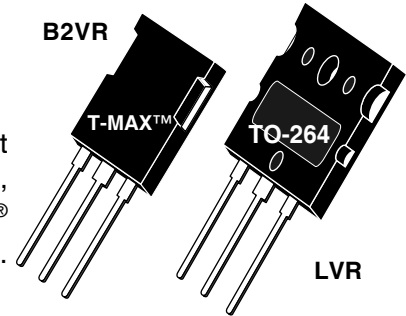
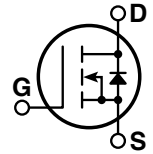


POWER MOS V® MOSFET

Power MOS V® is a new generation of high voltage N-Channel enhancement mode power MOSFETs. This new technology minimizes the JFET effect, increases packing density and reduces the on-resistance. Power MOS V® also achieves faster switching speeds through optimized gate layout.



- TO-264 MAX Package
- Avalanche Energy Rated
- Faster Switching
- Lower Leakage



MAXIMUM RATINGS

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

| Symbol | Parameter | APT6011B2VR_LVR | UNIT |
|----------------|--|-----------------|---------------------|
| V_{DSS} | Drain-Source Voltage | 600 | Volts |
| I_D | Continuous Drain Current @ $T_C = 25^\circ\text{C}$ | 49 | Amps |
| I_{DM} | Pulsed Drain Current ^① | 196 | |
| V_{GS} | Gate-Source Voltage Continuous | ± 30 | Volts |
| V_{GSM} | Gate-Source Voltage Transient | ± 40 | |
| P_D | Total Power Dissipation @ $T_C = 25^\circ\text{C}$ | 625 | Watts |
| | Linear Derating Factor | 5.00 | 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) | 49 | Amps |
| E_{AR} | Repetitive Avalanche Energy ^① | 50 | mJ |
| E_{AS} | Single Pulse Avalanche Energy ^④ | 3000 | |

STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|--------------|---|-----|-----|-----------|---------------|
| BV_{DSS} | Drain-Source Breakdown Voltage ($V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$) | 600 | | | Volts |
| $R_{DS(on)}$ | Drain-Source On-State Resistance ^② ($V_{GS} = 10\text{V}, I_D = 24.5\text{A}$) | | | 0.110 | Ohms |
| I_{DSS} | Zero Gate Voltage Drain Current ($V_{DS} = 600\text{V}, V_{GS} = 0\text{V}$) | | | 25 | μA |
| | Zero Gate Voltage Drain Current ($V_{DS} = 480\text{V}, V_{GS} = 0\text{V}, T_C = 125^\circ\text{C}$) | | | 250 | |
| I_{GSS} | Gate-Source Leakage Current ($V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$) | | | ± 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 2.5\text{mA}$) | 2 | | 4 | Volts |

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

APT Website - <http://www.advancedpower.com>

DYNAMIC CHARACTERISTICS

APT6011B2VR_LVR

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|--------------|------------------------------|--|-----|------|-----|------|
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 \text{ MHz}$ | | 8900 | | pF |
| C_{oss} | Output Capacitance | | | 1100 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 500 | | |
| Q_g | Total Gate Charge ③ | $V_{GS} = 10V$ $V_{DD} = 300V$ $I_D = 49A @ 25^\circ C$ | | 450 | | nC |
| Q_{gs} | Gate-Source Charge | | | 50 | | |
| Q_{gd} | Gate-Drain ("Miller") Charge | | | 200 | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{GS} = 15V$ $V_{DD} = 300V$ $I_D = 49A @ 25^\circ C$ $R_G = 0.6\Omega$ | | 17 | | ns |
| t_r | Rise Time | | | 16 | | |
| $t_{d(off)}$ | Turn-off Delay Time | | | 65 | | |
| t_f | Fall Time | | | 6 | | |

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|----------|--|-----|------|-----|---------|
| I_S | Continuous Source Current (Body Diode) | | | 49 | Amps |
| I_{SM} | Pulsed Source Current ① (Body Diode) | | | 196 | |
| V_{SD} | Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -49A$) | | | 1.3 | Volts |
| t_{rr} | Reverse Recovery Time ($I_S = -49A, di_S/dt = 100A/\mu s$) | | 760 | | ns |
| Q_{rr} | Reverse Recovery Charge ($I_S = -49A, di_S/dt = 100A/\mu s$) | | 18.4 | | μC |
| dv/dt | Peak Diode Recovery dv/dt ⑤ | | | 8 | V/ns |

THERMAL CHARACTERISTICS

| Symbol | Characteristic | MIN | TYP | MAX | UNIT |
|-----------------|---------------------|-----|-----|------|--------------|
| $R_{\theta JC}$ | Junction to Case | | | 0.20 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction to Ambient | | | 40 | |

① Repetitive Rating: Pulse width limited by maximum junction temperature

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.

④ Starting $T_j = +25^\circ C$, $L = 2.50mH$, $R_G = 25\Omega$, Peak $I_L = 49A$

⑤ dv/dt numbers reflect the limitations of the test circuit rather than the device itself. $I_S \leq -I_D 49A$ $di/dt \leq 700A/\mu s$ $v_R \leq 600V$ $T_J \leq 150^\circ C$

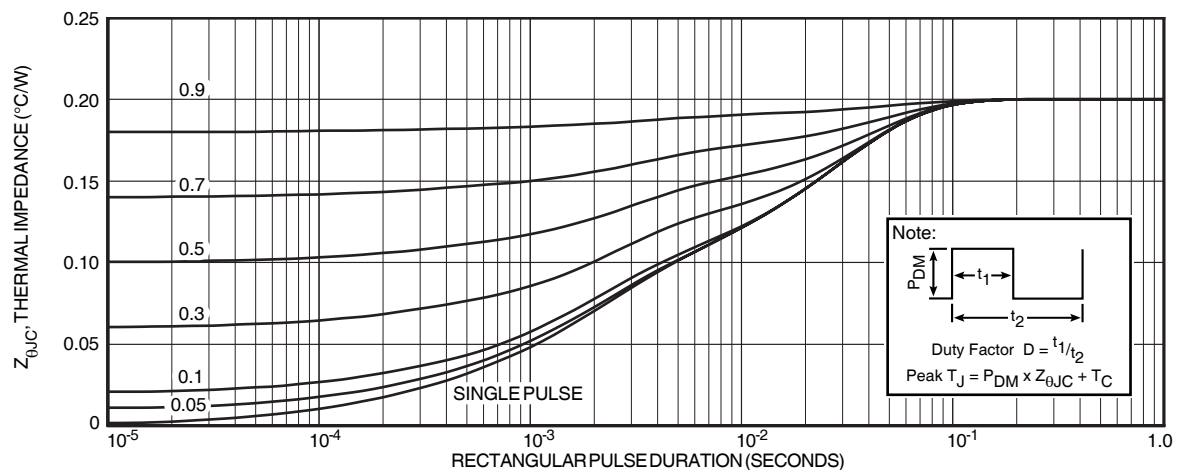


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Typical Performance Curves

APT6011B2VR_LVR

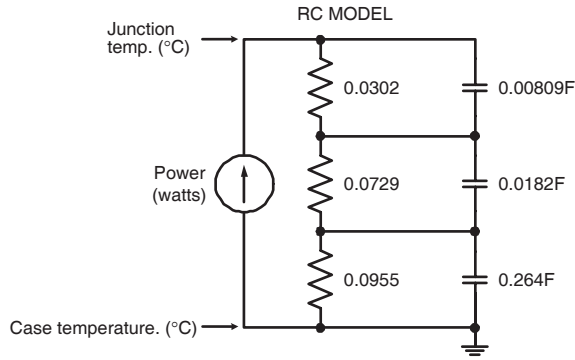


FIGURE 2, TRANSIENT THERMAL IMPEDANCE MODEL

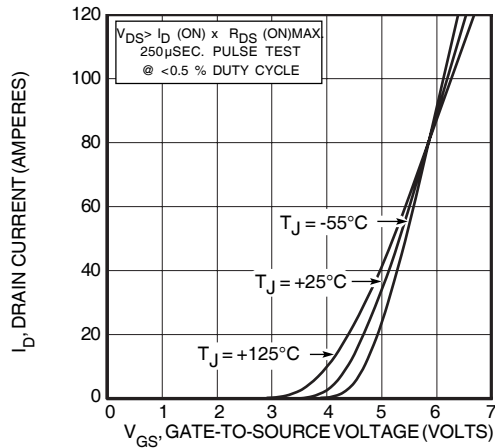


FIGURE 4, TRANSFER CHARACTERISTICS

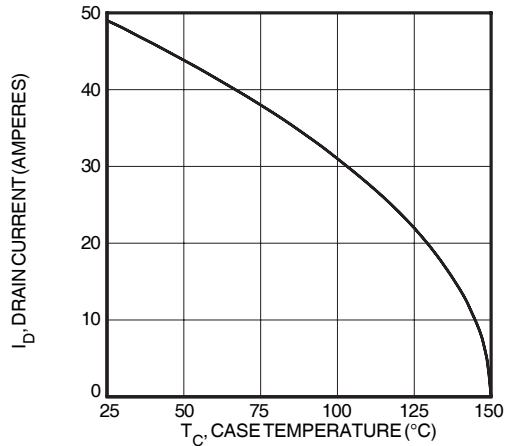


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

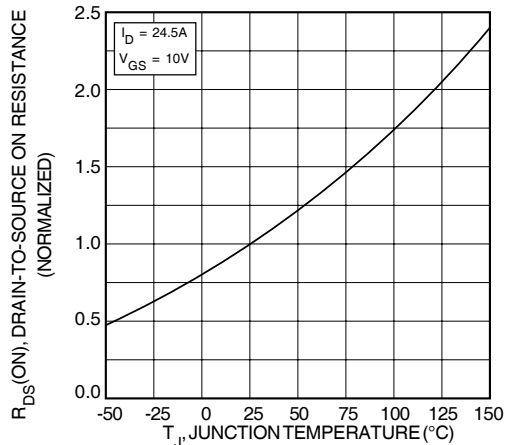


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

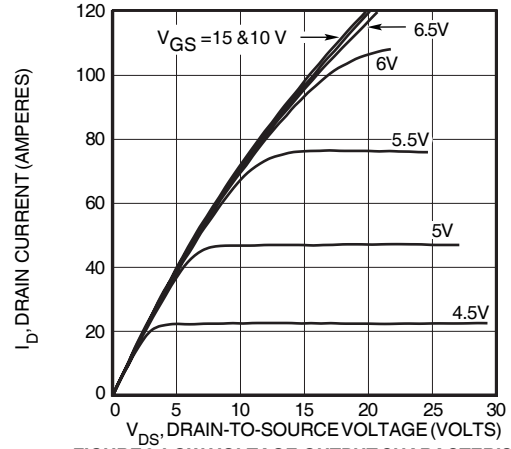


FIGURE 3, LOW VOLTAGE OUTPUT CHARACTERISTICS

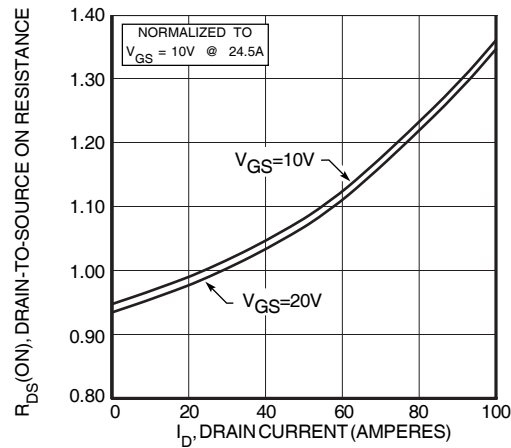


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

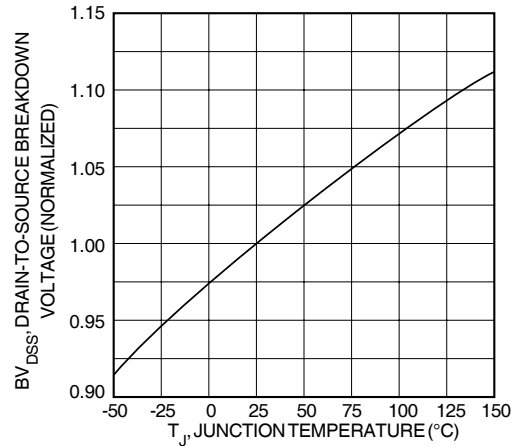


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

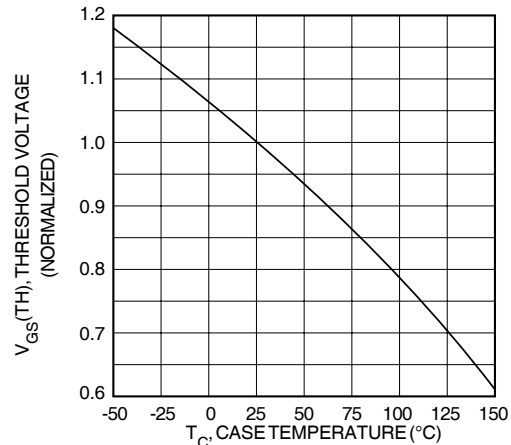


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

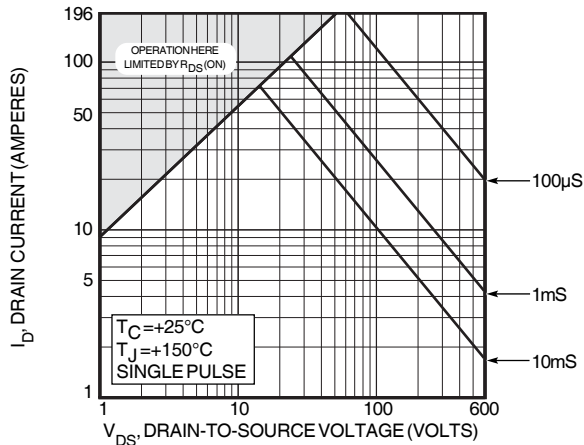


FIGURE 10, MAXIMUM SAFE OPERATING AREA

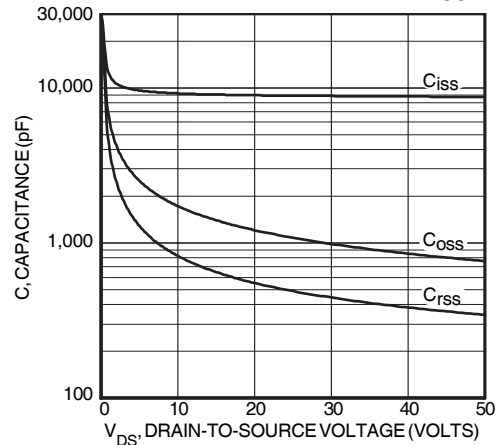


FIGURE 11, CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

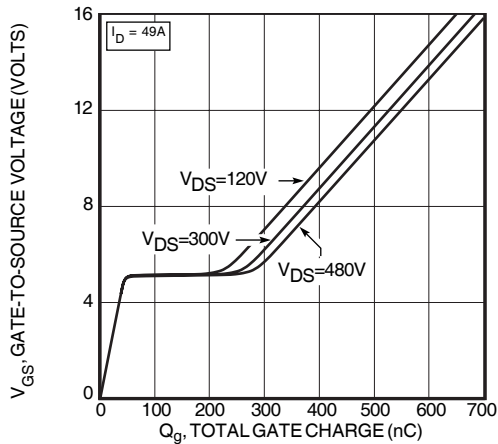


FIGURE 12, GATE CHARGE vs GATE-TO-SOURCE VOLTAGE

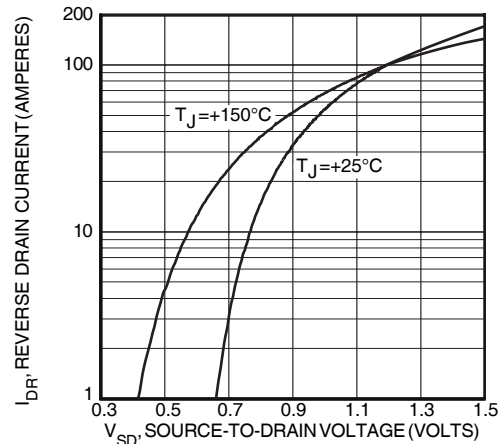
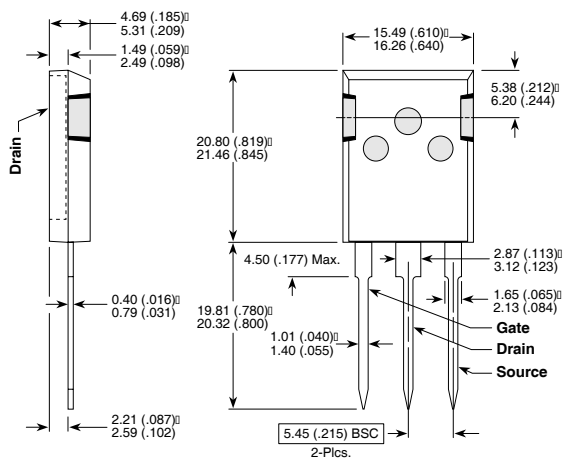


FIGURE 13, SOURCE-DRAIN DIODE FORWARD VOLTAGE

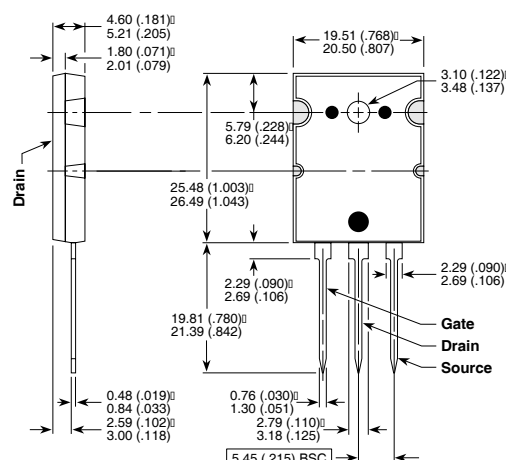
T-MAX™ (B2) Package Outline (B2VR)



These dimensions are equal to the TO-247 without the mounting hole.

Dimensions in Millimeters and (Inches)

TO-264 (L) Package Outline (LVR)



Dimensions in Millimeters and (Inches)