



## Description

The NVMFS5C673NLAFT3G 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

$V_{DS} = 60V$   $I_D = 65A$

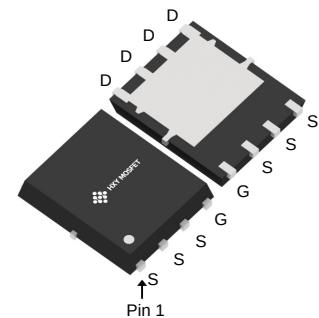
$R_{DS(ON)} < 11m\Omega$   $V_{GS}=10V$

## Application

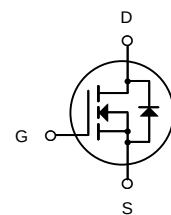
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L



N-Channel MOSFET

## Ordering Information

| Product ID        | Pack      | Brand      | Qty(PCS) |
|-------------------|-----------|------------|----------|
| NVMFS5C673NLAFT3G | DFN5X6-8L | 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             |
| $I_D@T_C=25^{\circ}C$ | Continuous Drain Current, $V_{GS} @ 10V$         | 65         | A             |
| $I_D@T_C=70^{\circ}C$ | Continuous Drain Current, $V_{GS} @ 10V$         | 49         | A             |
| $I_{DM}$              | Pulsed Drain Current <sup>2</sup>                | 180        | A             |
| EAS                   | Single Pulse Avalanche Energy <sup>3</sup>       | 56         | mJ            |
| $P_D@T_C=25^{\circ}C$ | Total Power Dissipation <sup>4</sup>             | 89         | W             |
| $T_{STG}$             | Storage Temperature Range                        | -55 to 150 | $^{\circ}C$   |
| $T_J$                 | Operating Junction Temperature Range             | -55 to 150 | $^{\circ}C$   |
| $R_{\theta JA}$       | Thermal Resistance Junction-Ambient <sup>1</sup> | 62         | $^{\circ}C/W$ |



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

| Symbol                                                 | Parameter                                                 | Test Condition                                                                           | Min. | Typ. | Max. | Units |
|--------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------|------|------|------|-------|
| Off Characteristic                                     |                                                           |                                                                                          |      |      |      |       |
| 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    |
| On Characteristics                                     |                                                           |                                                                                          |      |      |      |       |
| 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><small>note3</small> | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                                | -    | 8    | 11   | mΩ    |
|                                                        |                                                           | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A                                               | -    | 14   | 20   |       |
| Dynamic Characteristics                                |                                                           |                                                                                          |      |      |      |       |
| C <sub>iss</sub>                                       | Input Capacitance                                         | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V,<br>f=1.0MHz                                   | -    | 930  | -    | pF    |
| C <sub>oss</sub>                                       | Output Capacitance                                        |                                                                                          | -    | 370  | -    | pF    |
| C <sub>rss</sub>                                       | Reverse Transfer Capacitance                              |                                                                                          | -    | 20   | -    | pF    |
| Q <sub>g</sub>                                         | Total Gate Charge                                         | V <sub>DS</sub> =30V, I <sub>D</sub> =20A,<br>V <sub>GS</sub> =10V                       | -    | 19   | -    | nC    |
| Q <sub>gs</sub>                                        | Gate-Source Charge                                        |                                                                                          | -    | 4.8  | -    | nC    |
| Q <sub>gd</sub>                                        | Gate-Drain(“Miller”) Charge                               |                                                                                          | -    | 4.5  | -    | nC    |
| Switching Characteristics                              |                                                           |                                                                                          |      |      |      |       |
| t <sub>d(on)</sub>                                     | Turn-on Delay Time                                        | V <sub>DD</sub> =30V, I <sub>D</sub> =20A,<br>R <sub>G</sub> =1.6Ω, V <sub>GS</sub> =10V | -    | 4.9  | -    | ns    |
| t <sub>r</sub>                                         | Turn-on Rise Time                                         |                                                                                          | -    | 31   | -    | ns    |
| t <sub>d(off)</sub>                                    | Turn-off Delay Time                                       |                                                                                          | -    | 23   | -    | ns    |
| t <sub>f</sub>                                         | Turn-off Fall Time                                        |                                                                                          | -    | 8.7  | -    | ns    |
| Drain-Source Diode Characteristics and Maximum Ratings |                                                           |                                                                                          |      |      |      |       |
| I <sub>S</sub>                                         | Maximum Continuous Drain to Source Diode Forward Current  |                                                                                          | -    | -    | 65   | A     |
| I <sub>SM</sub>                                        | Maximum Pulsed Drain to Source Diode Forward Current      |                                                                                          | -    | -    | 240  | A     |
| V <sub>SD</sub>                                        | Drain to Source Diode Forward Voltage                     | V <sub>GS</sub> =0V, I <sub>S</sub> =30A                                                 | -    | -    | 1.4  | V     |
| t <sub>rr</sub>                                        | Body Diode Reverse Recovery Time                          | T <sub>J</sub> =25°C,<br>I <sub>F</sub> =20A,dl/dt=100A/μs                               | -    | 34   | -    | ns    |
| Q <sub>rr</sub>                                        | Body Diode Reverse Recovery Charge                        |                                                                                          | -    | 14   | -    | nC    |

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

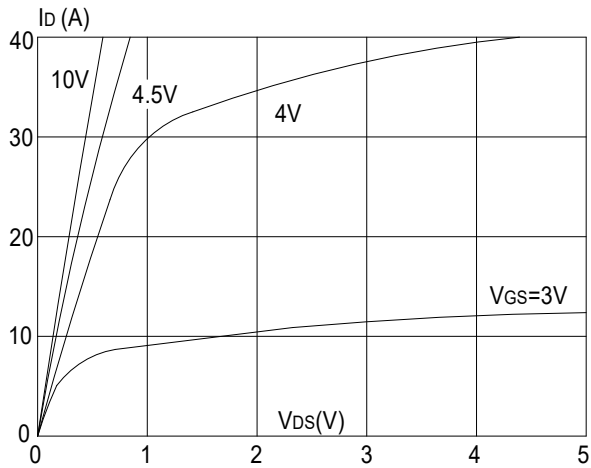
2. EAS condition:  $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, R_G=25\Omega, L=0.5mH, I_{AS}=12A$

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

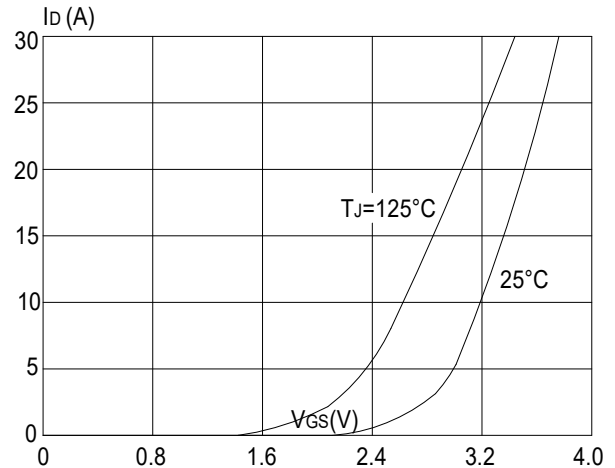


## Typical Performance Characteristics

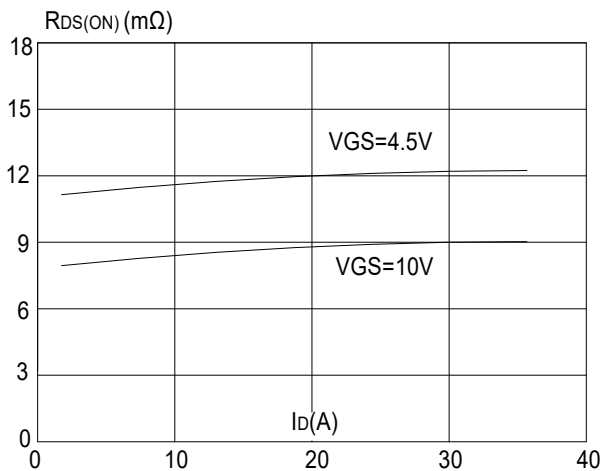
**Figure1: Output Characteristics**



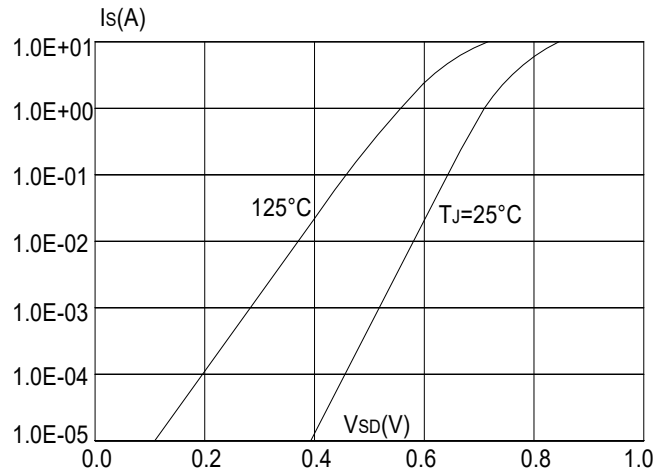
**Figure 2: Typical Transfer Characteristics**



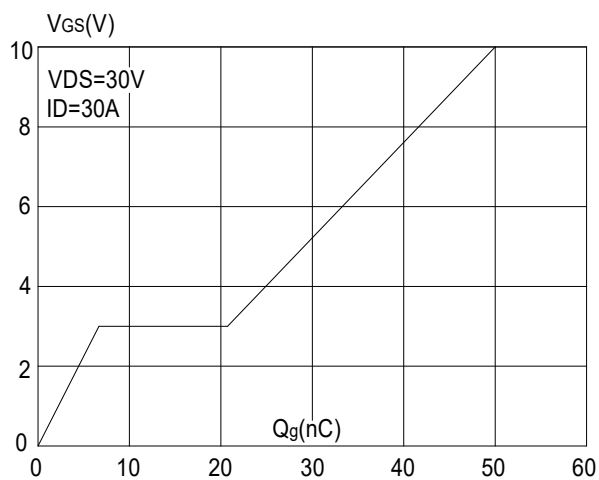
**Figure 3: On-resistance vs. Drain Current**



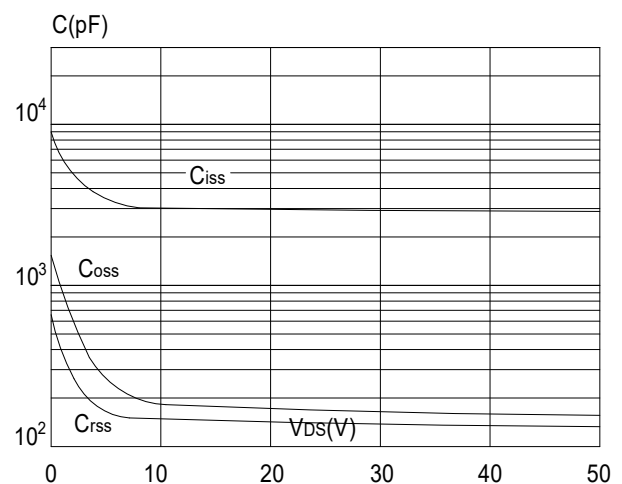
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**

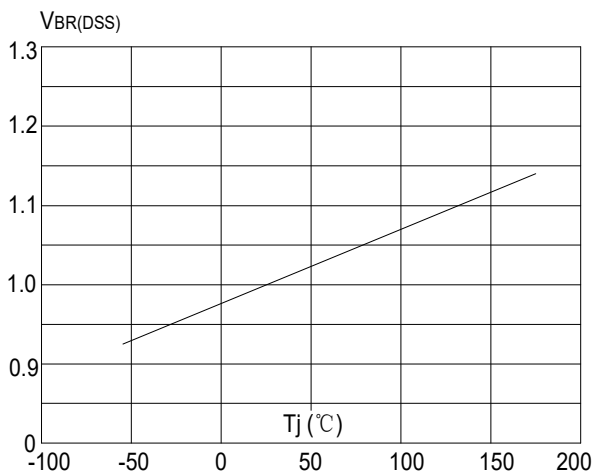


**Figure 6: Capacitance Characteristics**

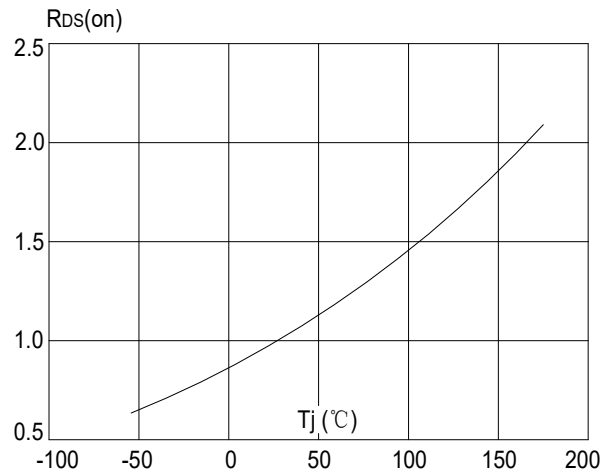




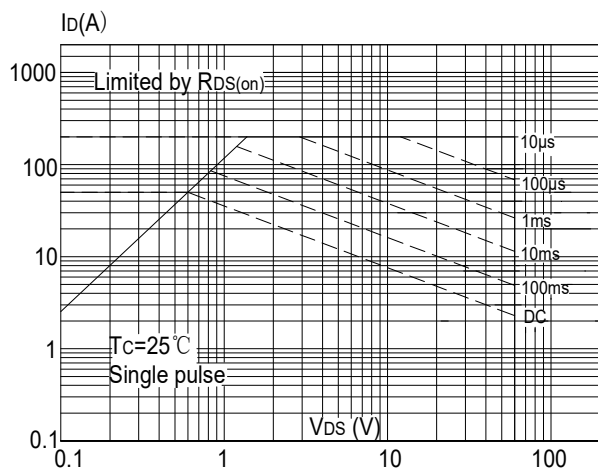
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



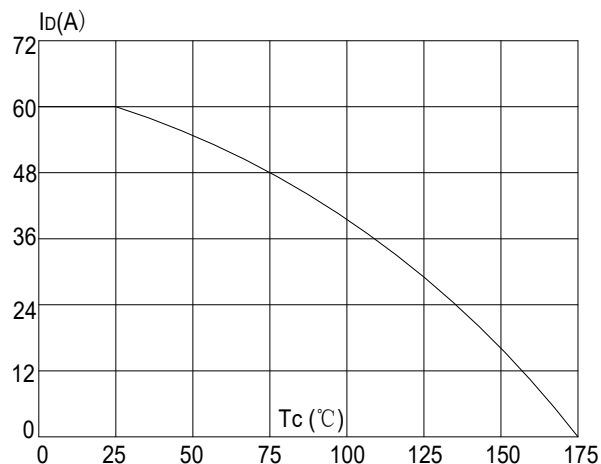
**Figure 8:** Normalized on Resistance vs. Junction Temperature



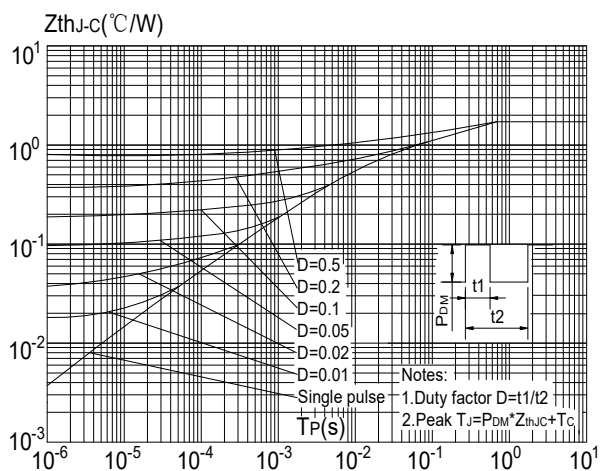
**Figure 9:** Maximum Safe Operating Area



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

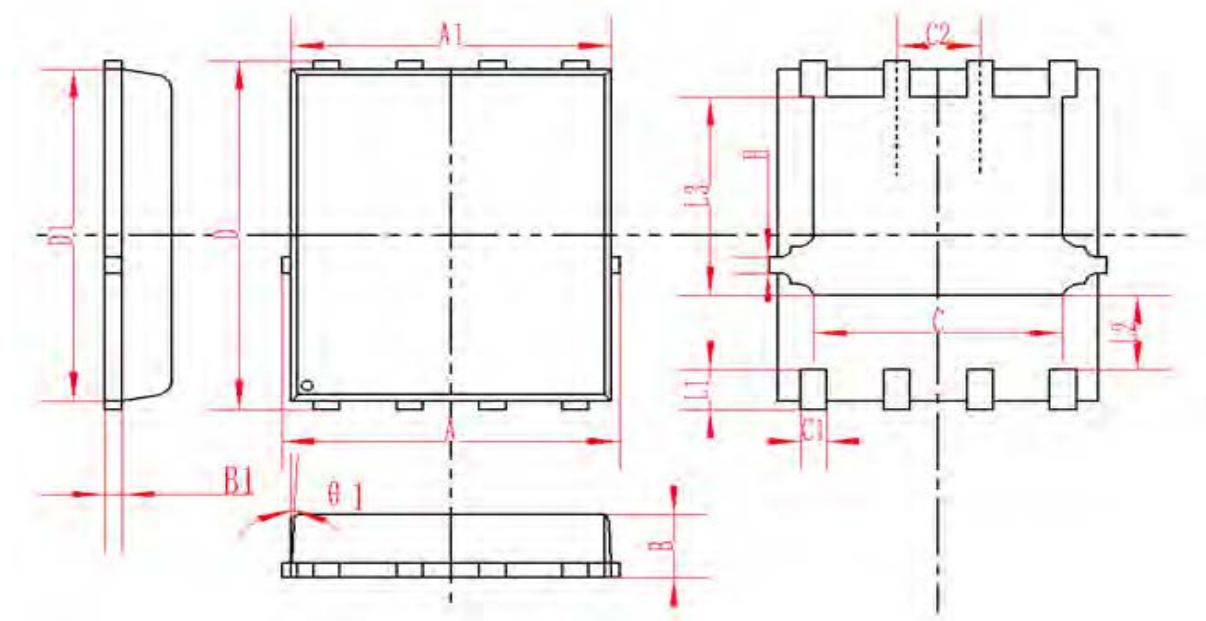


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case





## DFN5X6-8L Package Information



| SYMBOL | MM       |      |       | INCH     |       |       |
|--------|----------|------|-------|----------|-------|-------|
|        | MIN      | NOM  | MAX   | MIN      | NOM   | MAX   |
| A      | 4.95     | 5    | 5.05  | 0.195    | 0.197 | 0.199 |
| A1     | 4.82     | 4.9  | 4.98  | 0.190    | 0.193 | 0.196 |
| D      | 5.98     | 6    | 6.02  | 0.235    | 0.236 | 0.237 |
| D1     | 5.67     | 5.75 | 5.83  | 0.223    | 0.226 | 0.230 |
| B      | 0.9      | 0.95 | 1     | 0.035    | 0.037 | 0.039 |
| 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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