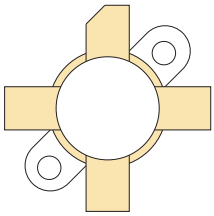
Microsemi
POWER PRODUCTS GROUP

VRF2933
PRELIMINARY

50V, 300W, 150MHz

RF POWER VERTICAL MOSFET

The VRF2933 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**
- **300W with 20dB Min. Gain @ 30MHz, 50V**
- **Excellent Stability & Low IMD**
- **Common Source Configuration**
- **RoHS Compliant**
- **3:1 Load VSWR Capability at Specified Operating Conditions**
- **Nitride Passivated**
- **Refractory Gold Metallization**
- **High Voltage Replacement for SD2933**
- **Thermally Enhanced Package**

Maximum Ratings

All Ratings: T_C =25°C unless otherwise specified

Symbol	Parameter	VRF2933	Unit
V_{DSS}	Drain-Source Voltage	170	V
I_D	Continuous Drain Current @ T_C = 25°C	40	A
V_{GS}	Gate-Source Voltage	±40	V
P_D	Total Device dissipation @ T_C = 25°C	648	W
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)	170	180		V
$V_{DS(ON)}$	On State Drain Voltage ($I_{D(ON)}$ = 20A, V_{GS} = 10V)		2.0	5.0	
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 100V, V_{GS} = 0V)			2.0	mA
I_{GSS}	Gate-Source Leakage Current (V_{DS} = ±20V, V_{DS} = 0V)			2.0	µA
g_{fs}	Forward Transconductance (V_{DS} = 10V, I_D = 20A)	8			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			0.27	°C/W

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

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Dynamic Characteristics

VRF2933

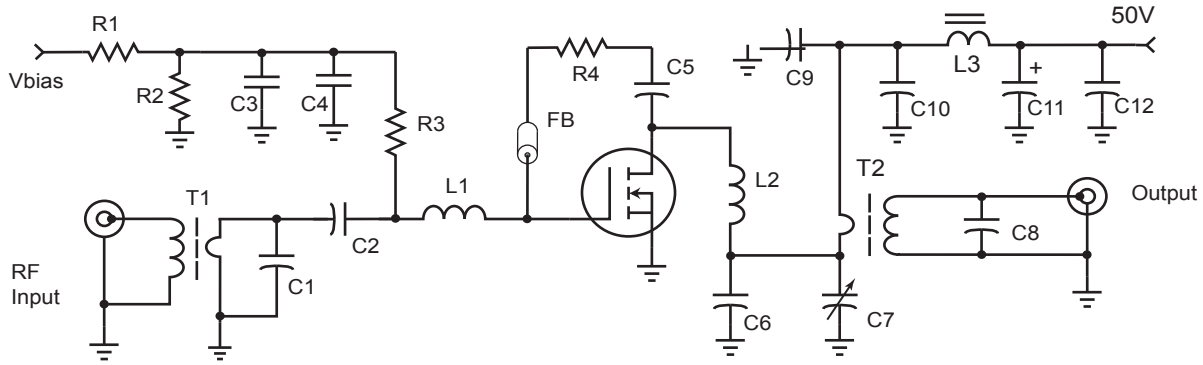
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	V_{GS} = 0V		740		pF
C_{oss}	Output Capacitance	V_{DS} = 150V		400		
C_{rss}	Reverse Transfer Capacitance	f = 1MHz		32		

Functional Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
G_{PS}	f_1 = 30MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 300W	18	22		dB
η_D	f_1 = 175MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 300W		50		%
ψ	f_1 = 30MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 300W 3:1 VSWR - All Phase Angles	No Degradation in Output Power			

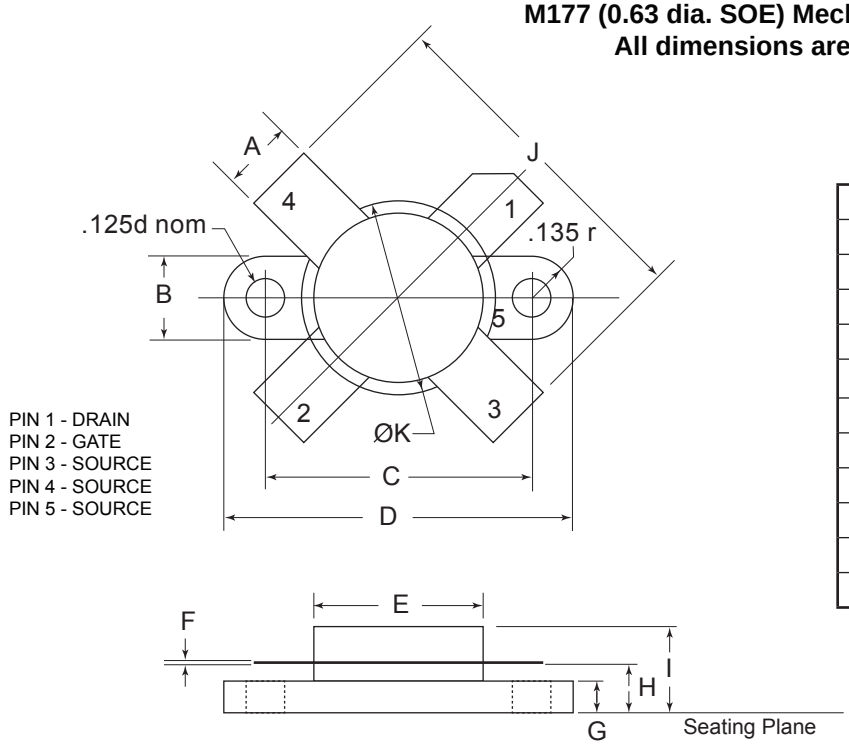
1. To MIL-STD-1311 Version A, test method 2204B, Two Tone, Reference Each Tone

30 MHz Test Circuit



C1 180pF ATC100B ceramic
C2, C3, C5, C9, C10, C12 0.1uF 100V
C6 680pF metal clad 500V mica
C7 ARCO 467 mica trimmer
C8 100pF ATC 100E ceramic
C4, C12 10uF 100V Electrolytic
FB small ferrite bead u-126
L1 20nH 2t #18 0.188"d .2"l
L2 18nH - 1.5t #14 enam. .25" dia.
L3 2t #16 on 2x 267300081 .5" bead
R1-R2 1k Ohm 1/4W
R3 100 Ohm 1W
R4 500 Ohm 10W flange mount
T1 16:1 transformer 4t #20 teflon on RF Parts Co. T1/2 transformer core
T2 9:1 transformer 3t #16 teflon on RF Parts Co. T1 transformer core

M177 (0.63 dia. SOE) Mechanical Data
All dimensions are ±.005



PIN 1 - DRAIN
PIN 2 - GATE
PIN 3 - SOURCE
PIN 4 - SOURCE
PIN 5 - SOURCE

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

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