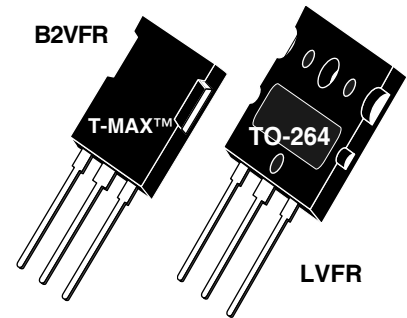
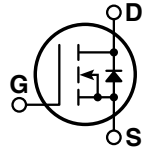


POWER MOS V® FREDFET

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.



- T-MAX™ or TO-264 Package
- Avalanche Energy Rated
- Faster Switching
- **FAST RECOVERY BODY DIODE**
- Lower Leakage


MAXIMUM RATINGS

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

| Symbol | Parameter | APT5014B2VFR_LVFR | UNIT |
|----------------|--|-------------------|-------|
| V_{DSS} | Drain-Source Voltage | 500 | Volts |
| I_D | Continuous Drain Current @ $T_C = 25^\circ\text{C}$ | 37 | Amps |
| I_{DM} | Pulsed Drain Current ^① | 148 | |
| V_{GS} | Gate-Source Voltage Continuous | ± 30 | Volts |
| V_{GSM} | Gate-Source Voltage Transient | ± 40 | |
| P_D | Total Power Dissipation @ $T_C = 25^\circ\text{C}$ | 450 | Watts |
| | Linear Derating Factor | 3.6 | 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) | 37 | Amps |
| E_{AR} | Repetitive Avalanche Energy ^① | 35 | mJ |
| E_{AS} | Single Pulse Avalanche Energy ^④ | 1600 | |

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 ^② ($V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$) | 37 | | | Amps |
| $R_{DS(on)}$ | Drain-Source On-State Resistance ^② ($V_{GS} = 10V, I_D = 18.5A$) | | | 0.14 | Ohms |
| I_{DSS} | Zero Gate Voltage Drain Current ($V_{DS} = 500V, V_{GS} = 0V$) | | | 250 | μA |
| | Zero Gate Voltage Drain Current ($V_{DS} = 400V, V_{GS} = 0V, T_C = 125^\circ\text{C}$) | | | 1000 | |
| I_{GSS} | Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$) | | | ± 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 2.5mA$) | 2 | | 4 | Volts |

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

DYNAMIC CHARACTERISTICS

APT5014B2VFR_LVFR

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|---------------------|--------------------------------|--|-----|------|------|------|
| C _{ISS} | Input Capacitance | V _{GS} = 0V | | 5600 | 6720 | pF |
| C _{OSS} | Output Capacitance | V _{DS} = 25V | | 737 | 1030 | |
| C _{RSS} | Reverse Transfer Capacitance | f = 1 MHz | | 330 | 500 | |
| Q _g | Total Gate Charge ^③ | V _{GS} = 10V | | 234 | 350 | nC |
| Q _{gs} | Gate-Source Charge | V _{DD} = 0.5 V _{DSS} | | 36 | 54 | |
| Q _{gd} | Gate-Drain ("Miller") Charge | I _D = I _D [Cont.] @ 25°C | | 115 | 170 | |
| t _{d(on)} | Turn-on Delay Time | V _{GS} = 15V | | 12 | 24 | ns |
| t _r | Rise Time | V _{DD} = 0.5 V _{DSS} | | 15 | 30 | |
| t _{d(off)} | Turn-off Delay Time | I _D = I _D [Cont.] @ 25°C | | 45 | 70 | |
| t _f | Fall Time | R _G = 1.6Ω | | 7 | 14 | |

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|------------------|---|------------------------|-----|-----|-------|
| I _S | Continuous Source Current (Body Diode) | | | 37 | Amps |
| I _{SM} | Pulsed Source Current ^① (Body Diode) | | | 148 | |
| V _{SD} | Diode Forward Voltage ^② (V _{GS} = 0V, I _S = -I _D [Cont.]) | | | 1.3 | Volts |
| dv/dt | Peak Diode Recovery dv/dt ^⑤ | | | 15 | V/ns |
| t _{rr} | Reverse Recovery Time (I _S = -I _D [Cont.], di/dt = 100A/μs) | T _j = 25°C | | 250 | ns |
| | | T _j = 125°C | | 525 | |
| Q _{rr} | Reverse Recovery Charge (I _S = -I _D [Cont.], di/dt = 100A/μs) | T _j = 25°C | | 1.6 | μC |
| | | T _j = 125°C | | 6.0 | |
| I _{RRM} | Peak Recovery Current (I _S = -I _D [Cont.], di/dt = 100A/μs) | T _j = 25°C | | 14 | Amps |
| | | T _j = 125°C | | 24 | |

THERMAL CHARACTERISTICS

| Symbol | Characteristic | MIN | TYP | MAX | UNIT |
|------------------|---------------------|-----|-----|------|------|
| R _{θJC} | Junction to Case | | | 0.28 | °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
- ④ Starting T_j = +25°C, L = 2.34mH, R_G = 25Ω, Peak I_L = 37A
- ⑤ dv/dt numbers reflect the limitations of the test circuit rather than the device itself. I_S ≤ I_D-37A di/dt ≤ 700A/μs v_R ≤ 500V T_j ≤ 150°C

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

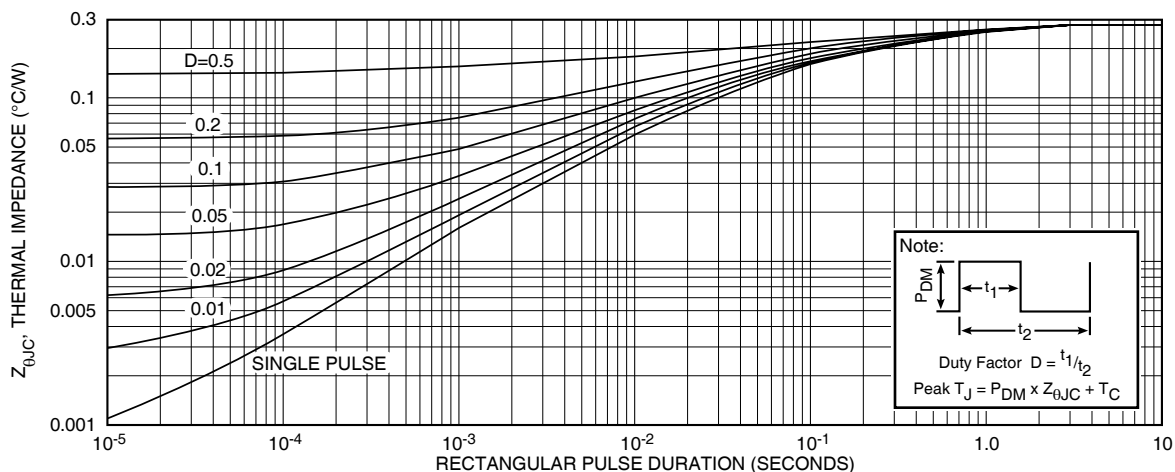


FIGURE 1, MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE vs PULSE DURATION

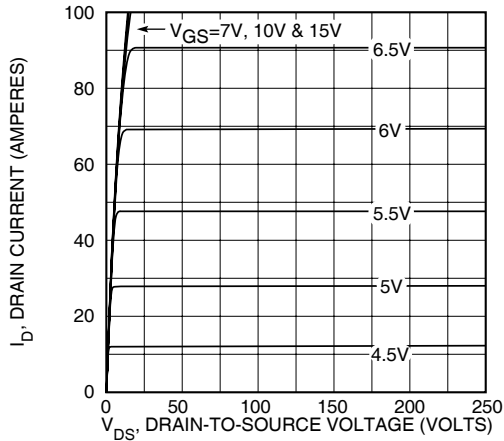


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

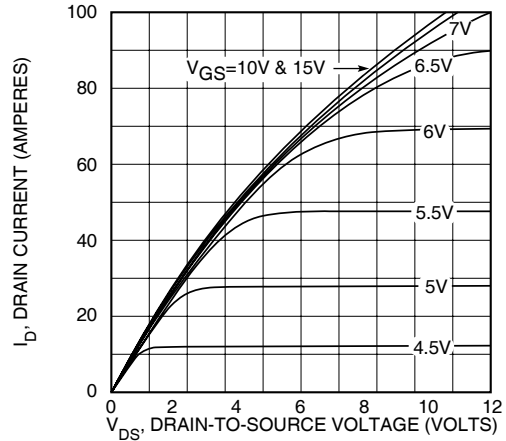


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

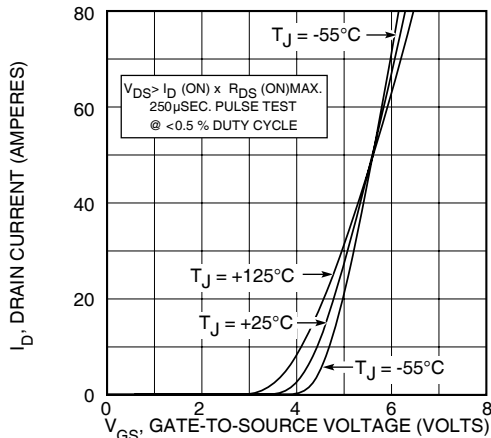


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

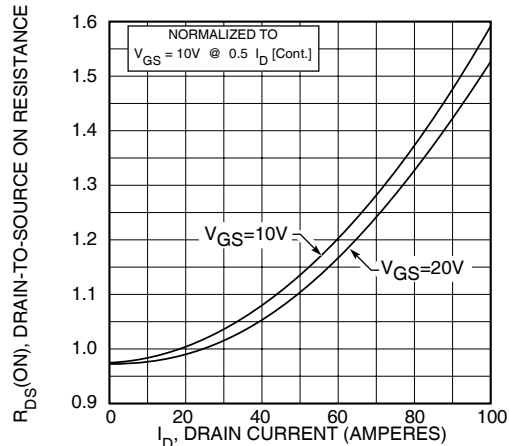


FIGURE 5, $R_{DS}(ON)$ vs DRAIN CURRENT

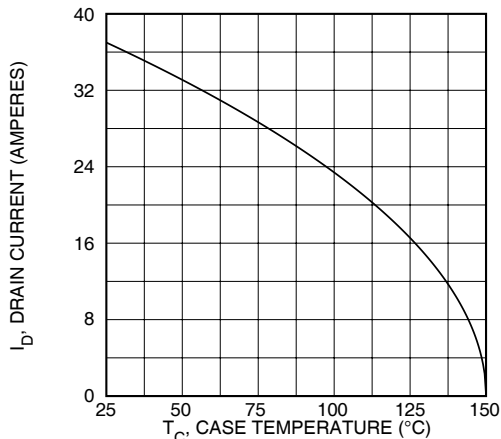


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

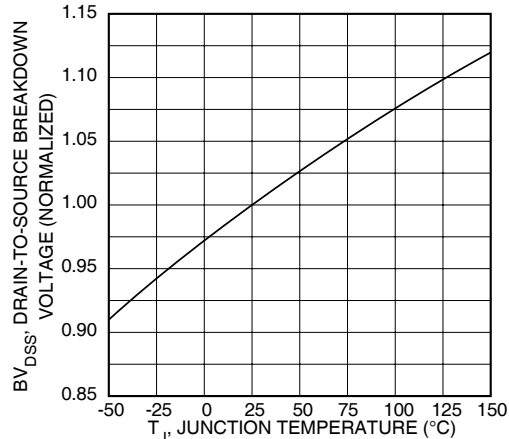


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

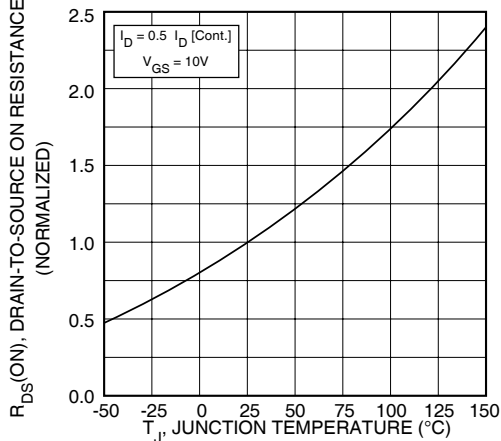


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

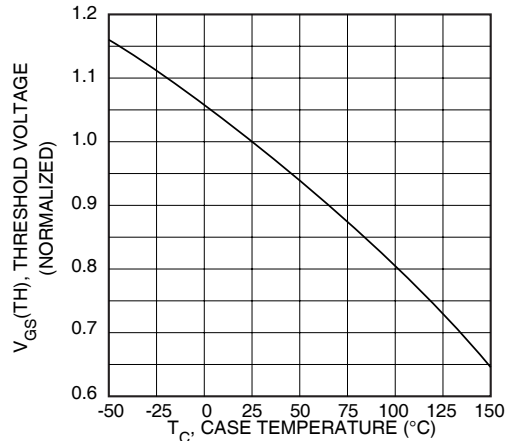


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

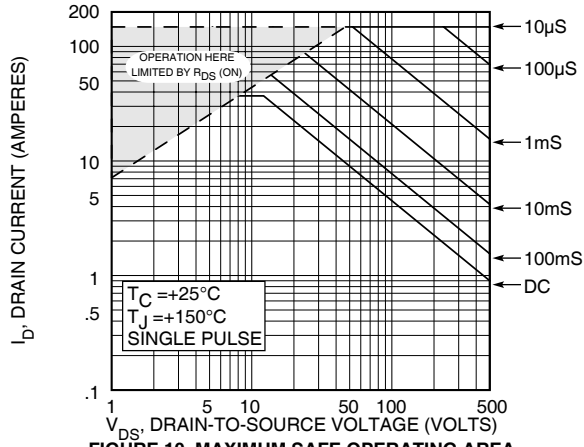


FIGURE 10, MAXIMUM SAFE OPERATING AREA

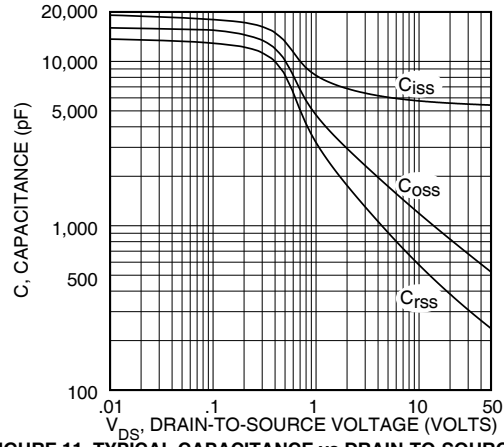


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

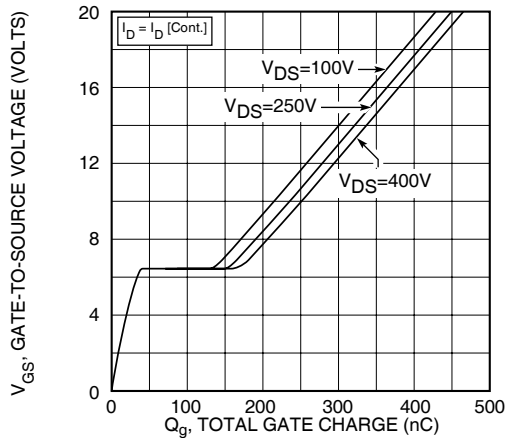


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

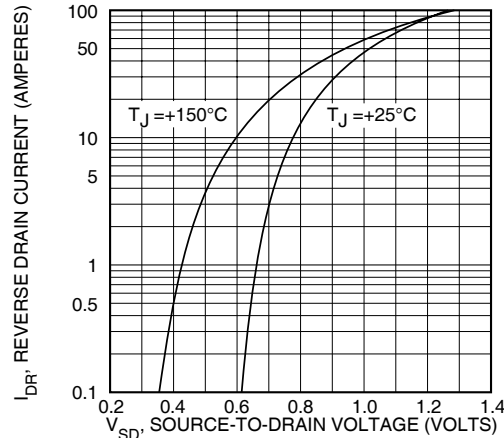
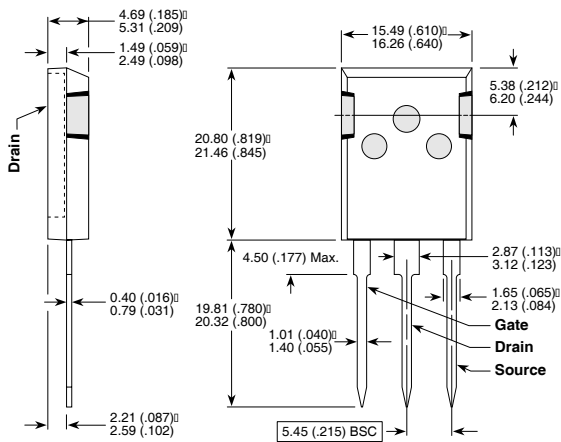


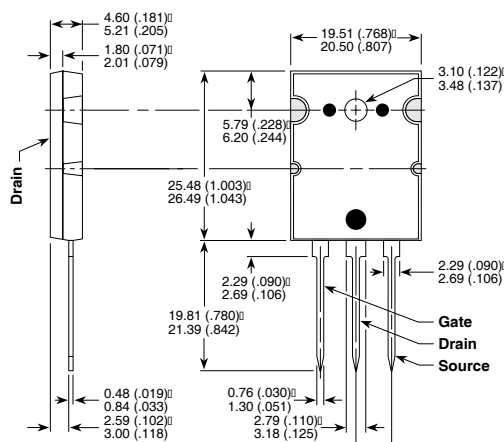
FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

T-MAX™ (B2) Package Outline (B2VFR)



These dimensions are equal to the TO-247 without the mounting hole.
Dimensions in Millimeters and (Inches)

TO-264 (L) Package Outline (LVFR)



Dimensions in Millimeters and (Inches)