

**APT8075BN 800V 13.0A 0.75Ω**

**APT8090BN 800V 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 8075BN | APT 8090BN | UNIT  |
|----------------------------------|--------------------------------------------------|------------|------------|-------|
| V <sub>DSS</sub>                 | Drain-Source Voltage                             | 800        | 800        | Volts |
| I <sub>D</sub>                   | Continuous Drain Current @ T <sub>C</sub> = 25°C | 13         | 12         | Amps  |
| I <sub>DM</sub>                  | Pulsed Drain Current <sup>①</sup>                | 56         | 48         |       |
| V <sub>GS</sub>                  | Gate-Source Voltage                              | ±30        |            | Volts |
| P <sub>D</sub>                   | Total Power Dissipation @ T <sub>C</sub> = 25°C  | 310        |            | Watts |
|                                  | Linear Derating Factor                           | 2.48       |            | W/°C  |
| T <sub>J</sub> ,T <sub>STG</sub> | Operating and Storage Junction Temperature Range | -55 to 150 |            | °C    |
| T <sub>L</sub>                   | 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<br>( $V_{GS} = 0V, I_D = 250 \mu A$ )                                  | APT8075BN | 800 |           | Volts   |
|              |                                                                                                       | APT8090BN | 800 |           |         |
| $I_{D(ON)}$  | On State Drain Current <sup>②</sup><br>( $V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 10V$ ) | APT8075BN | 13  |           | Amps    |
|              |                                                                                                       | APT8090BN | 12  |           |         |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance <sup>②</sup><br>( $V_{GS} = 10V, 0.5 I_D$ [Cont.])                   | APT8075BN |     | 0.75      | Ohms    |
|              |                                                                                                       | APT8090BN |     | 0.90      |         |
| $I_{DSS}$    | Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ )                                   |           |     | 250       | $\mu A$ |
|              | 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 ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )                                       |           |     | $\pm 100$ | 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    |     |     | 0.40 | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | 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

F-33700 Merignac - France

Phone: (541) 382-8028

Phone: (33) 5 57 92 15 15

FAX: (541) 388-0364

FAX: (33) 5 56 47 97 61

# DYNAMIC CHARACTERISTICS

APT8075/8090BN

| Symbol       | Characteristic               | Test Conditions                                                                                          | MIN | TYP  | MAX  | UNIT |
|--------------|------------------------------|----------------------------------------------------------------------------------------------------------|-----|------|------|------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1 \text{ MHz}$                                                   |     | 2410 | 2950 | pF   |
| $C_{oss}$    | Output Capacitance           |                                                                                                          |     | 370  | 520  |      |
| $C_{rss}$    | Reverse Transfer Capacitance |                                                                                                          |     | 120  | 180  |      |
| $Q_g$        | Total Gate Charge ③          | $V_{GS} = 10V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_D [\text{Cont.}] @ 25^\circ C$                      |     | 88   | 130  | nC   |
| $Q_{gs}$     | Gate-Source Charge           |                                                                                                          |     | 8.9  | 13   |      |
| $Q_{gd}$     | Gate-Drain ("Miller") Charge |                                                                                                          |     | 44   | 67   |      |
| $t_{d(on)}$  | Turn-on Delay Time           | $V_{GS} = 15V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_D [\text{Cont.}] @ 25^\circ C$<br>$R_G = 1.8\Omega$ |     | 13   | 27   | ns   |
| $t_r$        | Rise Time                    |                                                                                                          |     | 18   | 36   |      |
| $t_{d(off)}$ | Turn-off Delay Time          |                                                                                                          |     | 62   | 94   |      |
| $t_f$        | Fall Time                    |                                                                                                          |     | 24   | 48   |      |

# SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol   | Characteristic / Test Conditions / Part Number                                   | MIN       | TYP | MAX  | UNIT    |
|----------|----------------------------------------------------------------------------------|-----------|-----|------|---------|
| $I_S$    | Continuous Source Current (Body Diode)                                           | APT8075BN |     | 13   | Amps    |
|          |                                                                                  | APT8090BN |     | 12   |         |
| $I_{SM}$ | Pulsed Source Current ① (Body Diode)                                             | APT8075BN |     | 56   |         |
|          |                                                                                  | APT8090BN |     | 48   |         |
| $V_{SD}$ | Diode Forward Voltage ② ( $V_{GS} = 0V$ , $I_S = -I_D [\text{Cont.}]$ )          |           |     | 1.3  | Volts   |
| $t_{rr}$ | Reverse Recovery Time ( $I_S = -I_D [\text{Cont.}]$ , $dI_S/dt = 100A/\mu s$ )   |           | 656 | 1200 | ns      |
| $Q_{rr}$ | Reverse Recovery Charge ( $I_S = -I_D [\text{Cont.}]$ , $dI_S/dt = 100A/\mu s$ ) |           | 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 |     |     |       |
| $I_{LM}$ | Inductive Current Clamped | APT8075BN                                                                                  | 56  |     |     | Amps  |
|          |                           | APT8090BN                                                                                  | 48  |     |     |       |

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.

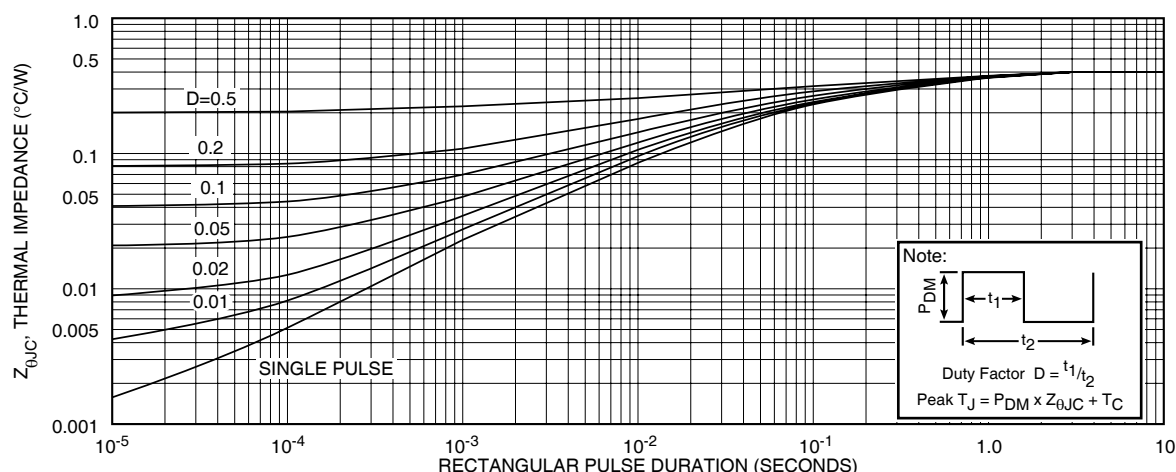
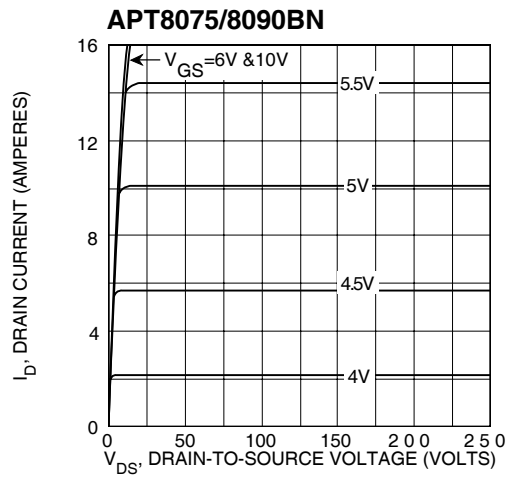
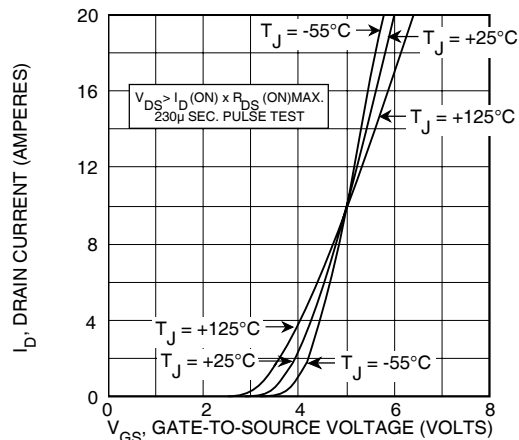


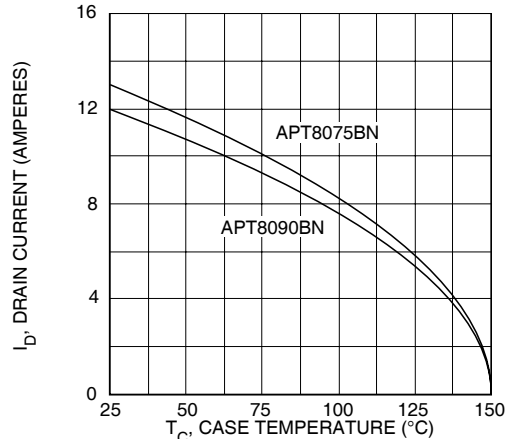
FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION



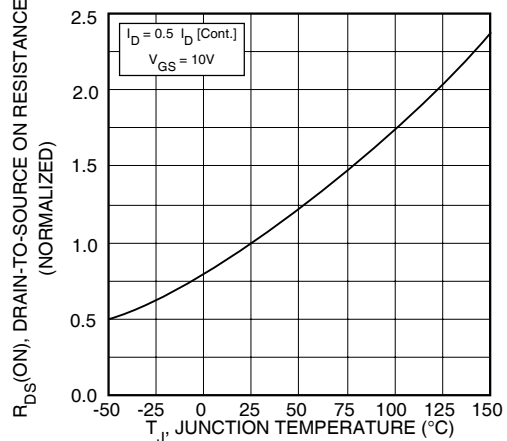
**FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS**



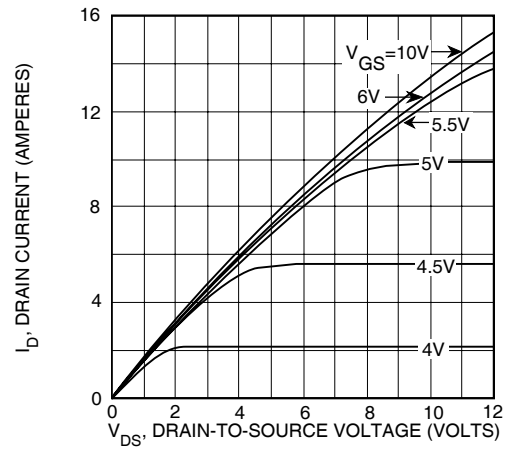
**FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS**



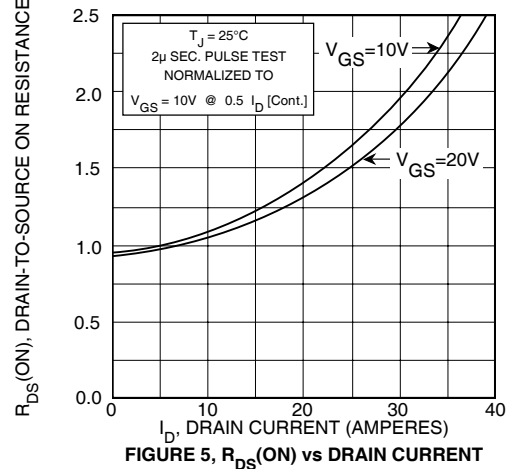
**FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE**



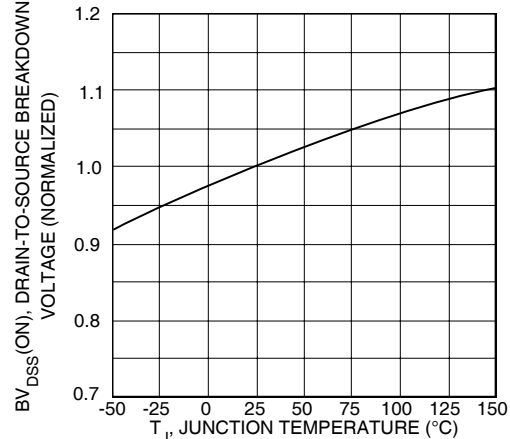
**FIGURE 8, ON-RESISTANCE vs. TEMPERATURE**



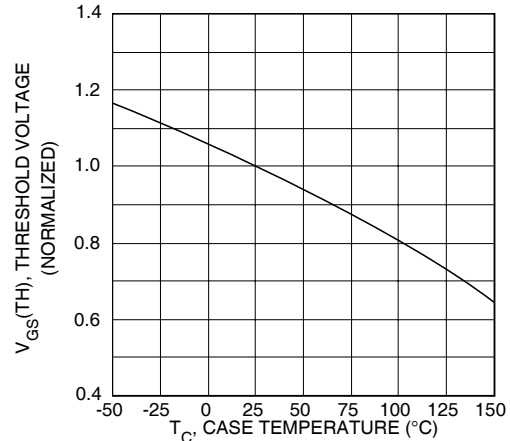
**FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS**



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



**FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE**



**FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE**

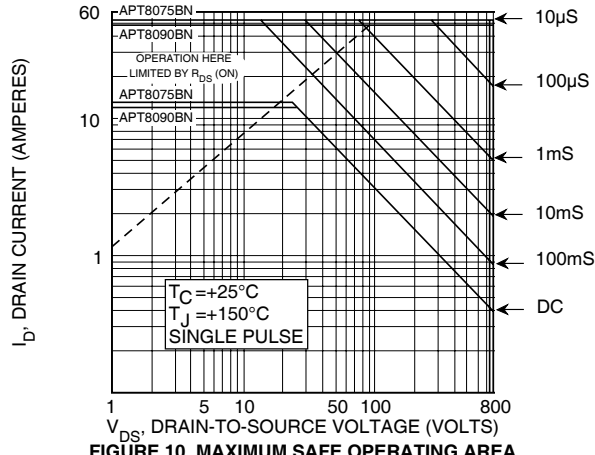


FIGURE 10, MAXIMUM SAFE OPERATING AREA

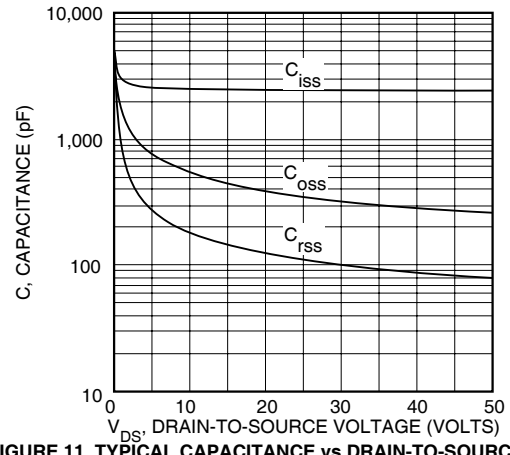


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

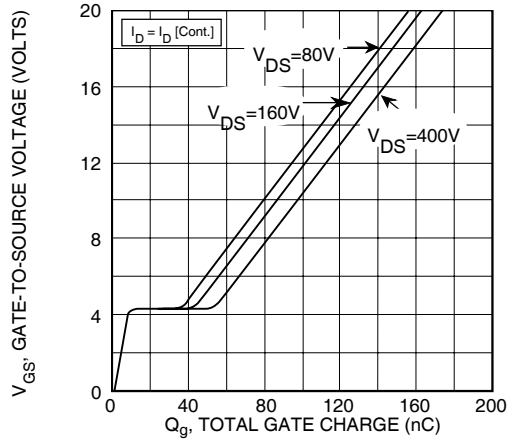


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

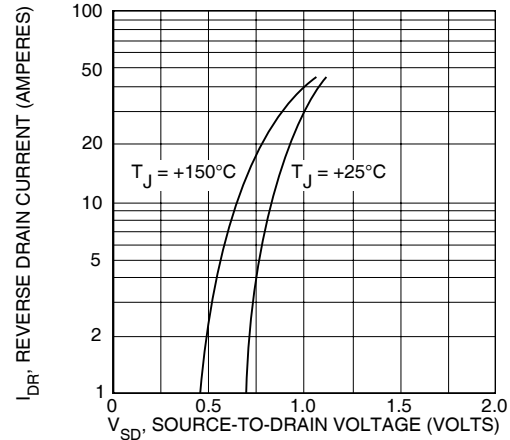


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

## TO-247AD Package Outline

