

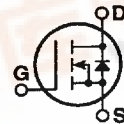
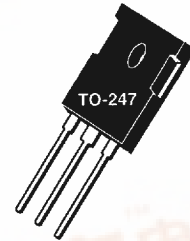


# APT5027BVR

500V 20A 0.270Ω

## POWER MOS V

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.



- Faster Switching
- Lower Leakage
- 100% Avalanche Tested
- Popular TO-247 Package

### MAXIMUM RATINGS

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

| Symbol         | Parameter  | APT5027BVR | UNIT                |
|----------------|--|------------|---------------------|
| $V_{DSS}$      | Drain-Source Voltage   | 500        | Volts               |
| $I_D$          | Continuous Drain Current @ $T_C = 25^\circ\text{C}$            | 20         | Amps                |
| $I_{DM}$       | Pulsed Drain Current <sup>①</sup>                              | 80         |                     |
| $V_{GS}$       | Gate-Source Voltage Continuous                                 | $\pm 30$   | Volts               |
| $V_{GSM}$      | Gate-Source Voltage Transient                                  | $\pm 40$   |                     |
| $P_D$          | Total Power Dissipation @ $T_C = 25^\circ\text{C}$             | 250        | Watts               |
|                | Linear Derating Factor   | 2          | 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) | 20         | Amps                |
| $E_{AR}$       | Repetitive Avalanche Energy <sup>①</sup>                       | 30         | mJ                  |
| $E_{AS}$       | Single Pulse Avalanche Energy <sup>④</sup>                     | 960        |                     |

### STATIC ELECTRICAL CHARACTERISTICS

| Symbol       | Characteristic / Test Conditions   | MIN | TYP | MAX       | UNIT          |
|--------------|--|-----|-----|-----------|---------------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 250\mu\text{A}$ )                               | 500 |     |           | Volts         |
| $I_{D(on)}$  | On State Drain Current <sup>②</sup> ( $V_{DS} > I_{D(on)} \times R_{DS(on)}$ , Max, $V_{GS} = 10V$ ) | 20  |     |           | Amps          |
| $R_{DS(on)}$ | Drain-Source On-State Resistance <sup>②</sup> ( $V_{GS} = 10V, 0.5 I_{D(Cont.)}$ )                   |     |     | 0.27      | Ohms          |
| $I_{DSS}$    | Zero Gate Voltage Drain Current ( $V_{DS} = V_{DSS}, V_{GS} = 0V$ )                                  |     |     | 25        | $\mu\text{A}$ |
|              | 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 ( $V_{DS} = V_{GS}, I_D = 1.0\text{mA}$ )                                     | 2   |     | 4         | Volts         |

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

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## DYNAMIC CHARACTERISTICS

APT5027BVR

| Symbol       | Characteristic               | Test Conditions  | MIN | TYP  | MAX | UNIT |
|--------------|------------------------------|--|-----|------|-----|------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1\text{ MHz}$  |     | 2600 |     | pF   |
| $C_{oss}$    | Output Capacitance           |  |     | 362  |     |      |
| $C_{rss}$    | Reverse Transfer Capacitance |  |     | 145  |     |      |
| $Q_g$        | Total Gate Charge ③          | $V_{GS} = 10V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_{D[Cont.]} @ 25^\circ C$                      |     | 120  |     | nC   |
| $Q_{gs}$     | Gate-Source Charge           |  |     | 13   |     |      |
| $Q_{gd}$     | Gate-Drain ("Miller") Charge |  |     | 48   |     |      |
| $t_{d(on)}$  | Turn-on Delay Time           | $V_{GS} = 15V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_{D[Cont.]} @ 25^\circ C$<br>$R_G = 1.6\Omega$ |     | 14   |     | ns   |
| $t_r$        | Rise Time                    |  |     | 15   |     |      |
| $t_{d(off)}$ | Turn-off Delay Time          |  |     | 40   |     |      |
| $t_f$        | Fall Time                    |  |     | 6    |     |      |

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol   | Characteristic / Test Conditions  | MIN | TYP | MAX | UNIT    |
|----------|---|-----|-----|-----|---------|
| $I_S$    | Continuous Source Current (Body Diode)                                  |     |     | 20  | Amps    |
| $I_{SM}$ | Pulsed Source Current ① (Body Diode)                                    |     |     | 80  |         |
| $V_{SD}$ | Diode Forward Voltage ② ( $V_{GS} = 0V, I_S = -I_{D[Cont.]}$ )          |     |     | 1.3 | Volts   |
| $t_{rr}$ | Reverse Recovery Time ( $I_S = -I_{D[Cont.]}, di_S/dt = 100A/\mu s$ )   |     | 410 |     | ns      |
| $Q_{rr}$ | Reverse Recovery Charge ( $I_S = -I_{D[Cont.]}, di_S/dt = 100A/\mu s$ ) |     | 6.5 |     | $\mu C$ |

## THERMAL CHARACTERISTICS

| Symbol          | Characteristic      | MIN | TYP | MAX  | UNIT         |
|-----------------|---------------------|-----|-----|------|--------------|
| $R_{\theta JC}$ | Junction to Case    |     |     | 0.50 | $^\circ C/W$ |
| $R_{\theta JA}$ | 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  $T_J = +25^\circ C$ ,  $L = 4.8mH$ ,  $R_G = 25\Omega$ , Peak  $I_L = 20A$

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

## TO-247AD Package Outline

