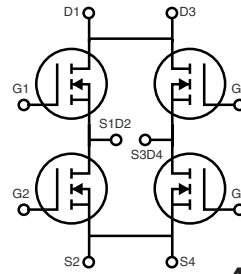
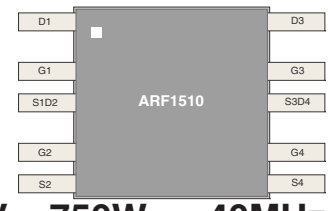


# RF POWER MOSFET

## FULL-BRIDGE



# ARF1510



**400V 750W 40MHz**

The ARF1510 is four RF power transistor arranged in an H-Bridge configuration. It is intended for off-line 300V operation in high power scientific, medical and, industrial RF power generator and amplifier applications up to 40 MHz.

- Specified 300 Volt, 27.12 MHz Characteristics:  
 Output Power = 750 Watts.  
 Gain = 17dB (Class D)

- High Performance Power RF Package.
- Very High Breakdown for Improved Ruggedness.
- Low Thermal Resistance.
- Nitride Passivated Die for Improved Reliability.
- RoHS Compliant

### MAXIMUM RATINGS

All Ratings:  $T_C = 25^\circ\text{C}$  unless otherwise specified.

| Symbol         | Parameter   | ARF 1510   | UNIT  |
|----------------|---|------------|-------|
| $V_{DSS}$      | Drain-Source Voltage                                | 1000       | Volts |
| $I_D$          | Continuous Drain Current @ $T_C = 25^\circ\text{C}$ | 8          | Amps  |
| $V_{GS}$       | Gate-Source Voltage                                 | $\pm 30$   | Volts |
| $P_D$          | Total Device Dissipation @ $T_C = 25^\circ\text{C}$ | 1500       | Watts |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range    | -55 to 175 | °C    |
| $T_L$          | Lead Temperature: 0.063" from Case for 10 Sec.      | 300        |       |

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol          | Characteristic / Test Conditions  | MIN  | TYP | MAX       | UNIT          |
|-----------------|---|------|-----|-----------|---------------|
| $BV_{DSS}$      | Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 250 \mu\text{A}$ )                   | 1000 |     |           | Volts         |
| $V_{DS(ON)}$    | On State Drain Voltage <sup>①</sup> ( $I_{D(ON)} = 3.25A, V_{GS} = 10V$ )                 |      | 6.8 | 7.5       |               |
| $I_{DSS}$       | Zero Gate Voltage Drain Current ( $V_{DS} = 1000V, V_{GS} = 0V$ )                         |      |     | 25        | $\mu\text{A}$ |
|                 | Zero Gate Voltage Drain Current ( $V_{DS} = 800V, V_{GS} = 0V, T_C = 125^\circ\text{C}$ ) |      |     | 250       |               |
| $I_{GSS}$       | Gate-Source Leakage Current ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )                           |      |     | $\pm 100$ | nA            |
| $g_{fs}$        | Forward Transconductance ( $V_{DS} = 25V, I_D = 3.25A$ )                                  | 3    | 4   |           | mhos          |
| $V_{isolation}$ | RMS Voltage (60Hz Sinewave from terminals to mounting surface for 1 minute)               | TBD  |     |           | Volts         |
| $V_{GS(TH)}$    | Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 50mA$ )                                  | 3    |     | 5         | Volts         |

### THERMAL CHARACTERISTICS

| Symbol           | Characteristic (per package unless otherwise noted)   | MIN | TYP  | MAX  | UNIT |
|------------------|---|-----|------|------|------|
| $R_{\theta JC}$  | Junction to Case  |     |      | 0.10 | °C/W |
| $R_{\theta JHS}$ | Junction to Sink (Use High Efficiency Thermal Joint Compound and Planar Heat Sink Surface.) |     | 0.16 |      |      |

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

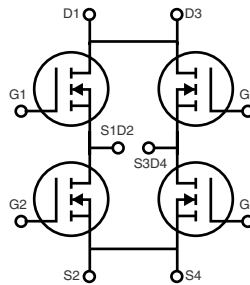
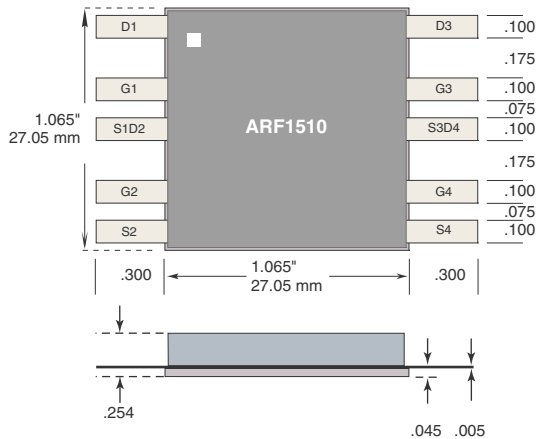
| Symbol       | Characteristic               | Test Conditions   | MIN | TYP  | MAX  | UNIT |
|--------------|------------------------------|---|-----|------|------|------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$<br>$V_{DS} = 200V$<br>$f = 1 \text{ MHz}$                             |     | 1200 | 1800 | pF   |
| $C_{oss}$    | Output Capacitance           |   |     | 100  | 130  |      |
| $C_{rss}$    | Reverse Transfer Capacitance |   |     | 20   | 26   |      |
| $t_{d(on)}$  | Turn-on Delay Time           | $V_{GS} = 15V$<br>$V_{DD} = 500V$<br>$I_D = 6.5A @ 25^\circ C$<br>$R_G = 1.6\Omega$ |     | 8    |      | ns   |
| $t_r$        | Rise Time                    |   |     | 5    |      |      |
| $t_{d(off)}$ | Turn-off Delay Time          |   |     | 18   |      |      |
| $t_f$        | Fall Time                    |   |     | 10   |      |      |

FUNCTIONAL CHARACTERISTICS

| Symbol   | Characteristic                     | Test Conditions               | MIN                            | TYP | MAX | UNIT |
|----------|------------------------------------|-------------------------------|--------------------------------|-----|-----|------|
| $G_{PS}$ | Common Source Amplifier Power Gain | $f = 40.7 \text{ MHz}$        | 13                             | 15  |     | dB   |
| $\eta$   | Drain Efficiency                   | $V_{GS} = 0V$ $V_{DD} = 400V$ |                                | 75  |     | %    |
| $\Psi$   | Electrical Ruggedness VSWR 6:1     | $P_{out} = 750W$              | No Degradation in Output Power |     |     |      |

① Pulse Test: Pulse width < 380  $\mu$ S, Duty Cycle < 2%.

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



**HAZARDOUS MATERIAL WARNING**

The ceramic portion of the device between leads and mounting surface is beryllium oxide, BeO. Beryllium oxide dust is 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.

**Thermal Considerations and Package Mounting:**

The rated 1500W power dissipation is only available when the package mounting surface is at 25°C and the junction temperature is 175°C. The thermal resistance between junctions and case mounting surface is 0.10°C/W. When installed, an additional thermal impedance of 0.06°C/W between the package base and the mounting surface is smooth and flat. Thermal joint compound must be used to reduce the effects of small surface irregularities. The heatsink should incorporate a copper heat spreader to obtain best results.

The package is designed to be clamped to a heatsink. A clamped joint maintains the required mounting pressure while allowing for thermal expansion of both the device and the heat sink. A simple clamp, and two 6-32 (M3.5) screws can provide the minimum 125 lb. required mounting force. T=4-6 in.-lb. Please refer to App Note 1802 "Mounting Instructions for Flangeless Packages."

