
 Common
Source

RF POWER MOSFETs

N-CHANNEL ENHANCEMENT MODE

65V 100W 100MHz

The ARF464A and ARF464B 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 100 MHz. They have been optimized for both linear and high efficiency classes of operation.

- **Specified 65 Volt, 81.36 MHz Characteristics:**
- **Low Cost Common Source RF Package.**
- Output Power = 100 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	ARF464A/B	UNIT
V_{DSS}	Drain-Source Voltage	200	Volts
V_{DGO}	Drain-Gate Voltage	200	
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 @ $T_C = 25^\circ\text{C}$	180	Watts
$R_{\theta JC}$	Junction to Case	0.70	$^\circ\text{C/W}$
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 ($V_{GS} = 0V, I_D = 250 \mu\text{A}$)	200			Volts
$V_{DS(ON)}$	On State Drain Voltage ^① ($I_D(ON) = 7.5A, V_{GS} = 10V$)			3.0	
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 ($V_{DS} = 25V, I_D = 7.5A$)	2	3.5	5	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.

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

DYNAMIC CHARACTERISTICS

ARF464A/B

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 150V$ $f = 1\text{ MHz}$		775	1000	pF
C_{oss}	Output Capacitance			340	480	
C_{rss}	Reverse Transfer Capacitance			150	230	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_{D[Cont.]} @ 25^\circ C$ $R_G = 1.6\Omega$		6	12	ns
t_r	Rise Time			9	18	
$t_{d(off)}$	Turn-off Delay Time			13	20	
t_f	Fall Time			3.4	10	

FUNCTIONAL CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
G_{PS}	Common Source Amplifier Power Gain	$f = 81.36\text{ MHz}$	13	15		dB
η	Drain Efficiency	$V_{GS} = 0V$ $V_{DD} = 65V$	70	75		%
ψ	Electrical Ruggedness VSWR 10:1	$P_{out} = 100W$	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.

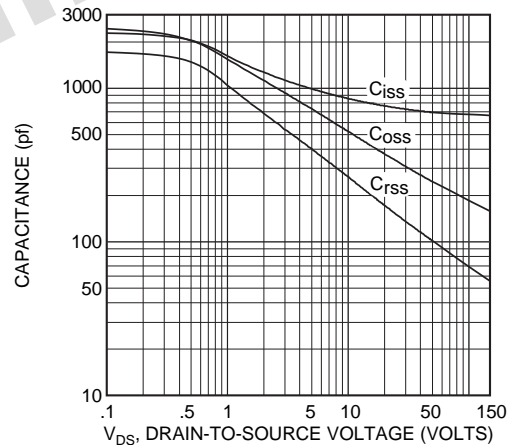


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

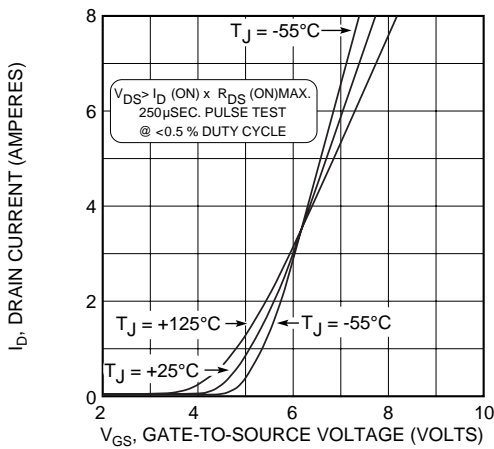


Figure 3, Typical Transfer Characteristics

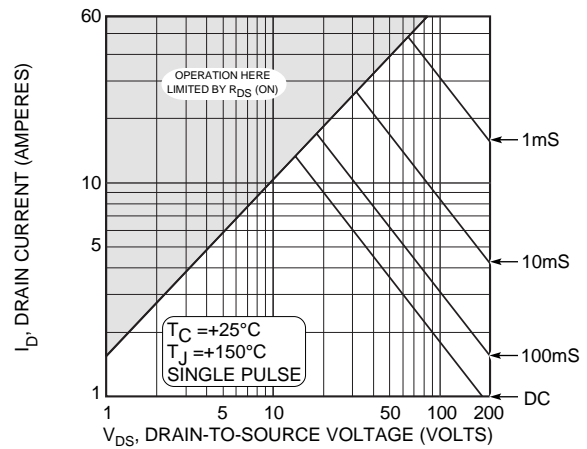


Figure 4, Typical Maximum Safe Operating Area

ARF464A/B

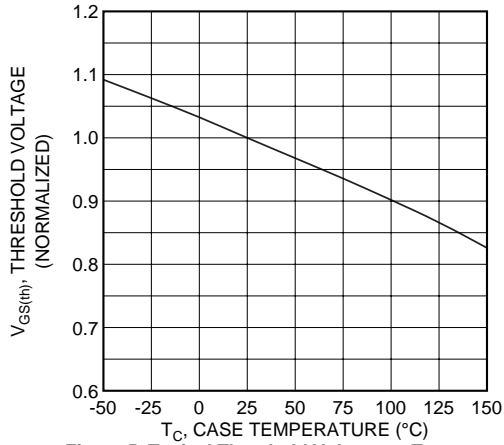


Figure 5, Typical Threshold Voltage vs Temperature

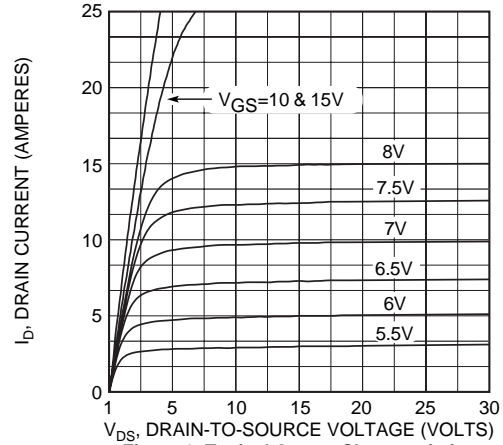


Figure 6, Typical Output Characteristics

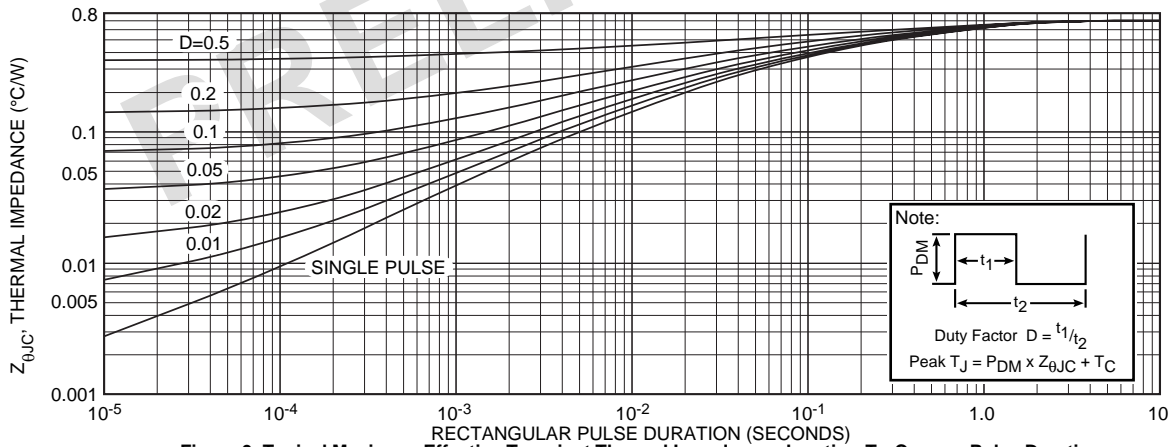


Figure 9, Typical Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

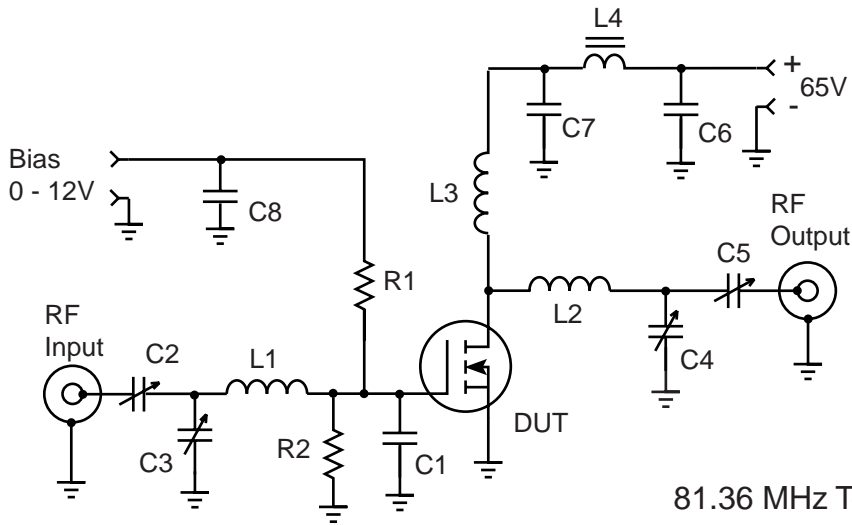
Table 1 - Typical Class AB Large Signal Input - Output Impedance

Freq. (MHz)	Z _{in} (Ω)	Z _{OL} (Ω)
2.0	24 - j 5	15.3 - j 0.6
13.5	7.5 - j 11	14.2 - j 3.4
27	2.0 - j 6.2	11.6 - j 5.3
40	0.7 - j 3.1	8.9 - j 5.6
65	0.31 + j 0.52	5.3 - j 4.0
80	0.47 + j 2.1	4.0 - j 2.7
100	0.9 + j 3.8	2.8 - j 0.9

Z_{in} - Gate shunted with 25Ω

I_{DQ} = 50mA

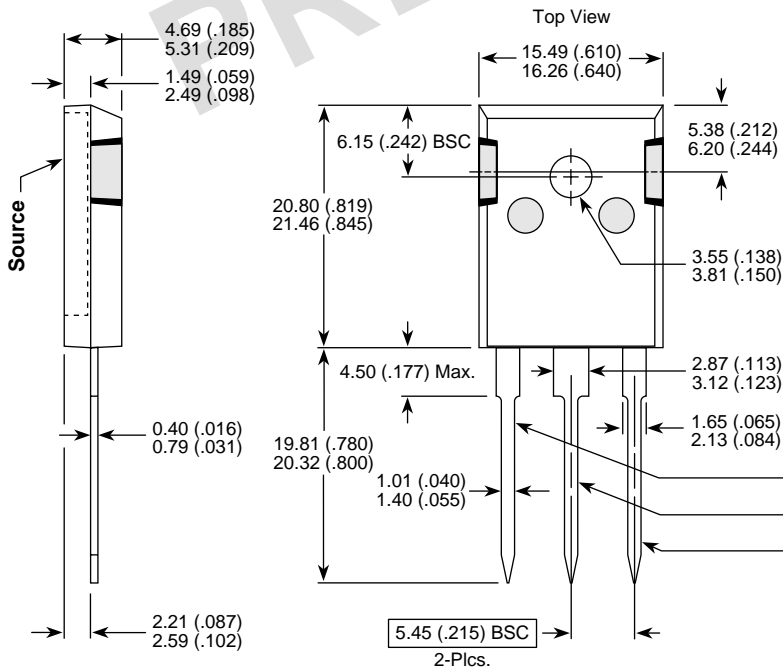
Z_{OL} - Conjugate of optimum load for 100 Watts output at V_{dd} = 65V



- C1 -- 560pF NPO 50V chip mounted at gate lead
- C2-C3 -- Arco 424 Mica trimmer
- C4-C5 -- Arco 463 Mica trimmer
- C5-C8 -- 10nF 500V COG chip
- L1 -- 3t #18 .25" ID .3"L ~48nH
- L2 -- 3t #16 AWG .25" ID .35"L ~68nH
- L3 -- 10t #18 AWG .25 ID ~470nH
- L4 -- VK200-4B ferrite choke ~3uH
- R1-R2 -- 50 Ohm 1/2W Carbon
- DUT = ARF464A/B

81.36 MHz Test Circuit

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