

| | | | |
|------------|------|------|-------|
| APT801R2BN | 800V | 9.0A | 1.20Ω |
| APT751R2BN | 750V | 9.0A | 1.20Ω |
| APT801R4BN | 800V | 8.5A | 1.40Ω |
| APT751R4BN | 750V | 8.5A | 1.40Ω |

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 |
|----------------|---|-------------|---------|---------|---------|------------------|
| | | 751R2BN | 801R2BN | 751R4BN | 801R4BN | |
| V_{DSS} | Drain-Source Voltage | 750 | 800 | 750 | 800 | Volts |
| I_D | Continuous Drain Current | 9.0 | | 8.5 | | Amps |
| I_{DM} | Pulsed Drain Current ^① | 36 | | 34 | | Amps |
| V_{GS} | Gate-Source Voltage | ±30 | | | | Volts |
| P_D | Total Power Dissipation @ $T_C = 25^\circ\text{C}$, Derate Above 25°C | 240 | | | | 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 ($V_{GS} = 0V, I_D = 250 \mu\text{A}$) | APT801R2BN / APT801R4BN | | 800 | Volts | |
| | | APT751R2BN / APT751R4BN | | 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, $V_{GS} = 10V$) | APT801R2BN / APT751R2BN | | 9.0 | Amps | |
| | | APT801R4BN / APT751R4BN | | 8.5 | 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 ($V_{GS} = 10V, I_D = 0.5 I_D$ [Cont.]) | APT801R2BN / APT751R2BN | | | 1.20 | Ohms |
| | | APT801R4BN / APT751R4BN | | | 1.40 | Ohms |

THERMAL CHARACTERISTICS

| Symbol | Characteristic | MIN | TYP | MAX | UNIT |
|-----------------|--|-----|-----|------|--------------------|
| $R_{\theta JC}$ | Junction to Case | | | 0.51 | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | 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.

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

Page 152

050-8003 Rev C

■ 0257909 0001556 616 ■

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|-------------------|--------------------------------|--|-----|------|------|------|
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$ | | 1500 | 1800 | pF |
| C_{oss} | Output Capacitance | | | 235 | 330 | pF |
| C_{rss} | Reverse Transfer Capacitance | | | 85 | 127 | pF |
| Q_g | Total Gate Charge ^③ | $V_{GS} = 10V, I_D = I_D[\text{Cont.}]$ $V_{DD} = 0.5 V_{DSS}$ | | 68 | 105 | nC |
| Q_{gs} | Gate-Source Charge | | | 7.6 | 11 | nC |
| Q_{gd} | Gate-Drain ("Miller") Charge | | | 33 | 49 | nC |
| $t_d(\text{on})$ | 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 | 26 | ns |
| t_r | Rise Time | | | 15 | 29 | ns |
| $t_d(\text{off})$ | Turn-off Delay Time | | | 54 | 81 | ns |
| t_f | Fall Time | | | 20 | 39 | ns |

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol | Characteristic / Test Conditions / Part Number | MIN | TYP | MAX | UNIT |
|----------|--|-------------------------|-----|-----|---------|
| I_S | Continuous Source Current (Body Diode) | APT801R2BN / APT751R2BN | | 9.0 | Amps |
| | | APT801R4BN / APT751R4BN | | 8.5 | Amps |
| I_{SM} | Pulsed Source Current ^① (Body Diode) | APT801R2BN / APT751R2BN | | 36 | Amps |
| | | APT801R4BN / APT751R4BN | | 34 | Amps |
| V_{SD} | Diode Forward Voltage ^② ($V_{GS} = 0V, I_S = -I_D[\text{Cont.}]$) | | | 1.3 | Volts |
| t_{rr} | Reverse Recovery Time ($I_S = -I_D[\text{Cont.}], di_S/dt = 100A/\mu s$) | 240 | 480 | 960 | ns |
| Q_{rr} | Reverse Recovery Charge | 1.7 | 3.4 | 7 | μC |

SAFE OPERATING AREA CHARACTERISTICS

| Symbol | Characteristic | Test Conditions / Part Number | MIN | TYP | MAX | UNIT |
|----------|---------------------------|---|-----|-----|-----|-------|
| SOA1 | Safe Operating Area | $V_{DS} = 0.4 V_{DSS}, I_{DS} = P_D / 0.4 V_{DSS}, t = 1\text{ Sec.}$ | 240 | | | Watts |
| SOA2 | Safe Operating Area | $I_{DS} = I_D[\text{Cont.}], V_{DS} = P_D / I_D[\text{Cont.}], t = 1\text{ Sec.}$ | 240 | | | Watts |
| I_{LM} | Inductive Current Clamped | APT801R2BN / APT751R2BN | 36 | | | Amps |
| | | APT801R4BN / APT751R4BN | 34 | | | 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.

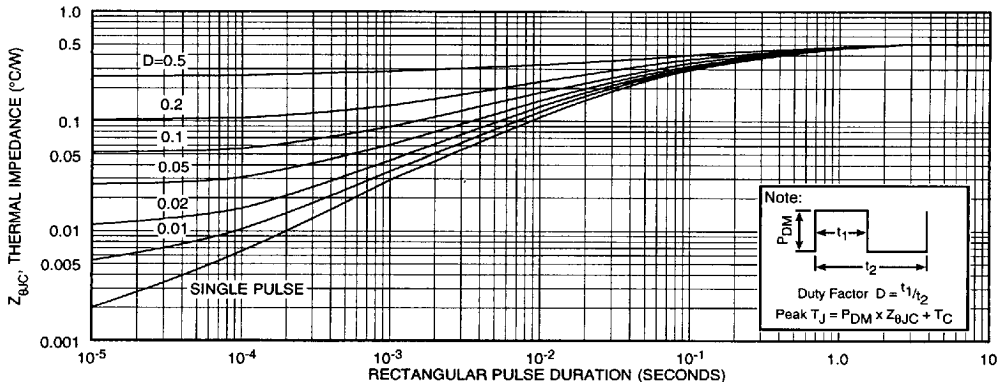


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION
Page 153

0257909 0001557 552

APT801R2/751R2/801R4/751R4BN

I_D , DRAIN CURRENT (AMPERES)

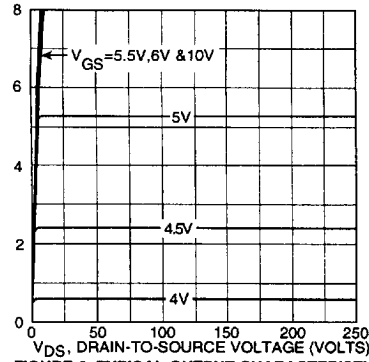


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

I_D , DRAIN CURRENT (AMPERES)

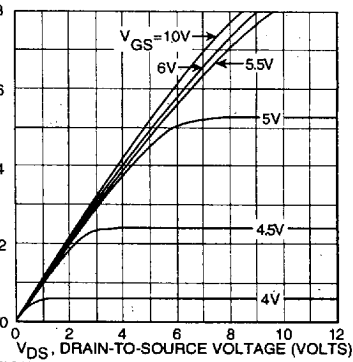


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

I_D , DRAIN CURRENT (AMPERES)

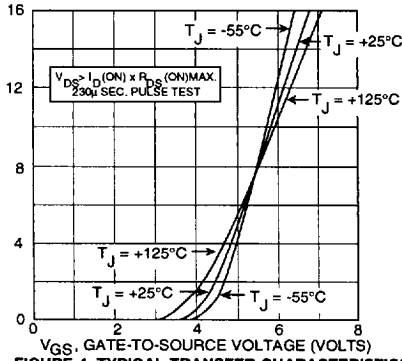


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

$R_{DS(ON)}$, DRAIN-TO-SOURCE ON RESISTANCE (NORMALIZED)

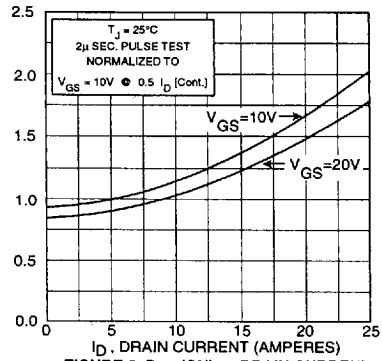


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

I_D , DRAIN CURRENT (AMPERES)

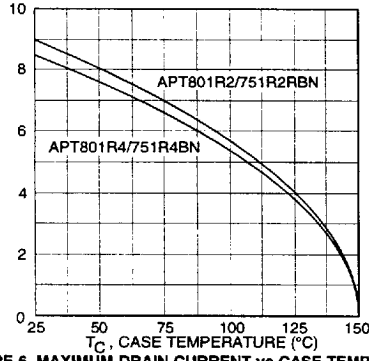


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

BV_{DSS} , DRAIN-TO-SOURCE BREAKDOWN VOLTAGE (NORMALIZED)

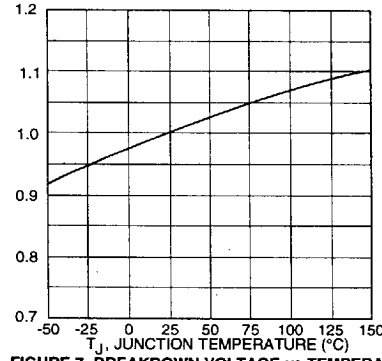


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

$R_{DS(ON)}$, DRAIN-TO-SOURCE ON RESISTANCE (NORMALIZED)

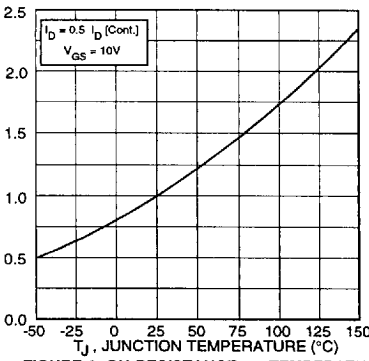


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

$V_{GS(TH)}$, THRESHOLD VOLTAGE (NORMALIZED)

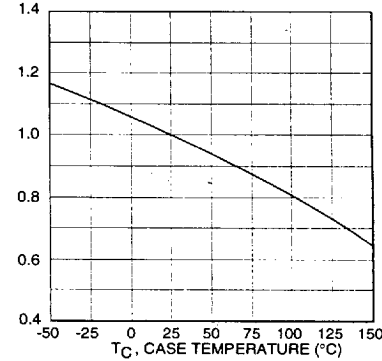


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

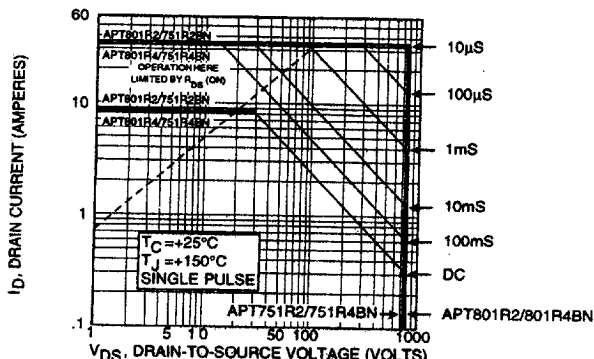


FIGURE 10, MAXIMUM SAFE OPERATING AREA

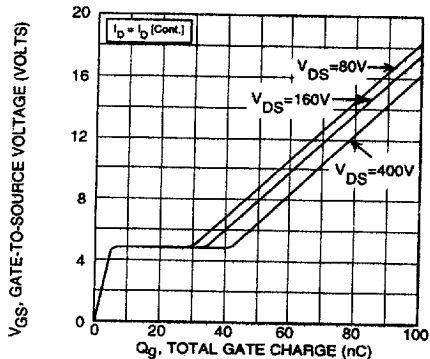


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

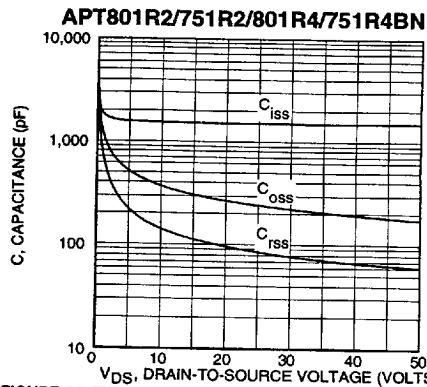


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

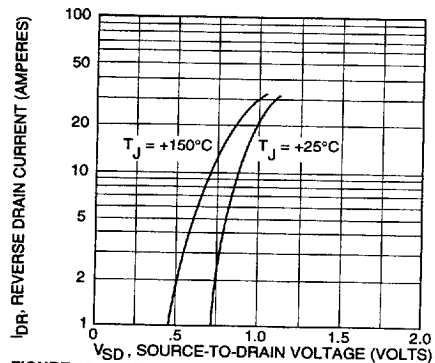
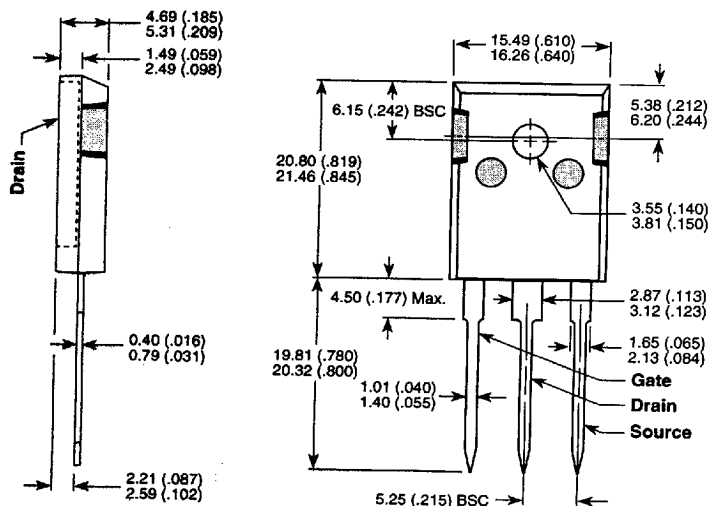


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247AD Package Outline



Dimensions in Millimeters and (Inches)
Page 155

0257909 0001559 325