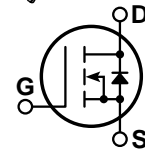
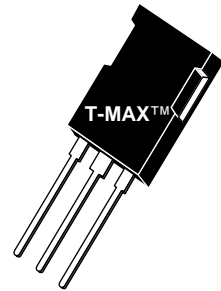


## POWER MOS VI™

Power MOS VI™ is a new generation of low gate charge, high voltage N-Channel enhancement mode power MOSFETs. Lower gate charge is achieved by optimizing the manufacturing process to minimize  $C_{iss}$  and  $C_{rss}$ . Lower gate charge coupled with Power MOS VI™ optimized gate layout, delivers exceptionally fast switching speeds.

- Lower Gate Charge
- Faster Switching
- 100% Avalanche Tested
- Lower Input Capacitance
- Easier To Drive
- Popular TMax Package



### MAXIMUM RATINGS

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

| Symbol         | Parameter  | APT5010B2LC | UNIT  |
|----------------|--|-------------|-------|
| $V_{DSS}$      | Drain-Source Voltage   | 500         | Volts |
| $I_D$          | Continuous Drain Current @ $T_C = 25^\circ\text{C}$            | 47          | Amps  |
| $I_{DM}$       | Pulsed Drain Current <sup>①</sup>                              | 188         |       |
| $V_{GS}$       | Gate-Source Voltage Continuous                                 | $\pm 30$    | Volts |
| $V_{GSM}$      | Gate-Source Voltage Transient                                  | $\pm 40$    |       |
| $P_D$          | Total Power Dissipation @ $T_C = 25^\circ\text{C}$             | 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         |       |
| $I_{AR}$       | Avalanche Current <sup>①</sup> (Repetitive and Non-Repetitive) | 47          | 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 ( $V_{GS} = 0V, I_D = 250\mu A$ )                                   | 500 |     |           | Volts   |
| $I_{D(on)}$  | On State Drain Current <sup>②</sup> ( $V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$ ) | 47  |     |           | Amps    |
| $R_{DS(on)}$ | Drain-Source On-State Resistance <sup>②</sup> ( $V_{GS} = 10V, 0.5 I_{D[Cont.]}$ )                 |     |     | 0.100     | Ohms    |
| $I_{DSS}$    | Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ )                                |     |     | 25        | $\mu A$ |
|              | Zero Gate Voltage Drain Current ( $V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$ )   |     |     | 250       |         |
| $I_{GSS}$    | Gate-Source Leakage Current ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )                                    |     |     | $\pm 100$ | nA      |
| $V_{GS(th)}$ | Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 2.5mA$ )  | 3   |     | 5         | Volts   |

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

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## DYNAMIC CHARACTERISTICS

APT5010B2LC

| Symbol       | Characteristic                 | Test Conditions  | MIN | TYP  | MAX | UNIT |
|--------------|--------------------------------|--|-----|------|-----|------|
| $C_{iss}$    | Input Capacitance              | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1 \text{ MHz}$   |     | 5120 |     | pF   |
| $C_{oss}$    | Output Capacitance             |  |     | 1030 |     |      |
| $C_{rss}$    | Reverse Transfer Capacitance   |  |     | 190  |     |      |
| $Q_g$        | Total Gate Charge <sup>③</sup> | $V_{GS} = 10V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_{D[Cont.]} @ 25^\circ C$                      |     | 145  |     | nC   |
| $Q_{gs}$     | Gate-Source Charge             |  |     | 26   |     |      |
| $Q_{gd}$     | Gate-Drain ("Miller") Charge   |  |     | 73   |     |      |
| $t_{d(on)}$  | Turn-on Delay Time             | $V_{GS} = 15V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_{D[Cont.]} @ 25^\circ C$<br>$R_G = 0.6\Omega$ |     | 11   |     | ns   |
| $t_r$        | Rise Time                      |  |     | 12   |     |      |
| $t_{d(off)}$ | Turn-off Delay Time            |  |     | 30   |     |      |
| $t_f$        | Fall Time                      |  |     | 6    |     |      |

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol   | Characteristic / Test Conditions  | MIN | TYP  | MAX | UNIT    |
|----------|---|-----|------|-----|---------|
| $I_S$    | Continuous Source Current (Body Diode)                                    |     |      | 47  | Amps    |
| $I_{SM}$ | Pulsed Source Current <sup>①</sup> (Body Diode)                           |     |      | 188 |         |
| $V_{SD}$ | Diode Forward Voltage <sup>②</sup> ( $V_{GS} = 0V, I_S = -I_{D[Cont.]}$ ) |     |      | 1.3 | Volts   |
| $t_{rr}$ | Reverse Recovery Time ( $I_S = -I_{D[Cont.]}, di_S/dt = 100A/\mu s$ )     |     | 570  |     | ns      |
| $Q_{rr}$ | Reverse Recovery Charge ( $I_S = -I_{D[Cont.]}, di_S/dt = 100A/\mu s$ )   |     | 11.0 |     | $\mu C$ |

## THERMAL CHARACTERISTICS

| Symbol          | Characteristic      | MIN | TYP | MAX  | UNIT         |
|-----------------|---------------------|-----|-----|------|--------------|
| $R_{\theta JC}$ | Junction to Case    |     |     | 0.24 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction to Ambient |     |     | 40   |              |

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

③ See MIL-STD-750 Method 3471

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

④ Starting  $T_j = +25^\circ C$ ,  $L = 2.26mH$ ,  $R_G = 25\Omega$ , Peak  $I_L = 47A$

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

## T-MAX™ Package Outline

