairpin
 L2 - printed line 0.2"W x 0.5" L
 L3 - 1" #16 ga into Hairpin
 L4 -2 turns #16 ga. 5/16" ID
 R1 R2 - 150 ohm 1W
 R3 - 470 ohm 3W, Panasonic ECG
 RFC1 Fair-Rite 2961666631 (VK200-4B)

Adding MP at the end of P/N specifies a matched pair where $V_{GS(TH)}$ is matched between the two parts. V_{TH} values are marked on the devices per the following table.

Code	Vth Range	Code 2	Vth Range
A	2.900 - 2.975	M	3.650 - 3.725
B	2.975 - 3.050	N	3.725 - 3.800
C	3.050 - 3.125	P	3.800 - 3.875
D	3.125 - 3.200	R	3.875 - 3.950
E	3.200 - 3.275	S	3.950 - 4.025
F	3.275 - 3.350	T	4.025 - 4.100
G	3.350 - 3.425	W	4.100 - 4.175
H	3.425 - 3.500	X	4.175 - 4.250
J	3.500 - 3.575	Y	4.250 - 4.325
K	3.575 - 3.650	Z	4.325 - 4.400

V_{TH} values are based on Microsemi measurements at datasheet conditions with an accuracy of 1.0%.

.5" SOE Package Outline
All Dimensions are $\pm .005$



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.096	0.990	24.39	25.14
B	0.465	0.510	11.82	12.95
C	0.229	0.275	5.82	6.98
D	0.216	0.235	5.49	5.96
E	0.084	0.110	2.14	2.79
H	0.144	0.178	3.66	4.52
J	0.003	0.007	0.08	0.17
K	0.435		11.0	
M	45° NOM		45° NOM	
Q	0.115	0.130	2.93	3.30
R	0.246	0.255	6.25	6.47
U	0.720	0.730	18.29	18.54

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