

ARF461A ARF461B

Common
Source

RF POWER MOSFETs

N-CHANNEL ENHANCEMENT MODE

250V 150W 65MHz

The ARF461A and ARF461B 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 250 Volt, 40.68 MHz Characteristics:
- Low Cost Common Source RF Package.
- Output Power = 150 Watts.
- Low V_{th} thermal coefficient.
- Gain = 13dB (Class AB)
- Low Thermal Resistance.
- Efficiency = 75% (Class C)
- Optimized SOA for Superior Ruggedness.

MAXIMUM RATINGS

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

Symbol	Parameter	ARF461A/B	UNIT
V_{DSS}	Drain-Source Voltage	1000	Volts
V_{DGO}	Drain-Gate Voltage	1000	
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	6.5	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 ($V_{GS} = 0V, I_D = 250 \mu\text{A}$)	1000			Volts
$V_{DS(ON)}$	On State Drain Voltage ① ($I_D(ON) = 3.25A, V_{GS} = 10V$)			6.5	
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 ($V_{DS} = 25V, I_D = 3.25A$)	3	4		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

ARF461A/B

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 50V$ $f = 1 \text{ MHz}$		1700		pF
C_{oss}	Output Capacitance			175		
C_{rss}	Reverse Transfer Capacitance			50		
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_{D[Cont.]} @ 25^\circ C$ $R_G = 1.6\Omega$		8		ns
t_r	Rise Time			5		
$t_{d(off)}$	Turn-off Delay Time			21		
t_f	Fall Time			10.1		

FUNCTIONAL CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
G_{PS}	Common Source Amplifier Power Gain	$f = 40.68 \text{ MHz}$ $V_{GS} = 0V \quad V_{DD} = 250V$ $P_{out} = 150W$	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.

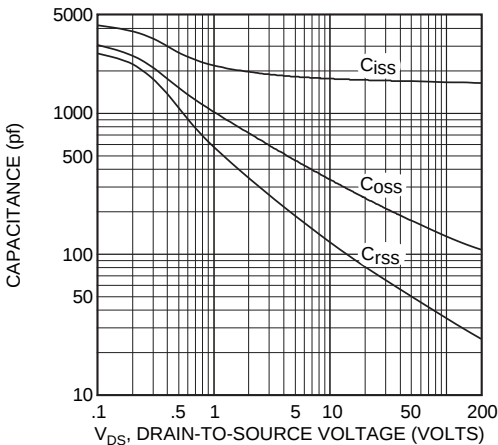


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

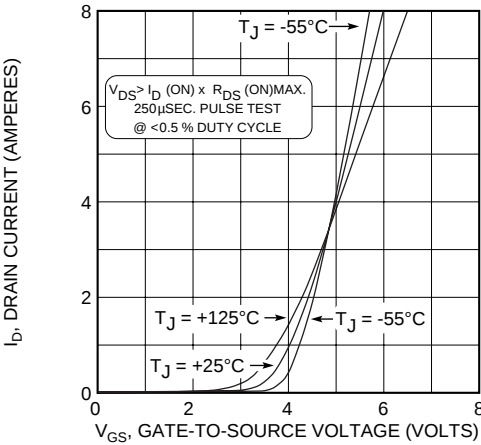


Figure 3, Typical Transfer Characteristics

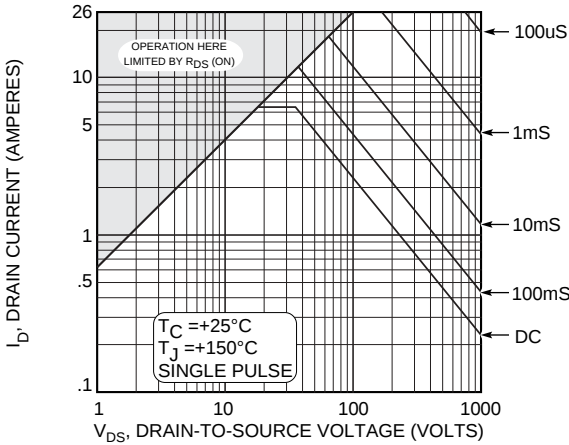


Figure 4, Typical Maximum Safe Operating Area

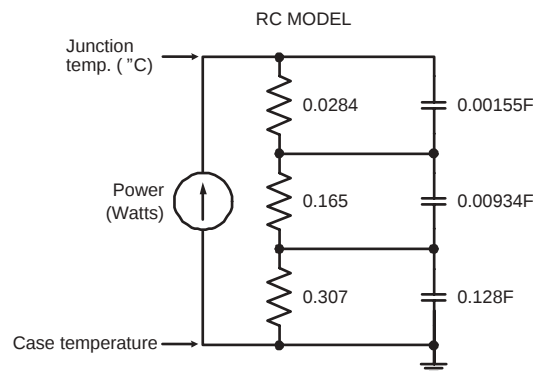
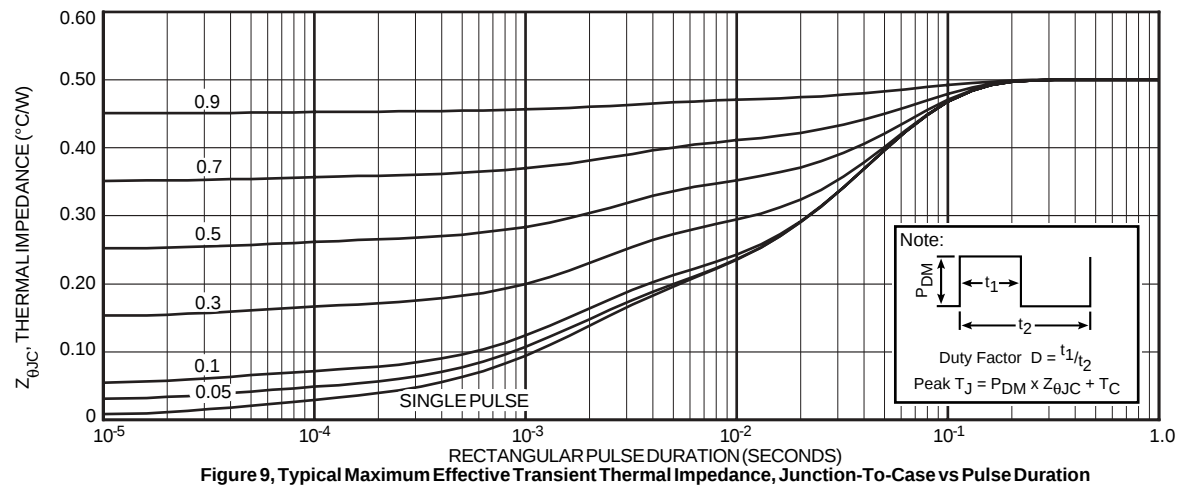
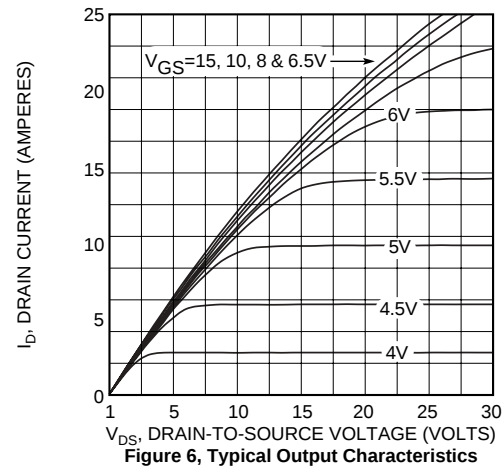
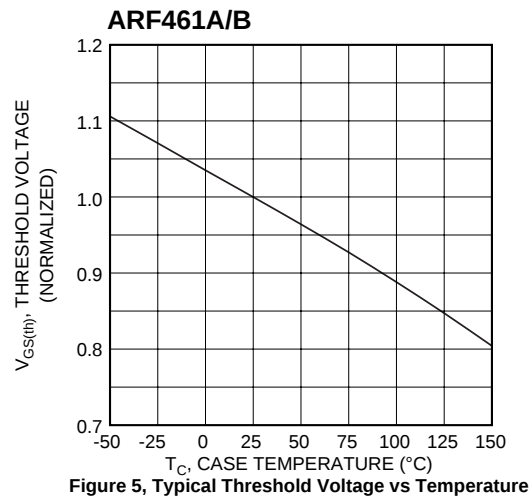
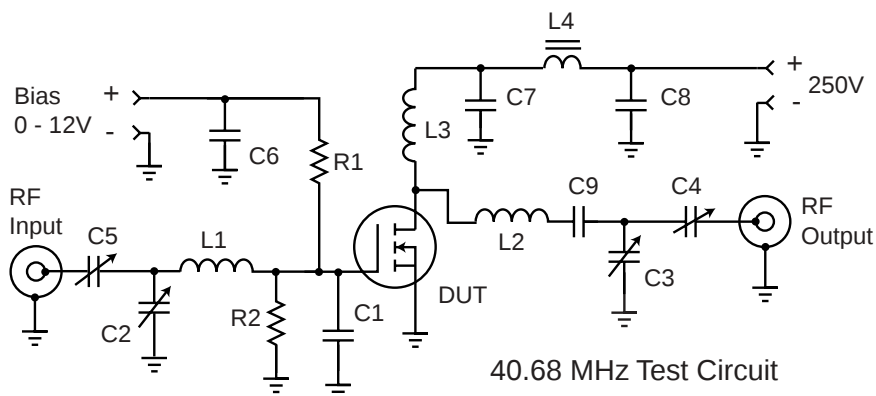


Figure 9a, TRANSIENT THERMAL IMPEDANCE MODEL

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

Freq. (MHz)	Z_{in} (Ω)	Z_{OL} (Ω)
2.0	20.4 - j 9.6	148 - j 20
13.5	2.1 - j 6.4	84 - j 74
27	.50 - j 2.3	36 - j 63
40	.20 - j 0.4	19 - j 48
65	.46 + j 2.0	7.7 - j 30

Z_{in} - Gate shunted with 25Ω $I_{DQ} = 100\text{mA}$
 Z_{OL} - Conjugate of optimum load for 150 Watts output at $V_{dd} = 250\text{V}$



C1 -- 1800pF + 1000pF 100V chips mounted at gate lead
 C2-C5 -- Arco 463 Mica trimmer
 C6-C8 -- .1 μ F 500V ceramic chip
 C9 -- 2200 pF 500 V chip
 L1 -- 4t #20 AWG .25"ID .3 "L ~80nH
 L2 -- 7t #16 AWG .4" ID .5"L ~335nH
 L3 -- 25t #24 AWG .25"ID ~2.2uH
 L4 -- VK200-4B ferrite choke 3uH
 R1-R2 -- 51 Ohm 0.5W Carbon
 DUT = ARF461A/B

TO-247 Package Outline

