

**ADVANCED
POWER
TECHNOLOGY®**
APL1001J 1000V 18.0A 0.60Ω

"UL Recognized" File No. E145592 (S)

POWER MOS IV®

SINGLE DIE ISOTOP® PACKAGE

N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

MAXIMUM RATINGS

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

| Symbol | Parameter | APL1001J | UNIT |
|------------------|---|------------|-------|
| V_{DSS} | Drain-Source Voltage | 1000 | Volts |
| I_D | Continuous Drain Current @ $T_C = 25^\circ\text{C}$ | 18 | Amps |
| I_{DM}, I_{LM} | Pulsed Drain Current ^① and Inductive Current Clamped | 72 | |
| V_{GS} | Gate-Source Voltage | ±30 | Volts |
| P_D | Total Power Dissipation @ $T_C = 25^\circ\text{C}$ | 520 | Watts |
| | Linear Derating Factor | 4.16 | 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 ($V_{GS} = 0V, I_D = 250 \mu\text{A}$) | 1000 | | | Volts |
| $I_{D(ON)}$ | On State Drain Current ^② ($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 8V$) | 18 | | | Amps |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance ^② ($V_{GS} = 10V, 0.5 I_D$ [Cont.]) | | | 0.60 | Ohms |
| 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 ($V_{GS} = \pm 30V, V_{DS} = 0V$) | | | ±100 | nA |
| $V_{GS(TH)}$ | Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 2.5\text{mA}$) | 2 | | 4 | Volts |

THERMAL CHARACTERISTICS

| Symbol | Characteristic | MIN | TYP | MAX | UNIT |
|-----------------|---|------|-----|------|-------|
| $R_{\theta JC}$ | Junction to Case | | | 0.24 | °C/W |
| $R_{\theta JA}$ | Junction to Ambient | | | 40 | |
| $V_{Isolation}$ | RMS Voltage (50-60 Hz Sinusoidal Waveform From Terminals to Mounting Base for 1 Min.) | 2500 | | | Volts |
| Torque | Maximum Torque for Device Mounting Screws and Electrical Terminations. | | | 13 | lb*in |

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

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

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| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|-------------------|------------------------------|---|-----|------|------|------|
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$ | | 6000 | 7200 | pF |
| C_{oss} | Output Capacitance | | | 775 | 1080 | |
| C_{rss} | Reverse Transfer Capacitance | | | 285 | 430 | |
| $t_d(\text{on})$ | Turn-on Delay Time | $V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D[\text{Cont.}] @ 25^\circ\text{C}$ $R_G = 0.6\Omega$ | | 14 | 28 | ns |
| t_r | Rise Time | | | 14 | 28 | |
| $t_d(\text{off})$ | Turn-off Delay Time | | | 60 | 92 | |
| t_f | Fall Time | | | 14 | 20 | |

SAFE OPERATING AREA CHARACTERISTICS

| Symbol | Characteristic | Test Conditions / Part Number | MIN | TYP | MAX | UNIT |
|--------|---------------------|---|-----|-----|-----|-------|
| SOA1 | Safe Operating Area | $V_{DS} = 400\text{ V}, I_{DS} = 0.813\text{A}, t = 20\text{ sec.}, T_C = 60^\circ\text{C}$ | 325 | | | Watts |

- 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

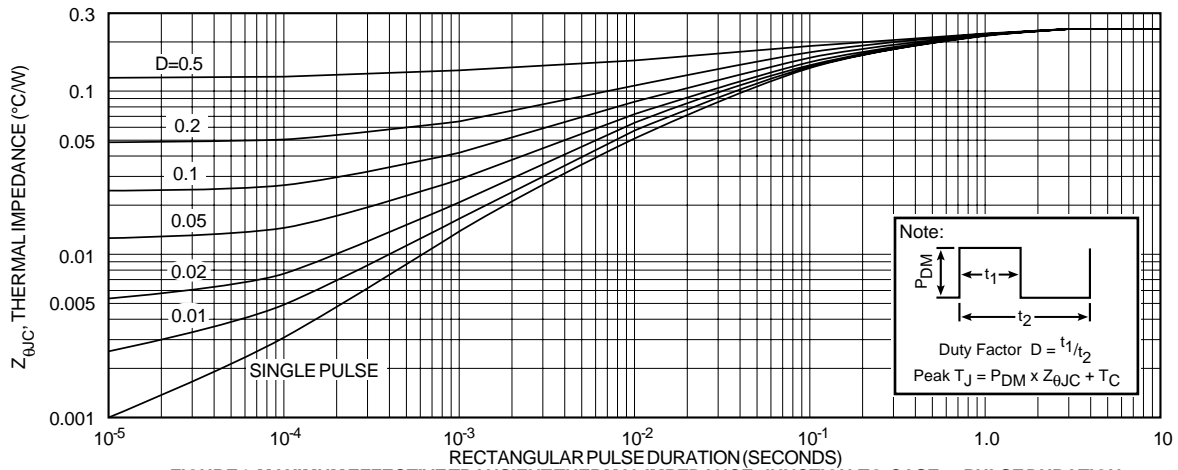


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

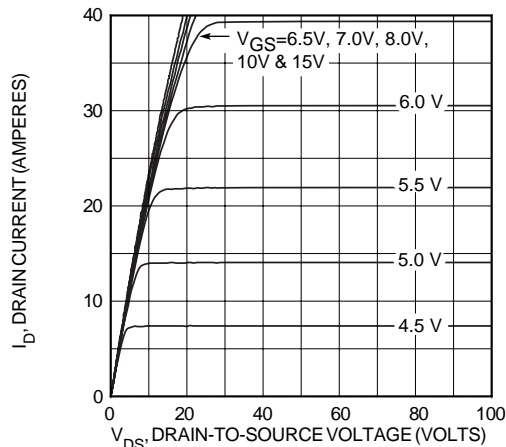


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

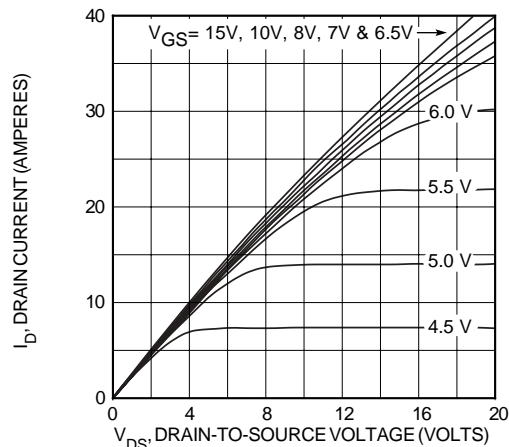


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

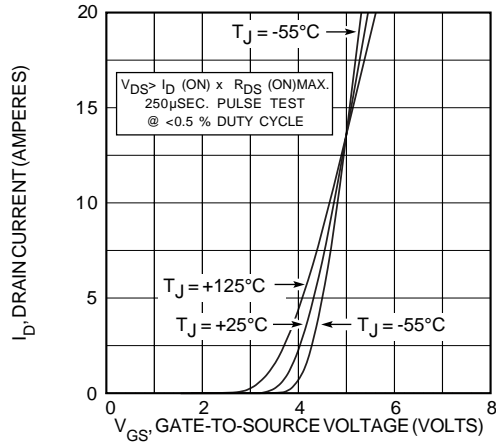


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

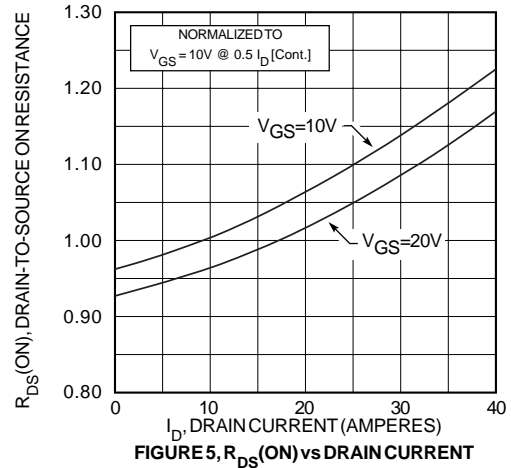


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

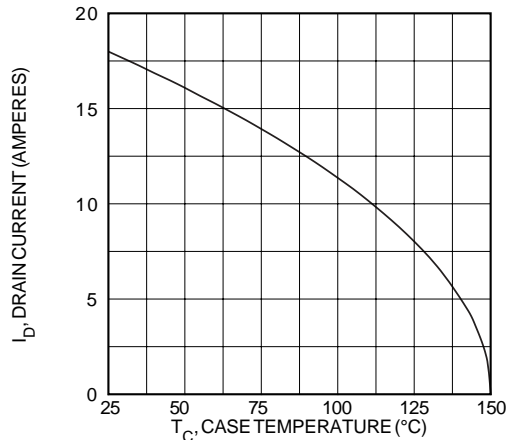


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

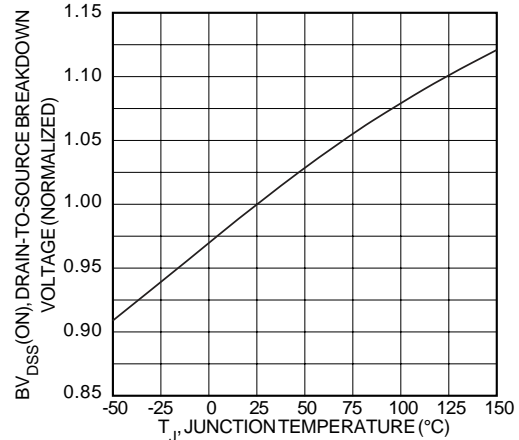


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

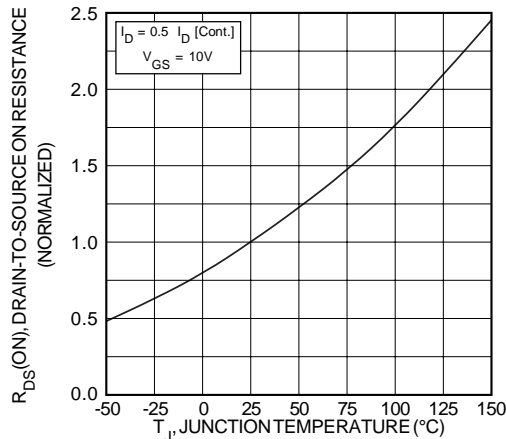


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

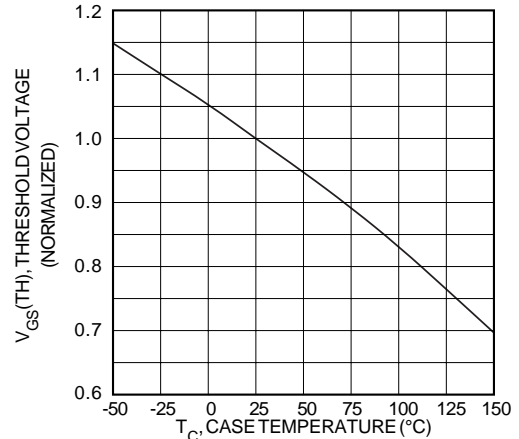


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

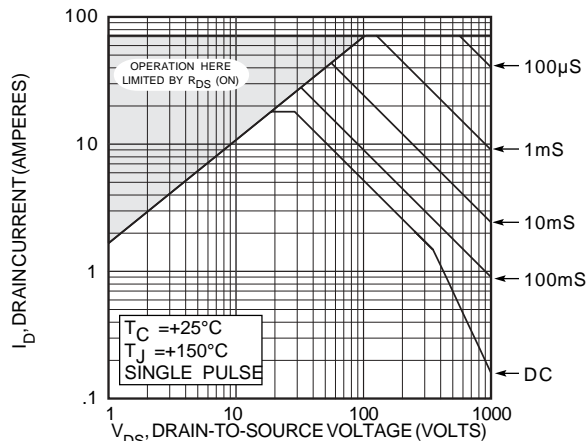


FIGURE 10, MAXIMUM SAFE OPERATING AREA

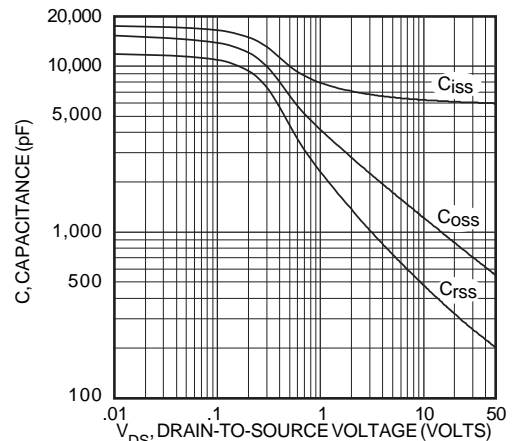
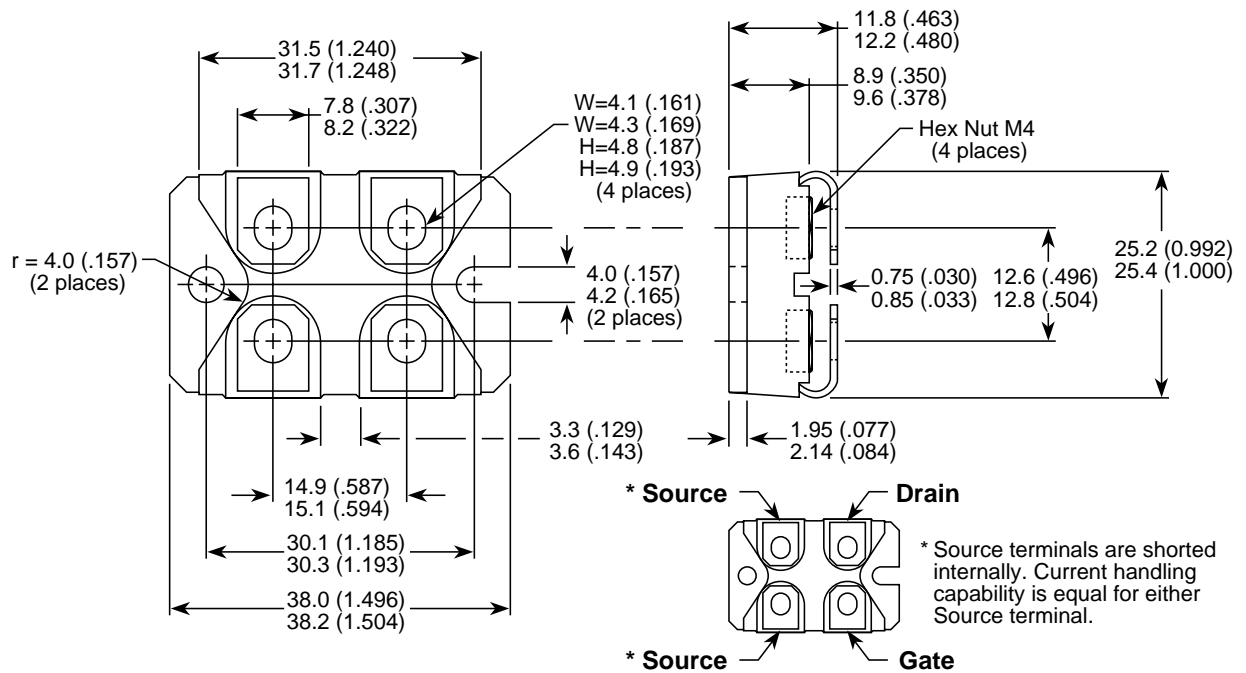


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)