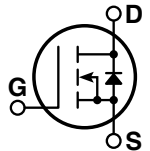
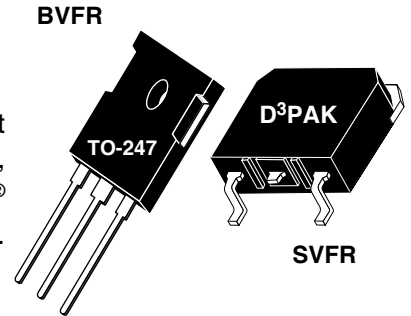


**POWER MOS V® FREDFET**

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**
- **TO-247 or Surface Mount D<sup>3</sup>PAK Package**
- **Avalanche Energy Rated**
- **FAST RECOVERY BODY DIODE**


**MAXIMUM RATINGS**

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

| Symbol         | Parameter  | APT6035BVFR_SVFR | UNIT                |
|----------------|--|------------------|---------------------|
| $V_{DSS}$      | Drain-Source Voltage   | 600              | Volts               |
| $I_D$          | Continuous Drain Current @ $T_C = 25^\circ\text{C}$            | 18               | Amps                |
| $I_{DM}$       | Pulsed Drain Current <sup>①</sup>                              | 72               |                     |
| $V_{GS}$       | Gate-Source Voltage Continuous                                 | $\pm 30$         | Volts               |
| $V_{GSM}$      | Gate-Source Voltage Transient                                  | $\pm 40$         |                     |
| $P_D$          | Total Power Dissipation @ $T_C = 25^\circ\text{C}$             | 280              | Watts               |
|                | Linear Derating Factor   | 2.24             | 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) | 18               | Amps                |
| $E_{AR}$       | Repetitive Avalanche Energy <sup>①</sup>                       | 30               | mJ                  |
| $E_{AS}$       | Single Pulse Avalanche Energy <sup>④</sup>                     | 1210             |                     |

**STATIC ELECTRICAL CHARACTERISTICS**

| Symbol       | Characteristic / Test Conditions  | MIN | TYP | MAX       | UNIT          |
|--------------|---|-----|-----|-----------|---------------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage ( $V_{GS} = 0V, I_D = 250\mu\text{A}$ )                    | 600 |     |           | Volts         |
| $R_{DS(on)}$ | Drain-Source On-State Resistance <sup>②</sup> ( $V_{GS} = 10V, I_D = 9A$ )                |     |     | 0.350     | Ohms          |
| $I_{DSS}$    | Zero Gate Voltage Drain Current ( $V_{DS} = 600V, V_{GS} = 0V$ )                          |     |     | 250       | $\mu\text{A}$ |
|              | Zero Gate Voltage Drain Current ( $V_{DS} = 480V, V_{GS} = 0V, T_C = 125^\circ\text{C}$ ) |     |     | 1000      |               |
| $I_{GSS}$    | Gate-Source Leakage Current ( $V_{GS} = \pm 30V, V_{DS} = 0V$ )                           |     |     | $\pm 100$ | nA            |
| $V_{GS(th)}$ | Gate Threshold Voltage ( $V_{DS} = V_{GS}, I_D = 1\text{mA}$ )                            | 2   |     | 4         | Volts         |

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

### DYNAMIC CHARACTERISTICS

APT6035BVFR\_SVFR

| Symbol       | Characteristic               | Test Conditions  | MIN | TYP  | MAX  | UNIT |
|--------------|------------------------------|--|-----|------|------|------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1\text{ MHz}$                              |     | 3450 | 4140 | pF   |
| $C_{oss}$    | Output Capacitance           |  |     | 403  | 565  |      |
| $C_{rss}$    | Reverse Transfer Capacitance |  |     | 155  | 235  |      |
| $Q_g$        | Total Gate Charge ③          | $V_{GS} = 10V$<br>$V_{DD} = 300V$<br>$I_D = 18A @ 25^\circ C$                      |     | 140  | 210  | nC   |
| $Q_{gs}$     | Gate-Source Charge           |  |     | 19   | 30   |      |
| $Q_{gd}$     | Gate-Drain ("Miller") Charge |  |     | 68   | 100  |      |
| $t_{d(on)}$  | Turn-on Delay Time           | $V_{GS} = 15V$<br>$V_{DD} = 300V$<br>$I_D = 18A @ 25^\circ C$<br>$R_G = 1.6\Omega$ |     | 12   | 24   | ns   |
| $t_r$        | Rise Time                    |  |     | 12   | 24   |      |
| $t_{d(off)}$ | Turn-off Delay Time          |  |     | 40   | 60   |      |
| $t_f$        | Fall Time                    |  |     | 8    | 16   |      |

### SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol    | Characteristic / Test Conditions                                | MIN                 | TYP | MAX | UNIT    |
|-----------|---|---------------------|-----|-----|---------|
| $I_S$     | Continuous Source Current (Body Diode)                          |                     |     | 18  | Amps    |
| $I_{SM}$  | Pulsed Source Current ① (Body Diode)                            |                     |     | 72  |         |
| $V_{SD}$  | Diode Forward Voltage ② ( $V_{GS} = 0V, I_S = -18A$ )           |                     |     | 1.3 | Volts   |
| $dv/dt$   | Peak Diode Recovery $dv/dt$ ⑤                                   |                     |     | 15  | V/ns    |
| $t_{rr}$  | Reverse Recovery Time<br>( $I_S = -18A, di/dt = 100A/\mu s$ )   | $T_j = 25^\circ C$  |     | 250 | ns      |
|           |   | $T_j = 125^\circ C$ |     | 500 |         |
| $Q_{rr}$  | Reverse Recovery Charge<br>( $I_S = -18A, di/dt = 100A/\mu s$ ) | $T_j = 25^\circ C$  |     | 1.8 | $\mu C$ |
|           |   | $T_j = 125^\circ C$ |     | 5.2 |         |
| $I_{FRM}$ | Peak Recovery Current<br>( $I_S = -18A, di/dt = 100A/\mu s$ )   | $T_j = 25^\circ C$  |     | 11  | Amps    |
|           |   | $T_j = 125^\circ C$ |     | 18  |         |

### THERMAL CHARACTERISTICS

| Symbol          | Characteristic      | MIN | TYP | MAX  | UNIT         |
|-----------------|---------------------|-----|-----|------|--------------|
| $R_{\theta JC}$ | Junction to Case    |     |     | 0.45 | $^\circ C/W$ |
| $R_{\theta JA}$ | 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  $T_j = +25^\circ C$ ,  $L = 7.47mH$ ,  $R_G = 25\Omega$ , Peak  $I_L = 18A$

⑤  $dv/dt$  numbers reflect the limitations of the test circuit rather than the device itself.  $I_S \leq -I_D 18A$   $di/dt \leq 700A/\mu s$   $V_R \leq 600V$   $T_j \leq 150^\circ C$

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

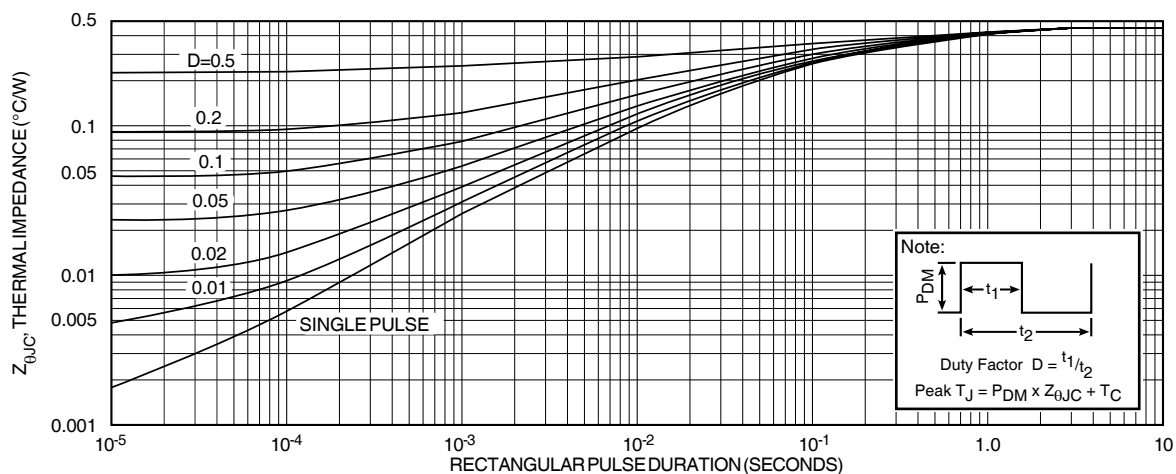


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Typical Performance Curves

APT6035BVFR\_SVFR

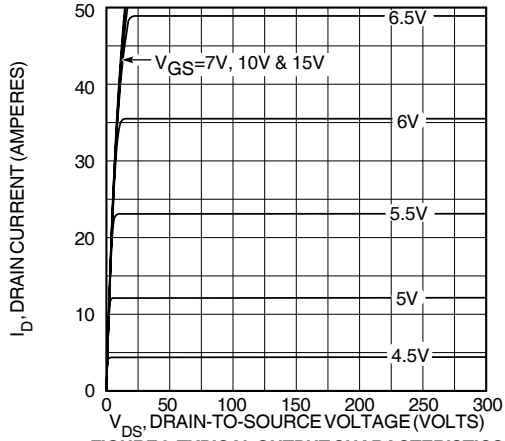


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

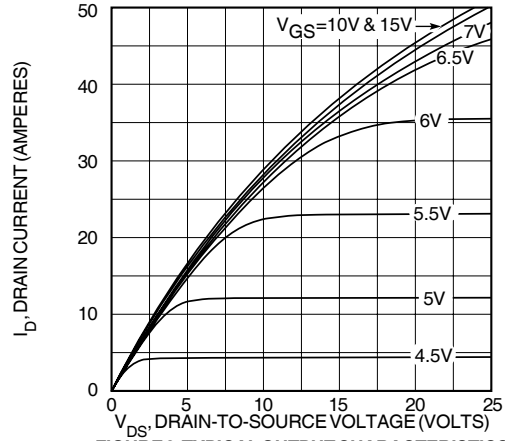


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

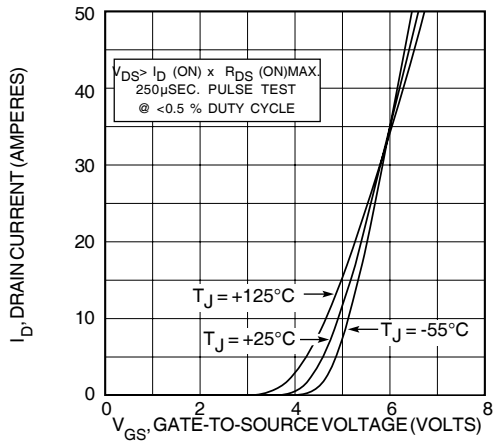


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

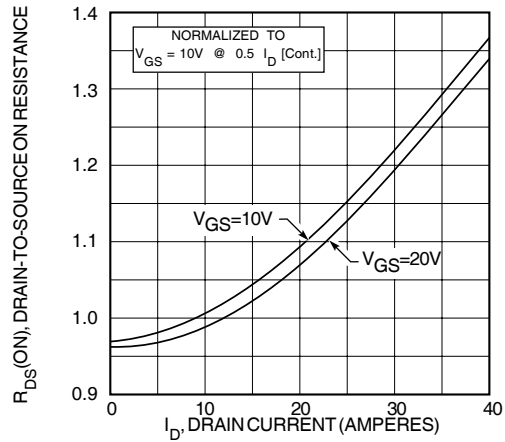


FIGURE 5,  $R_{DS(ON)}$  vs DRAIN CURRENT

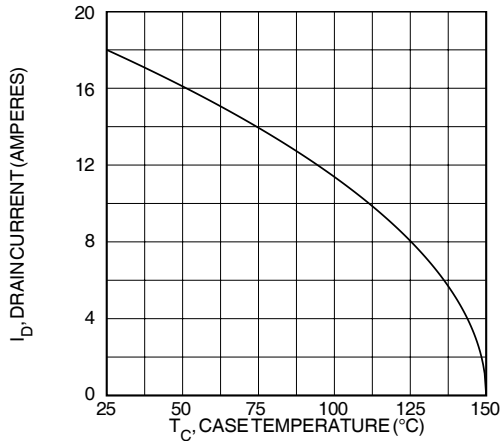


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

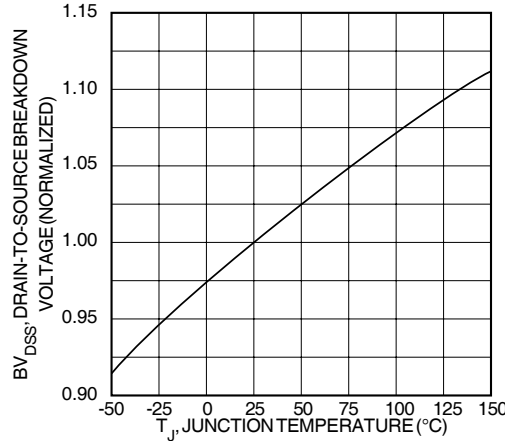


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

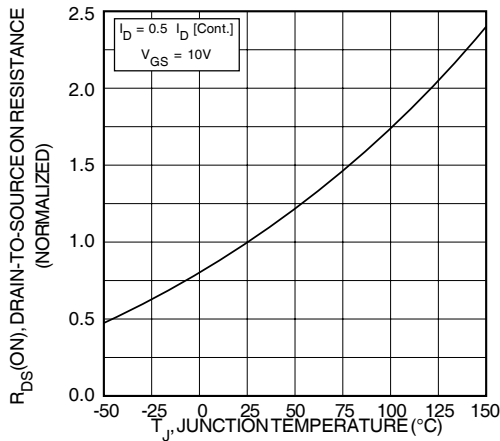


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

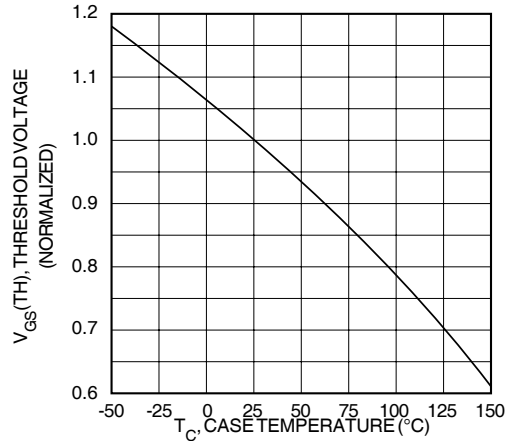


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

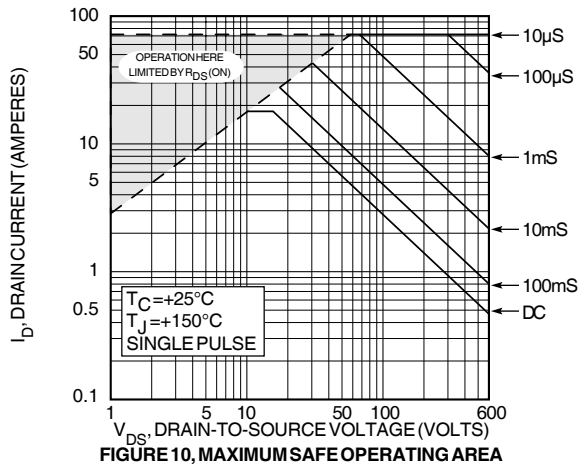


FIGURE 10, MAXIMUM SAFE OPERATING AREA

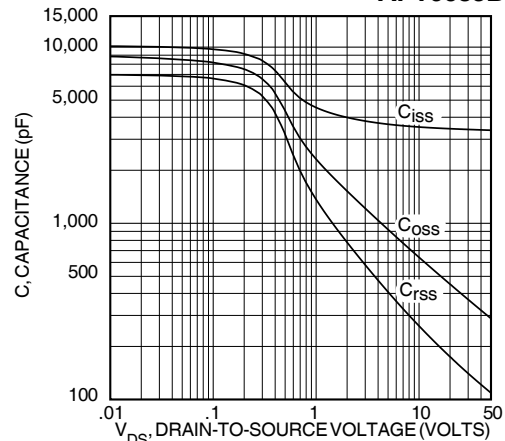


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

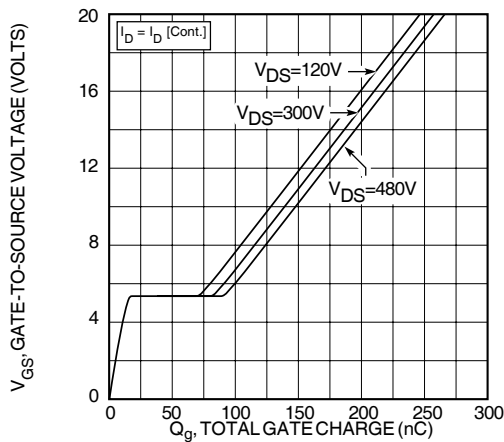


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

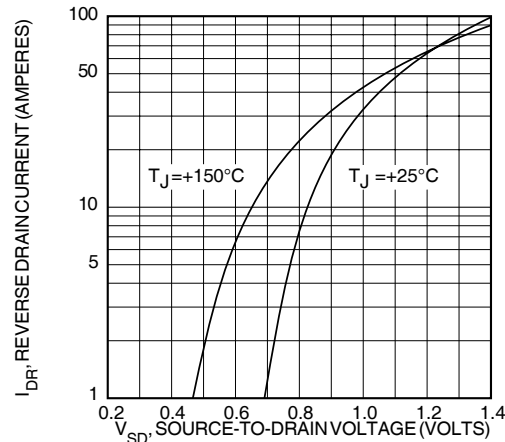
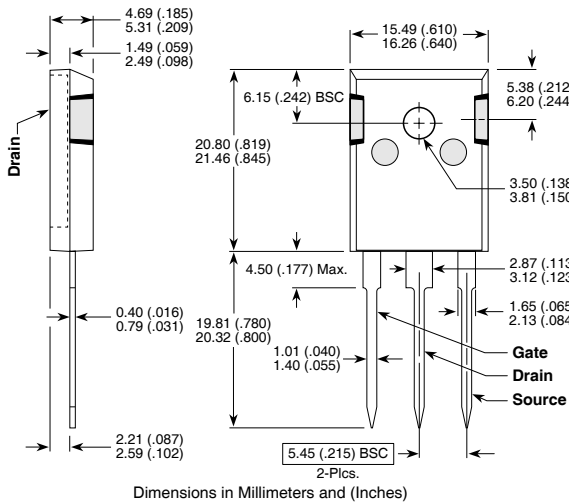


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

TO-247 Package Outline (BVFR)



D<sup>3</sup>PAK Package Outline (SVFR)

