

APT6015JN 600V 38.0A 0.15Ω
 APT6018JN 600V 35.0A 0.18Ω

"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 | APT 6015JN | APT 6018JN | UNIT |
|------------------|---|------------|------------|-------|
| V_{DSS} | Drain-Source Voltage | 600 | 600 | Volts |
| I_D | Continuous Drain Current @ $T_C = 25^\circ\text{C}$ | 38 | 35 | Amps |
| I_{DM}, I_{LM} | Pulsed Drain Current ^① and Inductive Current Clamped | 152 | 140 | |
| 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 ($V_{GS} = 0V, I_D = 250 \mu\text{A}$) | APT6015JN | 600 | | Volts |
| | | APT6018JN | 600 | | |
| $I_{D(ON)}$ | On State Drain Current ^② ($V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max, $V_{GS} = 10V$) | APT6015JN | 38 | | Amps |
| | | APT6018JN | 35 | | |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance ^② ($V_{GS} = 10V, 0.5 I_D$ [Cont.]) | APT6015JN | | 0.15 | Ohms |
| | | APT6018JN | | 0.18 | |
| 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 |
| $R_{\theta CS}$ | Case to Sink (Use High Efficiency Thermal Joint Compound and Planer Heat Sink Surface.) | | 0.06 | | |

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

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DYNAMIC CHARACTERISTICS

APT6015/6018JN

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|-------------------|------------------------------|--|-----|------|------|------|
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$ | | 5540 | 6500 | pF |
| C_{oss} | Output Capacitance | | | 1025 | 1450 | |
| C_{rss} | Reverse Transfer Capacitance | | | 375 | 570 | |
| Q_g | Total Gate Charge ③ | $V_{GS} = 10V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$ | | 242 | 370 | nC |
| Q_{gs} | Gate-Source Charge | | | 30 | 45 | |
| Q_{gd} | Gate-Drain ("Miller") Charge | | | 118 | 175 | |
| $t_d(\text{on})$ | Turn-on Delay Time | $V_{GS} = 15V$ $V_{DD} = 0.5 V_{DSS}$ $I_D = I_D [\text{Cont.}] @ 25^\circ\text{C}$ $R_G = 0.6\Omega$ | | 15 | 30 | ns |
| t_r | Rise Time | | | 24 | 48 | |
| $t_d(\text{off})$ | Turn-off Delay Time | | | 46 | 75 | |
| t_f | Fall Time | | | 13 | 26 | |

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|----------|---|-----------|-----|------|---------|
| I_S | Continuous Source Current (Body Diode) | APT6015JN | | 38 | Amps |
| | | APT6018JN | | 35 | |
| I_{SM} | Pulsed Source Current ① (Body Diode) | APT6015JN | | 152 | Amps |
| | | APT6018JN | | 140 | |
| V_{SD} | Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$) | | | 1.8 | Volts |
| t_{rr} | Reverse Recovery Time ($I_S = -I_D [\text{Cont.}], di_S/dt = 100A/\mu s$) | | 660 | 1200 | ns |
| Q_{rr} | Reverse Recovery Charge ($I_S = -I_D [\text{Cont.}], di_S/dt = 100A/\mu s$) | | 12 | 24 | μC |

PACKAGE CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|-----------------|---|------|-----|-----|--------|
| L_D | Internal Drain Inductance (Measured From Drain Terminal to Center of Die.) | | 3 | | nH |
| L_S | Internal Source Inductance (Measured From Source Terminals to Source Bond Pads) | | 5 | | |
| $V_{isolation}$ | RMS Voltage (50-60 Hz Sinusoidal Waveform From Terminals to Mounting Base for 1 Min.) | 2500 | | | Volts |
| $C_{isolation}$ | Drain-to-Mounting Base Capacitance ($f = 1\text{MHz}$) | | 35 | | pF |
| Torque | Maximum Torque for Device Mounting Screws and Electrical Terminations. | | | 13 | in-lbs |

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

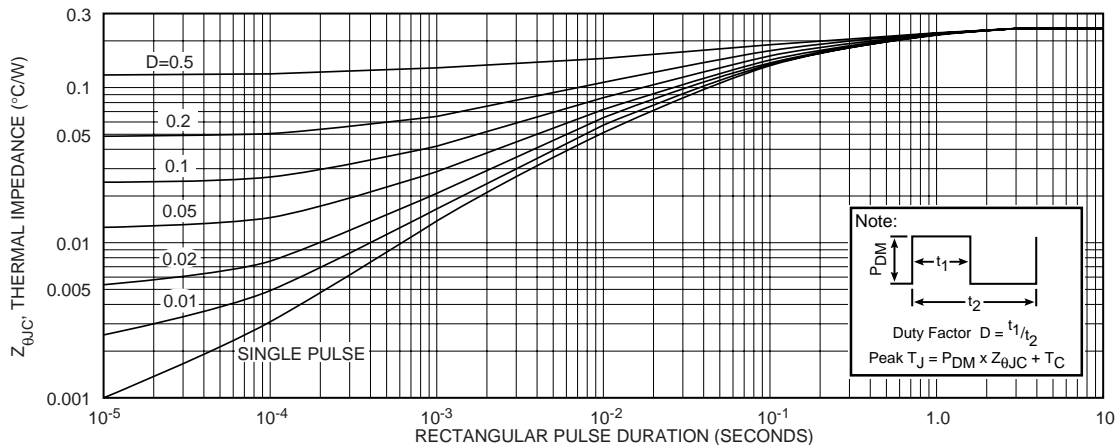


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

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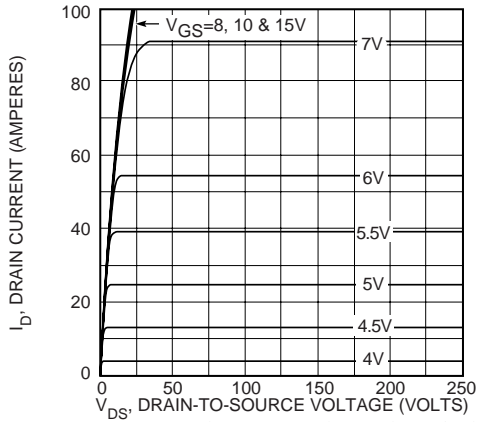


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

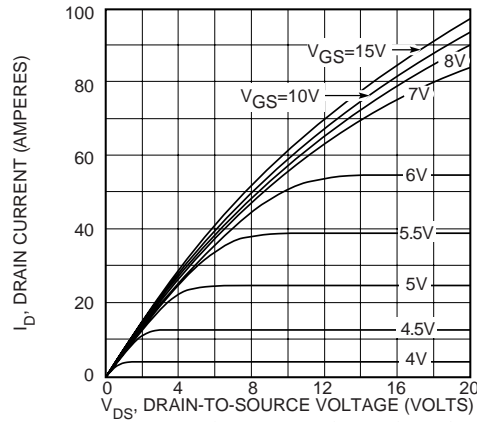


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

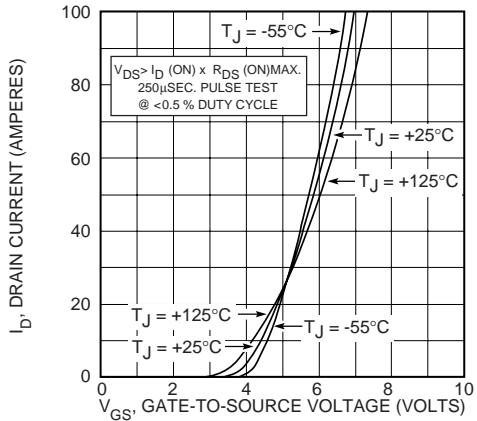


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

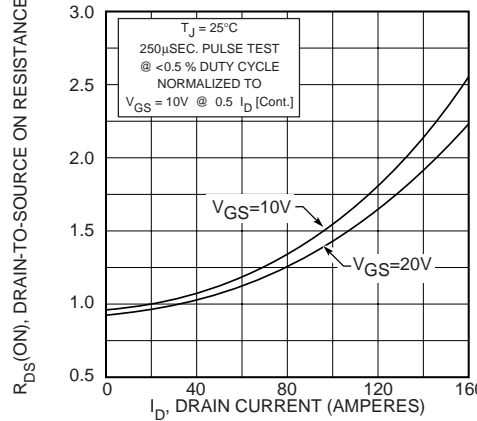


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

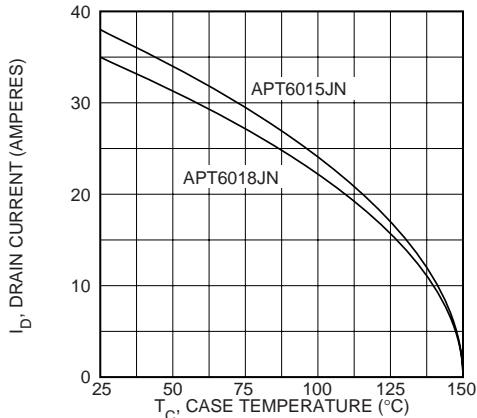


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

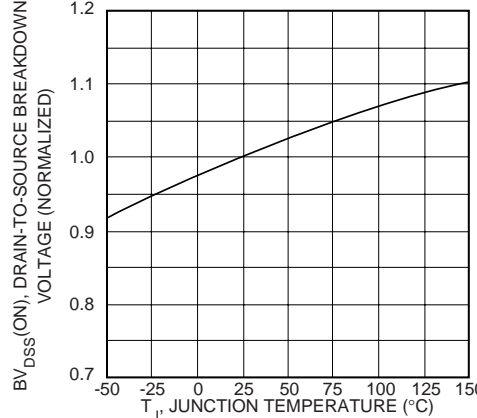


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

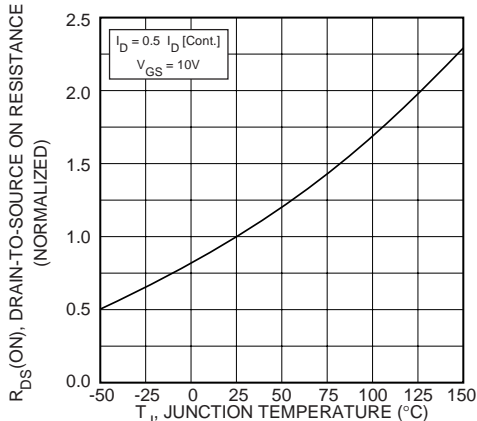


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

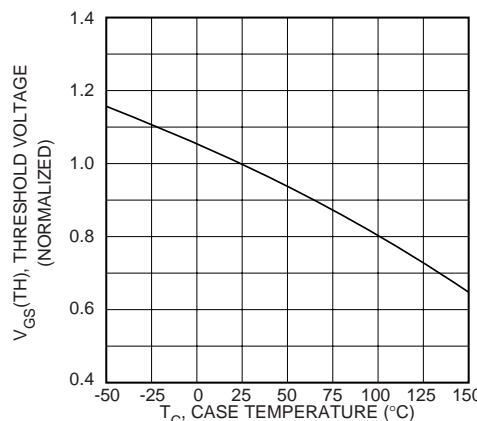


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

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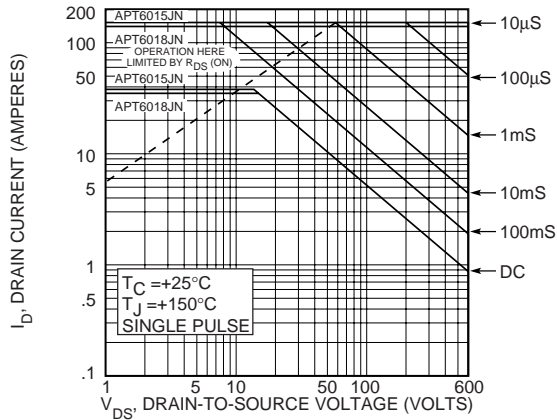


FIGURE 10, MAXIMUM SAFE OPERATING AREA

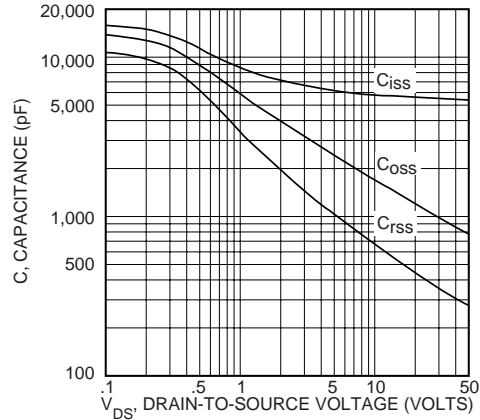


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

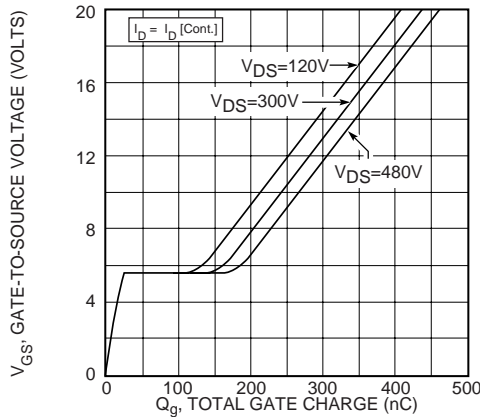


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

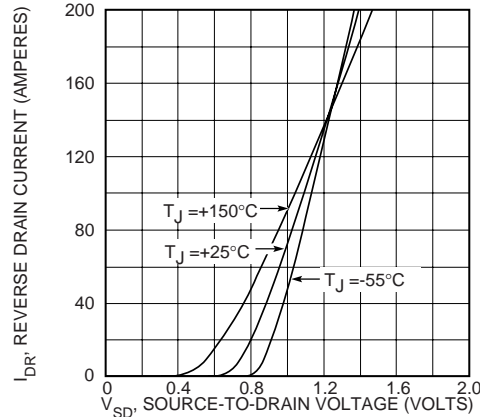
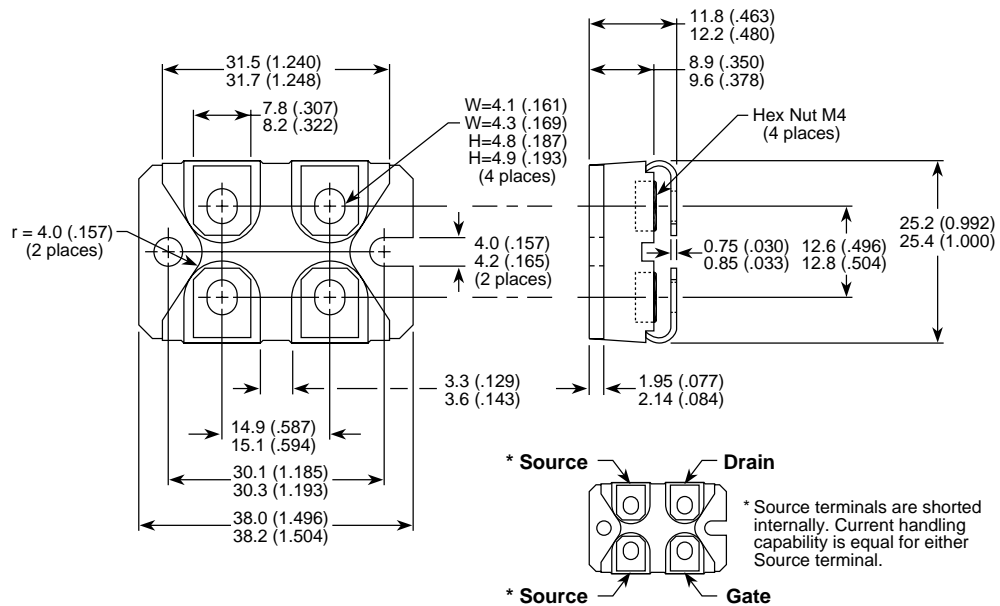


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

APT Reserves the right to change, without notice, the specifications and information contained herein.

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)

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