
 Common  
Source

# RF POWER MOSFETS

**N-CHANNEL ENHANCEMENT MODE**
**300V 150W 60MHz**

The ARF465A and 465B 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 60 MHz.

**Specified 300 Volt, 40.68 MHz Characteristics:**
**Output Power = 150 Watts.**
**Gain = 13dB (Class C)**
**Efficiency = 75%**

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

- **Low Vth 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	ARF465A/B	UNIT
$V_{DSS}$	Drain-Source Voltage	1200	Volts
$V_{DGO}$	Drain-Gate Voltage	1200	
$I_D$	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	6	Amps
$V_{GS}$	Gate-Source Voltage	$\pm 30$	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 ( $V_{GS} = 0V, I_D = 250 \mu\text{A}$ )	1200			Volts
$V_{DS(ON)}$	On State Drain Voltage <sup>①</sup> ( $I_D(ON) = 3A, V_{GS} = 10V$ )			7	
$I_{DSS}$	Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ )			25	$\mu\text{A}$
	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 ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )			$\pm 100$	nA
$g_{fs}$	Forward Transconductance ( $V_{DS} = 25V, I_D = 3A$ )	3	4		mhos
$V_{GS(TH)}$	Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 50\text{mA}$ )	3		5	Volts


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

# DYNAMIC CHARACTERISTICS

ARF465A/B

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 200V$ $f = 1\text{ MHz}$		1200	1500	pF
$C_{oss}$	Output Capacitance			80	100	
$C_{rss}$	Reverse Transfer Capacitance			30	50	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_{D[Cont.]} @ 25^\circ C$ $R_G = 1.6\Omega$		7	15	ns
$t_r$	Rise Time			5	10	
$t_{d(off)}$	Turn-off Delay Time			21	34	
$t_f$	Fall Time			12	25	

# FUNCTIONAL CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
$G_{PS}$	Common Source Amplifier Power Gain	$f = 40.68\text{ MHz}$ $V_{GS} = 0V$ $V_{DD} = 300V$ $P_{out} = 150W$	13	15		dB
$\eta$	Drain Efficiency		70	75		%
$\Psi$	Electrical Ruggedness VSWR 6:1		No Degradation in Output Power			

① Pulse Test: Pulse width < 380  $\mu$ S, Duty Cycle < 2%

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

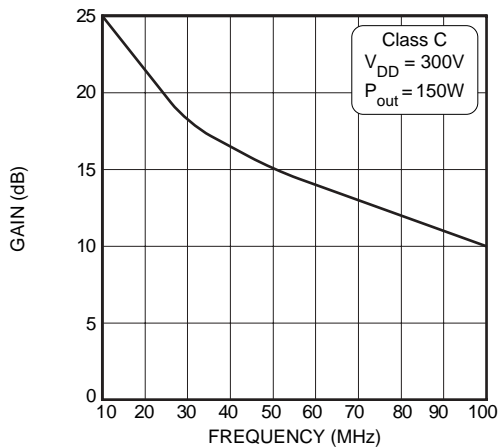


Figure 1, Typical Gain vs Frequency

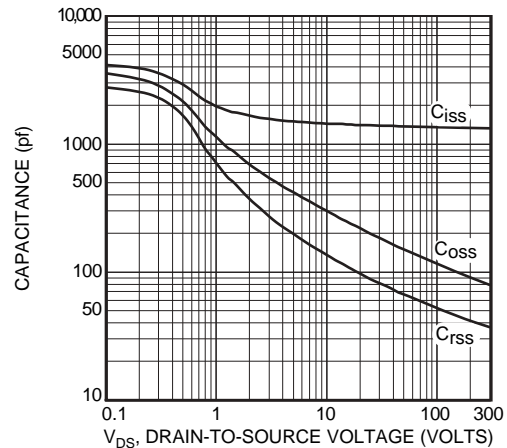


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

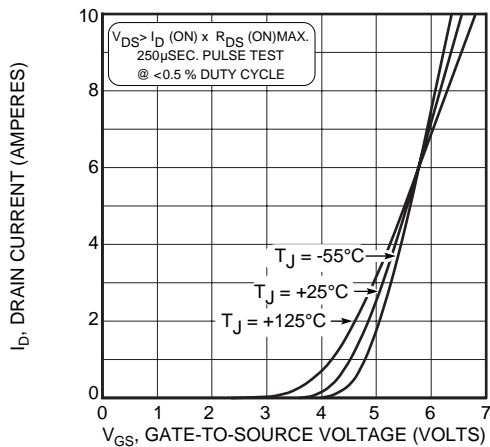


Figure 3, Typical Transfer Characteristics

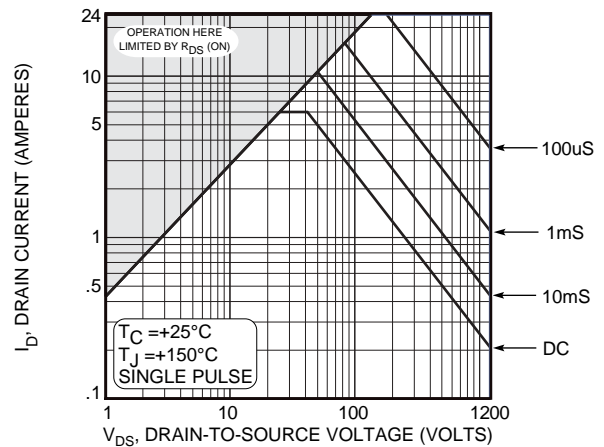


Figure 4, Typical Maximum Safe Operating Area

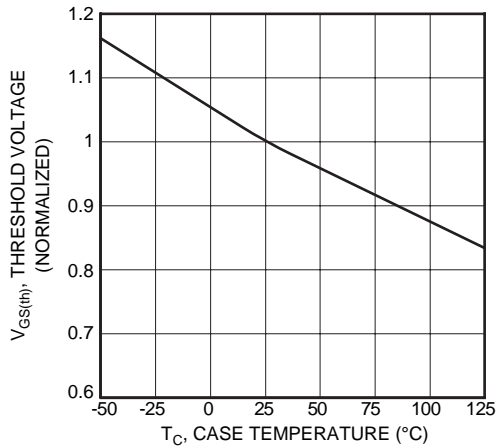


Figure 5, Typical Threshold Voltage vs Temperature

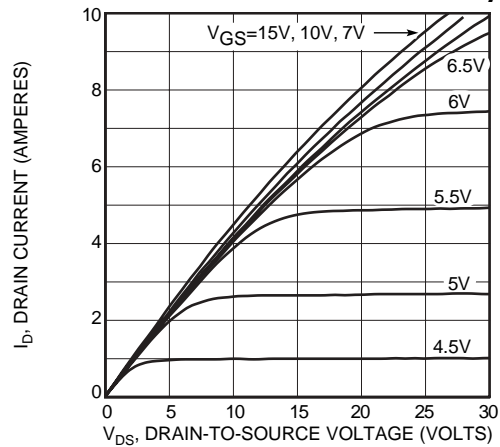


Figure 6, Typical Output Characteristics

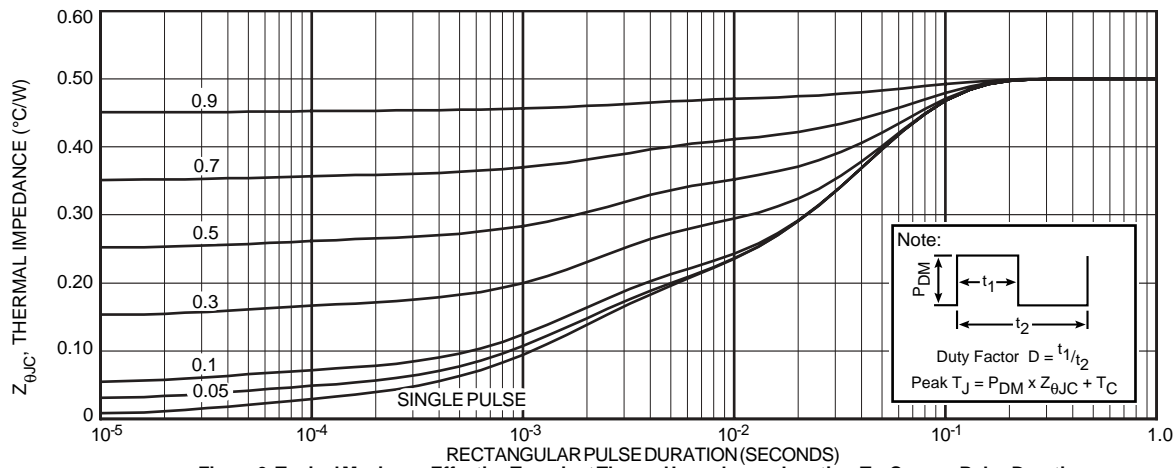


Figure 9, Typical Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

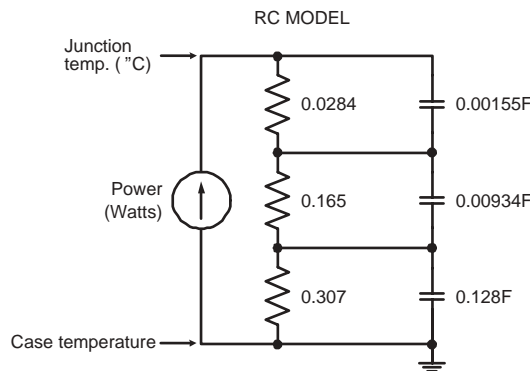


Figure 9a, TRANSIENT THERMAL IMPEDANCE MODEL

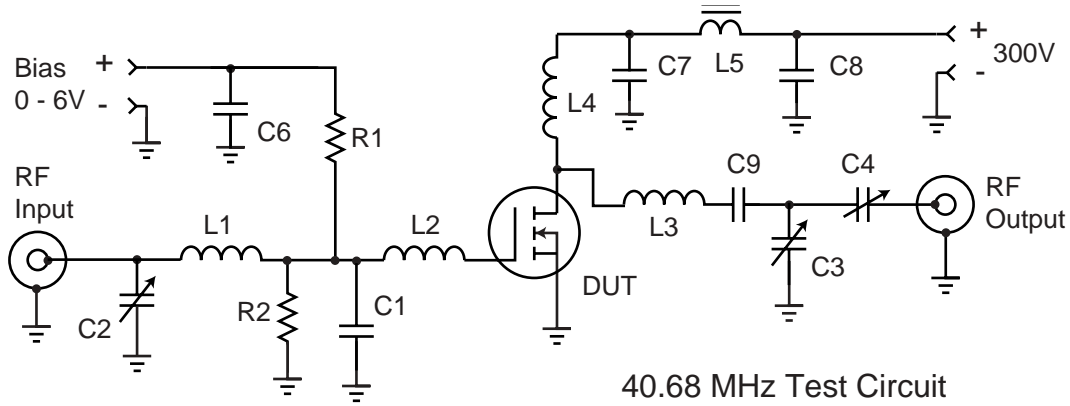
Table 1 - Typical Class AB Large Signal Input - Output Impedance

Freq. (MHz)	Z <sub>in</sub> (Ω)	Z <sub>OL</sub> (Ω)
2.0	21.4 - j 8.7	206 - j 45
13.5	2.6 - j 7.3	68 - j 99
27	.54 - j 2.9	22 - j 64
40	.22 - j .69	10.5 - j 44
65	.31 + j 1.65	4.4 - j 27

Z<sub>in</sub> - Gate shunted with 25Ω

I<sub>DQ</sub> = 100mA

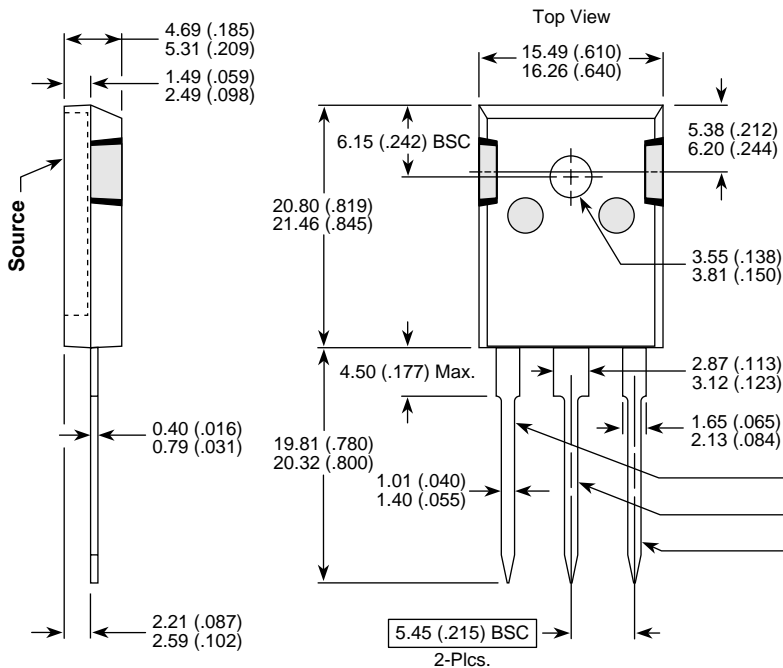
Z<sub>OL</sub> - Conjugate of optimum load for 150 Watts output at V<sub>dd</sub> = 300V



C1 - 1000pF 100V chip ATC 700B  
 C2-C5 - Arco 463 Mica trimmer  
 C6-C8 - .01  $\mu$ F 500V ceramic chip  
 C9 - 2200 pF COG 500 V chip  
 L1 - 4t #20 AWG .25"ID .3"L ~110 nH  
 L2 - 2t #20 AWG .25"ID .3"L ~ 25 nH

L3-- 4t #16 AWG .4" ID .5"L ~290 nH  
 L4 -- 25t #24 AWG .35"ID ~2uH  
 L5-- VK200-4B ferrite choke 3uH  
 R1-R2 -- 51 Ohm 0.5W Carbon  
 DUT = ARF465A/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