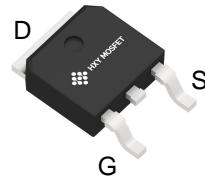




Description

The STD100N3LF3 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

$V_{DS} = 30V$ $I_D = 100A$

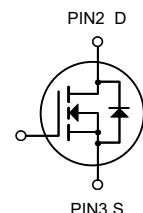
$R_{DS(ON)} < 5.5m\Omega$ @ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|-------------|-----------|------------|----------|
| STD100N3LF3 | TO-252-2L | HXY MOSFET | 2500 |

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 | ± 20 | V | |
| $I_D @ T_c=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 100 | A | |
| $I_D @ T_c=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 57 | A | |
| $I_D @ T_A=25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 27 | A | |
| $I_D @ T_A=70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 23 | A | |
| I_{DM} | Pulsed Drain Current ² | 160 | A | |
| E_{AS} | Single Pulse Avalanche Energy ³ | 115.2 | mJ | |
| I_{AS} | Avalanche Current | 48 | A | |
| $P_D @ T_c=25^\circ C$ | Total Power Dissipation ⁴ | 53 | W | |
| $P_D @ T_A=25^\circ C$ | Total Power Dissipation ⁴ | 6 | 2.4 | W |
| T_{STG} | Storage Temperature Range | -55 to 175 | °C | |
| T_J | Operating Junction Temperature Range | -55 to 175 | °C | |
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient (Steady State) ¹ | 62 | °C/W | |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ ($\leq 10s$) | 25 | °C/W | |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | 2.8 | °C/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 =250μA | 30 | --- | --- | V |
| △BV _{DSS} /△T _J | BVDSS Temperature Coefficient | Reference to 25°C, I _D =1mA | --- | 0.028 | --- | V/°C |
| R _{DSON} | Static Drain-Source On-Resistance ² | V _{GS} =10V, I _D =30A | --- | 3.8 | 5.5 | mΩ |
| | | V _{GS} =4.5V, I _D =15A | --- | 7.5 | 9 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{GS} =V _{DS} , I _D =250μA | 1.0 | 1.5 | 2.5 | V |
| △V _{GS(th)} | V _{GS(th)} Temperature Coefficient | | --- | -6.16 | --- | mV/°C |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =24V, V _{GS} =0V, T _J =25°C | --- | --- | 1 | uA |
| | | V _{DS} =24V, V _{GS} =0V, T _J =55°C | --- | --- | 5 | |
| I _{GSS} | Gate-Source Leakage Current | V _{GS} =±20V, V _{DS} =0V | --- | --- | ±100 | nA |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =30A | --- | 22 | --- | S |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MHz | --- | 1.7 | 3.4 | Ω |
| Q _g | Total Gate Charge (4.5V) | | --- | 20 | --- | nC |
| Q _{gs} | Gate-Source Charge | V _{DS} =15V, V _{GS} =4.5V, I _D =15A | --- | 7.6 | --- | |
| Q _{gd} | Gate-Drain Charge | | --- | 7.2 | --- | |
| T _{d(on)} | Turn-On Delay Time | | --- | 7.8 | --- | ns |
| T _r | Rise Time | V _{DD} =15V, V _{GS} =10V, R _G =3.3, I _D =15A | --- | 15 | --- | |
| T _{d(off)} | Turn-Off Delay Time | | --- | 37.3 | --- | |
| T _f | Fall Time | | --- | 10.6 | --- | |
| C _{iss} | Input Capacitance | | --- | 2295 | --- | pF |
| C _{oss} | Output Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | --- | 267 | --- | |
| C _{rss} | Reverse Transfer Capacitance | | --- | 210 | --- | |
| I _s | Continuous Source Current ^{1,5} | V _G =V _D =0V, Force Current | --- | --- | 80 | A |
| I _{SM} | Pulsed Source Current ^{2,5} | | --- | --- | 160 | A |
| V _{SD} | Diode Forward Voltage ² | V _{GS} =0V, I _s =1A, T _J =25°C | --- | --- | 1 | V |
| t _{rr} | Reverse Recovery Time | I _F =30A, dI/dt=100A/μs | --- | 14 | --- | nS |
| Q _{rr} | Reverse Recovery Charge | T _J =25°C | --- | 5 | --- | nC |

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed, pulse width .The EAS data shows Max. rating .
- 3.The test cond \leq 300us , duty cycle ition is V_{DD}=25 \leq V, V 2%_{GS} =10V,L=0.1mH,I_{AS}=53.8A
- 4.The power dissipation is limited by 175°C junction temperature
- 5.The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.



Typical Characteristics

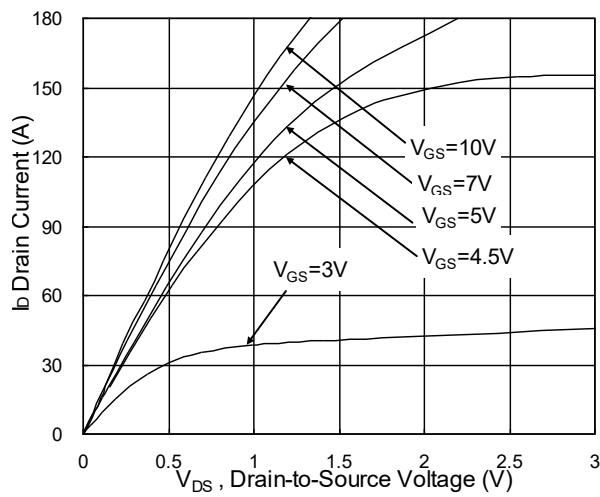


Fig.1 Typical Output Characteristics

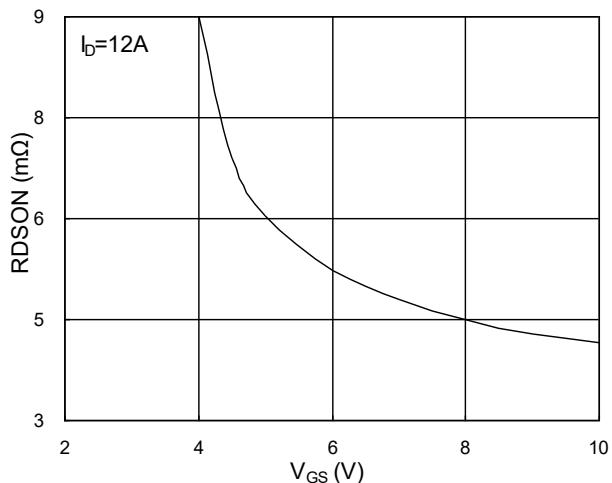


Fig.2 On-Resistance vs. G-S Voltage

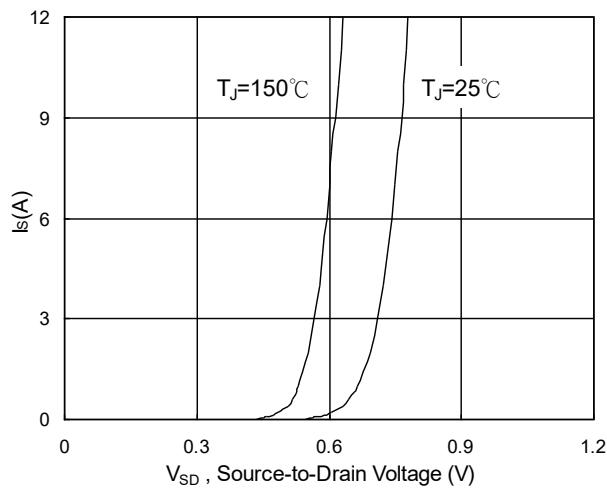


Fig.3 Forward Characteristics of Reverse

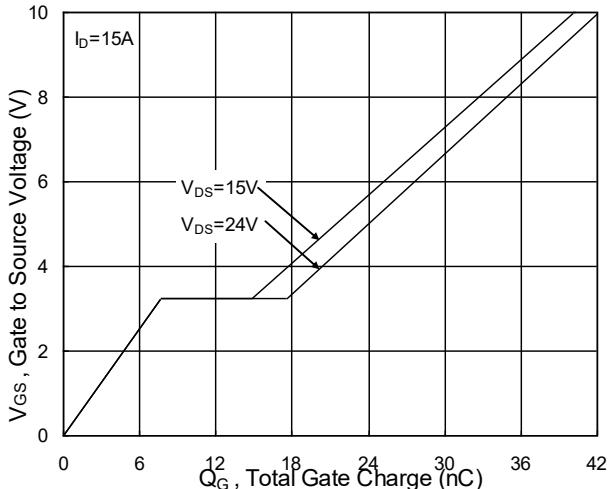


Fig.4 Gate-Charge Characteristics

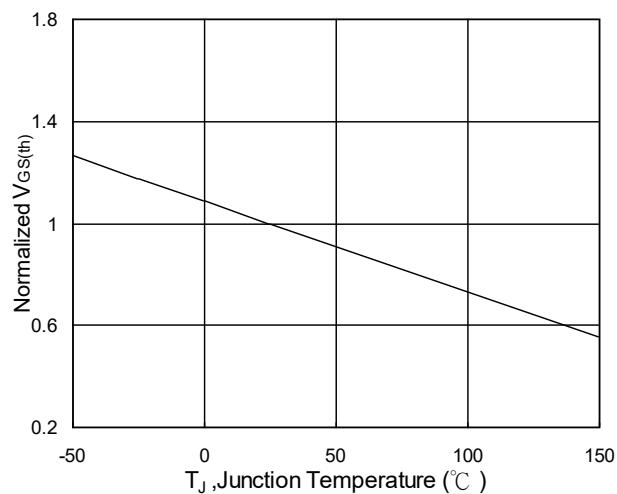


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

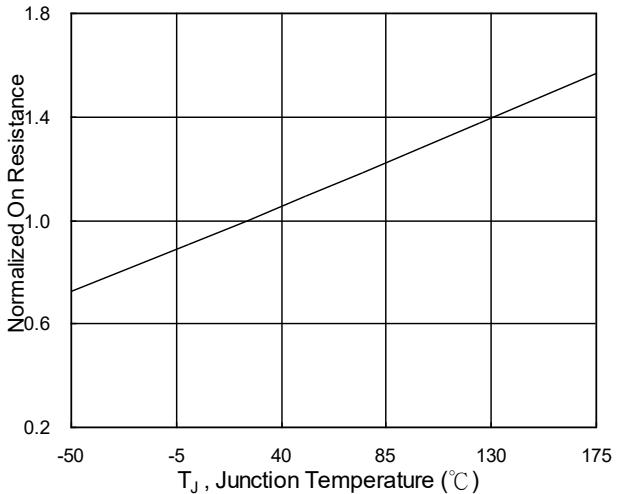


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

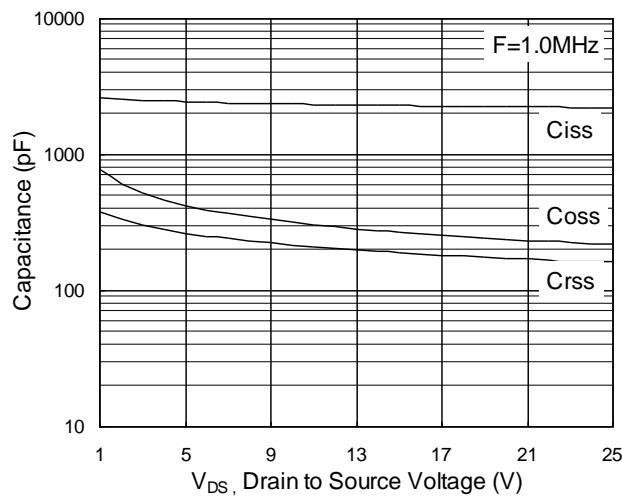


Fig.7 Capacitance

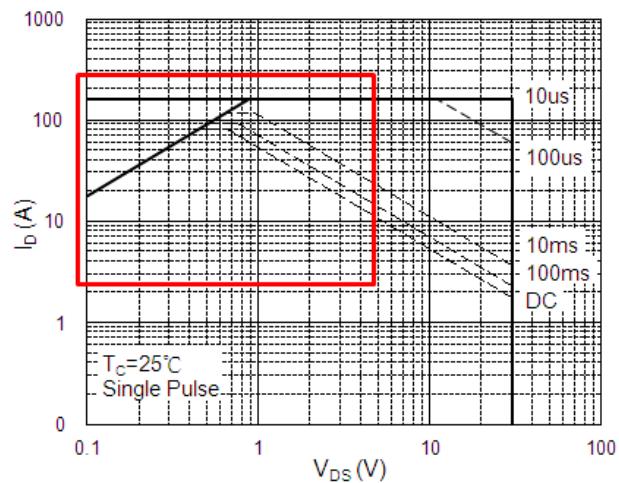


Fig.8 Safe Operating Area

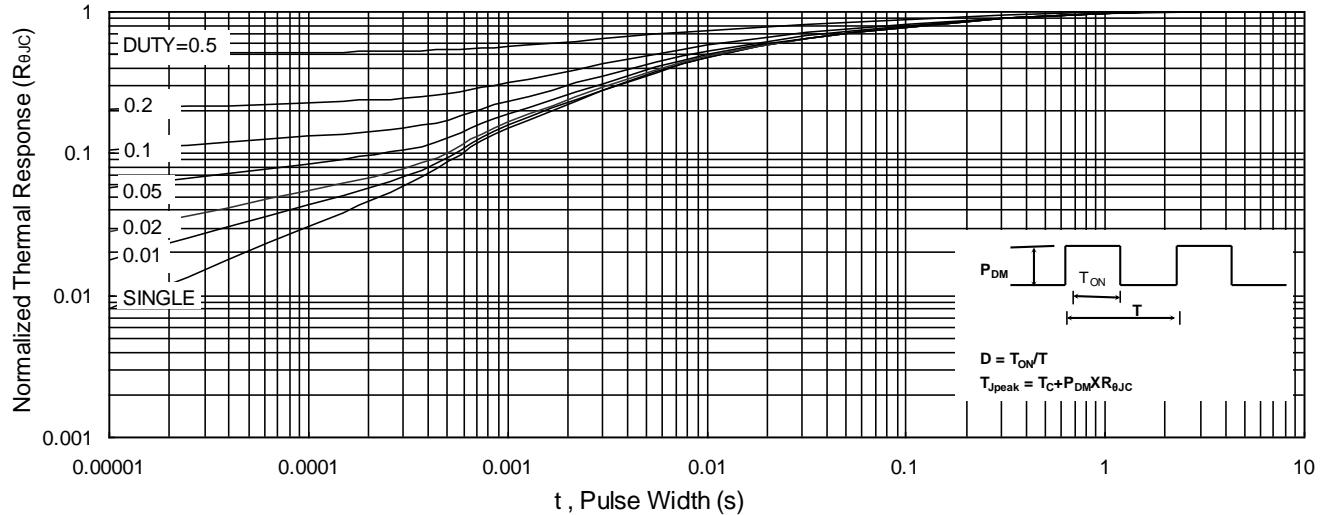


Fig.9 Normalized Maximum Transient Thermal Impedance

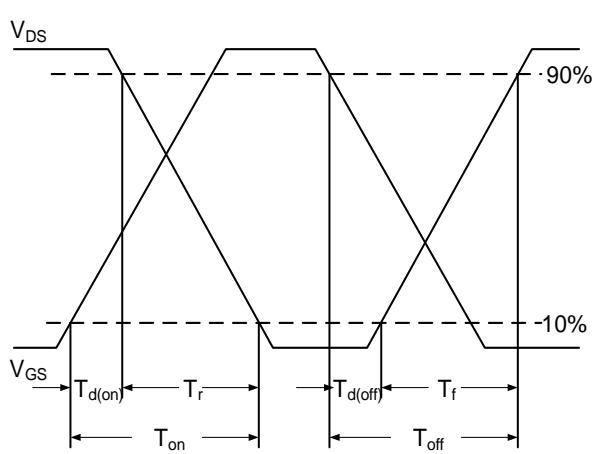


Fig.10 Switching Time Waveform

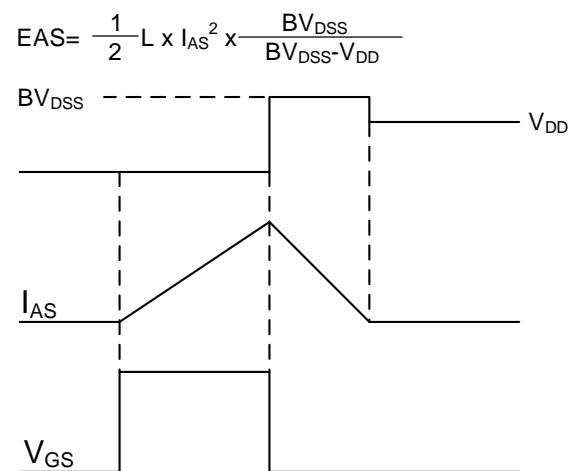
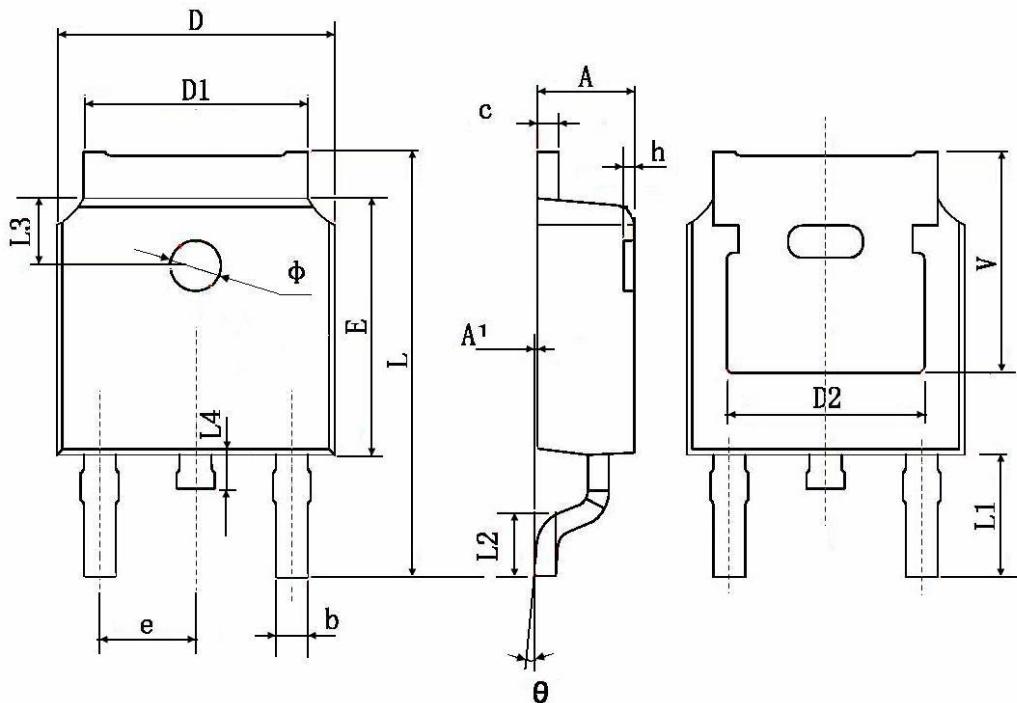


Fig.11 Unclamped Inductive Switching Waveform



TO-252-2L Package Information



| 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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