

ARF460A
ARF460B

Common
Source

RF POWER MOSFETs

N-CHANNEL ENHANCEMENT MODE

125V 150W 65MHz

The ARF460A and ARF460B 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. They have been optimized for both linear and high efficiency classes of operation.

- Specified 125 Volt, 40.68 MHz Characteristics:
 - Output Power = 150 Watts.
 - Gain = 13dB (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	ARF460A/B	UNIT
V_{DSS}	Drain-Source Voltage	500	Volts
V_{DGO}	Drain-Gate Voltage	500	
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	14	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 ($V_{GS} = 0V, I_D = 250 \mu\text{A}$)	500			Volts
$V_{DS(ON)}$	On State Drain Voltage ① ($I_D(ON) = 7A, V_{GS} = 10V$)			4	
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 ($V_{DS} = 25V, I_D = 7A$)	3.3	5.5	8	mhos
$V_{GS(TH)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 50mA$)	3		5	Volts

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

DYNAMIC CHARACTERISTICS

ARF460A/B

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 150V$ $f = 1\text{ MHz}$		1200	1400	pF
C_{oss}	Output Capacitance			150	300	
C_{rss}	Reverse Transfer Capacitance			60	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		ns
t_r	Rise Time			6		
$t_{d(off)}$	Turn-off Delay Time			20		
t_f	Fall Time			4.4		

FUNCTIONAL CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
G_{PS}	Common Source Amplifier Power Gain	$f = 40.68\text{ MHz}$ $V_{GS} = 0V$ $V_{DD} = 125V$ $P_{out} = 150W$	13	15		dB
η	Drain Efficiency		70	75		%
ψ	Electrical Ruggedness VSWR 10:1		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.

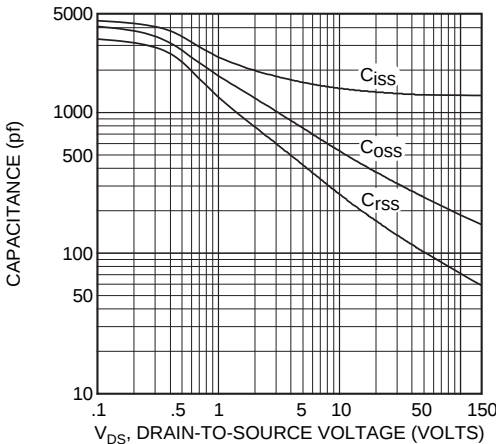
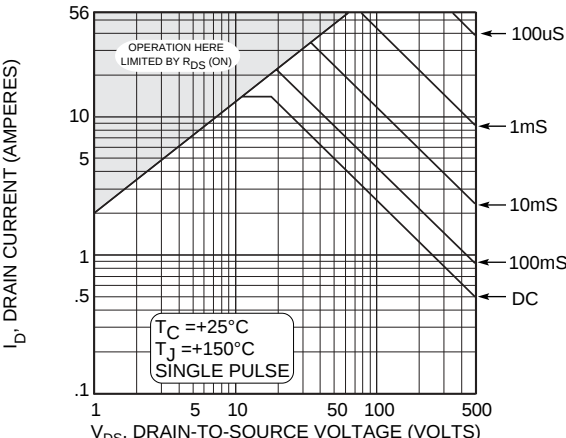
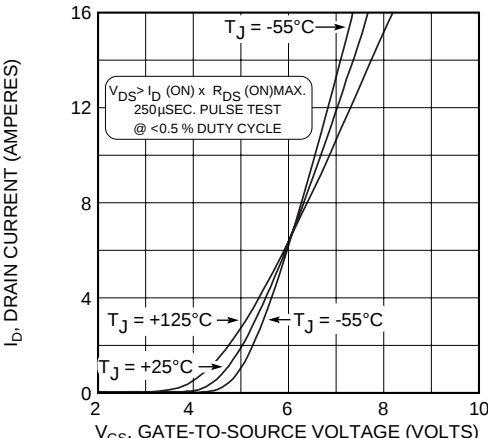


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage



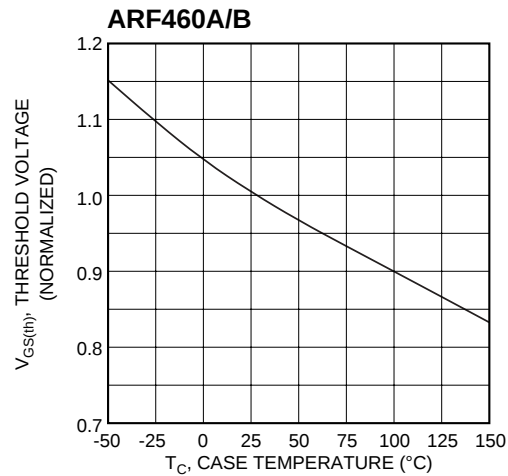


Figure 5, Typical Threshold Voltage vs Temperature

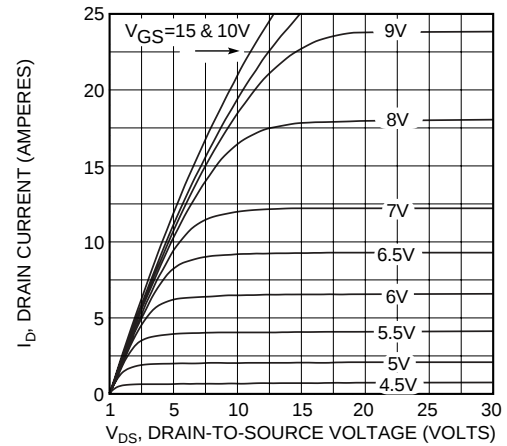


Figure 6, Typical Output Characteristics

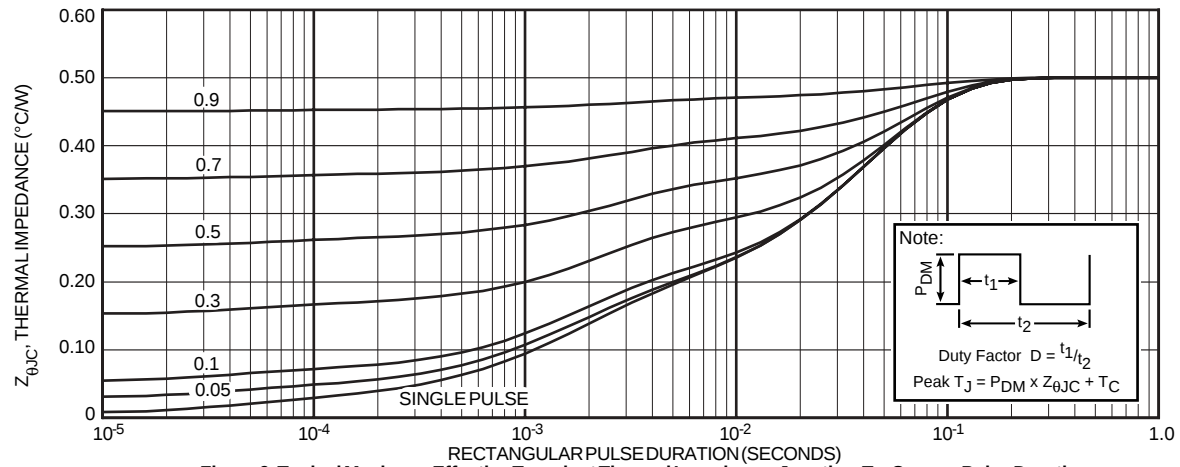


Figure 9, Typical Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

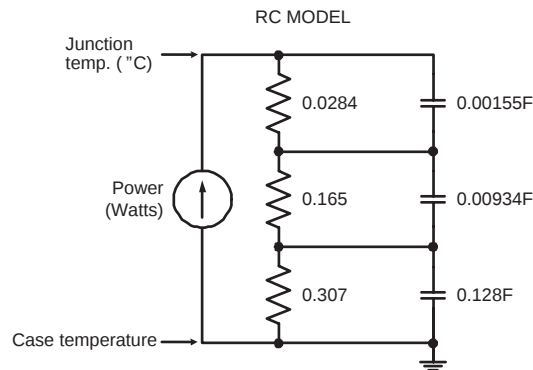


Figure 9a, TRANSIENT THERMAL IMPEDANCE MODEL

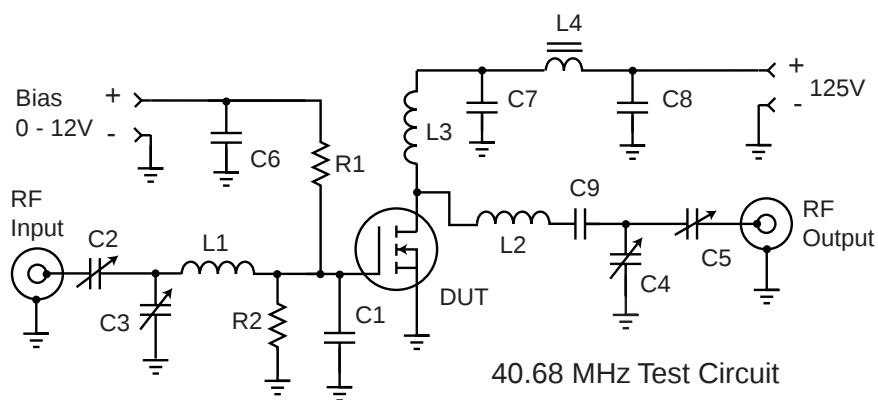
Table 1 - Typical Class AB Large Signal Input - Output Impedance

Freq. (MHz)	Z_{in} (Ω)	Z_{OL} (Ω)
2.0	20.9 - j 9.2	38 - j 2.6
13.5	2.4 - j 6.8	31 - j 14
27	.57 - j 2.6	19.6 - j 17.6
40	.31 - j 0.5	12.5 - j 15.8
65	.44 + j 1.9	6.0 - j 10.5

Z_{in} - Gate shunted with 25Ω

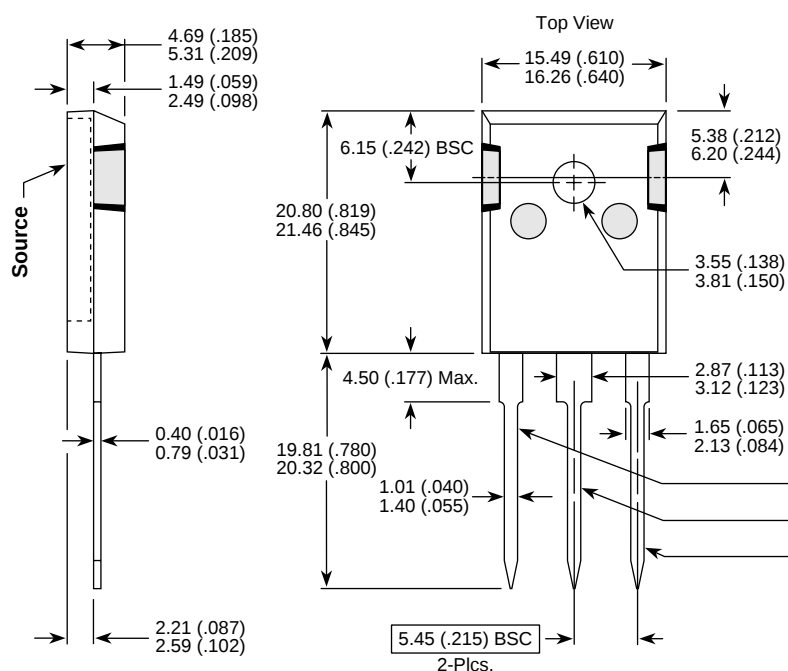
$I_{DQ} = 100\text{mA}$

ARF460A/B



- C1 -- 2000 pF 100V NPO chip mounted at gate lead
- C2-C5 -- Arco 463 Mica trimmer
- C6-C8 -- .1 μ F 500V ceramic chip
- C9 -- 2200 pF 500V chip
- L1 -- 4t #20 AWG .25"ID .3 "L ~80nH
- L2 -- 6t #16 AWG .312" ID .4"L ~185nH
- L3 -- 15t #24 AWG .25"ID ~.85uH
- L4 -- VK200-4B ferrite choke 3uH
- R1-R2 -- 51 Ohm 0.5W Carbon
- DUT = ARF460A/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