

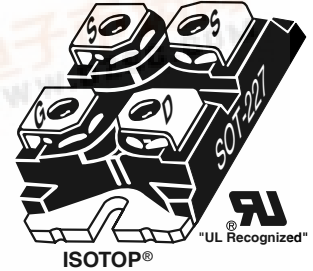


APT12040JVFR

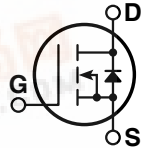
1200V 26A 0.400Ω

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
- Popular SOT-227 Package
- Avalanche Energy Rated
- **FAST RECOVERY BODY DIODE**



MAXIMUM RATINGS

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

| Symbol | Parameter | APT12040JVFR | UNIT |
|----------------|--|--------------|---------------------|
| V_{DSS} | Drain-Source Voltage | 1200 | Volts |
| I_D | Continuous Drain Current @ $T_C = 25^\circ\text{C}$ | 26 | Amps |
| I_{DM} | Pulsed Drain Current ^① | 104 | |
| V_{GS} | Gate-Source Voltage Continuous | ± 30 | Volts |
| V_{GSM} | Gate-Source Voltage Transient | ± 40 | |
| P_D | Total Power Dissipation @ $T_C = 25^\circ\text{C}$ | 700 | Watts |
| | Linear Derating Factor | 5.6 | 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 ^① (Repetitive and Non-Repetitive) | 26 | Amps |
| E_{AR} | Repetitive Avalanche Energy ^① | 50 | mJ |
| E_{AS} | Single Pulse Avalanche Energy ^④ | 3600 | |

STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|--------------|--|------|-----|-----------|---------------|
| BV_{DSS} | Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu\text{A}$) | 1200 | | | Volts |
| $I_{D(on)}$ | On State Drain Current ^② ($V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$) | 26 | | | Amps |
| $R_{DS(on)}$ | Drain-Source On-State Resistance ^② ($V_{GS} = 10V, 0.5 I_{D(Cont.)}$) | | | 0.400 | Ohms |
| I_{DSS} | Zero Gate Voltage Drain Current ($V_{DS} = V_{DSS}, V_{GS} = 0V$) | | | 250 | μA |
| | Zero Gate Voltage Drain Current ($V_{DS} = 0.8 V_{DSS}, V_{GS} = 0V, T_C = 125^\circ\text{C}$) | | | 1000 | |
| I_{GSS} | Gate-Source Leakage Current ($V_{GS} = \pm 30V, V_{DS} = 0V$) | | | ± 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage ($V_{DS} = V_{GS}, I_D = 5mA$) | 2 | | 4 | Volts |

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

DYNAMIC CHARACTERISTICS

APT12040JVFR

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|--------------|------------------------------|--|-----|-------|-------|------|
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1\text{ MHz}$ | | 15000 | 18000 | pF |
| C_{oss} | Output Capacitance | | | 1240 | 1730 | |
| C_{rss} | Reverse Transfer Capacitance | | | 640 | 960 | |
| Q_g | Total Gate Charge ③ | $V_{GS} = 10V$ $V_{DD} = 600V$ $I_D = 26A @ 25^\circ C$ | | 800 | 1200 | nC |
| Q_{gs} | Gate-Source Charge | | | 64 | 96 | |
| Q_{gd} | Gate-Drain ("Miller") Charge | | | 400 | 600 | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{GS} = 15V$ $V_{DD} = 600V$ $I_D = 26A @ 25^\circ C$ $R_G = 0.6\Omega$ | | 20 | 40 | ns |
| t_r | Rise Time | | | 18 | 36 | |
| $t_{d(off)}$ | Turn-off Delay Time | | | 90 | 135 | |
| t_f | Fall Time | | | 20 | 40 | |

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

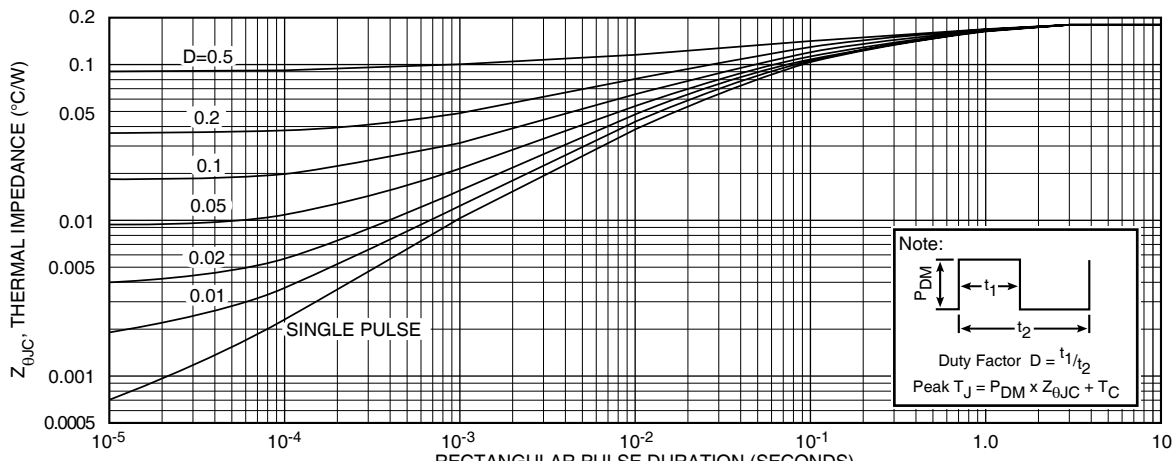
| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|-----------|---|---------------------|-----|-----|---------|
| I_S | Continuous Source Current (Body Diode) | | | 26 | Amps |
| I_{SM} | Pulsed Source Current ① (Body Diode) | | | 104 | |
| V_{SD} | Diode Forward Voltage ② ($V_{GS} = 0V, I_S = -26A$) | | | 1.3 | Volts |
| dv/dt | Peak Diode Recovery dv/dt ⑤ | | | 18 | V/ns |
| t_{rr} | Reverse Recovery Time ($I_S = -26A, di/dt = 100A/\mu s$) | $T_j = 25^\circ C$ | | 300 | ns |
| | | $T_j = 125^\circ C$ | | 600 | |
| Q_{rr} | Reverse Recovery Charge ($I_S = -26A, di/dt = 100A/\mu s$) | $T_j = 25^\circ C$ | | 1.8 | μC |
| | | $T_j = 125^\circ C$ | | 7.4 | |
| I_{FRM} | Peak Recovery Current ($I_S = -26A, di/dt = 100A/\mu s$) | $T_j = 25^\circ C$ | | 15 | Amps |
| | | $T_j = 125^\circ C$ | | 30 | |

THERMAL/PACKAGE CHARACTERISTICS

| Symbol | Characteristic | MIN | TYP | MAX | UNIT |
|-----------------|---|------|-----|------|--------------|
| $R_{\theta JC}$ | Junction to Case | | | 0.18 | $^\circ C/W$ |
| $R_{\theta JA}$ | Junction to Ambient | | | 40 | |
| $V_{Isolation}$ | RMS Voltage (50-60 Hz Sinusoidal Waveform From Terminals to Mounting Base for 1 Min.) | 2500 | | | Volts |
| Torque | Maximum Torque for Device Mounting Screws and Electrical Terminations | | | 10 | lb•in |

- 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 $T_j = +25^\circ C$, $L = 10.65mH$, $R_G = 25\Omega$, Peak $I_L = 26A$
- ⑤ $I_S \leq I_D 26A$, $di/dt = 100A/\mu s$, $T_j \leq 150^\circ C$, $R_G = 2.0\Omega$, $V_R = 1200V$.

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



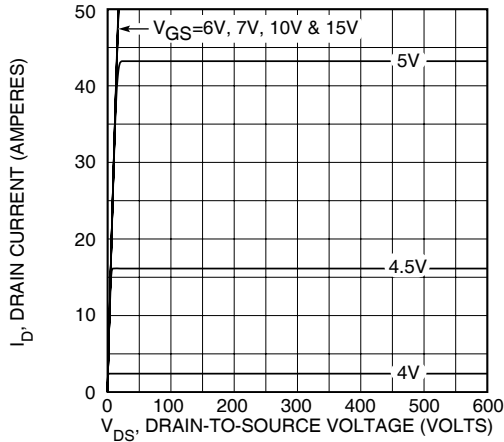


FIGURE 2, TYPICAL OUTPUT CHARACTERISTICS

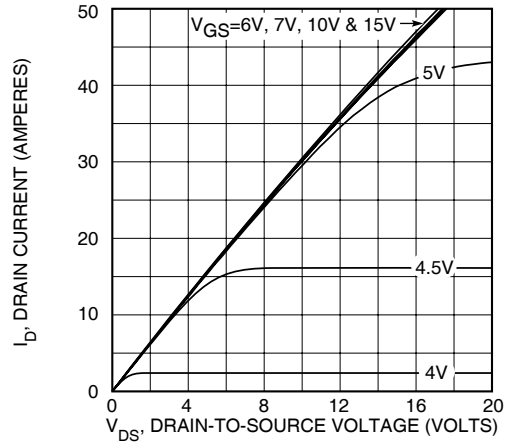


FIGURE 3, TYPICAL OUTPUT CHARACTERISTICS

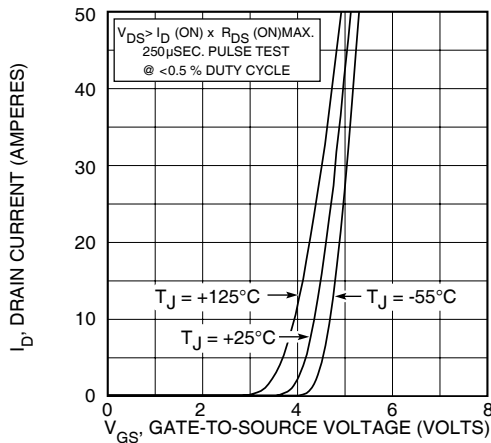


FIGURE 4, TYPICAL TRANSFER CHARACTERISTICS

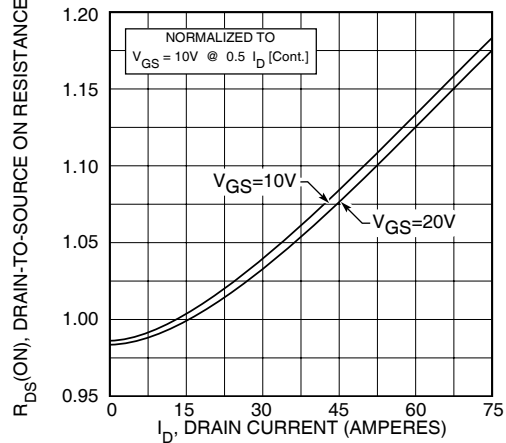


FIGURE 5, $R_{DS(ON)}$ vs DRAIN CURRENT

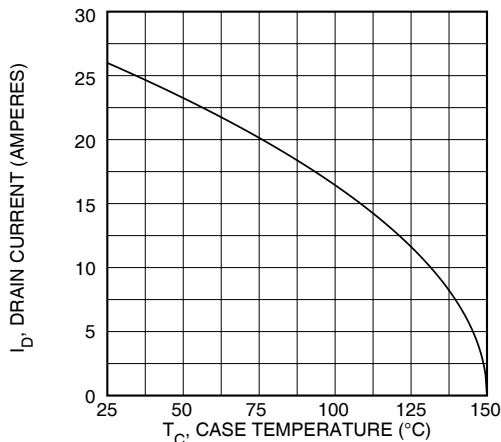


FIGURE 6, MAXIMUM DRAIN CURRENT vs CASE TEMPERATURE

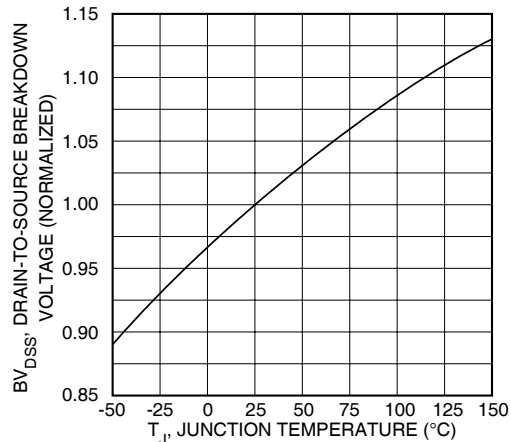


FIGURE 7, BREAKDOWN VOLTAGE vs TEMPERATURE

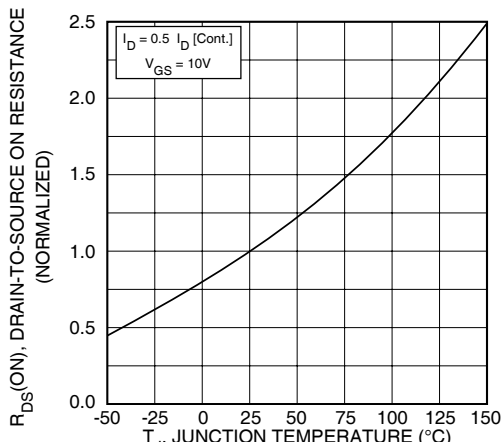


FIGURE 8, ON-RESISTANCE vs. TEMPERATURE

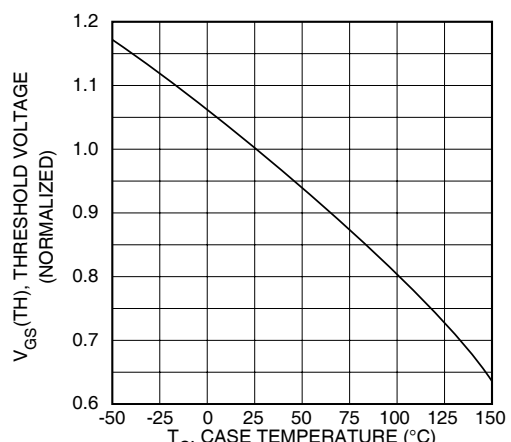


FIGURE 9, THRESHOLD VOLTAGE vs TEMPERATURE

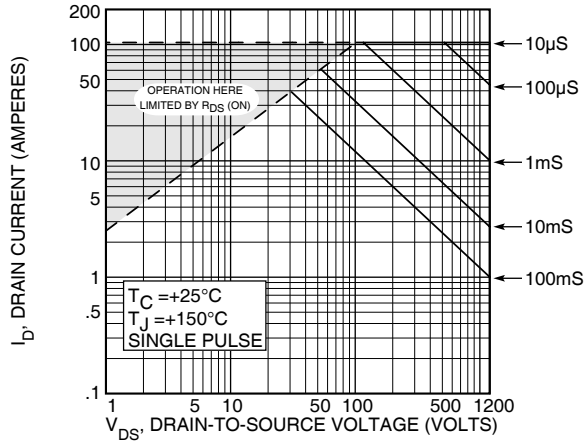


FIGURE 10, MAXIMUM SAFE OPERATING AREA

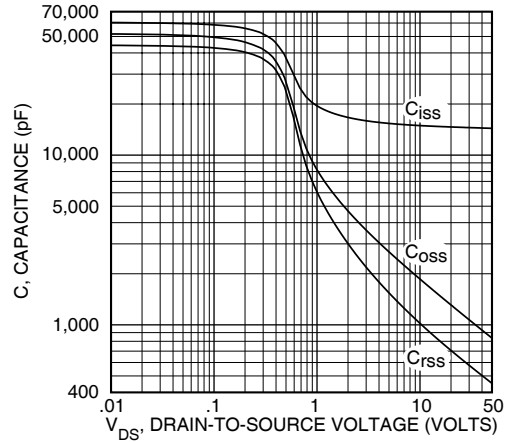


FIGURE 11, TYPICAL CAPACITANCE vs DRAIN-TO-SOURCE VOLTAGE

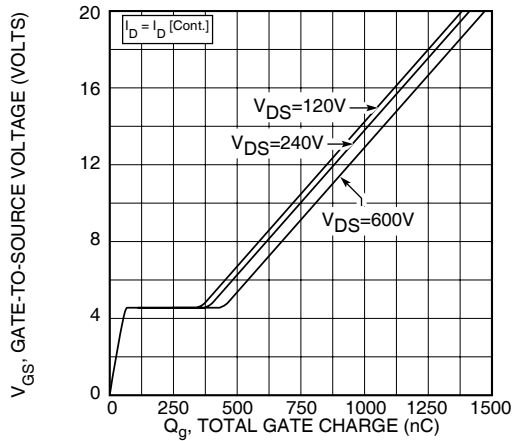


FIGURE 12, GATE CHARGES vs GATE-TO-SOURCE VOLTAGE

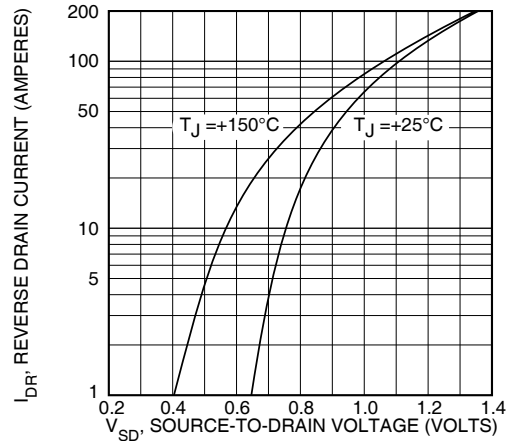
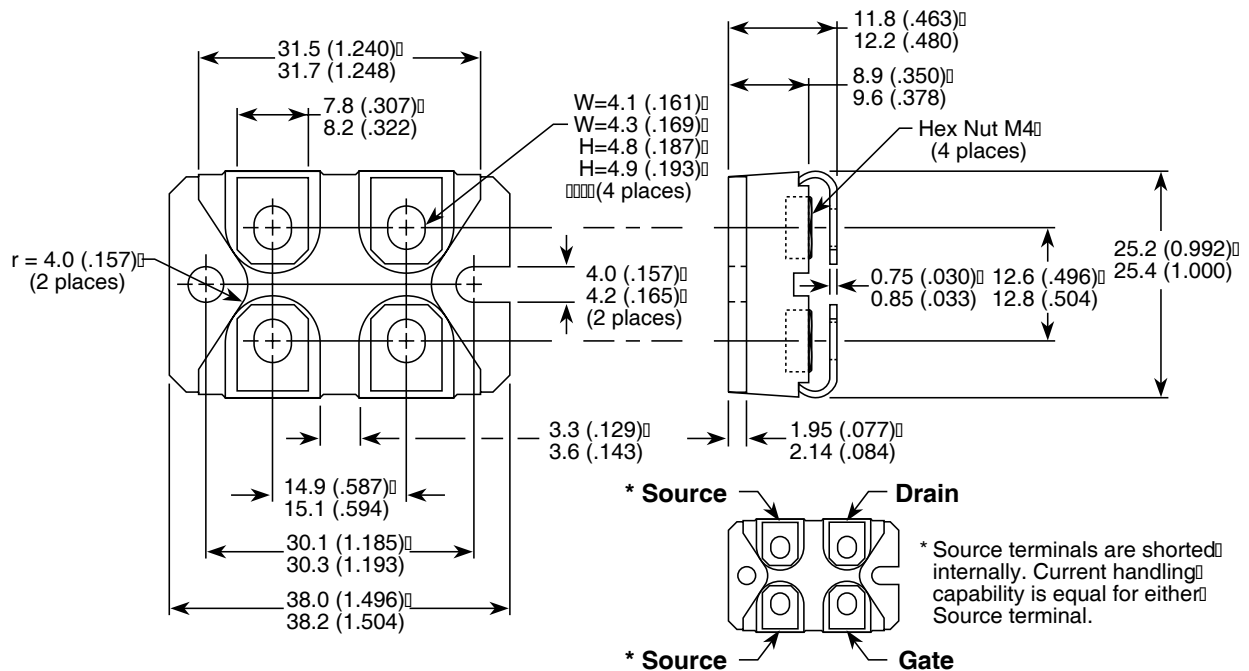


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)