



### Description

The DMN3011LFVW-13 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

### General Features

$V_{DS} = 30V$   $I_D = 35A$

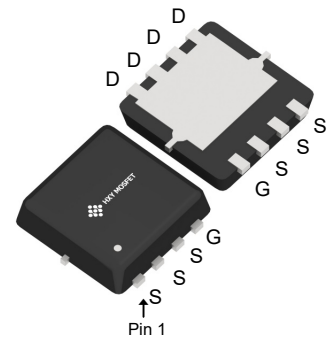
$R_{DS(ON)} < 10m\Omega$  @  $V_{GS}=10V$

### Application

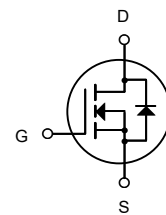
Battery protection

Load switch

Uninterruptible power supply



DFN3X3-8L



N-Channel MOSFET

### Ordering Information

| Product ID     | Pack      | Brand      | Qty(PCS) |
|----------------|-----------|------------|----------|
| DMN3011LFVW-13 | DFN3X3-8L | HXY MOSFET | 5000     |

### Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise noted)

| Symbol                | Parameter  | Rating     | Units        |
|-----------------------|--|------------|--------------|
| $V_{DS}$              | Drain-Source Voltage                             | 30         | V            |
| $V_{GS}$              | Gate-Source Voltage                              | $\pm 20$   | V            |
| $I_D@T_C=25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V^1$       | 35         | A            |
| $I_D@T_C=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$       | 25         | A            |
| $I_{DM}$              | Pulsed Drain Current                             | 112        | A            |
| EAS                   | Single Pulse Avalanche Energy <sup>3</sup>       | 24.2       | mJ           |
| $I_{AS}$              | Avalanche Current                                | 22         | A            |
| $P_D@T_C=25^\circ C$  | Total Power Dissipation <sup>4</sup>             | 37.5       | W            |
| $T_{STG}$             | Storage Temperature Range                        | -55 to 175 | $^\circ C$   |
| $T_J$                 | Operating Junction Temperature Range             | -55 to 175 | $^\circ C$   |
| $R_{\theta JA}$       | Thermal Resistance Junction-Ambient <sup>1</sup> | 62         | $^\circ C/W$ |
| $R_{\theta JC}$       | Thermal Resistance Junction-Case <sup>1</sup>    | 4          | $^\circ C/W$ |



**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   | 30   | ---    | ---  | V     |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BVDSS Temperature Coefficient                  | Reference to 25°C, I <sub>D</sub> =1mA   | ---  | 0.0193 | ---  | V/°C  |
| R <sub>DS(ON)</sub>                 | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =30A  | ---  | 7.5    | 10   | mΩ    |
|                                     |  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A   | ---  | 11     | 18   |       |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                         | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA                                   | 1.2  | ---    | 2.5  | V     |
| ΔV <sub>GS(th)</sub>                | V <sub>GS(th)</sub> Temperature Coefficient    |  | ---  | -3.97  | ---  | mV/°C |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current                   | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                            | ---  | ---    | 1    | uA    |
|                                     |  | V <sub>DS</sub> =24V, 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    |
| g <sub>fs</sub>                     | Forward Transconductance                       | V <sub>DS</sub> =5V, I <sub>D</sub> =30A   | ---  | 34     | ---  | S     |
| R <sub>g</sub>                      | Gate Resistance                                | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz   | ---  | 1.8    | ---  | Ω     |
| Q <sub>g</sub>                      | Total Gate Charge (4.5V)                       | V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A                           | ---  | 9.8    | ---  | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                             |  | ---  | 4.2    | ---  |       |
| Q <sub>gd</sub>                     | Gate-Drain Charge                              |  | ---  | 3.6    | ---  |       |
| T <sub>d(on)</sub>                  | Turn-On Delay Time                             | V <sub>DD</sub> =15V, V <sub>GS</sub> =10V,<br>R <sub>G</sub> =3.3Ω<br>I <sub>D</sub> =15A | ---  | 4      | ---  | ns    |
| T <sub>r</sub>                      | Rise Time                                      |  | ---  | 8      | ---  |       |
| T <sub>d(off)</sub>                 | Turn-Off Delay Time                            |  | ---  | 31     | ---  |       |
| T <sub>f</sub>                      | Fall Time                                      |  | ---  | 4      | ---  |       |
| C <sub>iss</sub>                    | Input Capacitance                              | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz  | ---  | 940    | ---  | pF    |
| C <sub>oss</sub>                    | Output Capacitance                             |  | ---  | 131    | ---  |       |
| C <sub>rss</sub>                    | Reverse Transfer Capacitance                   |  | ---  | 109    | ---  |       |
| I <sub>S</sub>                      | Continuous Source Current <sup>1,5</sup>       | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current  | ---  | ---    | 43   | A     |
| I <sub>SM</sub>                     | Pulsed Source Current <sup>2,5</sup>           |  | ---  | ---    | 112  | 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    | V     |
| t <sub>rr</sub>                     | Reverse Recovery Time                          | I <sub>F</sub> =30A, dI/dt=100A/μs,<br>T <sub>J</sub> =25°C                                | ---  | 8.5    | ---  | nS    |
| Q <sub>rr</sub>                     | Reverse Recovery Charge                        |  | ---  | 2.2    | ---  | 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>=22A
- 4.The power dissipation is limited by 175°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

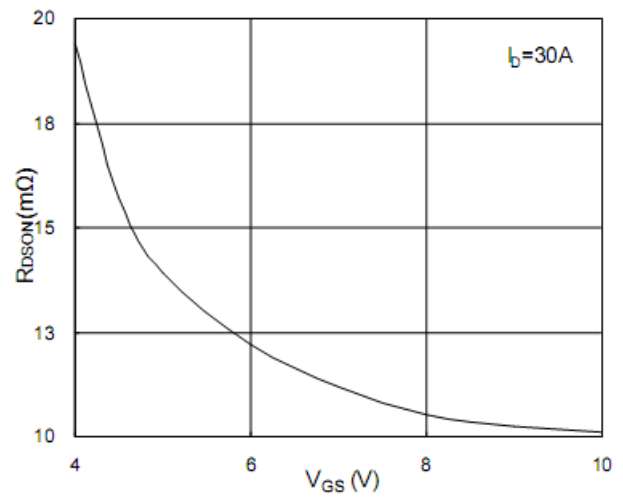


Fig.2 On-Resistance vs. G-S Voltage

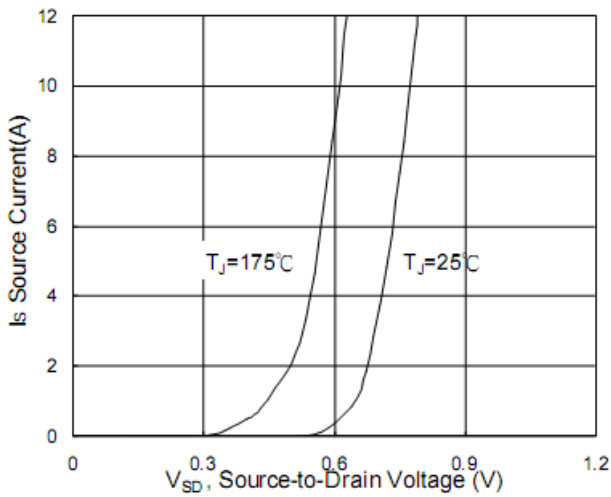


Fig.3 Forward Characteristics of Reverse

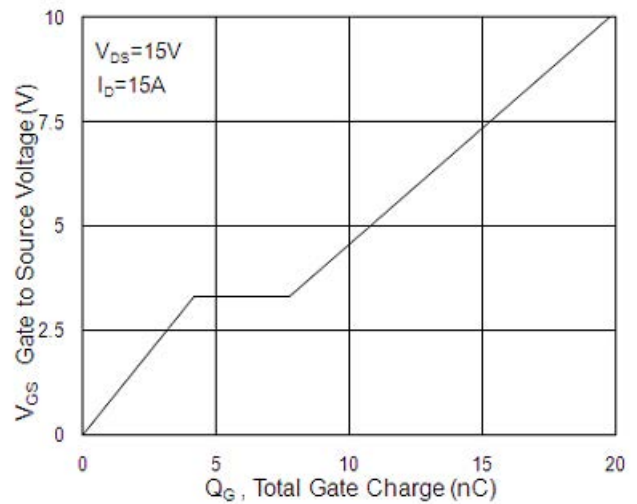


Fig.4 Gate-Charge Characteristics

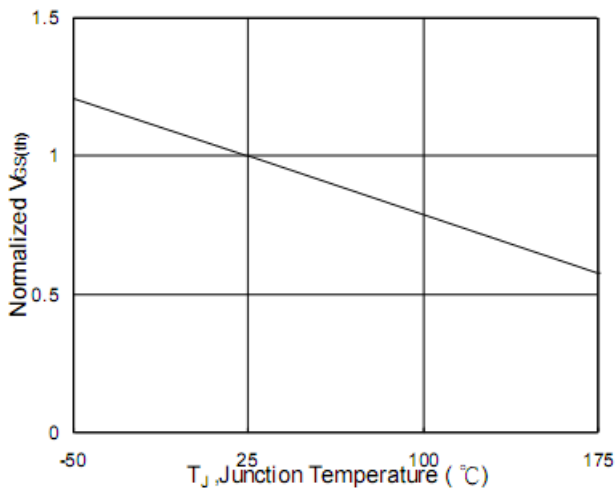


Fig.5 Normalized V<sub>GS(th)</sub> vs. T<sub>J</sub>

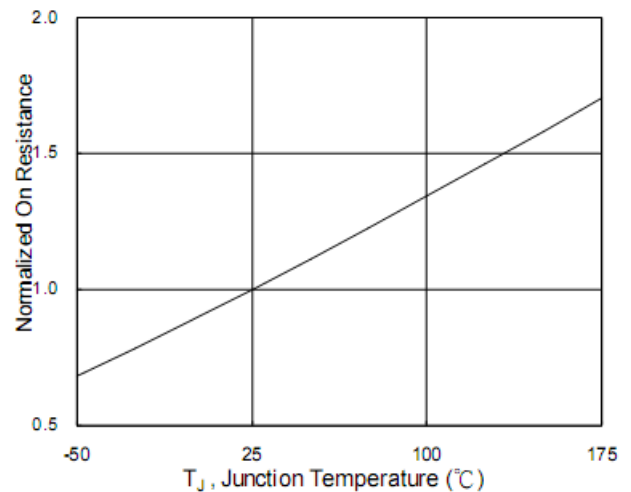


Fig.6 Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>



Fig.7 Capacitance



Fig.8 Safe Operating Area

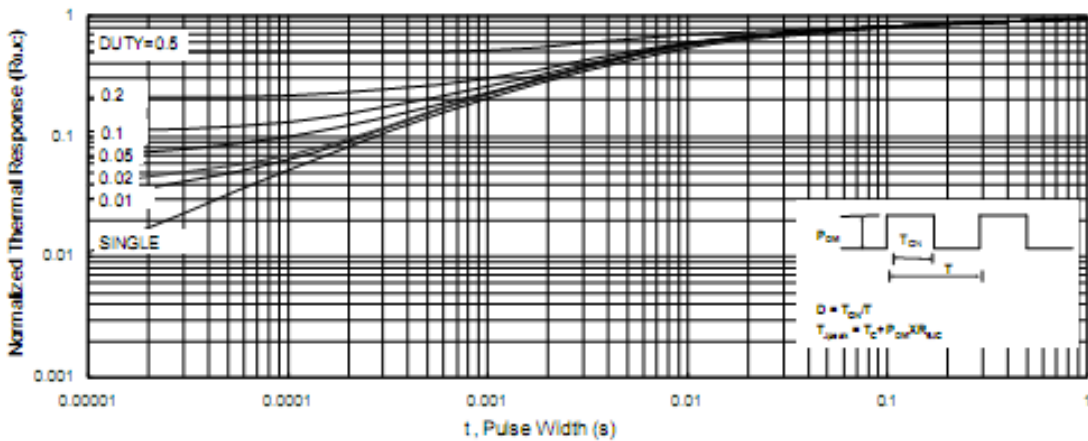


Fig.9 Normalized Maximum Transient Thermal Impedance



Fig.10 Switching Time Waveform

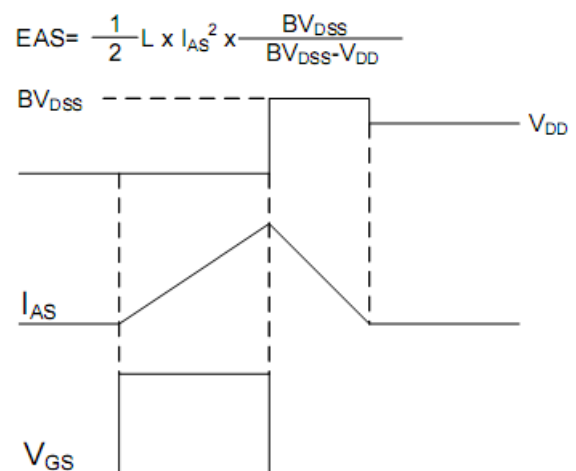
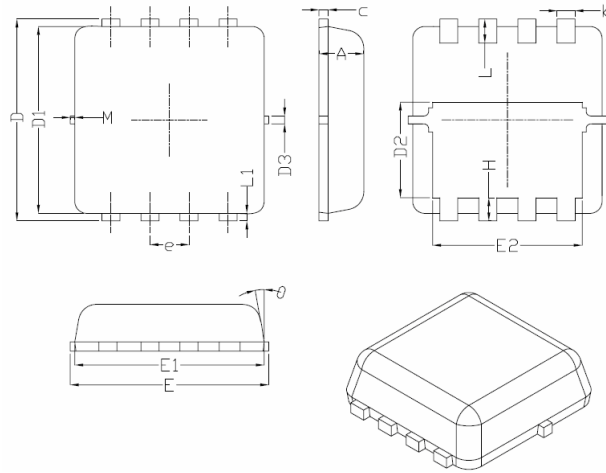


Fig.11 Unclamped Inductive Switching Waveform



### DFN3X3-8L Package Information



| Symbol   | Dimensions In Millimeters |      |      |
|----------|---------------------------|------|------|
|          | Min.                      | Nom. | Max. |
| A        | 0.70                      | 0.75 | 0.80 |
| b        | 0.25                      | 0.30 | 0.35 |
| c        | 0.10                      | 0.15 | 0.25 |
| D        | 3.25                      | 3.35 | 3.45 |
| D1       | 3.00                      | 3.10 | 3.20 |
| D2       | 1.48                      | 1.58 | 1.68 |
| D3       | -                         | 0.13 | -    |
| E        | 3.20                      | 3.30 | 3.40 |
| E1       | 3.00                      | 3.15 | 3.20 |
| E2       | 2.39                      | 2.49 | 2.59 |
| e        | 0.65BSC                   |      |      |
| H        | 0.30                      | 0.39 | 0.50 |
| L        | 0.30                      | 0.40 | 0.50 |
| L1       | -                         | 0.13 | -    |
| M        | *                         | *    | 0.15 |
| $\theta$ |                           | 10°  | 12°  |



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