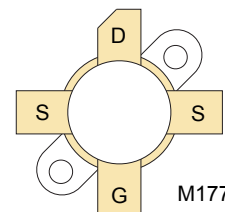


RF POWER VERTICAL MOSFET

The VRF2944 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 $V_{(BR)DSS} = 170V$
- 400W with 22dB Typ. Gain @ 30MHz, 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
- Higher Power Version of VRF2933
- Thermally Enhanced Package
- RoHS Compliant 

Maximum Ratings

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

Symbol	Parameter	VRF2933(MP)	Unit
V_{DSS}	Drain-Source Voltage	170	V
I_D	Continuous Drain Current @ $T_c = 25^\circ C$	50	A
V_{GS}	Gate-Source Voltage	± 40	V
P_D	Total Device dissipation @ $T_c = 25^\circ C$	795	W
T_{STG}	Storage Temperature Range	-65 to 150	$^\circ C$
T_J	Operating Junction Temperature Max	200	

Static Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 100mA$)	170	180		V
$V_{DS(ON)}$	On State Drain Voltage ($I_{D(ON)} = 25A, V_{GS} = 10V$)		2.0	2.4	
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 100V, V_{GS} = 0V$)			2.0	mA
I_{GSS}	Gate-Source Leakage Current ($V_{DS} = \pm 20V, V_{GS} = 0V$)			2.0	μA
g_{fs}	Forward Transconductance ($V_{DS} = 10V, I_D = 20A$)	10			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			0.22	$^\circ C/W$

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

Dynamic Characteristics

VRF2944(MP)

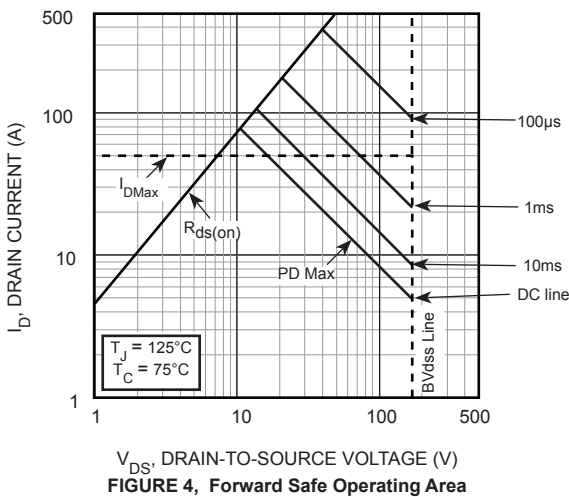
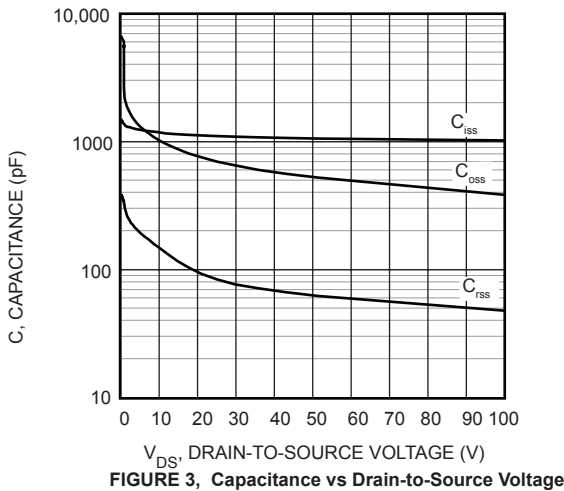
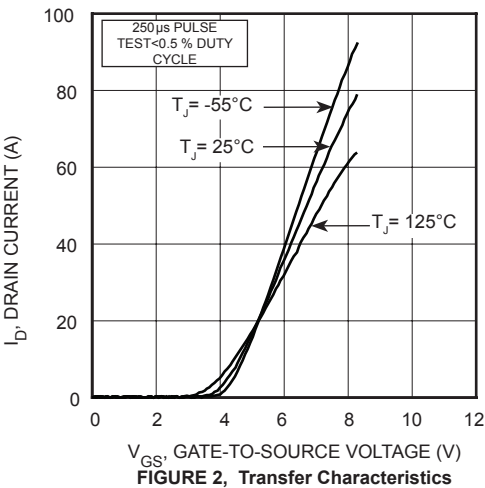
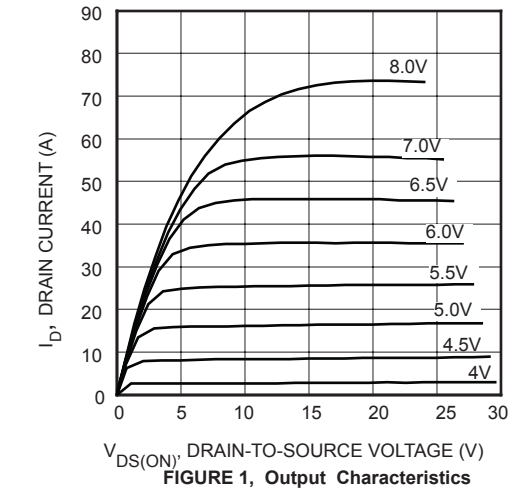
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 50V$ $f = 1MHz$		1050		pF
C_{oss}	Output Capacitance			520		
C_{rss}	Reverse Transfer Capacitance			62		

Functional Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
G_{PS}	$f_1 = 30MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 400W$	23	25		dB
η_D	$f_1 = 30MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 400W$		50		%
ψ	$f = 30MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 400W$ CW 70:1 VSWR - All Phase Angles, 0.2mSec X 20% Duty Factor	No Degradation in Output Power			

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

Typical Performance Curves



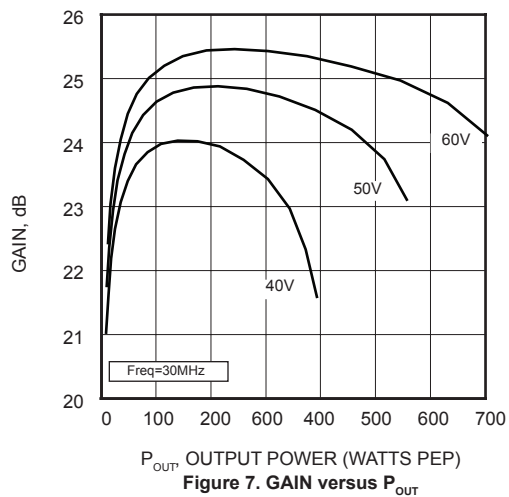
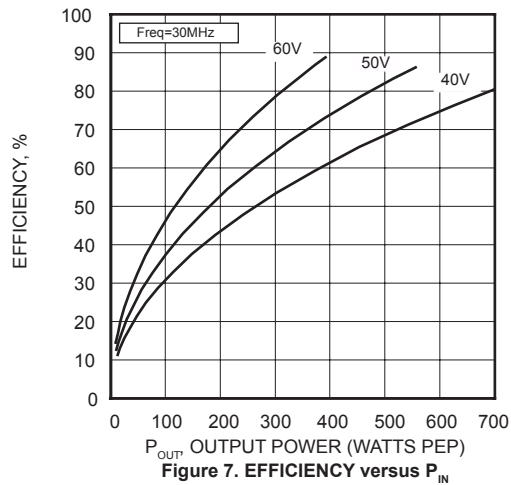
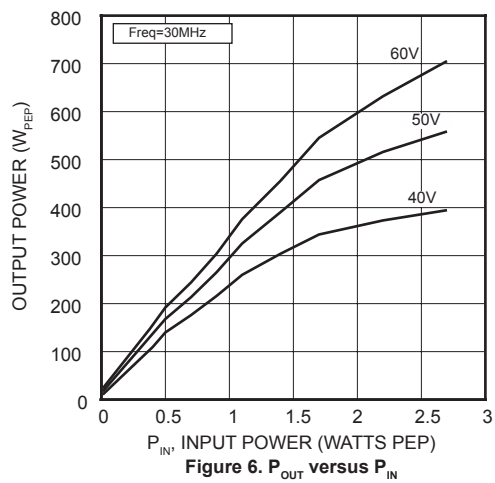
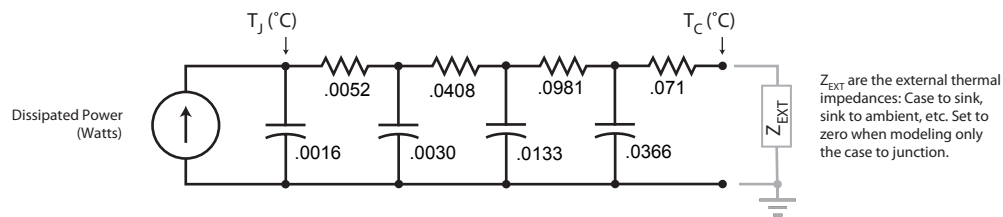
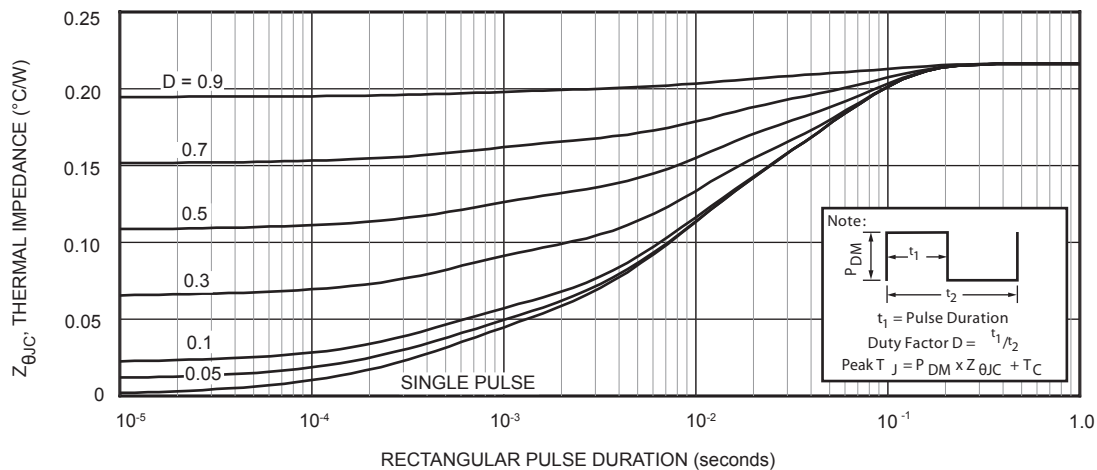
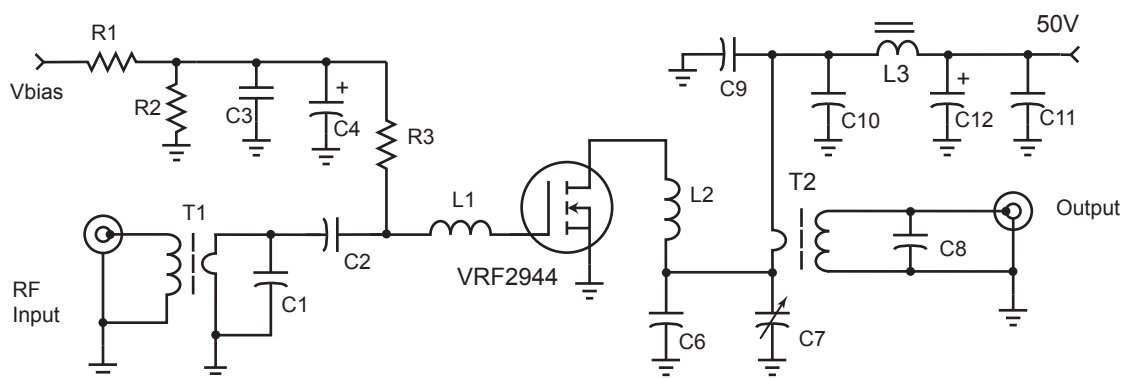


Table 1 - Typical Class AB Large Signal Input - Output Impedance

Freq. (MHz)	Z_{in}	Z_{out}
30	$4.5 - j 2.5$	$2.15 - j 2.71$

$I_{dq} = 100\text{mA}$ Z_{OL} - Conjugate of optimum load for 400 Watts output at $V_{dd}=150\text{V}$

30 MHz Test Circuit



C1 1200pF ATC100B ceramic
 C2, C3 0.1uF 100V 1206 SMT
 C9-C11 .047uF NPO 100V 1218 SMT
 C6 180 pF metal clad mica
 C7 ARCO 465 mica trimmer
 C8 100 pF ATC 100E ceramic
 C4, C12 10uF 100V Electrolytic
 L1 25 nH - 2t #18 0.2"d .2"

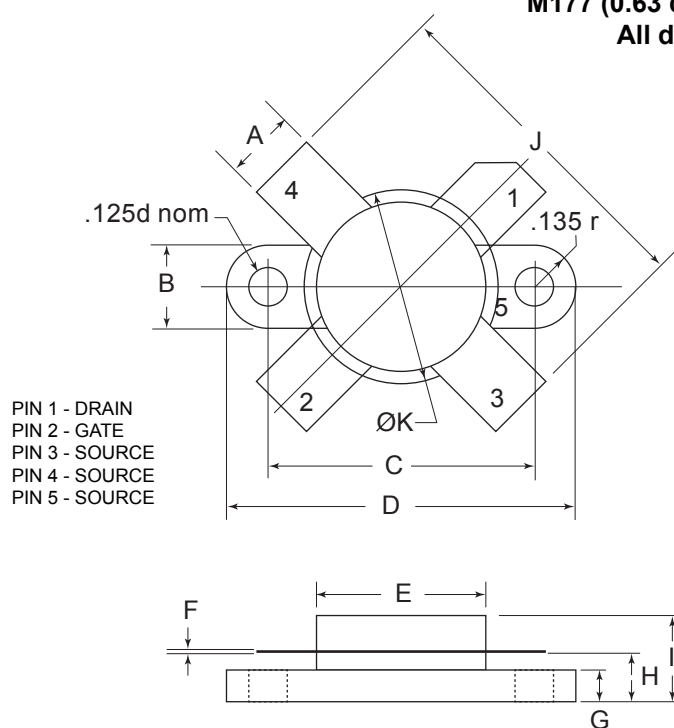
L2 26 nH - 1.5t #12 0.31"d2
 L3 2t #16 on 2x 267300081 .5" bead
 R1-R2 1k Ω 1/4W
 R3 100 Ω 1W
 T1 16:1 transformer 4t #24 teflon on
 RF Parts Co. T1/2 transformer core
 T2 9:1 transformer 3t 2-ply #16 teflon on
 RF Parts Co. T1 transformer core

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%.

M177 (0.63 dia. SOE) Mechanical Data
All dimensions are ± 0.005



DIM	MIN	TYP	MAX
A	0.225	0.230	0.235
B	0.265	0.270	0.275
C	0.860	0.865	0.870
D	1.130	1.135	1.140
E	0.545	0.550	0.555
F	0.003	0.005	0.007
G	0.098	0.103	0.108
H	0.150	0.160	0.170
I			0.280
J	1.080	1.100	1.120
K	0.625	0.630	0.635

HAZARDOUS MATERIAL WARNING: The ceramic portion of the device below the lead plane is beryllium oxide. Beryllium oxide dust is highly toxic when inhaled. Care 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. BeO substrate weight: 0.703g. Percentage of total module weight which is BeO: 9%.

**Microsemi Headquarters**

One Enterprise, Aliso Viejo,
CA 92656 USA

Within the USA: +1 (800) 713-4113

Outside the USA: +1 (949) 380-6100

Sales: +1 (949) 380-6136

Fax: +1 (949) 215-4996

Email: sales.support@microsemi.com

www.microsemi.com

© 2020 Microsemi. All rights reserved. Microsemi and the Microsemi logo are trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.

Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice.

Microsemi, a wholly owned subsidiary of Microchip Technology Inc. (Nasdaq: MCHP), offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions; security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, California, and has approximately 4,800 employees globally. Learn more at www.microsemi.com.