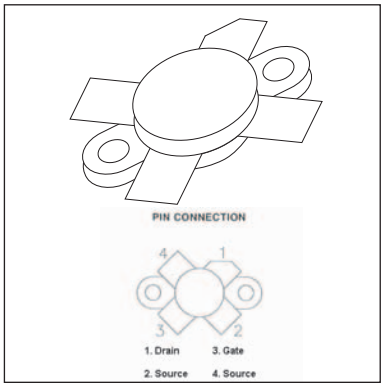
VRF150

50V 150W 150MHz

RF POWER VERTICAL MOSFET

The VRF150 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

- **150W with 11dB Typical Gain @ 150MHz, 50V**
- **150W with 18dB Min. Gain @ 30MHz, 50V**
- **Excellent Stability & Low IMD**
- **Common Source Configuration**
- **30:1 Load VSWR Capability at Specified Operating Conditions**
- **Nitride Passivated**
- **Refractory Gold Metallization**

Maximum Ratings

All Ratings: T_C = 25°C unless otherwise specified

Symbol	Parameter	VRF150	Unit
V_{DD}	Drain-Source Voltage	160	Volts
V_{DGO}	Drain-Gate Voltage	160	
I_D	Continuous Drain Current @ T_C = 25°C	16	Amps
V_{GS}	Gate-Source Voltage	±40	Volts
P_D	Total Device Dissipation @ T_C = 25°C	300	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 ($I_{D(ON)}$ = 10A, V_{GS} = 10V)	1.0	2.0	5.0	
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 50V, V_{GS} = 0V)			5.0	mA
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±20V, V_{DS} = 0V)			1.0	µA
g_{fs}	Forward Transconductance (V_{DS} = 10V, I_D = 5A)	4.5			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			0.60	°C/W

050-4936 Rev A 7-2006

DYNAMIC CHARACTERISTICS

VRF150

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	V_{GS} = 0V		480		pF
C_{oss}	Output Capacitance	V_{DS} = 50V		230		
C_{rss}	Reverse Transfer Capacitance	f = 1MHz		40		

FUNCTIONAL CHARACTERISTICS

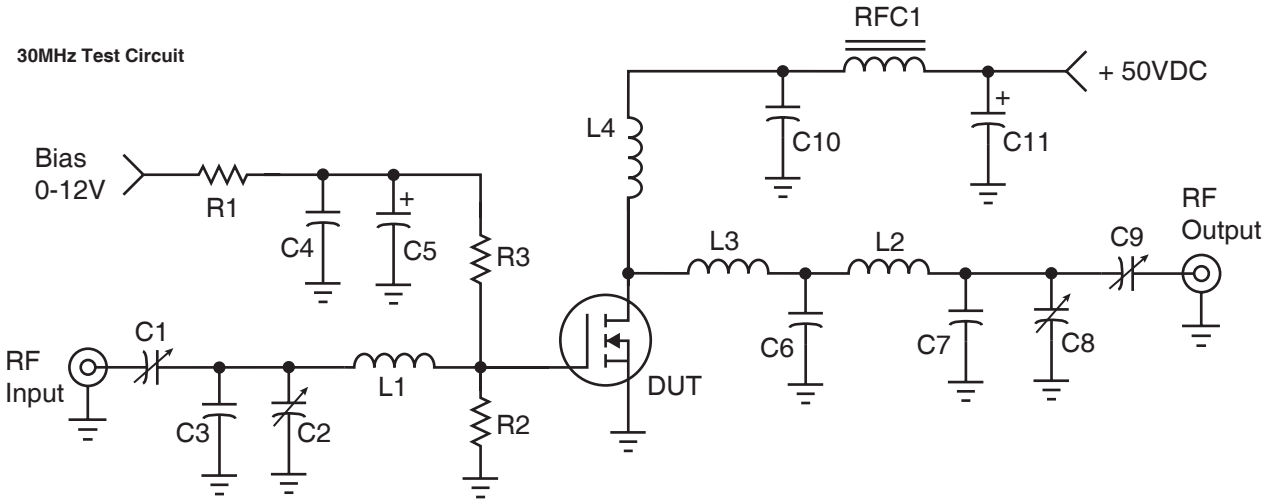
Symbol	Test Conditions	Min	Typ	Max	Unit
G_{PS}	f = 30MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W_{PEP}	18			dB
G_{PS}	f = 150MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W_{PEP}		11		
η_D	f = 150MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W_{PEP}		50		%
$IMD_{(d3)}$	f1 = 30MHz, f2 = 30.001MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W_{PEP} ①		-32		dBc
$IMD_{(d11)}$	f1 = 30MHz, f2 = 30.001MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W_{PEP}		-60		
ψ	f = 30MHz, V_{DD} = 50V, I_{DQ} = 250mA, P_{out} = 150W_{PEP} 30:1VSWR - All Phase Angles	No Degradation in Output Power			

Class A Characteristics

Symbol	Test Conditions	Min	Typ	Max	Unit
G_{PS}	V_{DD} = 50V, I_{DQ} = 3A, P_{out} = 50W_{PEP}, f1 = 30MHz, f2 = 30.001MHz		20		dB
$IMD_{(d3)}$			-50		
$IMD_{(d9\text{-}d13)}$			-75		

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

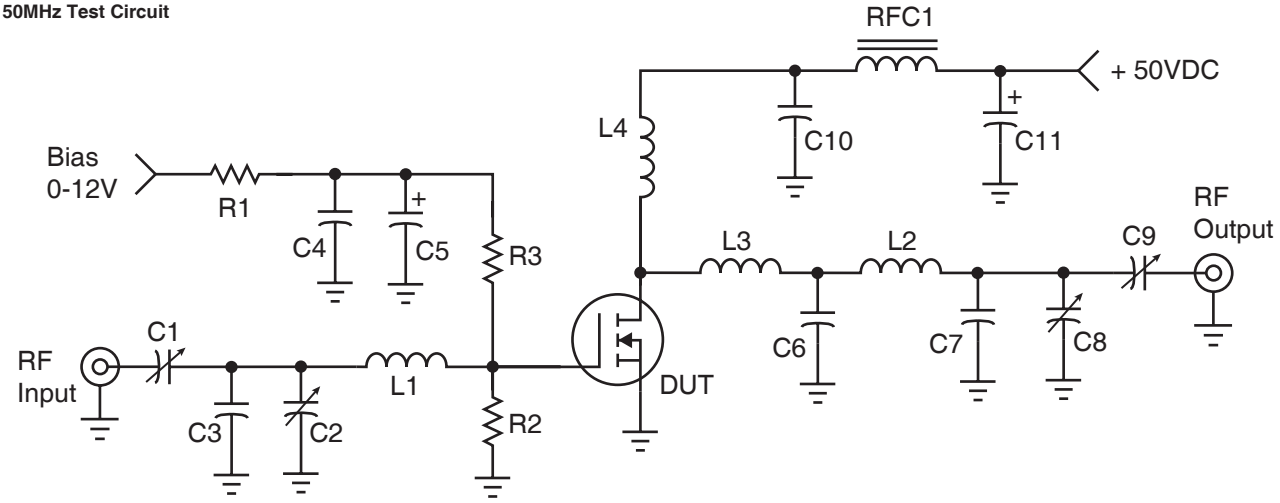
30MHz Test Circuit



C1, C2, C8 -- Arco 463 or equivalent
C3 -- 25pF, Unelco
C4 -- 0.1uF, Ceramic
C5 -- 1.0uF, 15 WV Tantalum
C6 -- 250pF, Unelco J101
C7-- 25pF, Unelco J101
C9 -- Arco 262 or equivalent
C10 -- 0.05uF, Ceramic
C11 -- 15uF, 60WV Electrolytic

L1 -- 3/4", #18 into Hairpin
L2 -- Printed Line, 0.200" W x 0.500" L
L3 -- 1", #16 into Hairpin approx 16nH
L4 -- 2 turns #16, 5/16" ID
RFC1 - VK200-4B
R1 -- 150Ω, 1/2W Carbon
R2 -- 10kΩ, 1/2W Carbon
R3 -- 120Ω, 1/2W Carbon

150MHz Test Circuit



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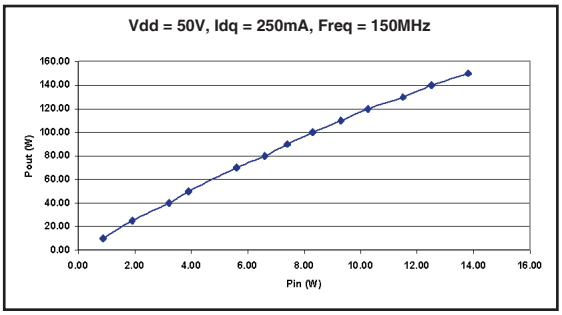
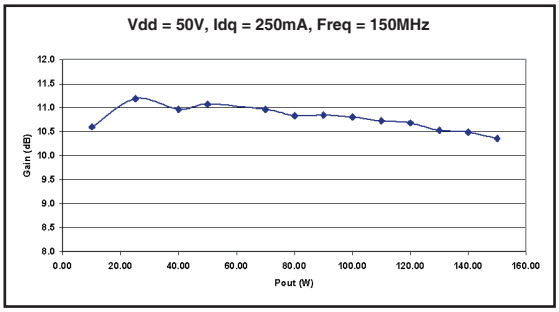
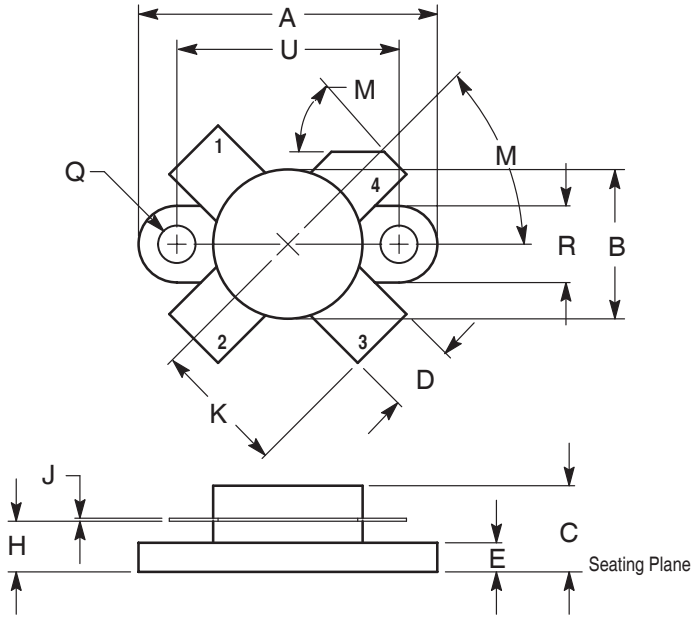
Power Out vs. Power In



Gain vs. Power Out



.5" SOE Package Outine



PIN 1. SOURCE
2. GATE
3. SOURCE
4. DRAIN

2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.960	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