

APT801R2AN 800V 8.0A 1.20 Ω
 APT751R2AN 750V 8.0A 1.20 Ω
 APT801R4AN 800V 7.5A 1.40 Ω
 APT751R4AN 750V 7.5A 1.40 Ω

POWER MOS IV™

N - CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT				UNIT
		751R2AN	801R2AN	751R4AN	801R4AN	
V_{DSS}	Drain-Source Voltage	750	800	750	800	Volts
I_D	Continuous Drain Current	8.0		7.5		Amps
I_{DM}	Pulsed Drain Current ¹	32		30		Amps
V_{GS}	Gate-Source Voltage	±30				Volts
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$, Derate Above 25°C	198				Watts
T_J, T_{STG}	Operating and Storage Junction Temperature Range	- 55 to 150				°C

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250 \mu\text{A}$)	APT801R2AN / APT801R4AN		800	Volts
		APT751R2AN / APT751R4AN		750	Volts
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$) ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			250	μA
				1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)			±100	nA
$I_{D(ON)}$	On State Drain Current ² ($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 10V$)	APT801R2AN / APT751R2AN		8.0	Amps
		APT801R4AN / APT751R4AN		7.5	Amps
$V_{GS(TH)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1\text{mA}$)	2		4	Volts
$R_{DS(ON)}$	Static Drain-Source On-State Resistance ² ($V_{GS} = 10V, I_D = 0.5 I_D$ [Cont.])	APT801R2AN / APT751R2AN		1.20	Ohms
		APT801R4AN / APT751R4AN		1.40	Ohms

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.63	°C/W
$R_{\theta JA}$	Junction to Ambient			30	°C/W
T_L	Max. Lead Temp. for Soldering Conditions: 0.063" from Case for 10 Sec.			300	°C

405 S.W. COLUMBIA STREET
 BEND, OREGON 97702-1035
 U.S.A.

PHONE ... (503) 382-8028

FAX (503) 388-0364

DYNAMIC CHARACTERISTICS

APT801R2/751R2/801R4/751R4AN

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 MHz$		1500	1800	pF
C_{oss}	Output Capacitance			235	330	pF
C_{rss}	Reverse Transfer Capacitance			85	127	pF
Q_g	Total Gate Charge ³	$V_{GS} = 10V, I_D = I_D [Cont.]$ $V_{DD} = 0.5 V_{DSS}$		68	105	nC
Q_{gs}	Gate-Source Charge			7.6	11	nC
Q_{gd}	Gate-Drain ("Miller") Charge			33	49	nC
$t_d(on)$	Turn-on Delay Time	$V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [Cont.], V_{GS} = 15V$ $R_G = 1.8\Omega$		13	26	ns
t_r	Rise Time			15	29	ns
$t_d(off)$	Turn-off Delay Time			54	81	ns
t_f	Fall Time			20	39	ns

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT	
I_S	Continuous Source Current (Body Diode)	APT801R2AN / APT751R2AN			8.0	Amps
		APT801R4AN / APT751R4AN			7.5	Amps
I_{SM}	Pulsed Source Current ¹ (Body Diode)	APT801R2AN / APT751R2AN			32	Amps
		APT801R4AN / APT751R4AN			30	Amps
V_{SD}	Diode Forward Voltage ² ($V_{GS} = 0V, I_S = -I_D [Cont.]$)			1.3	Volts	
t_{rr}	Reverse Recovery Time ($I_S = -I_D [Cont.], di_S/dt = 100A/\mu s$)	240	480	960	ns	
Q_{rr}	Reverse Recovery Charge	1.7	3.4	7	μC	

SAFE OPERATING AREA CHARACTERISTICS

Symbol	Characteristic	Test Conditions / Part Number	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} = 0.4 V_{DSS}, I_{DS} = P_D / 0.4 V_{DSS}, t = 1 Sec.$	198			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D [Cont.], V_{DS} = P_D / I_D [Cont.], t = 1 Sec.$	198			Watts
I_{LM}	Inductive Current Clamped	APT801R2AN / APT751R2AN	32			Amps
		APT801R4AN / APT751R4AN	30			Amps

1.) Repetitive Rating: Pulse width limited by maximum junction temperature. See Transient Thermal Impedance Curve. (Fig.1)

2.) Pulse Test: Pulse width < 380 μs
Duty Cycle < 2%
3.) See MIL-STD-750 Method 3471

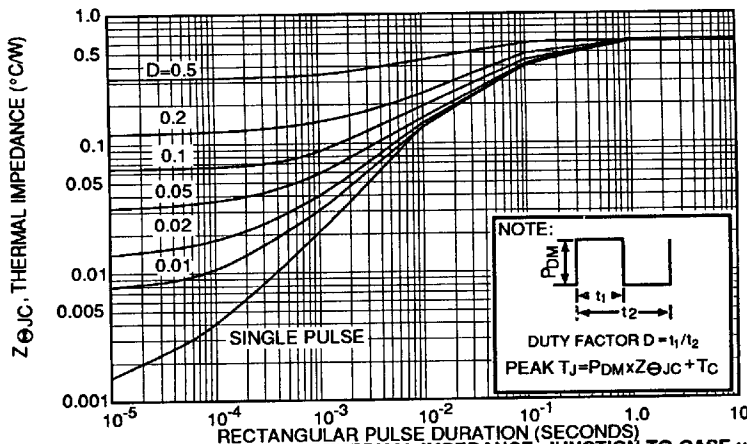


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

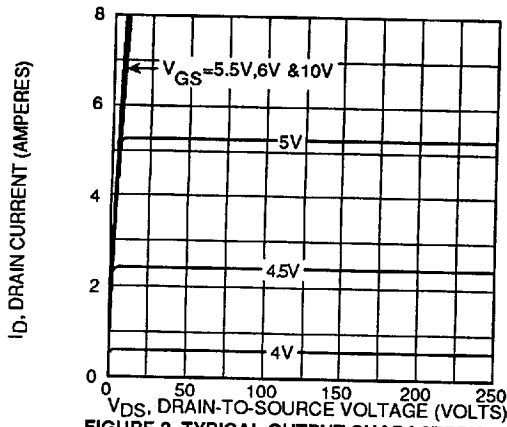


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

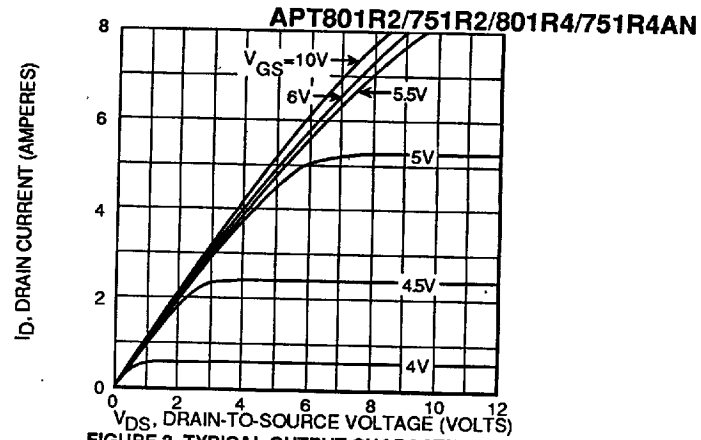


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

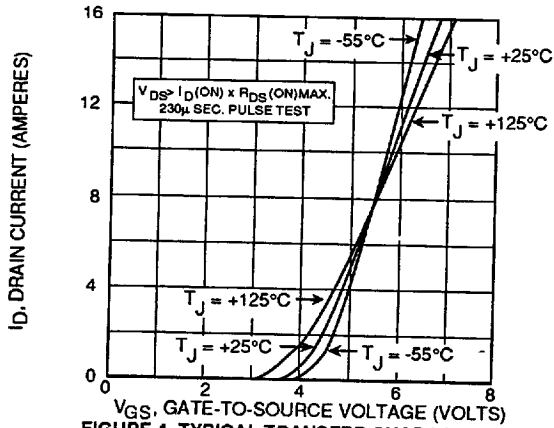


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

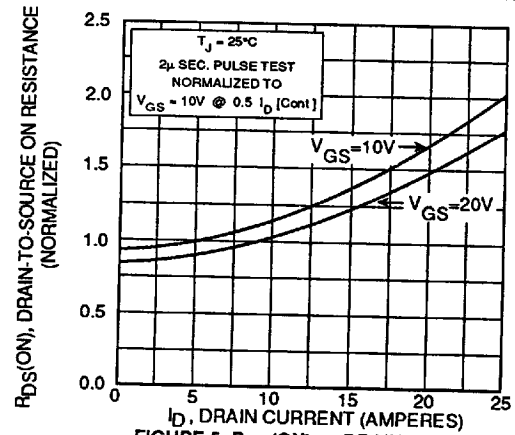


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

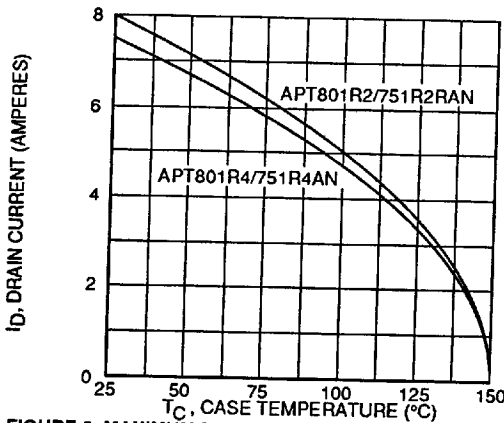


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

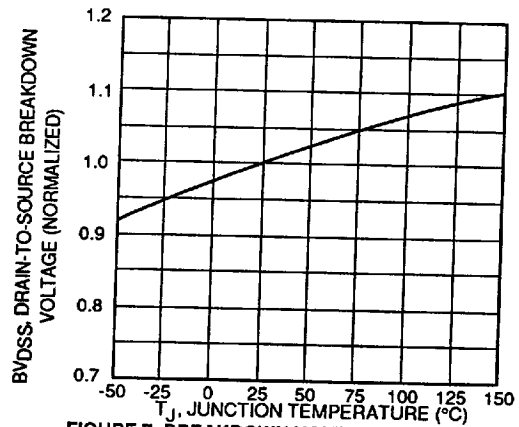


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

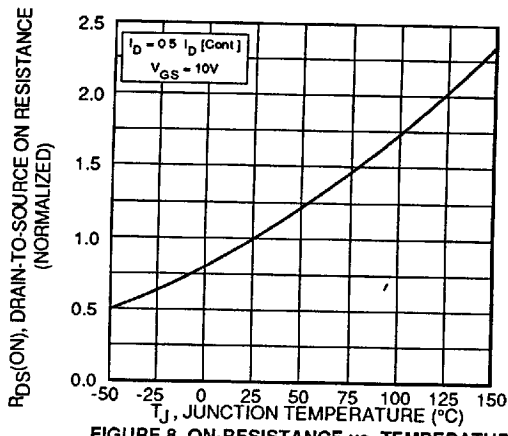


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

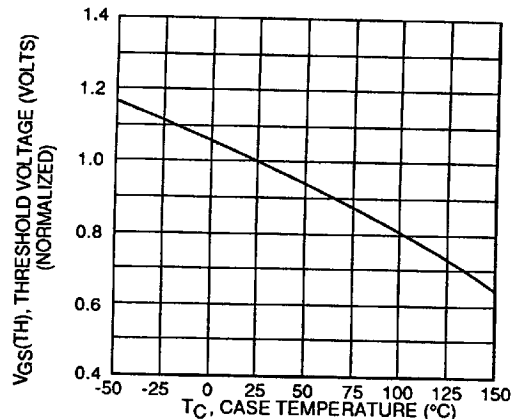


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

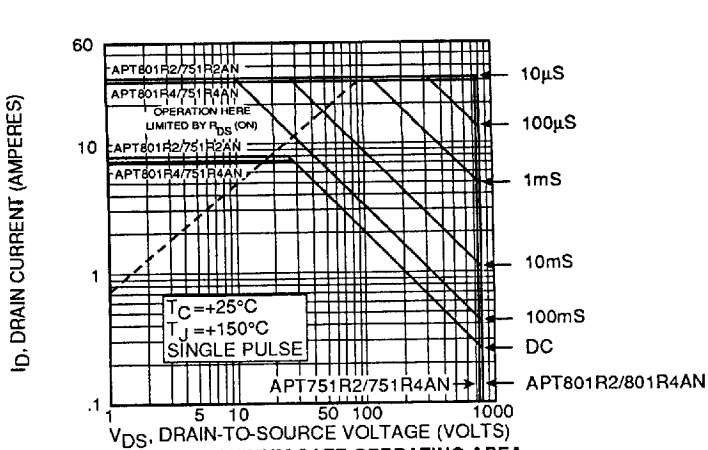


FIGURE 10, MAXIMUM SAFE OPERATING AREA

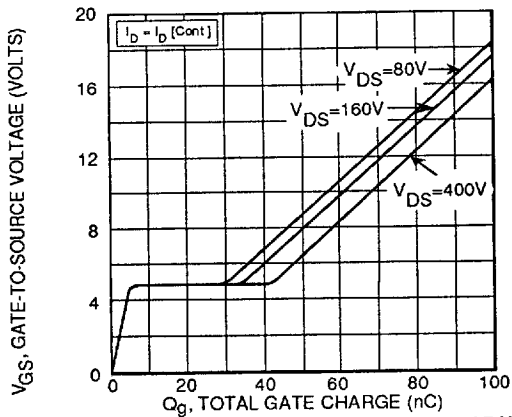


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

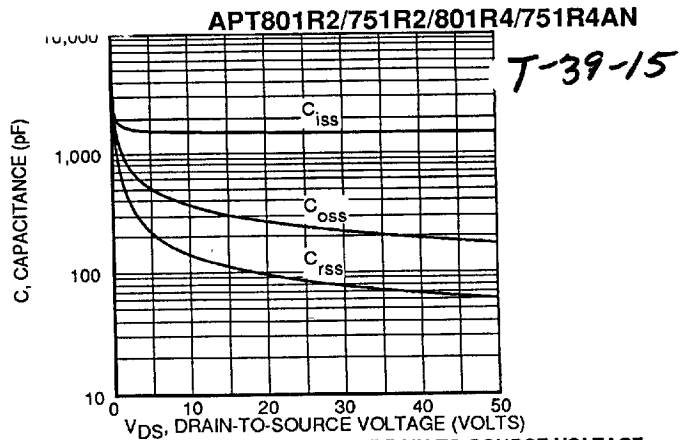


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

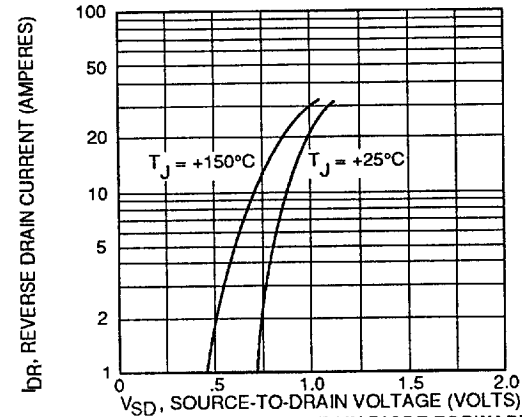
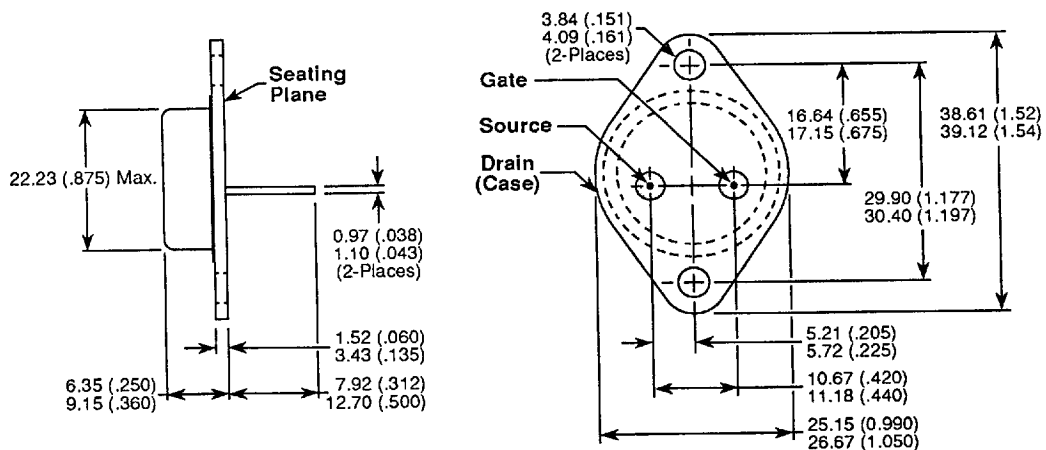


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-3 Package Outline (TO-204AA)



Dimensions in Millimeters and (Inches)