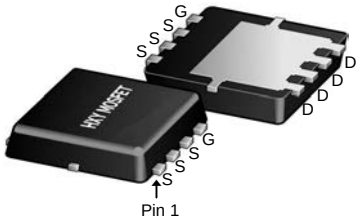
## General Description

The NTMFS4939N 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 and suitable to use in

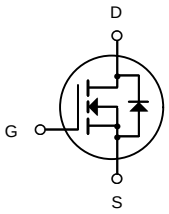



DFN5X6-8L

### General Features

$V_{DS}$ =30V $I_D$ =60A

$R_{DS(ON)}$ < 5.8mΩ@ $V_{GS}$=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) |
|---|---|---|---|
| NTMFS4939N | DFN5X6-8L | HXY MOSFET | 5000 |

### Absolute Maximum Ratings ($T_C$=25℃unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current, $V_{GS}$ @ 10V | 60 | A |
| $I_D$@$T_C$=100℃ | Continuous Drain Current, $V_{GS}$ @ 10V | 38 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 135 | A |
| EAS | Single Pulse Avalanche Energy[3] | 29.8 | mJ |
| $P_D$@$T_C$=25℃ | Total Power Dissipation[4] | 30 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |
| $R_{\theta JC}$ | Thermal Resistance from Junction-to-Ambient[3] | 4.6 | ℃/W |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient [1] | 50 | ℃/W |

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

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 30 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=20A | --- | 4.4 | 5.8 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=15A | --- | 6.9 | 9 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.2 | --- | 2.5 | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_D$=20A | --- | 67 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 1.7 | --- | Ω |
| $Q_g$ | Total Gate Charge (4.5V) | $V_{DS}$=15V , $V_{GS}$=4.5V , $I_D$=15A | --- | 8 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 2.4 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 3.2 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=15V , $V_{GS}$=10V , $R_G$=3.3Ω $I_D$=15A | --- | 7.1 | --- | ns |
| $T_r$ | Rise Time | | --- | 40 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 15 | --- | |
| $T_f$ | Fall Time | | --- | 6 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 814 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 498 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 41 | --- | |
| $I_S$ | Continuous Source Current[1,6] | $V_G$=$V_D$=0V , Force Current | --- | --- | 60 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=20A , di/dt=100A/μs , $T_J$=25℃ | --- | 15 | --- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 25 | --- | nC |

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,$I_{AS}$=24A
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

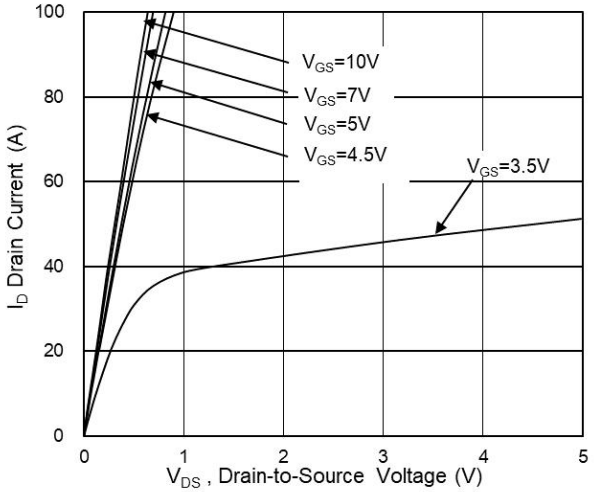



**Fig.1 Typical Output Characteristics**

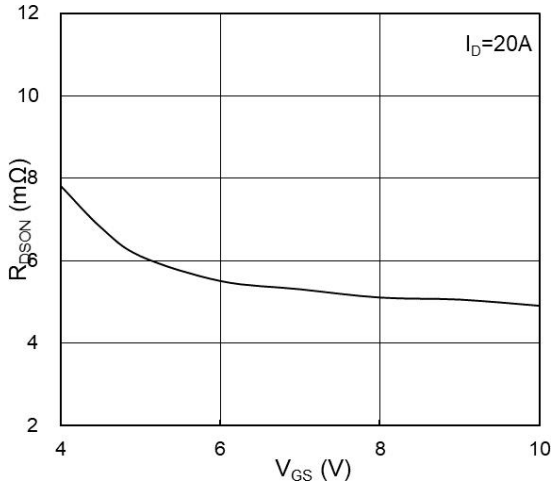



**Fig.2 On-Resistance vs G-S Voltage**

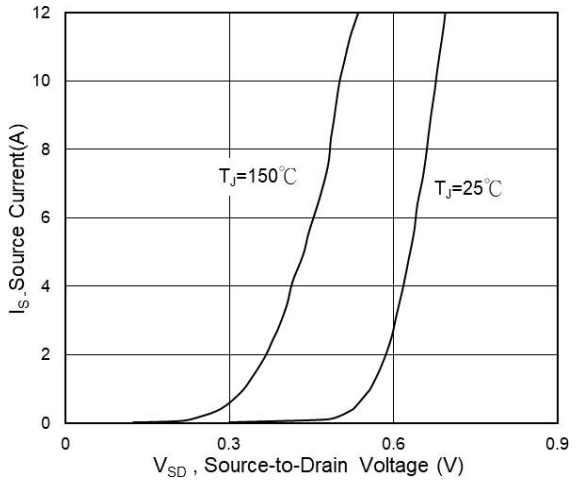



**Fig.3 Source Drain Forward Characteristics**

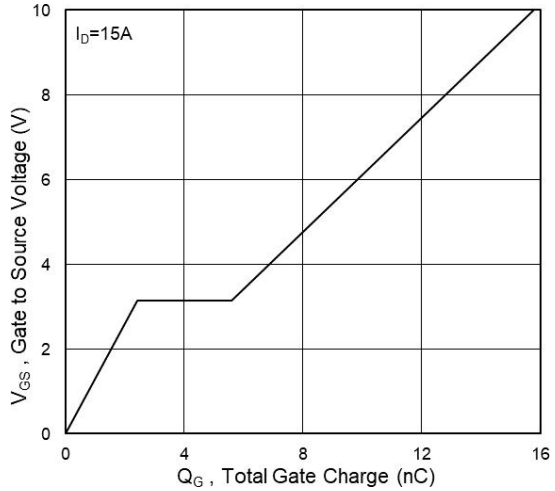



**Fig.4 Gate-Charge Characteristics**

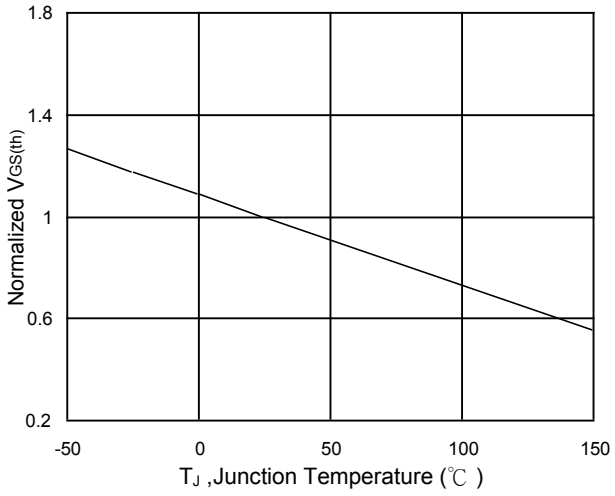



**Fig.5 Normalized $V_{GS(th)}$ vs $T_J$**

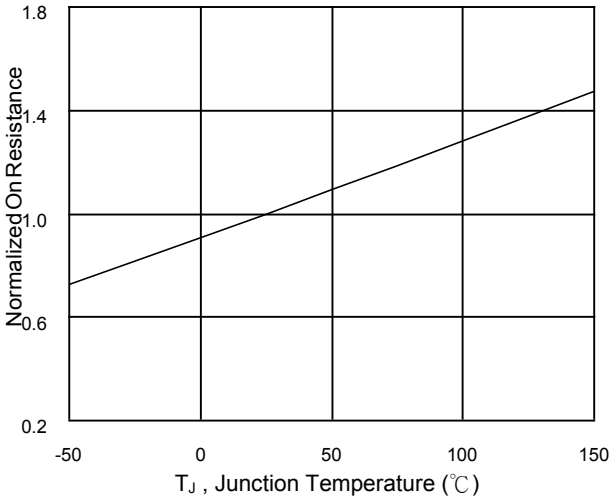



**Fig.6 Normalized $R_{DSON}$ vs $T_J$**

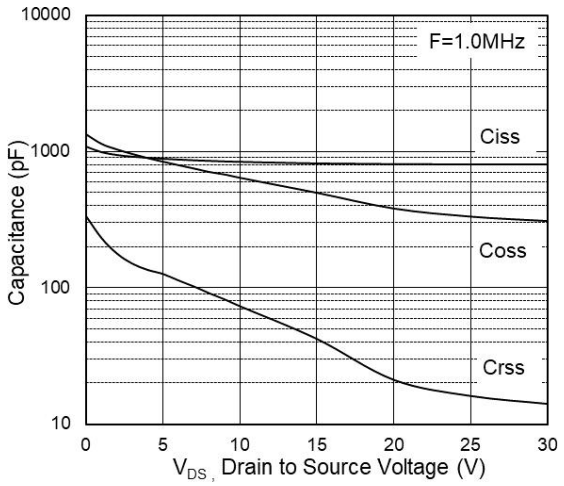



**Fig.7 Capacitance**

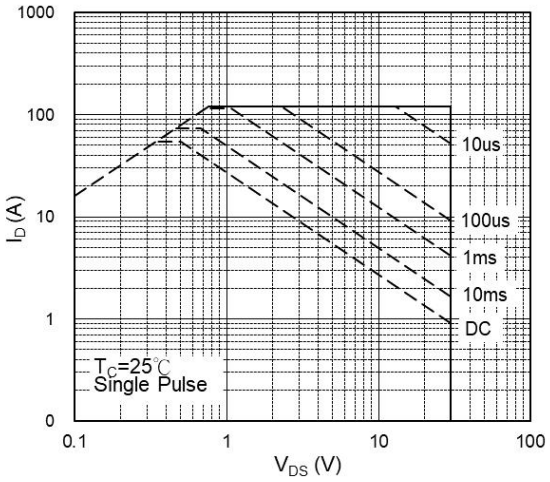



**Fig.8 Safe Operating Area**

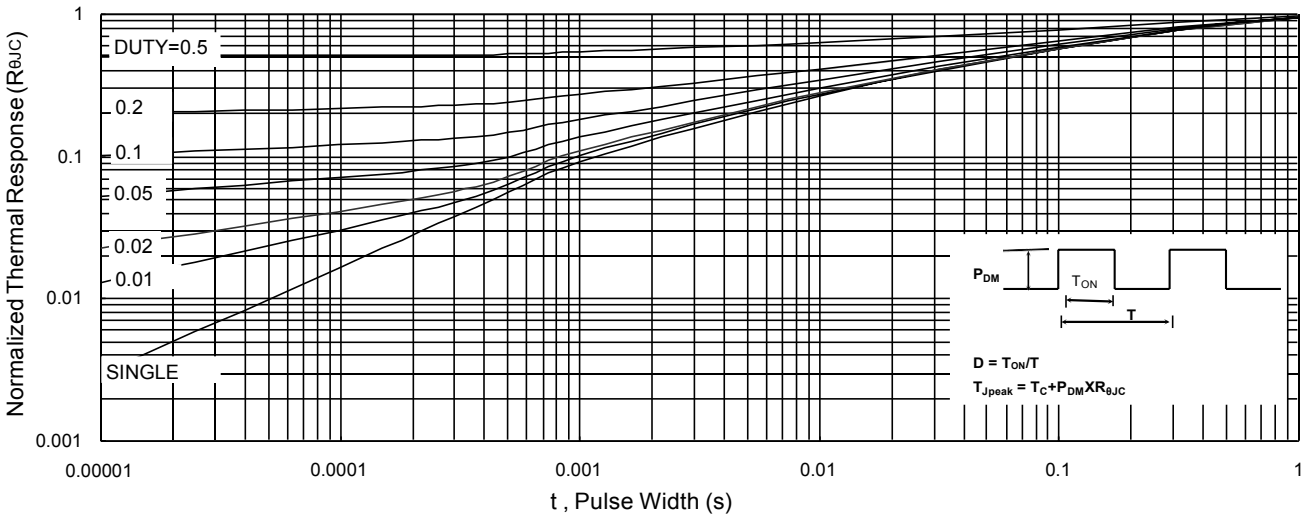



**Fig.9 Normalized Maximum Transient Thermal Impedance**

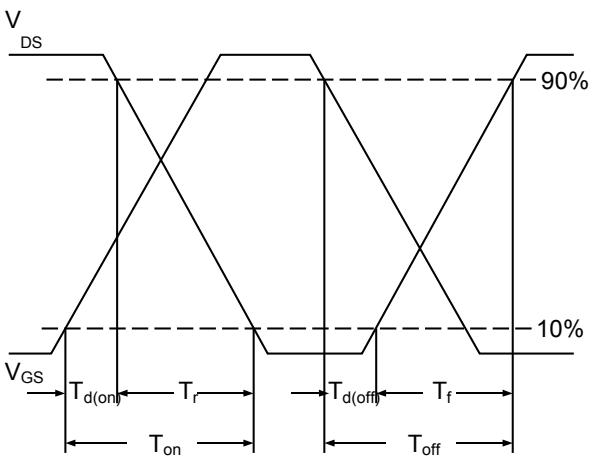



**Fig.10 Switching Time Waveform**

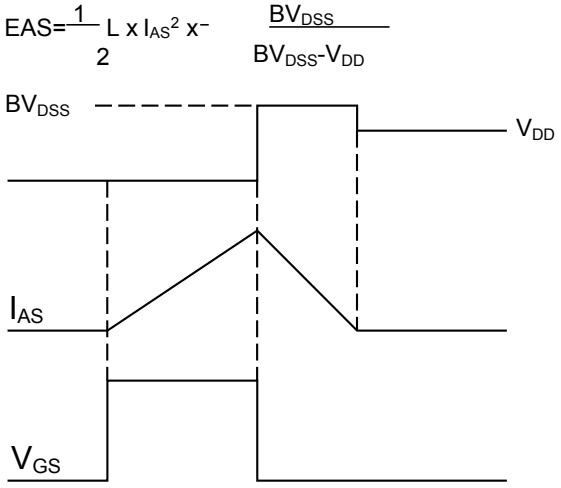
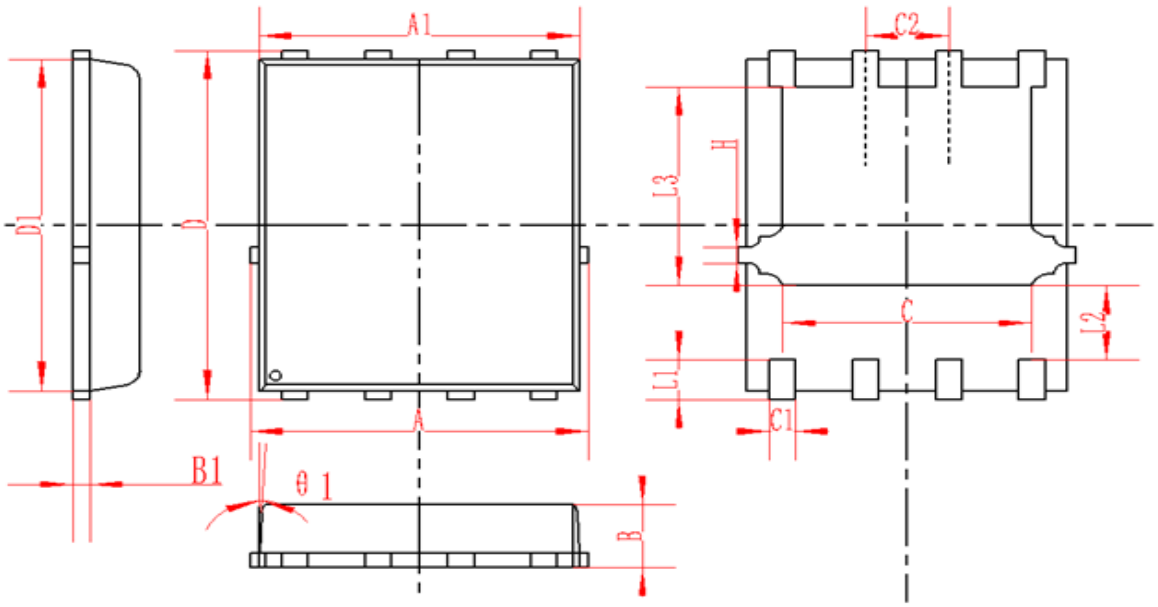



**Fig.11 Unclamped Inductive Switching Waveform**

## 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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