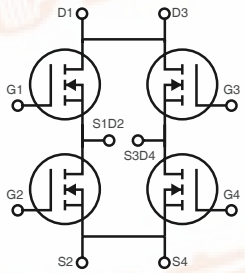
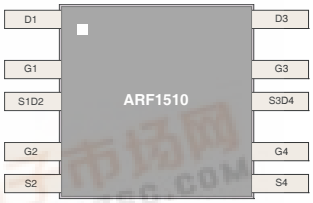
ADVANCED POWER TECHNOLOGY®

ARF1510





RF POWER MOSFET

FULL-BRIDGE

400V 750W 40MHz

The ARF1510 is four RF power transistor arranged in an H-Bridge configuration. It is intended for off-line 300V operation in high power scientific, medical and, industrial RF power generator and amplifier applications up to 40 MHz.

- **Specified 300 Volt, 27.12 MHz Characteristics:**
  - **Output Power = 750 Watts.**
  - **Gain = 17dB (Class D)**
  - **Efficiency > 80%**
- **High Performance Power RF Package.**
- **Very High Breakdown for Improved Ruggedness.**
- **Low Thermal Resistance.**
- **Nitride Passivated Die for Improved Reliability.**

MAXIMUM RATINGS

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

Symbol	Parameter	ARF 1510	UNIT
V_{DSS}	Drain-Source Voltage	1000	Volts
I_D	Continuous Drain Current @ T_C = 25°C	6.5	Amps
V_{GS}	Gate-Source Voltage	±30	Volts
P_D	Total Device Dissipation @ T_C = 25°C	1500	Watts
T_J,T_{STG}	Operating and Storage Junction Temperature Range	-55 to 200	°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)	1000			Volts
$V_{DS(ON)}$	On State Drain Voltage ① ($I_{D(ON)}$ = 3.25A, V_{GS} = 10V)		6.8	7.5	
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = 1000V, V_{GS} = 0V)			25	µA
	Zero Gate Voltage Drain Current (V_{DS} = 800V, 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 = 3.25A)	3	4		mhos
$V_{isolation}$	RMS Voltage (60Hz Sinewave from terminals to mounting surface for 1 minute)	2500			Volts
$V_{GS(TH)}$	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 50mA)	3		5	Volts

THERMAL CHARACTERISTICS

Symbol	Characteristic (per package unless otherwise noted)	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.12	°C/W
$R_{\theta CS}$	Case to Sink (Use High Efficiency Thermal Joint Compound and Planar Heat Sink Surface.)		0.08		

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

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DYNAMIC CHARACTERISTICS

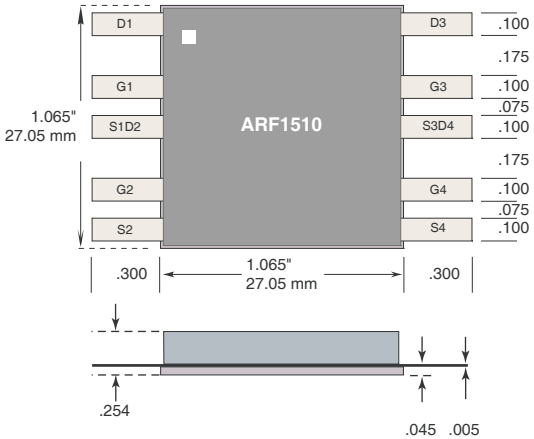
ARF1510

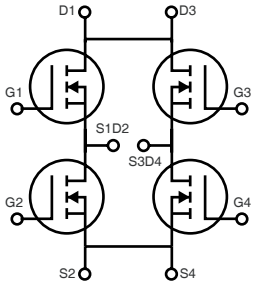
Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 200V f = 1 MHz		1200	1800	pF
C_{oss}	Output Capacitance			100	130	
C_{rss}	Reverse Transfer Capacitance			20	26	
$t_{d(on)}$	Turn-on Delay Time	V_{GS} = 15V V_{DD} = 500V I_D = 6.5A @ 25°C R_G = 1.6 Ω		8		ns
t_r	Rise Time			5		
$t_{d(off)}$	Turn-off Delay Time			18		
t_f	Fall Time			10		

FUNCTIONAL CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
G_{PS}	Common Source Amplifier Power Gain	f = 40.7 MHz V_{GS} = 0V V_{DD} = 400V P_{out} = 750W	13	15		dB
η	Drain Efficiency			75		%
Ψ	Electrical Ruggedness VSWR 6:1		No Degradation in Output Power			

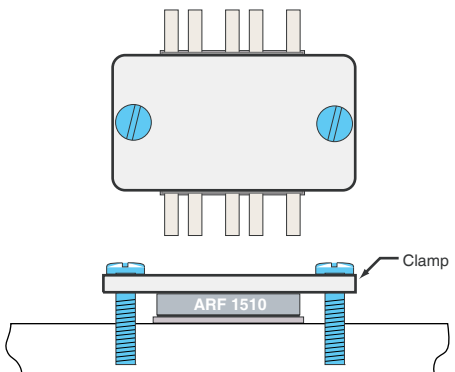
① Pulse Test: Pulse width < 380 µS, Duty Cycle < 2%.





HAZARDOUS MATERIAL WARNING

The ceramic portion of the device between leads and mounting surface is beryllium oxide, BeO. Beryllium oxide dust is toxic when inhaled. Care must be taken during handling and mounting to avoid damage to this area. These devices must never be thrown away with general industrial or domestic waste.



Thermal Considerations and Package Mounting:

The rated 1500W power dissipation is only available when the package mounting surface is at 25°C and the junction temperature is 200°C. The thermal resistance between junctions and case mounting surface is 0.12°C/W. When installed, and additional thermal impedance of 0.08°C/W between the package base and the mounting surface is typical. Insure that the mounting surface is smooth and flat. Thermal joint compound must be used to reduce the effects of small surface irregularities. The heat sink should incorporate a copper heat spreader to obtain best results.

The package is designed to be clamped to a heatsink. A clamped joint maintains the required mounting pressure while allowing for thermal expansion of both the device and the heat sink. A simple clamp and two 6-32 (M3.5) screw can provide the minimum

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