

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	± 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 ($V_{GS} = 0V, I_D = 250 \mu\text{A}$)	1000			Volts
$R_{DS(ON)}$	Drain-Source On-State Resistance ^① ($V_{GS} = 10V, I_D = 6.5A$)			1.0	ohms
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = 1000V, V_{GS} = 0V$)			25	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 800V, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			250	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			± 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	$V_{GS} = 0V$ $V_{DS} = 150V$ $f = 1\text{ MHz}$		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
η	Drain Efficiency	$V_{GS} = 2.5V$ $V_{DD} = 150V$	70	75		%
Ψ	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.

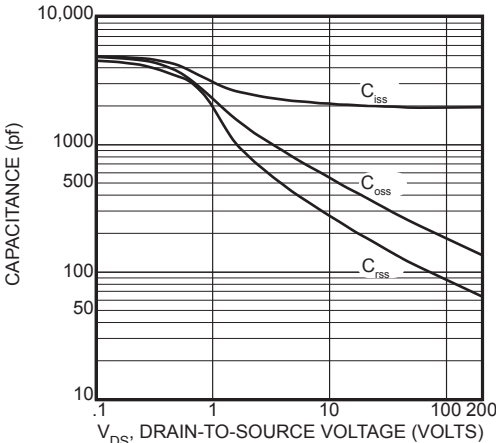


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

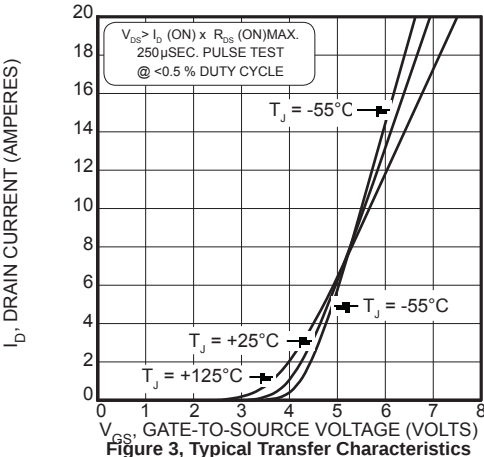


Figure 3, Typical Transfer Characteristics

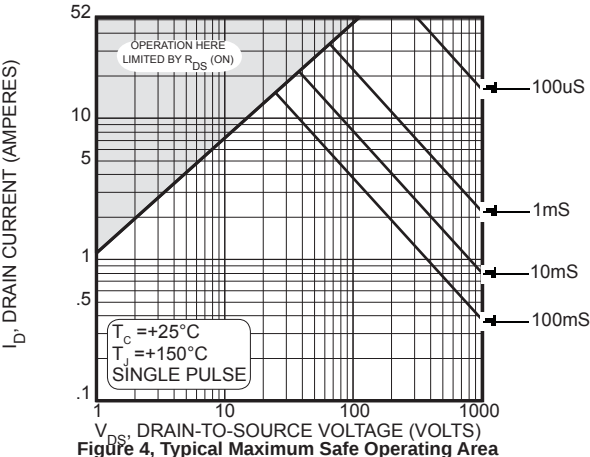


Figure 4, Typical Maximum Safe Operating Area

TYPICAL PERFORMANCE CURVES

ARF466A_B(G)

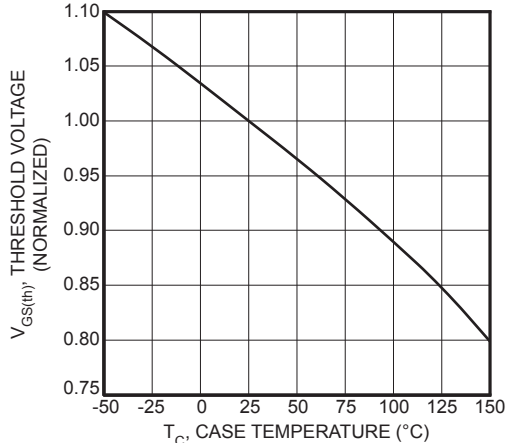


Figure 5, Typical Threshold Voltage vs Temperature

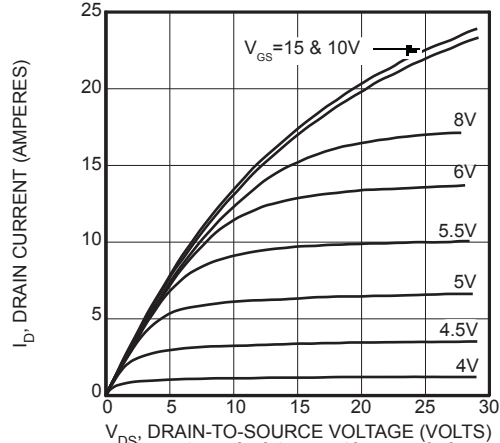


Figure 6, Typical Output Characteristics

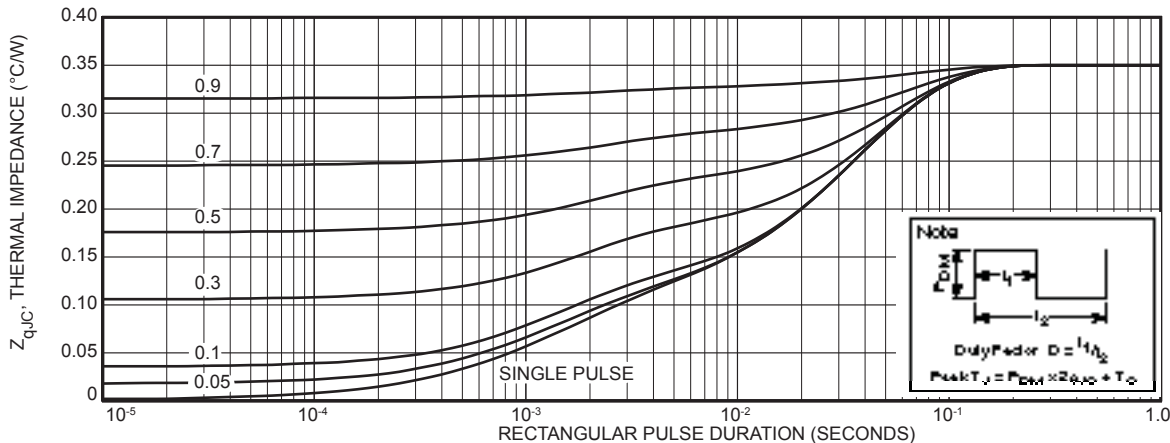


FIGURE 7a, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

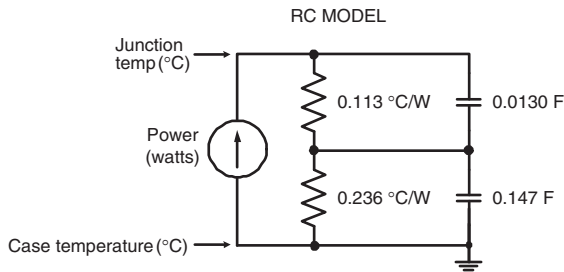
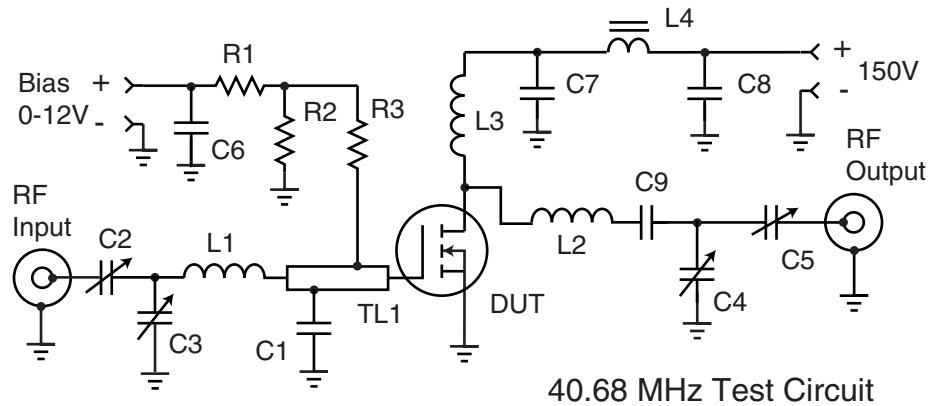


Figure 7b, TRANSIENT THERMAL IMPEDANCE

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

Freq. (MHz)	$Z_{IN} (\Omega)$	$Z_{OL} (\Omega)$
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 Ω $I_{DQ} = 100\text{mA}$
 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 -- .1μF 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 ~.5μH

L4 -- VK200-4B ferrite choke 3μH

R1- R3 -- 1k W 0.5Ω Carbon

TL1 -- 38Ω t-line .175 x 1 in long

C1 .45" from gate pin.

DUT = ARF466A/B

TO-264 (L) Package Outline

