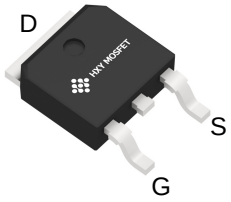
# STD5407NNT4G

N-Channel Enhancement Mode MOSFET

## Description

The STD5407NNT4G 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.




**TO-252-2L**

## General Features

$V_{DS}$ = 40V $I_D$ = 30A

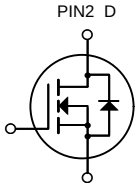
$R_{DS(ON)}$ < 22mΩ @ $V_{GS}$=10V

## Application

Battery protection

Load switch

Uninterruptible power supply




N-Channel MOSFET

## Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| STD5407NNT4G | TO-252-2L | HXY MOSFET | 2500 |

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

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 40 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25°C | Continuous Drain Current, $V_{GS}$ @ 10V | 30 | A |
| $I_D$@$T_C$=100°C | Continuous Drain Current, $V_{GS}$ @ 10V | 15 | A |
| $I_{DM}$ | Pulsed Drain Current | 40 | A |
| EAS | Single Pulse Avalanche Energy | 17.1 | mJ |
| $I_{AS}$ | Avalanche Current | 10 | A |
| $P_D$@$T_C$=25°C | Total Power Dissipation | 4 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | °C |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | °C |
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient (Steady State) | 62 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case | 2.8 | °C/W |

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

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V, $I_D$=250μA | 40 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=40V, $V_{GS}$=0V | - | - | 1.0 | μA |
| $I_{GSS}$ | Gate to Body Leakage Current | $V_{DS}$=0V, $V_{GS}$=±20V | - | - | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1.0 | 1.5 | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance note3 | $V_{GS}$=10V, $I_D$=8A | - | 18 | 22 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=5A | - | 25 | 35 | mΩ |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=20V, $V_{GS}$=0V, f=1.0MHz | - | 633 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 67 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 58 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{DS}$=20V, $I_D$=8A, $V_{GS}$=10V | - | 12 | - | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 3.2 | - | nC |
| $Q_{gd}$ | Gate-Drain(“Miller”) Charge | | - | 3.1 | - | nC |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}$= 20V, $R_L$ =2.5Ω $V_{GS}$=10V,$R_{REN}$ =3Ω | - | 4 | - | ns |
| $t_r$ | Turn-on Rise Time | | - | 3 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 15 | - | ns |
| $t_f$ | Turn-off Fall Time | | - | 2 | - | ns |
| $I_S$ | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 30 | A |
| $I_{SM}$ | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 40 | A |
| $V_{SD}$ | Drain to Source Diode Forward Voltage | $V_{GS}$=0V, $I_S$= 8A | - | - | 1.2 | V |

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

2. EAS condition : $T_J$=25°C,$V_{DD}$=20V,$V_G$=10V,L=0.5mH,Rg=25Ω,$I_{AS}$=7.2A

$T_J$=25°C,$V_{DD}$=-20V,$V_G$= -10V,L=0.5mH,Rg=25Ω,$I_{AS}$=-8.4A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

## Typical Performance Characteristics

**Figure1:** Output Characteristics

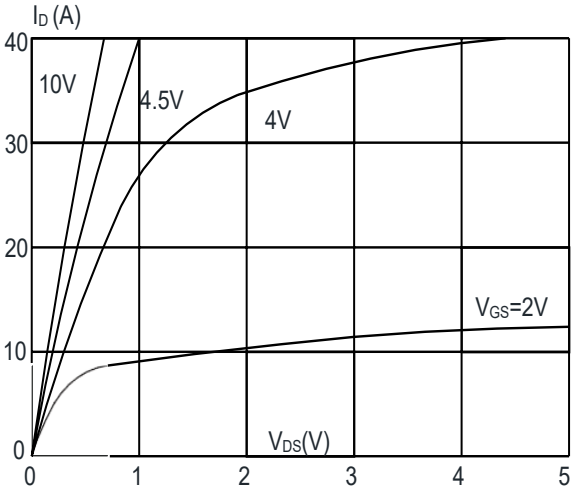



**Figure 2:** Typical Transfer Characteristics

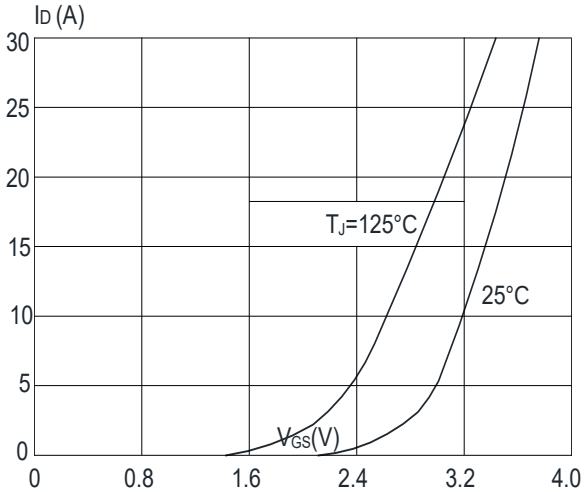



**Figure 3:**On-resistance vs· Drain Current

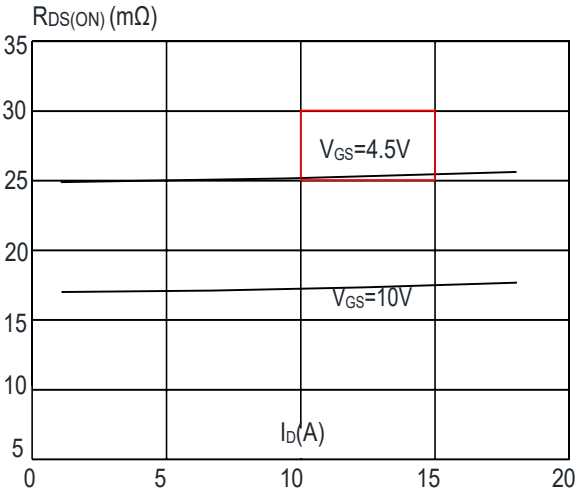



**Figure 4**: Body Diode Characteristics

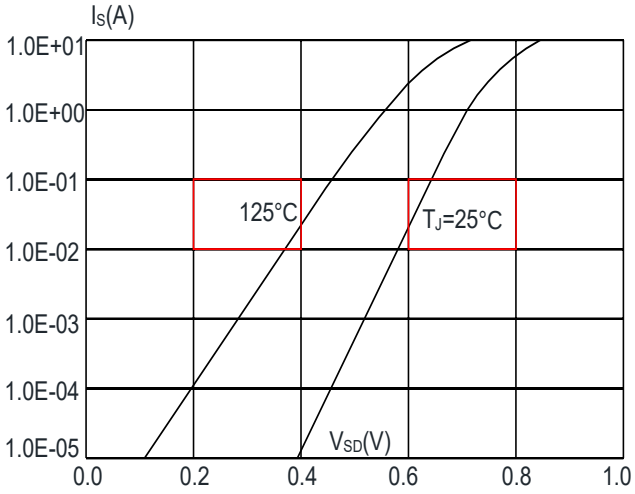



**Figure 5:** Gate Charge Characteristics

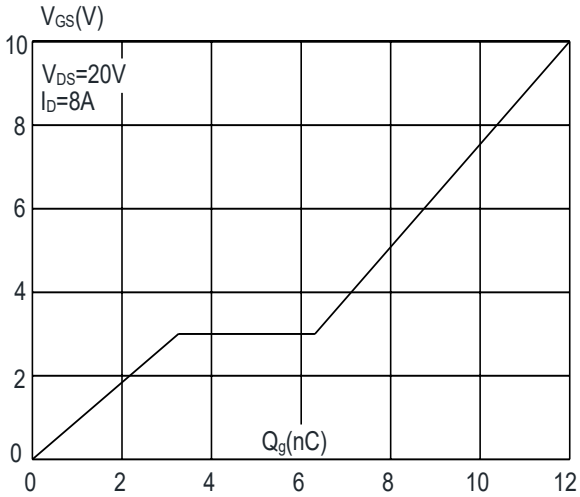



**Figure 6:** Capacitance Characteristics

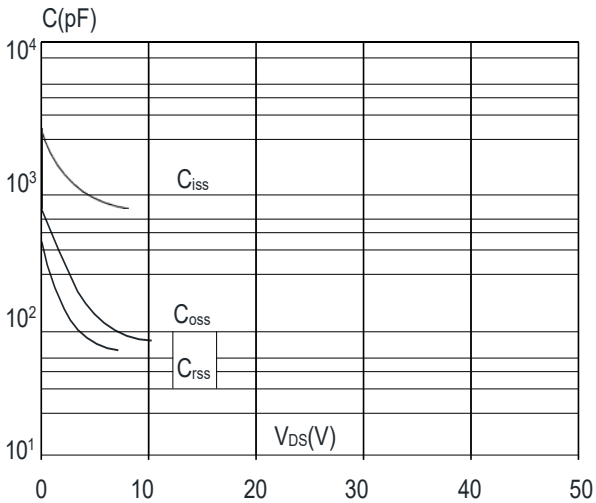


**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

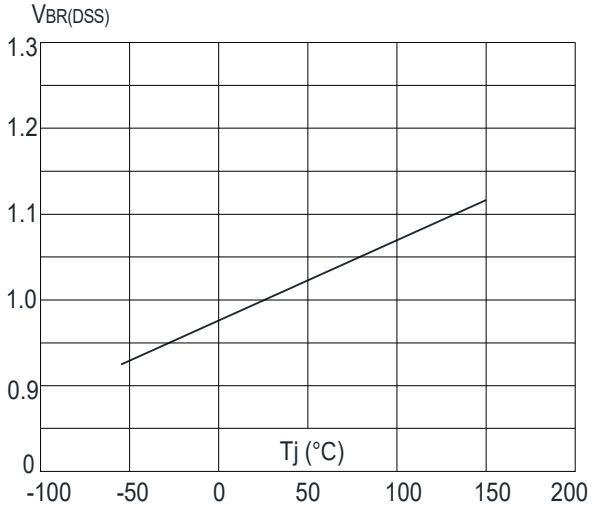



**Figure 8:** Normalized on Resistance vs. Junction Temperature

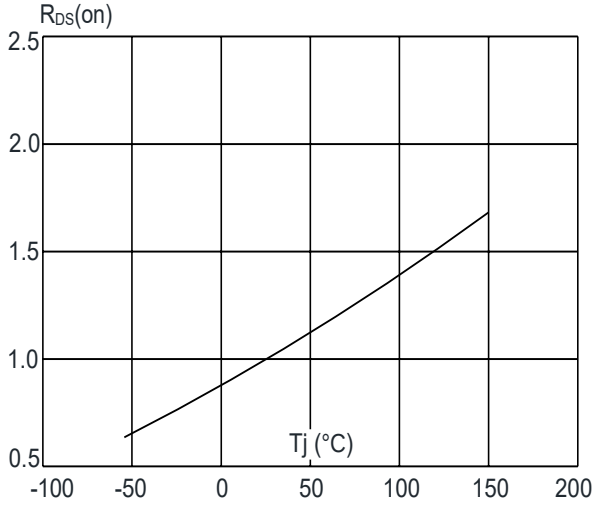



**Figure 9:** Maximum Safe Operating Area

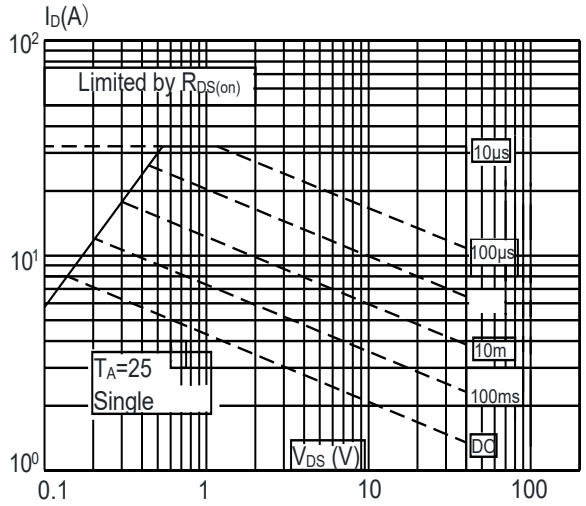



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

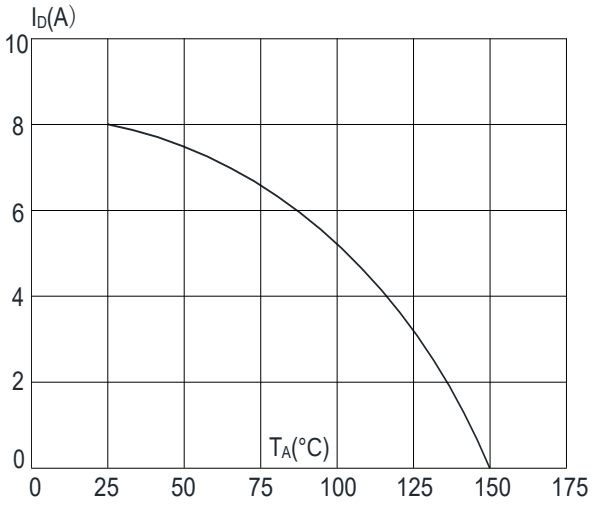
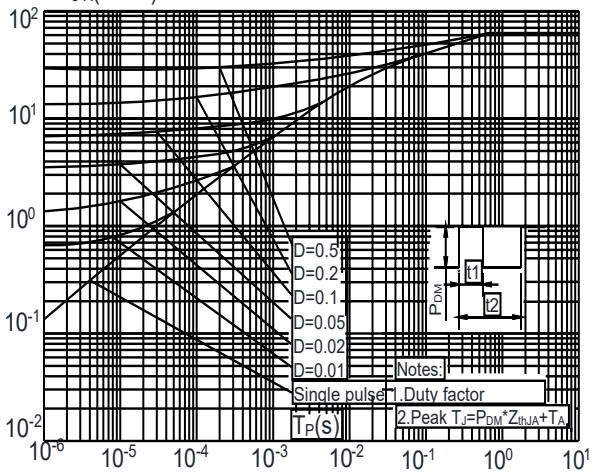
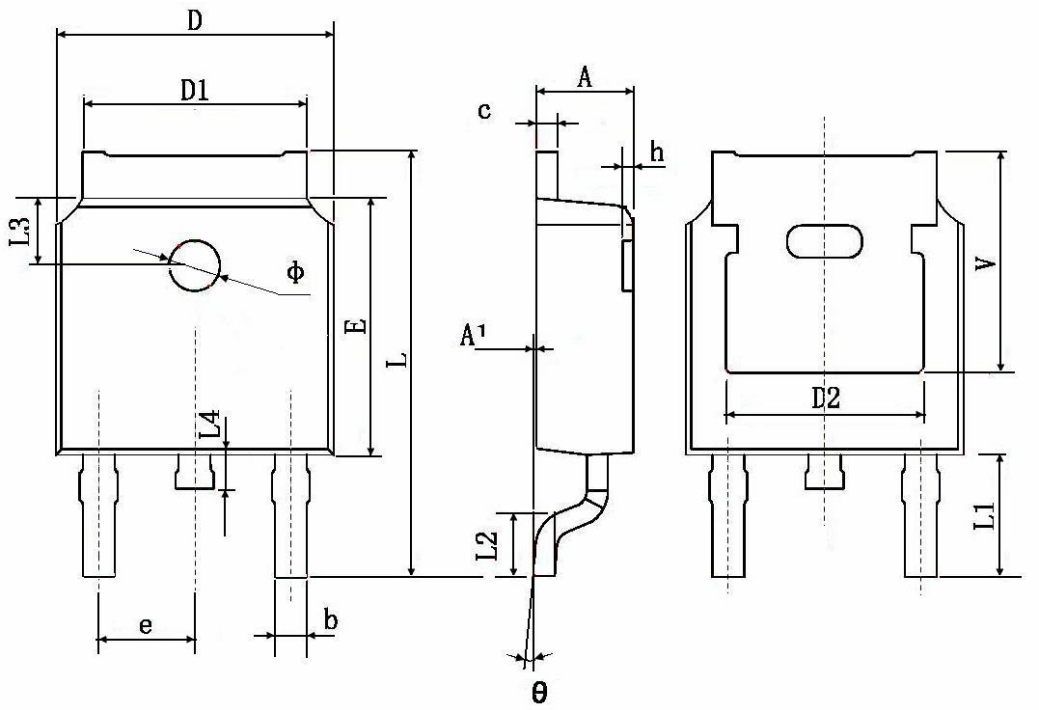



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



## TO-252-2L Package Infommation




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| b | 0.660 | 0.860 | 0.026 | 0.034 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 0.483 TYP. | | 0.190 TYP. | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 9.800 | 10.400 | 0.386 | 0.409 |
| L1 | 2.900 TYP. | | 0.114 TYP. | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 1.600 TYP. | | 0.063 TYP. | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| Φ | 1.100 | 1.300 | 0.043 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.350 TYP. | | 0.211 TYP. | |

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