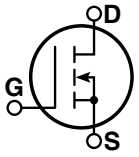
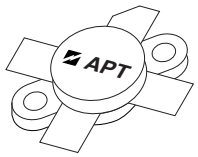
ADVANCED POWER TECHNOLOGY®

ARF521





RF POWER MOSFET

N-CHANNEL ENHANCEMENT MODE

165V 150W 150MHz

The ARF521 is an RF power transistor designed for high voltage operation in broadband HF, narrow band ISM and MRI power amplifiers up to 150MHz.

- **Specified 125 Volt, 81MHz Characteristics:**
  - **Output Power = 150 Watts.**
  - **Gain = 13dB (Class AB)**
  - **Efficiency = 50%**
- **High Voltage Breakdown and Large SOA for Superior Ruggedness.**
- **Industry standard package**
- **Low Vth thermal coefficient**

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

Symbol	Parameter	ARF521	UNIT
V_{DSS}	Drain-Source Voltage	500	Volts
I_D	Continuous Drain Current @ T_C = 25°C	10	Amps
V_{GS}	Gate-Source Voltage	±30	Volts
P_D	Total Device Dissipation @ T_C = 25°C	250	Watts
T_J,T_{STG}	Operating and Storage Junction Temperature Range	-55 to 175	°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)	500			Volts
$R_{DS(ON)}$	Drain-Source On-State Resistance ① ($I_{D(ON)}$ = 5A, V_{GS} = 10V)		0.56	8	Ohms
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = V_{DSS}, V_{GS} = 0V)			25	µA
	Zero Gate Voltage Drain Current (V_{DS} = 50V, V_{GS} = 0, 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} = 15V, I_D = 5A)	3	3.6		mhos
$V_{GS(TH)}$	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 200mA)	2		4	Volts

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.60	°C/W
$R_{\theta CS}$	Case to Sink (Use High Efficiency Thermal Joint Compound and Planar Heat Sink Surface.)		0.1		

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

APT Website - http://www.advancedpower.com

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DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V		780	900	pF
C_{oss}	Output Capacitance	V_{DS} = 50V		125	150	
C_{rss}	Reverse Transfer Capacitance	f = 1 MHz		7	10	
$t_{d(on)}$	Turn-on Delay Time	V_{GS} = 15V		5.1	10	ns
t_r	Rise Time	V_{DD} = 0.5 V_{DSS}		4.1	8	
$t_{d(off)}$	Turn-off Delay Time	I_D = $I_{D[Cont.]}$ @ 25°C		12	18	
t_f	Fall Time	R_G = 1.6 Ω		4.0	7	

FUNCTIONAL CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
G_{PS}	Common Source Amplifier Power Gain	f = 81MHz	14	15		dB
η	Drain Efficiency	I_{dq} = 50mA V_{DD} = 125V	50	55		%
Ψ	Electrical Ruggedness VSWR 5:1	P_{out} = 150W	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.

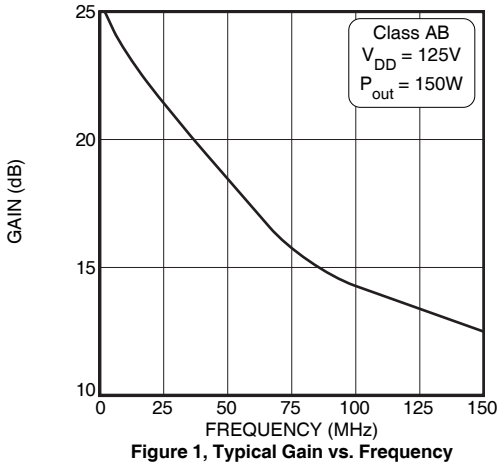


Figure 1, Typical Gain vs. Frequency

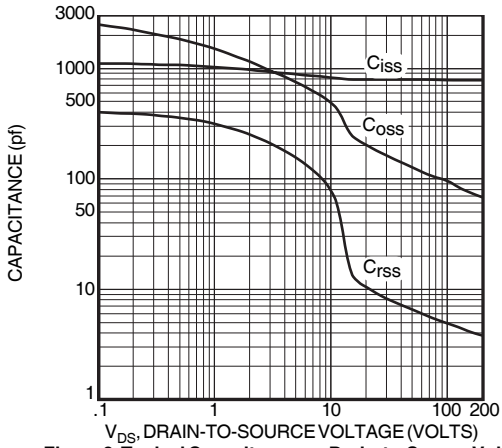


Figure 2, Typical Capacitance vs. Drain-to-Source Voltage

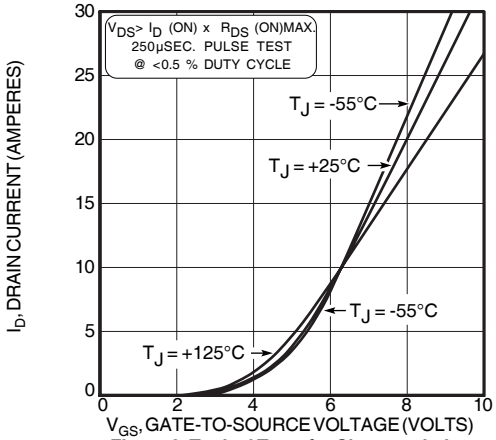


Figure 3, Typical Transfer Characteristics

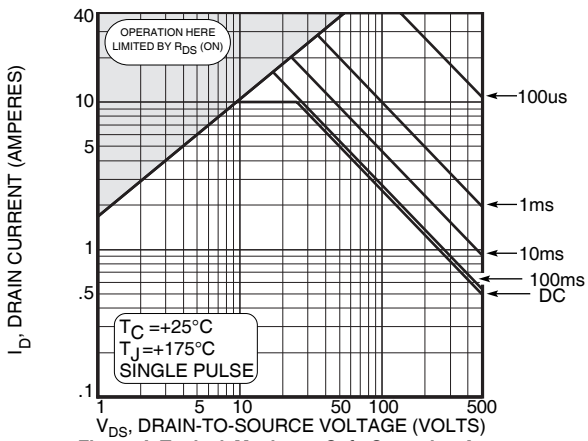


Figure 4, Typical Maximum Safe Operating Area

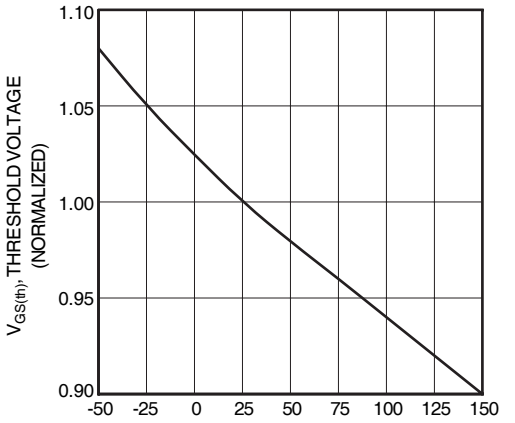


Figure 5, Typical Threshold Voltage vs Temperature

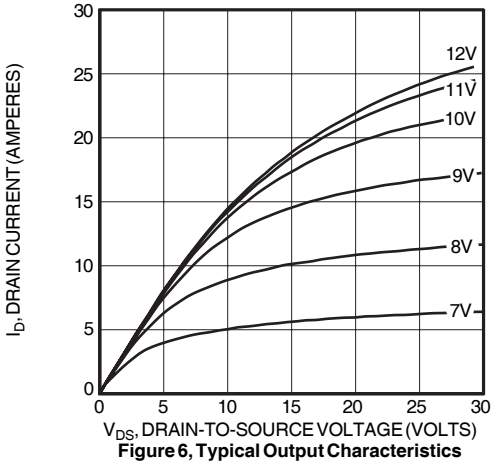


Figure 6, Typical Output Characteristics

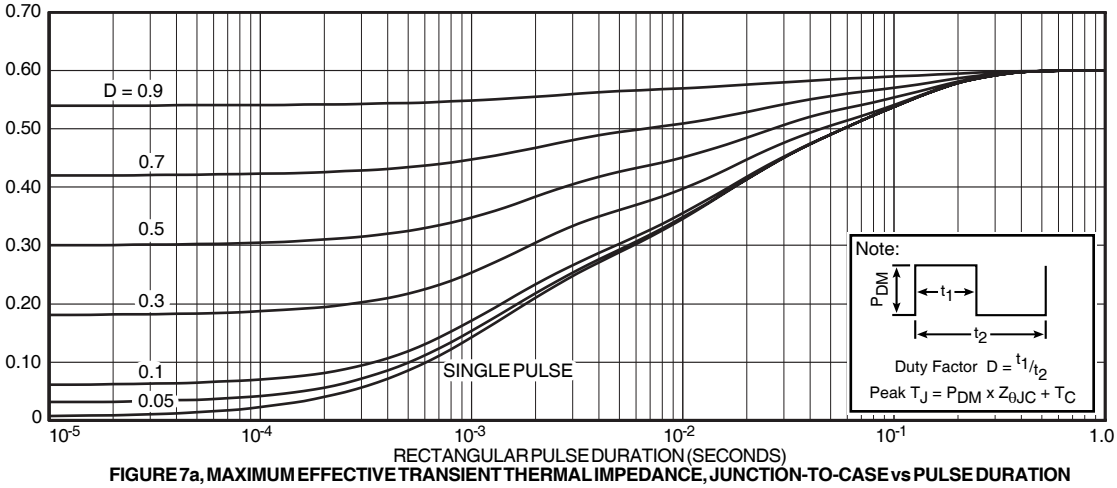


FIGURE 7a, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Transient Thermal Impedance RC Model

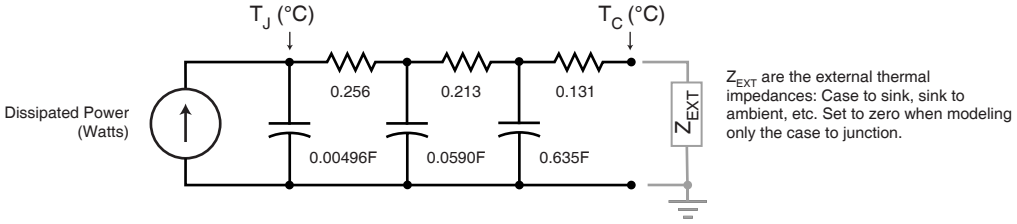


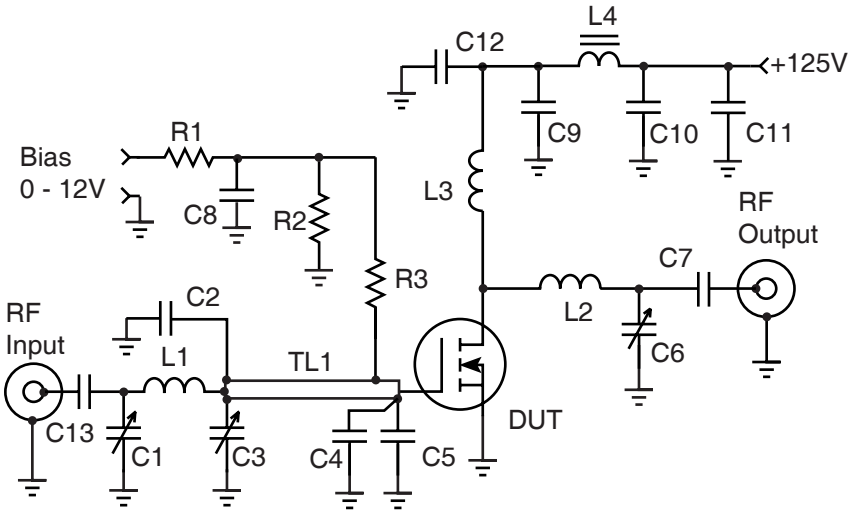
Figure 7b, TRANSIENT THERMAL IMPEDANCE MODEL

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

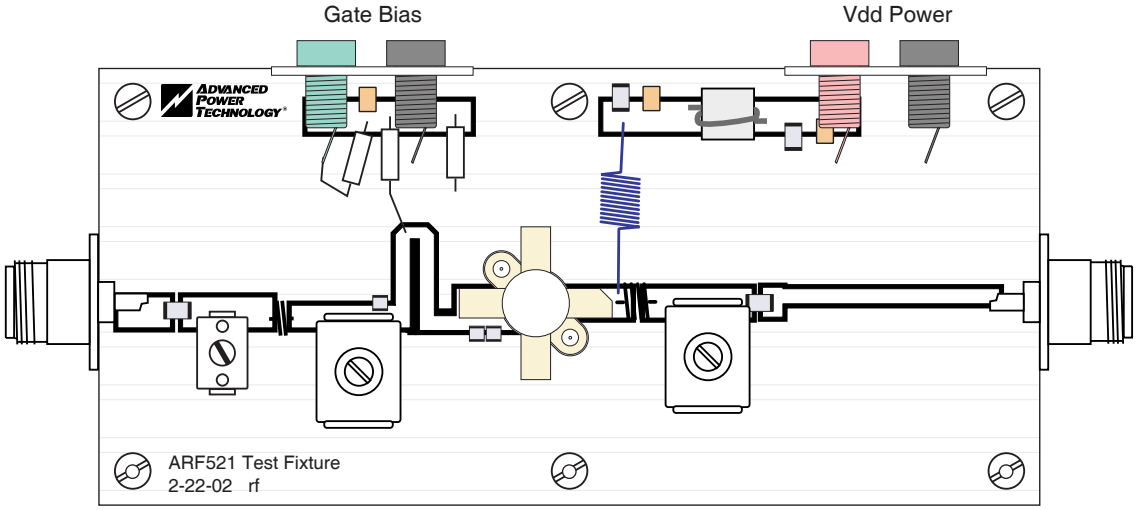
Freq. (MHz)	Z_{in} (Ω)	Z_{OL} (Ω)
2.0	24 - j 4.5	55 - j 4
13.5	8.3 - j 11.6	45 - j 22
27	2.5 - j 7.1	28.7 - j 28
40	1.0 - j 4.2	17.9 - j 26
65	.30 - j 1.1	9.0 - j 20.6
80	.25 + j 0.3	5.8 - j 17
100	.35 + j 1.6	4 - j 14.2

Z_{in} - Gate shunted with 25Ω I_{dq} = 50mA
Z_{OL} - Conjugate of optimum load for 150 Watts output at V_{dd} = 125V

ARF521 Test Circuit 81.36 MHz



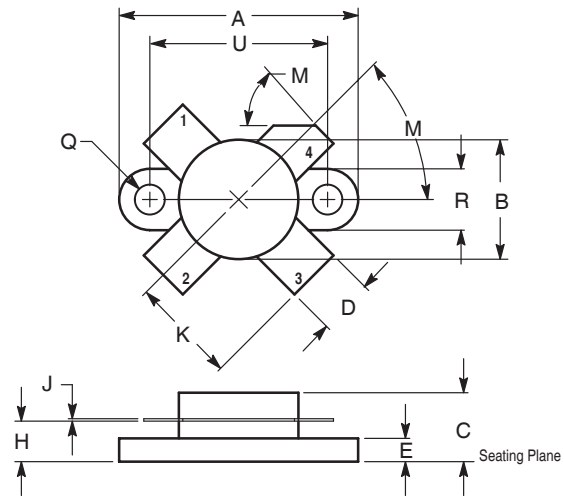
C1 - Arco 406 Mica trimmer
C2 - 220pF Semco metal clad
C3 - Arco 464 Mica trimmer
C4 - 820pF ATC 700B
C5- 1000pF ATC 700B
C6 - Arco 463 Mica trimmer
C7-C10 10nF 500V chip
C11-C13 1nF NPO 500V
TL1 - .23" x 1.5" stripline
L1 -- 2t #18 .3" ID .2"L ~50nH
L2 -- 3t #16 AWG .31" ID .3"L ~65nH
L3 -- 10t #22 AWG .25 ID ~470nH
L4 -- VK200-4B ferrite choke ~3uH
R1-R3 -- 1k Ohm 1/4W Carbon
DUT = ARF521



Hazardous Material Warning

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

.5" SOE Package Outine



PIN 1. SOURCE
2. GATE
3. SOURCE
4. DRAIN

2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.960	0.990	24.39	25.14
B	0.465	0.510	11.82	12.95
C	0.229	0.275	5.82	6.98
D	0.216	0.235	5.49	5.96
E	0.084	0.110	2.14	2.79
H	0.144	0.178	3.66	4.52
J	0.003	0.007	0.08	0.17
K	0.435		11.0	
M	45° NOM		45° NOM	
Q	0.115	0.130	2.93	3.30
R	0.246	0.255	6.25	6.47
U	0.720	0.730	18.29	18.54

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APT's products are covered by one or more of U.S.patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 6,939,743 and foreign patents. US and Foreign patents pending. All Rights Reserved.