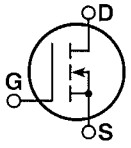
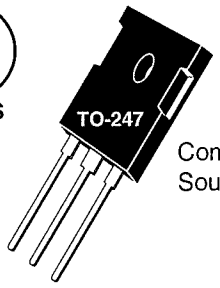
Microsemi
POWER PRODUCTS GROUP





Common Source

ARF446G
ARF447G

*G Donotes RoHS Compliant, Pb Free Terminal Finish

RF POWER MOSFETs

N-CHANNEL ENHANCEMENT MODE

250V 140W 65MHz

The ARF446 and ARF447 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 65MHz.

- **Specified 250 Volt, 40.68 MHz Characteristics:**
  - **Output Power = 140 Watts.**
  - **Gain = 15dB (Class C)**
  - **Efficiency = 75%**
- **Low Cost Common Source RF Package.**
- **Very High Breakdown for Improved Ruggedness.**
- **Low Thermal Resistance.**
- **Nitride Passivated Die for Improved Reliability.**

MAXIMUM RATINGS

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

Symbol	Parameter	ARF446G/447G	UNIT
V_{DSS}	Drain-Source Voltage	900	Volts
V_{DGO}	Drain-Gate Voltage	900	
I_D	Continuous Drain Current @ T_C = 25°C	6.5	Amps
V_{GS}	Gate-Source Voltage	±30	Volts
P_D	Total Power Dissipation @ T_C = 25°C	230	Watts
$R_{\theta JC}$	Junction to Case	0.55	°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	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250 μA)	900			Volts
V_{DS}(ON)	On State Drain Voltage ① (I_D(ON) = 3.5A, 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°C)			250	
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±30V, V_{DS} = 0V)			±100	nA
g_{fs}	Forward Transconductance (V_{DS} = 25V, I_D = 3.5A)	4	5.7		mhos
V_{GS}(TH)	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 50mA)	2		5	Volts

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

Microsemi Website - http://www.microsemi.com

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DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 300V f = 1 MHz		1500	1800	pF
C_{oss}	Output Capacitance			70	130	
C_{rss}	Reverse Transfer Capacitance			27	50	
$t_{d(on)}$	Turn-on Delay Time	V_{GS} = 15V V_{DD} = 0.5 V_{DSS} I_D = $I_{D[Cont.]}$ @ 25°C R_G = 1.6Ω		7	15	ns
t_r	Rise Time			5	10	
$t_{d(off)}$	Turn-off Delay Time			23	40	
t_f	Fall Time			12	25	

FUNCTIONAL CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
G_{PS}	Common Source Amplifier Power Gain	f = 27.12 MHz V_{GS} = 0V V_{DD} = 300V P_{out} = 140W		20		dB
η	Drain Efficiency			80		%
ψ	Electrical Ruggedness VSWR 20:1		No Degradation in Output Power			
G_{PS}	Common Source Amplifier Power Gain	f = 40.68 MHz V_{GS} = 0V V_{DD} = 250V P_{out} = 140W	13	15		dB
η	Drain Efficiency		70	75		%
ψ	Electrical Ruggedness VSWR 20:1		No Degradation in Output Power			

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

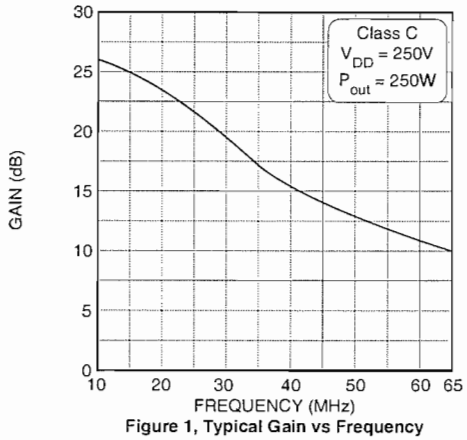


Figure 1, Typical Gain vs Frequency

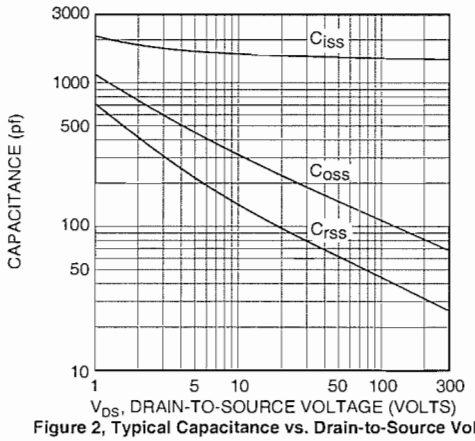


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

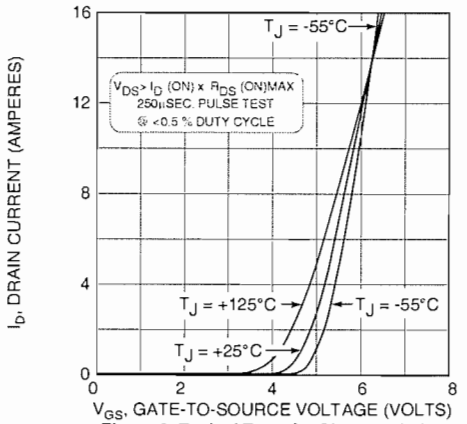


Figure 3, Typical Transfer Characteristics

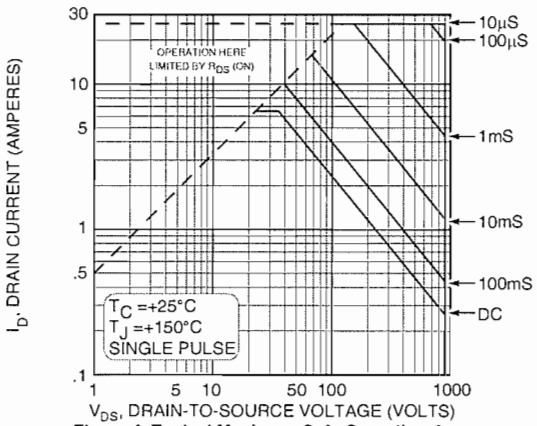


Figure 4, Typical Maximum Safe Operating Area

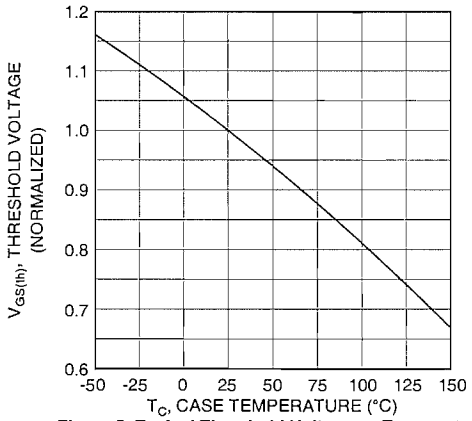


Figure 5, Typical Threshold Voltage vs Temperature

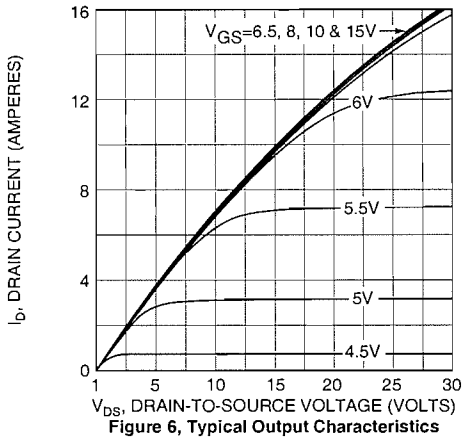


Figure 6, Typical Output Characteristics

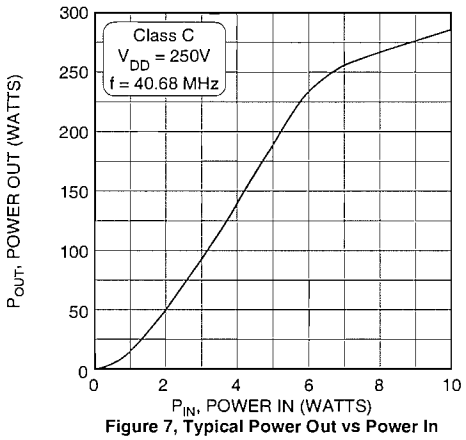


Figure 7, Typical Power Out vs Power In

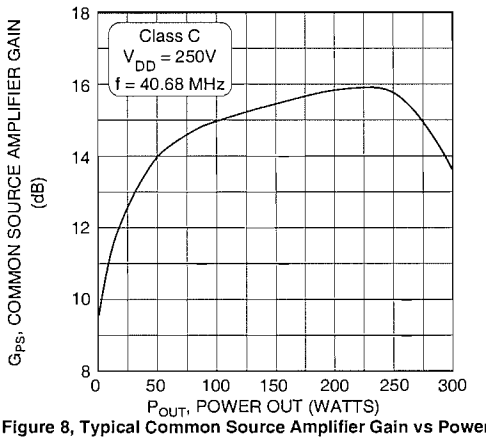


Figure 8, Typical Common Source Amplifier Gain vs Power Out

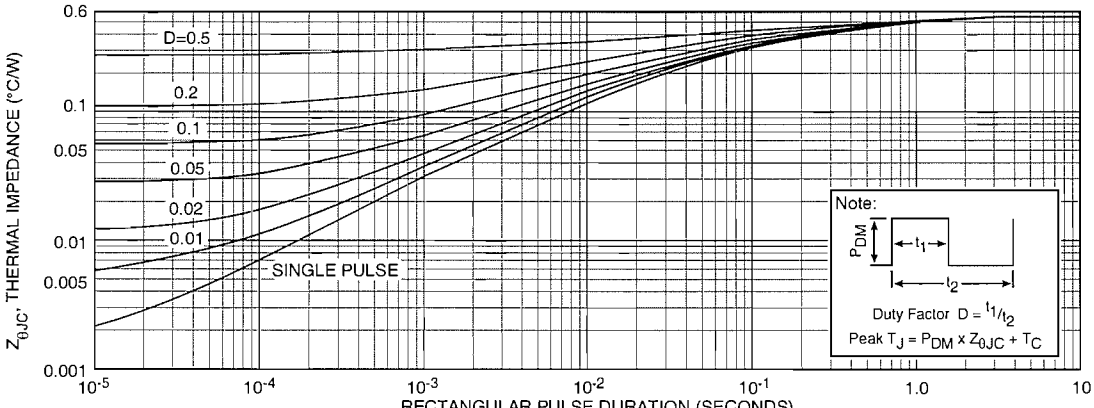


Figure 9, Typical Maximum Effective Transient Thermal Impedance, Junction-To-Case vs Pulse Duration

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

Freq. (MHz)	Z_{in} (Ω)	Z_{OL} (Ω)
2.0	20.40 - j 9.6	142.0 - j 20
13.5	2.10 - j 6.4	73.0 - j 71
27.0	0.50 - j 2.3	30.0 - j 57
40.0	0.30 - j 0.4	15.0 - j 42
65.0	0.46 + j 2.0	6.2 - j 25

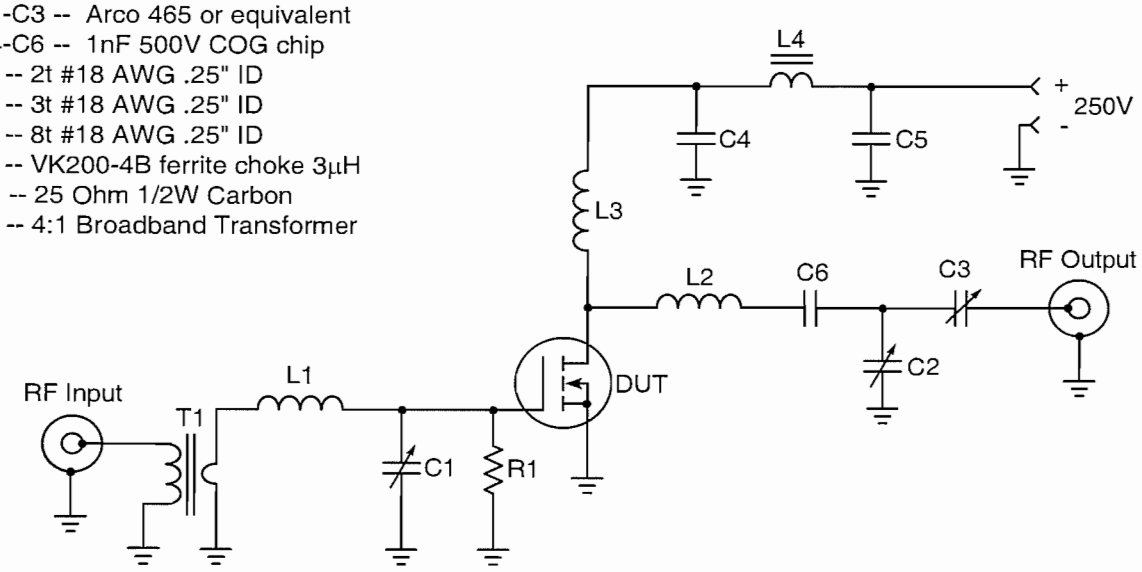
Z_{in} - gate shunted by 25Ω

Z_{OL} - conjugate of optimum load impedance for 250W at 250V

40.68 MHz Test Circuit

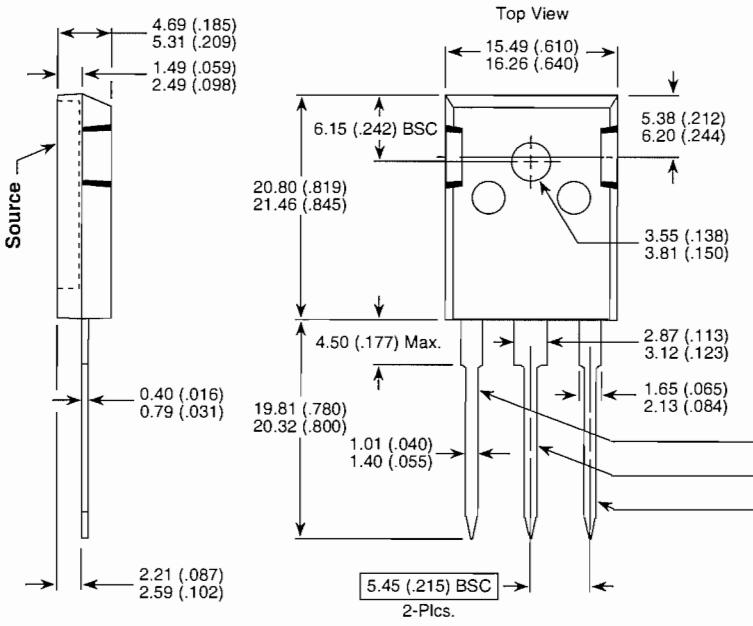
Parts List

C1-C3 -- Arco 465 or equivalent
C4-C6 -- 1nF 500V COG chip
L1 -- 2t #18 AWG .25" ID
L2 -- 3t #18 AWG .25" ID
L3 -- 8t #18 AWG .25" ID
L4 -- VK200-4B ferrite choke 3µH
R1 -- 25 Ohm 1/2W Carbon
T1 -- 4:1 Broadband Transformer



TO-247 Package Outline

e1 SAC: Tin, Silver, Copper



Dimensions in Millimeters and (Inches)

NOTE: The ARF446G and ARF447G Gcomprise 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	
ARF446G	ARF447G
Gate	Drain
Source	Source
Drain	Gate

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Microchip:

ARF446G ARF447G