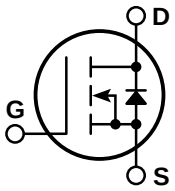

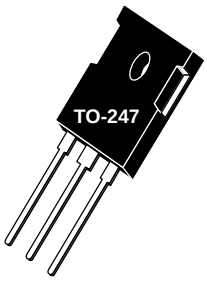

ADVANCED POWER TECHNOLOGY®

APT5020BN 500V 28.0A 0.20Ω

APT5022BN 500V 27.0A 0.22Ω

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 5020BN	APT 5022BN	UNIT
V_{DSS}	Drain-Source Voltage	500	500	Volts
I_D	Continuous Drain Current @ T_C = 25°C	28	27	Amps
I_{DM}	Pulsed Drain Current ①	112	108	
V_{GS}	Gate-Source Voltage	±30		Volts
P_D	Total Power Dissipation @ T_C = 25°C	360		Watts
	Linear Derating Factor	2.9		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)	APT5020BN	500			Volts
		APT5022BN	500			
$I_{D(ON)}$	On State Drain Current ② ($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, V_{GS} = 10V)	APT5020BN	28			Amps
		APT5022BN	27			
$R_{DS(ON)}$	Drain-Source On-State Resistance ② (V_{GS} = 10V, 0.5 I_D [Cont.])	APT5020BN			0.20	Ohms
		APT5022BN			0.22	
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			0.34	°C/W
$R_{\theta JA}$	Junction to Ambient			40	

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

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EUROPE
Avenue J.F. Kennedy Bât B4 Parc Cadéra Nord F-33700 Merignac - France Phone: (33) 5 57 92 15 15 FAX: (33) 5 56 47 97 61

050-5008 Rev C

DYNAMIC CHARACTERISTICS

APT5020/5022BN

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1 MHz		2890	3500	pF
C_{oss}	Output Capacitance			590	830	
C_{rss}	Reverse Transfer Capacitance			230	350	
Q_g	Total Gate Charge ③	V_{GS} = 10V V_{DD} = 0.5 V_{DSS} I_D = I_D [Cont.] @ 25°C		140	210	nC
Q_{gs}	Gate-Source Charge			18	27	
Q_{gd}	Gate-Drain ("Miller") Charge			75	110	
$t_d(on)$	Turn-on Delay Time	V_{GS} = 15V V_{DD} = 0.5 V_{DSS} I_D = I_D [Cont.] @ 25°C R_G = 1.8Ω		19	38	ns
t_r	Rise Time			43	86	
$t_d(off)$	Turn-off Delay Time			85	125	
t_f	Fall Time			56	112	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number		MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	**APT5020BN**			28	Amps
		APT5022BN			27	
I_{SM}	Pulsed Source Current ① (Body Diode)	**APT5020BN**			112	
		APT5022BN			108	
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)		215	430	860	ns
Q_{rr}	Reverse Recovery Charge (I_S = -I_D [Cont.], dI_S/dt = 100A/µs)		3	7	14	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.	360			Watts
SOA2	Safe Operating Area	I_{DS} = I_D [Cont.], V_{DS} = P_D / I_D [Cont.], t = 1 Sec.	360			
I_{LM}	Inductive Current Clamped	**APT5020BN**	112			Amps
		APT5022BN	108			

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

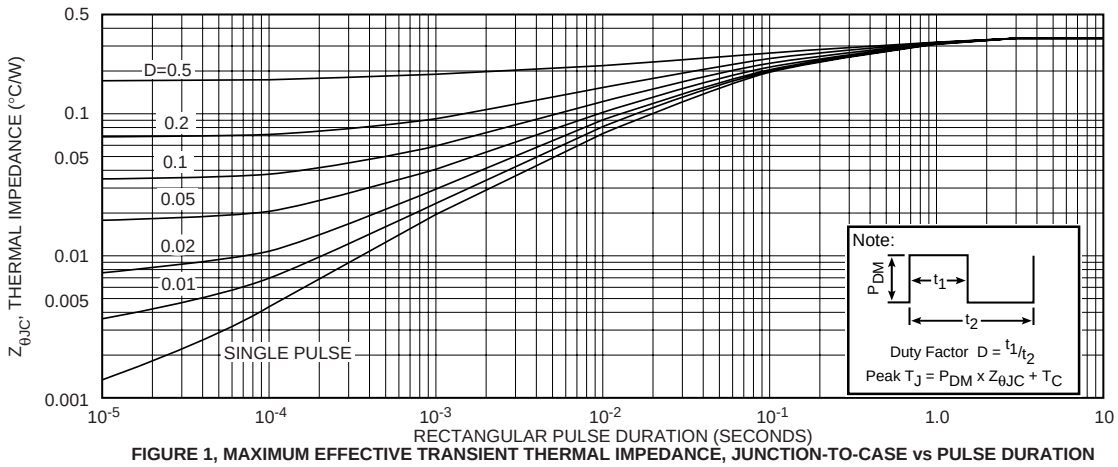


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

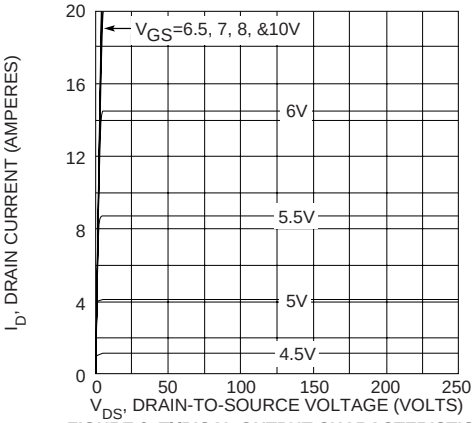


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

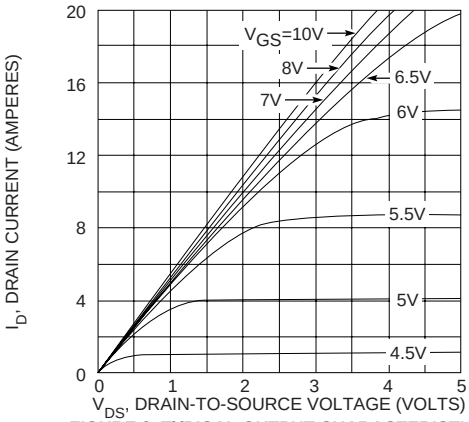


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

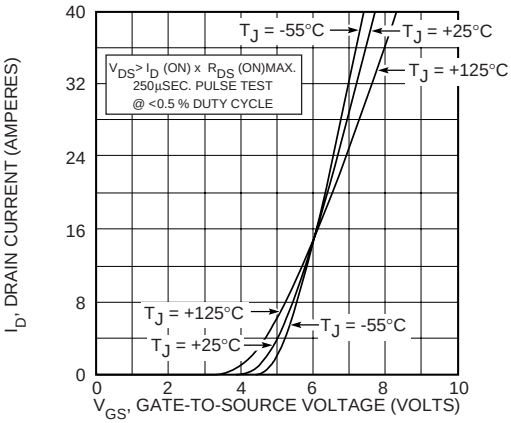


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

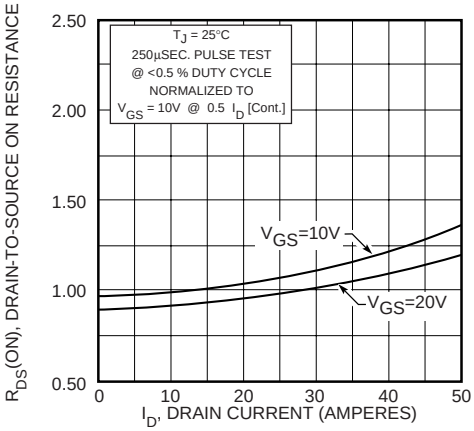


FIGURE 5, R_{DS}(ON) vs DRAIN CURRENT

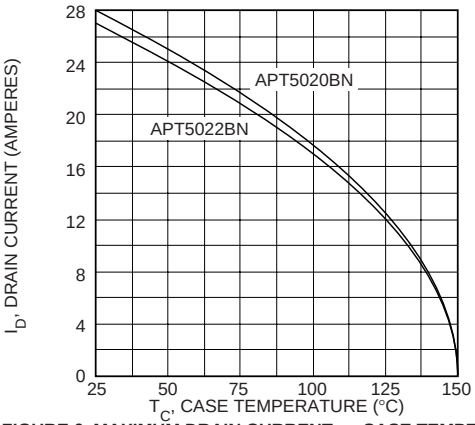


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

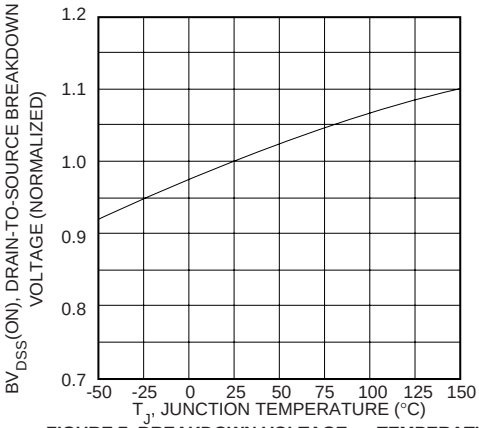


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

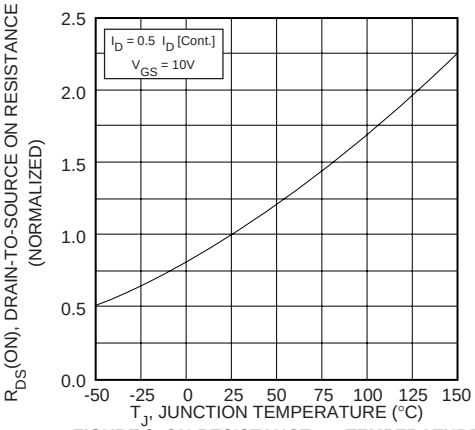


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

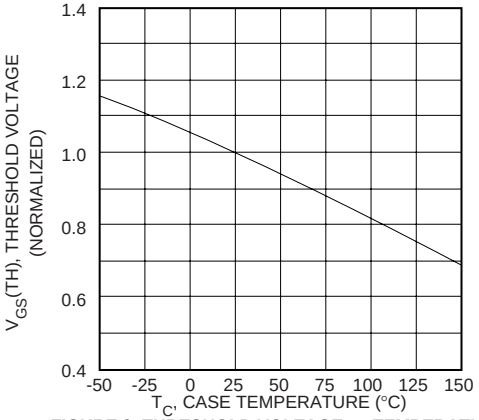


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

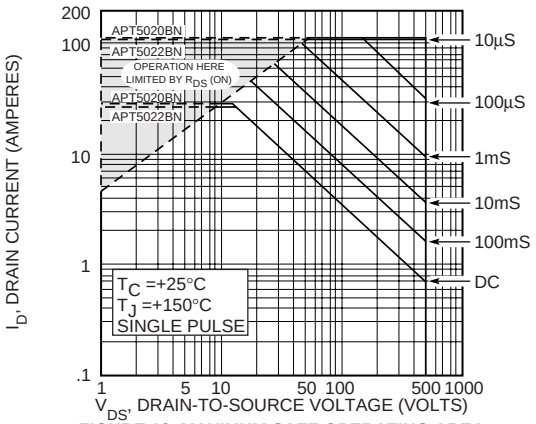


FIGURE 10, MAXIMUM SAFE OPERATING AREA

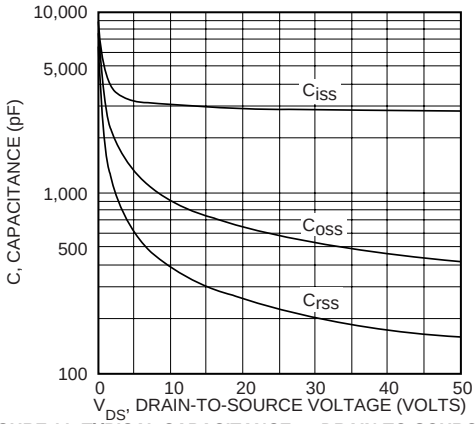


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

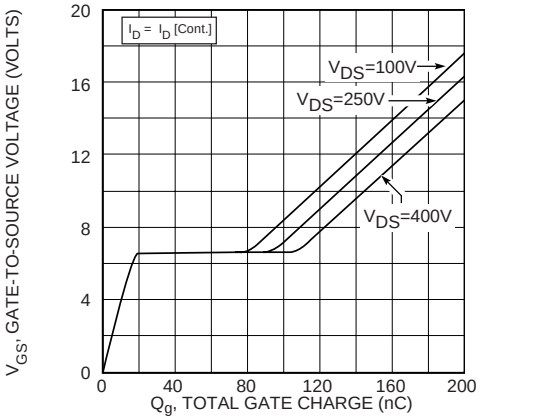


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

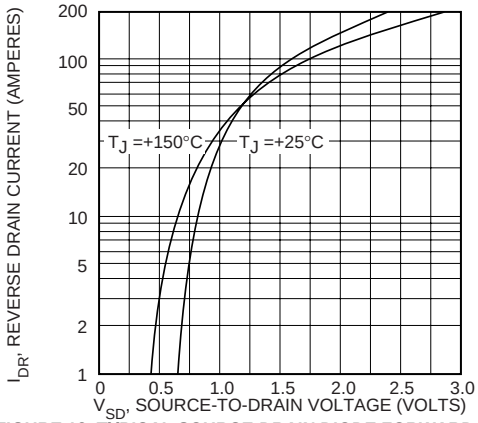
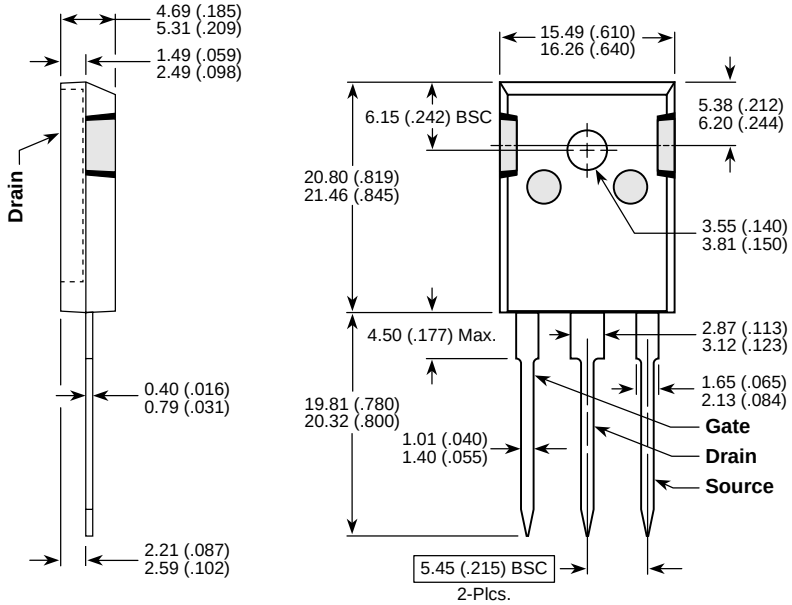


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)

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