

## LMNDS02N15SF 150V N-Channel MOSFET

### Features

- 150V, 1.2A,  $R_{DS(ON)} = 480m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS guaranteed

These devices are well suited for high efficiency fast switching applications.

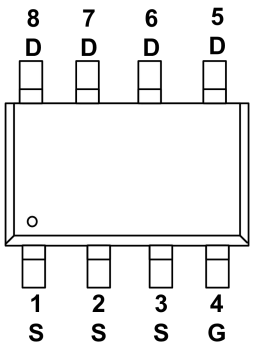
### Product Description

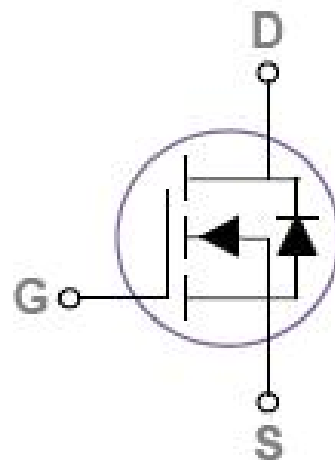
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

### Applications

- Networking
- Load Switch
- LED applications

### Pin Configuration

| LMNDS02N15SF (SOP-8)                                                                                 |             |     |             |
|------------------------------------------------------------------------------------------------------|-------------|-----|-------------|
|  <p>Top Views</p> |             |     |             |
| PIN                                                                                                  | Description | PIN | Description |
| 1                                                                                                    | Source      | 5   | Drain       |
| 2                                                                                                    | Source      | 6   | Drain       |
| 3                                                                                                    | Source      | 7   | Drain       |
| 4                                                                                                    | Gate        | 8   | Drain       |



**Ordering Information**

| Part Number  | P/N        | PKG Code | Pb Free Code | Package | Quantity Reel |
|--------------|------------|----------|--------------|---------|---------------|
| LMNDS02N15SF | LMNDS02N15 | S        | F            | SOP-8   | 4000 pcs      |

**Marking Information**

| Part Marking     | Part Number | LFC code |
|------------------|-------------|----------|
| 02N15S<br>XWMMMM | 02N15S      | XWMMMM   |

**Absolute Maximum Ratings**

(T<sub>A</sub>=25°C Unless otherwise noted)

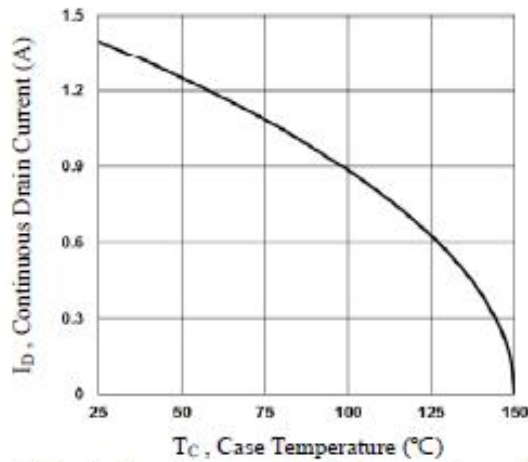
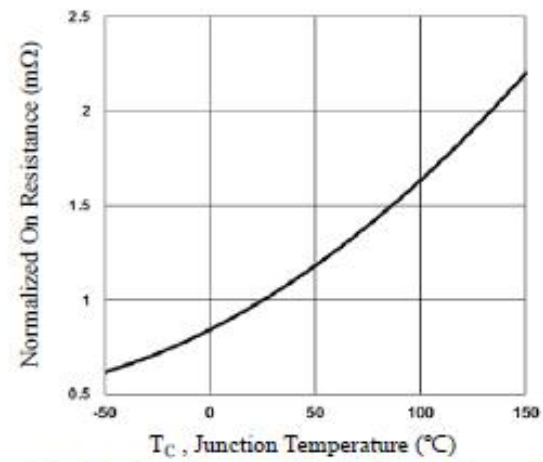
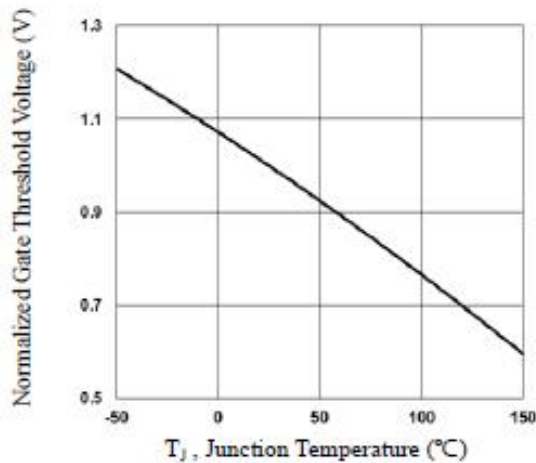
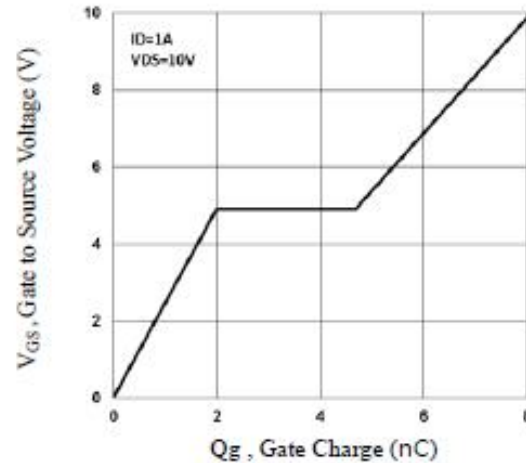
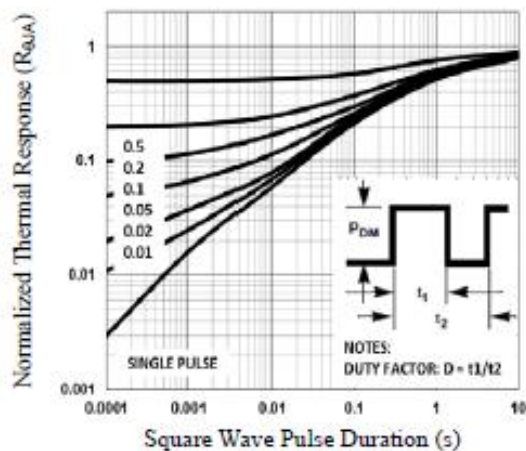
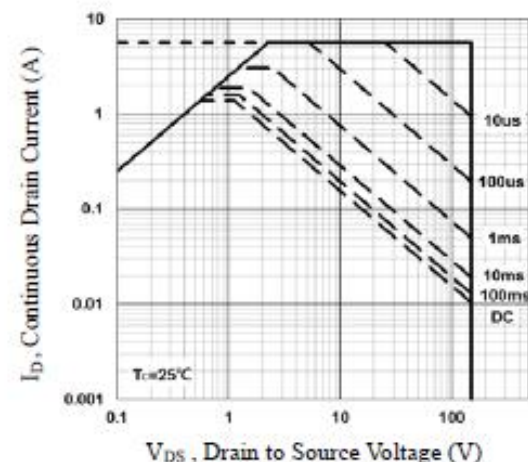
| Symbol           | Parameter                               |                       | Typical     | Unit |
|------------------|-----------------------------------------|-----------------------|-------------|------|
| V <sub>DS</sub>  | Drain-Source Voltage                    |                       | 150         | V    |
| V <sub>GS</sub>  | Gate-Source Voltage                     |                       | ±20         | V    |
| I <sub>D</sub>   | Continuous Drain Current                | T <sub>A</sub> =25°C  | 1.2         | A    |
|                  |                                         | T <sub>A</sub> =100°C | 0.75        |      |
| I <sub>DM</sub>  | Pulsed Drain Current                    |                       | 4.8         | A    |
| P <sub>D</sub>   | Power Dissipation(T <sub>A</sub> =25°C) |                       | 1.56        | W    |
|                  | Power Dissipation(Derate above 25°C)    |                       | 0.012       | W/°C |
| T <sub>J</sub>   | Operating Junction Temperature Range    |                       | -50 to +150 | °C   |
| T <sub>STG</sub> | Storage Temperature Range               |                       | -50 to +150 | °C   |
| R <sub>θJA</sub> | Thermal Resistance-Junction to Ambient  |                       | 80          | °C/W |

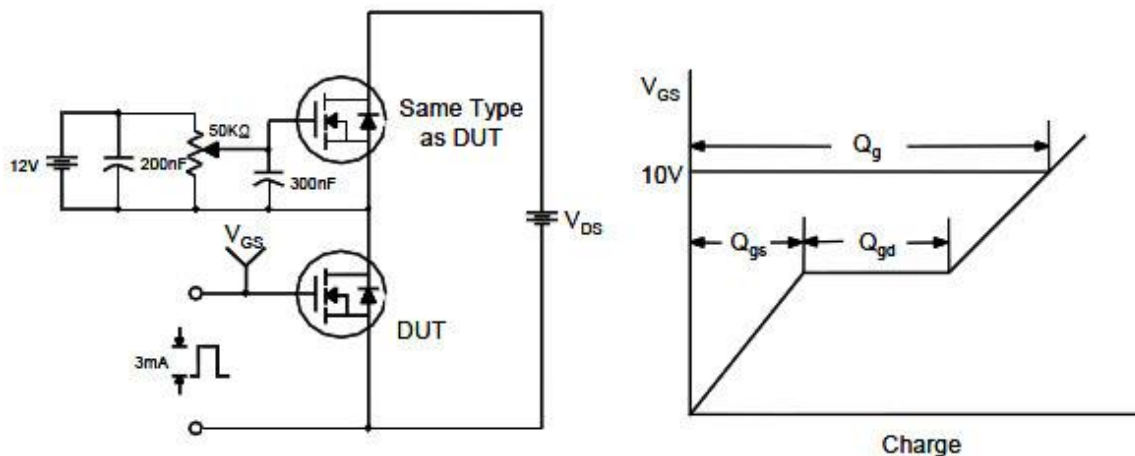
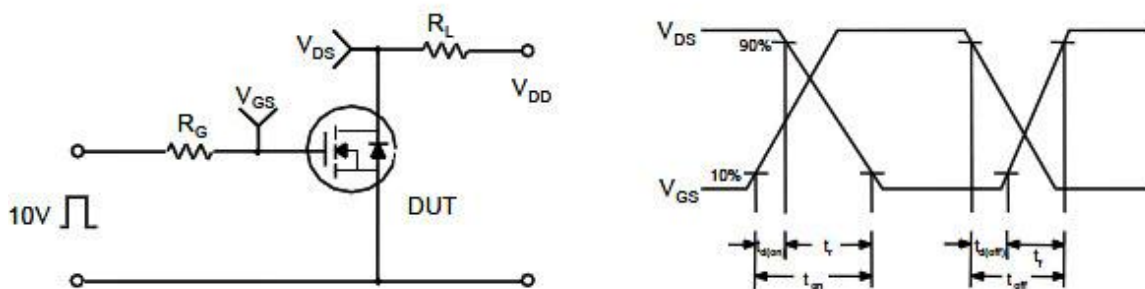
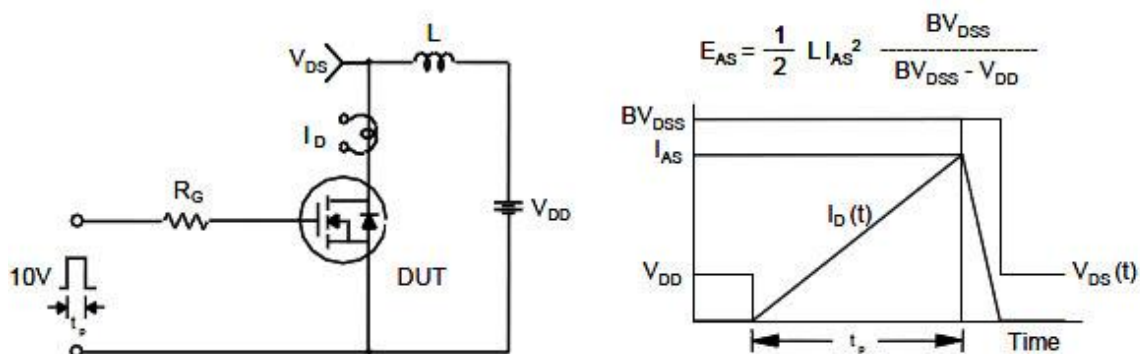
**Electrical Characteristics**

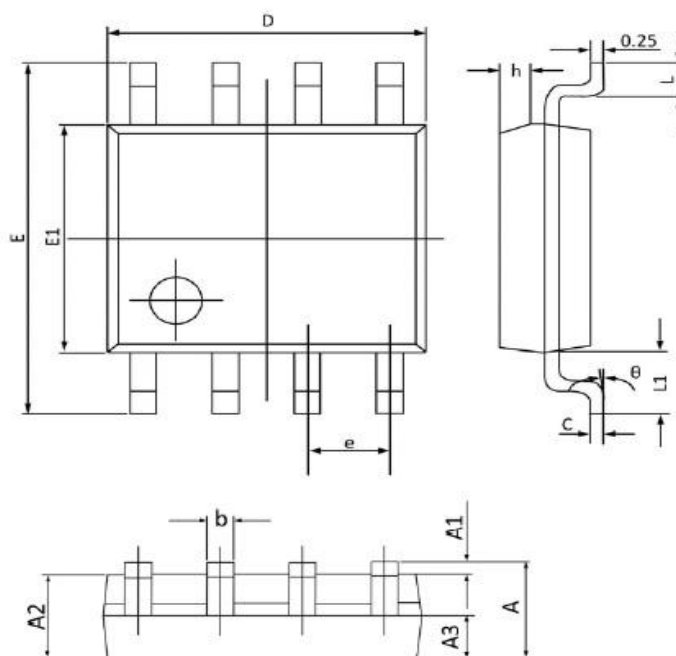
(T<sub>A</sub>=25°C Unless otherwise noted)

| Symbol               | Parameter                       | Conditions                                                                            | Min | Typ  | Max  | Unit |
|----------------------|---------------------------------|---------------------------------------------------------------------------------------|-----|------|------|------|
| Static               |                                 |                                                                                       |     |      |      |      |
| V <sub>(BR)DSS</sub> | Drain-Source Breakdown Voltage  | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                            | 150 |      |      | V    |
| V <sub>GS(th)</sub>  | Gate Threshold Voltage          | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA                              | 2   | 3    | 4    | V    |
| I <sub>GSS</sub>     | Gate Leakage Current            | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                            |     |      | ±100 | nA   |
| I <sub>DSS</sub>     | Zero Gate Voltage Drain Current | V <sub>DS</sub> =150V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                      |     |      | 1    | uA   |
|                      |                                 | V <sub>DS</sub> =120V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C                     |     |      | 10   |      |
| I <sub>DSS</sub>     | Continuous Source Current       | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current                                     |     |      | 1.2  | A    |
| I <sub>DSS</sub>     | Pulsed Source Current           |                                                                                       |     |      | 2.4  |      |
| R <sub>DS(on)</sub>  | Drain-Source On-Resistance      | V <sub>GS</sub> =10V, I <sub>D</sub> =1A                                              |     | 380  | 480  | mΩ   |
|                      |                                 | V <sub>GS</sub> =6V, I <sub>D</sub> =0.5A                                             |     | 410  | 520  |      |
| g <sub>FS</sub>      | Forward Transconductance        | V <sub>DS</sub> =10V, I <sub>D</sub> =1A                                              |     | 1.7  |      | S    |
| V <sub>SD</sub>      | Diode Forward Voltage           | V <sub>GS</sub> =0V, I <sub>S</sub> =1A                                               |     |      | 1    | V    |
| Dynamic              |                                 |                                                                                       |     |      |      |      |
| C <sub>iss</sub>     | Input Capacitance               | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz                                     |     | 350  | 700  | pF   |
| C <sub>oss</sub>     | Output Capacitance              |                                                                                       |     | 34   | 68   |      |
| C <sub>rss</sub>     | Reverse Transfer Capacitance    |                                                                                       |     | 26   | 52   |      |
| Q <sub>g</sub>       | Total Gate Charge               | V <sub>DS</sub> =75V, V <sub>GS</sub> =10V, I <sub>D</sub> =1.0A                      |     | 8.1  | 16   | nC   |
| Q <sub>gs</sub>      | Gate-Source Charge              |                                                                                       |     | 2    | 4    |      |
| Q <sub>gd</sub>      | Gate-Drain Charge               |                                                                                       |     | 2.7  | 5.4  |      |
| t <sub>d(on)</sub>   | Turn-On Time                    | V <sub>DD</sub> =75V, I <sub>D</sub> =1.0A, V <sub>GS</sub> =10V, R <sub>G</sub> =10Ω |     | 8.2  | 16   | ns   |
| T <sub>r</sub>       |                                 |                                                                                       |     | 5.8  | 12   |      |
| t <sub>d(off)</sub>  | Turn-Off Time                   |                                                                                       |     | 14.8 | 28   |      |
| T <sub>f</sub>       |                                 |                                                                                       |     | 8.0  | 16   |      |
| R <sub>g</sub>       | Gate Resistance                 | V <sub>DS</sub> =V <sub>GS</sub> =0V, f=1MHz                                          |     | 2    | 3    | Ω    |

## Typical Performance Characteristics


**Fig.1 Continuous Drain Current vs.  $T_C$** 

**Fig.2 Continuous Drain Current vs.  $T_J$** 

**Fig.3 Normalized  $V_{th}$  vs.  $T_J$** 

**Fig.4 Gate Charge Waveform**

**Fig.5 Normalized Transient Impedance**

**Fig.6 Maximum Safe Operation Area**

**Typical Performance Characteristics (continue.)**
**Gate Charge Test Circuit & Waveform**

**Resistive Switching Test Circuit & Waveforms**

**Unclamped Inductive Switching Test Circuit & Waveforms**


**Package Dimension**
**SOP-8**


| Dimensions |             |       |           |       |
|------------|-------------|-------|-----------|-------|
| Symbol     | Millimeters |       | Inches    |       |
|            | Min         | Max   | Min       | Max   |
| <b>A</b>   | 1.350       | 1.750 | 0.053     | 0.068 |
| <b>A1</b>  | 0.100       | 0.250 | 0.004     | 0.009 |
| <b>A2</b>  | 1.300       | 1.500 | 0.052     | 0.059 |
| <b>A3</b>  | 0.600       | 0.700 | 0.024     | 0.027 |
| <b>b</b>   | 0.390       | 0.480 | 0.016     | 0.018 |
| <b>c</b>   | 0.210       | 0.260 | 0.009     | 0.010 |
| <b>D</b>   | 4.700       | 5.100 | 0.186     | 0.200 |
| <b>E</b>   | 5.800       | 6.200 | 0.229     | 0.244 |
| <b>E1</b>  | 3.700       | 4.100 | 0.146     | 0.161 |
| <b>e</b>   | 1.270 BSC   |       | 0.050 BSC |       |
| <b>h</b>   | 0.250       | 0.500 | 0.010     | 0.019 |
| <b>L</b>   | 0.500       | 0.800 | 0.019     | 0.031 |
| <b>L1</b>  | 1.050 BSC   |       | 0.041 BSC |       |
| <b>θ</b>   | 0°          | 8°    | 0°        | 8°    |