

Common Source

# ARF466A

# ARF466B

## 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<sub>th</sub> thermal coefficient.**
- **Low Thermal Resistance.**
- **Optimized SOA for Superior Ruggedness.**


#### MAXIMUM RATINGS

 All Ratings: T<sub>C</sub> = 25°C unless otherwise specified.

Symbol	Parameter	ARF466A_B	UNIT
V <sub>DSS</sub>	Drain-Source Voltage	1000	Volts
V <sub>DGO</sub>	Drain-Gate Voltage	1000	
I <sub>D</sub>	Continuous Drain Current @ T <sub>C</sub> = 25°C	13	Amps
V <sub>GS</sub>	Gate-Source Voltage	±30	Volts
P <sub>D</sub>	Total Power Dissipation @ T <sub>C</sub> = 25°C	357	Watts
R <sub>θJC</sub>	Junction to Case	0.35	°C/W
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Junction Temperature Range	-55 to 150	°C
T <sub>L</sub>	Lead Temperature: 0.063" from Case for 10 Sec.	300	

#### STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage (V <sub>GS</sub> = 0V, I <sub>D</sub> = 250 μA)	1000			Volts
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance <sup>①</sup> (V <sub>GS</sub> = 10V, I <sub>D</sub> = 6.5A)			1.0	ohms
I <sub>DSS</sub>	Zero Gate Voltage Drain Current (V <sub>DS</sub> = 1000V, V <sub>GS</sub> = 0V)			25	μA
	Zero Gate Voltage Drain Current (V <sub>DS</sub> = 800V, V <sub>GS</sub> = 0V, T <sub>C</sub> = 125°C)			250	
I <sub>GSS</sub>	Gate-Source Leakage Current (V <sub>GS</sub> = ±30V, V <sub>DS</sub> = 0V)			±100	nA
g <sub>fs</sub>	Forward Transconductance (V <sub>DS</sub> = 25V, I <sub>D</sub> = 6.5A)	3.3	7	9	mhos
V <sub>GS(TH)</sub>	Gate Threshold Voltage (V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA)	2		4	Volts

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

## DYNAMIC CHARACTERISTICS

ARF466A\_B

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

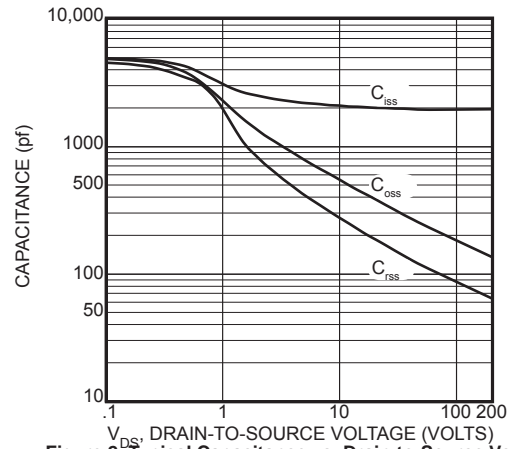


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

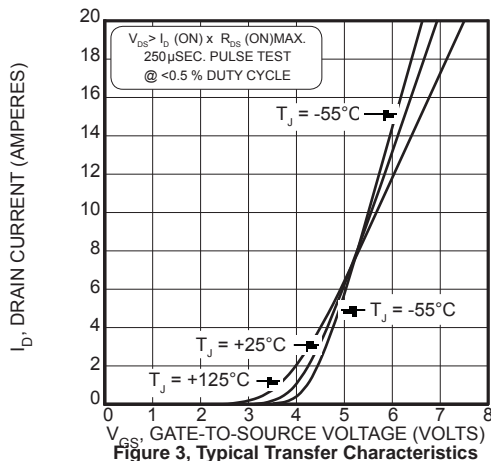


Figure 3, Typical Transfer Characteristics

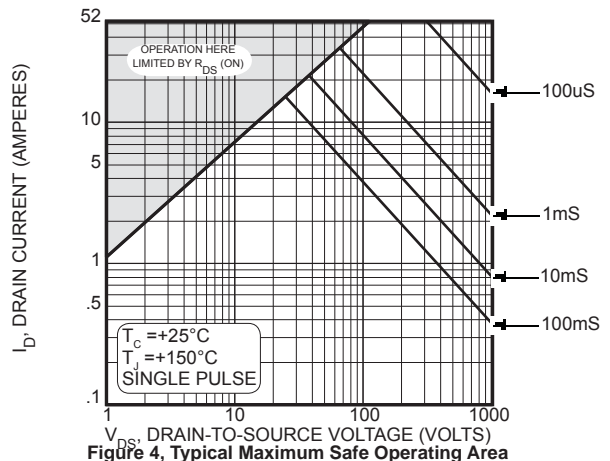


Figure 4, Typical Maximum Safe Operating Area

# TYPICAL PERFORMANCE CURVES

ARF466A\_B

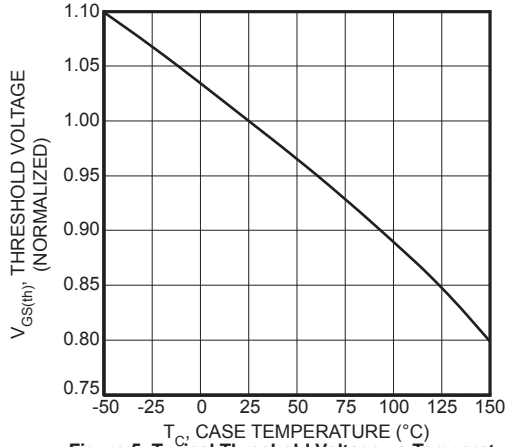


Figure 5, Typical Threshold Voltage vs Temperature

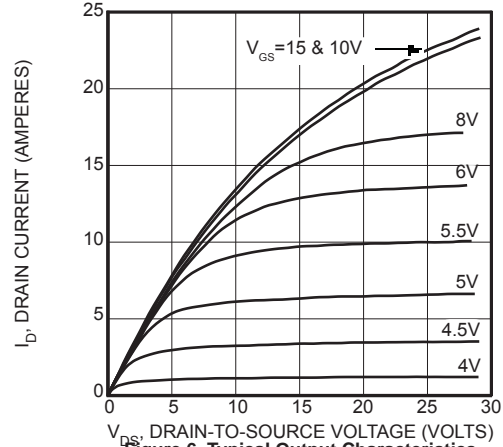


Figure 6, Typical Output Characteristics

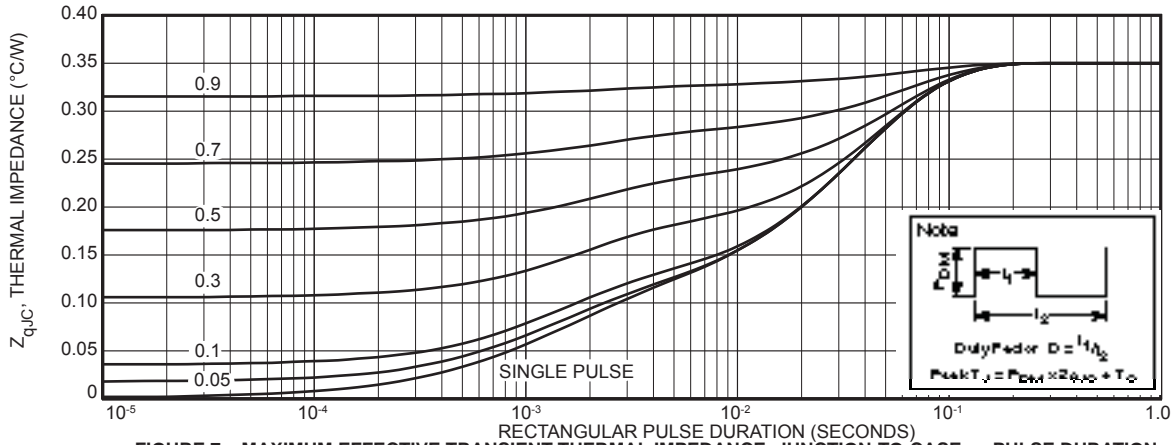


FIGURE 7a, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

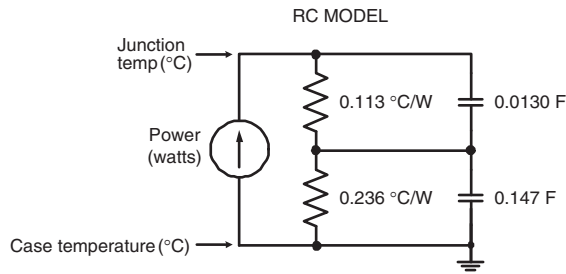


Figure 7b, TRANSIENT THERMAL IMPEDANCE

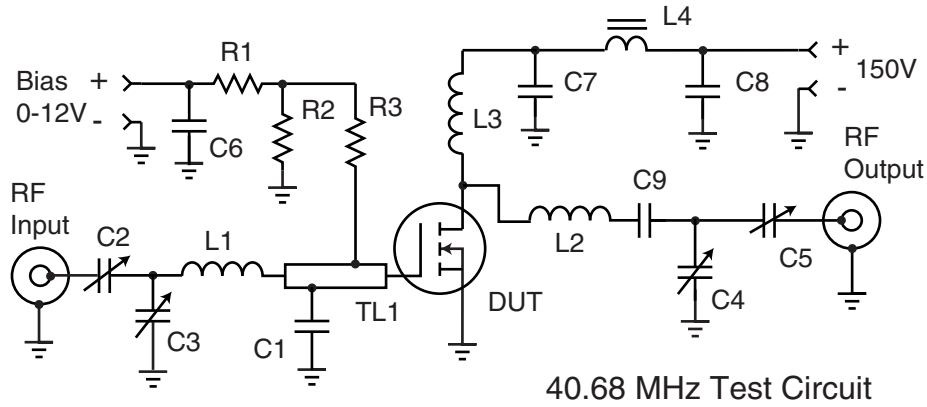
Table 1 - Typical Class AB Large Signal Input - Output Impedance

Freq. (MHz)	Z <sub>IN</sub> (Ω)	Z <sub>OL</sub> (Ω)
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<sub>IN</sub> - Gate shunted with 25Ω

I<sub>DQ</sub> = 100mA

Z<sub>OL</sub> - Conjugate of optimum load for 300W output at V<sub>dd</sub> = 150V



40.68 MHz Test Circuit

- |                                 |  |                                    |
|---------------------------------|--|------------------------------------|
| C1 -- 2200 pF ATC 700B          | L1 -- 4t #22 AWG .25"ID .25 "L ~87nH   | R1- R3 -- 1k W 0.5Ω Carbon         |
| C2-C5 -- Arco 465 Mica trimmer  | L2 -- 5t #16 AWG .312" ID .35"L ~176nH | TL1 -- 38Ω t-line .175 x 1 in long |
| C6-C8 -- .1μF 500V ceramic chip | L3 -- 10t #24 AWG .25"ID ~.5μH         | C1 .45" from gate pin.             |
| C9 -- 3x 2200 pF 500V chips COG | L4 -- VK200-4B ferrite choke 3μH       | DUT = ARF466A/B                    |

TO-264 (L) Package Outline

