

**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 <sup>①</sup>	52		48		Amps
$V_{GS}$	Gate-Source Voltage	±30				Volts
$P_D$	Total Power Dissipation @ $T_C = 25^\circ\text{C}$ , Derate Above $25^\circ\text{C}$	310				Watts
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	- 55 to 150				$^\circ\text{C}$

#### 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	$\mu\text{A}$
				1000	
$I_{GSS}$	Gate-Source Leakage Current ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )			±100	nA
$I_D(ON)$	On State Drain Current <sup>②</sup> ( $V_{DS} > I_D(ON) \times R_{DS(ON)}$ 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 <sup>②</sup> ( $V_{GS} = 10V, I_D = 0.5 I_D(\text{Cont.})$ )	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	$^\circ\text{C/W}$
$R_{\theta JA}$	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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**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 <sup>③</sup>	$V_{GS} = 10V, I_D = I_D [\text{Cont.}]$ $V_{DD} = 0.5 V_{DSS}$		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	$V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}], V_{GS} = 15V$ $R_G = 1.8\Omega$		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**

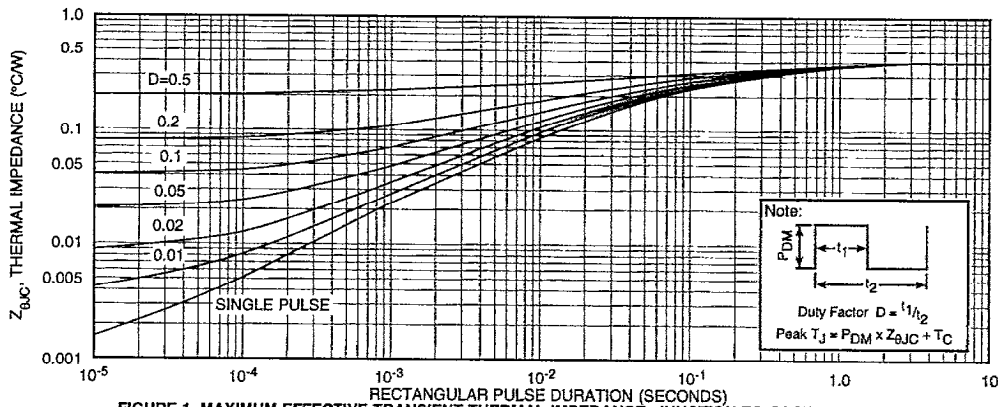
Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
$I_S$	Continuous Source Current (Body Diode)	APT8075BN / APT7575BN		13.0	Amps
		APT8090BN / APT7590BN		12.0	Amps
$I_{SM}$	Pulsed Source Current <sup>①</sup> (Body Diode)	APT8075BN / APT7575BN		52	Amps
		APT8090BN / APT7590BN		48	Amps
$V_{SD}$	Diode Forward Voltage <sup>②</sup> ( $V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$ )			1.3	Volts
$t_{rr}$	Reverse Recovery Time ( $I_S = -I_D [\text{Cont.}], di_S/dt = 100A/\mu s$ )	328	656	1300	ns
$Q_{rr}$	Reverse Recovery Charge	3.1	6.2	12	$\mu C$

**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	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  $\mu s$ , 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**  
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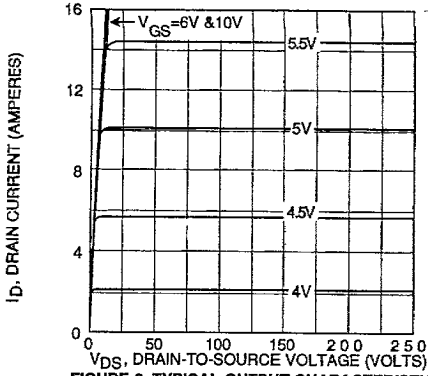


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

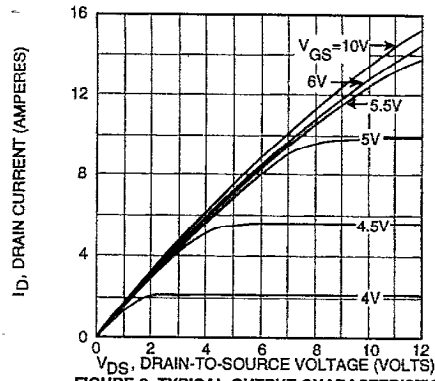


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

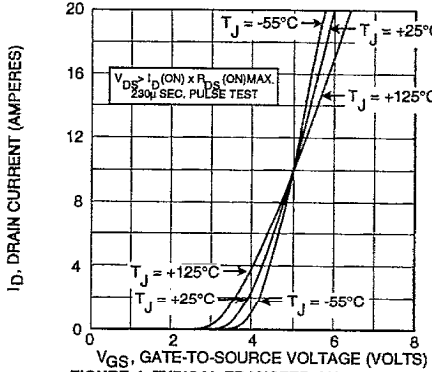


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

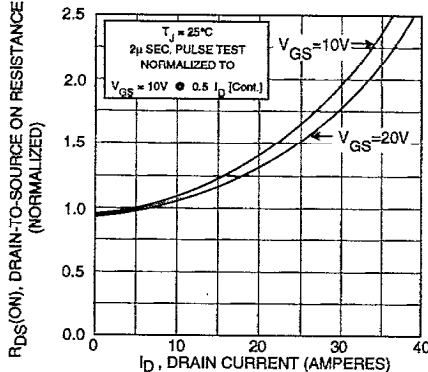


FIGURE 5,  $R_{DS(ON)}$  vs DRAIN CURRENT

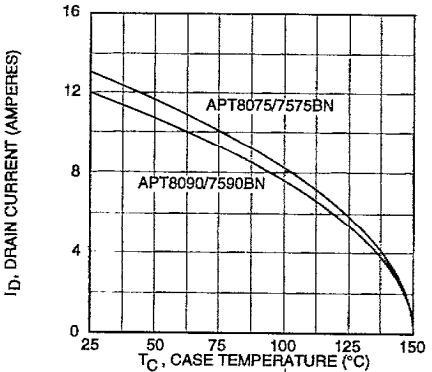


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

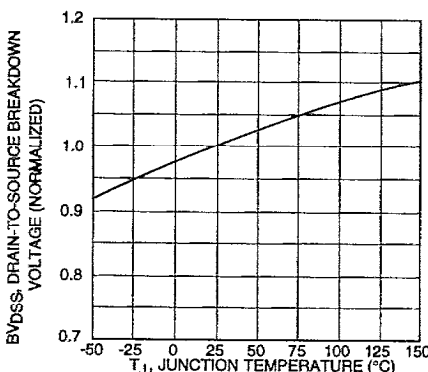


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

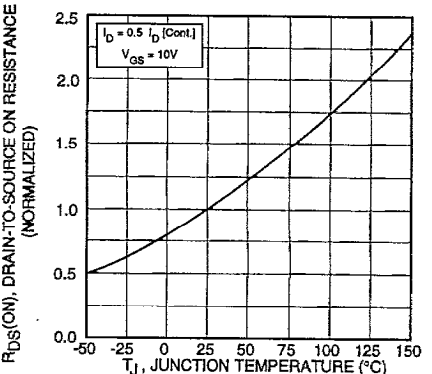


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

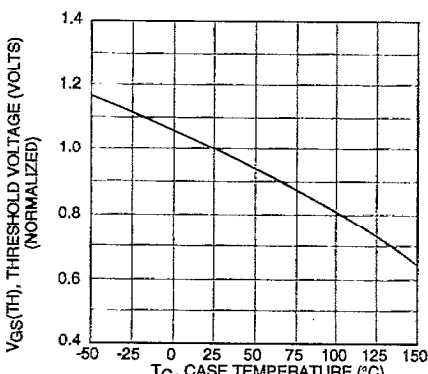


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

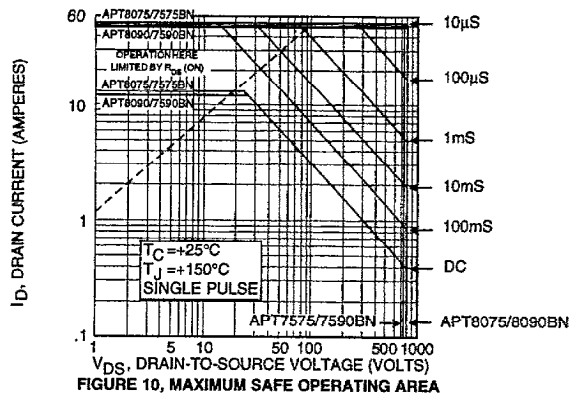


FIGURE 10, MAXIMUM SAFE OPERATING AREA

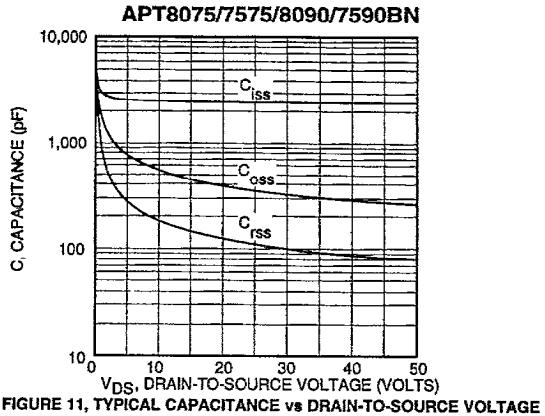


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

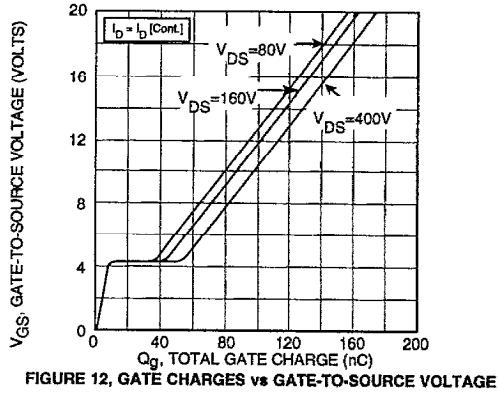


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

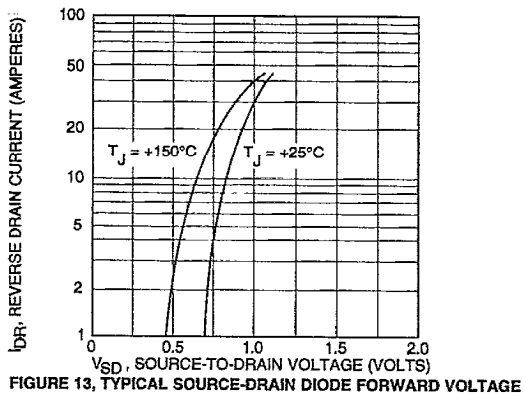
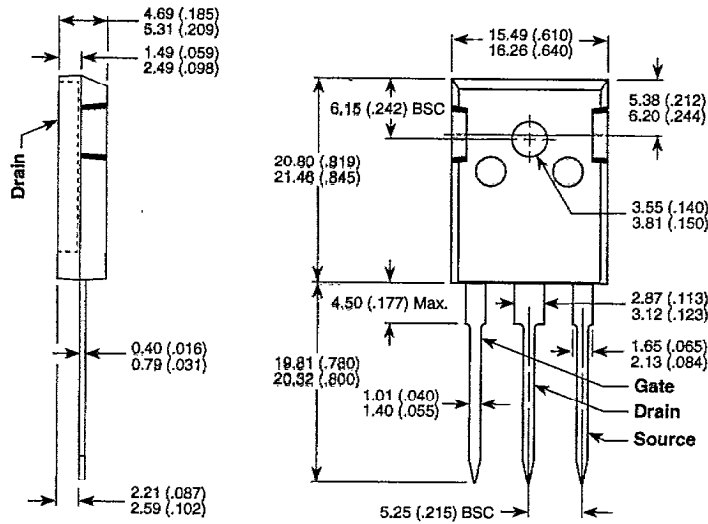


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)  
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