
 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 V_{th} thermal coefficient.**

- **Low Thermal Resistance.**

- **Optimized SOA for Superior Ruggedness.**


MAXIMUM RATINGS

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

| Symbol | Parameter | ARF465A/B | UNIT |
|-----------------|-----------------------------------------------------|------------|--------------------|
| V_{DSS} | Drain-Source Voltage | 1200 | Volts |
| V_{DGO} | Drain-Gate Voltage | 1200 | |
| I_D | Continuous Drain Current @ $T_C = 25^\circ\text{C}$ | 6 | Amps |
| V_{GS} | Gate-Source Voltage | ± 30 | Volts |
| P_D | Total Power Dissipation @ $T_C = 25^\circ\text{C}$ | 250 | Watts |
| $R_{\theta JC}$ | Junction to Case | 0.50 | $^\circ\text{C/W}$ |
| T_J, T_{STG} | Operating and Storage Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| 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 ($V_{GS} = 0V, I_D = 250 \mu\text{A}$) | 1200 | | | Volts |
| $V_{DS(ON)}$ | On State Drain Voltage ^① ($I_D(ON) = 3A, V_{GS} = 10V$) | | | 7 | |
| I_{DSS} | Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$) | | | 25 | μA |
| | Zero Gate Voltage Drain Current ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$) | | | 250 | |
| I_{GSS} | Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$) | | | ± 100 | nA |
| g_{fs} | Forward Transconductance ($V_{DS} = 25V, I_D = 3A$) | 3 | 4 | | mhos |
| $V_{GS(TH)}$ | Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 50\text{mA}$) | 3 | | 5 | Volts |


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

DYNAMIC CHARACTERISTICS

ARF465A/B

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|--------------|------------------------------|----------------------------------------------------------------------------------------------------|-----|------|------|------|
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ $V_{DS} = 200V$ $f = 1 \text{ MHz}$ | | 1200 | 1500 | pF |
| C_{oss} | Output Capacitance | | | 80 | 100 | |
| C_{rss} | Reverse Transfer Capacitance | | | 30 | 50 | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_{D[Cont.]} @ 25^\circ C$ $R_G = 1.6\Omega$ | | 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 | $f = 40.68 \text{ MHz}$ | 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%

APT Reserves the right to change, without notice, the specifications and information contained herein.

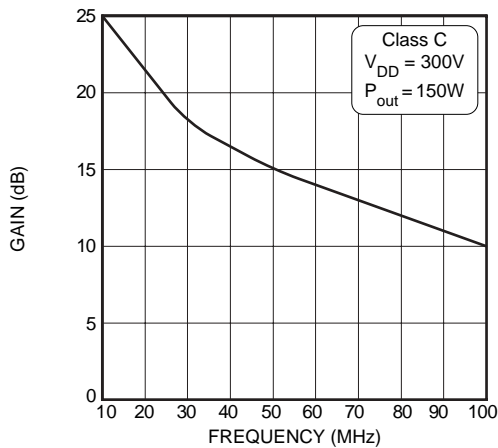


Figure 1, Typical Gain vs Frequency

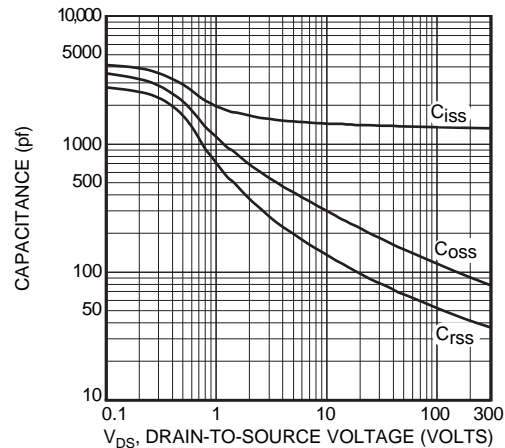


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

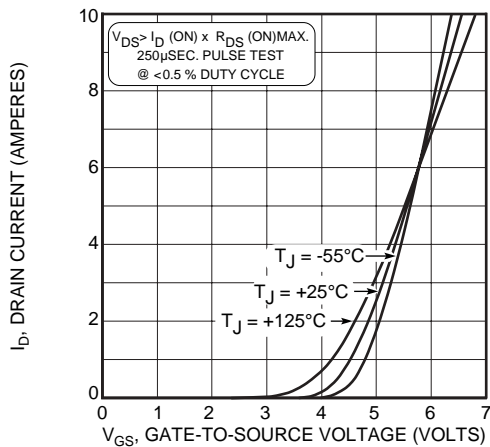


Figure 3, Typical Transfer Characteristics

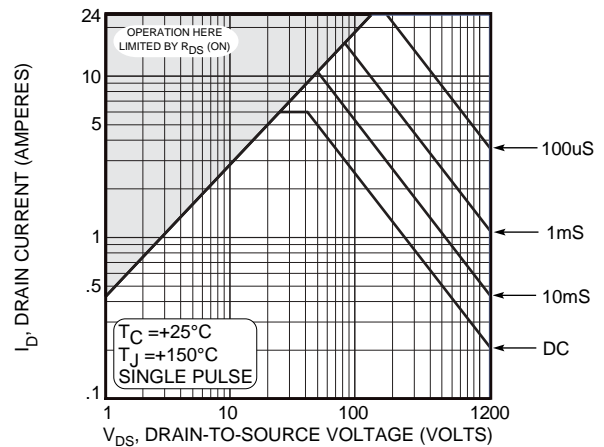


Figure 4, Typical Maximum Safe Operating Area

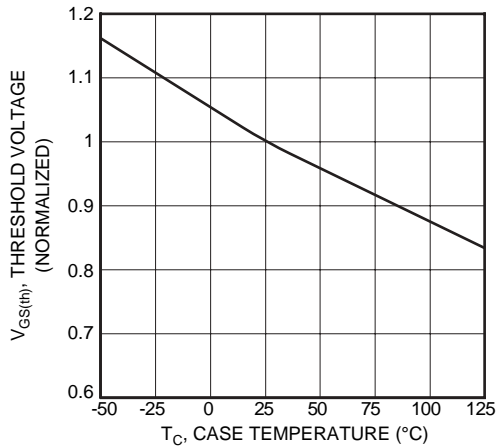


Figure 5, Typical Threshold Voltage vs Temperature

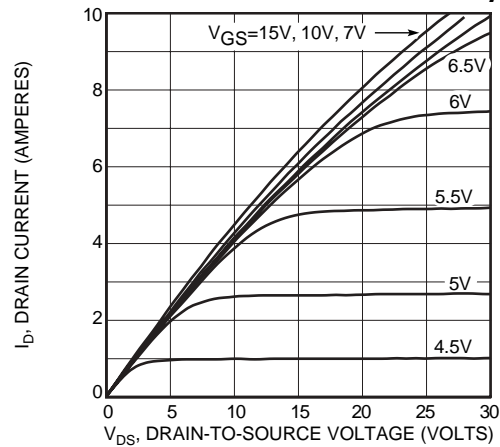


Figure 6, Typical Output Characteristics

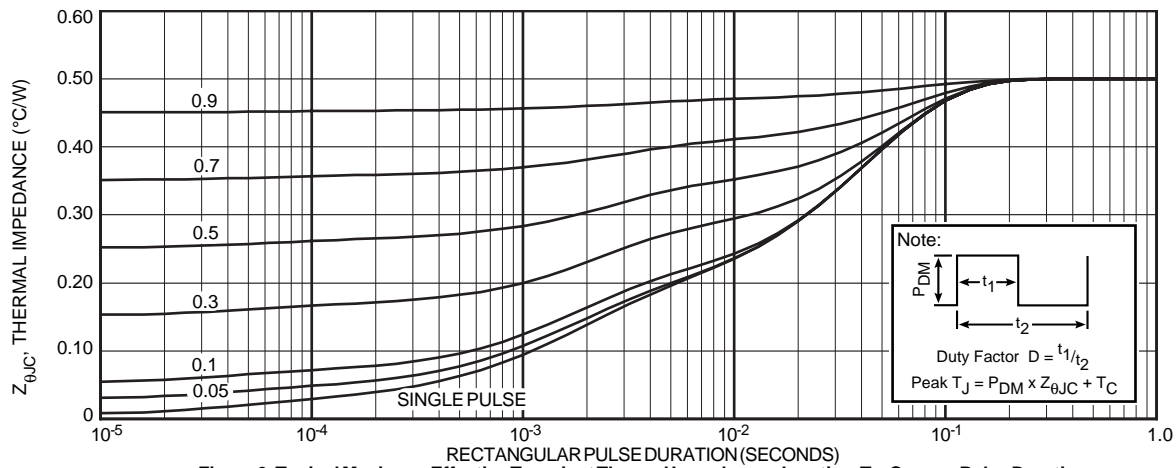


Figure 9, Typical Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

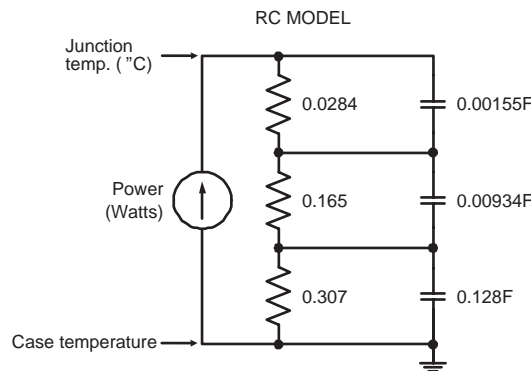


Figure 9a, TRANSIENT THERMAL IMPEDANCE MODEL

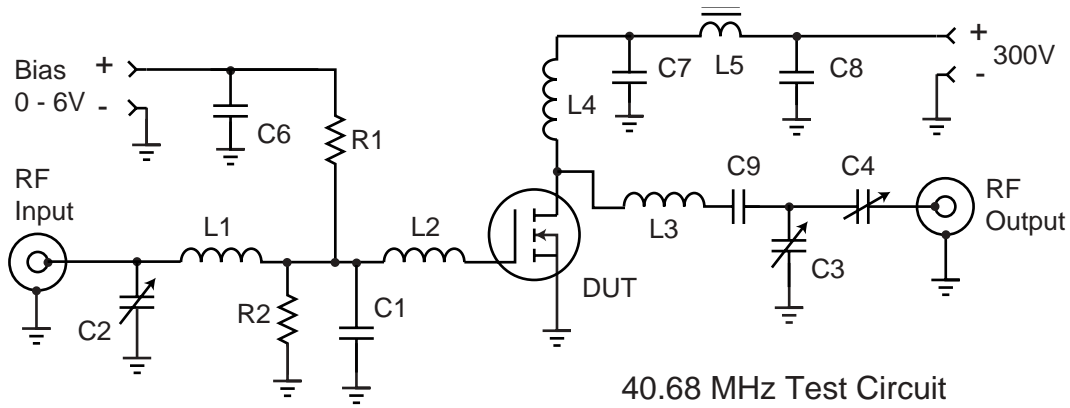
Table 1 - Typical Class AB Large Signal Input - Output Impedance

| 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

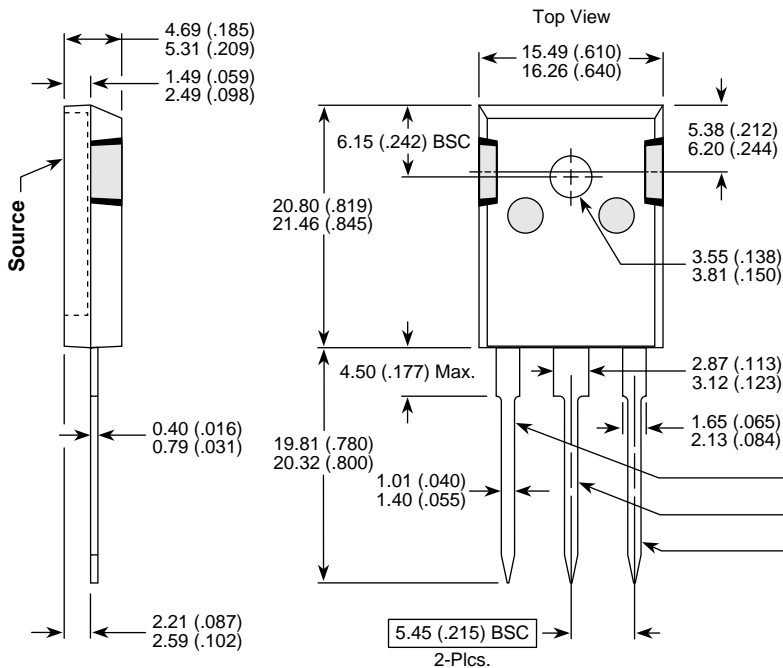
Z_{OL} - Conjugate of optimum load for 150 Watts output at V_{dd} = 300V



C1 - 1000pF 100V chip ATC 700B
 C2-C5 - Arco 463 Mica trimmer
 C6-C8 - .01 μ F 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



Dimensions in Millimeters and (Inches)
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.

| Device | |
|---------|---------|
| ARF - A | ARF - B |
| Gate | Drain |
| Source | Source |
| Drain | Gate |