

ARF465A ARF465B

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 V_{th} 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 ($V_{GS} = 0V, I_D = 250 \mu A$)	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 ($V_{DS} = V_{GS}, I_D = 50mA$)	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
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.

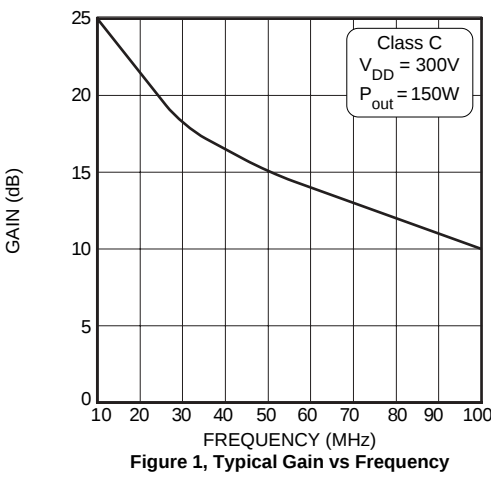


Figure 1, Typical Gain vs Frequency

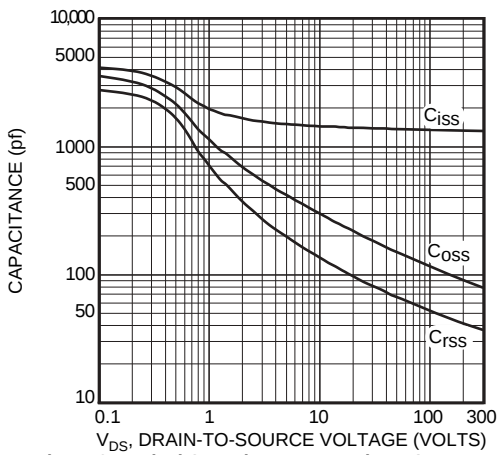
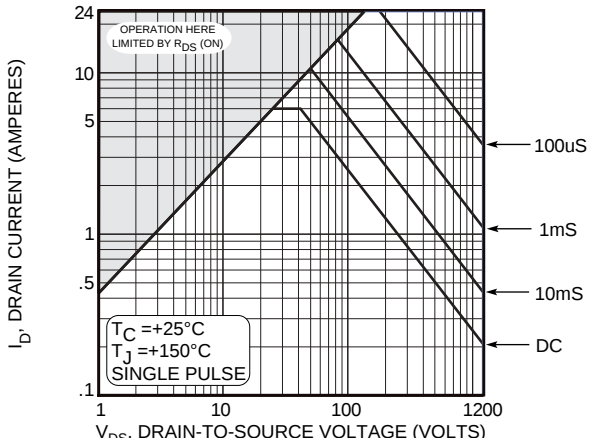
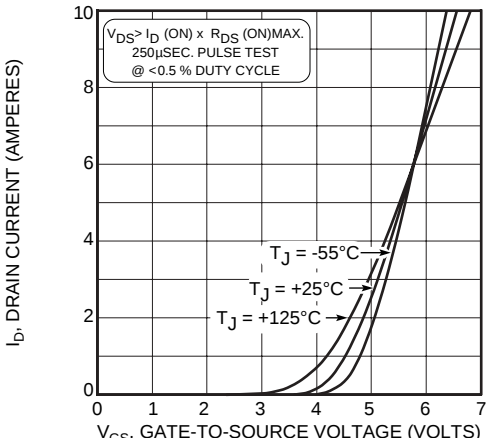


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage



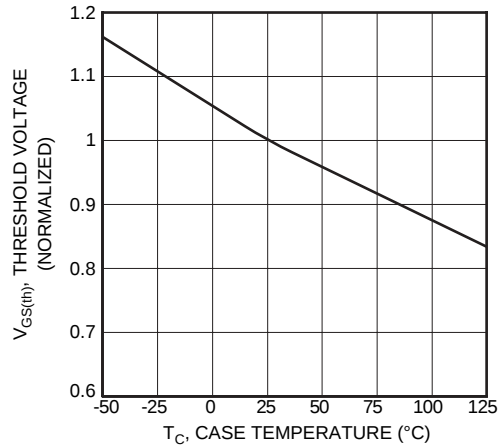


Figure 5, Typical Threshold Voltage vs Temperature

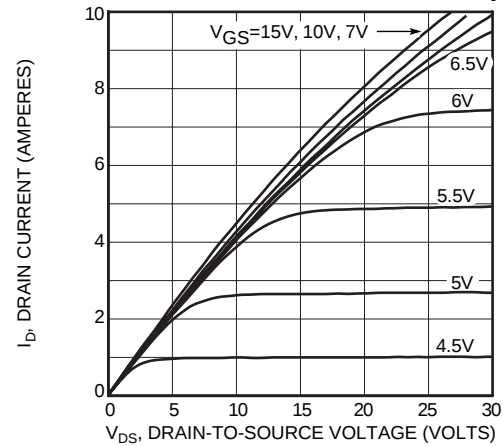


Figure 6, Typical Output Characteristics

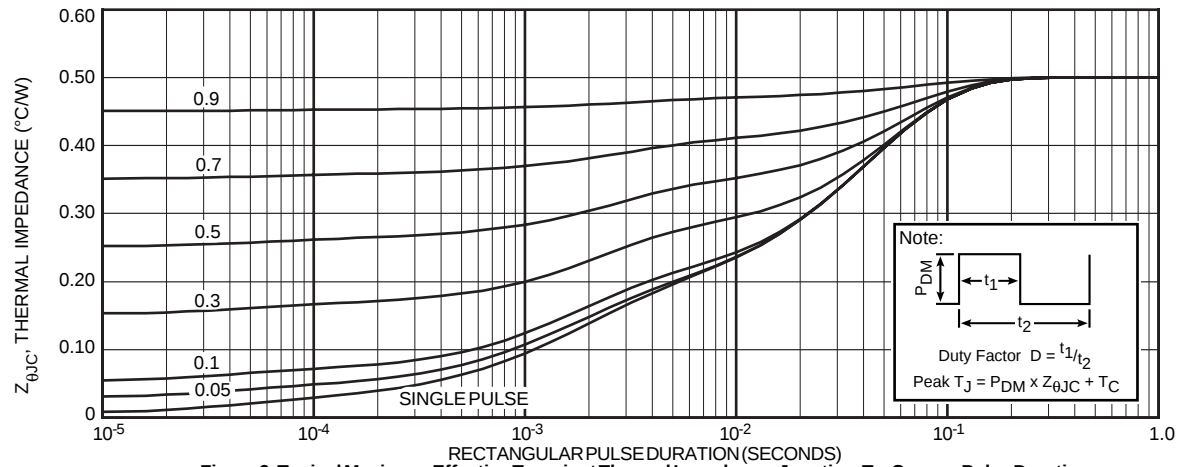


Figure 9, Typical Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

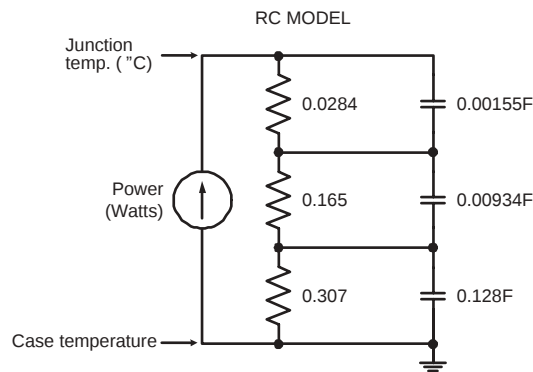
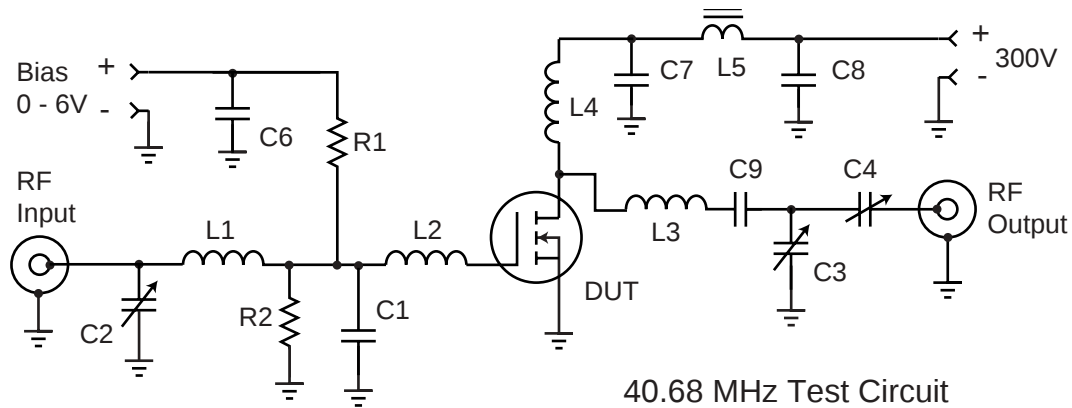


Figure 9a, TRANSIENT THERMAL IMPEDANCE MODEL

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 $V_{dd} = 300\text{V}$

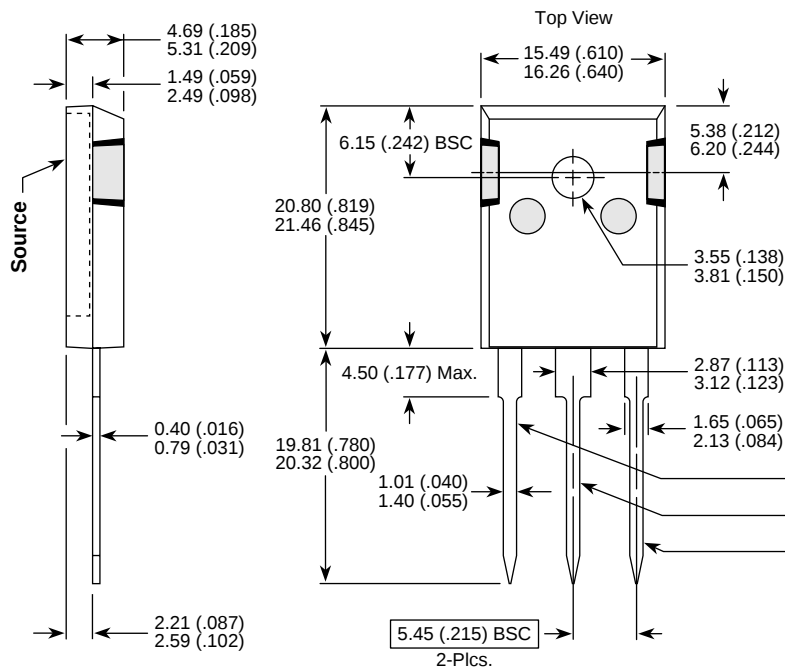


40.68 MHz Test Circuit

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 ~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