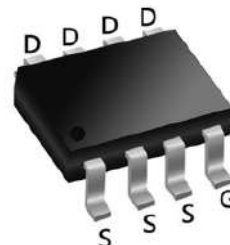


## N-Ch 30V Fast Switching MOSFETs

### Features:

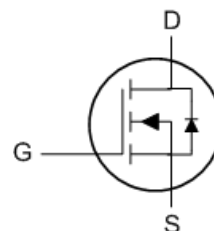
- Advanced Trench MOS Technology
- Low Gate Charge
- Low  $R_{DS(ON)}$
- 100% EAS Guaranteed
- Green Device Available



### Applications:

- Power Management in Desktop Computer or DC/DC Converters.
- Isolated DC/DC Converters in Telecom and Industrial.

### SOP8 Pin Configuration



### Product Summary

| BVDSS | RDSON | ID  |
|-------|-------|-----|
| 30V   | 8.0mΩ | 15A |

### Absolute Maximum Ratings

| Symbol                         | Parameter                                  | Rating     | Units            |
|--------------------------------|--------------------------------------------|------------|------------------|
| $V_{DS}$                       | Drain-Source Voltage                       | 30         | V                |
| $V_{GS}$                       | Gate-Source Voltage                        | $\pm 20$   | V                |
| $I_D @ T_A = 25^\circ\text{C}$ | Continuous Drain Current <sup>1</sup>      | 15         | A                |
| $I_D @ T_A = 70^\circ\text{C}$ | Continuous Drain Current <sup>1</sup>      | 12         | A                |
| $I_{DM}$                       | Pulsed Drain Current <sup>2</sup>          | 60         | A                |
| EAS                            | Single Pulse Avalanche Energy <sup>3</sup> | 39.2       | mJ               |
| $I_{AS}$                       | Avalanche Current                          | 28         | A                |
| $P_D @ T_A = 25^\circ\text{C}$ | Total Power Dissipation <sup>4</sup>       | 3.1        | W                |
| $T_{STG}$                      | Storage Temperature Range                  | -55 to 150 | $^\circ\text{C}$ |
| $T_J$                          | Operating Junction Temperature Range       | -55 to 150 | $^\circ\text{C}$ |

### Thermal Data

| Symbol          | Parameter                                                              | Typ. | Max. | Unit               |
|-----------------|------------------------------------------------------------------------|------|------|--------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient <sup>1</sup>                       | ---  | 75   | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient <sup>1</sup> $t \leq 10\text{sec}$ | ---  | 40   | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>                          | ---  | 24   | $^\circ\text{C/W}$ |

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

| Symbol       | Parameter                                      | Conditions                                     | Min. | Typ. | Max.      | Unit       |
|--------------|------------------------------------------------|------------------------------------------------|------|------|-----------|------------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage                 | $V_{GS}=0V, I_D=250\mu A$                      | 30   | ---  | ---       | V          |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=10V, I_D=12A$                          | ---  | 6.0  | 8         | m $\Omega$ |
|              |                                                | $V_{GS}=4.5V, I_D=12A$                         | ---  | 9.4  | 11        |            |
| $V_{GS(th)}$ | Gate Threshold Voltage                         | $V_{GS}=V_{DS}, I_D=250\mu A$                  | 1.2  | 1.7  | 2.2       | V          |
| $I_{DSS}$    | Drain-Source Leakage Current                   | $V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$  | ---  | ---  | 1         | $\mu A$    |
|              |                                                | $V_{DS}=30V, V_{GS}=0V, T_J=55^\circ\text{C}$  | ---  | ---  | 5         |            |
| $I_{GSS}$    | Gate-Source Leakage Current                    | $V_{GS}=\pm 20V, V_{DS}=0V$                    | ---  | ---  | $\pm 100$ | nA         |
| $g_{fs}$     | Forward Transconductance                       | $V_{DS}=5V, I_D=12A$                           | ---  | 55   | ---       | S          |
| $R_g$        | Gate Resistance                                | $V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$          | 0.8  | 1.7  | 2.6       | $\Omega$   |
| $Q_g$        | Total Gate Charge (4.5V)                       | $V_{DS}=15V, V_{GS}=10V, I_D=12A$              | ---  | 7.1  | ---       | nC         |
| $Q_{gs}$     | Gate-Source Charge                             |                                                | ---  | 2.2  | ---       |            |
| $Q_{gd}$     | Gate-Drain Charge                              |                                                | ---  | 3.1  | ---       |            |
| $T_{d(on)}$  | Turn-On Delay Time                             | $V_{DD}=15V, V_{GS}=10V, R_G=3\Omega, I_D=12A$ | ---  | 7    | ---       | ns         |
| $T_r$        | Rise Time                                      |                                                | ---  | 18.8 | ---       |            |
| $T_{d(off)}$ | Turn-Off Delay Time                            |                                                | ---  | 19.5 | ---       |            |
| $T_f$        | Fall Time                                      |                                                | ---  | 3.4  | ---       |            |
| $C_{iss}$    | Input Capacitance                              | $V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$         | ---  | 693  | ---       | pF         |
| $C_{oss}$    | Output Capacitance                             |                                                | ---  | 332  | ---       |            |
| $C_{rss}$    | Reverse Transfer Capacitance                   |                                                | ---  | 34   | ---       |            |

**Diode Characteristics**

| Symbol   | Parameter                                | Conditions                                | Min. | Typ. | Max. | Unit |
|----------|------------------------------------------|-------------------------------------------|------|------|------|------|
| $I_S$    | Continuous Source Current <sup>1,5</sup> | $V_G=V_D=0V$ , Force Current              | ---  | ---  | 12   | A    |
| $V_{SD}$ | Diode Forward Voltage <sup>2</sup>       | $V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$ | ---  | ---  | 1    | V    |

Note :

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
2. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
3. The EAS data shows Max. rating. The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=28A$
4. The power dissipation is limited by  $150^\circ\text{C}$  junction temperature
5. The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

## Typical Characteristics

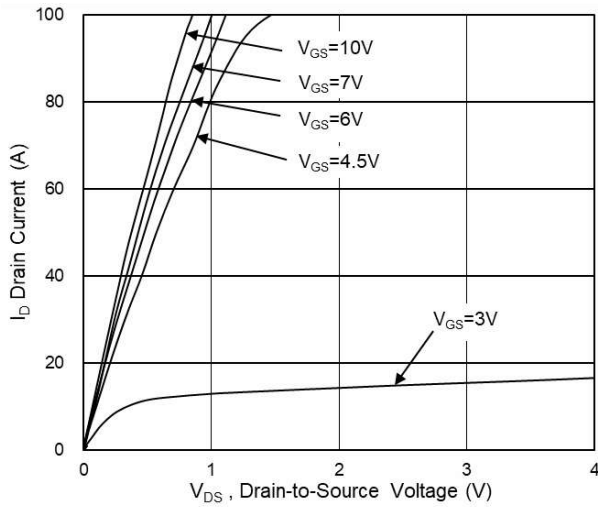


Fig.1 Typical Output Characteristics

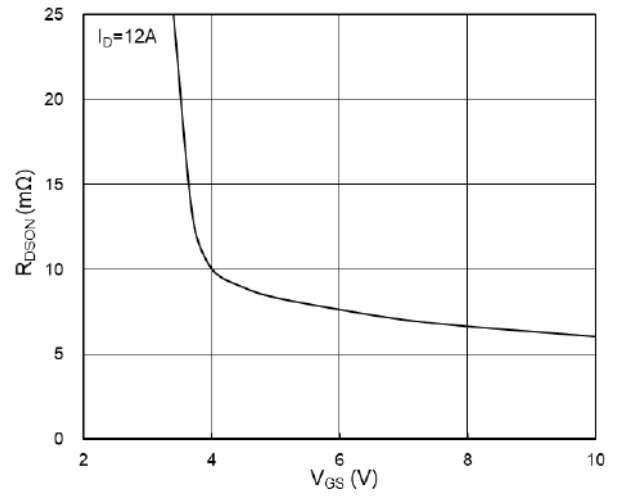


Fig.2 On-Resistance vs G-S Voltage

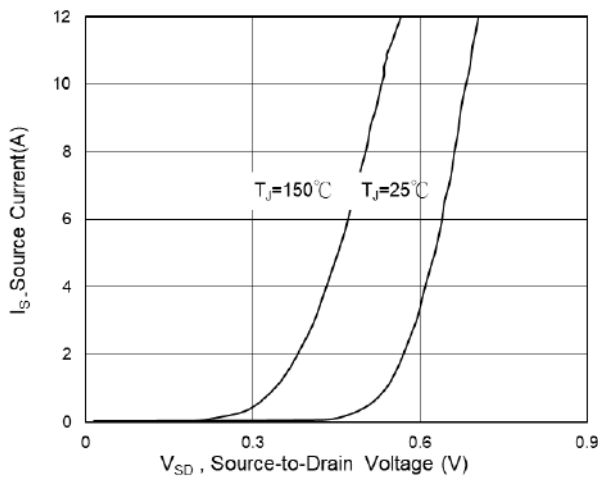


Fig.3 Source Drain Forward Characteristics

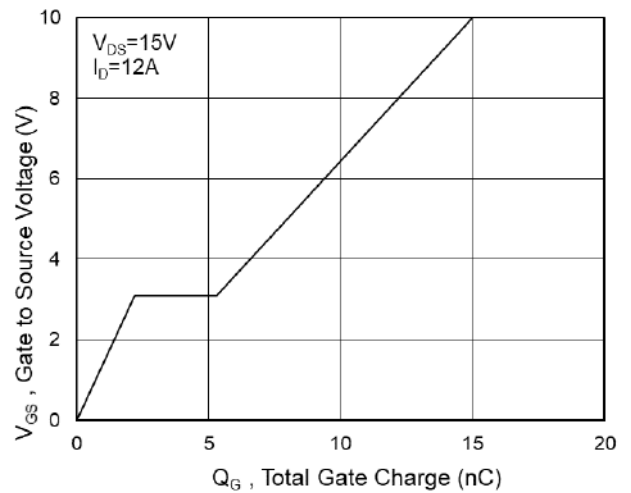


Fig.4 Gate-Charge Characteristics

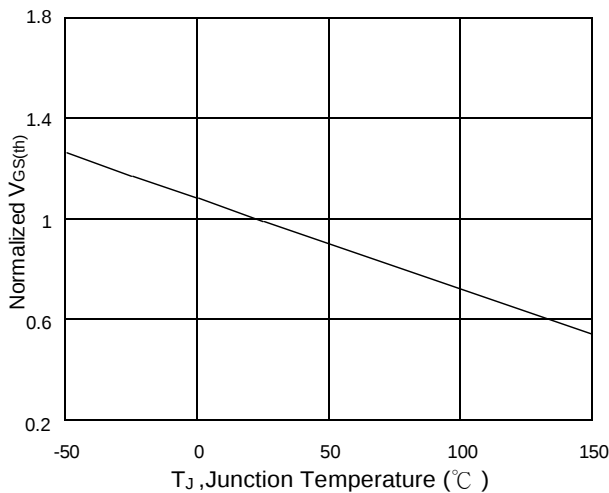


Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$

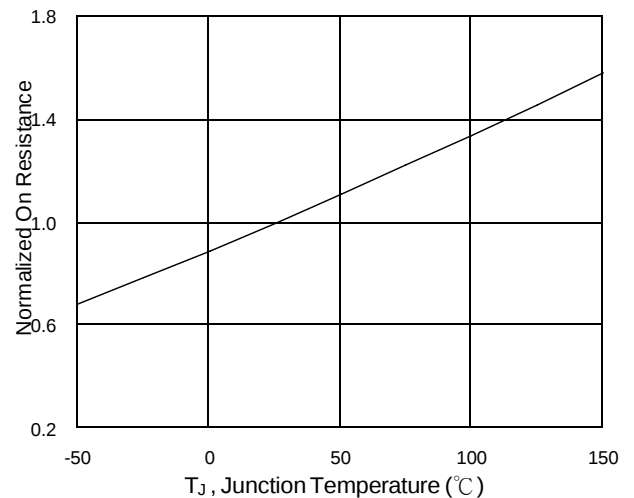
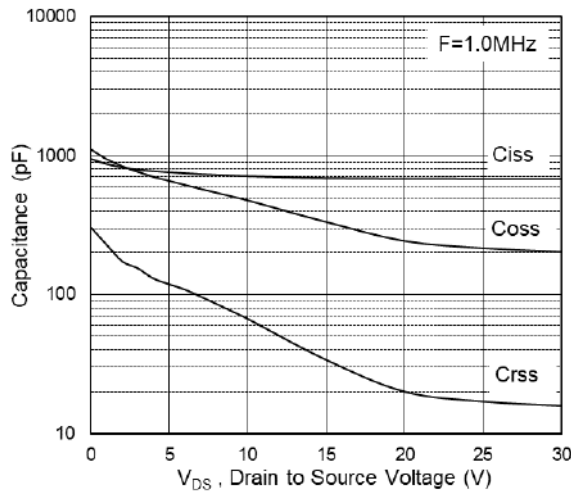
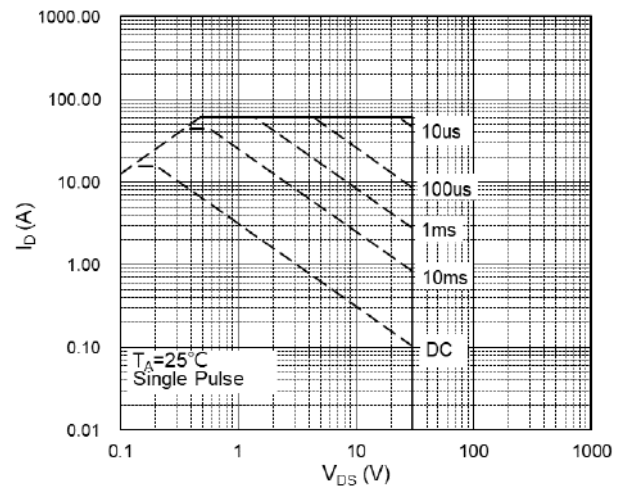


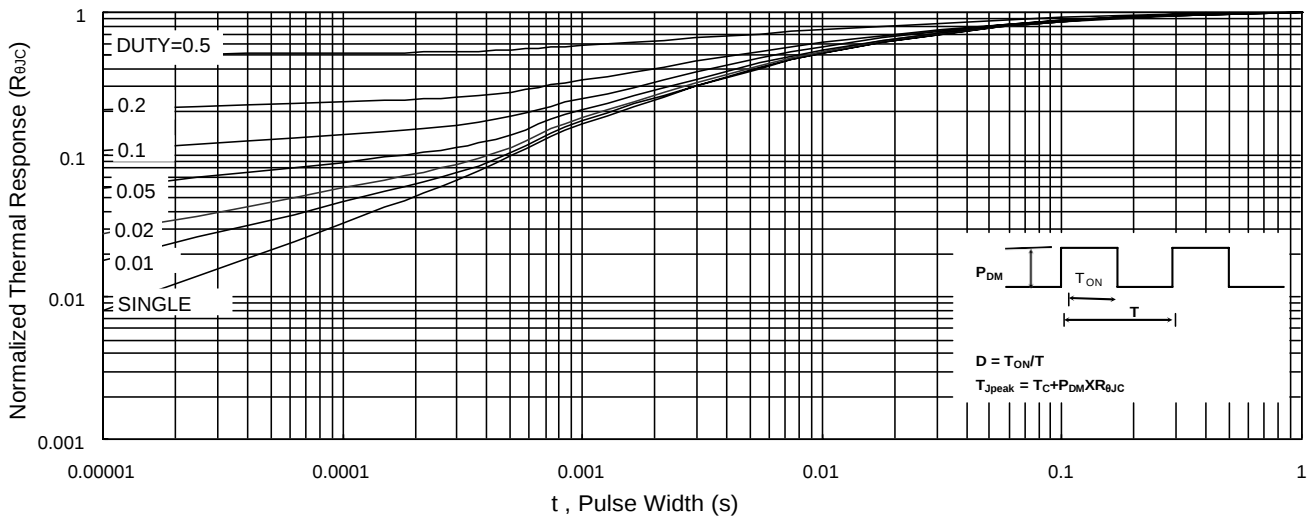
Fig.6 Normalized  $R_{DS(on)}$  vs  $T_J$



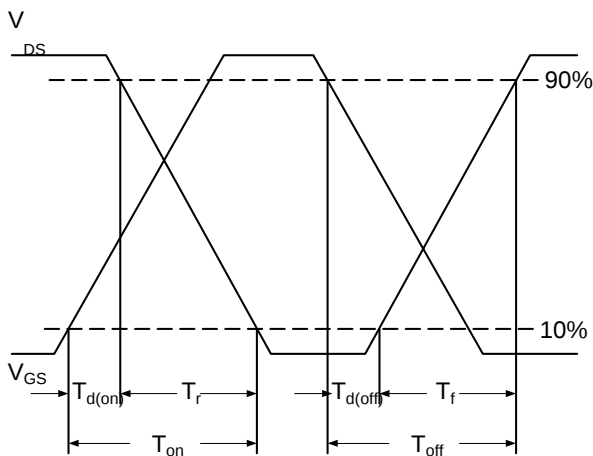
**Fig.7 Capacitance**



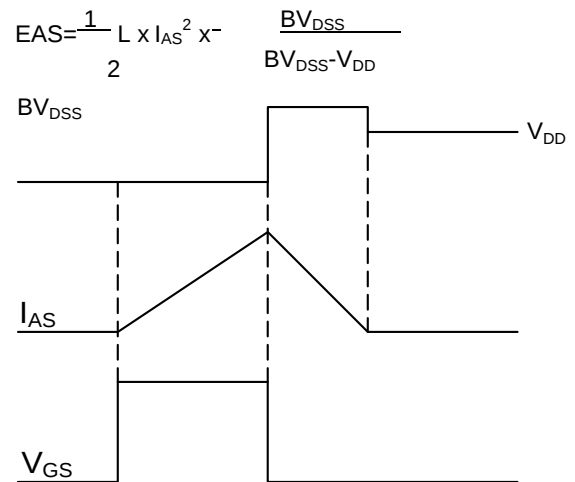
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**