



## Description

The HNTMFS4C06N 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

$V_{DS} = 30\text{ V}$   $I_D = 120\text{ A}$

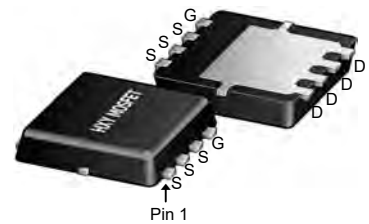
$R_{DS(ON)} < 4.4\text{ m}\Omega$   $V_{GS} = 10\text{ V}$

## Application

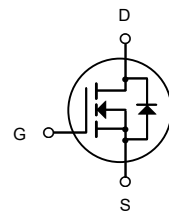
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L



N-Channel MOSFET

## Package Marking and Ordering Information

| Product ID  | Pack      | Brand      | Qty(PCS) |
|-------------|-----------|------------|----------|
| HNTMFS4C06N | DFN5X6-8L | HXY MOSFET | 5000     |

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

| Symbol                          | Parameter                                             | Rating     | Units              |
|---------------------------------|-------------------------------------------------------|------------|--------------------|
| $V_{DS}$                        | Drain-Source Voltage                                  | 30         | V                  |
| $V_{GS}$                        | Gate-Source Voltage                                   | $\pm 20$   | V                  |
| $I_D @ T_C = 25^\circ\text{C}$  | Continuous Drain Current, $V_{GS} @ 10\text{V}^{1,6}$ | 120        | A                  |
| $I_D @ T_C = 100^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10\text{V}^{1,6}$ | 66         | A                  |
| $I_{DM}$                        | Pulsed Drain Current <sup>2</sup>                     | 320        | A                  |
| EAS                             | Single Pulse Avalanche Energy <sup>3</sup>            | 180        | mJ                 |
| $I_{AS}$                        | Avalanche Current                                     | 60         | A                  |
| $P_D @ T_C = 25^\circ\text{C}$  | Total Power Dissipation <sup>4</sup>                  | 187        | W                  |
| $T_{STG}$                       | Storage Temperature Range                             | -55 to 150 | $^\circ\text{C}$   |
| $T_J$                           | Operating Junction Temperature Range                  | -55 to 150 | $^\circ\text{C}$   |
| $R_{\theta JA}$                 | Thermal Resistance Junction-Ambient <sup>1</sup>      | 62         | $^\circ\text{C/W}$ |
| $R_{\theta JC}$                 | Thermal Resistance Junction-Case <sup>1</sup>         | 1.1        | $^\circ\text{C/W}$ |

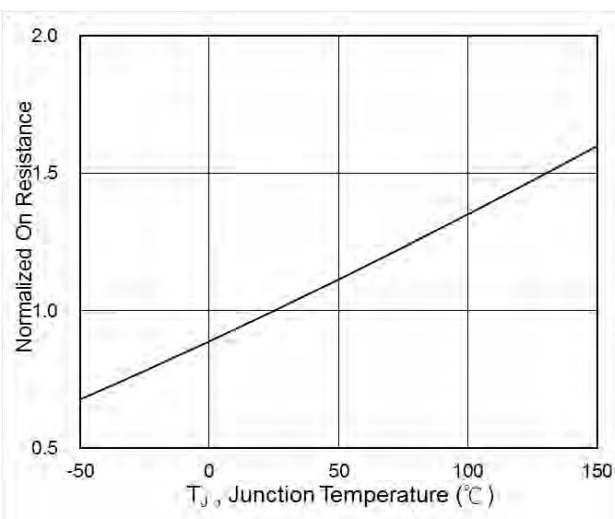
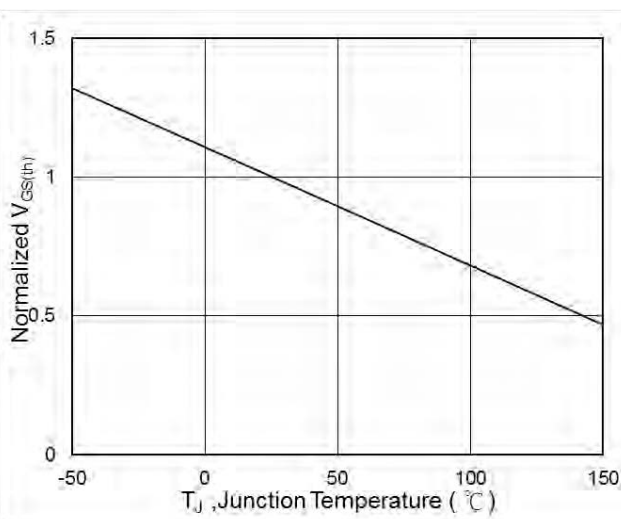
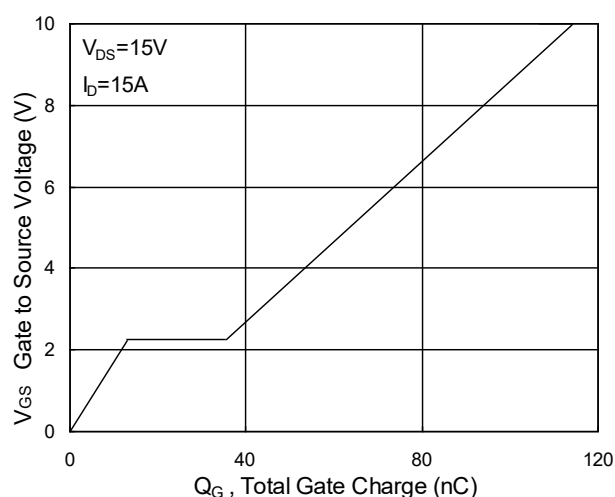
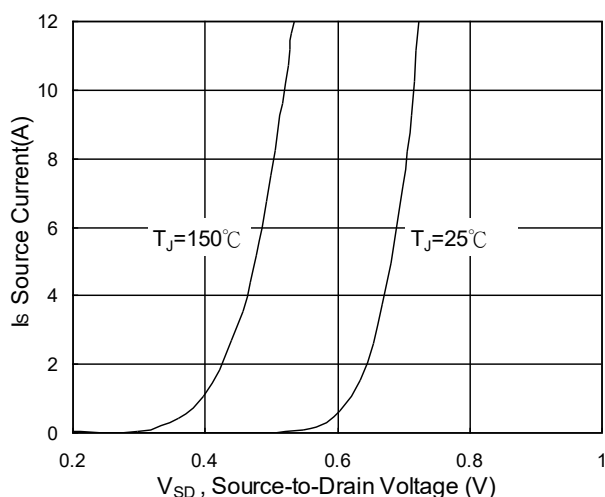
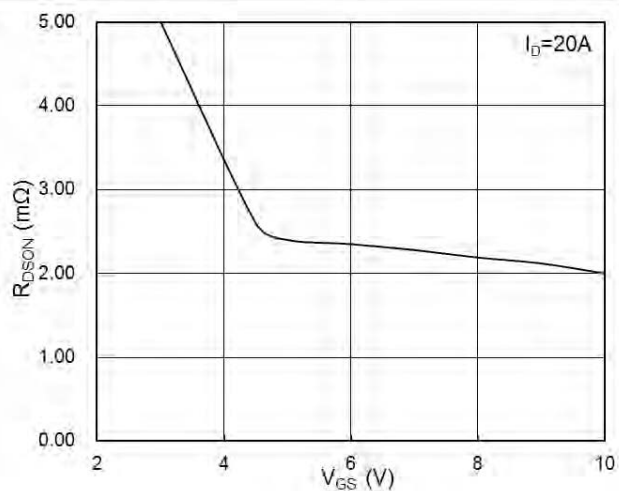
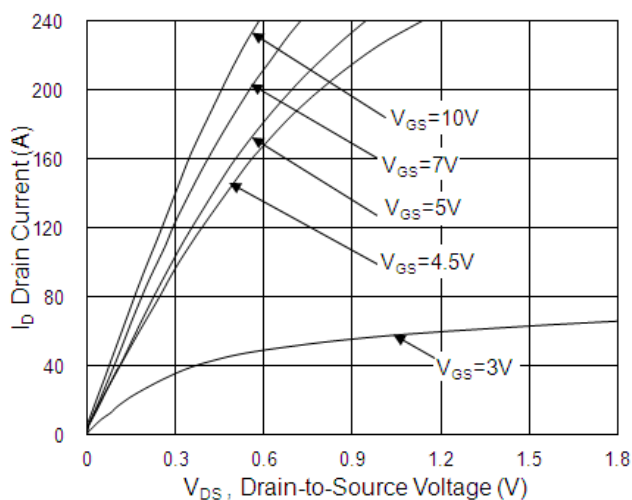


**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

| 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> | BV <sub>DSS</sub> Temperature Coefficient      | Reference to 25°C , I <sub>D</sub> =1mA                                                       | ---  | 0.014 | ---  | 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                                                    | ---  | 3.5   | 4.4  | mΩ    |
|                                     |                                                | V <sub>GS</sub> =4.5V , I <sub>D</sub> =15A                                                   | ---  | 4.6   | 5.8  |       |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                         | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA , I                                  | 1.2  | ---   | 2.5  | V     |
| ΔV <sub>GS(th)</sub>                | V <sub>GS(th)</sub> Temperature Coefficient    |                                                                                               | ---  | -4    | ---  | 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                                                     | ---  | 50    | ---  | S     |
| R <sub>g</sub>                      | Gate Resistance                                | V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz                                            | ---  | 1.7   | ---  | Ω     |
| Q <sub>g</sub>                      | Total Gate Charge (4.5V)                       | V <sub>DS</sub> =15V , V <sub>GS</sub> =10V , I <sub>D</sub> =15A                             | ---  | 56.9  | ---  | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                             |                                                                                               | ---  | 13.8  | ---  |       |
| Q <sub>gd</sub>                     | Gate-Drain Charge                              |                                                                                               | ---  | 23.5  | ---  |       |
| 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> =1A | ---  | 20.1  | ---  | ns    |
| T <sub>r</sub>                      | Rise Time                                      |                                                                                               | ---  | 6.3   | ---  |       |
| T <sub>d(off)</sub>                 | Turn-Off Delay Time                            |                                                                                               | ---  | 124.6 | ---  |       |
| T <sub>f</sub>                      | Fall Time                                      |                                                                                               | ---  | 15.8  | ---  |       |
| C <sub>iss</sub>                    | Input Capacitance                              | V <sub>DS</sub> =15V , V <sub>GS</sub> =0V , f=1MHz                                           | ---  | 4345  | ---  | pF    |
| C <sub>oss</sub>                    | Output Capacitance                             |                                                                                               | ---  | 340   | ---  |       |
| C <sub>rss</sub>                    | Reverse Transfer Capacitance                   |                                                                                               | ---  | 225   | ---  |       |
| I <sub>S</sub>                      | Continuous Source Current <sup>1,6</sup>       | V <sub>G</sub> =V <sub>D</sub> =0V , Force Current                                            | ---  | ---   | 85   | 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     |



## Typical Characteristics



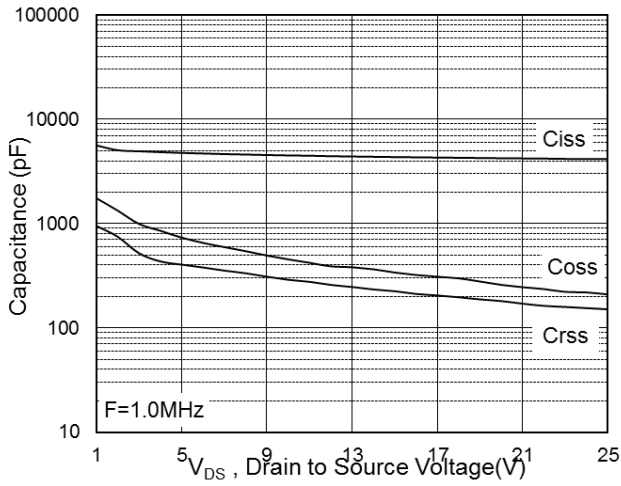


Fig.7 Capacitance

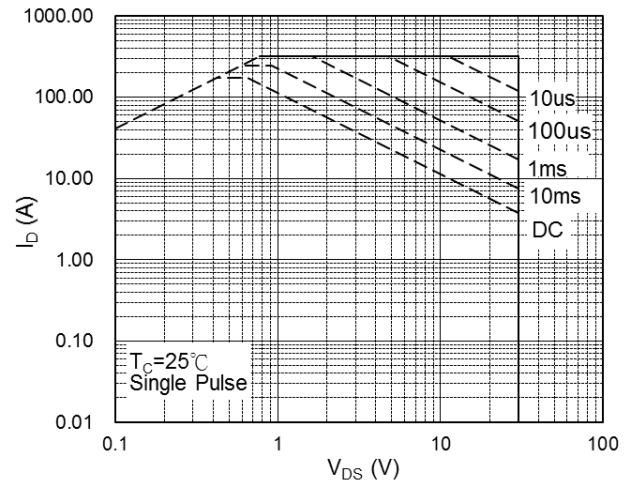


Fig.8 Safe Operating Area

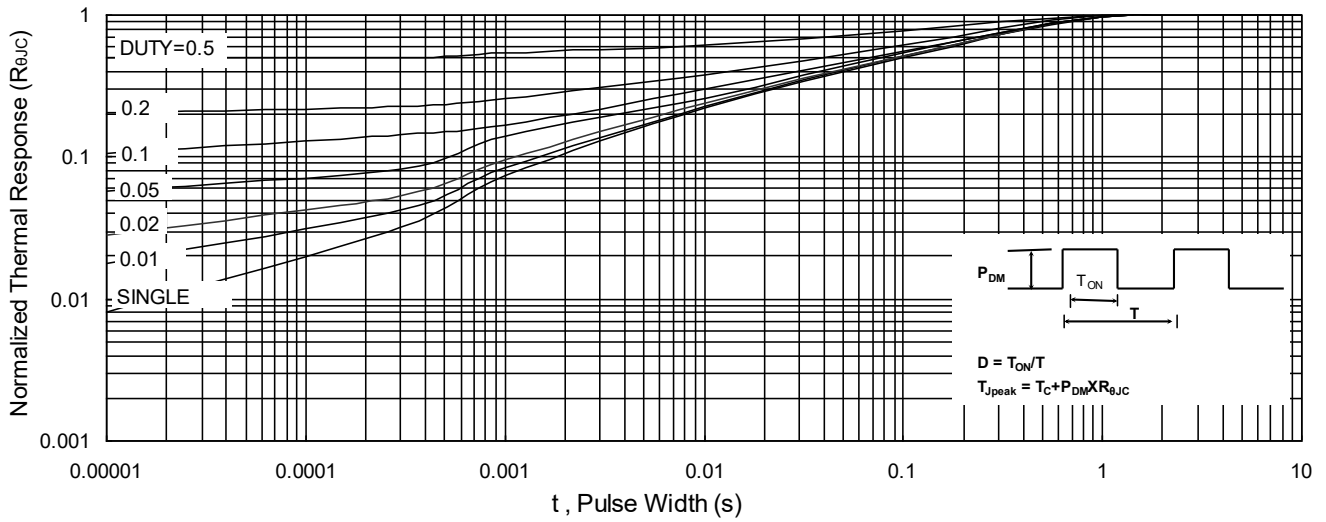


Fig.9 Normalized Maximum Transient Thermal Impedance

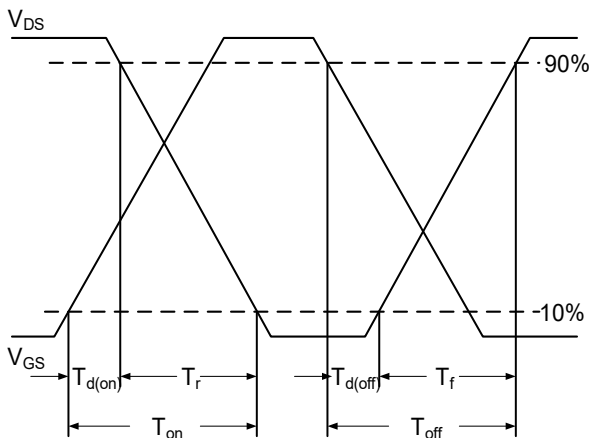


Fig.10 Switching Time Waveform

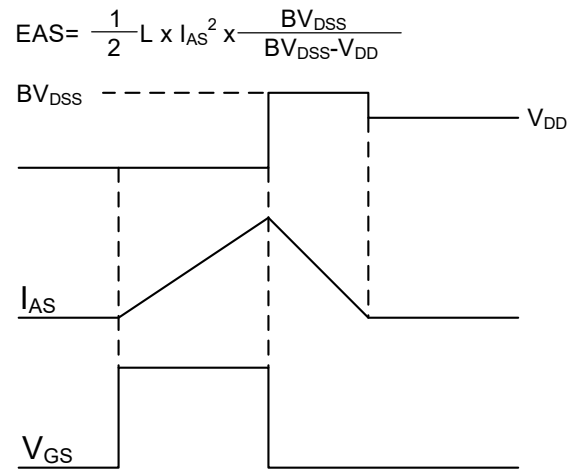
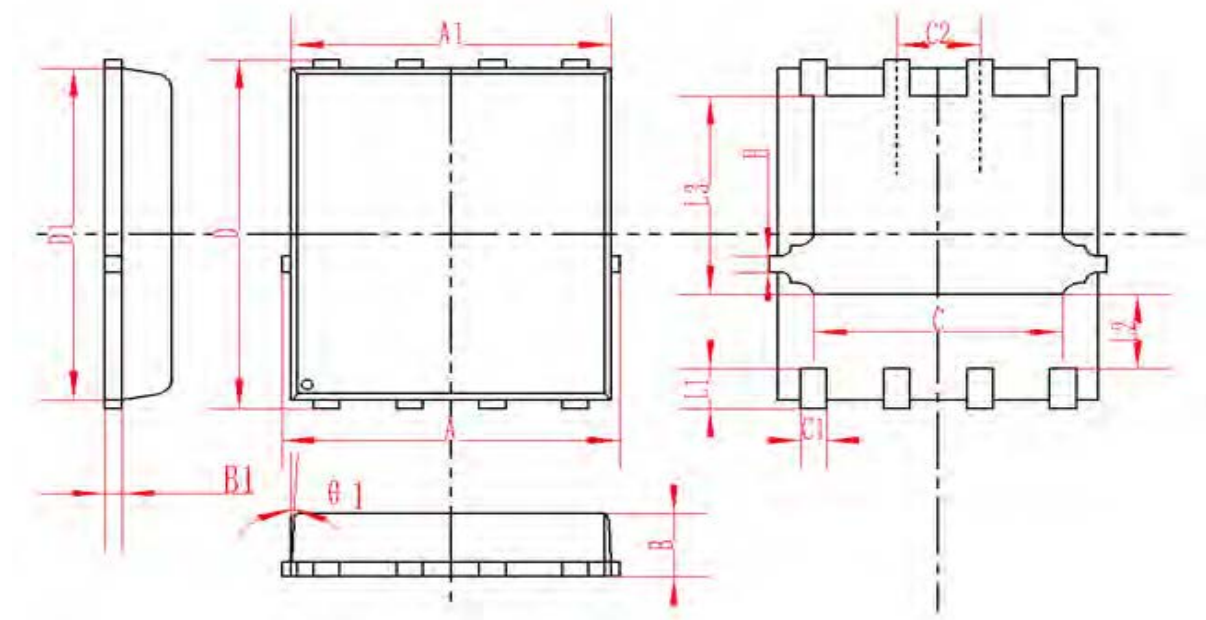


Fig.11 Unclamped Inductive Switching Waveform



## DFN5X6-8L Package Information



| SYMBOL | MM       |      |       | INCH     |       |       |
|--------|----------|------|-------|----------|-------|-------|
|        | MIN      | NOM  | MAX   | MIN      | NOM   | MAX   |
| A      | 5.3      | 5.5  | 5.7   | 0.208    | 0.216 | 0.224 |
| A1     | 5.1      | 5.2  | 5.3   | 0.2      | 0.204 | 0.209 |
| D      | 5.98     | 6    | 6.02  | 0.235    | 0.236 | 0.237 |
| D1     | 5.85     | 6.05 | 6.25  | 0.23     | 0.238 | 0.246 |
| B      | 0.85     | 0.95 | 1.05  | 0.033    | 0.037 | 0.041 |
| B1     | 0.254REF |      |       | 0.010REF |       |       |
| C      | 3.95     | 4    | 4.05  | 0.156    | 0.157 | 0.159 |
| C1     | 0.35     | 0.4  | 0.45  | 0.014    | 0.016 | 0.018 |
| C2     | 1.27TYP  |      |       | 0.5TYP   |       |       |
| θ1     | 8°       | 10°  | 12°   | 8°       | 10°   | 12°   |
| L1     | 0.63     | 0.64 | 0.65  | 0.025    | 0.025 | 0.026 |
| L2     | 1.2      | 1.3  | 1.4   | 0.047    | 0.051 | 0.055 |
| L3     | 3.415    | 3.42 | 3.425 | 0.134    | 0.135 | 0.135 |
| H      | 0.24     | 0.25 | 0.26  | 0.009    | 0.010 | 0.010 |



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