

APT8075BNR 800V 13.0A 0.75Ω
APT8090BNR 800V 12.0A 0.90Ω

POWER MOSFET®

AVALANCHE RATED

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

Symbol	Parameter	APT8075BNR	APT8090BNR	UNIT
V_{DSS}	Drain-Source Voltage	800	800	Volts
I_D	Continuous Drain Current @ $T_C = 25^\circ\text{C}$	13	12	Amps
I_{DM}	Pulsed Drain Current ^①	52	48	
V_{GS}	Gate-Source Voltage Continuous	± 20		Volts
V_{GSM}	Gate-Source Voltage Transient	± 30		
P_D	Total Power Dissipation @ $T_C = 25^\circ\text{C}$	310		Watts
	Linear Derating Factor	2.5		W/ $^\circ\text{C}$
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150		$^\circ\text{C}$
T_L	Lead Temperature: 0.063" from Case for 10 Sec.	300		
I_{AR}	Avalanche Current ^① (Repetitive and Non-Repetitive)	13		Amps
E_{AR}	Repetitive Avalanche Energy ^①	25		mJ
E_{AS}	Single Pulse Avalanche Energy ^④	1210		

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
BV_{DSS}	Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu\text{A}$)	800			Volts
$I_D(\text{ON})$	On State Drain Current ^② ($V_{DS} > I_D(\text{ON}) \times R_{DS}(\text{ON})$ Max, $V_{GS} = 10V$)	APT8075BNR	13		Amps
		APT8090BNR	12		
$R_{DS}(\text{ON})$	Drain-Source On-State Resistance ^② ($V_{GS} = 10V, 0.5 I_D$ [Cont.])	APT8075BNR		0.75	Ohms
		APT8090BNR		0.90	
I_{DSS}	Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$)			250	μA
	Zero Gate Voltage Drain Current ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$)			1000	
I_{GSS}	Gate-Source Leakage Current ($V_{GS} = \pm 20V, V_{DS} = 0V$)			± 100	nA
$V_{GS}(\text{TH})$	Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1.0\text{mA}$)	2		4	Volts

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	

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

USA
 405 S.W. Columbia Street
EUROPE
 Avenue J.F. Kennedy Bât B4 Parc Cadéra Nord

Bend, Oregon 97702-1035 Phone: (503) 382-8028 FAX: (503) 388-0364
 F-33700 Merignac - France Phone: (33) 56 34 34 71 FAX: (33) 56 47 97 61

DYNAMIC CHARACTERISTICS

APT8075/8090BNR

Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{ISS}	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$		3560	4300	pF
C_{OSS}	Output Capacitance			400	560	
C_{RSS}	Reverse Transfer Capacitance			130	195	
Q_g	Total Gate Charge ③	$V_{GS} = 10V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D[\text{Cont.}] @ 25^\circ\text{C}$		156	230	nC
Q_{gs}	Gate-Source Charge			18	27	
Q_{gd}	Gate-Drain ("Miller") Charge			64	95	
$t_{d(\text{on})}$	Turn-on Delay Time	$V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D[\text{Cont.}] @ 25^\circ\text{C}$ $R_G = 1.8\Omega$		18	30	ns
t_r	Rise Time			22	35	
$t_{d(\text{off})}$	Turn-off Delay Time			100	150	
t_f	Fall Time			38	60	

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

Symbol	Characteristic / Test Conditions / Part Number	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current (Body Diode)	APT8075BNR		13	Amps
		APT8090BNR		12	
I_{SM}	Pulsed Source Current ① (Body Diode)	APT8075BNR		52	Amps
		APT8090BNR		48	
V_{SD}	Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -I_D[\text{Cont.}]$)			1.3	Volts
t_{rr}	Reverse Recovery Time ($I_S = -I_D[\text{Cont.}], di_S/dt = 100A/\mu s$)	268	535	1070	ns
Q_{rr}	Reverse Recovery Charge ($I_S = -I_D[\text{Cont.}], di_S/dt = 100A/\mu s$)	2.7	5.4	10.8	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			
I_{LM}	Inductive Current Clamped	APT8075BNR	52			Amps
		APT8090BNR	48			

① Repetitive Rating: Pulse width limited by maximum junction temperature.

③ See MIL-STD-750 Method 3471

② Pulse Test: Pulse width < 380 μs , Duty Cycle < 2%

④ Starting $T_J = +25^\circ\text{C}$, $L = 14.3\text{mH}$, $R_G = 25\Omega$, Peak $I_L = 13A$

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

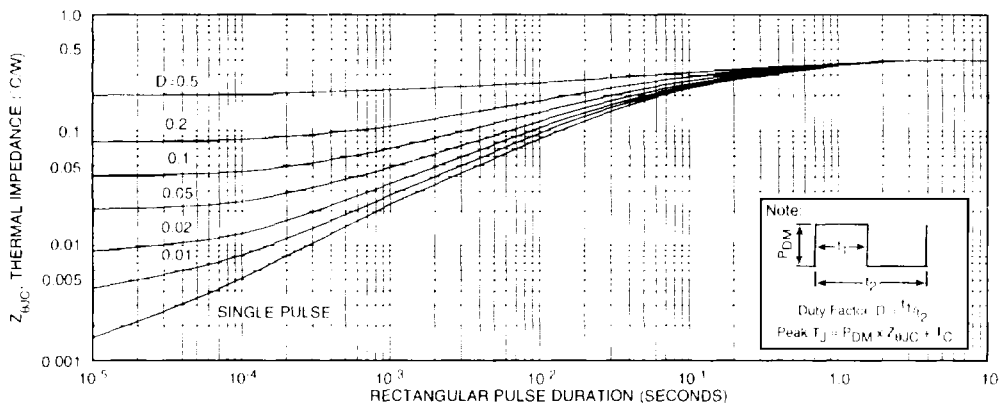


FIGURE 1. MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

APT8075/8090BNR

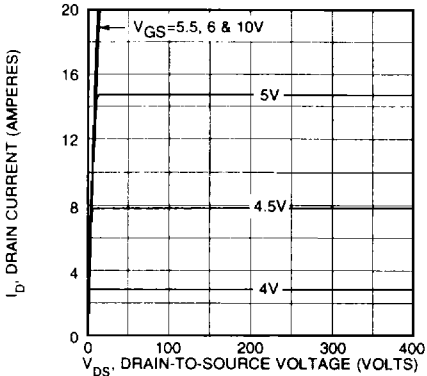


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

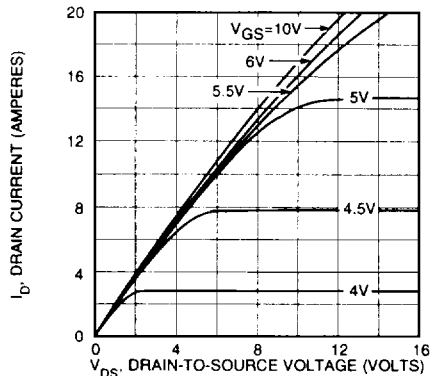


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

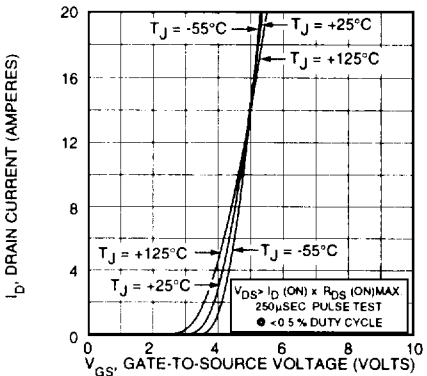


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

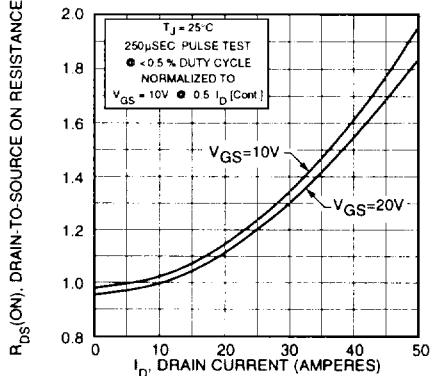


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

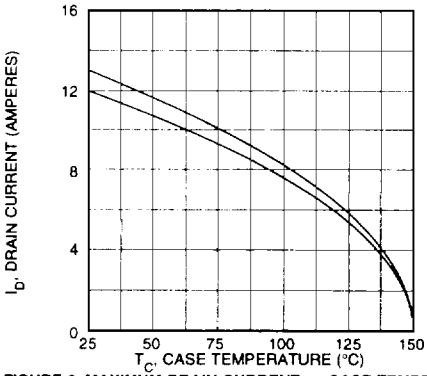


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

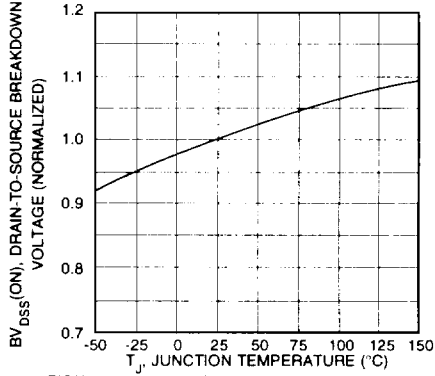


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

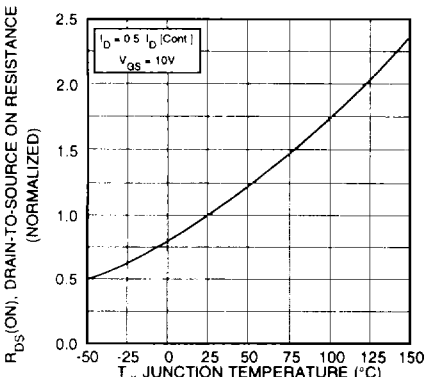


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

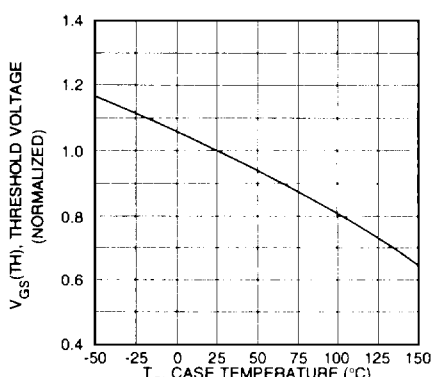


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

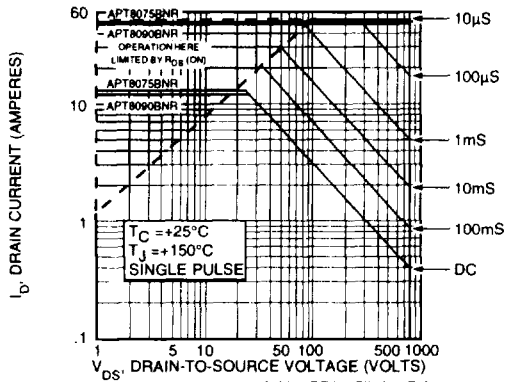


FIGURE 10, MAXIMUM SAFE OPERATING AREA

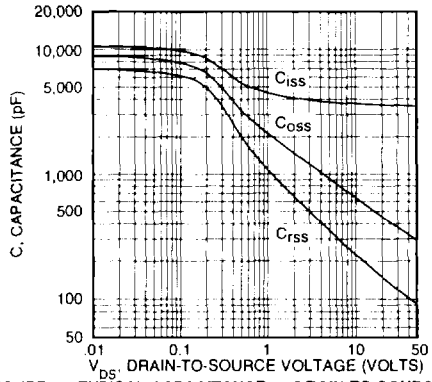


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

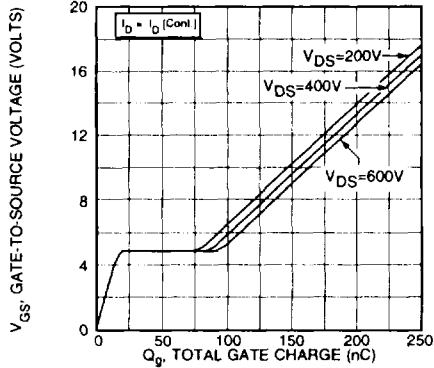


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

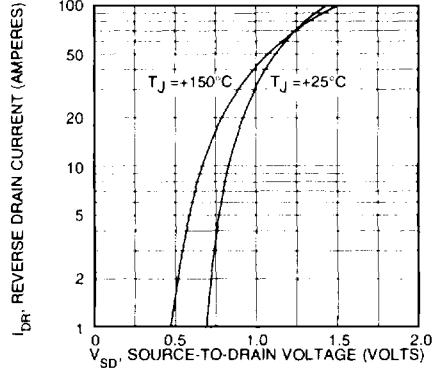


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline

