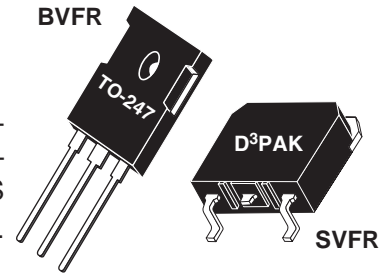
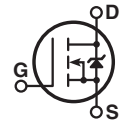


POWER MOS V[®] FREDFET

Power MOS V[®] is a new generation of high voltage N-Channel enhancement mode 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**
- **Avalanche Energy Rated**
- **Lower Leakage**
- **FAST RECOVERY BODY DIODE**
- **TO-247 or Surface Mount D³PAK Package**




MAXIMUM RATINGS

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

| Symbol | Parameter | APT6045B_SVFR(G) | UNIT |
|----------------|--|------------------|-------|
| V_{DSS} | Drain-Source Voltage | 600 | Volts |
| I_D | Continuous Drain Current @ $T_C = 25^\circ\text{C}$ | 15 | Amps |
| I_{DM} | Pulsed Drain Current ^① | 60 | |
| V_{GS} | Gate-Source Voltage Continuous | ±30 | Volts |
| V_{GSM} | Gate-Source Voltage Transient | ±40 | |
| P_D | Total Power Dissipation @ $T_C = 25^\circ\text{C}$ | 250 | Watts |
| | Linear Derating Factor | 2.0 | 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 ^① (Repetitive and Non-Repetitive) | 15 | Amps |
| E_{AR} | Repetitive Avalanche Energy ^① | 30 | mJ |
| E_{AS} | Single Pulse Avalanche Energy ^④ | 960 | |

STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|--------------|---|-----|-----|------|-------|
| BV_{DSS} | Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu\text{A}$) | 600 | | | Volts |
| $R_{DS(on)}$ | Drain-Source On-State Resistance ^② ($V_{GS} = 10V, I_D = 7.5A$) | | | 0.45 | Ohms |
| I_{DSS} | Zero Gate Voltage Drain Current ($V_{DS} = 600V, V_{GS} = 0V$) | | | 250 | μA |
| | Zero Gate Voltage Drain Current ($V_{DS} = 480V, V_{GS} = 0V, T_C = 125^\circ\text{C}$) | | | 1000 | |
| I_{GSS} | Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$) | | | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 1mA$) | 2 | | 4 | Volts |

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

DYNAMIC CHARACTERISTICS

APT6045B_SVFR(G)

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|---------------------|--------------------------------|---|-----|------|------|------|
| C _{iss} | Input Capacitance | V _{GS} = 0V V _{DS} = 25V f = 1 MHz | | 2600 | 3120 | pF |
| C _{oss} | Output Capacitance | | | 305 | 425 | |
| C _{rss} | Reverse Transfer Capacitance | | | 125 | 180 | |
| Q _g | Total Gate Charge ^③ | V _{GS} = 10V V _{DD} = 300V I _D = 15A @ 25°C | | 115 | 170 | nC |
| Q _{gs} | Gate-Source Charge | | | 15 | 25 | |
| Q _{gd} | Gate-Drain ("Miller") Charge | | | 52 | 75 | |
| t _{d(on)} | Turn-on Delay Time | V _{GS} = 15V V _{DD} = 300V I _D = 15A @ 25°C R _G = 1.6Ω | | 10 | 20 | ns |
| t _r | Rise Time | | | 9 | 18 | |
| t _{d(off)} | Turn-off Delay Time | | | 38 | 50 | |
| t _f | Fall Time | | | 6 | 12 | |

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|---------------------|---|------------------------|-----|-----|-------|
| I _S | Continuous Source Current (Body Diode) | | | 15 | Amps |
| I _{SM} | Pulsed Source Current ^① (Body Diode) | | | 60 | Amps |
| V _{SD} | Diode Forward Voltage ^② (V _{GS} = 0V, I _S = -15A) | | | 1.3 | Volts |
| dv _i /dt | Peak Diode Recovery ^⑤ dv _i /dt | | | 15 | V/ns |
| t _{rr} | Reverse Recovery Time (I _S = -15A, di _i /dt = 100A/μs) | T _j = 25°C | | 250 | ns |
| | | T _j = 125°C | | 500 | |
| Q _{rr} | Reverse Recovery Charge (I _S = -15A, di _i /dt = 100A/μs) | T _j = 25°C | | 1.9 | μC |
| | | T _j = 125°C | | 6 | |
| I _{RRM} | Peak Recovery Current (I _S = -15A, di _i /dt = 100A/μs) | T _j = 25°C | | 15 | Amps |
| | | T _j = 125°C | | 26 | |

THERMAL CHARACTERISTICS

| Symbol | Characteristic | MIN | TYP | MAX | UNIT |
|------------------|---------------------|-----|-----|------|------|
| R _{θJC} | Junction to Case | | | 0.50 | °C/W |
| R _{θJA} | Junction to Ambient | | | 40 | |

① Repetitive Rating: Pulse width limited by maximum junction temperature

② Pulse Test: Pulse width < 380 μs, Duty Cycle < 2%

③ See MIL-STD-750 Method 3471

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

④ Starting T_j = +25°C, L = 8.50mH, R_G = 25Ω, Peak I_L = 15A

⑤ dv_i/dt numbers reflect the limitations of the test circuit rather than the device itself. I_S ≤ -I_D 14A di_i/dt ≤ 700A/μs V_R ≤ 600V T_J ≤ 150°C

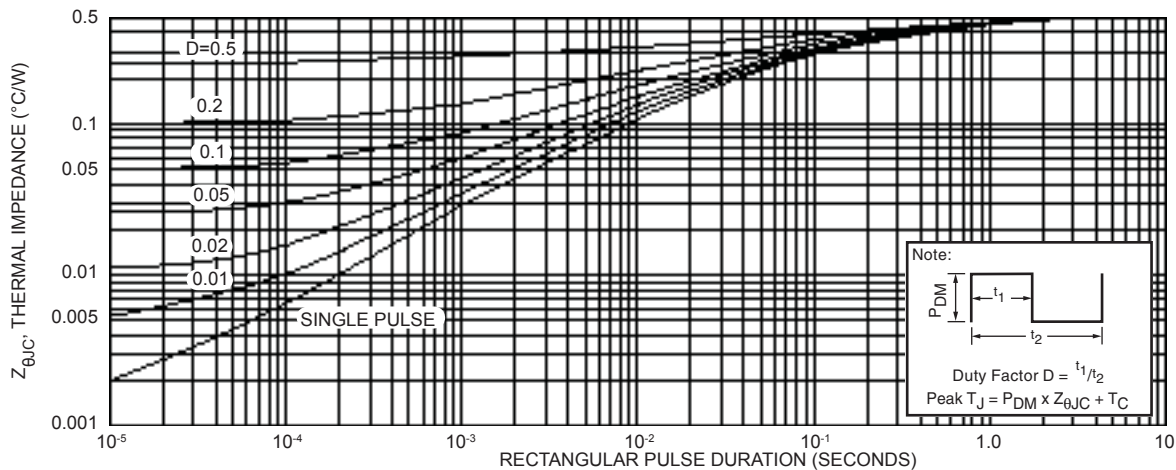


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

Typical Performance Curves

APT6045B_SVFR(G)

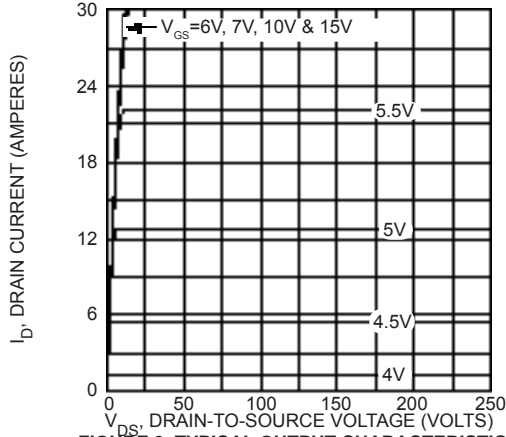


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

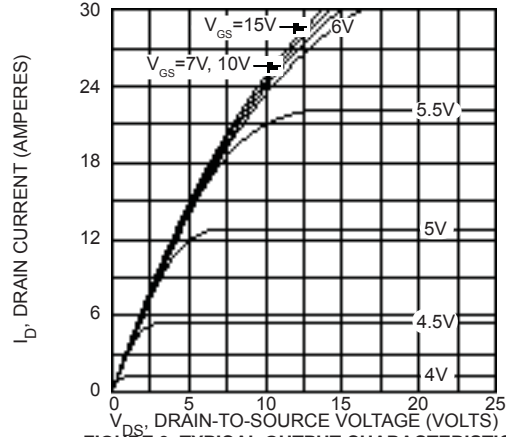


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

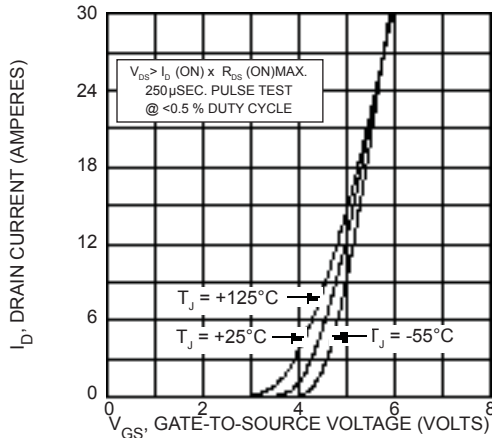


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

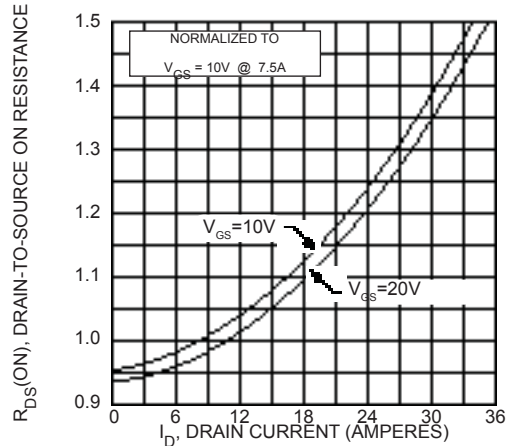


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

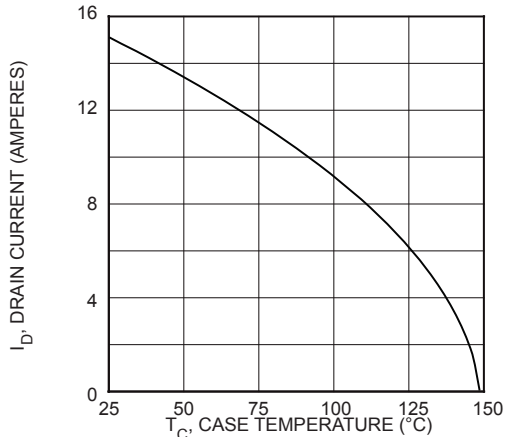


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

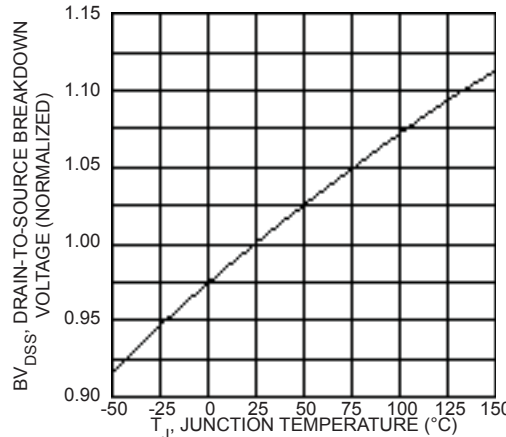


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

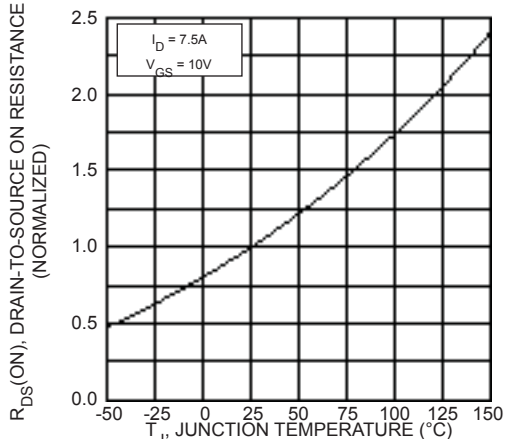


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

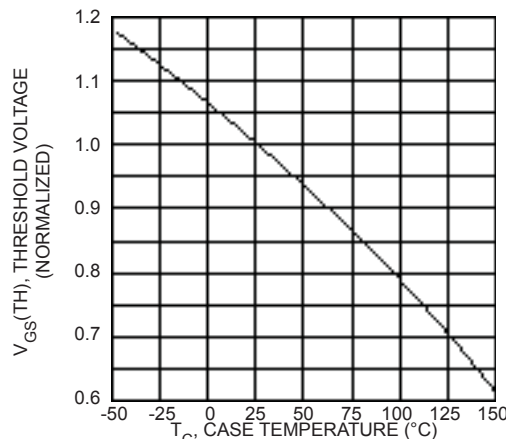


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

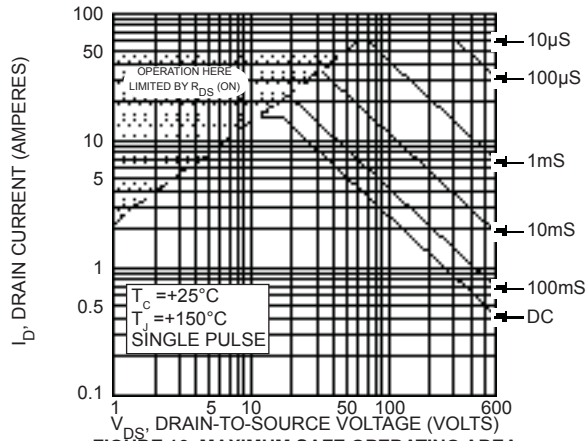


FIGURE 10, MAXIMUM SAFE OPERATING AREA

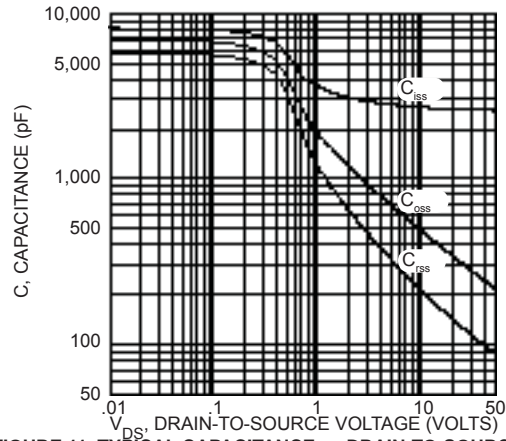


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

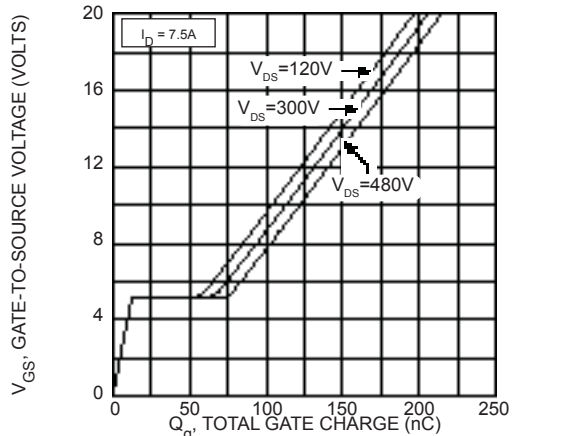


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

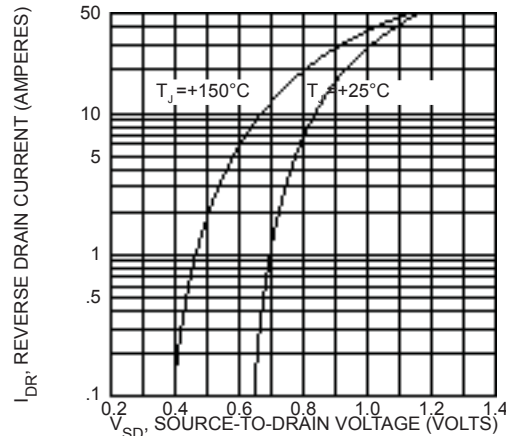
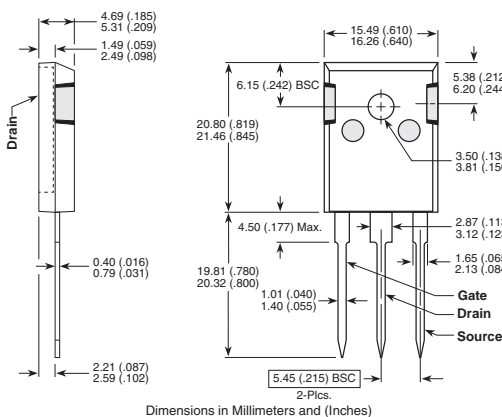


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

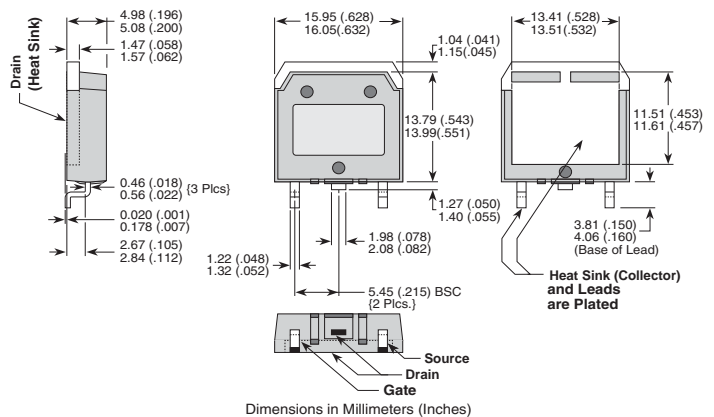
TO-247 (B) Package Outline



Dimensions in Millimeters and (Inches)

D³PAK Package Outline

e3 100% Sn Plated



Dimensions in Millimeters (Inches)