

APT8075BN	800V	13.0A	0.75Ω
APT7575BN	750V	13.0A	0.75Ω
APT8090BN	800V	12.0A	0.90Ω
APT7590BN	750V	12.0A	0.90Ω

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
		7575BN	8075BN	7590BN	8090BN	
V_{DSS}	Drain-Source Voltage	750	800	750	800	Volts
I_D	Continuous Drain Current	13.0		12.0		Amps
I_{DM}	Pulsed Drain Current ①	52		48		Amps
V_{GS}	Gate-Source Voltage	±30				Volts
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$, 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 ($V_{GS} = 0V, I_D = 250 \mu\text{A}$)	APT8075BN / APT8090BN		800	Volts
		APT7575BN / APT7590BN		750	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 ($V_{DS} > I_D(ON) \times R_{DS(ON)}$ Max, $V_{GS} = 10V$)	APT8075BN / APT7575BN		13.0	Amps
		APT8090BN / APT7590BN		12.0	Amps
$V_{GS(TH)}$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1\text{mA}$)	2		4	Volts
$R_{DS(ON)}$	Static Drain-Source On-State Resistance ② ($V_{GS} = 10V, I_D = 0.5 I_D(\text{Cont.})$)	APT8075BN / APT7575BN		0.75	Ohms
		APT8090BN / APT7590BN		0.90	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.

USA
405 S.W. Columbia Street
EUROPE

Bend, Oregon 97702-1035 Phone: (503) 382-8028 FAX: (503) 388-0364

Avenue J.F. Kennedy Bât B4 Parc Cadéra Nord F-33700 Merignac - France Phone: (33) 56 34 34 71 FAX: (33) 56 47 97 61

Page 144

■ 0257909 0001548 54T ■

050-8007 Rev B

DYNAMIC CHARACTERISTICS

APT8075/7575/8090/7590BN

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{iss}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		2410	2950	pF
C_{oss}	Output Capacitance			370	520	pF
C_{rss}	Reverse Transfer Capacitance			120	180	pF
Q_g	Total Gate Charge ^③	$V_{GS} = 10V, I_D = I_D [Cont.]$ $V_{DD} = 0.5 V_{DSS}$		88	130	nC
Q_{gs}	Gate-Source Charge			8.9	13	nC
Q_{gd}	Gate-Drain ("Miller") Charge			44	67	nC
$t_d(on)$	Turn-on Delay Time	$V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [Cont.], V_{GS} = 15V$ $R_G = 1.8\Omega$		13	27	ns
t_r	Rise Time			18	36	ns
$t_d(off)$	Turn-off Delay Time			62	94	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)	APT8075BN / APT7575BN		13.0	Amps
		APT8090BN / APT7590BN		12.0	Amps
I_{SM}	Pulsed Source Current ^① (Body Diode)	APT8075BN / APT7575BN		52	Amps
		APT8090BN / APT7590BN		48	Amps
V_{SD}	Diode Forward Voltage ^② ($V_{GS} = 0V, I_S = -I_D [Cont.]$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D [Cont.], di_S/dt = 100A/\mu s$)	328	656	1300	ns
Q_{rr}	Reverse Recovery Charge	3.1	6.2	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	$I_{DS} = I_D [Cont.], V_{DS} = P_D / I_D [Cont.], t = 1\text{ Sec.}$	310			Watts
I_{LM}	Inductive Current Clamped	APT8075BN / APT7575BN	52			Amps
		APT8090BN / APT7590BN	48			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.

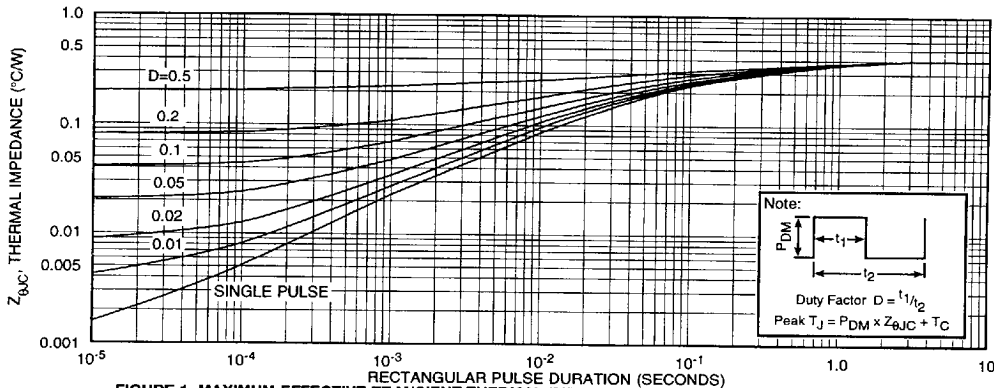


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION
Page 145

0257909 0001549 486

050-8007 Rev B

APT8075/7575/8090/7590BN

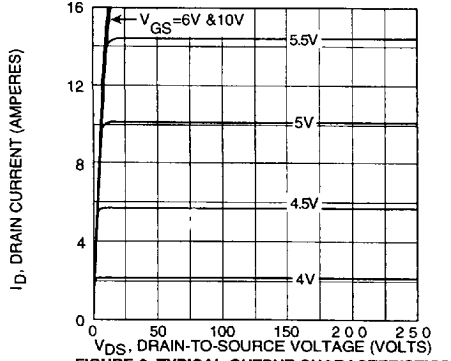


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

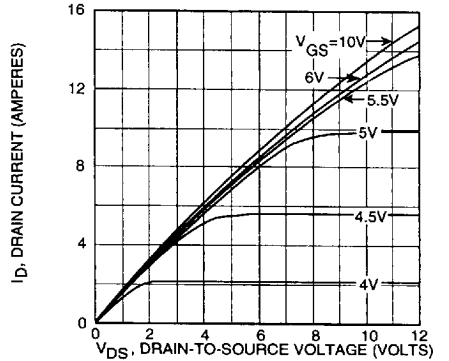


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

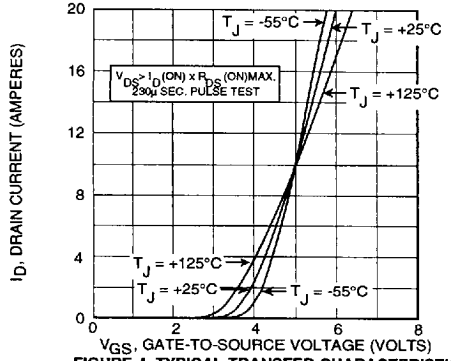


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

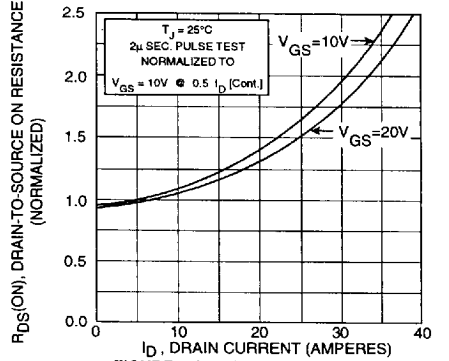


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

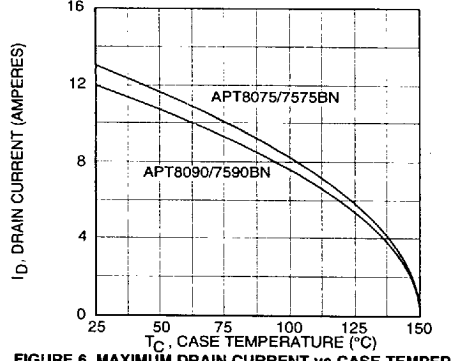


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

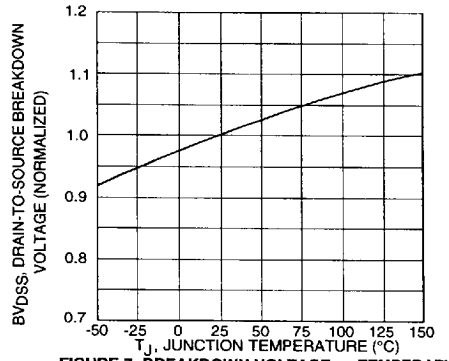


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

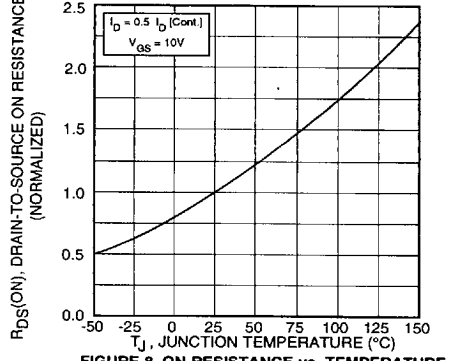


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

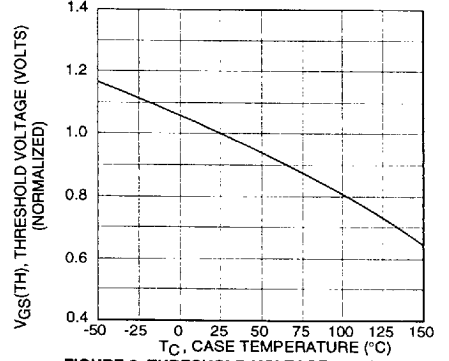
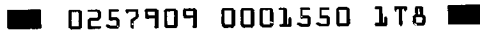


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE



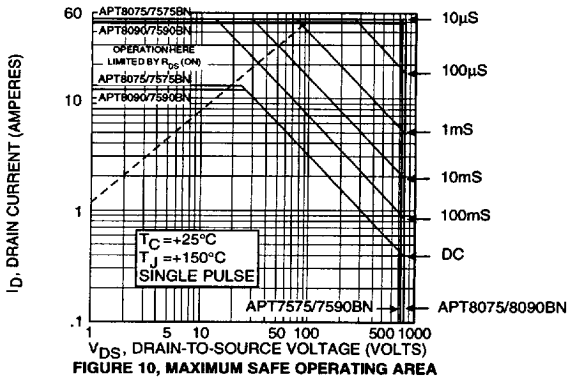


FIGURE 10, MAXIMUM SAFE OPERATING AREA

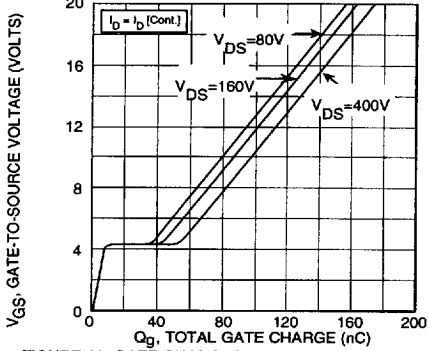


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

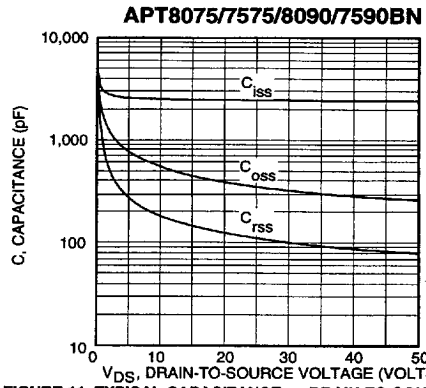


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

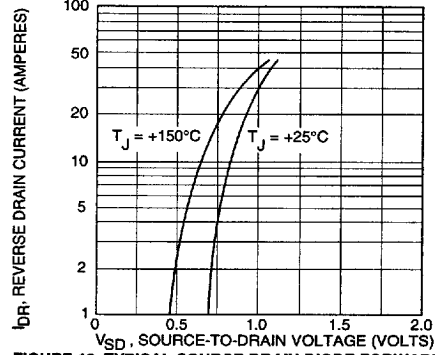
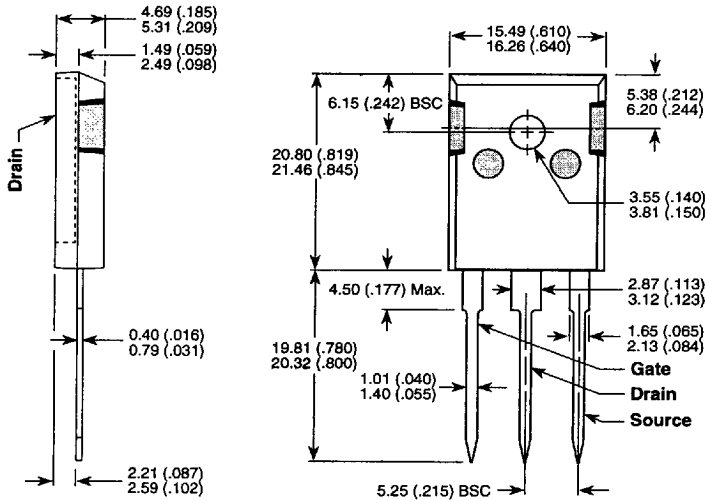


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)
Page 147

0257909 0001551 034