

ARF448A ARF448B

Common
Source

RF POWER MOSFETs

N-CHANNEL ENHANCEMENT MODE

150V 140W 65MHz

The ARF448A and ARF448B 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 65 MHz.

• **Specified 150 Volt, 40.68 MHz Characteristics:**

Output Power = 140 Watts.

Gain = 15dB (Class C)

Efficiency = 75%

• **Low Cost Common Source RF Package.**

• **Very High Breakdown for Improved Ruggedness.**

• **Low Thermal Resistance.**

• **Nitride Passivated Die for Improved Reliability.**

MAXIMUM RATINGS

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

Symbol	Parameter	ARF448A/448B	UNIT
V_{DSS}	Drain-Source Voltage	450	Volts
V_{DGO}	Drain-Gate Voltage	450	
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	15	Amps
V_{GS}	Gate-Source Voltage	± 30	Volts
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	230	Watts
$R_{\theta JC}$	Junction to Case	0.55	$^\circ\text{C/W}$
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 ($V_{GS} = 0V, I_D = 250 \mu\text{A}$)	450			Volts
$V_{DS(ON)}$	On State Drain Voltage ^① ($I_{D(ON)} = 7.5A, V_{GS} = 10V$)			3	
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 ($V_{DS} = 25V, I_D = 7.5A$)	5	8.5		mhos
$V_{GS(TH)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 50mA$)	2		5	Volts

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

APT Website - <http://www.advancedpower.com>

DYNAMIC CHARACTERISTICS

ARF448A/448B

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 150V$ $f = 1\text{ MHz}$		1400	1700	pF
C_{oss}	Output Capacitance			150	200	
C_{rss}	Reverse Transfer Capacitance			65	100	
$t_{d(on)}$	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			23	40	
t_f	Fall Time			12	25	

FUNCTIONAL CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
G_{PS}	Common Source Amplifier Power Gain	$f = 40.68\text{ MHz}$ $V_{GS} = 0V$ $V_{DD} = 150V$ $P_{out} = 140W$	13	15		dB
η	Drain Efficiency		70	75		%
ψ	Electrical Ruggedness VSWR 20:1		No Degradation in Output Power			

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

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

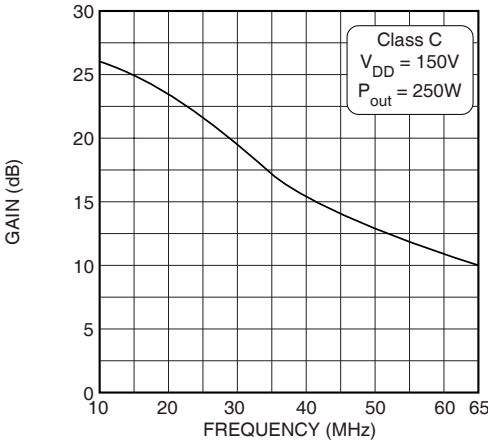


Figure 1, Typical Gain vs Frequency

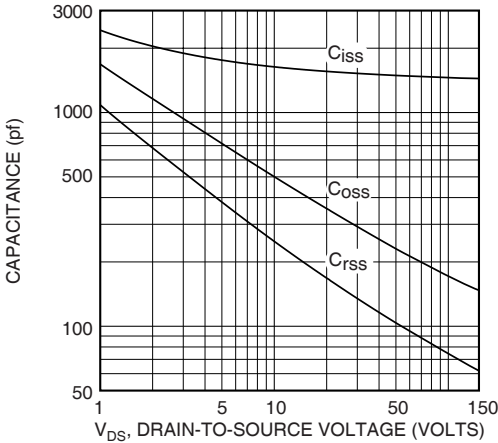


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

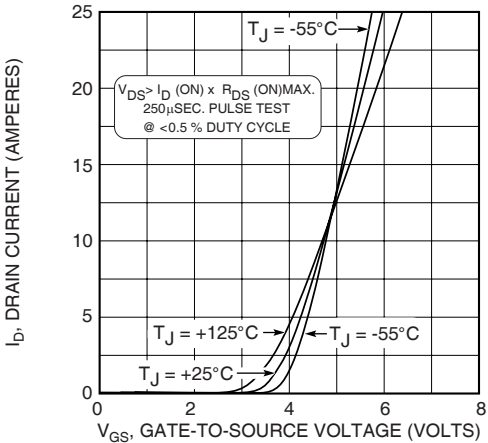


Figure 3, Typical Transfer Characteristics

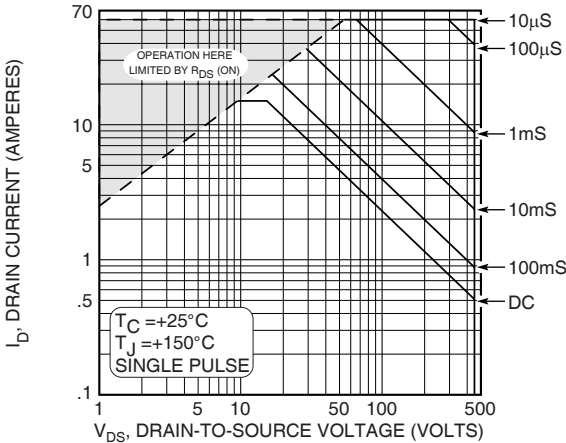


Figure 4, Typical Maximum Safe Operating Area

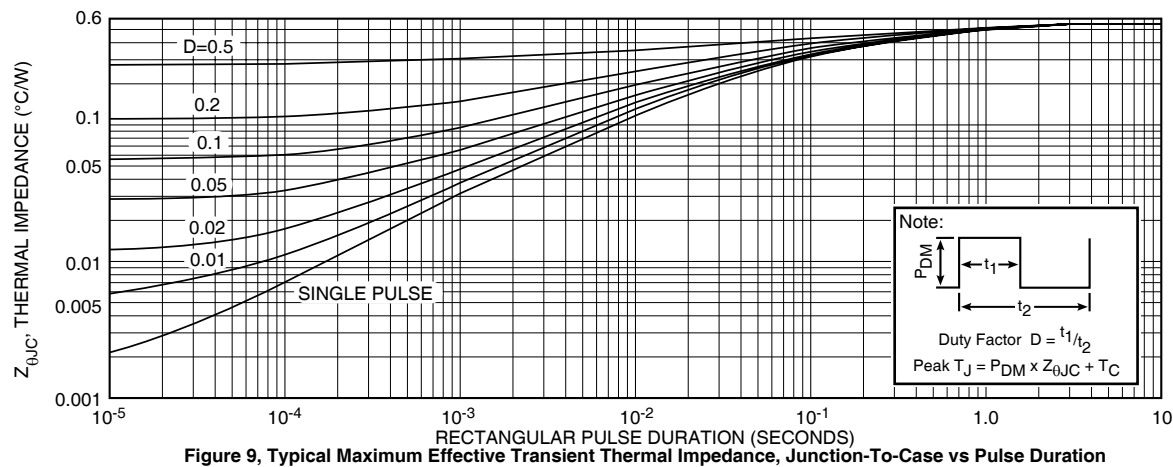
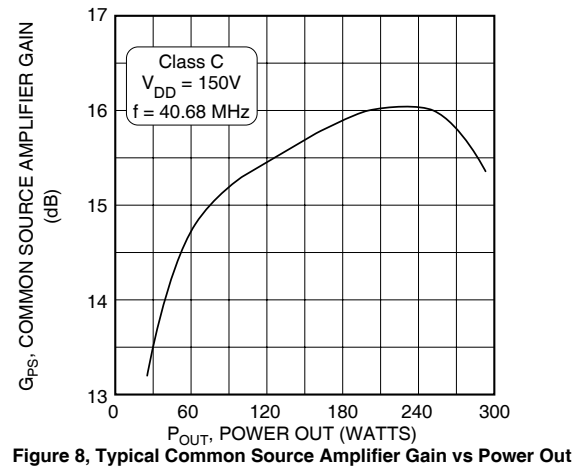
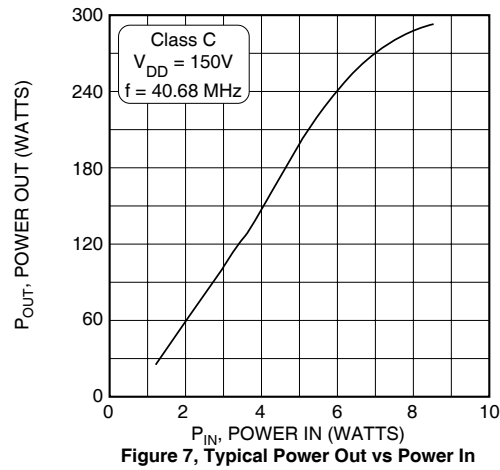
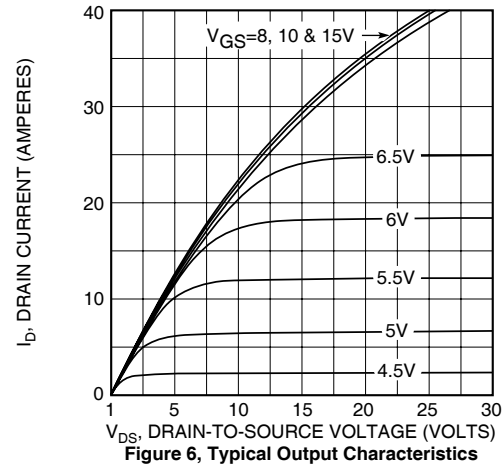
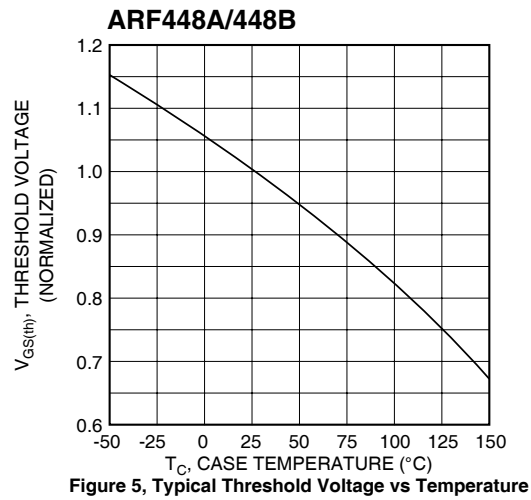


Table 1 - Typical Class C Large Signal Input-Output Impedance

Freq. (MHz)	Z_{in} (Ω)	Z_{OL} (Ω)
2.0	20.90 - j 9.2	56.00 - j 06.0
13.5	2.40 - j 6.8	37.00 - j 26.0
27.0	0.57 - j 2.6	18.00 - j 25.0
40.0	0.31 - j 0.5	9.90 - j 19.2
65.0	0.44 + j 1.9	4.35 - j 11.4

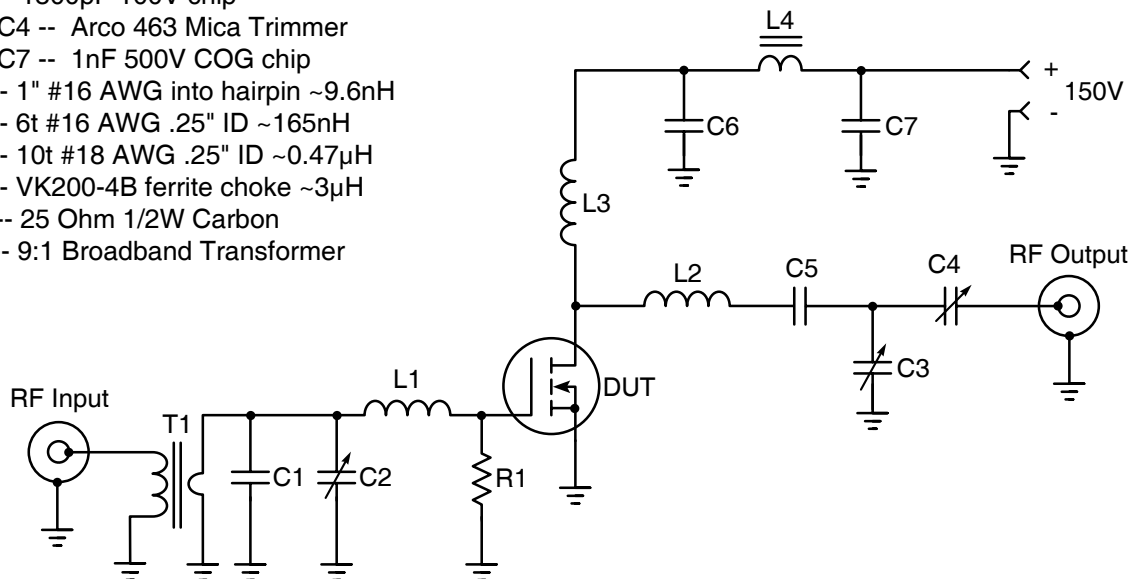
Z_{in} - gate shunted by 25 Ω

Z_{OL} - conjugate of optimum load impedance for 250W at 150V

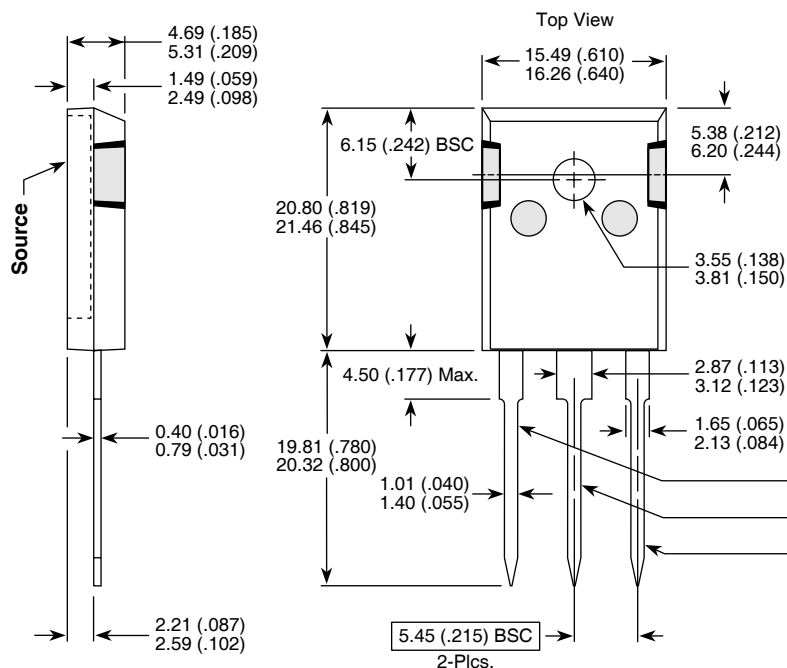
40.68 MHz Test Circuit

Parts List

- C1 -- 1800pF 100V chip
 C2-C4 -- Arco 463 Mica Trimmer
 C5-C7 -- 1nF 500V COG chip
 L1 -- 1" #16 AWG into hairpin ~9.6nH
 L2 -- 6t #16 AWG .25" ID ~165nH
 L3 -- 10t #18 AWG .25" ID ~0.47μH
 L4 -- VK200-4B ferrite choke ~3μH
 R1 -- 25 Ohm 1/2W Carbon
 T1 -- 9:1 Broadband Transformer



TO-247 Package Outline



Dimensions in Millimeters and (Inches)

NOTE: The ARF446 and ARF447 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	
ARF448A	ARF448B
Gate	Drain
Source	Source
Drain	Gate