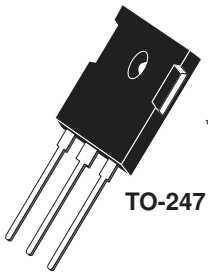
Microsemi
POWER PRODUCTS GROUP

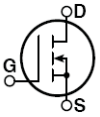


TO-247

# ARF465A(G)
# ARF465B(G)

*G Denotes RoHS Compliant, Pb Free Terminal Finish

Common Source




# RF POWER MOSFETs
## N-CHANNEL ENHANCEMENT MODE

**300V 150W 60MHz**

The ARF465A and 465B comprise a symmetric pair of common source RF power transistors designed for push-pull scientific, commercial, medical and industrial RF power amplifier applications up to 60 MHz.

- **Specified 300 Volt, 40.68 MHz Characteristics:**
  - **Output Power = 150 Watts.**
  - **Gain = 13dB (Class C)**
  - **Efficiency = 75%**
- **Low Cost Common Source RF Package.**
- **Low Vth thermal coefficient.**
- **Low Thermal Resistance.**
- **Optimized SOA for Superior Ruggedness.**

**MAXIMUM RATINGS** All Ratings: $T_C$ = 25°C unless otherwise specified.

| Symbol | Parameter | ARF465A/B(G) | UNIT |
|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | 1200 | Volts |
| $V_{DGO}$ | Drain-Gate Voltage | 1200 | |
| $I_D$ | Continuous Drain Current @ $T_C$ = 25°C | 6 | Amps |
| $V_{GS}$ | Gate-Source Voltage | ±30 | Volts |
| $P_D$ | Total Power Dissipation @ $T_C$ = 25°C | 250 | Watts |
| $R_{\theta JC}$ | Junction to Case | 0.50 | °C/W |
| $T_J$,$T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to 150 | °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 µA) | 1200 | | | Volts |
| $V_{DS}$(ON) | On State Drain Voltage ① ($I_D$(ON) = 3A, $V_{GS}$ = 10V) | | | 8 | |
| $I_{DSS}$ | Zero Gate Voltage Drain Current ($V_{DS}$ = $V_{DSS}$, $V_{GS}$ = 0V) | | | 25 | µA |
| | Zero Gate Voltage Drain Current ($V_{DS}$ = 0.8 $V_{DSS}$, $V_{GS}$ = 0V, $T_C$ = 125°C) | | | 250 | |
| $I_{GSS}$ | Gate-Source Leakage Current ($V_{GS}$ = ±30V, $V_{DS}$ = 0V) | | | ±100 | nA |
| $g_{fs}$ | Forward Transconductance ($V_{DS}$ = 25V, $I_D$ = 3A) | 3 | 4 | | mhos |
| $V_{GS}$(TH) | Gate Threshold Voltage ($V_{DS}$ = $V_{GS}$, $I_D$ = 50mA) | 3 | | 5 | Volts |

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

## DYNAMIC CHARACTERISTICS

**ARF465A/B(G)**

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V<br>$V_{DS}$ = 200V<br>f = 1 MHz | | 1200 | 1500 | pF |
| $C_{oss}$ | Output Capacitance | | | 80 | 100 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 30 | 50 | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{GS}$ = 15V<br>$V_{DD}$ = 0.5V<br>$I_D = I_{D[Cont.]}$ @ 25°C<br>$R_G$ = 1.6W | | 7 | 15 | ns |
| $t_r$ | Rise Time | | | 5 | 10 | |
| $t_{d(off)}$ | Turn-off Delay Time | | | 21 | 34 | |
| $t_f$ | Fall Time | | | 12 | 25 | |

## FUNCTIONAL CHARACTERISTICS

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $G_{PS}$ | Common Source Amplifier Power Gain | f = 40.68 MHz | 13 | 15 | | dB |
| η | Drain Efficiency | $V_{GS}$ = 0V $V_{DD}$ = 300V | 70 | 75 | | % |
| Ψ | Electrical Ruggedness VSWR 6:1 | $P_{out}$ = 150W | No Degradation in Output Power | | | |

① Pulse Test: Pulse width < 380 μS, Duty Cycle < 2%



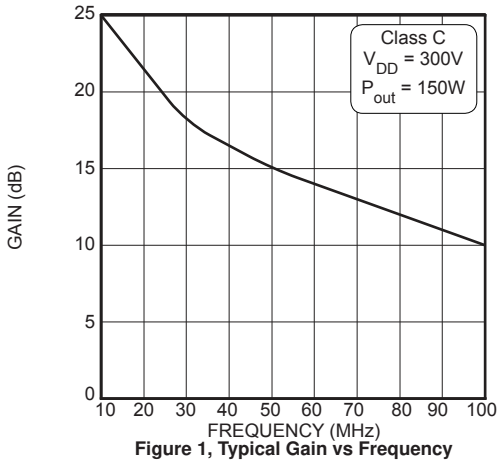



**Figure 1, Typical Gain vs Frequency**

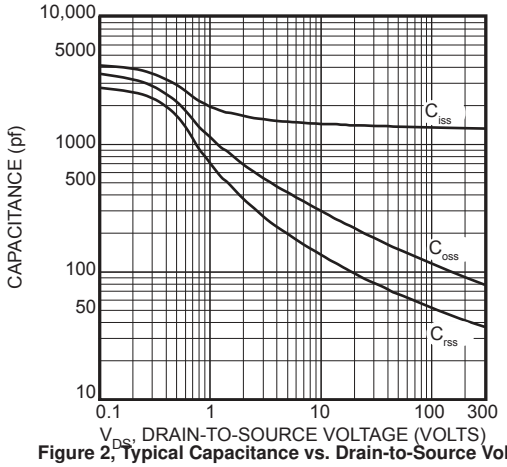



**Figure 2, Typical Capacitance vs. Drain-to-Source Voltage**

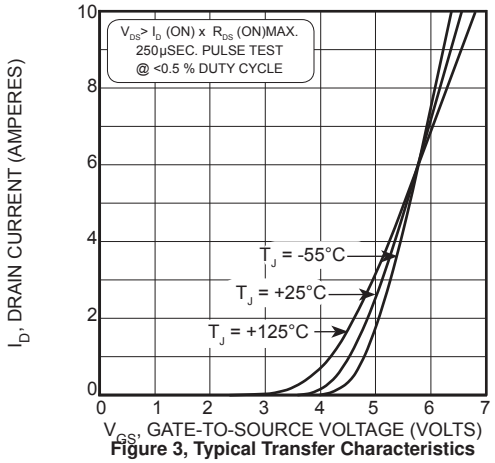



**Figure 3, Typical Transfer Characteristics**

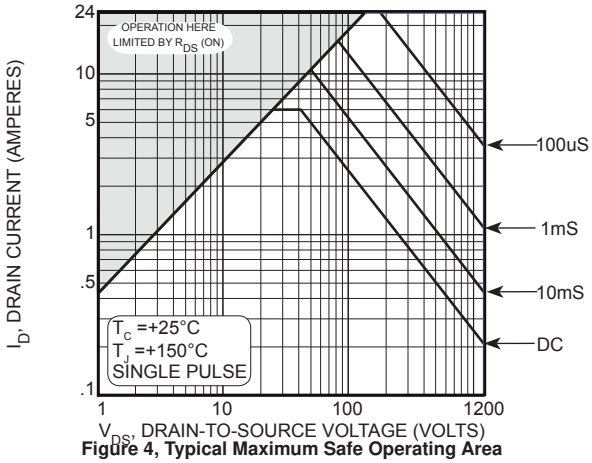



**Figure 4, Typical Maximum Safe Operating Area**

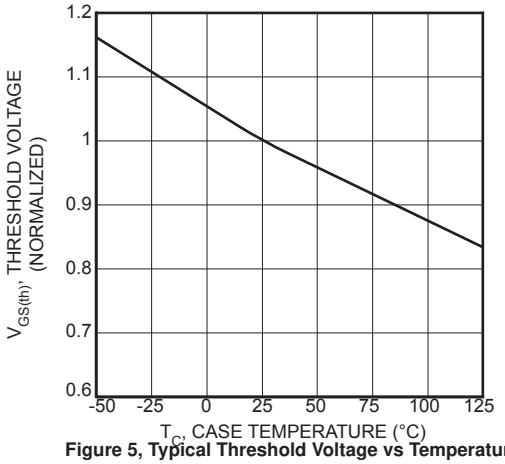



**Figure 5, Typical Threshold Voltage vs Temperature**

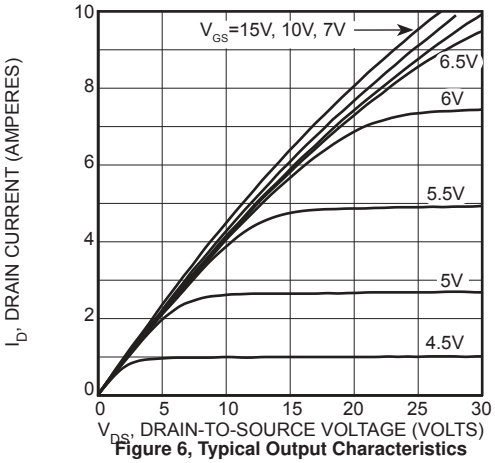



**Figure 6, Typical Output Characteristics**

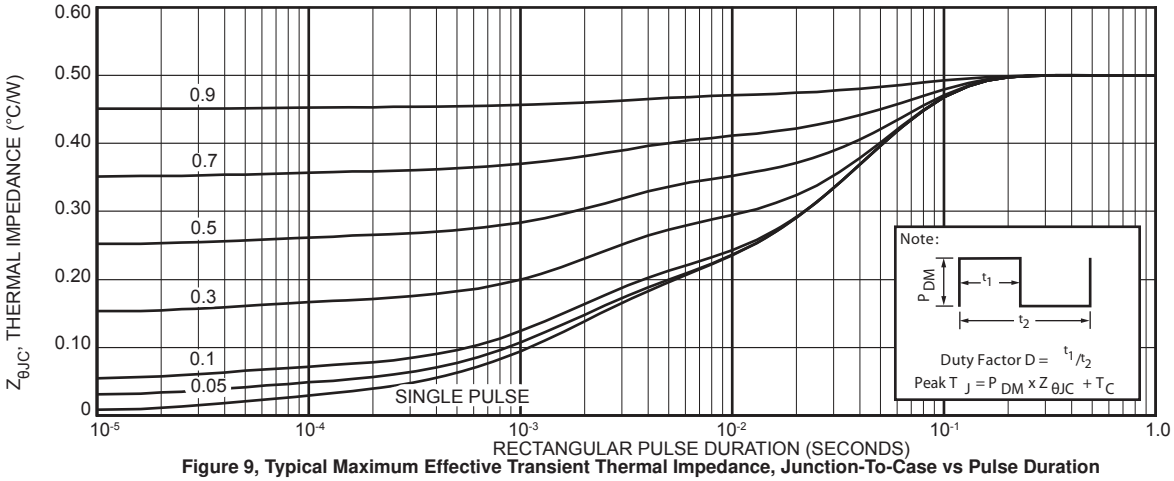



**Figure 9, Typical Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration**

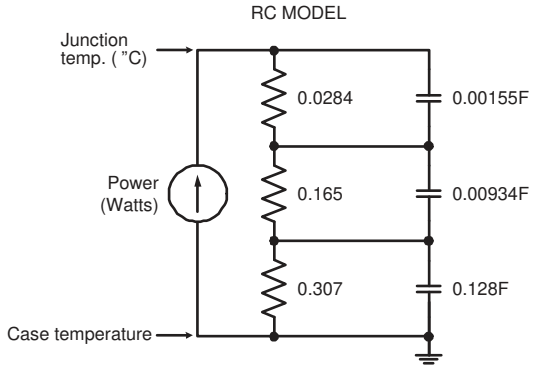


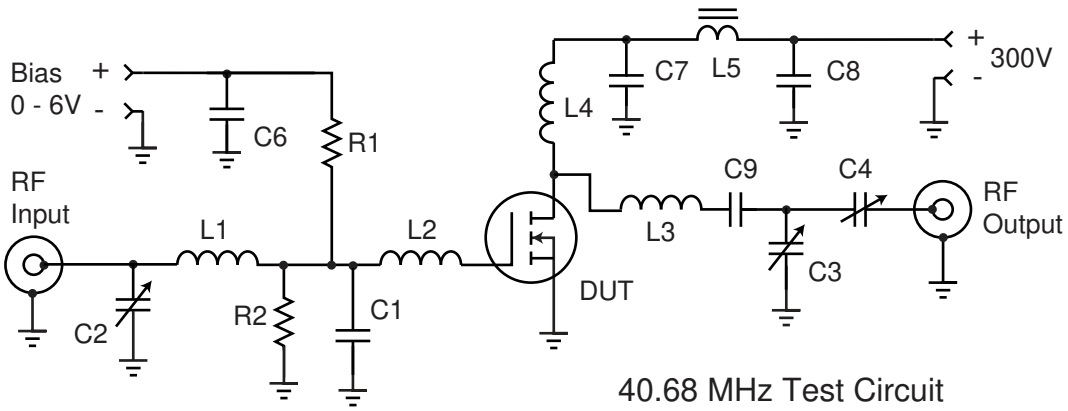

**Figure 9a, TRANSIENT THERMAL IMPEDANCE MODEL**

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

| Freq. (MHz) | $Z_{in}$ (Ω) | $Z_{OL}$ (Ω) |
|---|---|---|
| 2.0 | 21.4 - j 8.7 | 206 - j 45 |
| 13.5 | 2.6 - j 7.3 | 68 - j 99 |
| 27 | .54 - j 2.9 | 22 - j 64 |
| 40 | .22 - j .69 | 10.5 - j 44 |
| 65 | .31 + j 1.65 | 4.4 - j 27 |

$Z_{in}$ - Gate shunted with 25Ω $I_{DQ}$ = 100mA

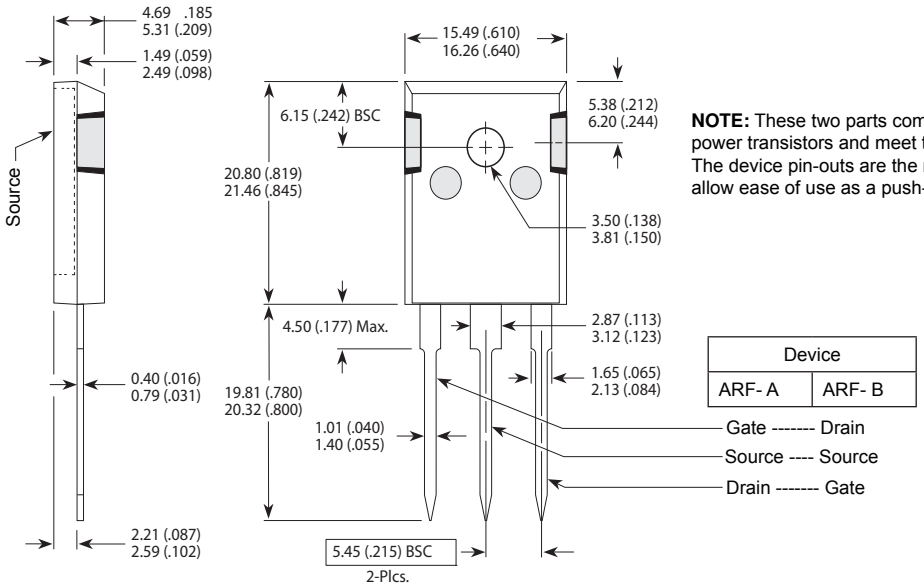
$Z_{OL}$ - Conjugate of optimum load for 150 Watts output at $V_{dd}$ = 300V




40.68 MHz Test Circuit

C1 - 1000pF 100V chip ATC 700B
C2-C5 - Arco 463 Mica trimmer
C6-C8 - .01 μF 500V ceramic chip
C9 - 2200 pF COG 500 V chip
L1 - 4t #20 AWG .25"ID .3"L ~110 nH
L2 - 2t #20 AWG .25"ID .3"L ~ 25 nH
L3-- 4t #16 AWG .4" ID .5"L ~290 nH
L4 -- 25t #24 AWG .35"ID ~2uH
L5-- VK200-4B ferrite choke 3uH
R1-R2 -- 51 Ohm 0.5W Carbon
DUT = ARF465A/B

## TO-247 Package Outline




| Device | |
|---|---|
| ARF- A | ARF- B |

**NOTE:** These two parts comprise a symmetric pair of RF power transistors and meet the same electrical specifications. The device pin-outs are the mirror image of each other to allow ease of use as a push-pull pair.

Dimensions in Millimeters and (Inches)

**HAZARDOUS MATERIAL WARNING:**
The ceramic portion of the device between leads and mounting flange 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.

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