

**N-Ch 100V Fast Switching MOSFETs**
**General Description**

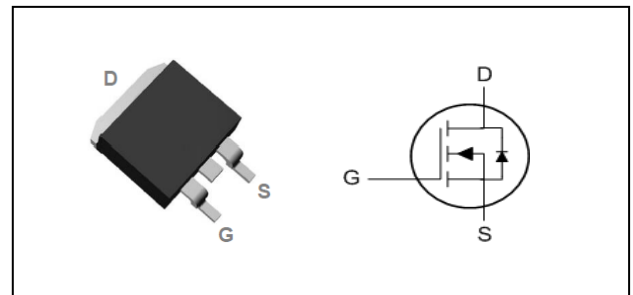
- 100% EAS Guaranteed
- Green Device Available
- Super Low  $R_{DS(ON)}$
- Advanced high cell density Trench technology

**Applications**

- MOTOR Driver.
- BMS.
- High frequency switching and synchronous rectification.

**Product Summary**

|                  |     |           |
|------------------|-----|-----------|
| $V_{DS}$         | 100 | V         |
| $R_{DS(ON),typ}$ | 1.8 | $m\Omega$ |
| $I_D$            | 308 | A         |

**TO263 Pin Configuration**

**Absolute Maximum Ratings**

| Symbol                | Parameter                                      | Rating     | Units      |
|-----------------------|------------------------------------------------|------------|------------|
| $V_{DS}$              | Drain-Source Voltage                           | 100        | V          |
| $V_{GS}$              | Gate-Source Voltage                            | $\pm 20$   | V          |
| $I_D@T_C=25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V^{1,6}$ | 308        | A          |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^{1,6}$ | 218        | A          |
| $I_{DM}$              | Pulsed Drain Current <sup>2</sup>              | 550        | A          |
| EAS                   | Single Pulse Avalanche Energy <sup>3</sup>     | 1013       | mJ         |
| $I_{AS}$              | Avalanche Current                              | 45         | A          |
| $P_D@T_C=25^\circ C$  | Total Power Dissipation <sup>4</sup>           | 430        | 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> | ---  | 60   | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case <sup>1</sup>    | ---  | 0.35 | $^\circ C/W$ |

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**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 <sup>2</sup> | $V_{GS}=10V$ , $I_D=30A$                                     | ---  | 1.8   | 2.2       | $m\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage                         | $V_{GS}=V_{DS}$ , $I_D=250\mu A$                             | 2.0  | ---   | 4.0       | V         |
| $I_{DSS}$    | Drain-Source Leakage Current                   | $V_{DS}=80V$ , $V_{GS}=0V$ , $T_J=25^\circ\text{C}$          | ---  | ---   | 1         | $\mu A$   |
|              |                                                | $V_{DS}=80V$ , $V_{GS}=0V$ , $T_J=125^\circ\text{C}$         | ---  | ---   | 100       |           |
| $I_{GSS}$    | Gate-Source Leakage Current                    | $V_{GS}=\pm 20V$ , $V_{DS}=0V$                               | ---  | ---   | $\pm 100$ | nA        |
| $g_{fs}$     | Forward Transconductance                       | $V_{DS}=5V$ , $I_D=20A$                                      | ---  | 75    | ---       | S         |
| $Q_g$        | Total Gate Charge (10V)                        | $V_{DS}=50V$ , $V_{GS}=10V$ , $I_D=20A$                      | ---  | 200   | ---       | nC        |
| $Q_{gs}$     | Gate-Source Charge                             |                                                              | ---  | 54    | ---       |           |
| $Q_{gd}$     | Gate-Drain Charge                              |                                                              | ---  | 49    | ---       |           |
| $T_{d(on)}$  | Turn-On Delay Time                             | $V_{DD}=50V$ , $V_{GS}=10V$ , $R_G=3.0\Omega$ ,<br>$I_D=20A$ | ---  | 47    | ---       | ns        |
| $T_r$        | Rise Time                                      |                                                              | ---  | 28    | ---       |           |
| $T_{d(off)}$ | Turn-Off Delay Time                            |                                                              | ---  | 79    | ---       |           |
| $T_f$        | Fall Time                                      |                                                              | ---  | 18    | ---       |           |
| $C_{iss}$    | Input Capacitance                              | $V_{DS}=50V$ , $V_{GS}=0V$ , $f=1\text{MHz}$                 | ---  | 13370 | ---       | pF        |
| $C_{oss}$    | Output Capacitance                             |                                                              | ---  | 1920  | ---       |           |
| $C_{rss}$    | Reverse Transfer Capacitance                   |                                                              | ---  | 388   | ---       |           |

**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                     | ---  | ---  | 80   | A    |
| $V_{SD}$ | Diode Forward Voltage <sup>2</sup>       | $V_{GS}=0V$ , $I_S=50A$ , $T_J=25^\circ\text{C}$ | ---  | ---  | 1.1  | V    |
| $t_{rr}$ | Reverse Recovery Time                    | $I_F=20A$ , $dI/dt=100A/\mu s$ ,                 | ---  | 70   | ---  | nS   |
| $Q_{rr}$ | Reverse Recovery Charge                  | $T_J=25^\circ\text{C}$                           | ---  | 580  | ---  | nC   |

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  $\leq 300\mu s$  , duty cycle  $\leq 2\%$

3.The EAS data shows Max. rating . The test condition is  $V_{DD}=25V$ ,  $V_{GS}=10V$ ,  $L=0.1mH$ ,  $I_{AS}=45A$

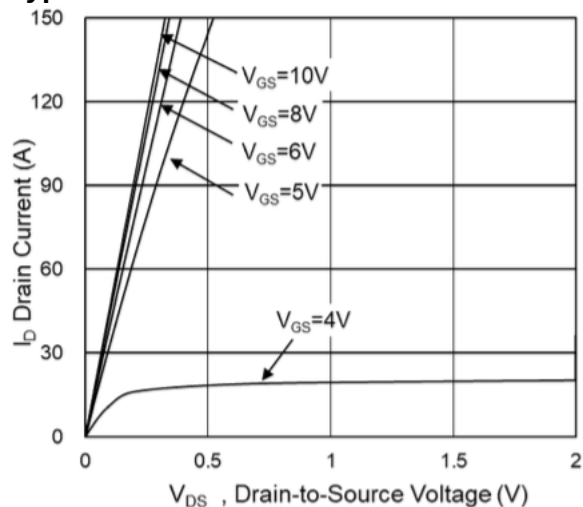
4.The power dissipation is limited by  $150^\circ\text{C}$  junction temperature

5.The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.

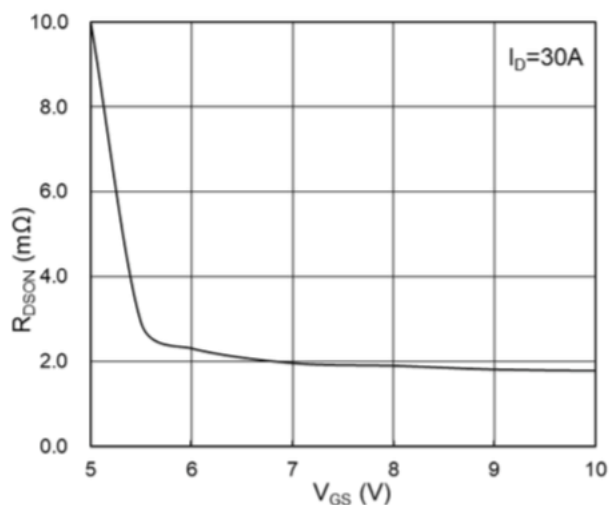
6.Package limitation current.

## N-Ch 100V Fast Switching MOSFETs

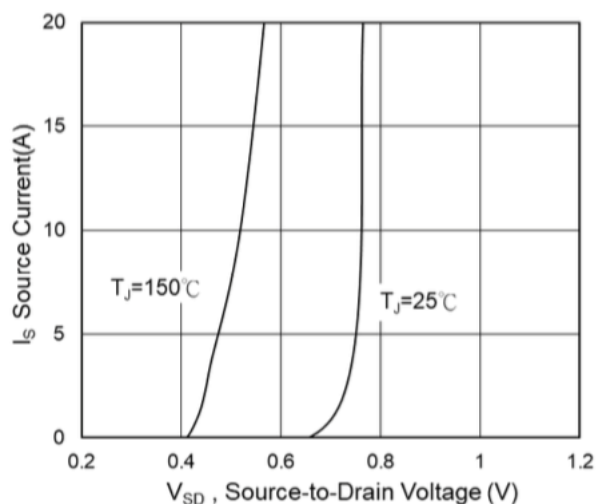
### Typical Characteristics



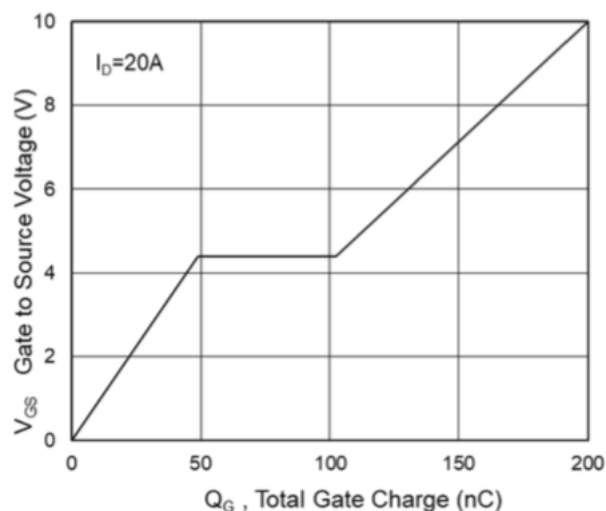
**Fig.1 Typical Output Characteristics**



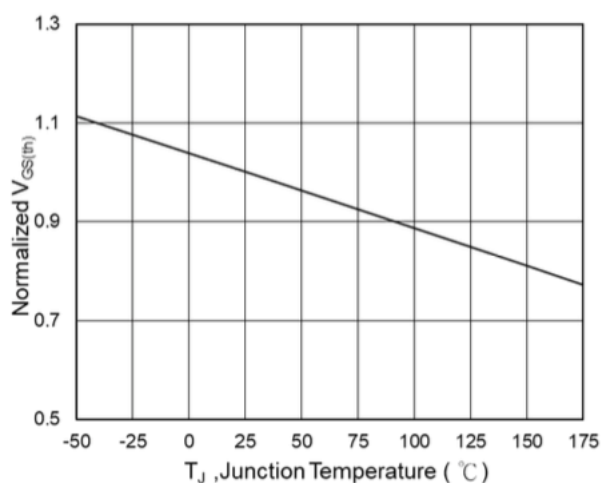
**Fig.2 On-Resistance vs G-S Voltage**



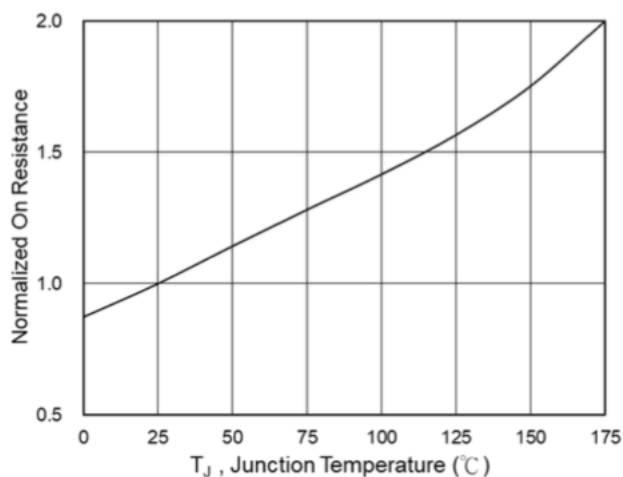
**Fig.3 Source Drain Forward Characteristics**



**Fig.4 Gate-Charge Characteristics**



**Fig.5 Normalized  $V_{TH}$  vs  $T_J$**



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

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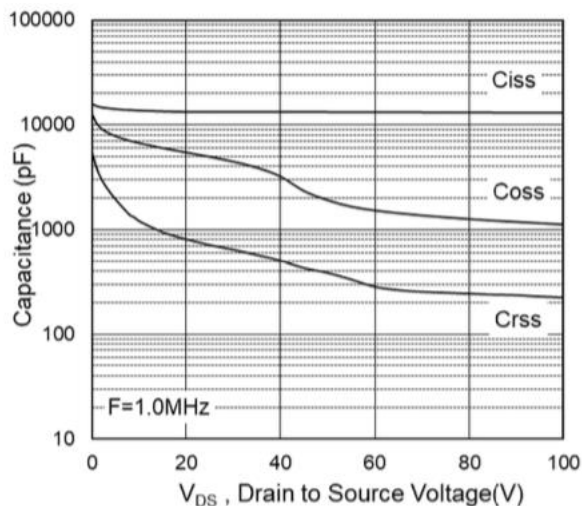


Fig.7 Capacitance

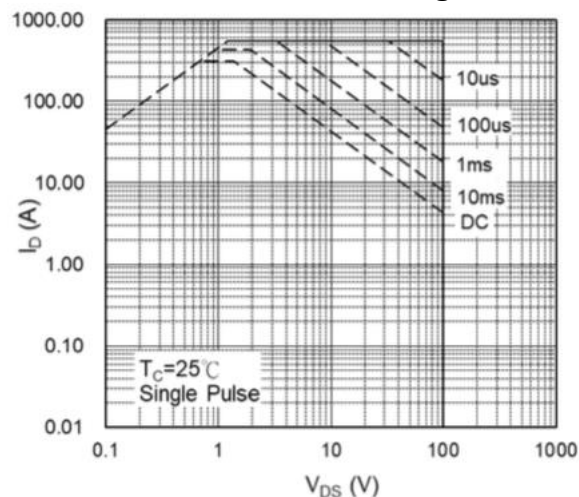


Fig.8 Safe Operating Area

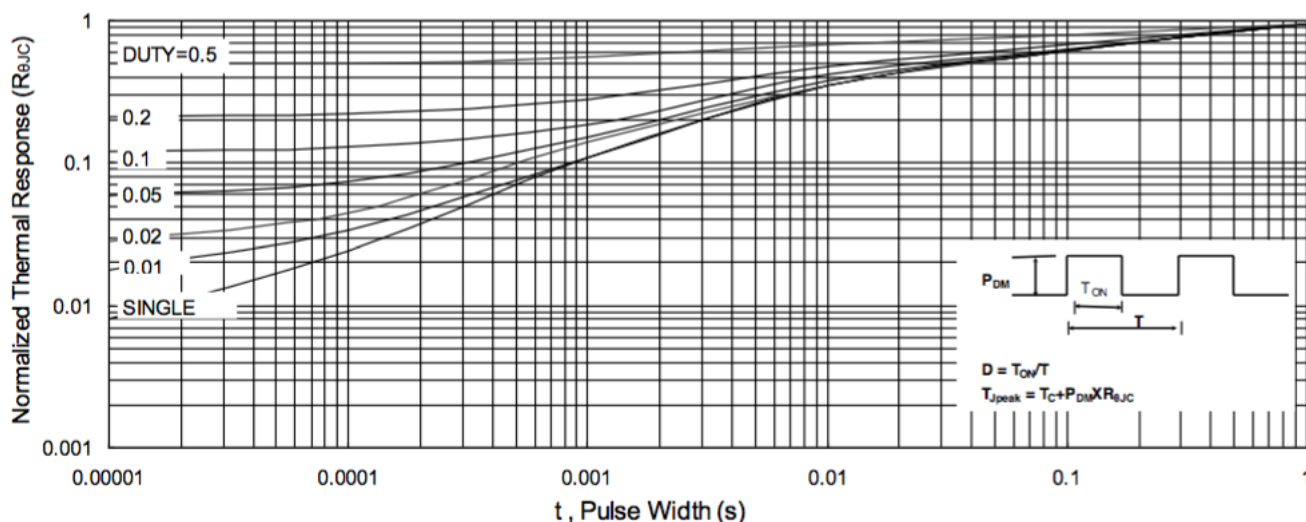


Fig.9 Normalized Maximum Transient Thermal Impedance

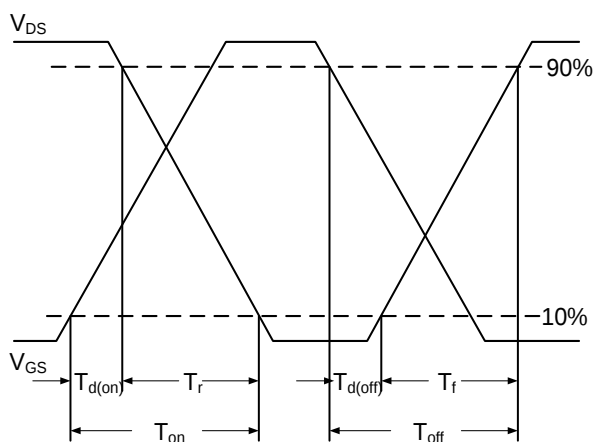


Fig.10 Switching Time Waveform

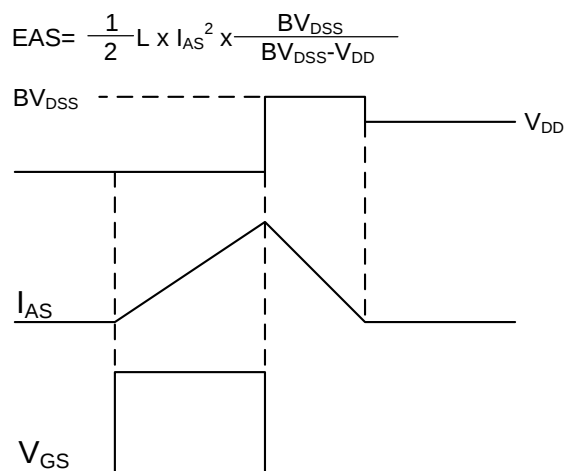
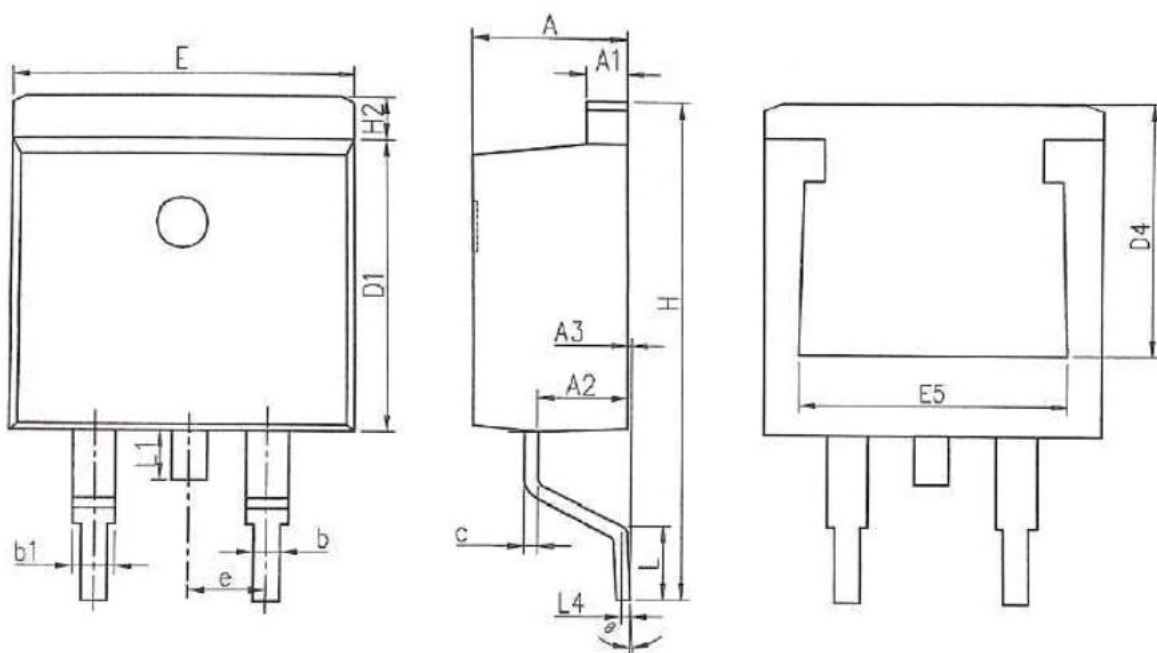


Fig.11 Unclamped Inductive Switching Waveform



| SYMBOLS | MILLIMETERS |       | INCHES    |       |
|---------|-------------|-------|-----------|-------|
|         | MIN         | MAX   | MIN       | MAX   |
| A       | 4.370       | 4.770 | 0.172     | 0.188 |
| A1      | 1.220       | 1.420 | 0.048     | 0.056 |
| A2      | 2.200       | 2.890 | 0.087     | 0.114 |
| A3      | 0.000       | 0.250 | 0.000     | 0.010 |
| b       | 0.700       | 0.960 | 0.028     | 0.038 |
| b1      | 1.170       | 1.470 | 0.046     | 0.058 |
| c       | 0.300       | 0.530 | 0.012     | 0.021 |
| D1      | 8.500       | 9.300 | 0.335     | 0.366 |
| D4      | 6.600       | -     | 0.260     | -     |
| E       | 9.860       | 10.36 | 0.388     | 0.408 |
| E5      | 7.060       | -     | 0.278     | -     |
| e       | 2.540 BSC   |       | 0.100 BSC |       |
| H       | 14.70       | 15.70 | 0.579     | 0.618 |
| H2      | 1.070       | 1.470 | 0.042     | 0.058 |
| L       | 2.000       | 2.600 | 0.079     | 0.102 |
| L1      | 1.400       | 1.750 | 0.055     | 0.069 |
| L4      | 0.250 BSC   |       | 0.010 BSC |       |
| Θ       | 0°          | 9°    | 0°        | 9°    |