

APT4020BN	400V	26.0A	0.20Ω
APT3520BN	350V	26.0A	0.20Ω
APT4025BN	400V	23.0A	0.25Ω
APT3525BN	350V	23.0A	0.25Ω

POWER MOS IV®

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

All Ratings: $T_C = 25^\circ\text{C}$ unless otherwise specified.

Symbol	Parameter	APT				UNIT
		3520BN	4020BN	3525BN	4025BN	
V _{DSS}	Drain-Source Voltage	350	400	350	400	Volts
I _D	Continuous Drain Current	26		23		Amps
I _{DM}	Pulsed Drain Current ①	104		92		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 ($V_{GS} = 0V, I_D = 250 \mu A$)	APT4020BN / APT4025BN	400			Volts
		APT3520BN / APT3525BN	350			Volts
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$) ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)				250	μA
					1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$)				± 100	nA
$I_{D(ON)}$	On State Drain Current ② ($V_{DS} > I_{D(ON)} \times R_{DS(ON)} \text{ Max}, V_{GS} = 10V$)	APT4020BN / APT3520BN	26			Amps
		APT4025BN / APT3525BN	23			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 ($V_{GS} = 10V, I_D = 0.5 I_D \text{ [Cont.]}$)	APT4020BN / APT3520BN			0.20	Ohms
		APT4025BN / APT3525BN			0.25	Ohms

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to Case			0.40	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction to Ambient			40	$^\circ\text{C/W}$
T_L	Max. Lead Temp. for Soldering Conditions: 0.063" from Case for 10 Sec.			300	$^\circ\text{C}$

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

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Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		2380	2950	pF
C_{oss}	Output Capacitance			563	750	pF
C_{rss}	Reverse Transfer Capacitance			207	310	pF
Q_g	Total Gate Charge ^③	$V_{GS} = 10V, I_D = I_D[\text{Cont.}]$ $V_{DD} = 0.5 V_{DSS}$		94	130	nC
Q_{gs}	Gate-Source Charge			11	16	nC
Q_{gd}	Gate-Drain ("Miller") Charge			47	70	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 0.5 V_{DSS}$ $I_D = I_D[\text{Cont.}], V_{GS} = 15V$ $R_G = 1.8\Omega$		14	28	ns
t_r	Rise Time			29	57	ns
$t_{d(off)}$	Turn-off Delay Time			60	90	ns
t_f	Fall Time			40	80	ns

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT4020BN / APT3520BN		26	Amps
		APT4025BN / APT3525BN		23	Amps
I_{SM}	Pulsed Source Current ^① (Body Diode)	APT4020BN / APT3520BN		104	Amps
		APT4025BN / APT3525BN		92	Amps
V_{SD}	Diode Forward Voltage ^② ($V_{GS} = 0V, I_S = -I_D[\text{Cont.}]$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D[\text{Cont.}], di_S/dt = 100A/\mu s$)	180	360	720	ns
Q_{rr}	Reverse Recovery Charge	3	6	12	μC

SAFE OPERATING AREA CHARACTERISTICS

Symbol	Characteristic	Test Conditions / Part Number	MIN	TYP	MAX	UNIT
SOA1	Safe Operating Area	$V_{DS} = 0.4 V_{DSS}, I_{DS} = P_D / 0.4 V_{DSS}, t = 1\text{ Sec.}$	310			Watts
SOA2	Safe Operating Area	$I_{DS} = I_D[\text{Cont.}], V_{DS} = P_D / I_D[\text{Cont.}], t = 1\text{ Sec.}$	310			Watts
I_{LM}	Inductive Current Clamped	APT4020BN / APT3520BN	104			Amps
		APT4025BN / APT3525BN	92			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.

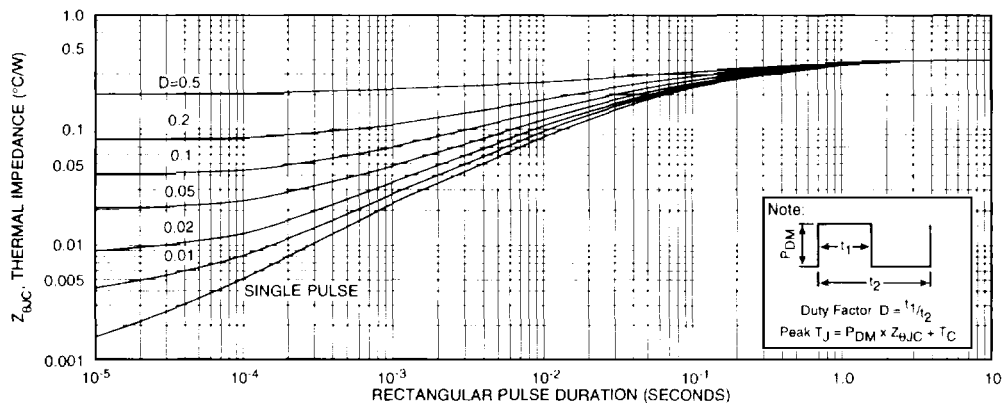
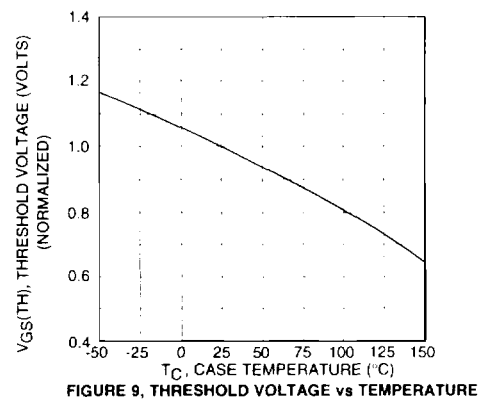
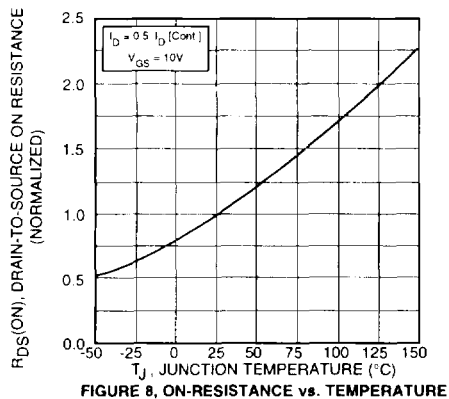
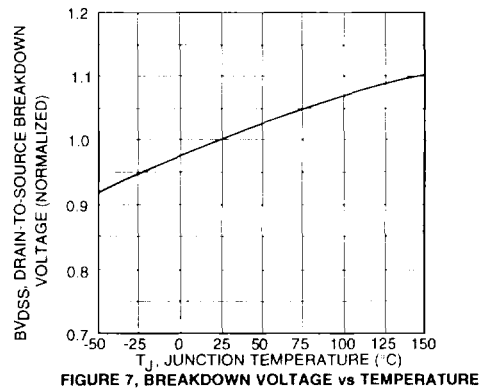
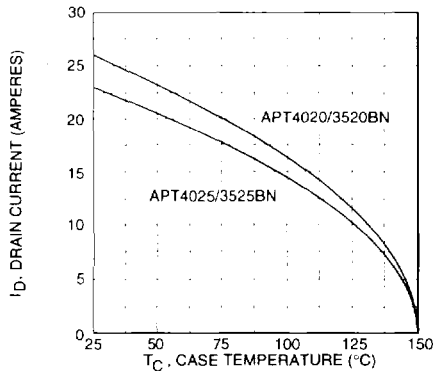
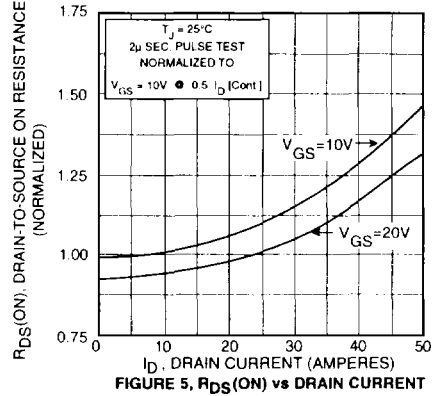
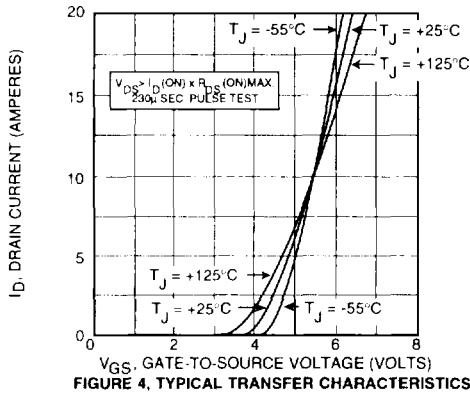
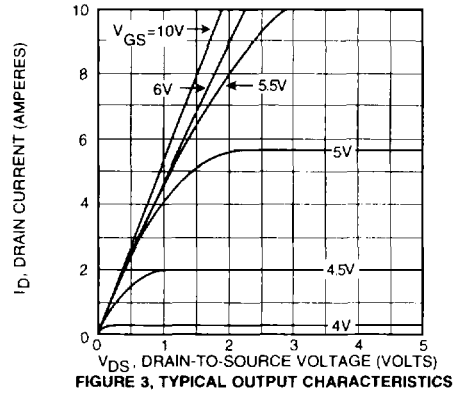
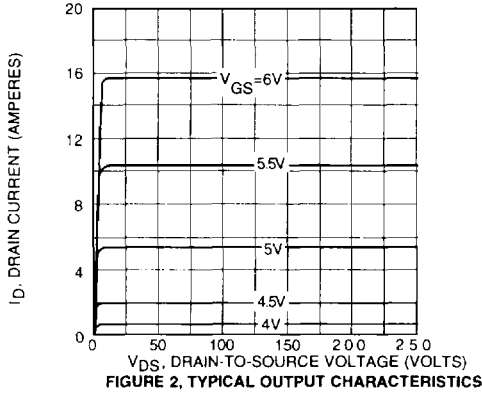


FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

APT4020/3520/4025/3525BN



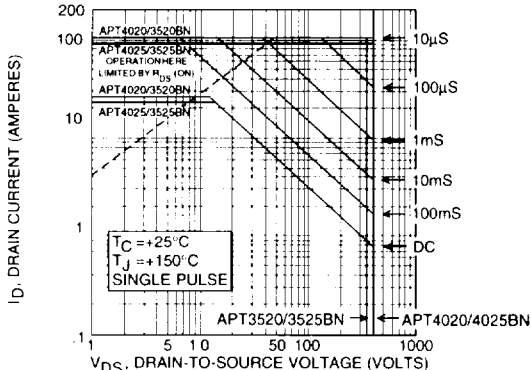


FIGURE 10. MAXIMUM SAFE OPERATING AREA

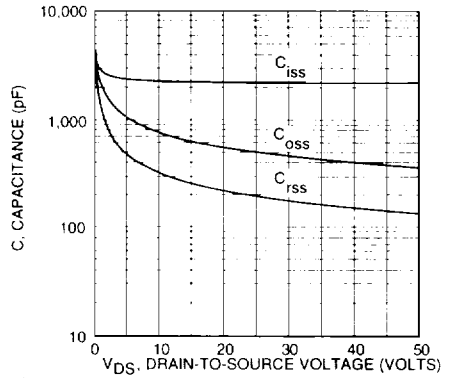


FIGURE 11. TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

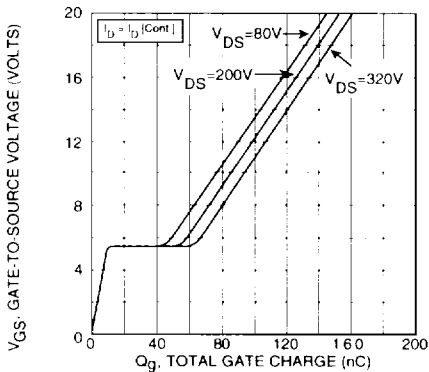


FIGURE 12. GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

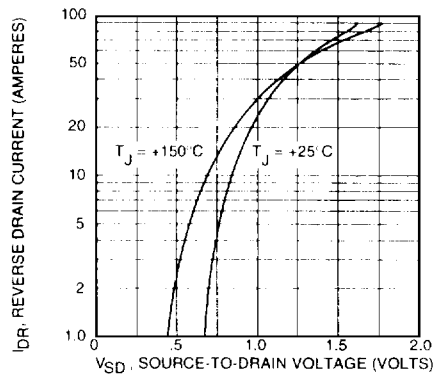
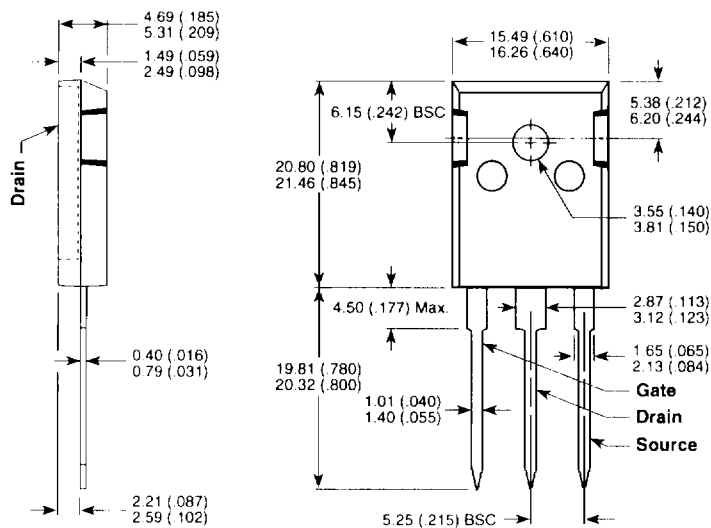


FIGURE 13. TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)