

Features

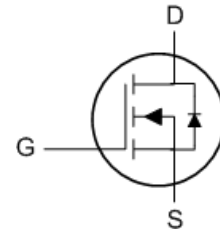
- ★ Advanced Trench MOS Technology
- ★ 100% EAS Guaranteed
- ★ Fast Switching Speed
- ★ Green Device Available

Applications

- ★ High Frequency Switching and Synchronous Rectification.
- ★ DC/DC Converter.

Product Summary


| BVDSS | RDSON | ID |
|-------|--------|-----|
| 100V | 11.5mΩ | 50A |

TO220F Pin Configuration

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|-------------------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage | 100 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_C=25^\circ C$ | Continuous Drain Current ¹ | 50 | A |
| $I_D @ T_C=100^\circ C$ | Continuous Drain Current ¹ | 32 | A |
| I_{DM} | Pulsed Drain Current ² | 200 | A |
| EAS | Single Pulse Avalanche Energy ³ | 33 | mJ |
| I_{AS} | Avalanche Current | 15 | A |
| $P_D @ T_C=25^\circ C$ | Total Power Dissipation ⁴ | 52 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | --- | 60 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 2.4 | $^\circ C/W$ |

**Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)**

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|--------------|--|--|------|------|-----------|------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 100 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance ² | $V_{GS}=10V, I_D=20A$ | --- | 8.5 | 11.5 | m Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\mu A$ | 2 | --- | 4 | V |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=80V, V_{GS}=0V, T_J=25^\circ\text{C}$ | --- | --- | 1 | μA |
| | | $V_{DS}=80V, V_{GS}=0V, T_J=55^\circ\text{C}$ | --- | --- | 5 | |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | --- | --- | ± 100 | nA |
| Q_g | Total Gate Charge (10V) | $V_{DS}=50V, V_{GS}=10V, I_D=20A$ | --- | 26 | --- | nC |
| Q_g | Total Gate Charge (4.5V) | | --- | 12 | --- | |
| Q_{gs} | Gate-Source Charge | | --- | 5.5 | --- | |
| Q_{gd} | Gate-Drain Charge | | --- | 5 | --- | |
| $T_d(on)$ | Turn-On Delay Time | $V_{DD}=50V, V_{GS}=10V, R_G=3.3\Omega, I_D=20A$ | --- | 7.6 | --- | ns |
| T_r | Rise Time | | --- | 3.8 | --- | |
| $T_d(off)$ | Turn-Off Delay Time | | --- | 26 | --- | |
| T_f | Fall Time | | --- | 5.8 | --- | |
| C_{iss} | Input Capacitance | $V_{DS}=50V, V_{GS}=0V, f=1\text{MHz}$ | --- | 2422 | --- | μF |
| C_{oss} | Output Capacitance | | --- | 288 | --- | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 12 | --- | |

Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------|--|---|------|------|------|------|
| I_S | Continuous Source Current ^{1,5} | $V_G=V_D=0V$, Force Current | --- | --- | 35 | A |
| V_{SD} | Diode Forward Voltage ² | $V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$ | --- | --- | 1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_F=20A, di/dt=100A/\mu s,$ | --- | 40 | --- | nS |
| Q_{rr} | Reverse Recovery Charge | $T_J=25^\circ\text{C}$ | --- | 162 | --- | nC |

Note :

- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating. The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.3mH, I_{AS}=15A$
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Typical Characteristics

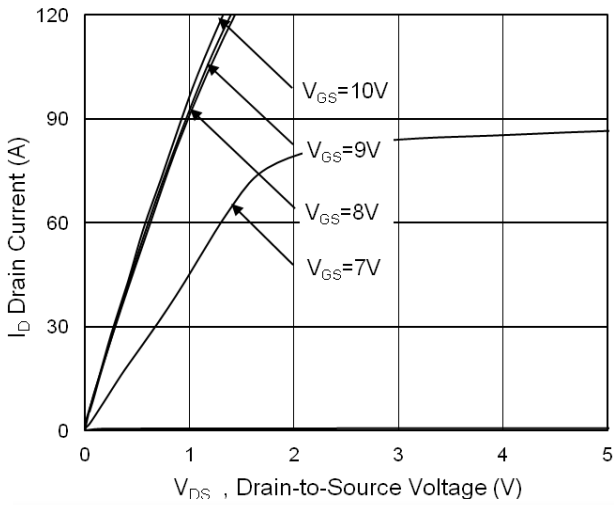


Fig.1 Typical Output Characteristics

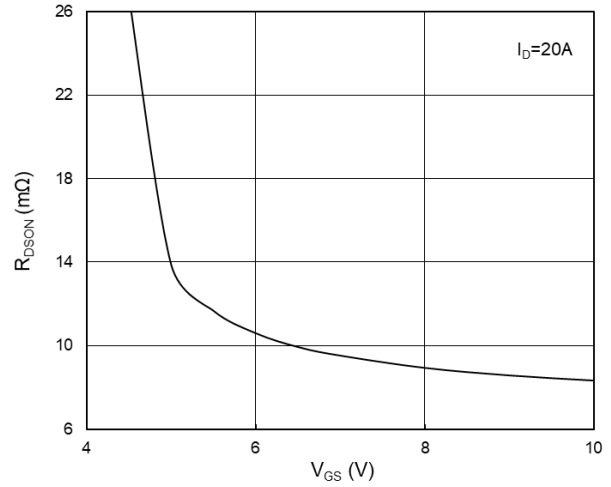


Fig.2 On-Resistance vs G-S Voltage

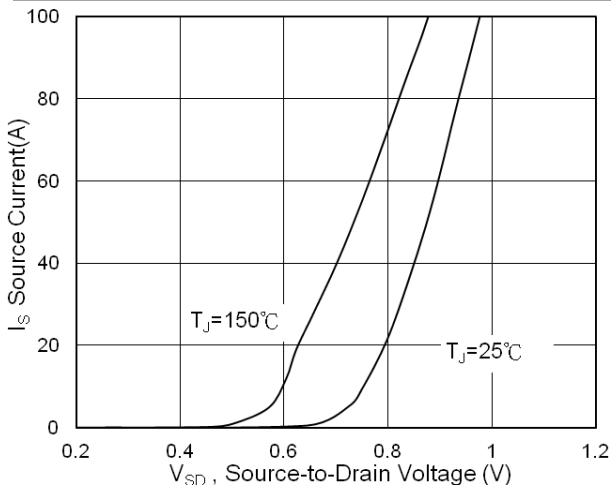


Fig.3 Source Drain Forward Characteristics

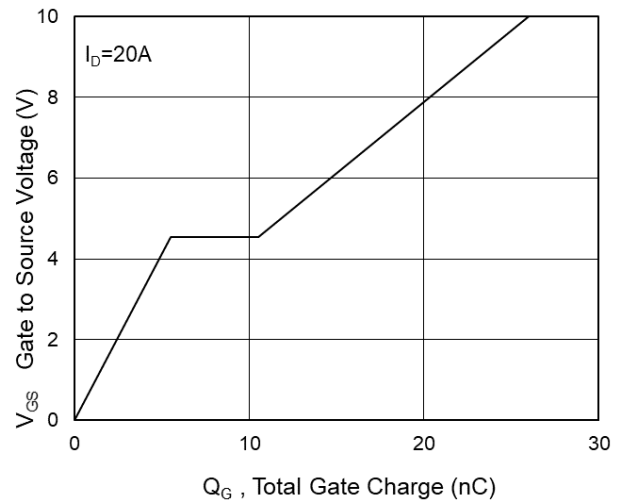


Fig.4 Gate-Charge Characteristics

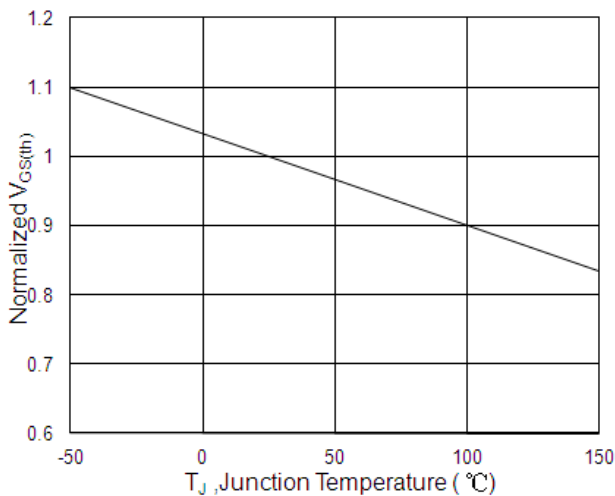


Fig.5 Normalized $V_{GS(th)}$ vs T_J

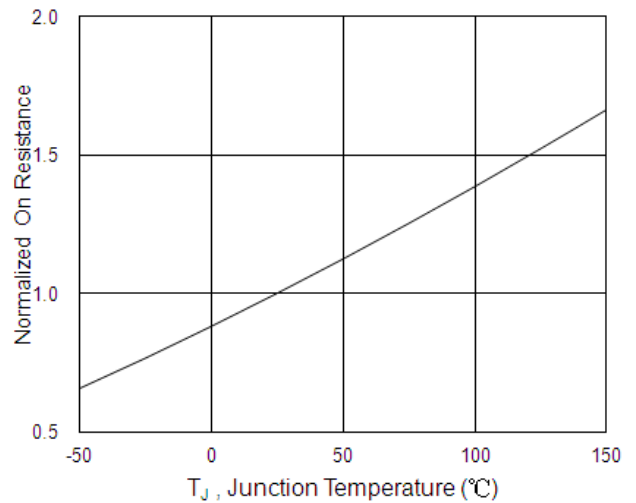


Fig.6 Normalized $R_{DS(on)}$ vs T_J

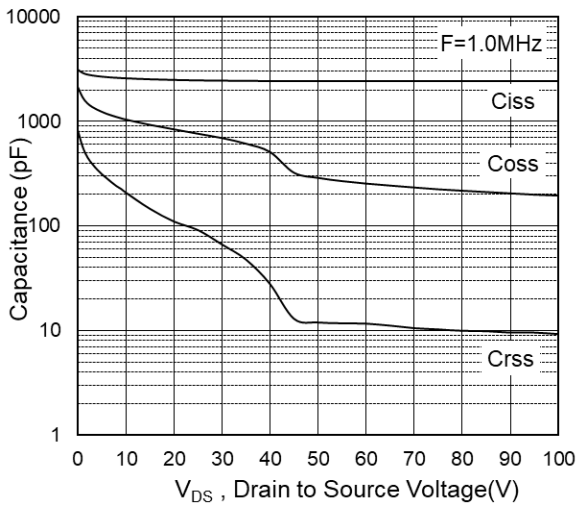


Fig.7 Capacitance

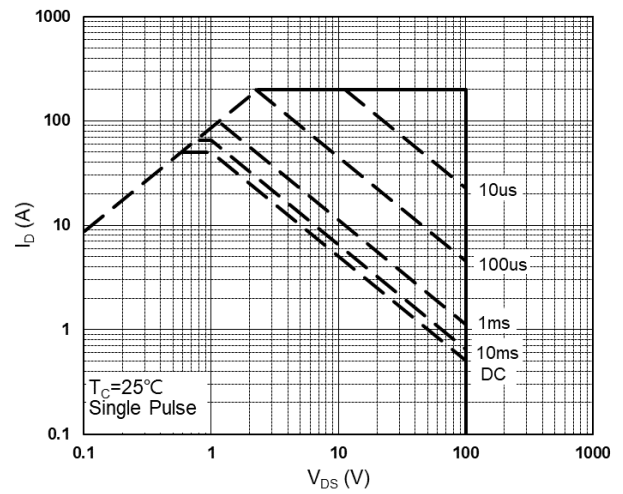


Fig.8 Safe Operating Area

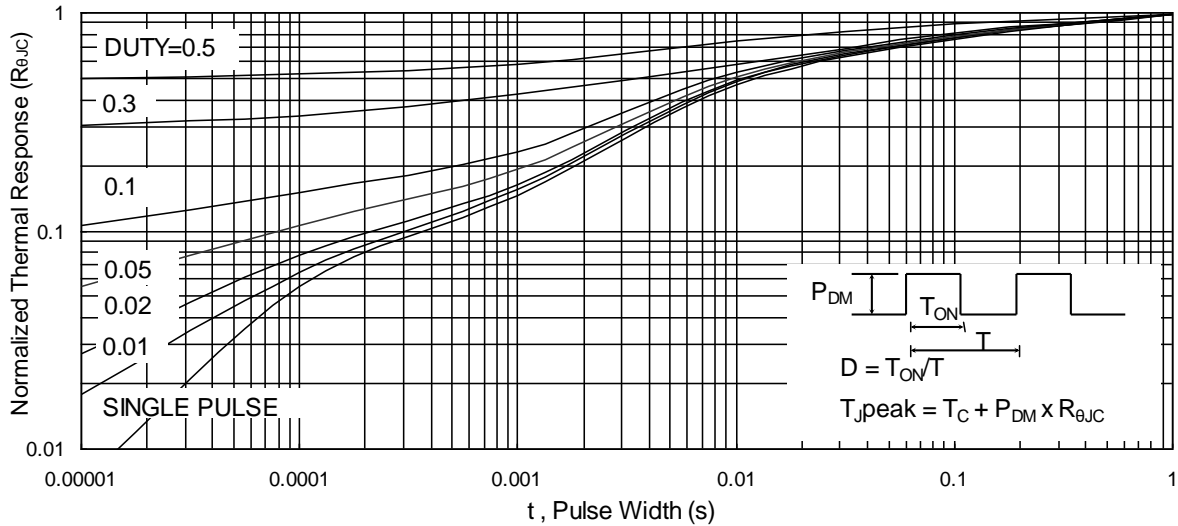


Fig.9 Normalized Maximum Transient Thermal Impedance

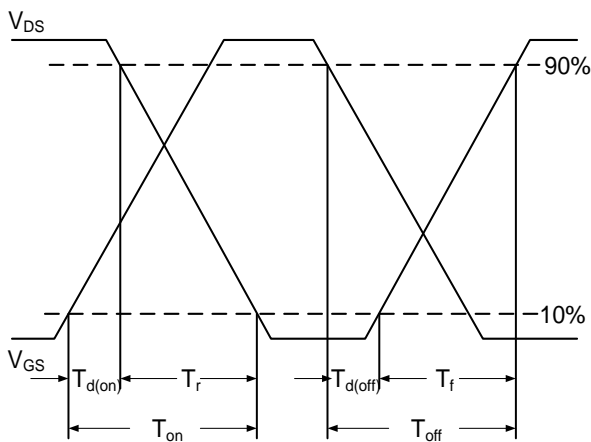


Fig.10 Switching Time Waveform

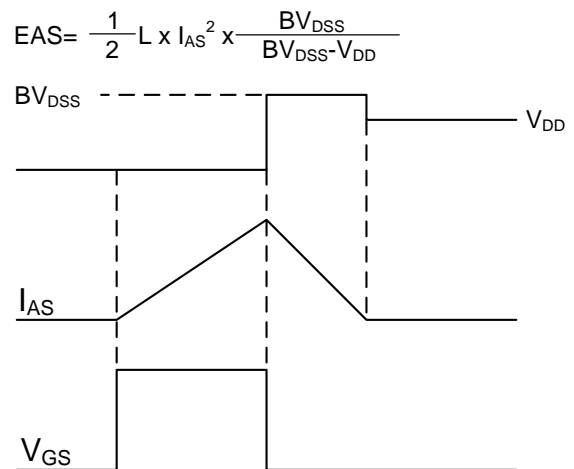


Fig.11 Unclamped Inductive Switching Waveform