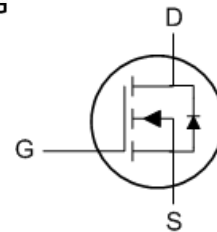
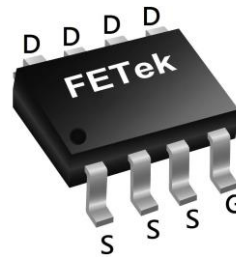


**Features**

- Advanced Trench MOS Technology
- Low Gate Charge
- Low  $R_{DS(ON)}$
- 100% EAS Guaranteed
- Green Device Available


**Product Summary**

| BVDSS | $R_{DS(ON)}$ | $I_D$ |
|-------|--------------|-------|
| 40V   | 9m $\Omega$  | 10.8A |

**SOP8 Pin Configuration**

**Applications**

- SMPS Synchronous Rectification
- DC/DC Converters
- Or-ing

**Absolute Maximum Ratings**

| Symbol                    | Parameter                                  | Rating     | Units      |
|---------------------------|--|------------|------------|
| $V_{DS}$                  | Drain-Source Voltage                       | 40         | V          |
| $V_{GS}$                  | Gate-Source Voltage                        | $\pm 20$   | V          |
| $I_D @ T_C = 25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V^1$ | 10.8       | A          |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 8.6        | A          |
| $I_{DM}$                  | Pulsed Drain Current <sup>2</sup>          | 40         | A          |
| EAS                       | Single Pulse Avalanche Energy <sup>3</sup> | 6          | mJ         |
| $I_{AS}$                  | Avalanche Current                          | 11         | A          |
| $P_D @ T_C = 25^\circ C$  | Total Power Dissipation <sup>4</sup>       | 1.67       | 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 <sup>1</sup> | ---  | 75   | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>    | ---  | 24   | $^\circ C/W$ |

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

| Symbol              | Parameter                                      | Conditions   | Min. | Typ. | Max. | Unit |
|---------------------|--|--|------|------|------|------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA   | 40   | ---  | ---  | V    |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =10A  | ---  | 7.5  | 9    | mΩ   |
|                     |  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A  | ---  | 11.5 | 14   |      |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                         | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                                 | 1.2  | 1.8  | 2.2  | V    |
| I <sub>DSS</sub>    | Drain-Source Leakage Current                   | V <sub>DS</sub> =32V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                          | ---  | ---  | 1    | uA   |
|                     |  | V <sub>DS</sub> =32V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C                          | ---  | ---  | 5    |      |
| I <sub>GSS</sub>    | Gate-Source Leakage Current                    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V   | ---  | ---  | ±100 | nA   |
| R <sub>g</sub>      | Gate Resistance                                | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz   | ---  | 2    | ---  | Ω    |
| Q <sub>g</sub>      | Total Gate Charge                              | V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A                          | ---  | 12.3 | ---  | nC   |
| Q <sub>gs</sub>     | Gate-Source Charge                             |  | ---  | 2.4  | ---  |      |
| Q <sub>gd</sub>     | Gate-Drain Charge                              |  | ---  | 2.5  | ---  |      |
| T <sub>d(on)</sub>  | Turn-On Delay Time                             | V <sub>DD</sub> =20V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω,<br>I <sub>D</sub> =10A | ---  | 12   | ---  | ns   |
| T <sub>r</sub>      | Rise Time                                      |  | ---  | 19   | ---  |      |
| T <sub>d(off)</sub> | Turn-Off Delay Time                            |  | ---  | 38   | ---  |      |
| T <sub>f</sub>      | Fall Time                                      |  | ---  | 10   | ---  |      |
| C <sub>iss</sub>    | Input Capacitance                              | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f=1MHz  | ---  | 669  | ---  | pF   |
| C <sub>oss</sub>    | Output Capacitance                             |  | ---  | 241  | ---  |      |
| C <sub>rss</sub>    | Reverse Transfer Capacitance                   |  | ---  | 19   | ---  |      |

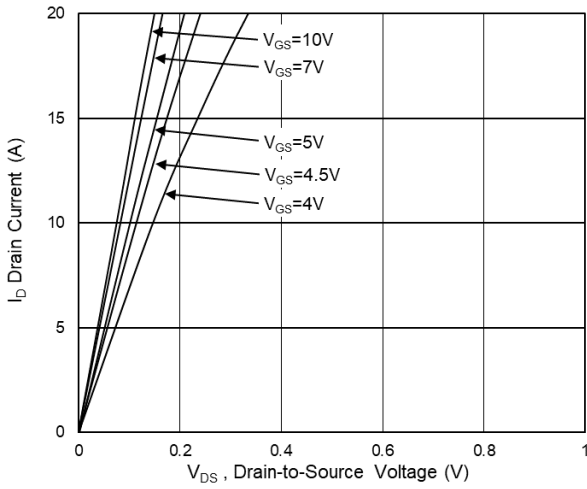
**Diode Characteristics**

| Symbol          | Parameter                              | Conditions  | Min. | Typ. | Max. | Unit |
|-----------------|--|---|------|------|------|------|
| I <sub>S</sub>  | Continuous Source Current <sup>1</sup> | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current             | ---  | ---  | 10.8 | A    |
| V <sub>SD</sub> | Diode Forward Voltage <sup>2</sup>     | V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C | ---  | ---  | 1.2  | V    |

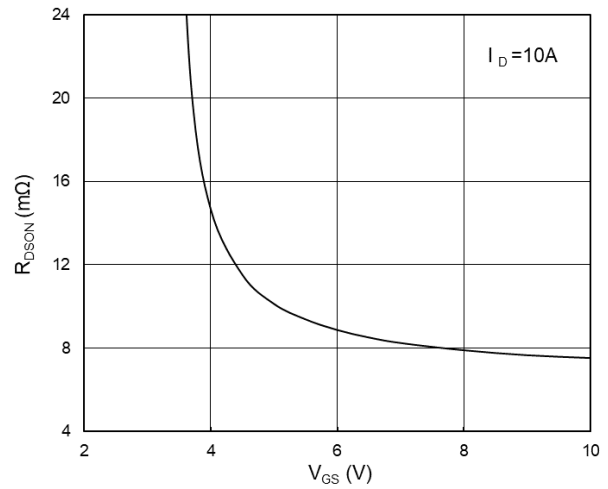
Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3.The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=11A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.

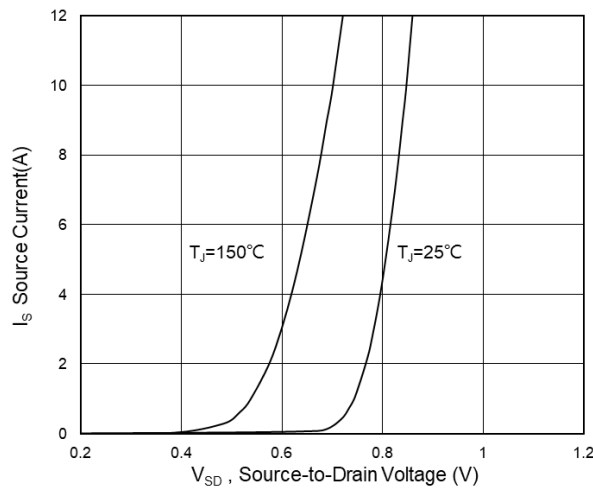
**Typical Characteristics**



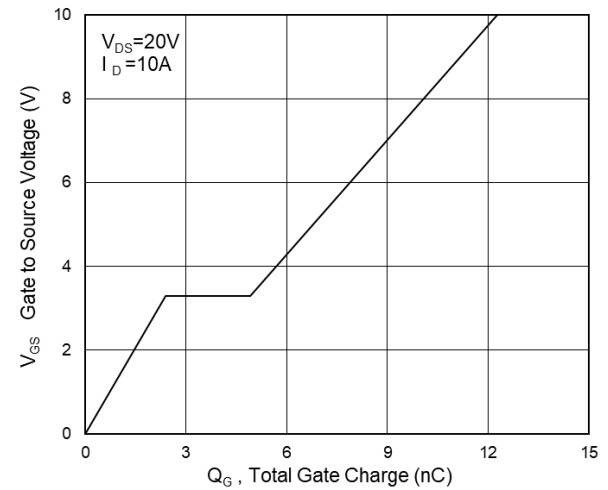
**Fig.1 Typical Output Characteristics**



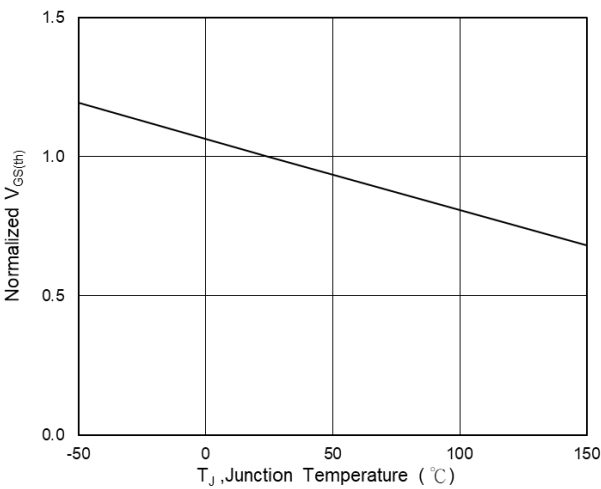
**Fig.2 On-Resistance vs G-S Voltage**



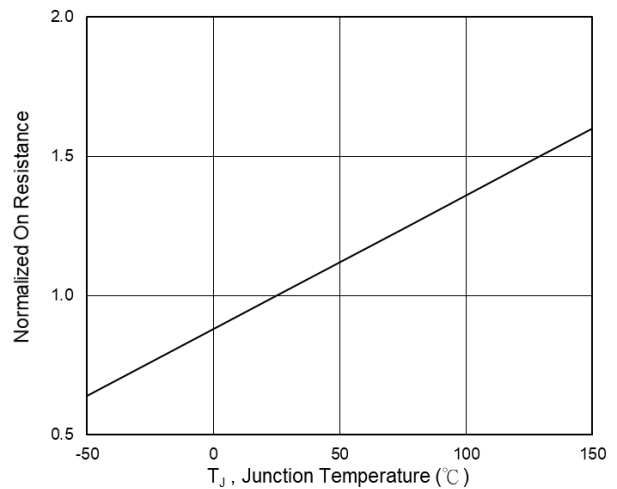
**Fig.3 Source Drain Forward Characteristics**



**Fig.4 Gate-Charge Characteristics**



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



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

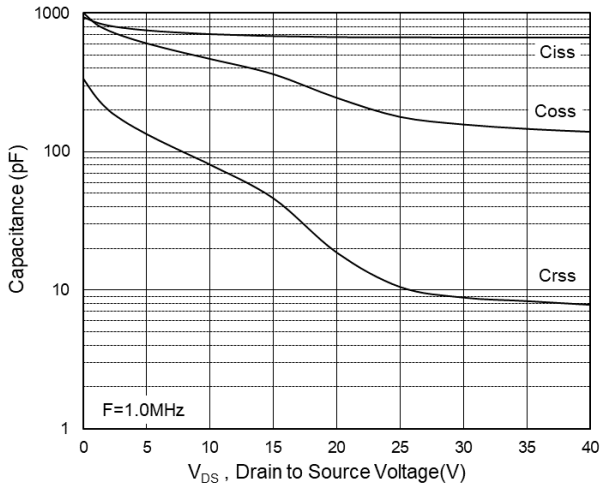


Fig.7 Capacitance

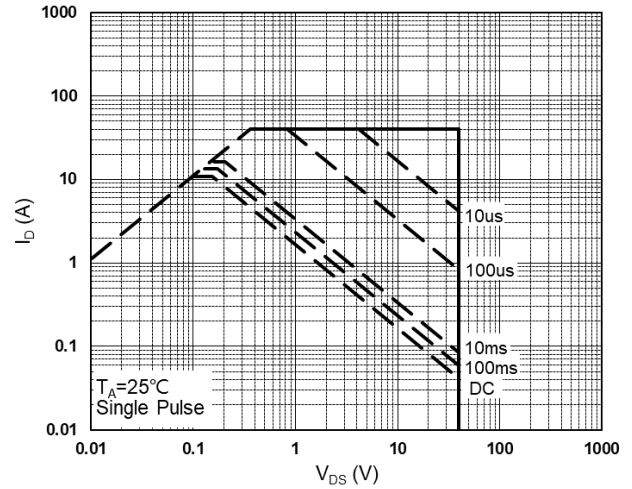


Fig.8 Safe Operating Area

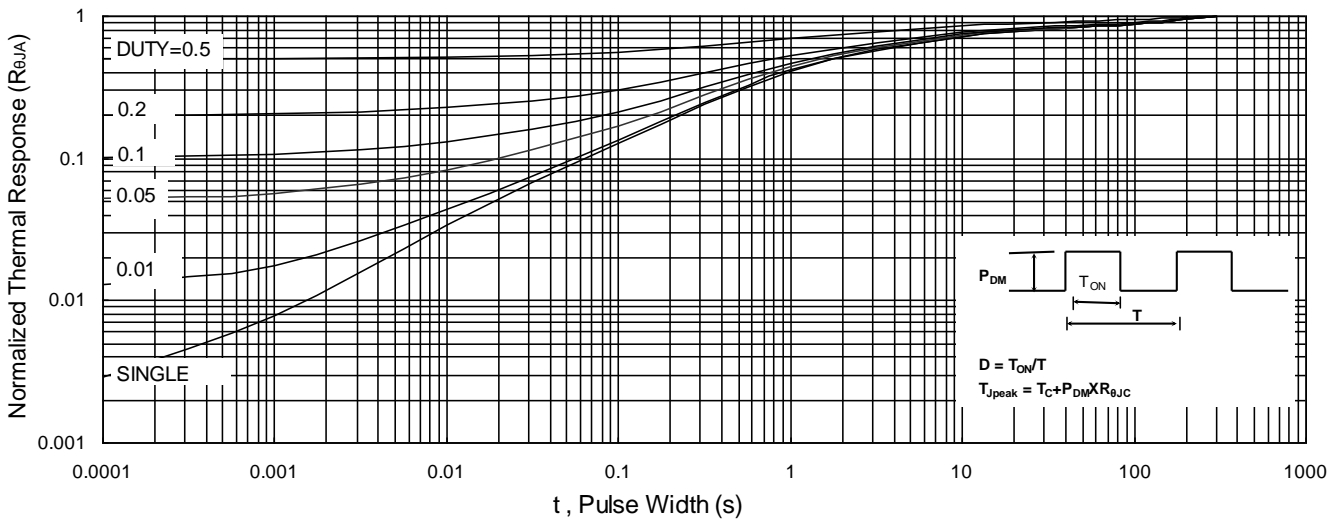


Fig.9 Normalized Maximum Transient Thermal Impedance



Fig.10 Switching Time Waveform



Fig.11 Unclamped Inductive Waveform