



## Description

The NTMFS4C032NT1G 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

$V_{DS} = 30V$   $I_D = 50A$

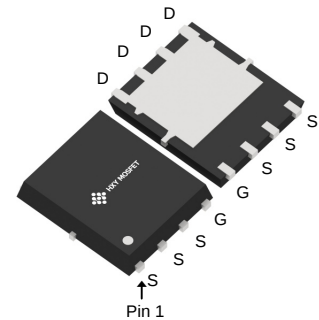
$R_{DS(ON)} < 8.5m\Omega$   $V_{GS}=10V$

## Application

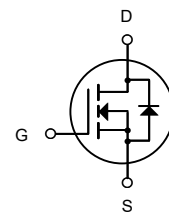
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L  
(SO-8-FL-5.8mm)



N-Channel MOSFET

## Package Marking and Ordering Information

| Product ID     | Pack                     | Brand      | Qty(PCS) |
|----------------|--------------------------|------------|----------|
| NTMFS4C032NT1G | DFN5X6-8L(SO-8-FL-5.8mm) | HXY MOSFET | 5000     |

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

| Symbol                 | Parameter                                        | Rating     | Units         |
|------------------------|--------------------------------------------------|------------|---------------|
| $V_{DS}$               | Drain-Source Voltage                             | 30         | V             |
| $V_{GS}$               | Gate-Source Voltage                              | $\pm 20$   | V             |
| $I_D@T_C=25^{\circ}C$  | Continuous Drain Current, $V_{GS} @ 10V^1$       | 60         | A             |
| $I_D@T_C=100^{\circ}C$ | Continuous Drain Current, $V_{GS} @ 10V^1$       | 38         | A             |
| $I_{DM}$               | Pulsed Drain Current <sup>2</sup>                | 200        | A             |
| EAS                    | Single Pulse Avalanche Energy <sup>3</sup>       | 36         | mJ            |
| $I_{AS}$               | Avalanche Current                                | 50         | A             |
| $P_D@T_C=25^{\circ}C$  | Total Power Dissipation <sup>4</sup>             | 31         | 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         | $^{\circ}C/W$ |
| $R_{\theta JC}$        | Thermal Resistance Junction-Case <sup>1</sup>    | 27         | $^{\circ}C/W$ |



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

| Symbol       | Parameter                                       | Conditions                                  | Min | Typ  | Max       | Units      |
|--------------|-------------------------------------------------|---------------------------------------------|-----|------|-----------|------------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage                  | $V_{GS}=0V, I_D=250\mu A$                   | 30  | ---  | ---       | V          |
| $I_{DSS}$    | Zero Gate Voltage Drain Current                 | $V_{GS}=0V, V_{DS}=24V$                     | --- | ---  | 1         | $\mu A$    |
| $I_{GSS}$    | Gate-Source Leakage Current                     | $V_{GS}=\pm 20V, V_{DS}=0A$                 | --- | ---  | $\pm 100$ | nA         |
| $V_{GS(th)}$ | GATE-Source Threshold Voltage                   | $V_{GS}=V_{DS}, I_D=250\mu A$               | 1.2 | 1.5  | 2.5       | V          |
| $R_{DS(ON)}$ | Drain-Source On Resistance <sup>2</sup>         | $V_{GS}=10V, I_D=30A$                       | --- | 6.5  | 8.5       | m $\Omega$ |
|              |                                                 | $V_{GS}=4.5V, I_D=15A$                      | --- | 11   | 14        |            |
| $G_{FS}$     | Forward Transconductance                        | $V_{DS}=5V, I_D=30A$                        | --- | 38   | ---       | S          |
| $C_{iss}$    | Input Capacitance                               | $V_{DS}=15V, V_{GS}=0V, f=1MHz$             | --- | 1317 | 1844      | pF         |
| $C_{oss}$    | Output Capacitance                              |                                             | --- | 163  | 228       |            |
| $C_{rss}$    | Reverse Transfer Capacitance                    |                                             | --- | 131  | 183       |            |
| $t_{d(on)}$  | Turn-On Delay Time                              | $V_{DD}=15V, I_D=15A, R_L=\Omega$           | --- | 4.6  | 9.2       | ns         |
| $t_r$        | Rise Time                                       |                                             | --- | 12.2 | 22        | ns         |
| $t_{d(off)}$ | Turn-Off Delay Time                             |                                             | --- | 26.6 | 53        | ns         |
| $t_f$        | Fall Time                                       |                                             | --- | 8    | 16        | ns         |
| $Q_g$        | Total Gate Charge                               | $V_{GS}=4.5V, V_{DS}=15V, I_D=15A$          | --- | 21   | 17.6      | nC         |
| $Q_{gs}$     | Gate-Source Charge                              |                                             | --- | 2.35 | 5.9       | nC         |
| $Q_{gd}$     | Gate-Drain "Miller" Charge                      |                                             | --- | 5.9  | 7.1       | nC         |
| $V_{SD}$     | Source-Drain Diode Forward Voltage <sup>2</sup> | $V_{GS}=0V, I_S=1A$                         | --- | ---  | 1         | V          |
| $I_S$        | Continuous Source Current <sup>1,5</sup>        | $V_G=V_D=0V, \text{ Force Current}$         | --- | ---  | 58        | A          |
| $I_{SM}$     | Pulsed Source Current <sup>2, 5</sup>           |                                             | --- | ---  | 115       | A          |
| $t_{rr}$     | Reverse Recovery Time                           | $I_F=30A, di/dt=100A/\mu s, T_J=25^\circ C$ | --- | 9.2  | ---       |            |
| $Q_{rr}$     | Reverse Recovery Charge                         |                                             | --- | 2    | ---       |            |



## Typical Characteristics

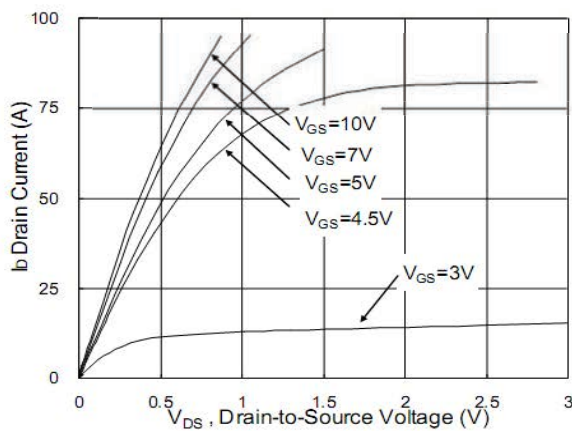


Fig.1 Typical Output Characteristics

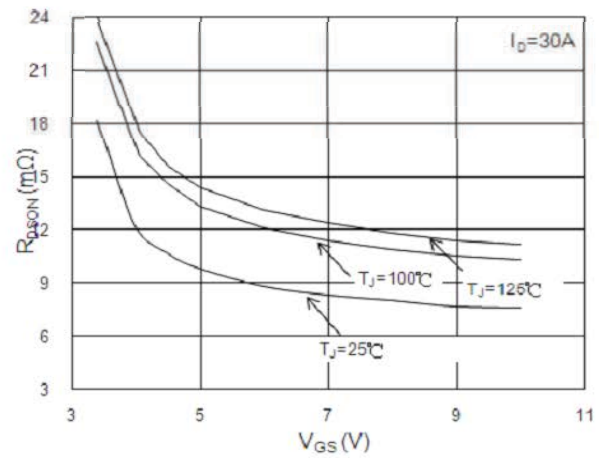


Fig.2 On-Resistance vs. Gate-Source

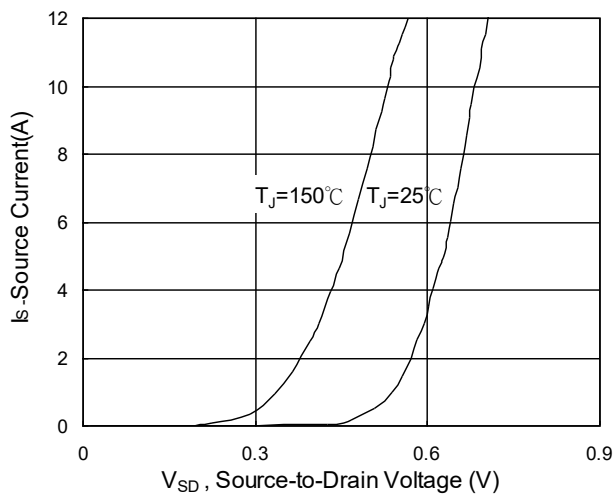


Fig.3 Forward Characteristics of reverse

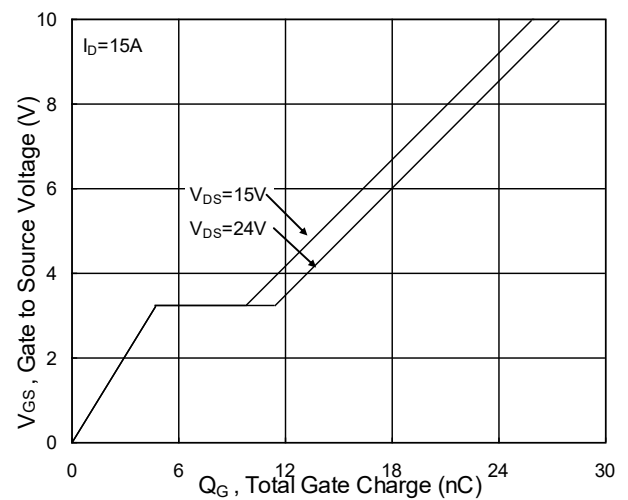


Fig.4 Gate-Charge Characteristics

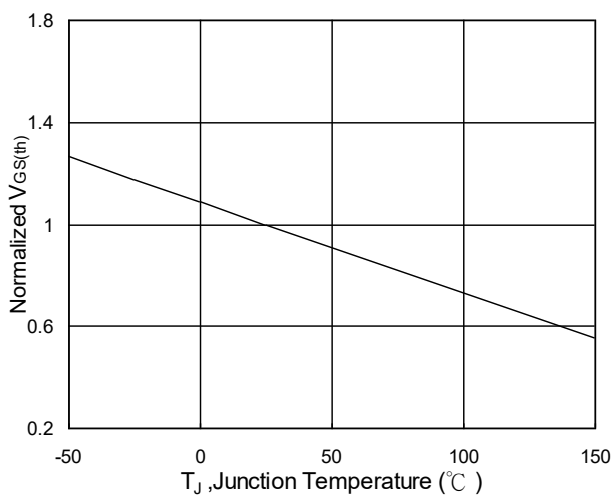


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

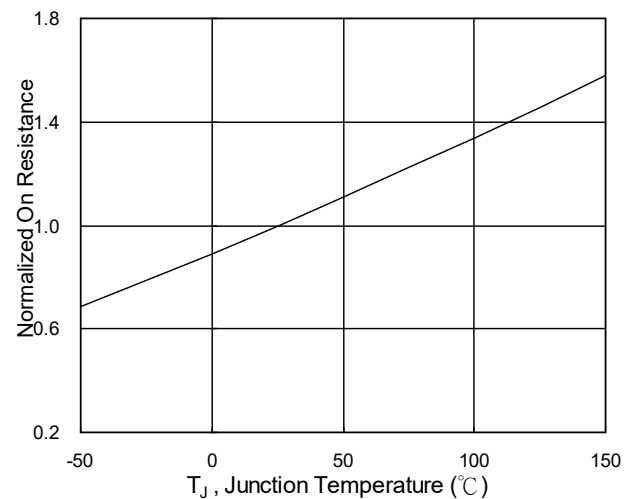


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

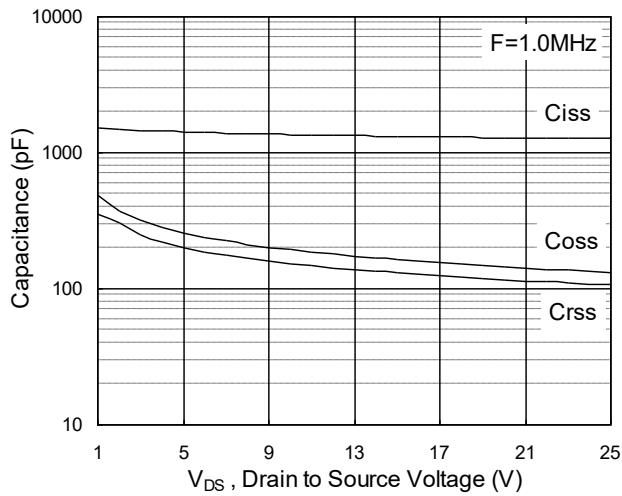


Fig.7 Capacitance

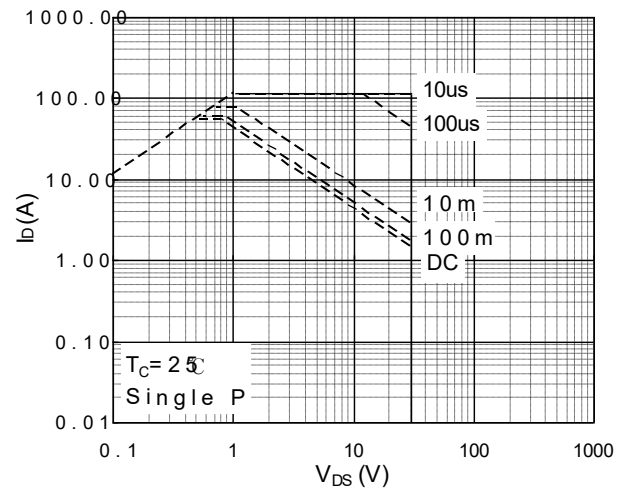


Fig.8 Safe Operating Area

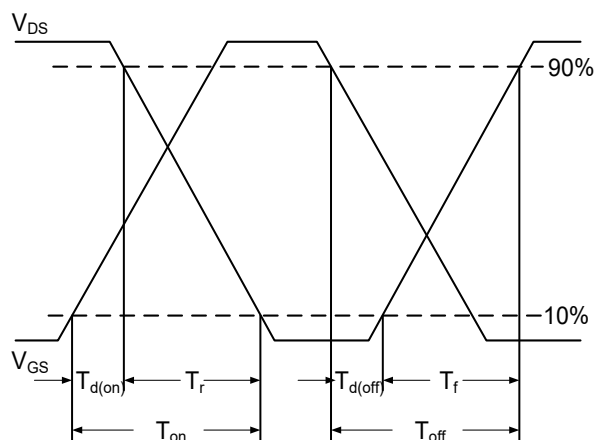


Fig.10 Switching Time Waveform





### DFN5X6-8L(SO-8-FL-5.8mm)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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