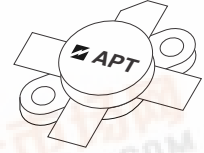
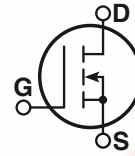




ARF521



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: $T_C = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	ARF521	UNIT
V_{DSS}	Drain-Source Voltage	500	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	10	Amps
V_{GS}	Gate-Source Voltage	± 30	Volts
P_D	Total Device Dissipation @ $T_C = 25^\circ\text{C}$	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 ($V_{GS} = 0V, I_D = 250 \mu A$)	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 ($V_{DS} = 50V, V_{GS} = 0, T_C = 125^\circ\text{C}$)			250	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			± 100	nA
g_{fs}	Forward Transconductance ($V_{DS} = 15V, I_D = 5A$)	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.



DYNAMIC CHARACTERISTICS

ARF521

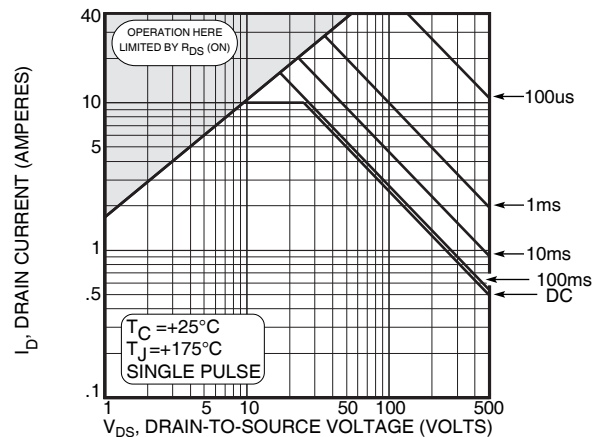
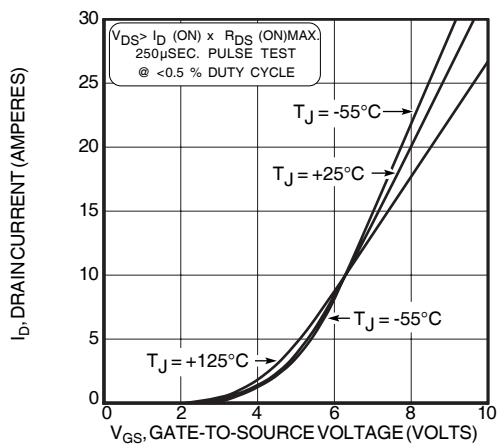
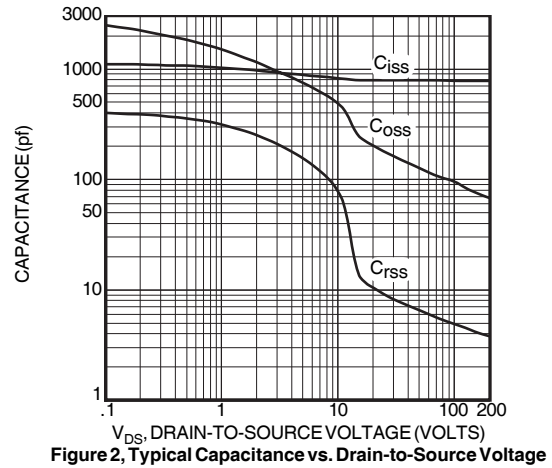
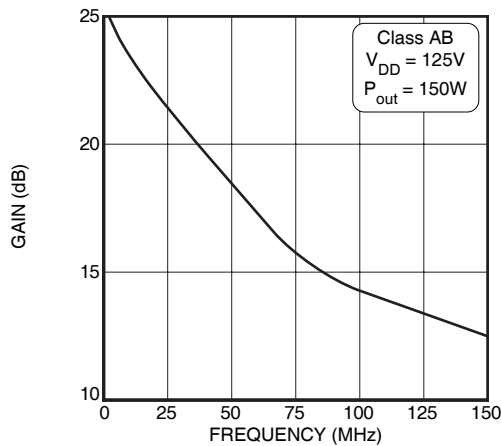
Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 50V$ $f = 1\text{ MHz}$		780	900	pF
C_{oss}	Output Capacitance			125	150	
C_{rss}	Reverse Transfer Capacitance			7	10	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_{D[Cont.]}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

FUNCTIONAL CHARACTERISTICS

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



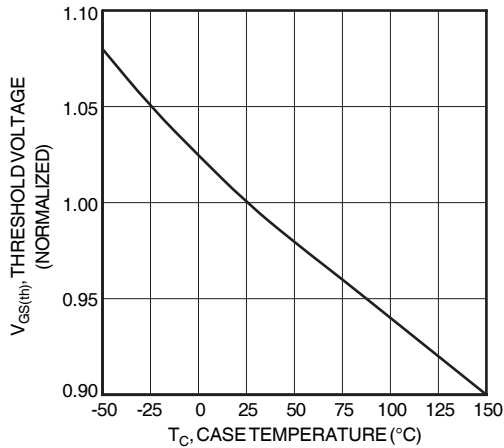


Figure 5, Typical Threshold Voltage vs Temperature

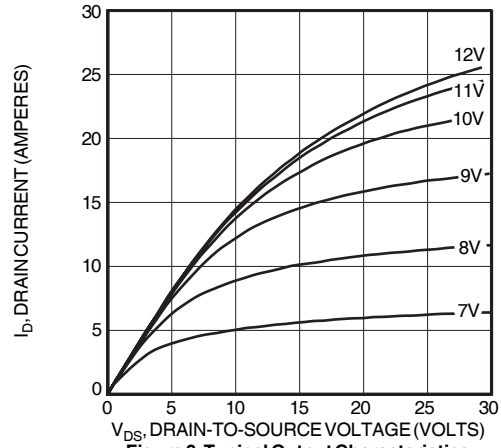


Figure 6, Typical Output Characteristics

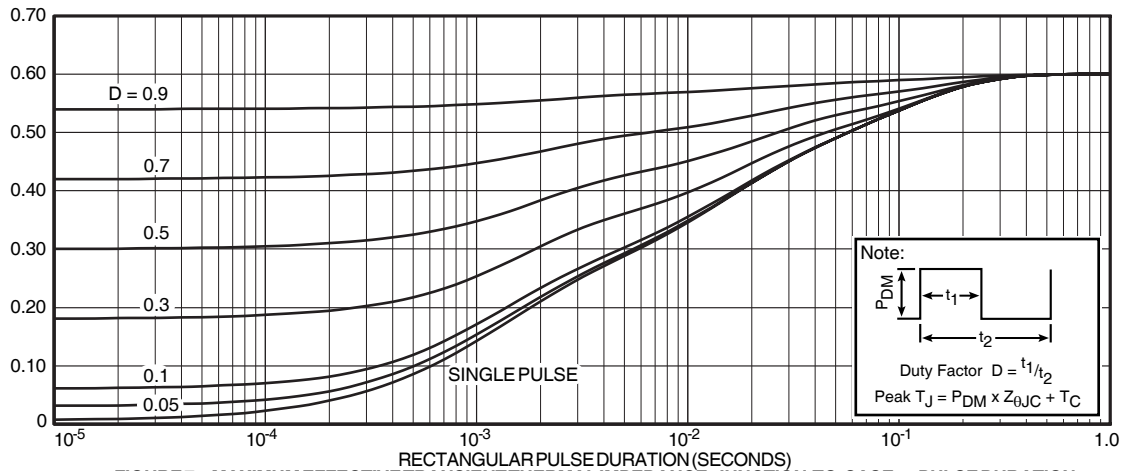


FIGURE 7a, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

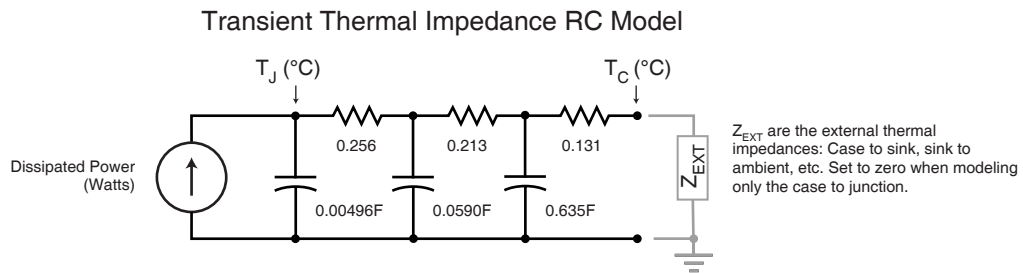


Figure 7b, TRANSIENT THERMAL IMPEDANCE MODEL

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

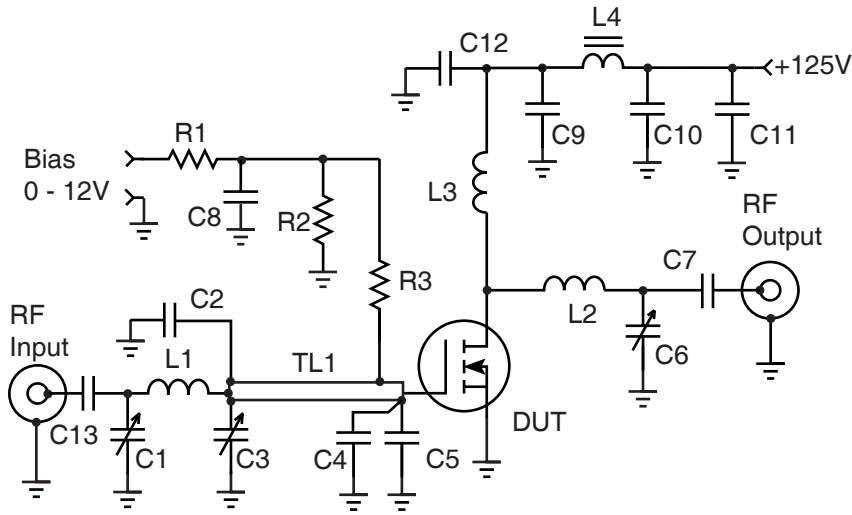
Freq. (MHz)	Z_{in} (Ω)	Z_{OL} (Ω)
2.0	24 - j 4.5	55 - j 4
13.5	8.3 - j 11.6	45 - j 22
27	2.5 - j 7.1	28.7 - j 28
40	1.0 - j 4.2	17.9 - j 26
65	.30 - j 1.1	9.0 - j 20.6
80	.25 + j 0.3	5.8 - j 17
100	.35 + j 1.6	4 - j 14.2

Z_{in} - Gate shunted with 25 Ω

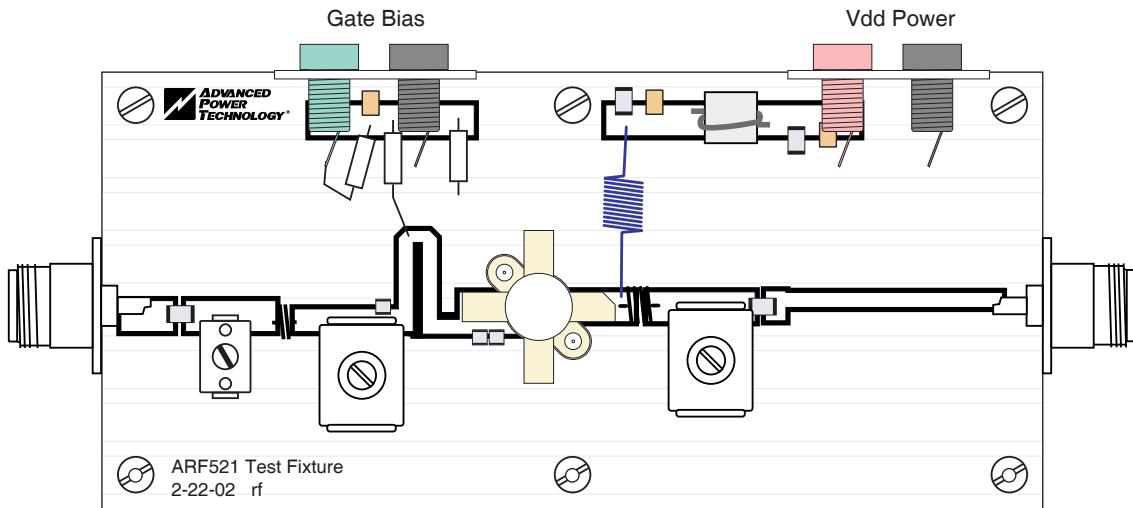
$I_{dq} = 50\text{mA}$

Z_{OL} - Conjugate of optimum load for 150 Watts output at $V_{DD} = 125\text{V}$

ARF521 Test Circuit 81.36 MHz



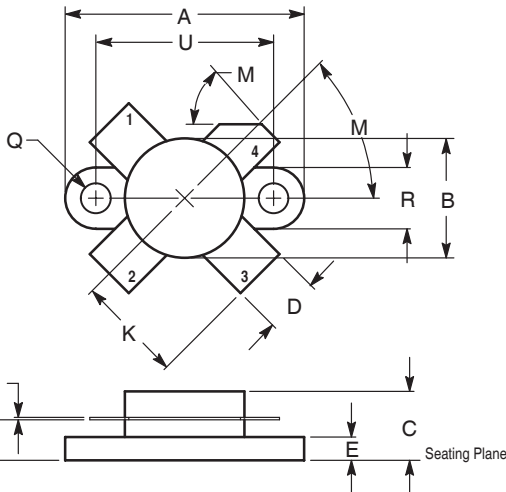
- C1 - Arco 406 Mica trimmer
- C2 - 220pF Semco metal clad
- C3 - Arco 464 Mica trimmer
- C4 - 820pF ATC 700B
- C5- 1000pF ATC 700B
- C6 - Arco 463 Mica trimmer
- C7-C10 10nF 500V chip
- C11-C13 1nF NPO 500V
- TL1 - .23" x 1.5" stripline
- L1 -- 2t #18 .3" ID .2"L ~50nH
- L2 -- 3t #16 AWG .31" ID .3"L ~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 Outline



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

2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	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