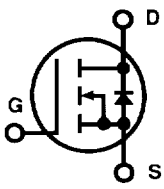

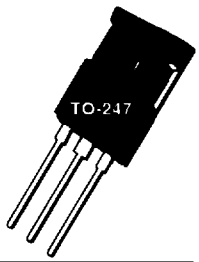

ADVANCED POWER TECHNOLOGY®

APT1001RBNR 1000V 11.0A 1.00Ω
APT1001R1BNR 1000V 10.5A 1.10Ω

POWER MOS IV® **UIS RATED**

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

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

Symbol	Parameter	APT1001RBNR	APT1001R1BNR	UNIT
V_{DSS}	Drain-Source Voltage	1000	1000	Volts
I_D	Continuous Drain Current @ T_C = 25°C	11	10.5	Amps
I_{DM}	Pulsed Drain Current ①	44	42	
V_{GS}	Gate-Source Voltage Continuous	±20		Volts
V_{GSM}	Gate-Source Voltage Transient	±30		
P_D	Total Power Dissipation @ T_C = 25°C	310		Watts
	Linear Derating Factor	2.5		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		
I_{AR}	Avalanche Current ① (Repetitive and Non-Repetitive)	11		Amps
E_{AR}	Repetitive Avalanche Energy ①	25		mJ
E_{AS}	Single Pulse Avalanche Energy ④	1210		

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
$I_D(ON)$	On State Drain Current ②	APT1001RBNR	11			Amps
	(V_{DS} > $I_D(ON)$ x $R_{DS}(ON)$ Max, V_{GS} = 10V)	APT1001R1BNR	10.5			
$R_{DS}(ON)$	Drain-Source On-State Resistance ②	APT1001RBNR			1.00	Ohms
	(V_{GS} = 10V, 0.5 I_D [Cont.])	APT1001R1BNR			1.10	
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} = ±20V, 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			0.40	°C/W
$R_{\theta JA}$	Junction to Ambient			40	

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

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

PHONE . . . (503) 382-8028
FAX . . . . . (503) 388-0364

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DYNAMIC CHARACTERISTICS

APT1001R/1001R1BNR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V		3400	4000	pF
C_{oss}	Output Capacitance	V_{DS} = 25V		330	500	
C_{rss}	Reverse Transfer Capacitance	f = 1 MHz		126	190	
Q_g	Total Gate Charge ③	V_{GS} = 10V		150	210	nC
Q_{gs}	Gate-Source Charge	V_{DD} = 0.5 V_{DSS}		16	25	
Q_{gd}	Gate-Drain ("Miller") Charge	I_D = I_D [Cont.] @ 25°C		75	110	
t_d(on)	Turn-on Delay Time	V_{GS} = 15V		18	36	ns
t_r	Rise Time	V_{DD} = 0.5 V_{DSS}		22	45	
t_d(off)	Turn-off Delay Time	I_D = I_D [Cont.] @ 25°C		110	160	
t_f	Fall Time	R_G = 1.8Ω		42	85	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	**APT1001RBNR**			11	Amps
		APT1001R1BNR			10.5	
I_{SM}	Pulsed Source Current ① (Body Diode)	**APT1001RBNR**			44	
		APT1001R1BNR			42	
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)		250	500	1000	ns
Q_{rr}	Reverse Recovery Charge (I_S = -I_D [Cont.], dI_S/dt = 100A/µs)		2.5	5	10	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.	310			Watts
SOA2	Safe Operating Area	I_{DS} = I_D [Cont.], V_{DS} = P_D / I_D [Cont.], t = 1 Sec.	310			
I_{LM}	Inductive Current Clamped	**APT1001RBNR**	44			Amps
		APT1001R1BNR	42			

① Repetitive Rating: Pulse width limited by maximum junction temperature.

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

③ See MIL-STD-750 Method 3471

④ Starting T_j = +25°C, L = 20mH, R_G = 25Ω, Peak I_L = 11A

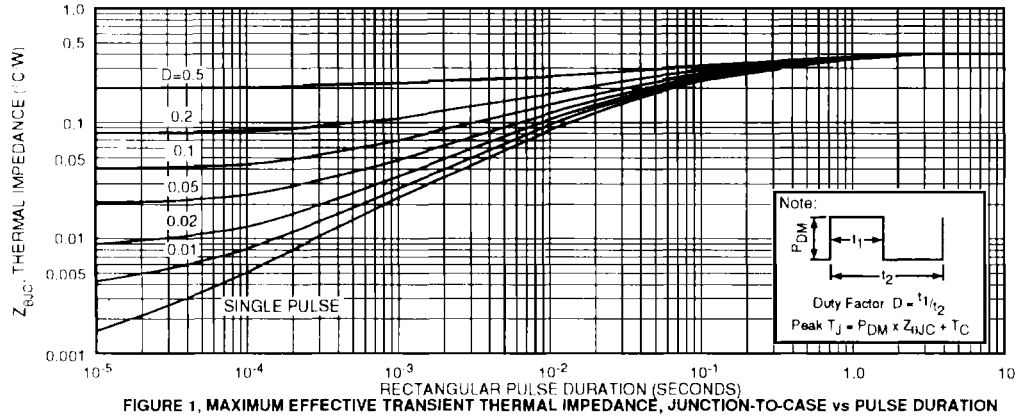

FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

APT1001R/1001R1BNR

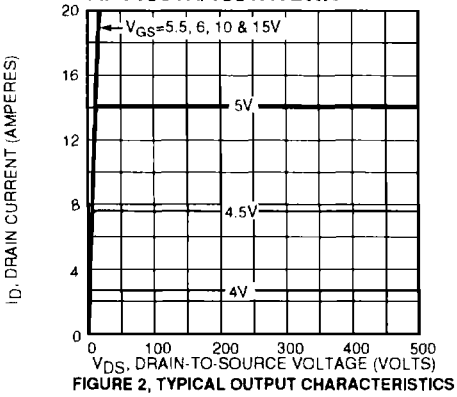

FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

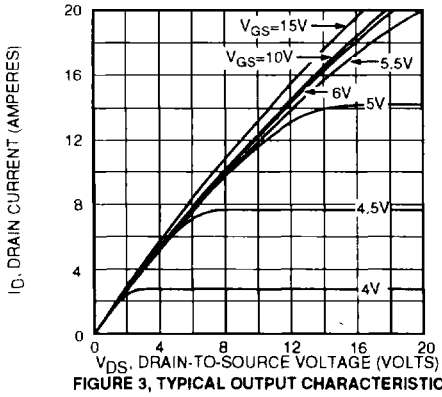

FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

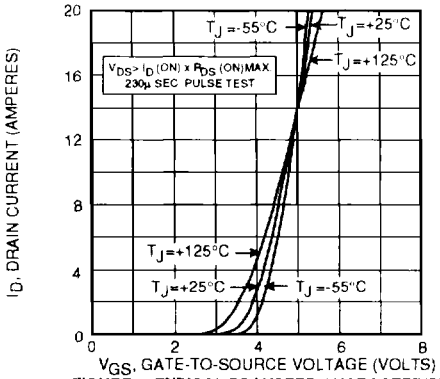

FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

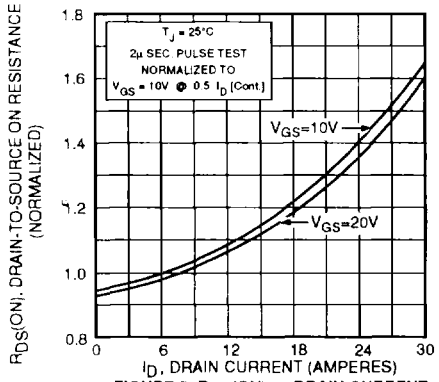

FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

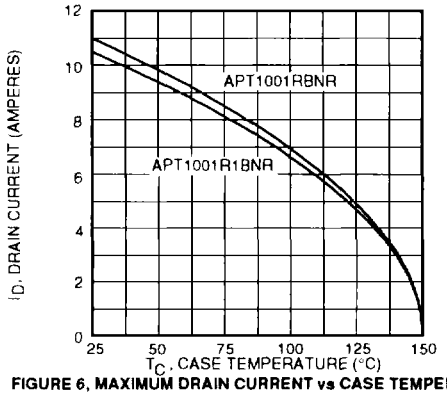

FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

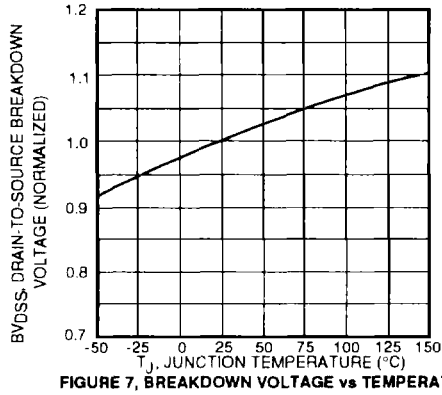

FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

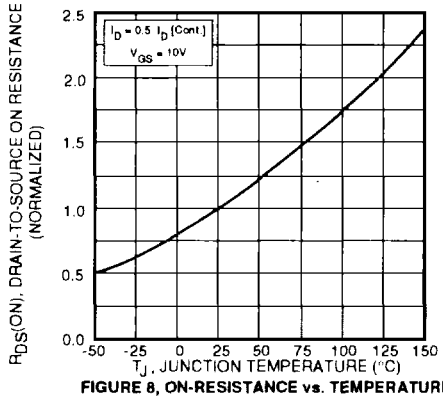

FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

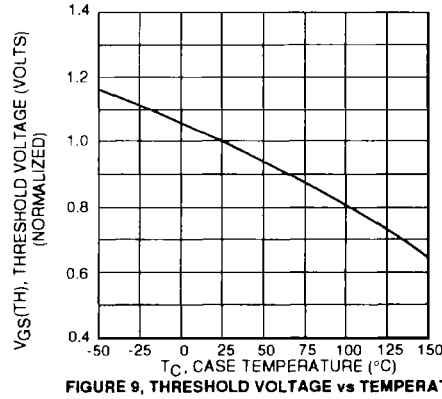

FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

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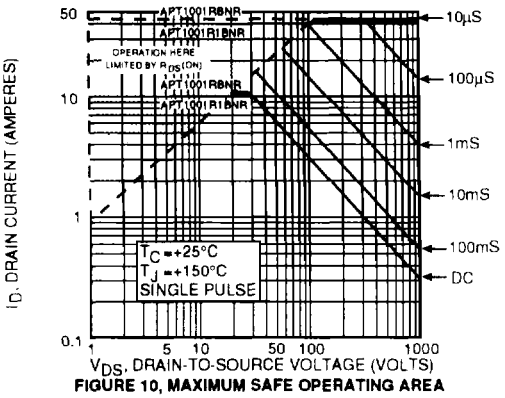


FIGURE 10, MAXIMUM SAFE OPERATING AREA

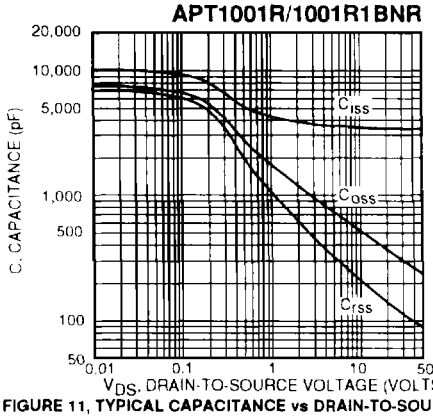


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

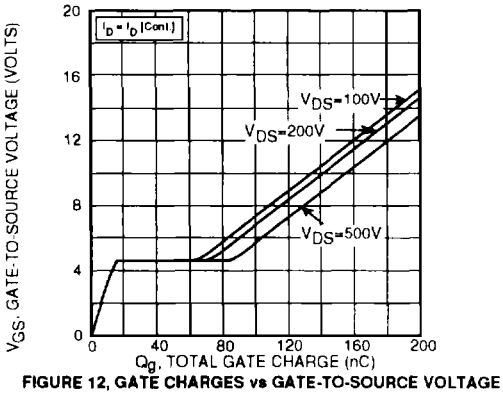


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

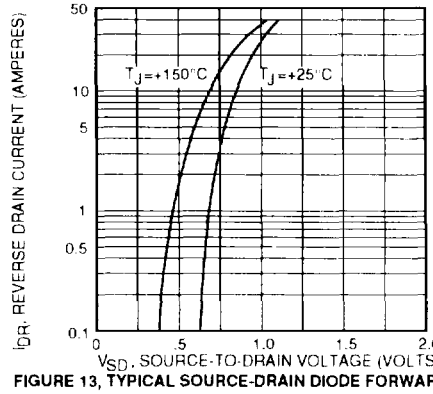
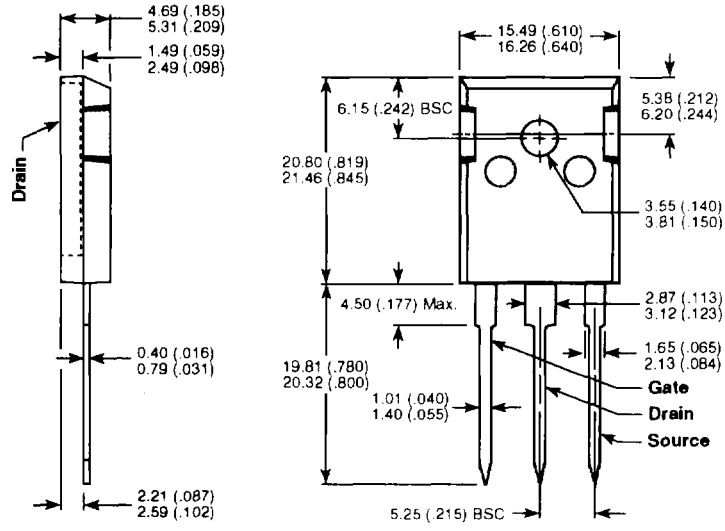


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)

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