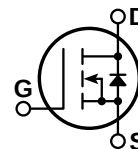


## POWER MOS 7™

Power MOS 7™ is a new generation of low loss, high voltage, N-Channel enhancement mode power MOSFETS. Both conduction and switching losses are addressed with Power MOS 7™ by significantly lowering  $R_{DS(ON)}$  and  $Q_g$ . Power MOS 7™ combines lower conduction and switching losses along with exceptionally fast switching speeds inherent with APT's patented metal gate structure.

- Lower Input Capacitance
- Lower Miller Capacitance
- Lower Gate Charge,  $Q_g$
- Increased Power Dissipation
- Easier To Drive
- Popular SOT-227 Package



### MAXIMUM RATINGS

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

| Symbol         | Parameter                                                      | APT8024JLL | UNIT                |
|----------------|----------------------------------------------------------------|------------|---------------------|
| $V_{DSS}$      | Drain-Source Voltage                                           | 800        | Volts               |
| $I_D$          | Continuous Drain Current @ $T_C = 25^\circ\text{C}$            | 29         | Amps                |
| $I_{DM}$       | Pulsed Drain Current <sup>①</sup>                              | 116        |                     |
| $V_{GS}$       | Gate-Source Voltage Continuous                                 | $\pm 30$   | Volts               |
| $V_{GSM}$      | Gate-Source Voltage Transient                                  | $\pm 40$   |                     |
| $P_D$          | Total Power Dissipation @ $T_C = 25^\circ\text{C}$             | 460        | Watts               |
|                | Linear Derating Factor                                         | 3.68       | 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 <sup>①</sup> (Repetitive and Non-Repetitive) | 29         | Amps                |
| $E_{AR}$       | Repetitive Avalanche Energy <sup>①</sup>                       | 50         | mJ                  |
| $E_{AS}$       | Single Pulse Avalanche Energy <sup>④</sup>                     | 2500       |                     |

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol       | Characteristic / Test Conditions                                                                   | MIN | TYP | MAX       | UNIT          |
|--------------|----------------------------------------------------------------------------------------------------|-----|-----|-----------|---------------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 250\mu\text{A}$ )                             | 800 |     |           | Volts         |
| $I_{D(on)}$  | On State Drain Current <sup>②</sup> ( $V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$ ) | 29  |     |           | Amps          |
| $R_{DS(on)}$ | Drain-Source On-State Resistance <sup>②</sup> ( $V_{GS} = 10V, 0.5 I_{D[Cont.]}$ )                 |     |     | 0.240     | Ohms          |
| $I_{DSS}$    | Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ )                                |     |     | 100       | $\mu\text{A}$ |
|              | Zero Gate Voltage Drain Current ( $V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$ )   |     |     | 500       |               |
| $I_{GSS}$    | Gate-Source Leakage Current ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )                                    |     |     | $\pm 100$ | nA            |
| $V_{GS(th)}$ | Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 2.5\text{mA}$ )                                   | 3   |     | 5         | Volts         |



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

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

# DYNAMIC CHARACTERISTICS

APT8024JLL

| Symbol       | Characteristic                 | Test Conditions                                                                                    | MIN | TYP  | MAX | UNIT |
|--------------|--------------------------------|----------------------------------------------------------------------------------------------------|-----|------|-----|------|
| $C_{iss}$    | Input Capacitance              | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1 \text{ MHz}$                                             |     | 4420 |     | pF   |
| $C_{oss}$    | Output Capacitance             |                                                                                                    |     | 850  |     |      |
| $C_{rss}$    | Reverse Transfer Capacitance   |                                                                                                    |     | 140  |     |      |
| $Q_g$        | Total Gate Charge <sup>③</sup> | $V_{GS} = 10V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_{D[Cont.]} @ 25^\circ C$                      |     | 163  |     | nC   |
| $Q_{gs}$     | Gate-Source Charge             |                                                                                                    |     | 21   |     |      |
| $Q_{gd}$     | Gate-Drain ("Miller") Charge   |                                                                                                    |     | 92   |     |      |
| $t_{d(on)}$  | Turn-on Delay Time             | $V_{GS} = 15V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_{D[Cont.]} @ 25^\circ C$<br>$R_G = 0.6\Omega$ |     | 17   |     | ns   |
| $t_r$        | Rise Time                      |                                                                                                    |     | 16   |     |      |
| $t_{d(off)}$ | Turn-off Delay Time            |                                                                                                    |     | 51   |     |      |
| $t_f$        | Fall Time                      |                                                                                                    |     | 10   |     |      |

# SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol   | Characteristic / Test Conditions                                             | MIN | TYP  | MAX | UNIT    |
|----------|------------------------------------------------------------------------------|-----|------|-----|---------|
| $I_S$    | Continuous Source Current (Body Diode)                                       |     |      | 29  | Amps    |
| $I_{SM}$ | Pulsed Source Current <sup>①</sup> (Body Diode)                              |     |      | 116 |         |
| $V_{SD}$ | Diode Forward Voltage <sup>②</sup> ( $V_{GS} = 0V$ , $I_S = -I_{D[Cont.]}$ ) |     |      | 1.3 | Volts   |
| $t_{rr}$ | Reverse Recovery Time ( $I_S = -I_{D[Cont.]}$ , $di_S/dt = 100A/\mu s$ )     |     | 850  |     | ns      |
| $Q_{rr}$ | Reverse Recovery Charge ( $I_S = -I_{D[Cont.]}$ , $di_S/dt = 100A/\mu s$ )   |     | 22.0 |     | $\mu C$ |
| $dv/dt$  | Peak Diode Recovery $dv/dt$ <sup>⑤</sup>                                     |     |      | 10  | V/ns    |

# THERMAL CHARACTERISTICS

| Symbol          | Characteristic      | MIN | TYP | MAX  | UNIT         |
|-----------------|---------------------|-----|-----|------|--------------|
| $R_{\theta JC}$ | Junction to Case    |     |     | 0.27 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction to Ambient |     |     | 40   |              |

① Repetitive Rating: Pulse width limited by maximum junction temperature.

② Pulse Test: Pulse width < 380  $\mu s$ , Duty Cycle < 2%

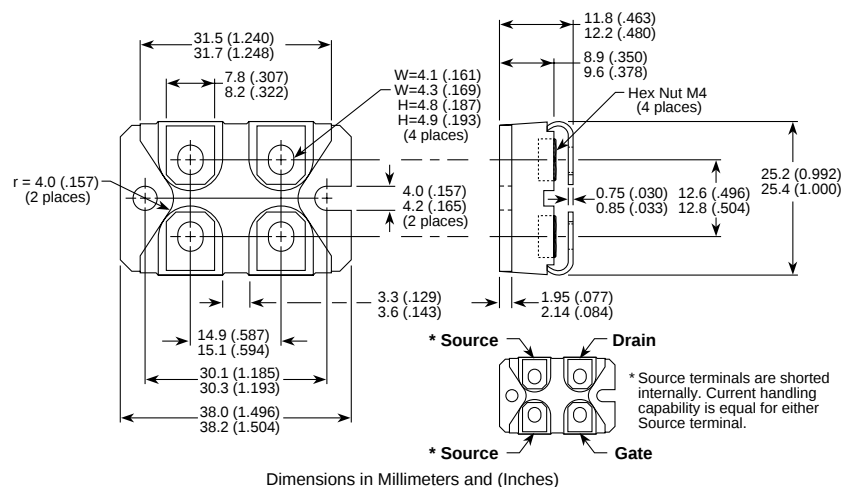
③ See MIL-STD-750 Method 3471

④ Starting  $T_J = +25^\circ C$ ,  $L = 5.95mH$ ,  $R_G = 25\Omega$ , Peak  $I_L = 29A$

⑤  $dv/dt$  numbers reflect the limitations of the test circuit rather than the device itself.  $I_S \leq -I_{D[Cont.]}$ ,  $di/dt \leq 700A/\mu s$ ,  $V_R \leq V_{DSS}$ ,  $T_J \leq 150^\circ C$

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

# SOT-227 (ISOTOP®) Package Outline



APT's devices are covered by one or more of the following U.S.patents: 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336  
5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058