

# RF POWER MOSFETs

## N-CHANNEL ENHANCEMENT MODE

**200V 300W 45MHz**

The ARF466A and ARF466B 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 45 MHz. They have been optimized for both linear and high efficiency classes of operation.

- Specified 150 Volt, 40.68 MHz Characteristics:
  - Output Power = 300 Watts.
  - Gain = 16dB (Class AB)
  - Efficiency = 75% (Class C)
- 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                                           | ARF466A_B(G) | UNIT               |
|-----------------|-----------------------------------------------------|--------------|--------------------|
| $V_{DSS}$       | Drain-Source Voltage                                | 1000         | Volts              |
| $V_{DGO}$       | Drain-Gate Voltage                                  | 1000         |                    |
| $I_D$           | Continuous Drain Current @ $T_C = 25^\circ\text{C}$ | 13           | Amps               |
| $V_{GS}$        | Gate-Source Voltage                                 | $\pm 30$     | Volts              |
| $P_D$           | Total Power Dissipation @ $T_C = 25^\circ\text{C}$  | 357          | Watts              |
| $R_{\theta JC}$ | Junction to Case                                    | 0.35         | $^\circ\text{C/W}$ |
| $T_J, T_{STG}$  | 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 ( $V_{GS} = 0V, I_D = 250 \mu A$ )                         | 1000 |     |           | Volts   |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance <sup>①</sup> ( $V_{GS} = 10V, I_D = 6.5A$ )              |      |     | 1.0       | ohms    |
| $I_{DSS}$    | Zero Gate Voltage Drain Current ( $V_{DS} = 1000V, V_{GS} = 0V$ )                         |      |     | 25        | $\mu A$ |
|              | 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 ( $V_{DS} = 25V, I_D = 6.5A$ )                                   | 3.3  | 7   | 9         | mhos    |
| $V_{GS(TH)}$ | Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 1mA$ )                                   | 2    |     | 4         | Volts   |

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

# DYNAMIC CHARACTERISTICS

ARF466A\_B(G)

| Symbol       | Characteristic               | Test Conditions                                                                       | MIN | TYP  | MAX | UNIT |
|--------------|------------------------------|---------------------------------------------------------------------------------------|-----|------|-----|------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$<br>$V_{DS} = 150V$<br>$f = 1\text{ MHz}$                                |     | 2000 |     | pF   |
| $C_{oss}$    | Output Capacitance           |                                                                                       |     | 165  |     |      |
| $C_{rss}$    | Reverse Transfer Capacitance |                                                                                       |     | 75   |     |      |
| $t_{d(on)}$  | Turn-on Delay Time           | $V_{GS} = 15V$<br>$V_{DD} = 500\text{ V}$<br>$I_D = 13A @ 25^\circ C$<br>$R_G = 1.6W$ |     | 12   |     | ns   |
| $t_r$        | Rise Time                    |                                                                                       |     | 10   |     |      |
| $t_{d(off)}$ | Turn-off Delay Time          |                                                                                       |     | 43   |     |      |
| $t_f$        | Fall Time                    |                                                                                       |     | 10   |     |      |

# FUNCTIONAL CHARACTERISTICS

| Symbol   | Characteristic                     | Test Conditions                 | MIN                            | TYP | MAX | UNIT |
|----------|------------------------------------|---------------------------------|--------------------------------|-----|-----|------|
| $G_{PS}$ | Common Source Amplifier Power Gain | $f = 40.68\text{ MHz}$          | 14                             | 16  |     | dB   |
| $\eta$   | Drain Efficiency                   | $V_{GS} = 2.5V$ $V_{DD} = 150V$ | 70                             | 75  |     | %    |
| $\Psi$   | Electrical Ruggedness VSWR 10:1    | $P_{out} = 300W$                | No Degradation in Output Power |     |     |      |

① Pulse Test: Pulse width < 380μS, Duty Cycle < 2%  
 APT Reserves the right to change, without notice, the specifications and information contained herein.

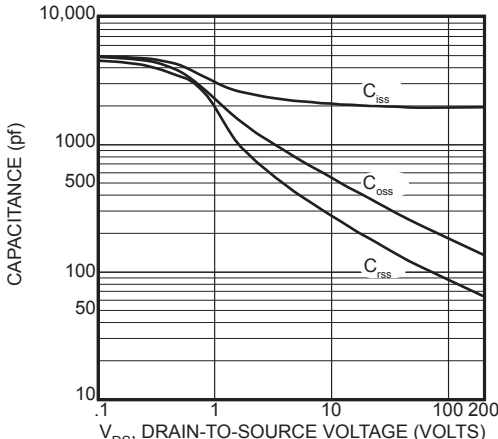


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

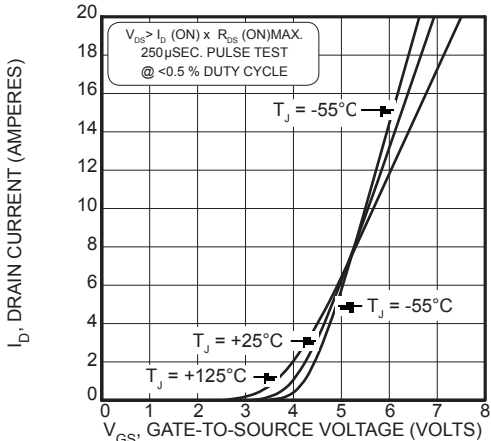


Figure 3, Typical Transfer Characteristics

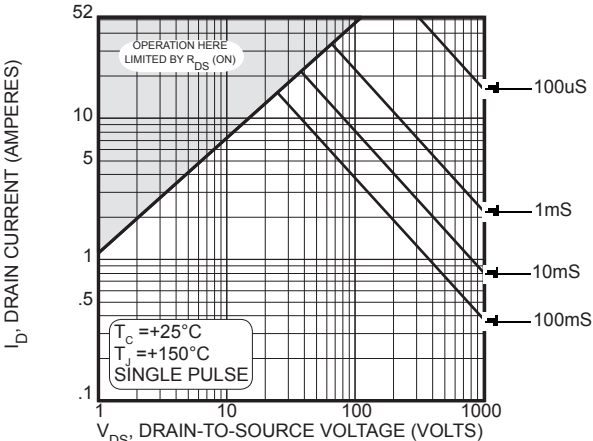


Figure 4, Typical Maximum Safe Operating Area

# TYPICAL PERFORMANCE CURVES

ARF466A\_B(G)

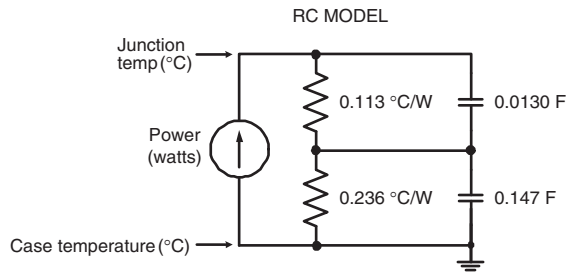
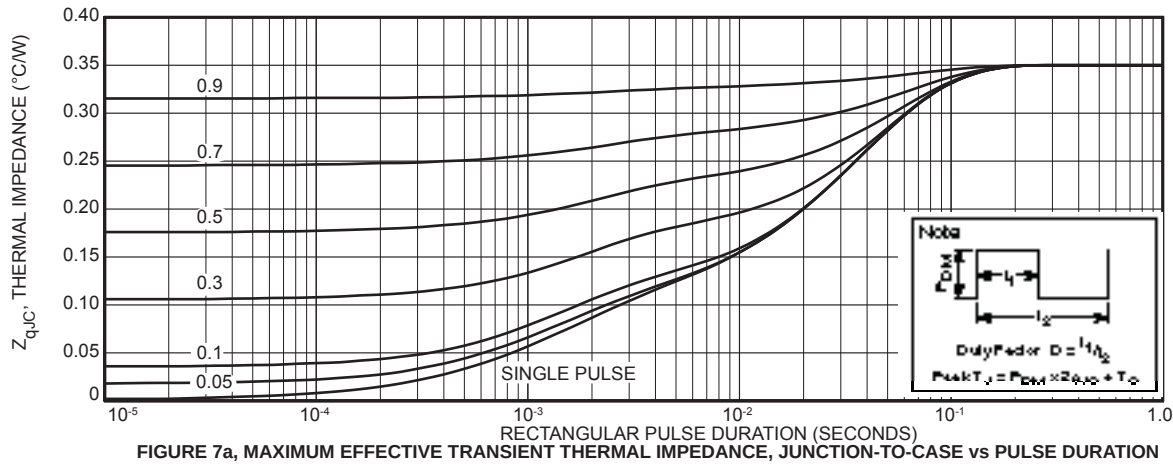
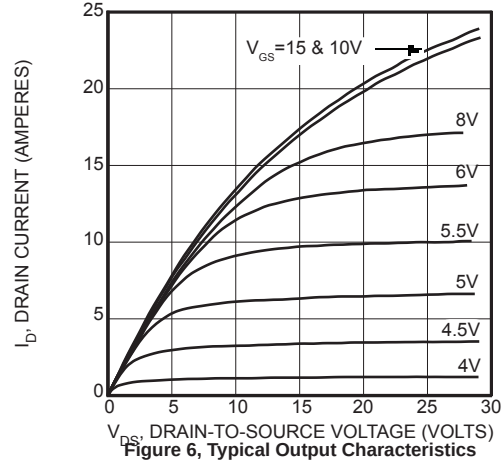
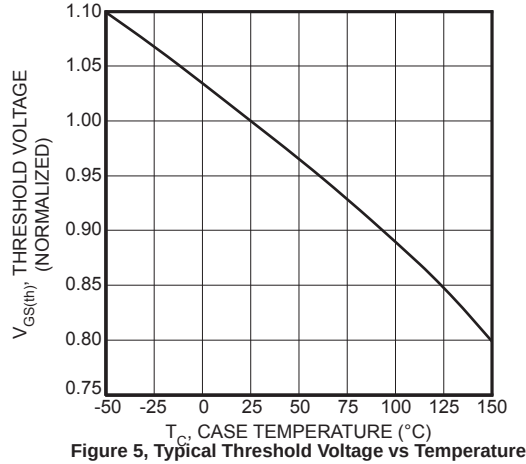


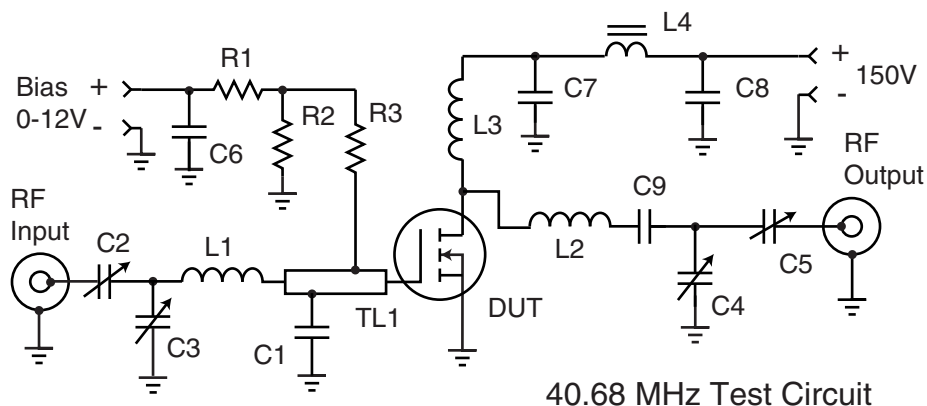
Table 1 - Typical Class AB Large Signal Input - Output Impedance

| Freq. (MHz) | $Z_{IN} (\Omega)$ | $Z_{OL} (\Omega)$ |
|-------------|-------------------|-------------------|
| 2.0         | 17.9 - j 11.2     | 30 - j 1.7        |
| 13.5        | 1.1 - j 4.9       | 25.7 - j 9.8      |
| 27.1        | .25 - j 1.5       | 18 - j 13.3       |
| 40.7        | .15 - j 0.9       | 12 - j 12.6       |
| 65          | .31 + j 2.0       | 6.2 - j 8.9       |

$Z_{IN}$  - Gate shunted with 25 $\Omega$

$I_{DQ} = 100\text{mA}$

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



40.68 MHz Test Circuit

C1 -- 2200 pF ATC 700B

C2-C5 -- Arco 465 Mica trimmer

C6-C8 -- .1 $\mu$ F 500V ceramic chip

C9 -- 3x 2200 pF 500V chips COG

L1 -- 4t #22 AWG .25"ID .25 "L ~87nH

L2 -- 5t #16 AWG .312" ID .35"L ~176nH

L3 -- 10t #24 AWG .25"ID ~.5 $\mu$ HL4 -- VK200-4B ferrite choke 3 $\mu$ HR1- R3 -- 1k W 0.5 $\Omega$  CarbonTL1 -- 38 $\Omega$  t-line .175 x 1 in long

C1 .45" from gate pin.

DUT = ARF466A/B

## TO-264 (L) Package Outline

