
 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	± 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 ① ($I_D(ON) = 3A, V_{GS} = 10V$)			7	
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 ($V_{DS} = 25V, I_D = 3A$)	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	$f = 40.68 \text{ MHz}$ $V_{GS} = 0V \quad V_{DD} = 300V$ $P_{out} = 150W$	13	15		dB
η	Drain Efficiency		70	75		%
Ψ	Electrical Ruggedness VSWR 6:1		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.

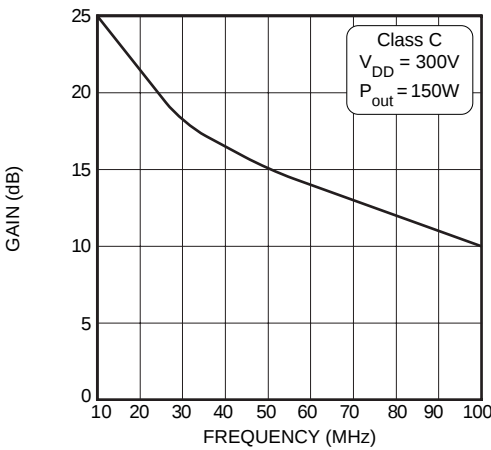


Figure 1, Typical Gain vs Frequency

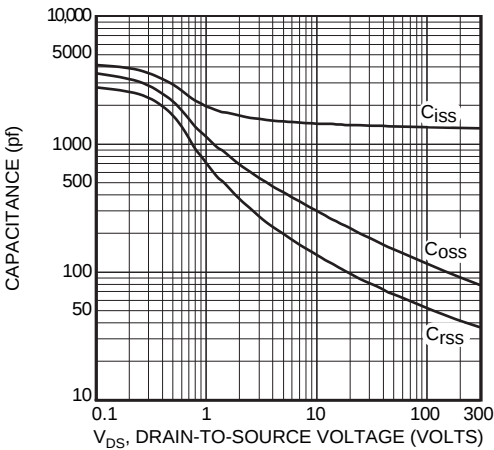


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

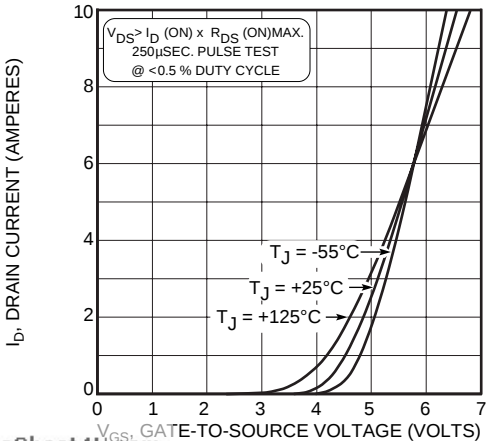


Figure 3, Typical Transfer Characteristics

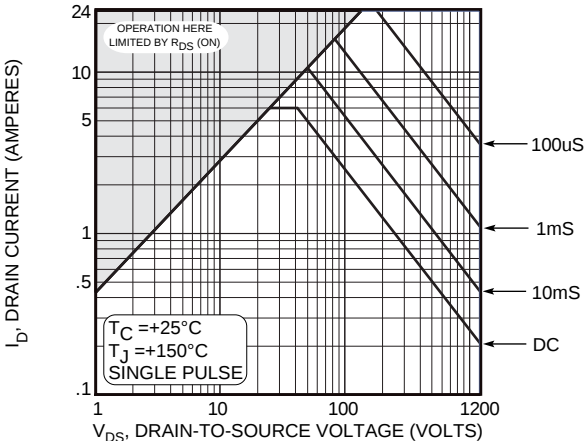


Figure 4, Typical Maximum Safe Operating Area

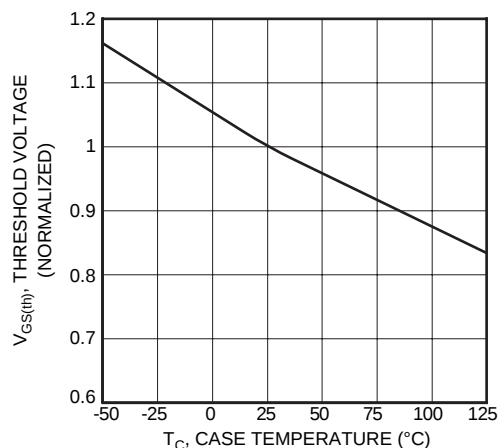


Figure 5, Typical Threshold Voltage vs Temperature

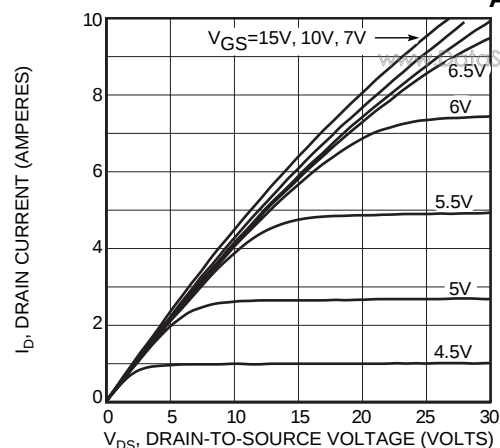


Figure 6, Typical Output Characteristics

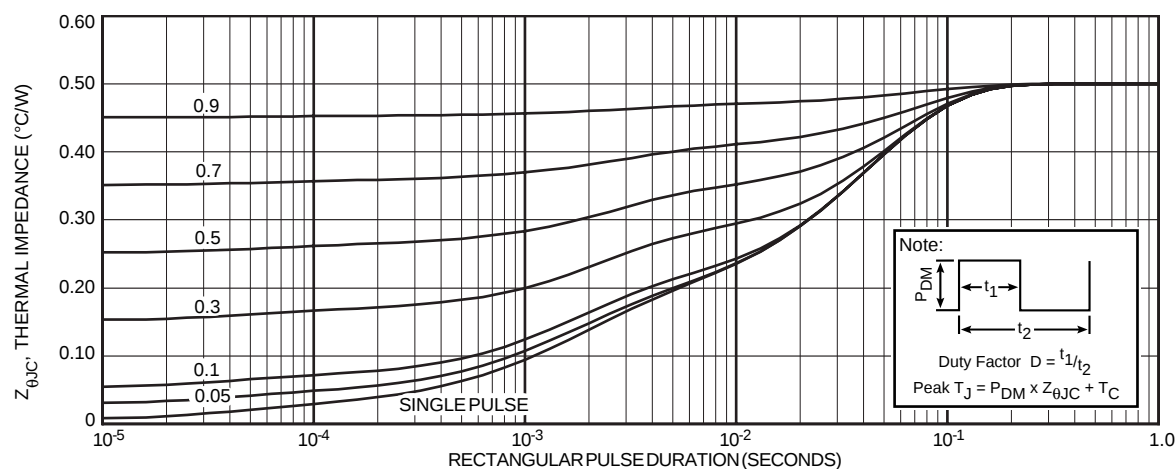


Figure 9, Typical Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

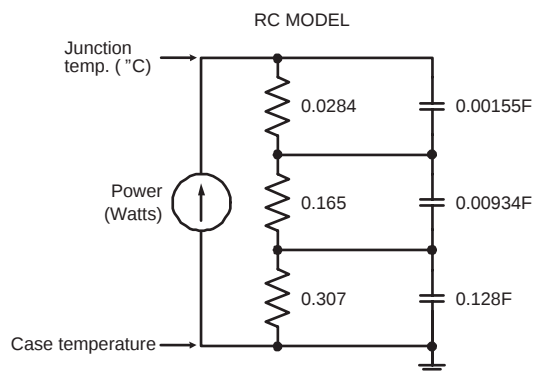
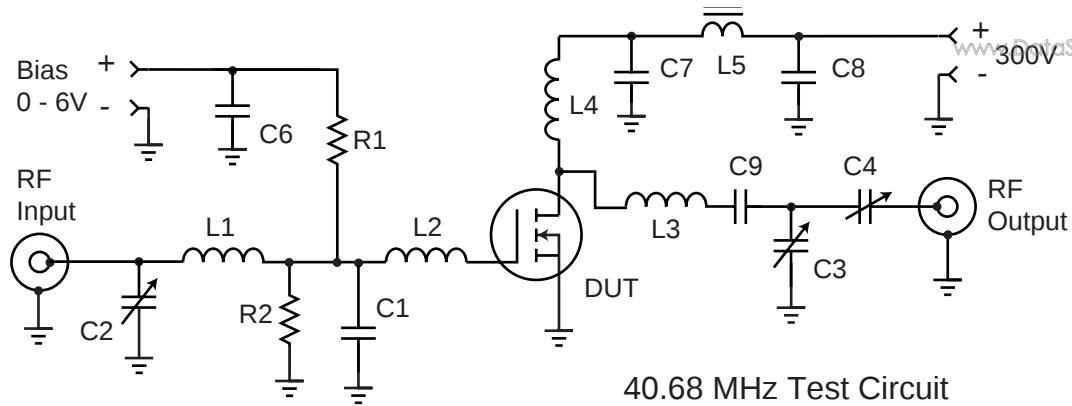


Figure 9a, TRANSIENT THERMAL IMPEDANCE MODEL

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

Freq. (MHz)	$Z_{in} (\Omega)$	$Z_{OL} (\Omega)$
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_{in} - Gate shunted with 25 Ω $I_{DQ} = 100\text{mA}$ Z_{OL} - Conjugate of optimum load for 150 Watts output at $V_{dd} = 300\text{V}$

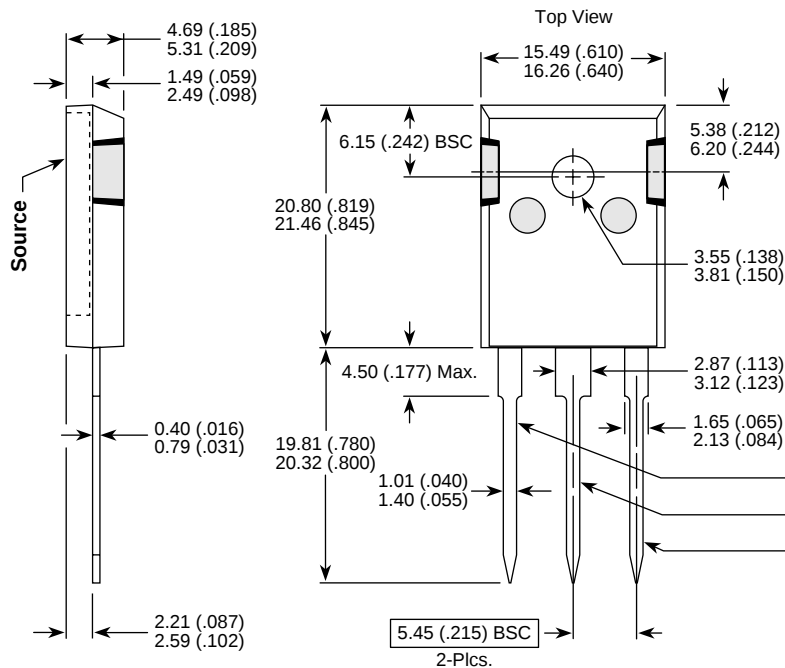


40.68 MHz Test Circuit

C1 - 1000pF 100V chip ATC 700B
 C2-C5 - Arco 463 Mica trimmer
 C6-C8 - .01 μ 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 ~2 μ H
 L5-- VK200-4B ferrite choke 3 μ H
 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