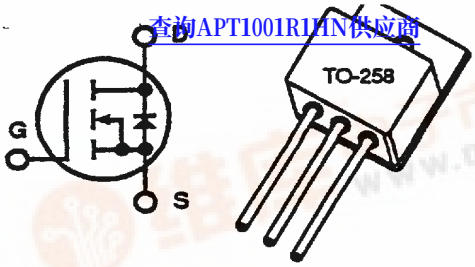

ADVANCED POWER TECHNOLOGY®

APT1001R1HN	1000V	9.5A	1.10Ω
APT901R1HN	900V	9.5A	1.10Ω
APT1001R3HN	1000V	9.0A	1.30Ω
APT901R3HN	900V	9.0A	1.30Ω

POWER MOS IV™

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT 901R1HN	APT 1001R1HN	APT 901R3HN	APT 1001R3HN	UNIT
V_{DSS}	Drain-Source Voltage	900	1000	900	1000	Volts
I_D	Continuous Drain Current @ T_C = 25°C	9.5		9.0		Amps
I_{DM}	Pulsed Drain Current ①	38		36		
V_{GS}	Gate-Source Voltage	±30				Volts
P_D	Total Power Dissipation @ T_C = 25°C	250				Watts
	Linear Derating Factor	2.0				W/°C
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 / Part Number		MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage (V_{GS} = 0V, I_D = 250 µA)	APT1001R1HN/APT1001R3HN	1000			Volts
		APT901R1HN/APT901R3HN	900			
$I_{D(ON)}$	On State Drain Current ② (V_{DS} > $I_{D(ON)}$ x $R_{DS(ON)}$ Max, V_{GS}=10V)	APT1001R1HN/APT901R1HN	9.5			Amps
		APT1001R3HN/APT901R3HN	9.0			
$R_{DS(ON)}$	Drain-Source On-State Resistance ② (V_{GS} = 10V, 0.5 I_D [Cont.])	APT1001R1HN/APT901R1HN			1.10	Ohms
		APT1001R3HN/APT901R3HN			1.30	
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = V_{DSS}, V_{GS} = 0V)				250	µA
	Zero Gate Voltage Drain Current (V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125°C)				1000	
I_{GSS}	Gate-Source Leakage Current (V_{GS} = ±30V, V_{DS} = 0V)				±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 1.0mA)		2		4	Volts

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.50	°C/W
$R_{\theta JA}$	Junction to Ambient			40	

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

PHONE . . . (503) 382-8028

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DYNAMIC CHARACTERISTICS

APT1001R1/901R1/1001R3/901R3HN

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{DC}	Drain-to-Case Capacitance	f = 1 MHz		24	36	pF
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1 MHz		2430	2950	
C_{oss}	Output Capacitance			300	420	
C_{rss}	Reverse Transfer Capacitance			100	150	
Q_g	Total Gate Charge ③	V_{GS} = 10V, V_{DD} = 0.5 V_{DSS}, I_D = I_D [Cont.] @ 25°C		90	130	nC
Q_{gs}	Gate-Source Charge			9.3	14	
Q_{gd}	Gate-Drain ("Miller") Charge			47	70	
$t_d(on)$	Turn-on Delay Time	V_{GS} = 15V, V_{DD} = 0.5 V_{DSS}, I_D = I_D [Cont.] @ 25°C, R_G = 1.8Ω		14	28	ns
t_r	Rise Time			14	28	
$t_d(off)$	Turn-off Delay Time			66	90	
t_f	Fall Time			20	40	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT1001R1HN / APT901R1HN			9.5	Amps
		APT1001R3HN / APT901R3HN			9.0	
I_{SM}	Pulsed Source Current ① (Body Diode)	APT1001R1HN / APT901R1HN			38	
		APT1001R3HN / APT901R3HN			36	
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/µs)		320	636	1200	ns
Q_{rr}	Reverse Recovery Charge (I_S = -I_D [Cont.], dI_S/dt = 100A/µs)		2.2	4.5	9	µC

SAFE OPERATING AREA CHARACTERISTICS

Symbol	Characteristic	Test Conditions	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.	250			Watts
SOA2	Safe Operating Area	I_{DS} = I_D [Cont.], V_{DS} = P_D / I_D [Cont.], t = 1 Sec.	250			
I_{LM}	Inductive Current Clamped	APT1001R1HN / APT901R1HN	38			Amps
		APT1001R3HN / APT901R3HN	36			

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

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

③See MIL-STD-750 Method 3471

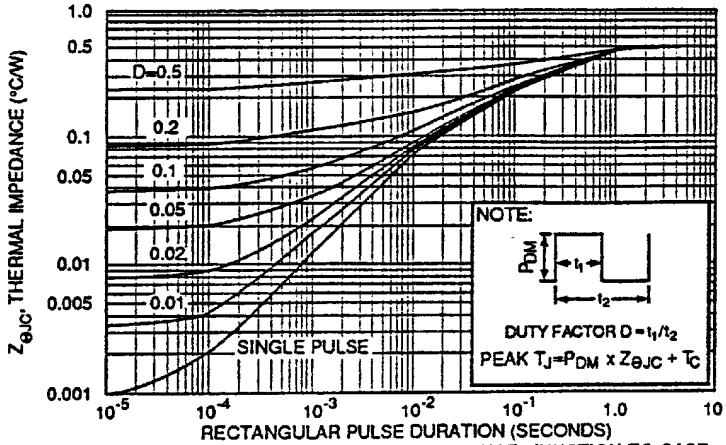


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

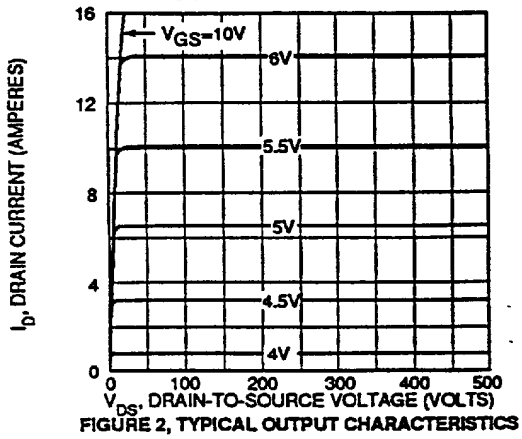


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

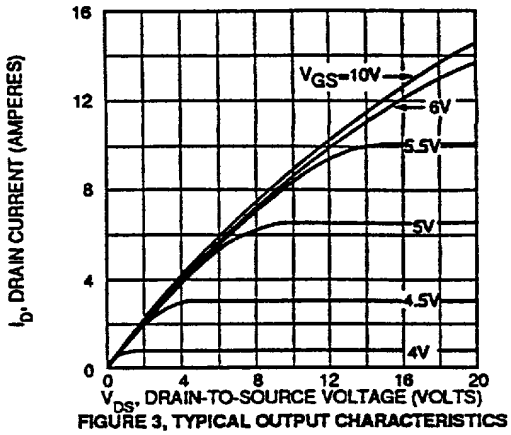


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

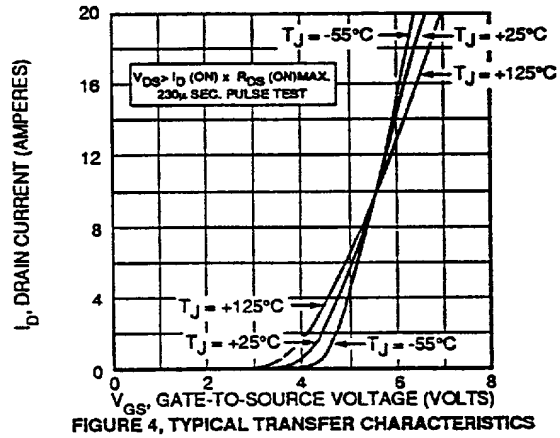


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

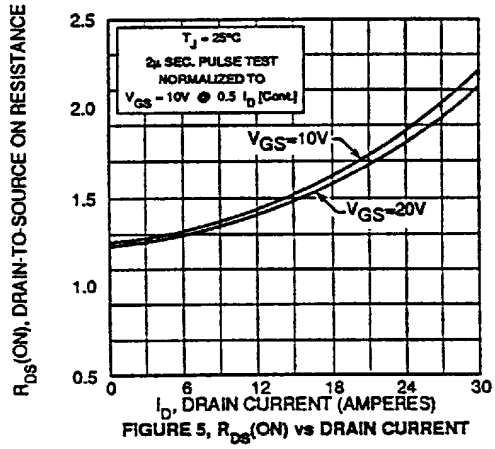


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

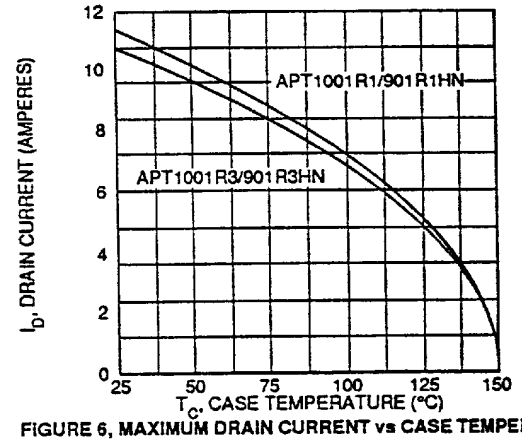


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

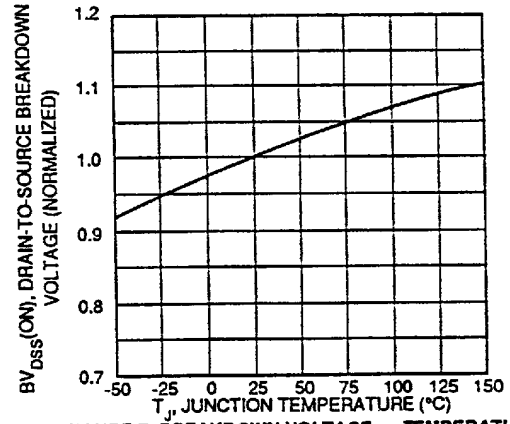


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

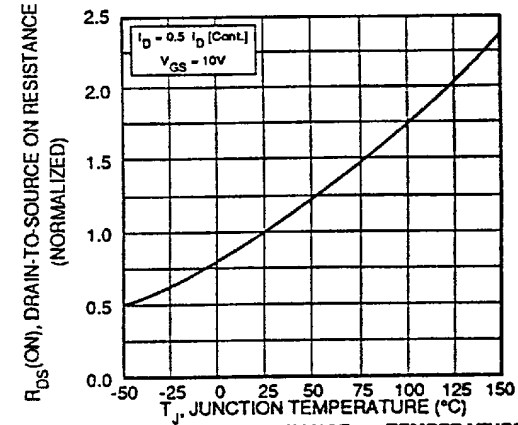


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

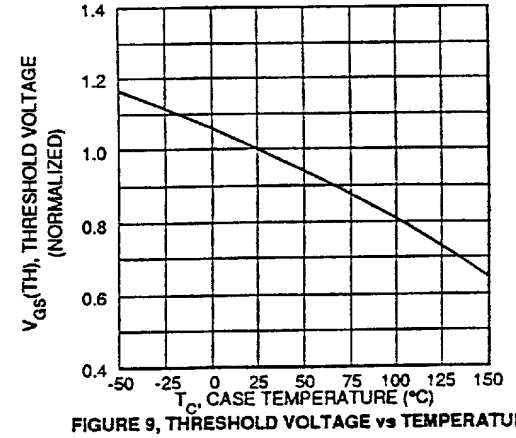


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

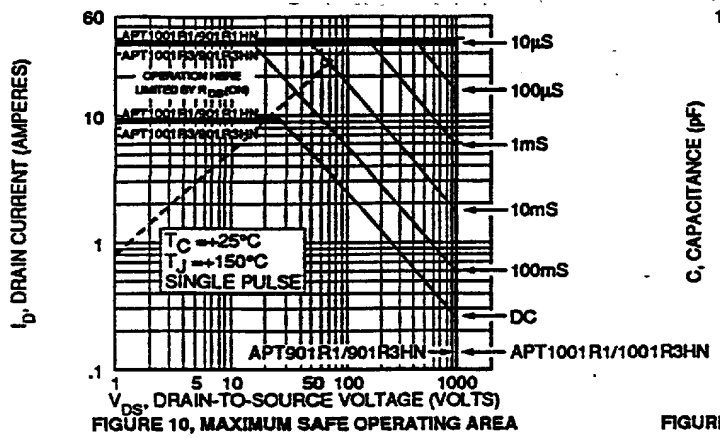


FIGURE 10, MAXIMUM SAFE OPERATING AREA

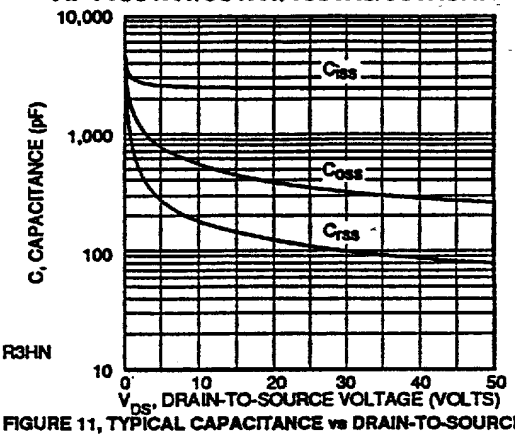


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

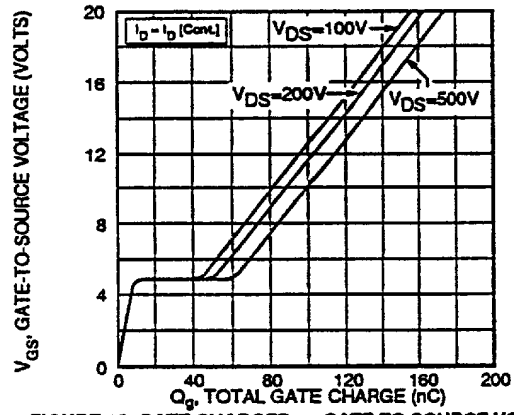


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

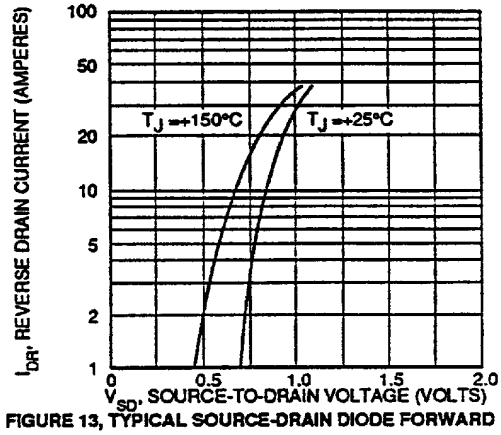
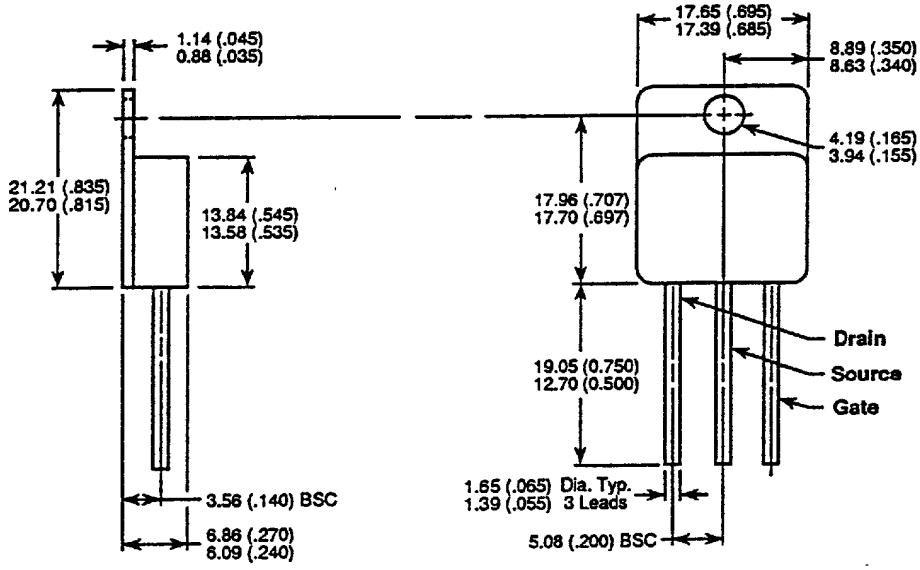


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-258AA Package Outline



Dimensions in Millimeters and (Inches)

050-0013
Rev A