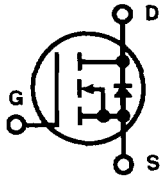

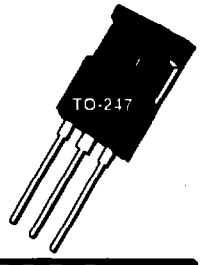

POWER MOS IV®

ADVANCED POWER TECHNOLOGY®

APT1001R1BN 1000V 10.5A 1.10Ω
APT901R1BN 900V 10.5A 1.10Ω
APT1001R3BN 1000V 10.0A 1.30Ω
APT901R3BN 900V 10.0A 1.30Ω

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT 901R1BN	APT 1001R1BN	APT 901R3BN	APT 1001R3BN	UNIT
V_{DSS}	Drain-Source Voltage	900	1000	900	1000	Volts
I_D	Continuous Drain Current	10.5		10.0		Amps
I_{DM}	Pulsed Drain Current ①	42		40		Amps
V_{GS}	Gate-Source Voltage	±30				Volts
P_D	Total Power Dissipation @ T_C = 25°C, Derate Above 25°C	310				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 μA)	APT1001R1BN / APT1001R3BN	1000			Volts
		APT901R1BN / APT901R3BN	900			Volts
I_{DSS}	Zero Gate Voltage Drain Current (V_{DS} = V_{DSS}, V_{GS} = 0V)				250	μA
	(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
I_D(ON)	On State Drain Current ② (V_{DS} > I_D(ON) x R_{DS}(ON) Max, V_{GS} = 10V)	APT1001R1BN / APT901R1BN	10.5			Amps
		APT1001R3BN / APT901R3BN	10.0			Amps
V_{GS}(TH)	Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 1mA)		2		4	Volts
R_{DS}(ON)	Static Drain-Source On-State Resistance ② (V_{GS} = 10V, I_D = 0.5 I_D [Cont.])	APT1001R1BN / APT901R1BN			1.10	Ohms
		APT1001R3BN / APT901R3BN			1.30	Ohms

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	°C/W
T_L	Max. Lead Temp. for Soldering Conditions: 0.063" from Case for 10 Sec.			300	°C

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

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BEND, OREGON 97702-1035
U.S.A.

PHONE . . . (503) 382-8028

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DYNAMIC CHARACTERISTICS

APT1001R1/901R1/1001R3/901R3BN

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		2460	2950	pF
C_{oss}	Output Capacitance			360	500	pF
C_{rss}	Reverse Transfer Capacitance			105	160	pF
Q_g	Total Gate Charge ③	V_{GS} = 10V, I_D = I_D [Cont.] V_{DD} = 0.5 V_{DSS}		90	130	nC
Q_{gs}	Gate-Source Charge			9.3	14	nC
Q_{gd}	Gate-Drain ("Miller") Charge			47	70	nC
t_d(on)	Turn-on Delay Time	V_{DD} = 0.5 V_{DSS} I_D = I_D [Cont.], V_{GS} = 15V R_G = 1.8Ω		15	30	ns
t_r	Rise Time			16	32	ns
t_d(off)	Turn-off Delay Time			64	95	ns
t_f	Fall Time			24	48	ns

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	**APT1001R1BN / APT901R1BN**			10.5	Amps
		APT1001R3BN / APT901R3BN			10.0	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)	**APT1001R1BN / APT901R1BN**			42	Amps
		APT1001R3BN / APT901R3BN			40	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/μs)		320	636	1200	ns
Q_{rr}	Reverse Recovery Charge		2.2	4.5	9	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.		310			Watts
SOA2	Safe Operating Area	I_{DS} = I_D [Cont.], V_{DS} = P_D / I_D [Cont.], t = 1 Sec.		310			Watts
I_{LM}	Inductive Current Clamped		**APT1001R1BN / APT901R1BN**	42			Amps
			APT1001R3BN / APT901R3BN	40			Amps

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

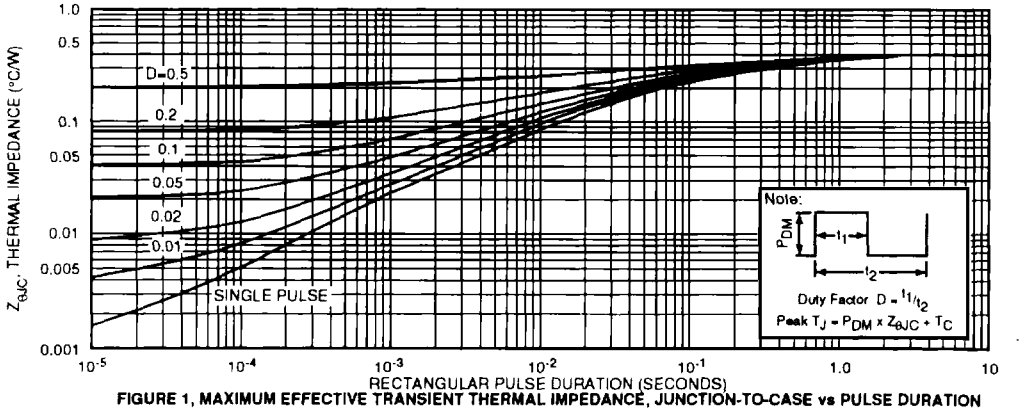


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

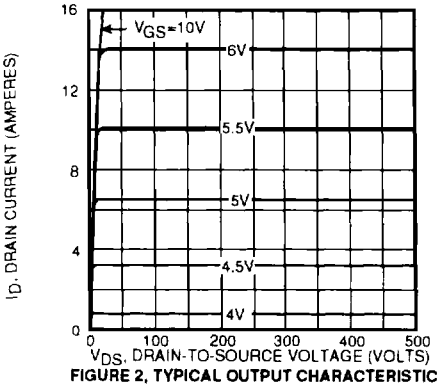


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

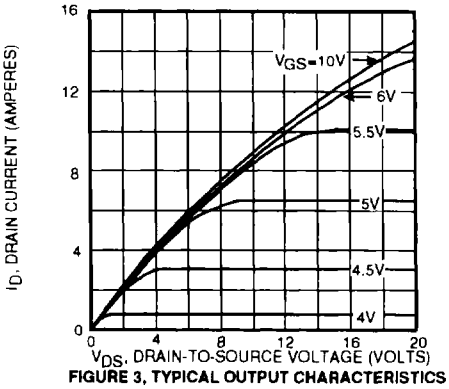


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

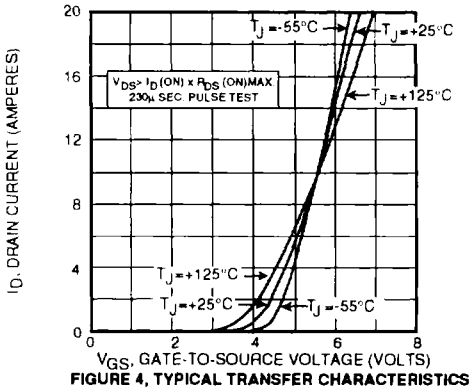


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

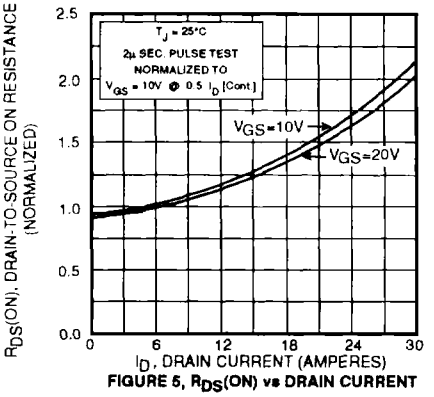


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

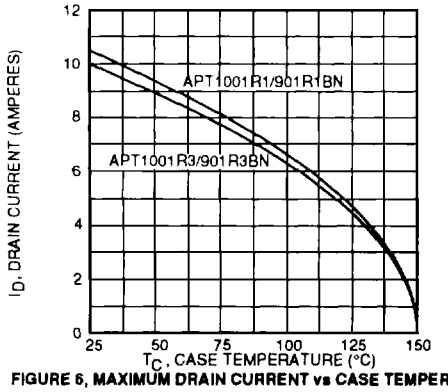


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

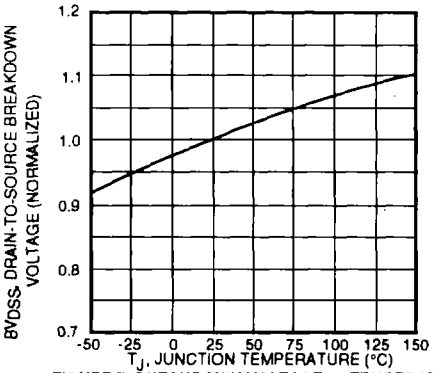


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

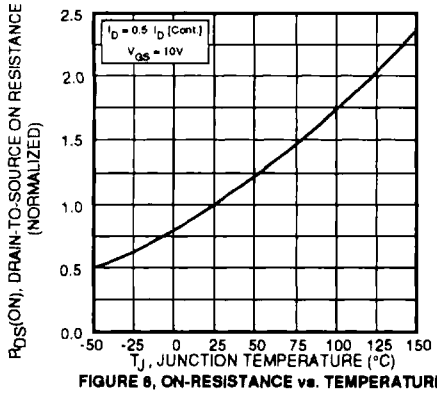


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

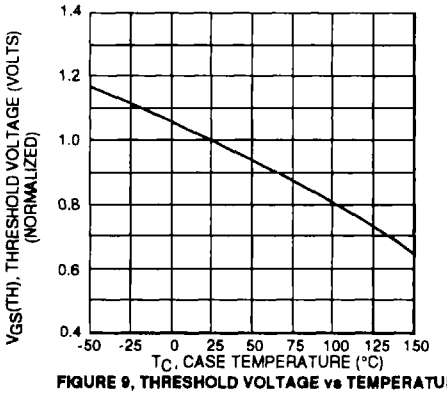


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

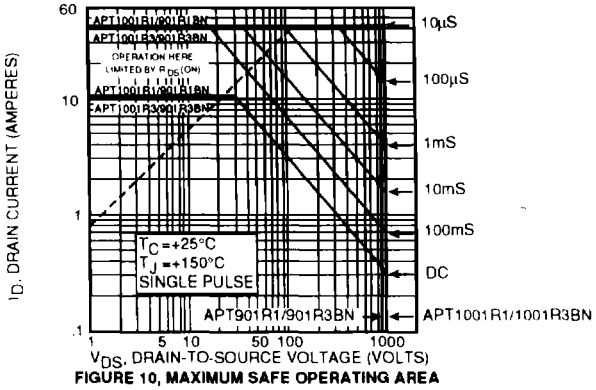


FIGURE 10, MAXIMUM SAFE OPERATING AREA

APT1001R1/901R1/1001R3/901R3BN

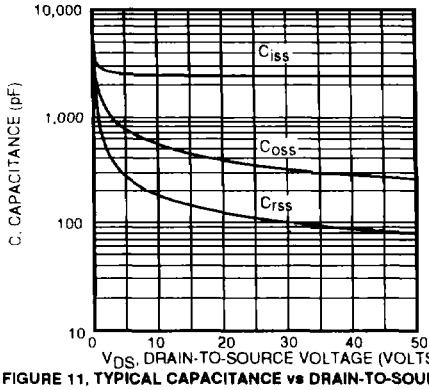


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

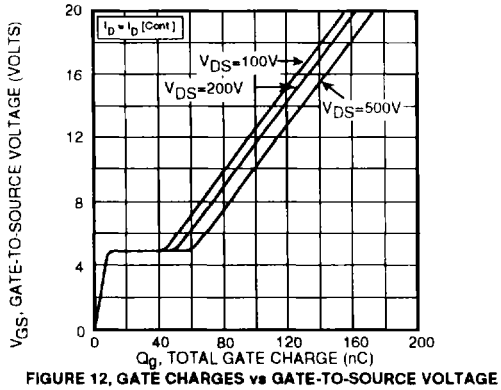


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

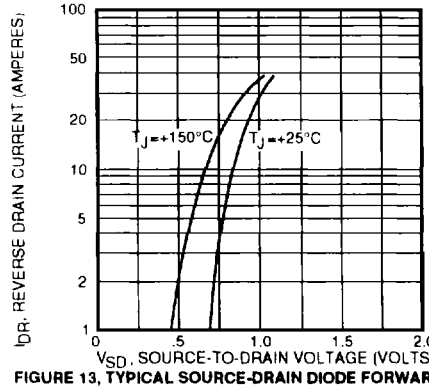
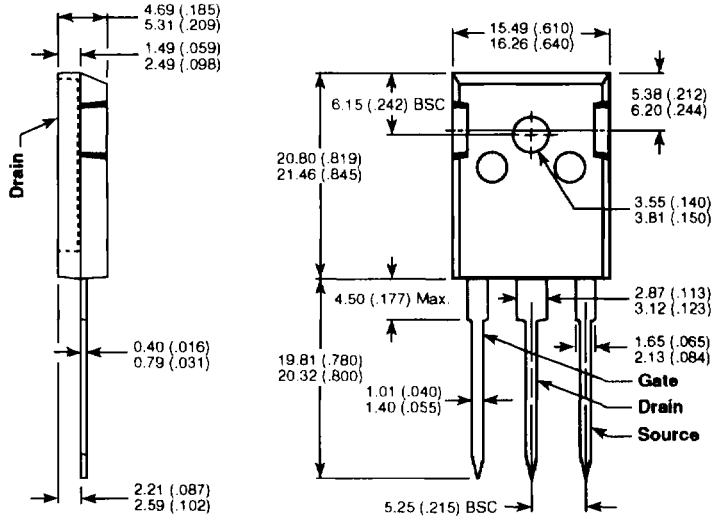


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)

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