

### Features

- Advanced Trench MOS Technology
- 100% EAS Guaranteed
- Reliable and Rugged
- Green Device Available

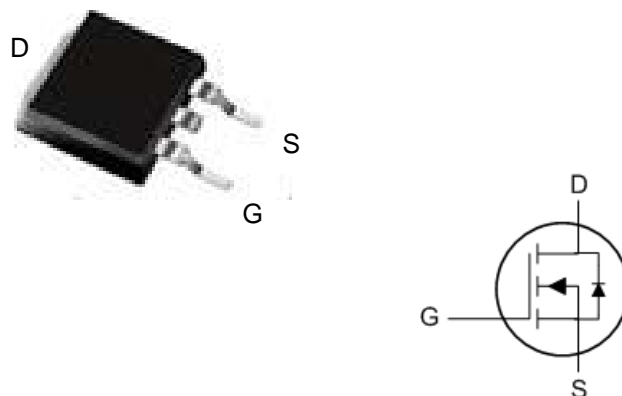
### Product Summary

| BVDSS | RDSON | ID  |
|-------|-------|-----|
| 100V  | 26mΩ  | 30A |

### Applications

- Synchronous Rectification in SMPS.
- Hard Switching and High Speed Circuit.
- DC/DC in Telecoms and Industrial.

### TO252 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 <sup>1</sup>      | 30         | A          |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current <sup>1</sup>      | 18.5       | A          |
| $I_{DM}$              | Pulsed Drain Current <sup>2</sup>          | 120        | A          |
| EAS                   | Single Pulse Avalanche Energy <sup>3</sup> | 64.8       | mJ         |
| $I_{AS}$              | Avalanche Current                          | 36         | A          |
| $P_D@T_C=25^\circ C$  | Total Power Dissipation <sup>4</sup>       | 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 <sup>1</sup> | ---  | 50   | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-case <sup>1</sup>    | ---  | 2.4  | $^\circ C/W$ |

# D30N10M

## 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> =250μA                                              | 100  | ---  | ---  | V    |
| R <sub>DS(ON)</sub>          | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =8A                                                | ---  | 22   | 26   | mΩ   |
|                              |                                                | V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A                                               | ---  | 24   | 32   | mΩ   |
| V <sub>GS(th)</sub>          | Gate Threshold Voltage                         | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA                                | 1.2  | 1.8  | 2.5  | V    |
| I <sub>DSS</sub>             | Drain-Source Leakage Current                   | V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                         | ---  | ---  | 1    | μA   |
|                              |                                                | V <sub>DS</sub> =80V, 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   |
| Q <sub>g</sub>               | Total Gate Charge (10V)                        | V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =8A                          | ---  | 57   | ---  | nC   |
| Q <sub>gs</sub>              | Gate-Source Charge                             |                                                                                         | ---  | 8.7  | ---  |      |
| Q <sub>gd</sub>              | Gate-Drain Charge                              |                                                                                         | ---  | 14   | ---  |      |
| T <sub>d(on)</sub>           | Turn-On Delay Time                             | V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =3.3Ω,<br>I <sub>D</sub> =1A | ---  | 16.2 | ---  | ns   |
| T <sub>r</sub>               | Rise Time                                      |                                                                                         | ---  | 41.2 | ---  |      |
| T <sub>d(off)</sub>          | Turn-Off Delay Time                            |                                                                                         | ---  | 56.4 | ---  |      |
| T <sub>f</sub>               | Fall Time                                      |                                                                                         | ---  | 16.2 | ---  |      |
| C <sub>iss</sub>             | Input Capacitance                              | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz                                       | ---  | 3307 | ---  | pF   |
| C <sub>oss</sub>             | Output Capacitance                             |                                                                                         | ---  | 201  | ---  |      |
| C <sub>rss</sub>             | Reverse Transfer Capacitance                   |                                                                                         | ---  | 151  | ---  |      |
| <b>Diode Characteristics</b> |                                                |                                                                                         |      |      |      |      |
| I <sub>S</sub>               | Continuous Source Current <sup>1,5</sup>       | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current                                       | ---  | ---  | 15   | 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    |
| t <sub>rr</sub>              | Reverse Recovery Time                          | I <sub>F</sub> =8A, di/dt=100A/μs,<br>T <sub>J</sub> =25°C                              | ---  | 44   | ---  | nS   |
| Q <sub>rr</sub>              | Reverse Recovery Charge                        |                                                                                         | ---  | 25   | ---  | 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 ≤ 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>=36A
- 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

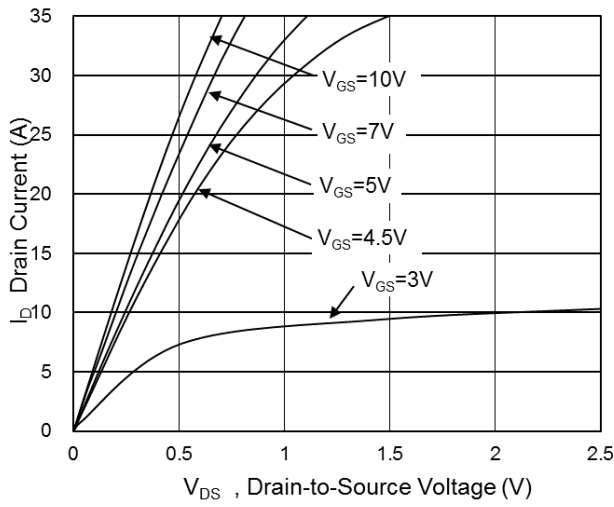


Fig.1 Typical Output Characteristics

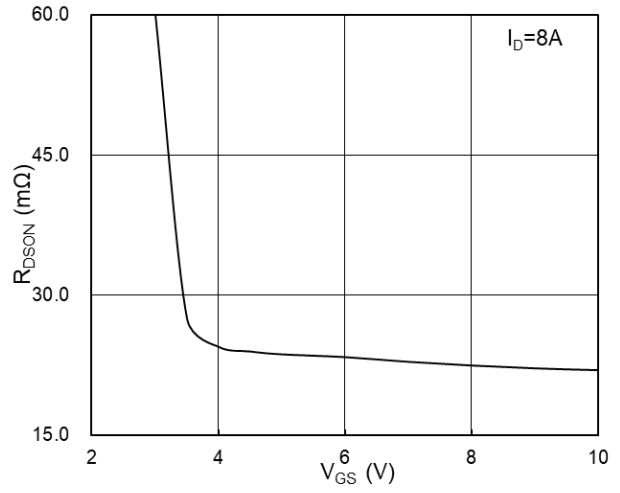


Fig.2 On-Resistance vs G-S Voltage

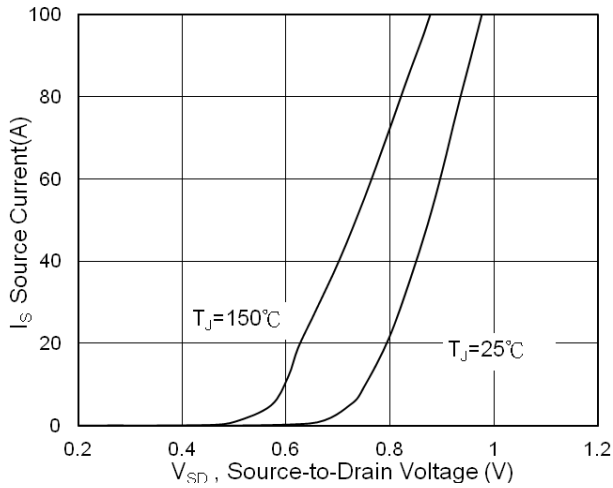


Fig.3 Source-Drain Diode Forward Voltage

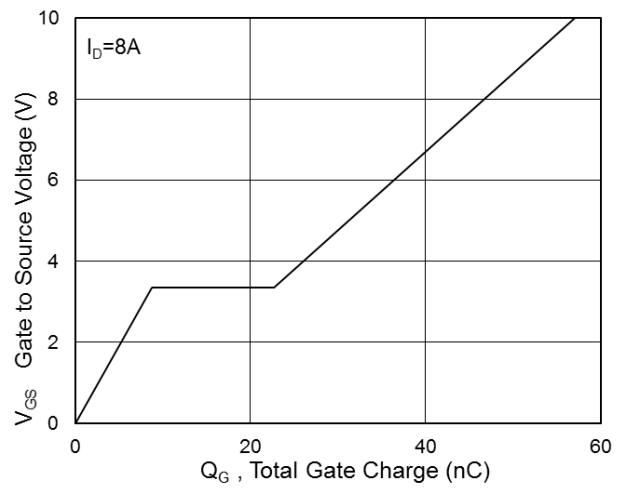


Fig.4 Gate-Charge Characteristics

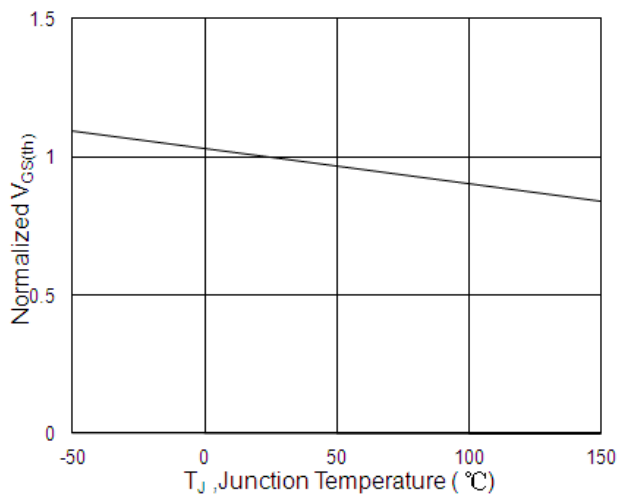


Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$

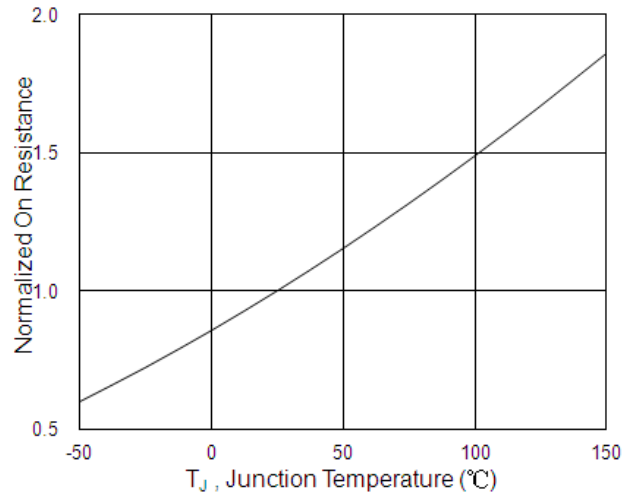
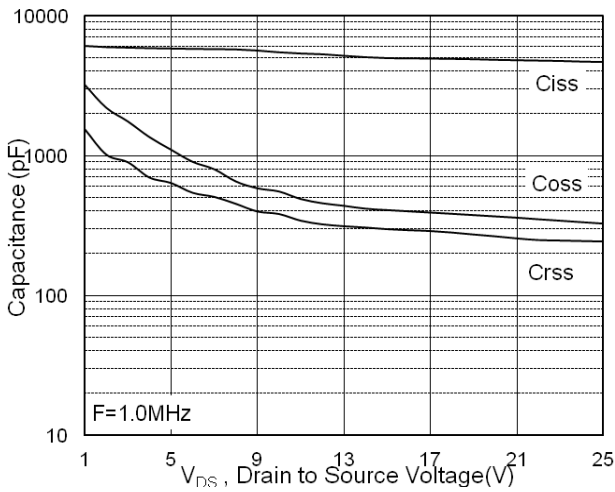
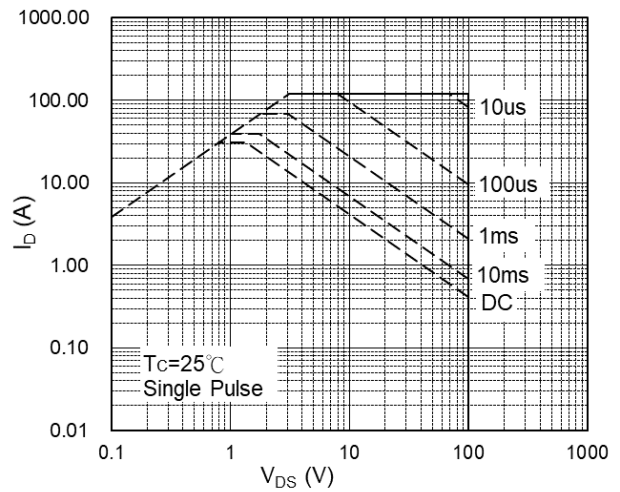


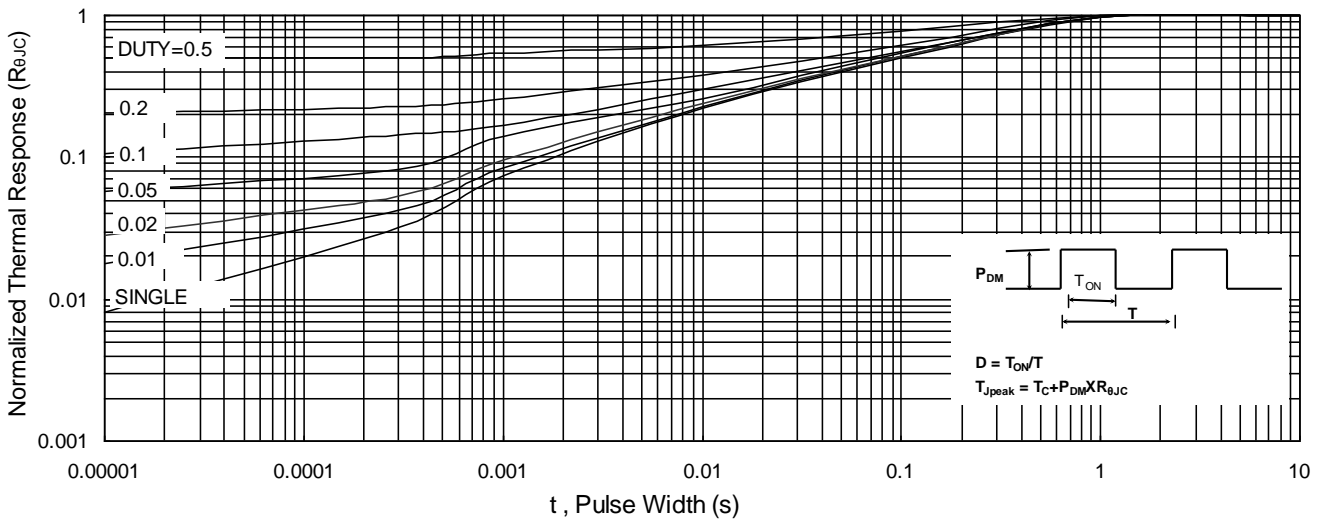
Fig.6 Normalized  $R_{DSON}$  vs  $T_J$



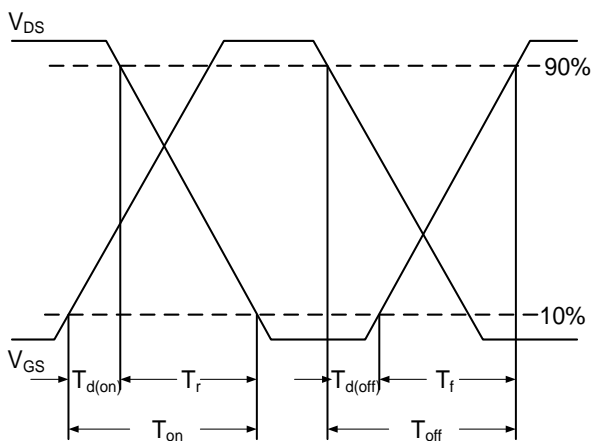
**Fig.7 Capacitance**



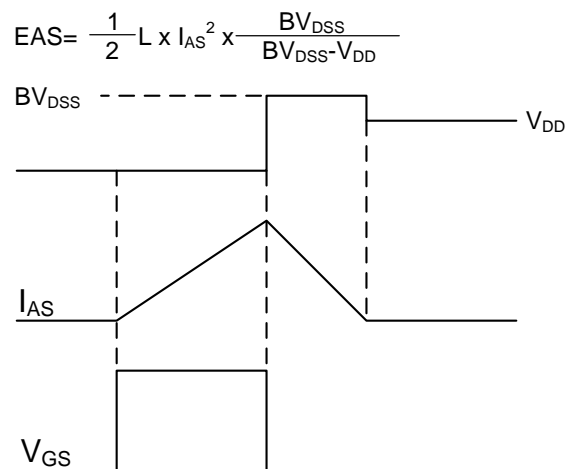
**Fig.8 Safe Operating Area**



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

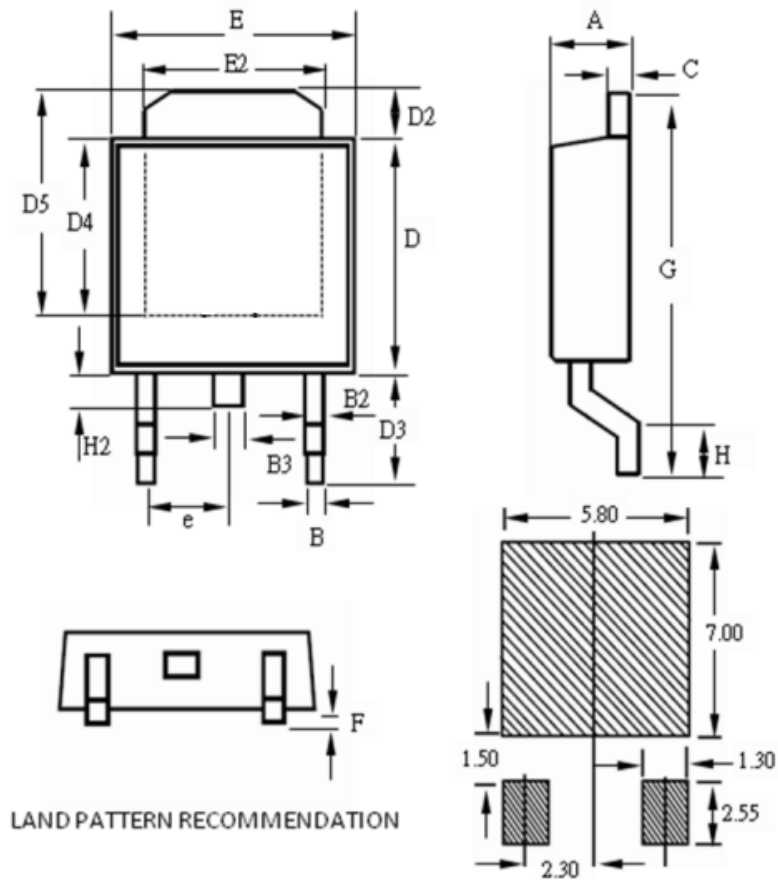


**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**

TO-252 Package Outline



| SYMBOLS | MILLIMETERS |      |       | INCHES |       |       |
|---------|-------------|------|-------|--------|-------|-------|
|         | MIN         | NOM  | MAX   | MIN    | NOM   | MAX   |
| A       | 2.10        | --   | 2.50  | 0.083  | --    | 0.098 |
| B       | 0.30        | --   | 0.89  | 0.012  | --    | 0.035 |
| B2      | 0.40        | --   | 1.14  | 0.016  | --    | 0.045 |
| B3      | 0.60        | --   | 1.00  | 0.024  | --    | 0.039 |
| C       | 0.40        | --   | 0.89  | 0.016  | --    | 0.035 |
| D       | 5.30        | --   | 6.25  | 0.209  | --    | 0.246 |
| D2      | 0.50        | --   | 1.70  | 0.020  | --    | 0.067 |
| D3      | 2.20        | --   | 3.40  | 0.087  | --    | 0.134 |
| D4      | 4.32        | --   | --    | 0.170  | --    | --    |
| D5      | 5.21        | --   | --    | 0.205  | --    | --    |
| E       | 6.30        | --   | 6.73  | 0.248  | --    | 0.265 |
| E2      | 4.80        | --   | 5.46  | 0.189  | --    | 0.215 |
| F       | 0.00        | --   | 0.30  | 0.000  | --    | 0.012 |
| G       | 9.20        | --   | 10.41 | 0.362  | --    | 0.410 |
| H       | 0.90        | --   | 1.95  | 0.035  | --    | 0.077 |
| H2      | 0.50        | --   | 1.10  | 0.020  | --    | 0.043 |
| e       | --          | 2.30 | --    | --     | 0.091 | --    |

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