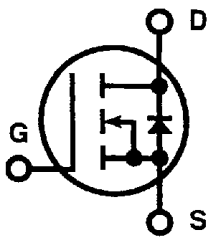
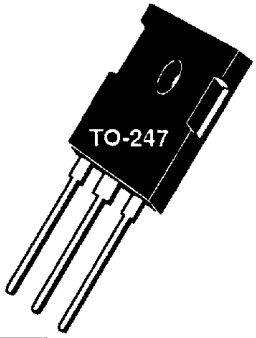




POWER MOS IV®

ADVANCED POWER TECHNOLOGY®

APT1002RBN	1000V	7.0A	2.00Ω
APT902RBN	900V	7.0A	2.00Ω
APT1002R4BN	1000V	6.5A	2.40Ω
APT902R4BN	900V	6.5A	2.40Ω

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT				UNIT
		902RBN	1002RBN	902R4BN	1002R4BN	
V_{DSS}	Drain-Source Voltage	900	1000	900	1000	Volts
I_D	Continuous Drain Current	7.0		6.5		Amps
I_{DM}	Pulsed Drain Current ①	28		26		Amps
V_{GS}	Gate-Source Voltage	±30				Volts
P_D	Total Power Dissipation @ T_C = 25°C, Derate Above 25°C	240				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)	APT1002RBN / APT1002R4BN	1000			Volts
		APT902RBN / APT902R4BN	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)	APT1002RBN / APT902RBN	7.0			Amps
		APT1002R4BN / APT902R4BN	6.5			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.])	APT1002RBN / APT902RBN			2.00	Ohms
		APT1002R4BN / APT902R4BN			2.40	Ohms

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.51	°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.

DYNAMIC CHARACTERISTICS

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		1530	1800	pF
C_{oss}	Output Capacitance			230	325	pF
C_{rss}	Reverse Transfer Capacitance			80	120	pF
Q_g	Total Gate Charge ③	V_{GS} = 10V, I_D = I_D [Cont.] V_{DD} = 0.5 V_{DSS}		66	105	nC
Q_{gs}	Gate-Source Charge			6.5	10	nC
Q_{gd}	Gate-Drain ("Miller") Charge			36	54	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		14	28	ns
t_r	Rise Time			13	26	ns
t_d(off)	Turn-off Delay Time			55	82	ns
t_f	Fall Time			19	37	ns

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	**APT1002RBN / APT902RBN**			7.0	Amps
		APT1002R4BN / APT902R4BN			6.5	Amps
I_{SM}	Pulsed Source Current ① (Body Diode)	**APT1002RBN / APT902RBN**			28	Amps
		APT1002R4BN / APT902R4BN			26	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)		225	450	910	ns
Q_{rr}	Reverse Recovery Charge		1.2	2.5	5	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.	240			Watts
SOA2	Safe Operating Area	I_{DS} = I_D [Cont.], V_{DS} = P_D / I_D [Cont.], t = 1 Sec.	240			Watts
I_{LM}	Inductive Current Clamped	**APT1002RBN / APT902RBN**	28			Amps
		APT1002R4BN / APT902R4BN	26			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

APT Reserves the right to change, without notice, the specifications and information contained herein.

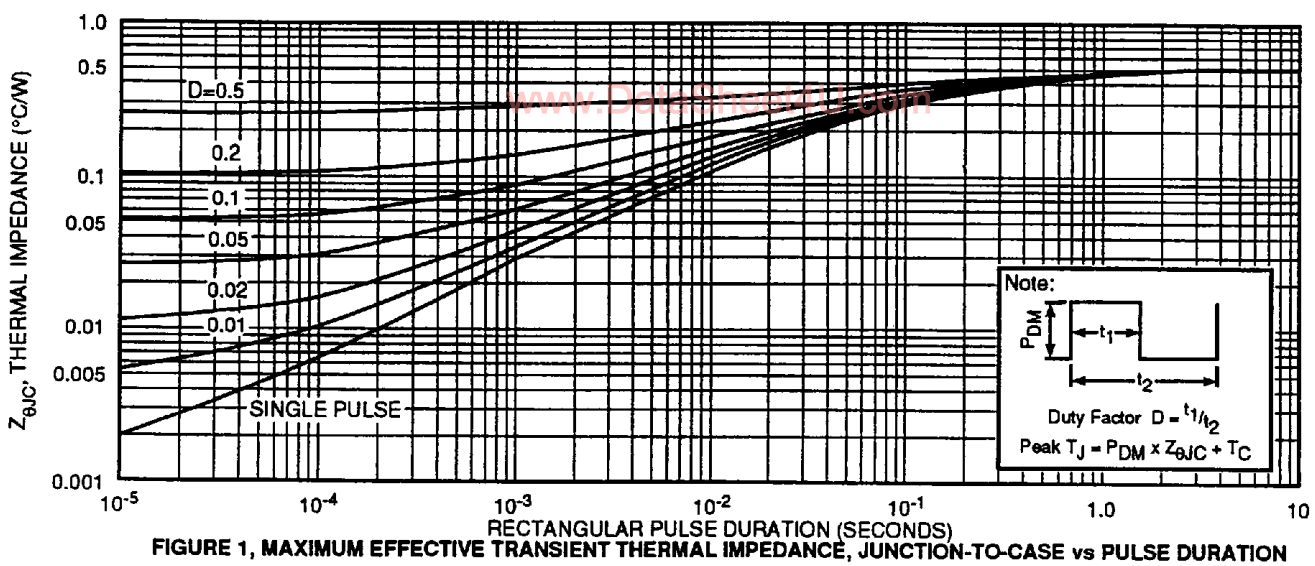


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

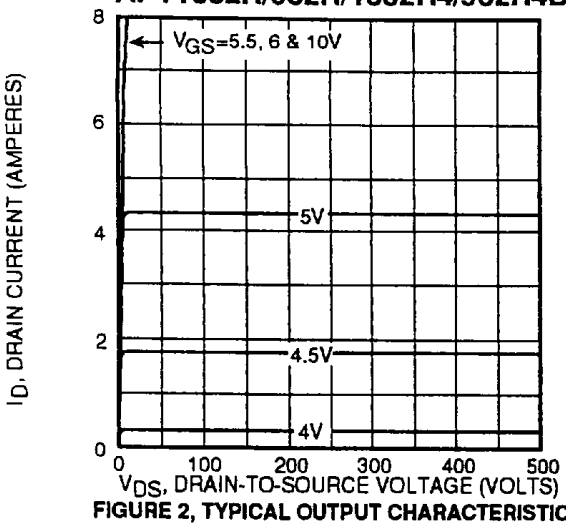


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

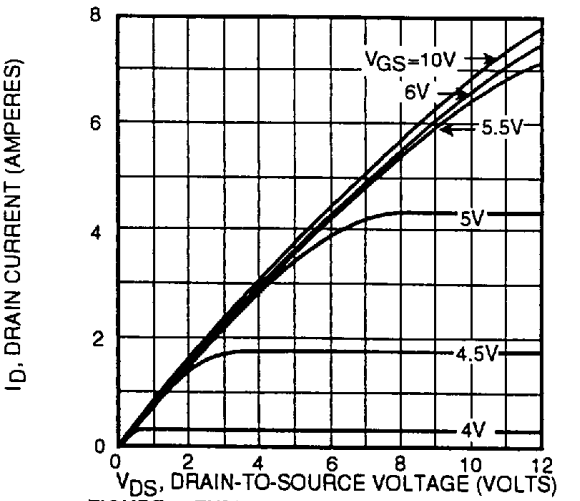


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

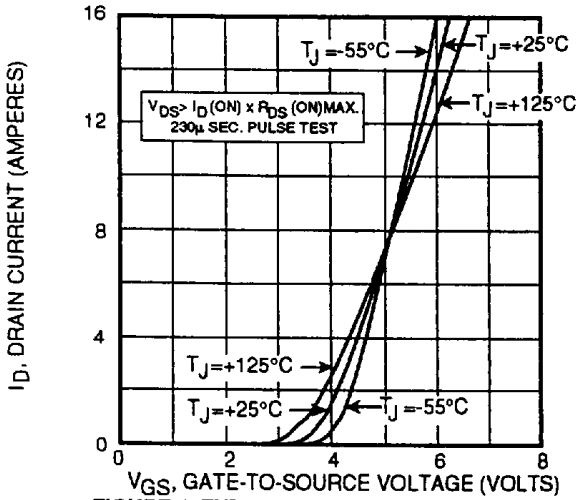


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

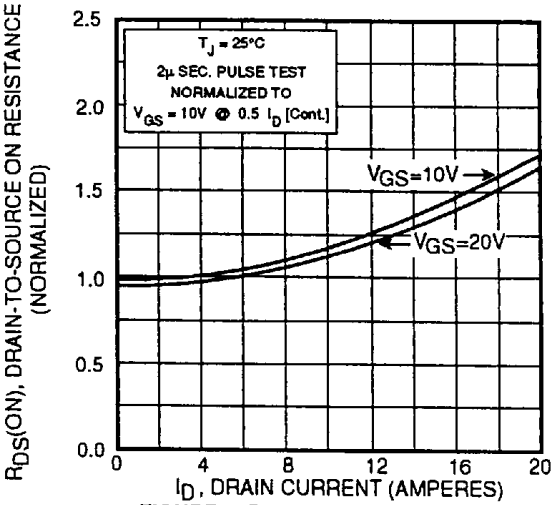


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

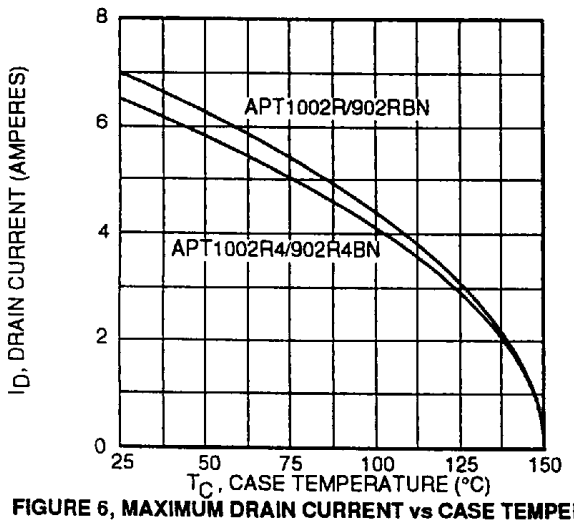


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

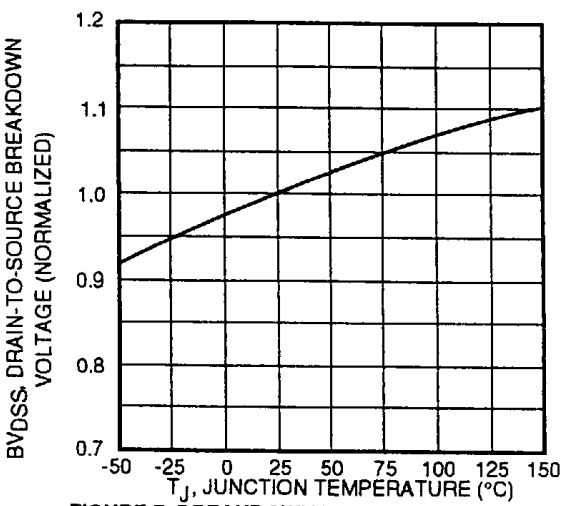


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

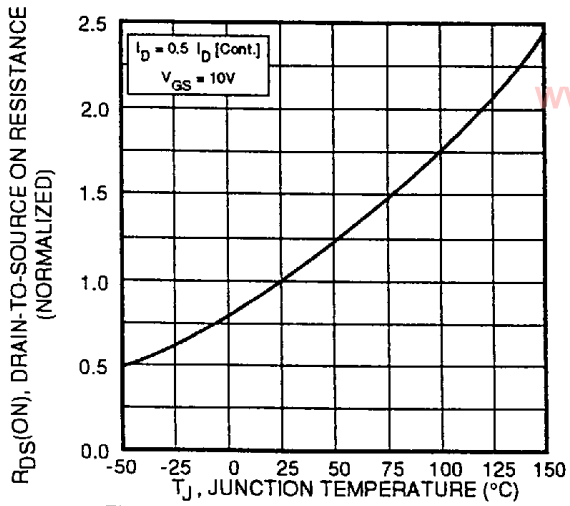


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

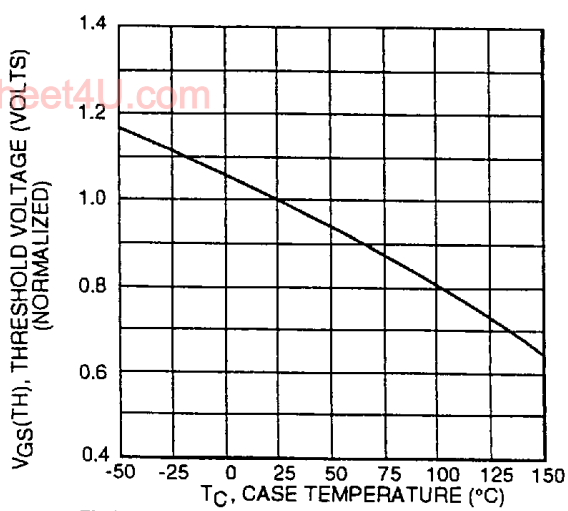


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

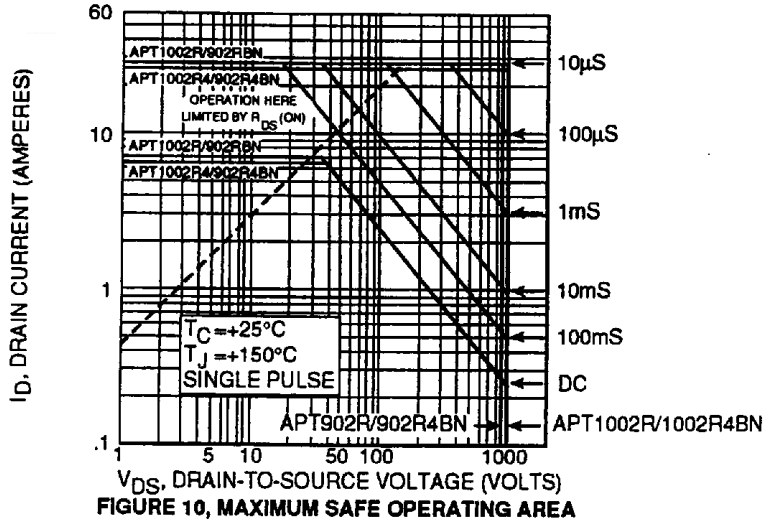


FIGURE 10, MAXIMUM SAFE OPERATING AREA

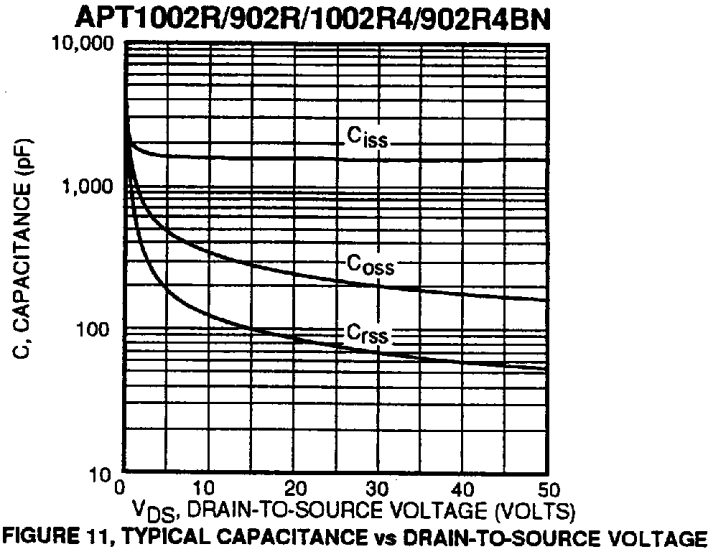


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

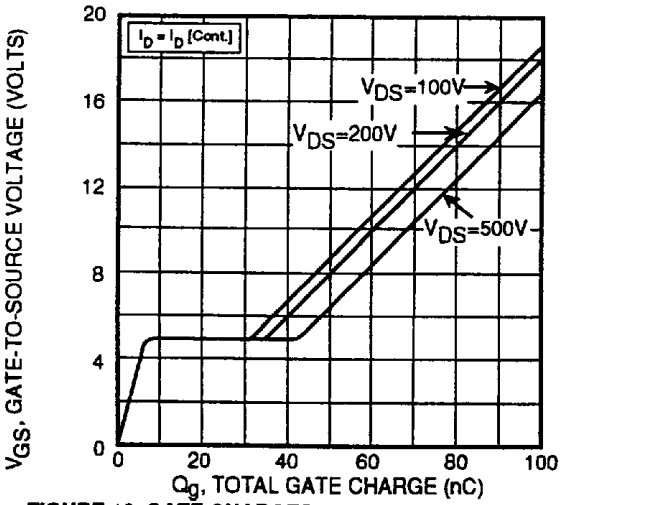


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

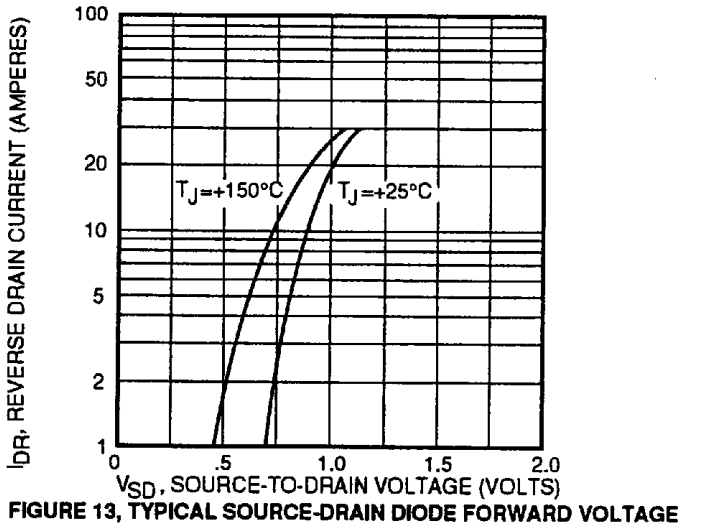
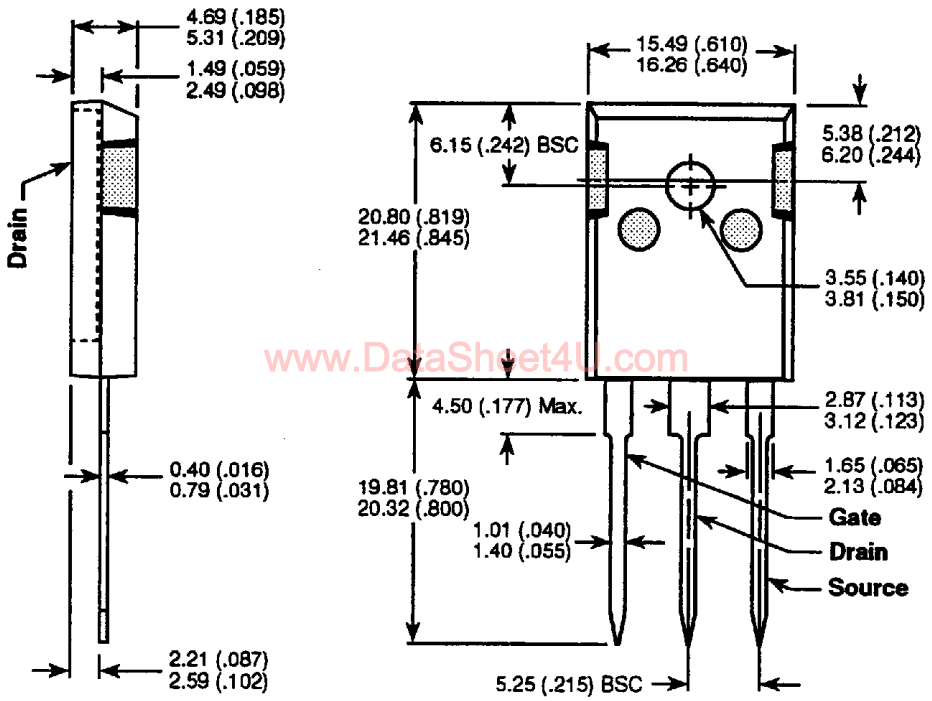


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)