



APT10045JFLL

1000V 21A 0.450Ω

POWER MOS 7™

FREDFET

Power MOS 7™ is a new generation of low loss, high voltage, N-Channel enhancement mode power MOSFETS. Both conduction and switching losses are addressed with Power MOS 7™ by significantly lowering $R_{DS(ON)}$ and Q_g . Power MOS 7™ combines lower conduction and switching losses along with exceptionally fast switching speeds inherent with APT's patented metal gate structure.



- Lower Input Capacitance
- Lower Miller Capacitance
- Lower Gate Charge, Q_g
- Increased Power Dissipation
- Easier To Drive
- Popular SOT-227 Package
- **FAST RECOVERY BODY DIODE**

MAXIMUM RATINGS

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

| Symbol | Parameter | APT10045JFLL | UNIT |
|----------------|--|--------------|-------|
| V_{DSS} | Drain-Source Voltage | 1000 | Volts |
| I_D | Continuous Drain Current @ $T_C = 25^\circ\text{C}$ | 21 | Amps |
| I_{DM} | Pulsed Drain Current ^① | 84 | |
| V_{GS} | Gate-Source Voltage Continuous | ±30 | Volts |
| V_{GSM} | Gate-Source Voltage Transient | ±40 | |
| P_D | Total Power Dissipation @ $T_C = 25^\circ\text{C}$ | 460 | Watts |
| | Linear Derating Factor | 3.68 | 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) | 21 | Amps |
| E_{AR} | Repetitive Avalanche Energy ^① | 50 | mJ |
| E_{AS} | Single Pulse Avalanche Energy ^④ | 2500 | |

STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|--------------|--|------|-----|-------|-------|
| BV_{DSS} | Drain-Source Breakdown Voltage ($V_{GS} = 0V, I_D = 250\mu A$) | 1000 | | | Volts |
| $I_{D(on)}$ | On State Drain Current ^② ($V_{DS} > I_{D(on)} \times R_{DS(on)}$ Max, $V_{GS} = 10V$) | 21 | | | Amps |
| $R_{DS(on)}$ | Drain-Source On-State Resistance ^② ($V_{GS} = 10V, 0.5 I_{D(Cont.)}$) | | | 0.450 | 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 ($V_{DS} = V_{GS}, I_D = 2.5mA$) | 3 | | 5 | Volts |

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

APT Website - <http://www.advancedpower.com>

DYNAMIC CHARACTERISTICS

APT10045JFLL

| Symbol | Characteristic | Test Conditions | MIN | TYP | MAX | UNIT |
|---------------------|--------------------------------|--|-----|------|-----|------|
| C _{iss} | Input Capacitance | V _{GS} = 0V | | 4410 | | pF |
| C _{oss} | Output Capacitance | V _{DS} = 25V | | 730 | | |
| C _{rss} | Reverse Transfer Capacitance | f = 1 MHz | | 145 | | |
| Q _g | Total Gate Charge ^③ | V _{GS} = 10V | | 169 | | nC |
| Q _{gs} | Gate-Source Charge | V _{DD} = 0.5 V _{DSS} | | 26 | | |
| Q _{gd} | Gate-Drain ("Miller") Charge | I _D = I _D [Cont.] @ 25°C | | 112 | | |
| t _{d(on)} | Turn-on Delay Time | V _{GS} = 15V | | 13 | | ns |
| t _r | Rise Time | V _{DD} = 0.5 V _{DSS} | | 6 | | |
| t _{d(off)} | Turn-off Delay Time | I _D = I _D [Cont.] @ 25°C | | 28 | | |
| t _f | Fall Time | R _G = 0.6Ω | | 5 | | |

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol | Characteristic / Test Conditions | MIN | TYP | MAX | UNIT |
|------------------|---|------------------------|-----|-----|-------|
| I _S | Continuous Source Current (Body Diode) | | | 21 | Amps |
| I _{SM} | Pulsed Source Current ^① (Body Diode) | | | 84 | |
| 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 | | | 18 | V/ns |
| t _{rr} | Reverse Recovery Time (I _S = -I _D [Cont.], di/dt = 100A/μs) | T _j = 25°C | | 300 | ns |
| | | T _j = 125°C | | 600 | |
| Q _{rr} | Reverse Recovery Charge (I _S = -I _D [Cont.], di/dt = 100A/μs) | T _j = 25°C | | 1.7 | μC |
| | | T _j = 125°C | | 4.8 | |
| I _{RRM} | Peak Recovery Current (I _S = -I _D [Cont.], di/dt = 100A/μs) | T _j = 25°C | | 12 | Amps |
| | | T _j = 125°C | | 19 | |

THERMAL CHARACTERISTICS

| Symbol | Characteristic | MIN | TYP | MAX | UNIT |
|------------------|---------------------|-----|-----|------|------|
| R _{θJC} | Junction to Case | | | 0.27 | °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%

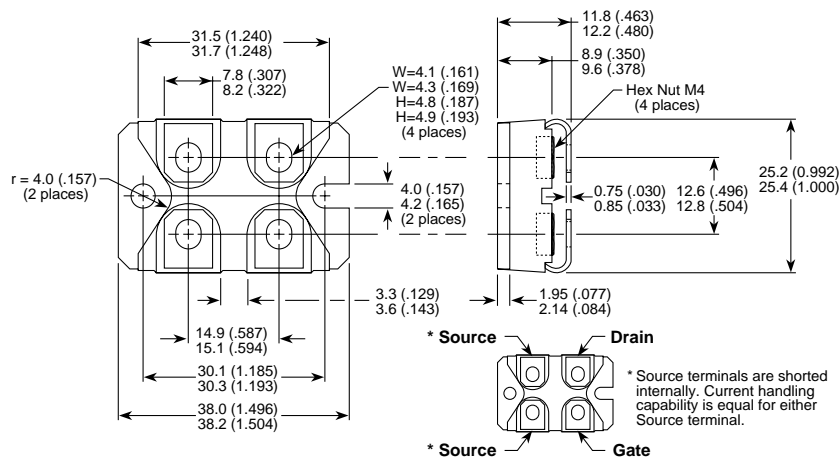
③ See MIL-STD-750 Method 3471

④ Starting T_j = +25°C, L = 11.34mH, R_G = 25Ω, Peak I_L = 21A

⑤ dv/dt numbers reflect the limitations of the test circuit rather than the device itself. I_S ≤ -I_D[Cont.] di/dt ≤ 700A/μs V_R ≤ V_{DSS} T_J ≤ 150°C

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

SOT-227 (ISOTOP®) Package Outline



Dimensions in Millimeters and (Inches)