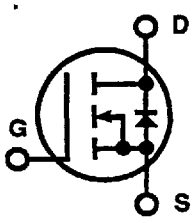
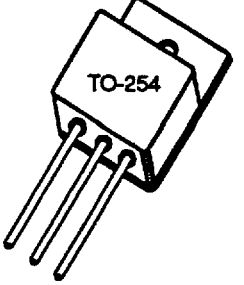



ADVANCED POWER TECHNOLOGY®

| | | | |
|---|---|---|---|
| APT801R2CN | 800V | 7.0A | 1.20Ω |
| APT751R2CN | 750V | 7.0A | 1.20Ω |
| APT801R4CN | 800V | 6.5A | 1.40Ω |
| APT751R4CN | 750V | 6.5A | 1.40Ω |

# POWER MOS IV™

## N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

### MAXIMUM RATINGS

All Ratings: $T_C$ = 25°C unless otherwise specified.

| Symbol | Parameter | APT 751R2CN | APT 801R2CN | APT 751R4GCN | APT 801R4CN | UNIT |
|---|---|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | 750 | 800 | 750 | 800 | Volts |
| $I_D$ | Continuous Drain Current @ $T_C$ = 25°C | 7.0 | | 6.5 | | Amps |
| $I_{DM}$ | Pulsed Drain Current ① | 28 | | 26 | | |
| $V_{GS}$ | Gate-Source Voltage | ±30 | | | | Volts |
| $P_D$ | Total Power Dissipation @ $T_C$ = 25°C | 150 | | | | Watts |
| | Linear Derating Factor | 1.2 | | | | W/°C |
| $T_J$,$T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to 150 | | | | °C |
| $T_L$ | 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 ($V_{GS}$ = 0V, $I_D$ = 250 μA) | APT801R2CN / APT801R4CN | 800 | | | Volts |
| | | APT751R2CN / APT751R4CN | 750 | | | |
| $I_{D(ON)}$ | On State Drain Current ② ($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS}$ = 10V) | APT801R2CN / APT751R2CN | 7.0 | | | Amps |
| | | APT801R4CN / APT751R4CN | 6.5 | | | |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance ② ($V_{GS}$ = 10V, 0.5 $I_D$ [Cont.]) | APT801R2CN / APT751R2CN | | | 1.20 | Ohms |
| | | APT801R4CN / APT751R4CN | | | 1.40 | |
| $I_{DSS}$ | 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°C) | | | | 1000 | |
| $I_{GSS}$ | Gate-Source Leakage Current ($V_{GS}$ = ±30V, $V_{DS}$ = 0V) | | | | ±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 | | | 0.80 | °C/W |
| $R_{\theta JA}$ | Junction to Ambient | | | 50 | |

405 S.W. COLUMBIA STREET
BEND, OREGON 97702-1035
U.S.A.

PHONE . . . (503) 382-8028
FAX . . . . . (503) 388-0364

## DYNAMIC CHARACTERISTICS

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $C_{DC}$ | Drain-to-Case Capacitance | f = 1 MHz | | 15 | 22 | pF |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1 MHz | | 1500 | 1800 | |
| $C_{oss}$ | Output Capacitance | | | 235 | 330 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 85 | 127 | |
| $Q_g$ | Total Gate Charge ③ | $V_{GS}$ = 10V, $V_{DD}$ = 0.5 $V_{DSS}$, $I_D$ = $I_D$[Cont.] @ 25°C | | 68 | 105 | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 7.6 | 11 | |
| $Q_{gd}$ | Gate-Drain ("Miller") Charge | | | 33 | 49 | |
| $t_d$(on) | Turn-on Delay Time | $V_{GS}$ = 15V, $V_{DD}$ = 0.5 $V_{DSS}$, $I_D$ = $I_D$[Cont.] @ 25°C, $R_G$ = 1.8Ω | | 12 | 24 | ns |
| $t_r$ | Rise Time | | | 15 | 30 | |
| $t_d$(off) | Turn-off Delay Time | | | 52 | 78 | |
| $t_f$ | Fall Time | | | 18 | 36 | |

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | APT801R2CN / APT751R2CN | | | 7.0 | Amps |
| | | APT801R4CN / APT751R4CN | | | 6.5 | |
| $I_{SM}$ | Pulsed Source Current ① (Body Diode) | APT801R2CN / APT751R2CN | | | 28 | |
| | | APT801R4CN / APT751R4CN | | | 26 | |
| $V_{SD}$ | 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/µs) | | 240 | 480 | 960 | ns |
| $Q_{rr}$ | Reverse Recovery Charge ($I_S$ = -$I_D$[Cont.], $dI_S/dt$ = 100A/µs) | | 1.7 | 3.4 | 7.0 | µC |

## SAFE OPERATING AREA CHARACTERISTICS

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| SOA1 | Safe Operating Area | $V_{DS}$ = 0.4 $V_{DSS}$, $I_{DS}$ = $P_D$ / 0.4 $V_{DSS}$, t = 1 Sec. | 150 | | | Watts |
| SOA2 | Safe Operating Area | $I_{DS}$ = $I_D$[Cont.], $V_{DS}$ = $P_D$ / $I_D$[Cont.], t = 1 Sec. | 150 | | | |
| $I_{LM}$ | Inductive Current Clamped | APT801R2CN / APT751R2CN | 28 | | | Amps |
| | | APT801R4CN / APT751R4CN | 26 | | | |

①Repetitive Rating: Pulse width limited by maximum junction temperature. See Transient Thermal Impedance Curve. (Fig.1)

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

③See MIL-STD-750 Method 3471

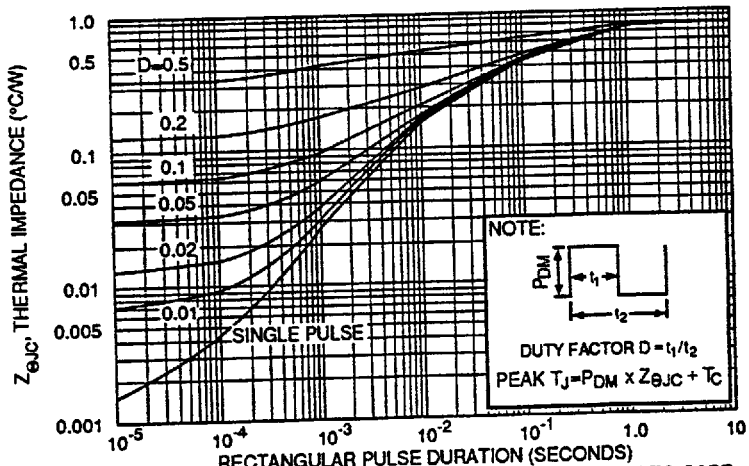



FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

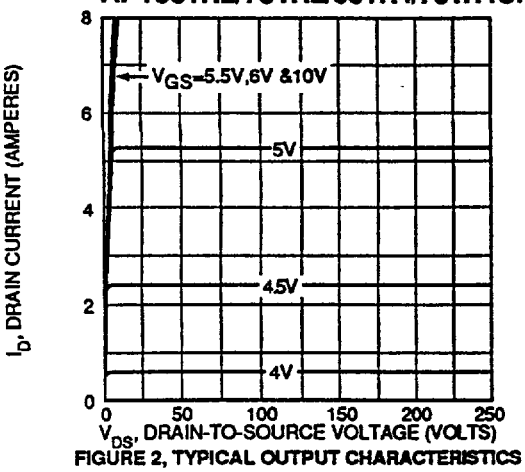



FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

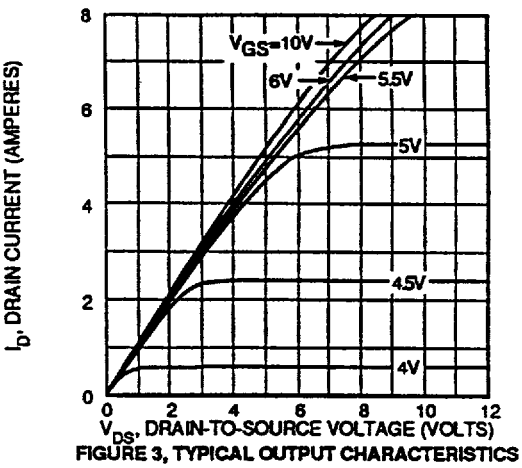



FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

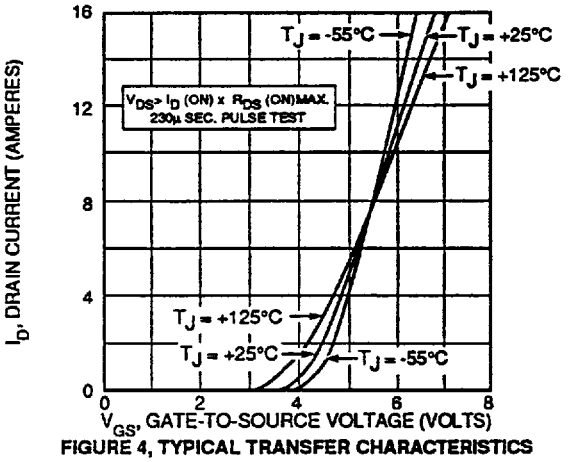



FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

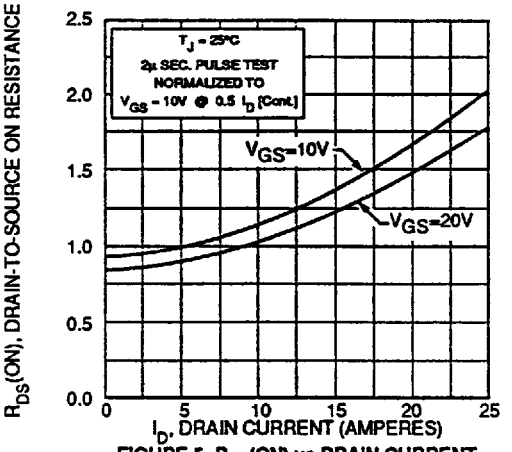



FIGURE 5, $R_{DS}$(ON) vs DRAIN CURRENT



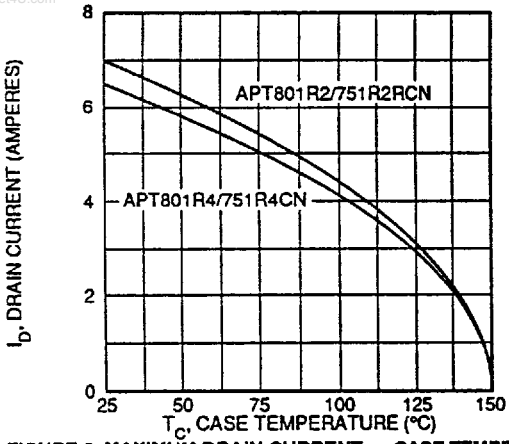



FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

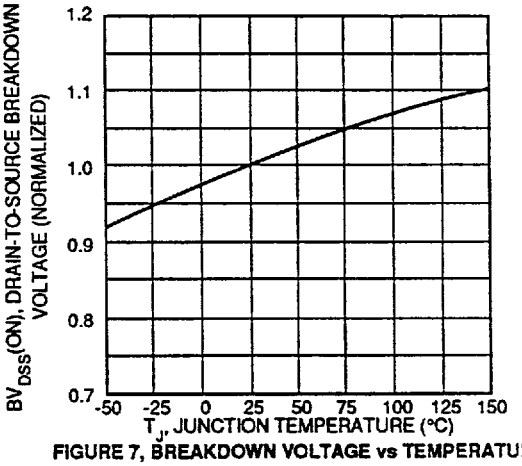



FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

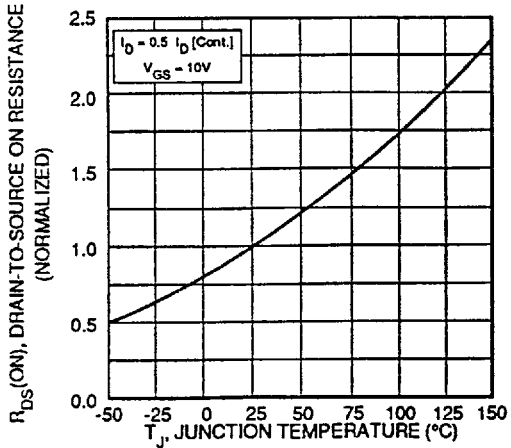



FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

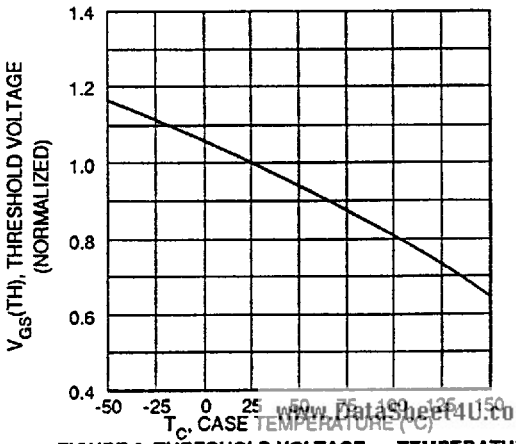



FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

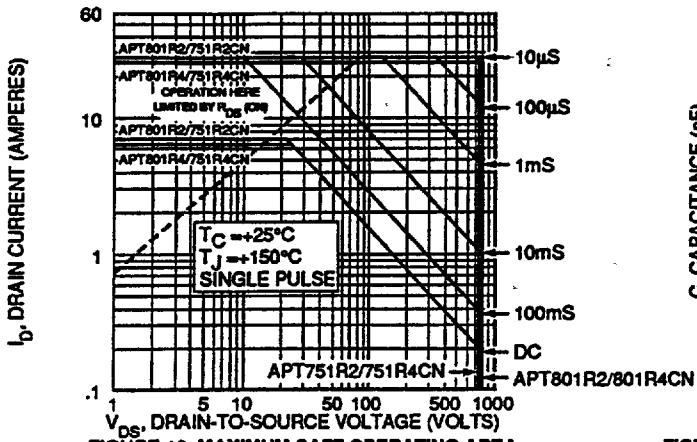



FIGURE 10, MAXIMUM SAFE OPERATING AREA

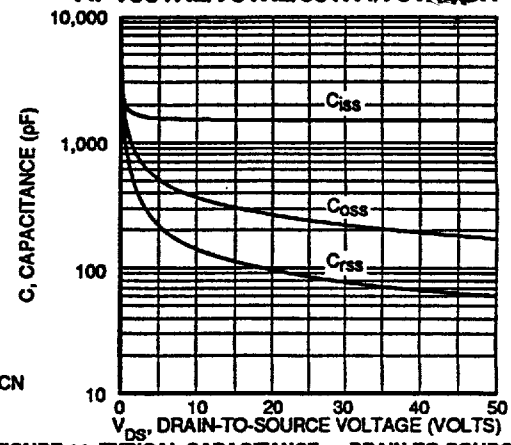



FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

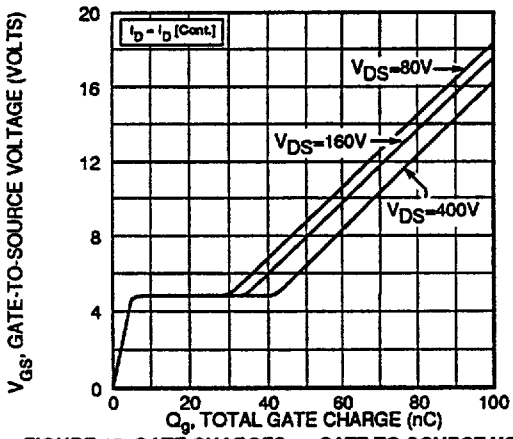



FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

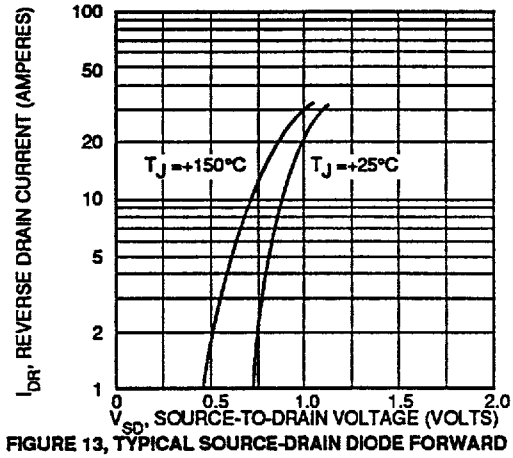
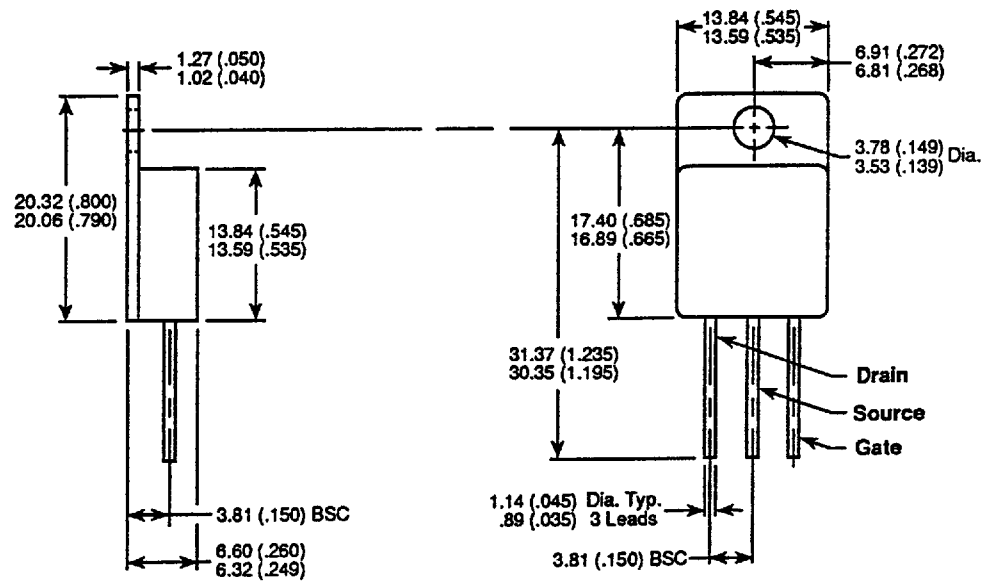



FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE



## TO-254AA Package Outline




Dimensions in Millimeters and (Inches)