



## Description

The NTTFS5826NL 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

$V_{DS} = 60V$   $I_D = 15A$

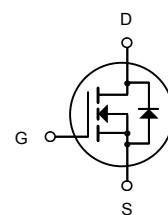
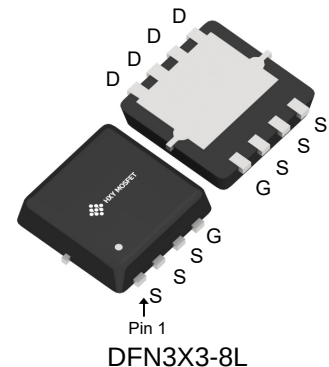
$R_{DS(ON)} < 40m\Omega$  @  $V_{GS}=10V$

## Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

## Package Marking and Ordering Information

| Product ID  | Pack      | Brand      | Qty(PCS) |
|-------------|-----------|------------|----------|
| NTTFS5826NL | 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                                  | 60         | V             |
| $V_{GS}$              | Gate-Source Voltage                                   | $\pm 20$   | V             |
| $I_D@T_A=25^{\circ}C$ | Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup> | 15         | A             |
| $I_D@T_A=70^{\circ}C$ | Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup> | 11         | A             |
| $I_{DM}$              | Pulsed Drain Current <sup>2</sup>                     | 46         | A             |
| EAS                   | Single Pulse Avalanche Energy <sup>3</sup>            | 25.5       | mJ            |
| $I_{AS}$              | Avalanche Current                                     | 20         | A             |
| $P_D@T_C=25^{\circ}C$ | Total Power Dissipation <sup>4</sup>                  | 34.7       | 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         | $^{\circ}C/W$ |



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

| Symbol               | Parameter                                                | Test Condition                                                                          | Min. | Typ. | Max. | Units |
|----------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------|------|------|------|-------|
| V <sub>(BR)DSS</sub> | Drain-Source Breakdown Voltage                           | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                              | 60   | -    | -    | V     |
| I <sub>DSS</sub>     | Zero Gate Voltage Drain Current                          | V <sub>DS</sub> =60V, V <sub>GS</sub> = 0V,                                             | -    | -    | 1.0  | μA    |
| I <sub>GSS</sub>     | Gate to Body Leakage Current                             | V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V                                             | -    | -    | ±100 | nA    |
| V <sub>GS(th)</sub>  | Gate Threshold Voltage                                   | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                | 1.0  | 1.6  | 2.5  | V     |
| R <sub>DS(on)</sub>  | Static Drain-Source on-Resistance<br>note3               | V <sub>GS</sub> =10V, I <sub>D</sub> =5A                                                | -    | 28   | 40   | mΩ    |
|                      |                                                          | V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A                                               | -    | 36   | 50   |       |
| C <sub>iss</sub>     | Input Capacitance                                        | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V,<br>f=1.0MHz                                  | -    | 1148 | -    | pF    |
| C <sub>oss</sub>     | Output Capacitance                                       |                                                                                         | -    | 58.5 | -    | pF    |
| C <sub>rss</sub>     | Reverse Transfer Capacitance                             |                                                                                         | -    | 49.4 | -    | pF    |
| Q <sub>g</sub>       | Total Gate Charge                                        | V <sub>DS</sub> =30V, I <sub>D</sub> =2.5A,<br>V <sub>GS</sub> =10V                     | -    | 20.3 | -    | nC    |
| Q <sub>gs</sub>      | Gate-Source Charge                                       |                                                                                         | -    | 3.7  | -    | nC    |
| Q <sub>gd</sub>      | Gate-Drain(“Miller”) Charge                              |                                                                                         | -    | 5.3  | -    | nC    |
| t <sub>d(on)</sub>   | Turn-on Delay Time                                       | V <sub>DS</sub> =30V, I <sub>D</sub> =5A,<br>R <sub>G</sub> =1.8Ω, V <sub>GS</sub> =10V | -    | 7.6  | -    | ns    |
| t <sub>r</sub>       | Turn-on Rise Time                                        |                                                                                         | -    | 20   | -    | ns    |
| t <sub>d(off)</sub>  | Turn-off Delay Time                                      |                                                                                         | -    | 15   | -    | ns    |
| t <sub>f</sub>       | Turn-off Fall Time                                       |                                                                                         | -    | 24   | -    | ns    |
| I <sub>S</sub>       | Maximum Continuous Drain to Source Diode Forward Current |                                                                                         | -    | -    | 5    | A     |
| I <sub>SM</sub>      | Maximum Pulsed Drain to Source Diode Forward Current     |                                                                                         | -    | -    | 15   | A     |
| V <sub>SD</sub>      | Drain to Source Diode Forward Voltage                    | V <sub>GS</sub> =0V, I <sub>S</sub> =5A                                                 | -    | -    | 1.2  | V     |
| t <sub>rr</sub>      | Body Diode Reverse Recovery Time                         | I <sub>F</sub> =5A, dI/dt=100A/μs                                                       | -    | 29   | -    | ns    |
| Q <sub>rr</sub>      | Body Diode Reverse Recovery Charge                       |                                                                                         | -    | 43   | -    | nC    |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

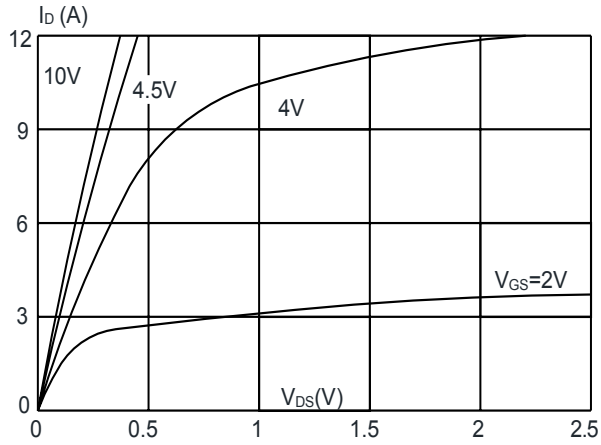
2. EAS condition :  $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega, I_{AS}=8.7A$

3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

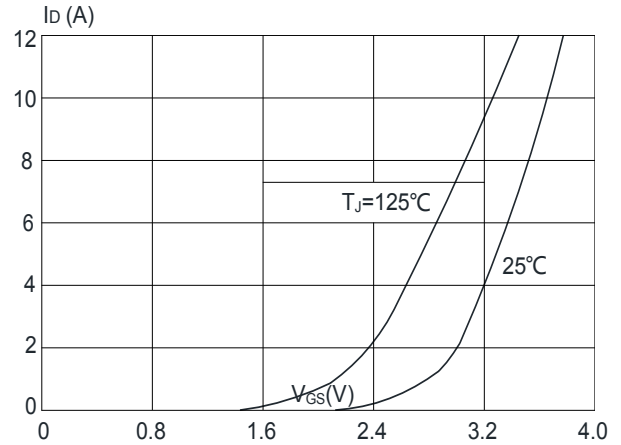


## Typical Characteristics

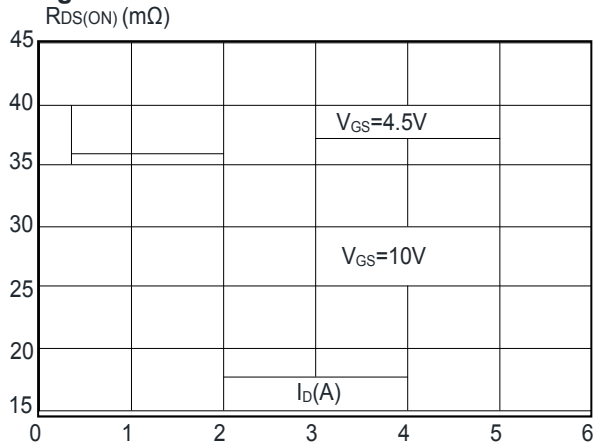
**Figure1:** Output Characteristics



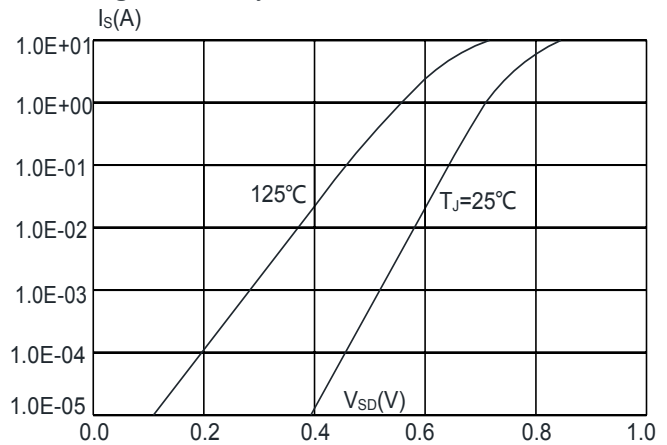
**Figure 2:** Typical Transfer Characteristics



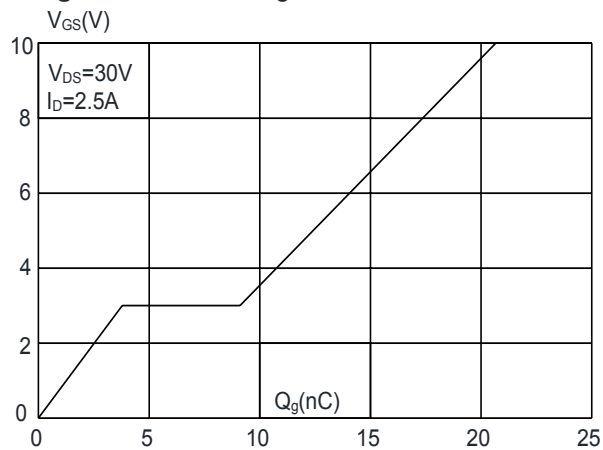
**Figure 3:** On-resistance vs. Drain Current



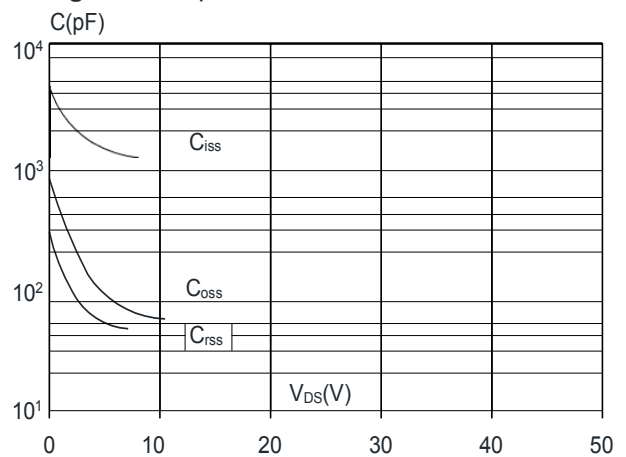
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics

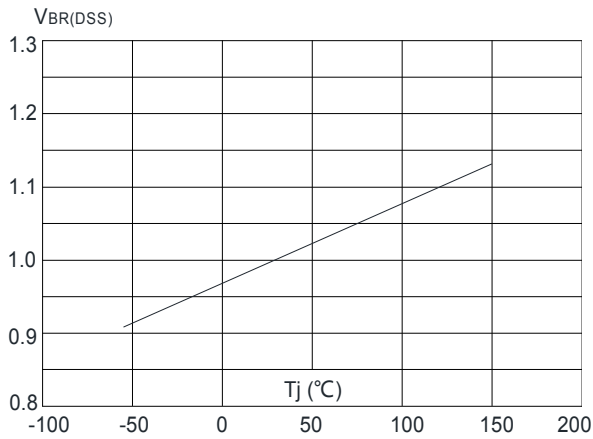


**Figure 6:** Capacitance Characteristics

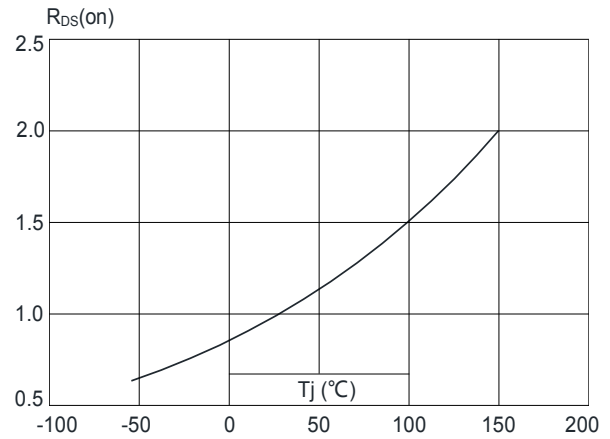




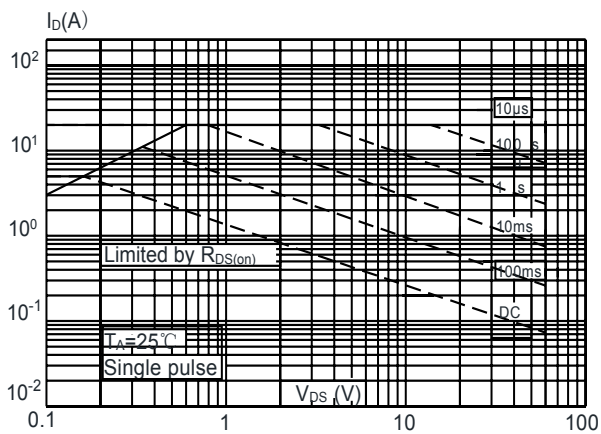
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



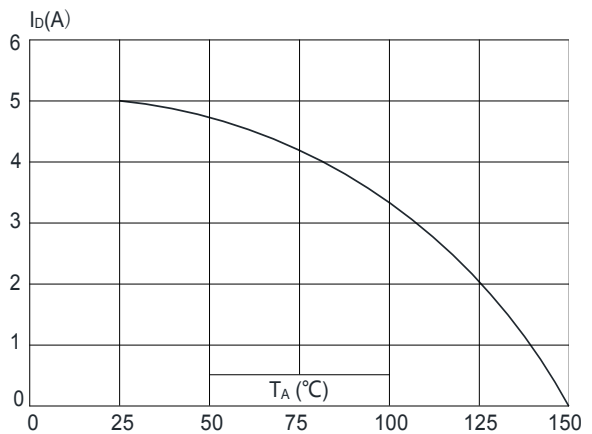
**Figure 8:** Normalized on Resistance vs. Junction Temperature



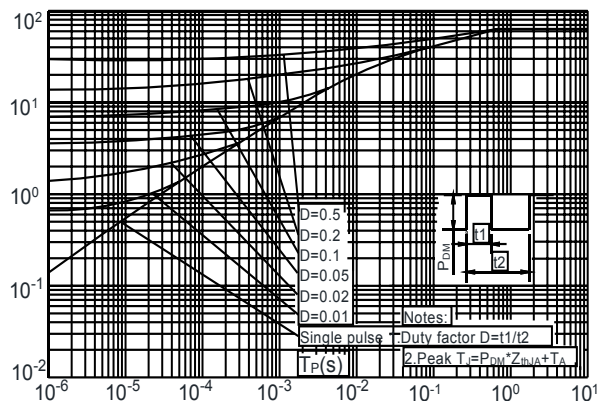
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





## Test Circuit

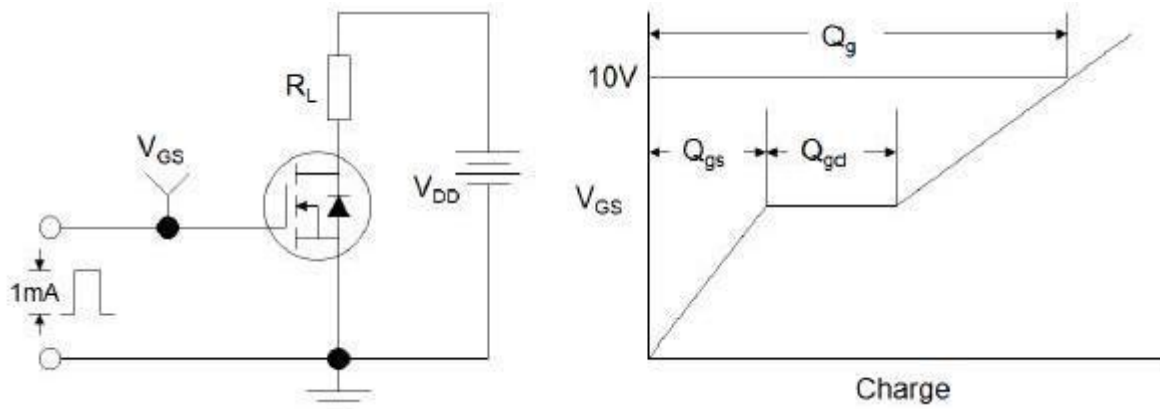


Figure1:Gate Charge Test Circuit & Waveform

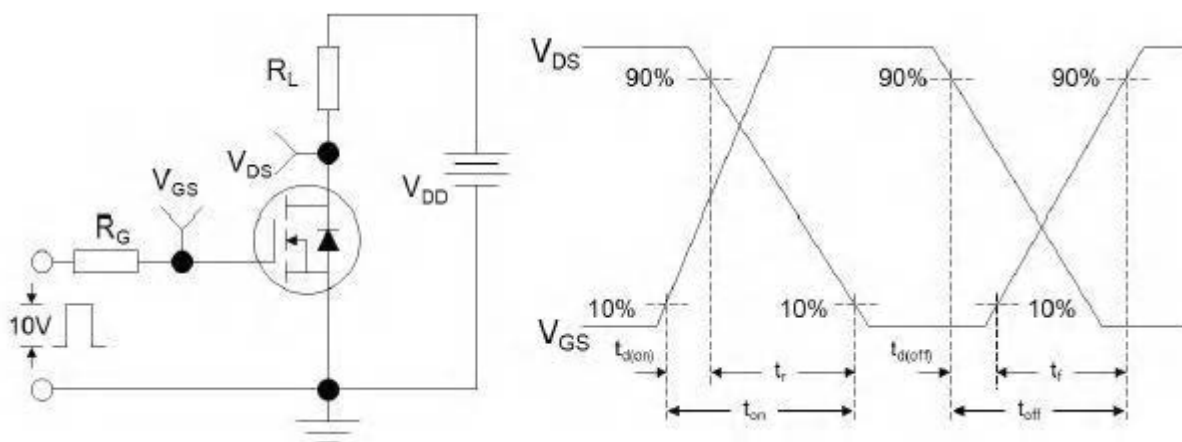


Figure 2: Resistive Switching Test Circuit & Waveforms

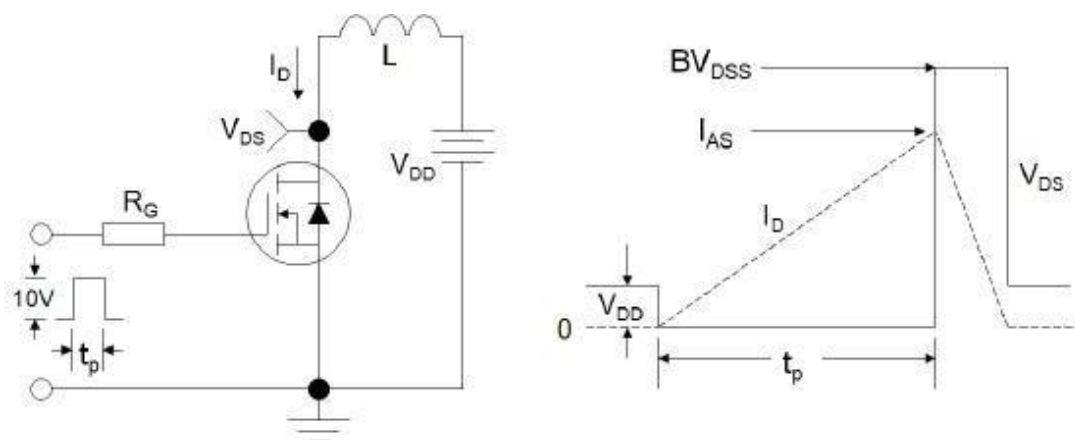
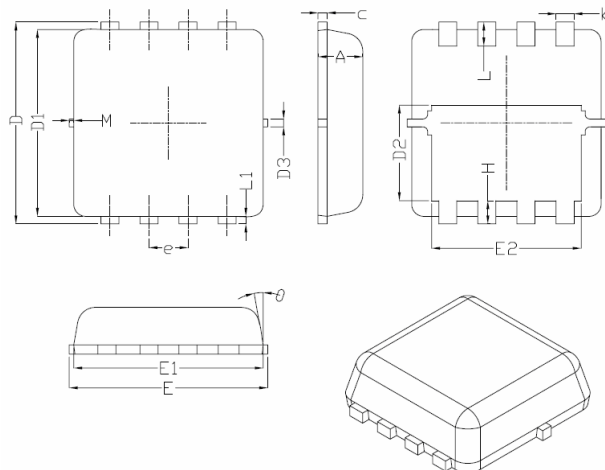


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



## 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 |
| θ      |                           | 10°  | 12°  |



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