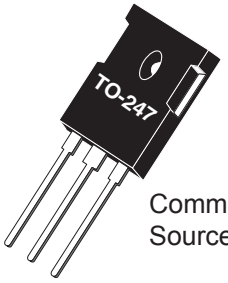
Microsemi
POWER PRODUCTS GROUP



Common
Source

ARF461A(G)
ARF461B(G)

RF POWER MOSFETs
N-CHANNEL ENHANCEMENT MODE

250V 150W 65MHz

The ARF461A and ARF461B comprise a symmetric pair of common drain 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:**
  - **Output Power = 150 Watts.**
  - **Gain = 13dB (Class AB)**
  - **Efficiency = 75% (Class C)**
- **Low Cost Common Source RF Package.**
- **Low Vth thermal coefficient.**
- **Low Thermal Resistance.**
- **Optimized SOA for Superior Ruggedness.**
- **RoHS Compliant**

MAXIMUM RATINGS

All Ratings: T_C = 25°C unless otherwise specified.

Symbol	Parameter	ARF461AG/BG	Unit
V_{DSS}	Drain-Source Voltage	1000	V
V_{DGO}	Drain-Gate Voltage	1000	
I_D	Continuous Drain Current @ T_C = 25°C	6.5	A
V_{GS}	Gate-Source Voltage	±30	V
P_D	Total Power Dissipation @ T_C = 25°C	250	W
$R_{\theta JC}$	Junction to Case	0.50	°C/W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	°C
T_L	Lead Temperature: 0.063" from Case for 10 Sec.	300	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Min	Typ	Max	Unit
BV_{DSS}	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250 µA)	1000			V
$V_{DS(ON)}$	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} = 0.8V_{DSS}, V_{GS} = 0, T_C = 125°C)			250	
I_{GSS}	Gate-Source Leakage Current (V_{DS} = ±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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 50V f = 1MHz		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} = 0.5V_{DSS} I_D = $I_{D\ (Cont.)}$ @ 25°C R_G = 1.6Ω		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 = 40.68MHz	13	15		dB
η	Drain Efficiency	V_{GS} = 0V V_{DD} = 250V	70	75		%
Ψ	Electrical Ruggedness VSWR 10:1	P_{OUT} = 150W	No Degradation in Output Power			

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

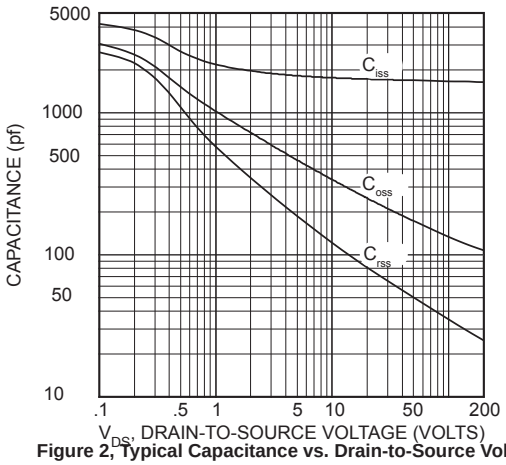


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

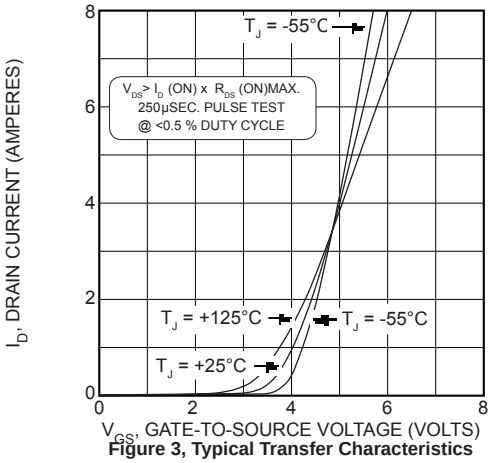


Figure 3, Typical Transfer Characteristics

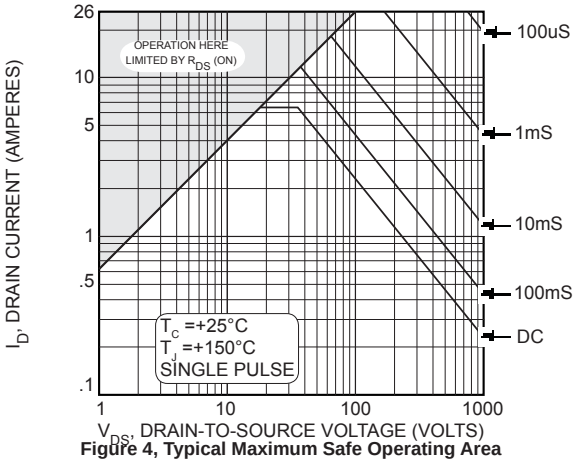


Figure 4, Typical Maximum Safe Operating Area

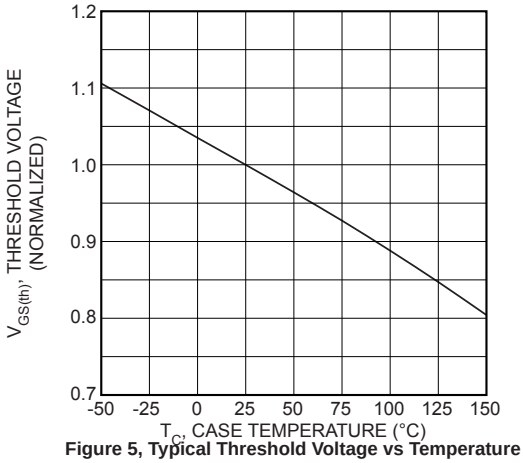


Figure 5, Typical Threshold Voltage vs Temperature

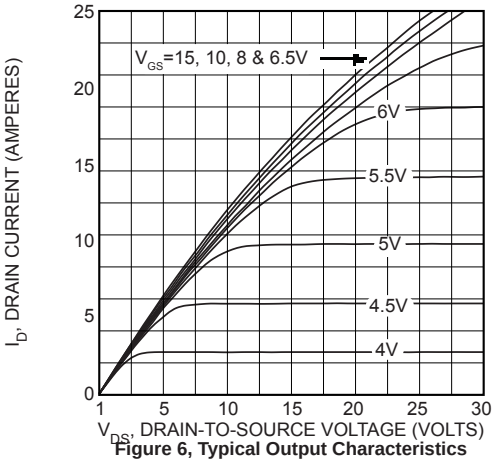


Figure 6, Typical Output Characteristics

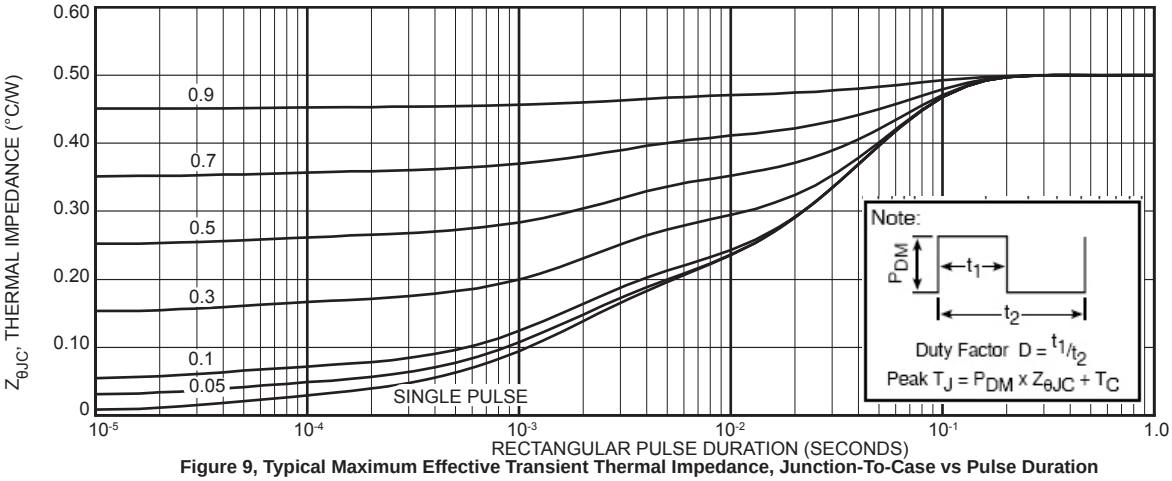


Figure 9, Typical Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

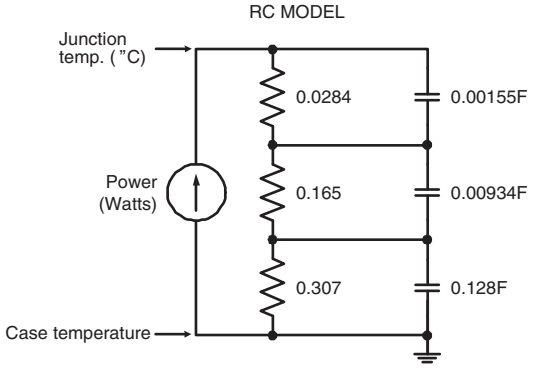
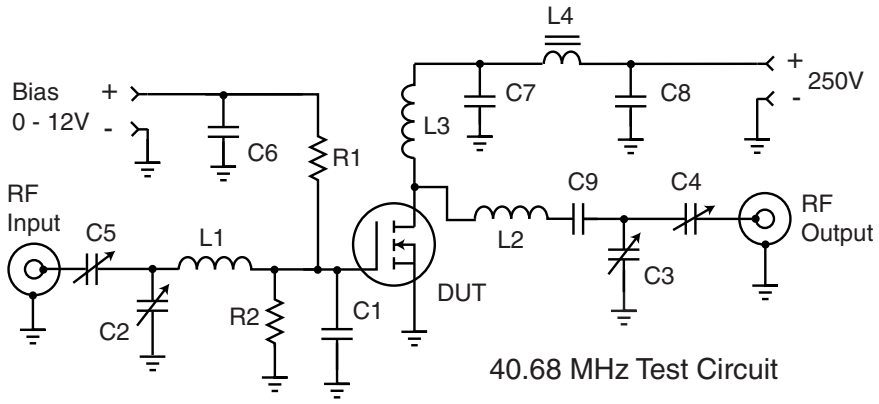


Figure 9a, TRANSIENT THERMAL IMPEDANCE MODEL

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

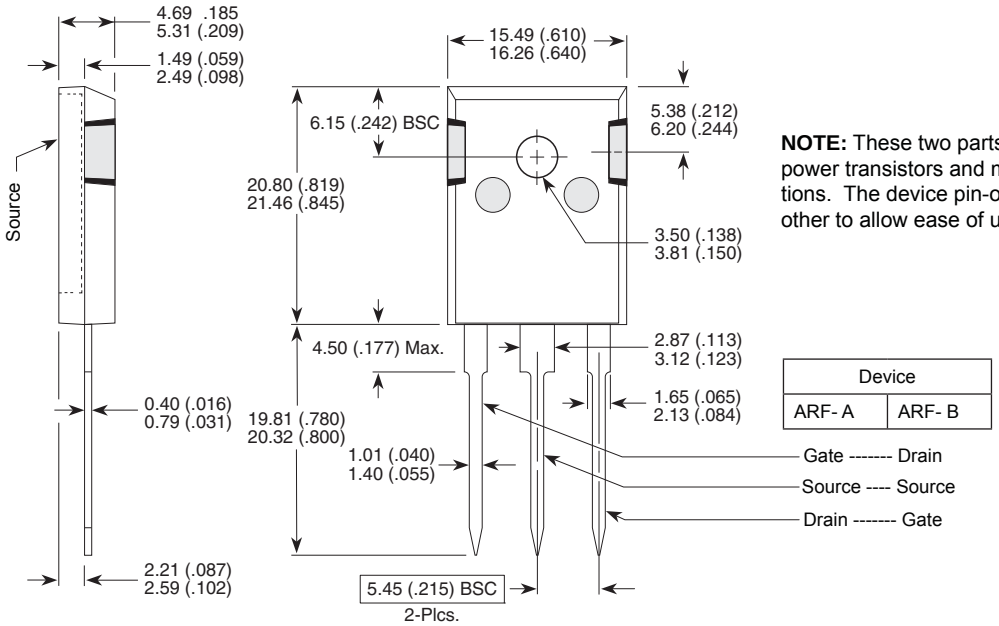
Z_{in} - Gate shunted with 25Ω I_{DQ} = 100mA
Z_{OL} - Conjugate of optimum load for 150 Watts output at V_{dd} = 125V



40.68 MHz Test Circuit

C1 -- 1800pF + 1000pF 100V chips mounted at gate lead
C2-C5 -- Arco 463 Mica trimmer
C6-C8 -- .1 μF 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



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

Dimensions in Millimeters and (Inches)