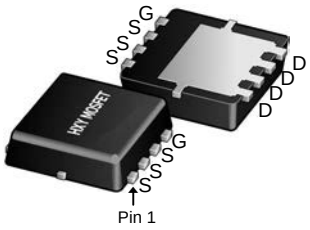
## General Description

The NVTFS5C478NLTAG use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics

This device is specially designed to get better ruggedness.

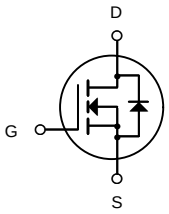



DFN3X3-8L

### General Features

$V_{DS}$ =40V $I_D$ =60 A

$R_{DS(ON)}$ < 8.5mΩ@ $V_{GS}$=10V




N-Channel MOSFET

## Applications

Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| NVTFS5C478NLTAG | DFN3X3-8L | HXY MOSFET | 5000 |

## Absolute Maximum Ratings at $T_j$=25℃ unless otherwise noted

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain source voltage | VDS | 40 | V |
| Gate source voltage | VGS | ±20 | V |
| Continuous drain current[1)] | ID | 60 | A |
| Pulsed drain current[2)] | ID, pulse | 130 | A |
| Power dissipation[3)] | $P_D$ | 39 | W |
| Single pulsed avalanche energy[5)] | EAS | 48 | mJ |
| Operation and storage temperature | Tstg，Tj | -55 to 150 | ℃ |
| Thermal resistance, junction-case | RθJC | 3.2 | °C/W |
| Thermal resistance, junction-ambient[4)] | RθJA | 60 | °C/W |

## Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 40 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=12A | --- | 6.9 | 8.5 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=10A | --- | 10.0 | 15 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.35 | --- | 3 | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=32V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=32V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 1.7 | --- | Ω |
| $Q_g$ | Total Gate Charge (4.5V) | $V_{DS}$=20V , $V_{GS}$=4.5V , $I_D$=12A | --- | 5.8 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 3 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 1.2 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=15V , $V_{GS}$=10V , $R_G$=3.3Ω $I_D$=1A | --- | 14.3 | --- | ns |
| $T_r$ | Rise Time | | --- | 5.6 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 20 | --- | |
| $T_f$ | Fall Time | | --- | 11 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 690 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 193 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 38 | --- | |

## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,5] | $V_G$=$V_D$=0V , Force Current | --- | --- | 60 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1 | V |

Note :
1.The data tested by surface mounted on a 1 inch$^2$ 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 $V_{DD}$=25V,$V_{GS}$=10V,L=0.1mH,$I_{AS}$=31A
4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

## Typical Characteristics

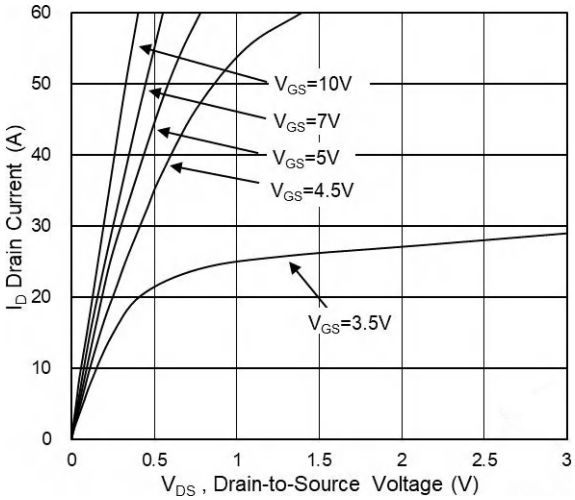



**Fig.1 Typical Output Characteristics**

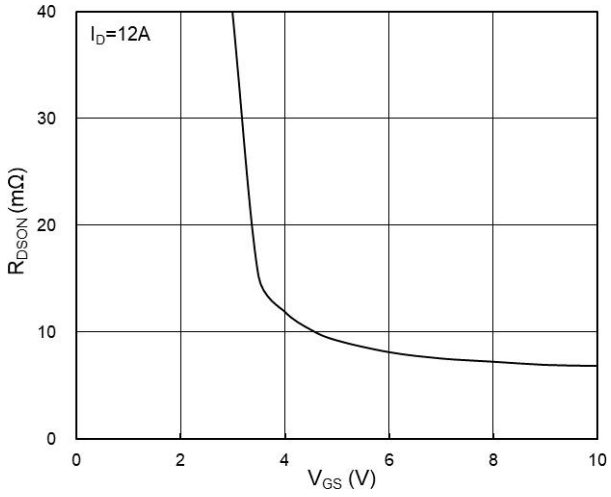



**Fig.2 On-Resistance vs G-S Voltage**

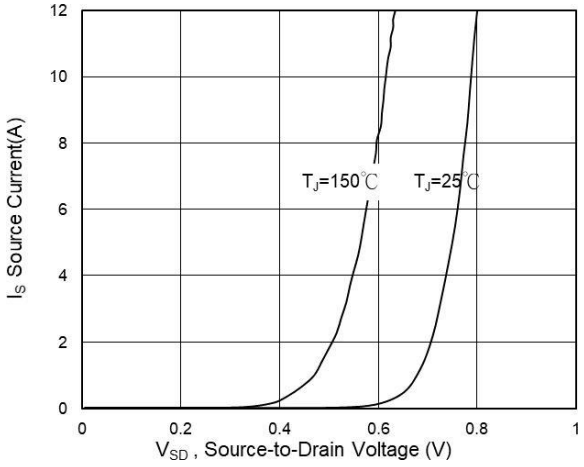



**Fig.3 Source Drain Forward Characteristics**

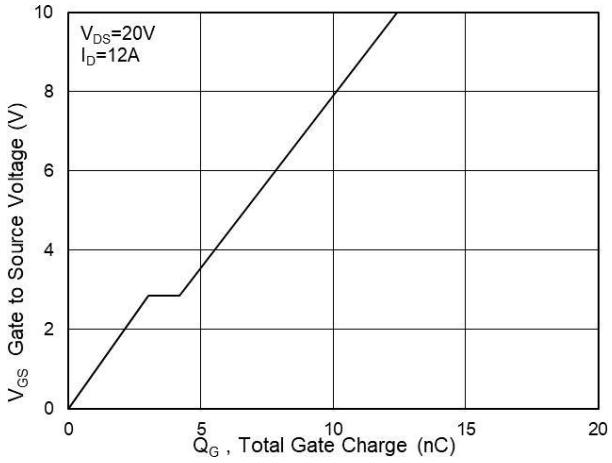



**Fig.4 Gate-Charge Characteristics**

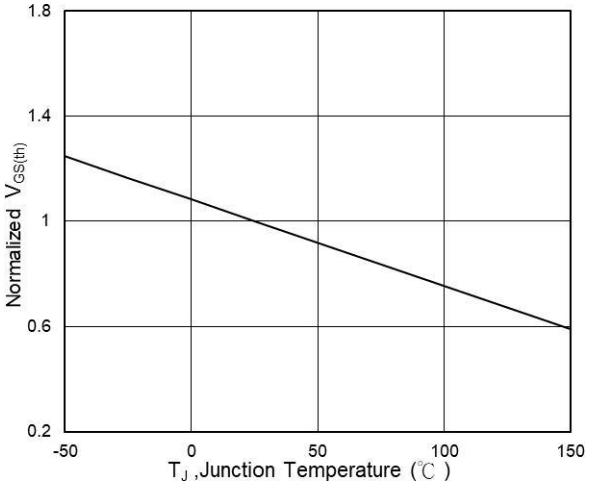



**Fig.5 Normalized $V_{GS(th)}$ vs $T_J$**

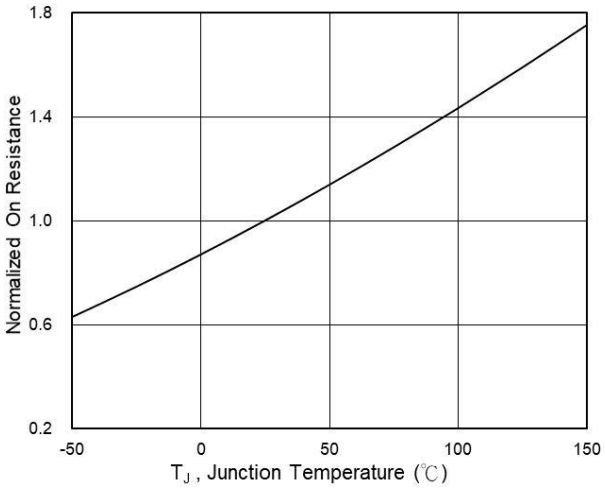



**Fig.6 Normalized $R_{DSON}$ vs $T_J$**

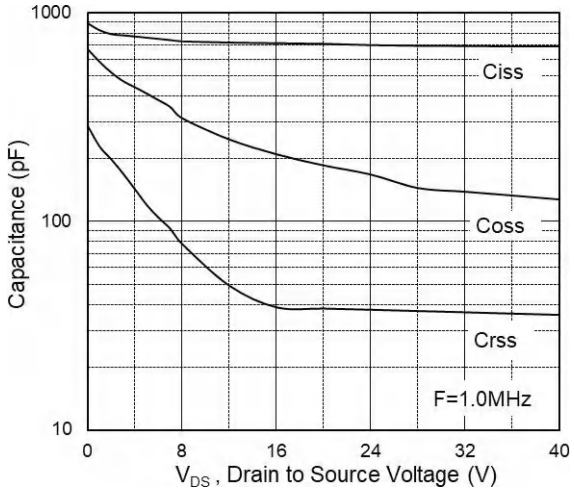



**Fig.7 Capacitance**

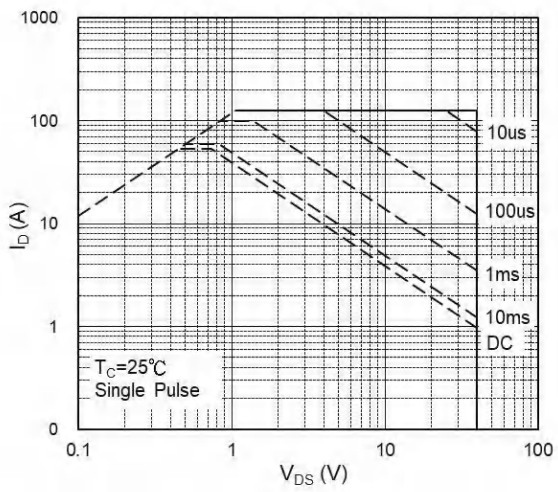



**Fig.8 Safe Operating Area**

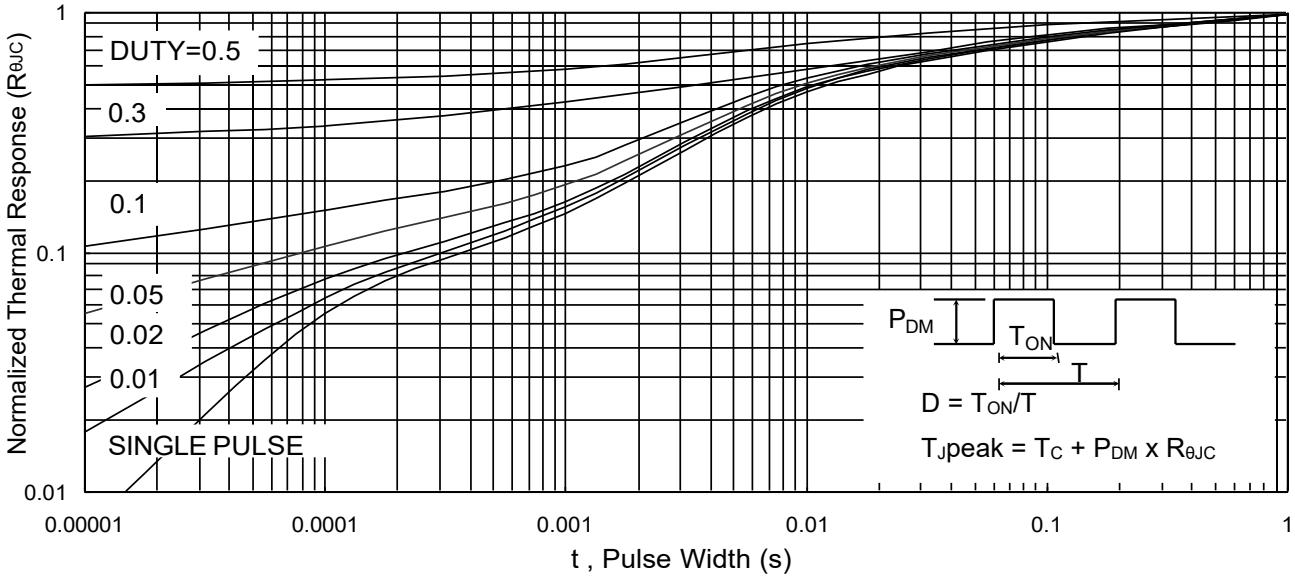
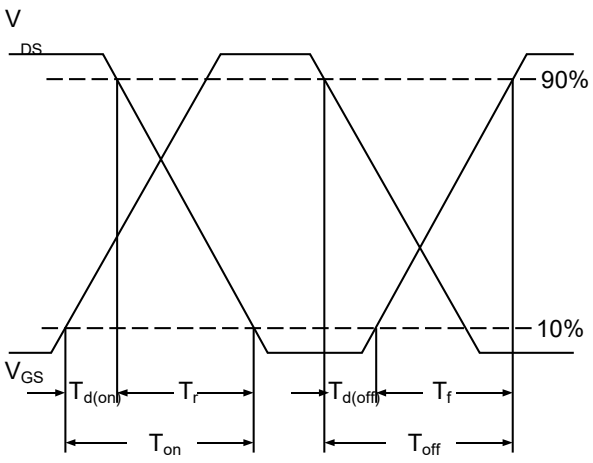



**Fig.9 Normalized Maximum Transient Thermal Impedance**



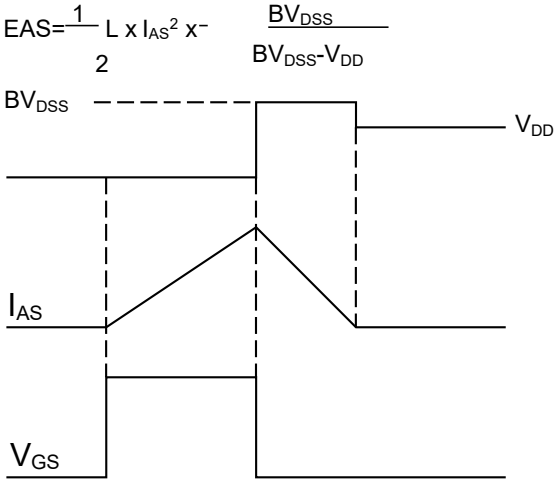
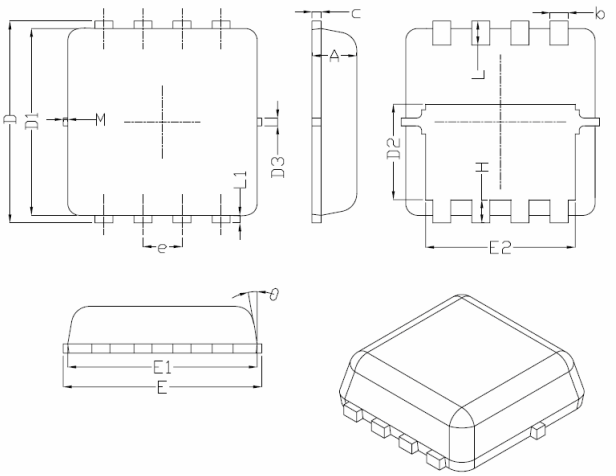




**Fig.11 Unclamped Inductive Waveform**

## 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 |
| θ | | 10° | 12° |

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