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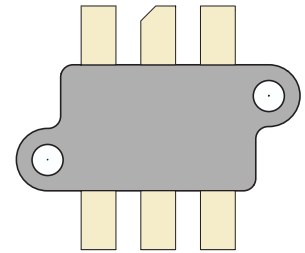
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RF POWER VERTICAL MOSFET

The VRF191 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.



T11

FEATURES

- Improved Ruggedness $V_{(BR)DSS} = 270V$ min
- 150W with 22dB Typical Gain @ 30MHz, 100V
- 150W with 14dB Typical Gain @ 150MHz, 100V
- Excellent Stability & Low IMD
- Common Source Configuration
- RoHS Compliant 
- 5:1 Load VSWR Capability at Specified Operating Conditions
- Nitride Passivated
- Refractory Gold Metallization
- High Performance Flangeless Package

Maximum Ratings

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

| Symbol | Parameter | VRF191 | Unit |
|-----------|---|------------|------|
| V_{DSS} | Drain-Source Voltage | 270 | V |
| I_D | Continuous Drain Current @ $T_c = 25^\circ C$ | 12 | 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 200 | °C |
| T_J | Operating Junction Temperature | 200 | |

Static Electrical Characteristics

| Symbol | Parameter | Min | Typ | Max | Unit |
|---------------|--|-----|-----|-----|---------|
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 100mA$) | 270 | 280 | | V |
| $V_{DS(ON)}$ | On State Drain Voltage ($I_{D(ON)} = 5A, V_{GS} = 10V$) | | 3.5 | 5.0 | |
| I_{DSS} | Zero Gate Voltage Drain Current ($V_{DS} = 200V, V_{GS} = 0V$) | | | 1.0 | mA |
| I_{GSS} | Gate-Source Leakage Current ($V_{DS} = \pm 20V, V_{GS} = 0V$) | | | 1.0 | μA |
| g_{fs} | Forward Transconductance ($V_{DS} = 10V, I_D = 5A$) | 4.0 | 6 | | 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 | | | 0.35 | |
| $R_{\theta JS}$ | Junction to Sink (Use high efficiency thermal joint compound and planar heat sink surface.) | | .45 | | °C/W |

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

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|-----------|------------------------------|--|-----|-----|-----|------|
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ $V_{DS} = 100V$ $f = 1MHz$ | | 460 | | pF |
| C_{oss} | Output Capacitance | | | 80 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 6 | | |

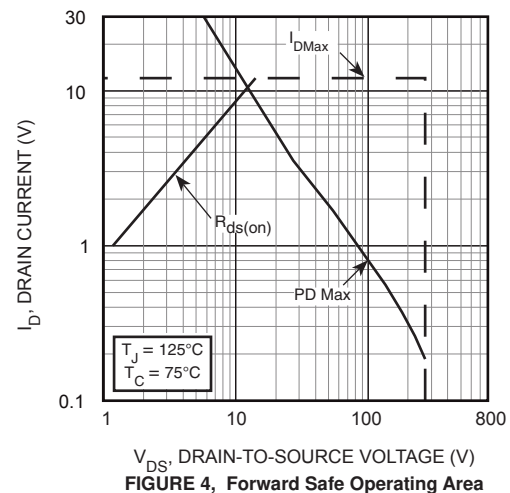
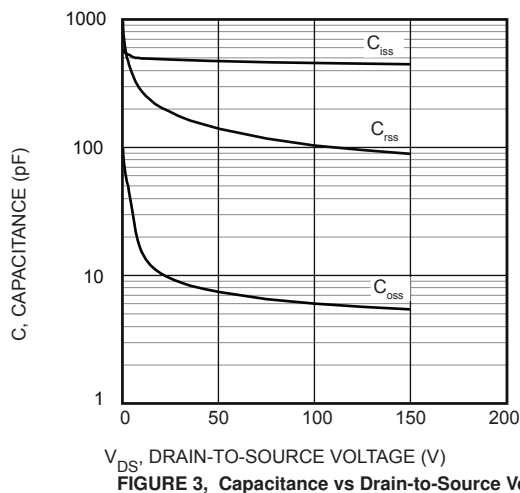
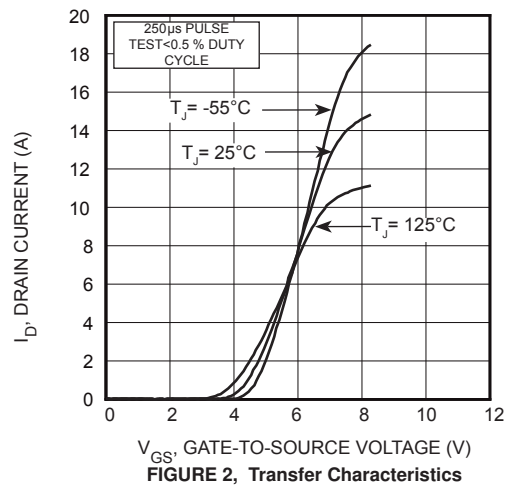
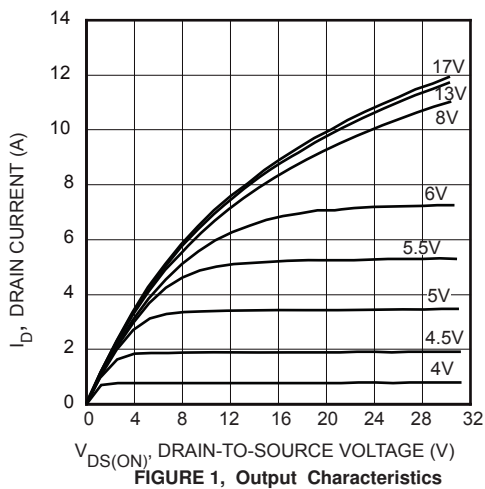
Functional Characteristics

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|----------|--|-----------------|--------------------------------|-----|-----|------|
| G_{PS} | $f_1 = 30MHz, V_{DD} = 100V, I_{DQ} = 250mA, P_{out} = 150W$ | | 18 | 22 | | dB |
| G_{PS} | $f_1 = 150MHz, V_{DD} = 100V, I_{DQ} = 250mA, P_{out} = 150W$ | | | 14 | | |
| η_D | $f_1 = 30MHz, V_{DD} = 100V, I_{DQ} = 250mA, P_{out} = 150W$ | | | 50 | | % |
| ψ | $f_1 = 30MHz, V_{DD} = 100V, I_{DQ} = 250mA, P_{out} = 150W$ Phase Angles | 5:1 VSWR - All | No Degradation in Output Power | | | |

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.

Typical Performance Curves



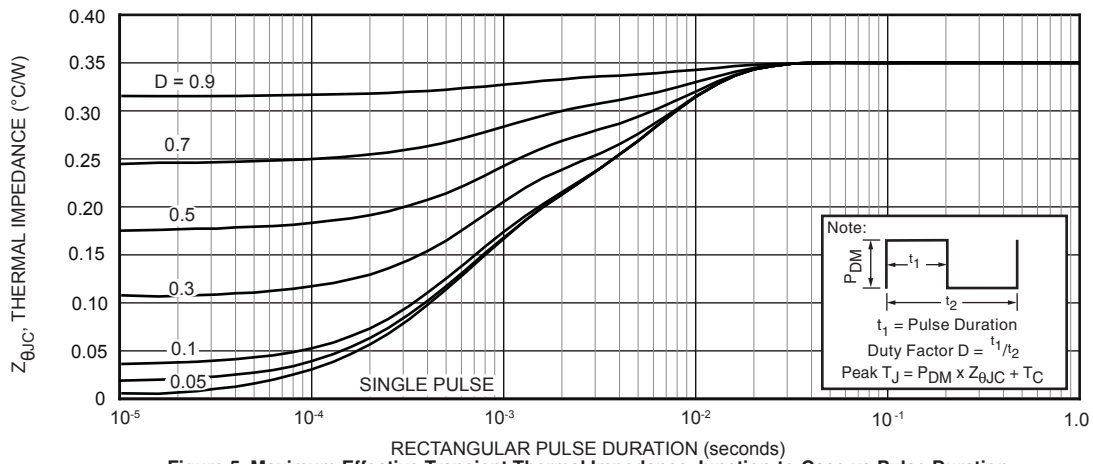


Figure 5. Maximum Effective Transient Thermal Impedance Junction-to-Case vs Pulse Duration

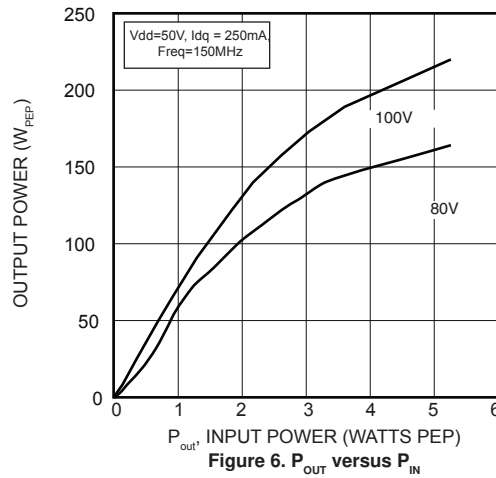
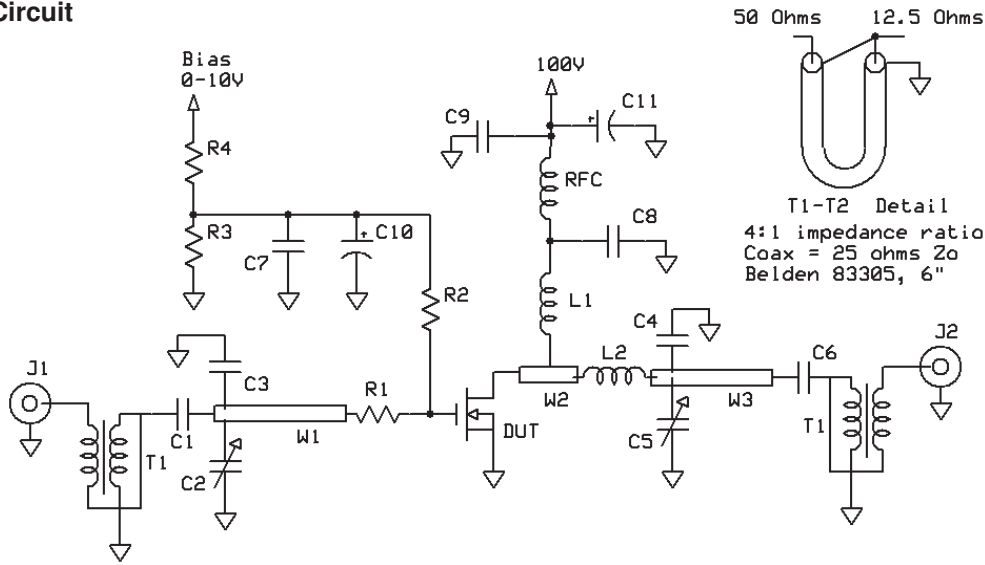
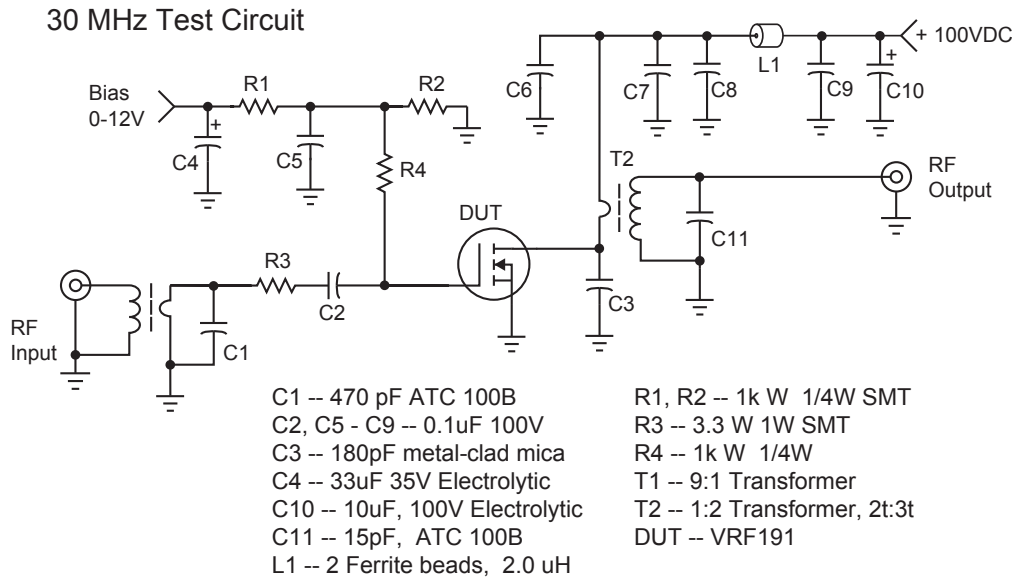


Figure 6. P_{out} versus P_{in}

150 MHz Test Circuit



- C1, C6 - 910pF ATC 100B
- C2, C5 - ARCO 406 ~70pF
- C3 - 110 pF ATC 100B
- C4 - 120 pF ATC 100B
- C7-C9 - 0.1uF 100V 120B SMT
- C10 - 1 uF 15 WV tant
- C11 - 15uF 100V Elect
- L1 - 6t #18 0.25" dia tight
- L2 - 1.2" #16 into hairpin 18 nH
- R1 - 1 ohm 1W SMT
- R2 - R4 - 2200 ohm 1/4W
- RFC Fair-Rite 2961666631 (VK200-4B)
- T1 T2 - 4:1 transformer - see detail
- W1 Stripline .25 x 1"
- W2 Stripline .25 x 0.50"
- W3 Stripline .25" x 75" (<30 ohm)
- DUT - VRF191



T11 Package Outline

