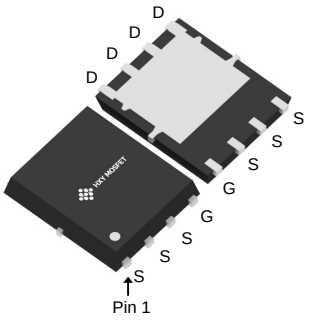
# SI7884BDP-T1-GE3

N-Channel Enhancement Mode MOSFET

## Description

The SI7884BDP-T1-GE3 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.

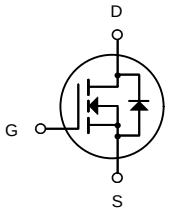



DFN5X6-8L

## General Features

$V_{DS}$ = 40V $I_D$ = 55A

$R_{DS(ON)}$ < 8.5mΩ $V_{GS}$=10V




N-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| SI7884BDP-T1-GE3 | DFN5X6-8L | HXY MOSFET | 5000 |

## Absolute Maximum Ratings ($T_C$=25℃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℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 55 | A |
| $I_D$@$T_C$=100℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 41 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 280 | A |
| EAS | Single Pulse Avalanche Energy[3] | 76 | mJ |
| $T_{STG}$ | Storage Temperature Range | -55 to 175 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 175 | ℃ |

## Electrical Characteristics ($T_C$=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 , $I_D$=15A | --- | 7.5 | 8.5 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=8A | --- | 9 | 12 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.2 | 1.8 | 2.5 | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=40V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=40V , $V_{GS}$=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 | --- | 2.0 | --- | Ω |
| $Q_g$ | Total Gate Charge (4.5V) | $V_{DS}$=20V , $V_{GS}$=10V , $I_D$=10A | --- | 19.7 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 2.8 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 5.1 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=15V , $V_{GS}$=10V , $R_G$=3.3Ω $I_D$=1A | --- | 13.2 | --- | ns |
| $T_r$ | Rise Time | | --- | 2.2 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 72 | --- | |
| $T_f$ | Fall Time | | --- | 4.5 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 6000 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 1509 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 129 | --- | |
| $I_S$ | Continuous Source Current[1,5] | $V_G$=$V_D$=0V , Force Current | --- | --- | 55 | 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

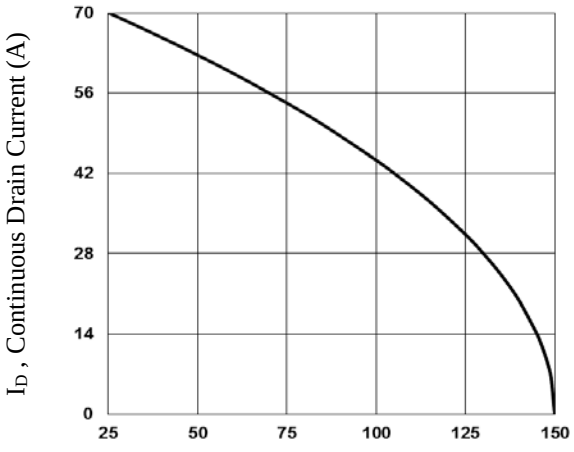



Fig.1 Continuous Drain Current vs. $T_C$

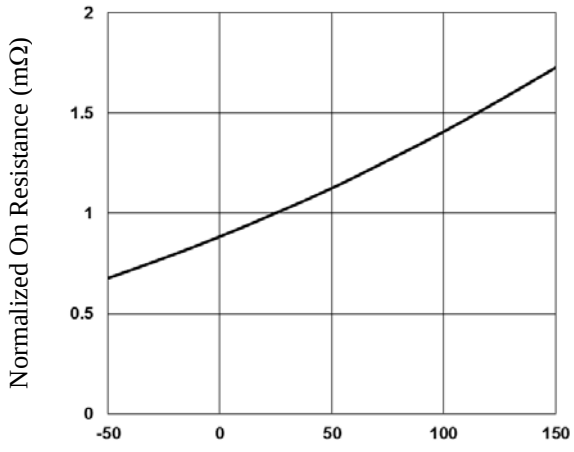



Fig.2 Normalized RDSON vs. $T_J$

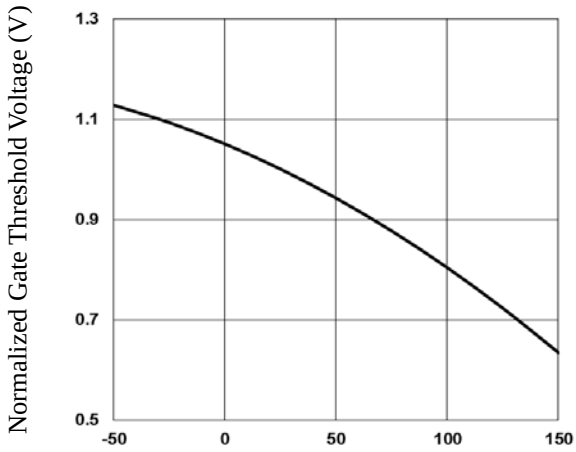



Fig.3 Normalized $V_{th}$ vs. $T_J$

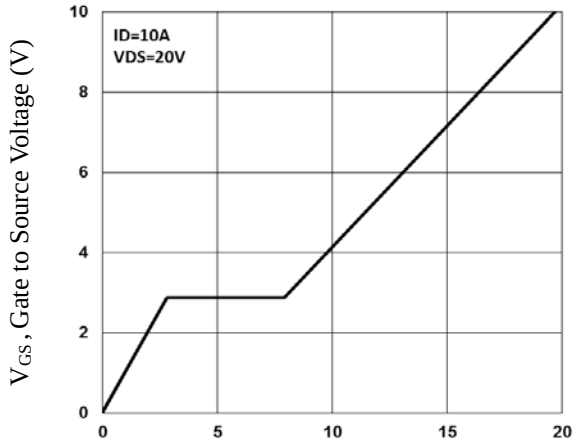



Fig.4 Gate Charge Waveform

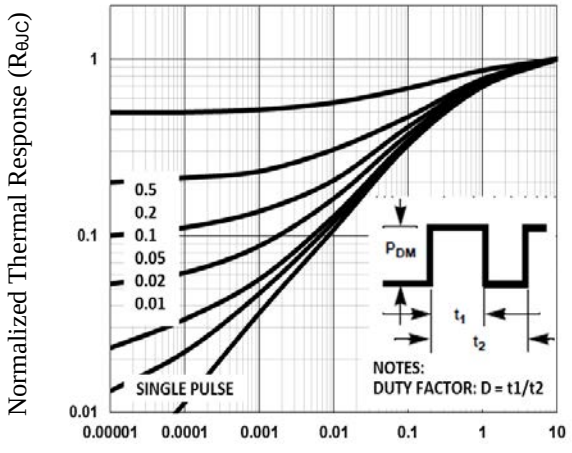



Fig.5 Normalized Transient Impedance

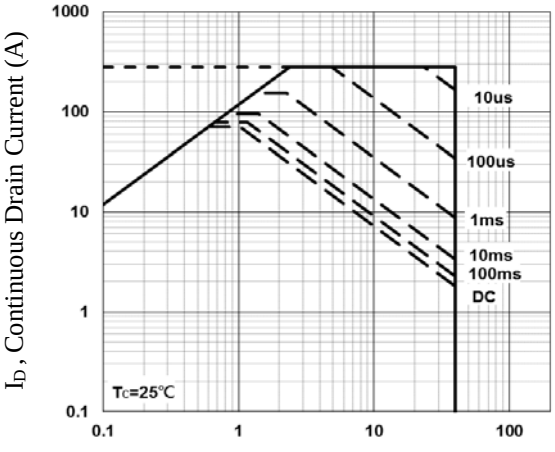



Fig.6 Maximum Safe Operation Area

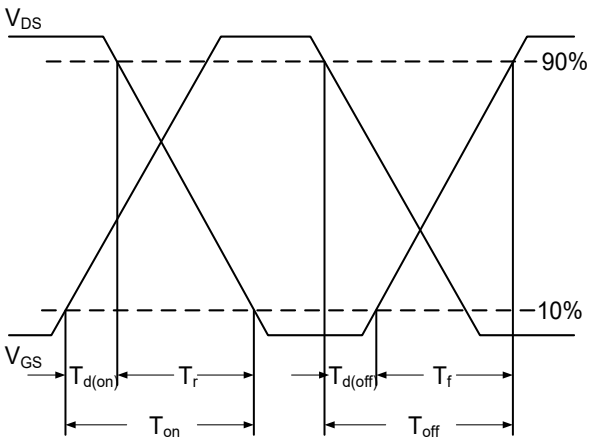



Fig.7 Switching Time Waveform

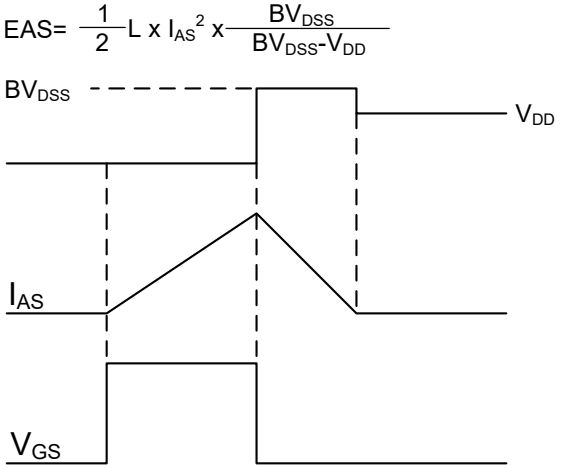
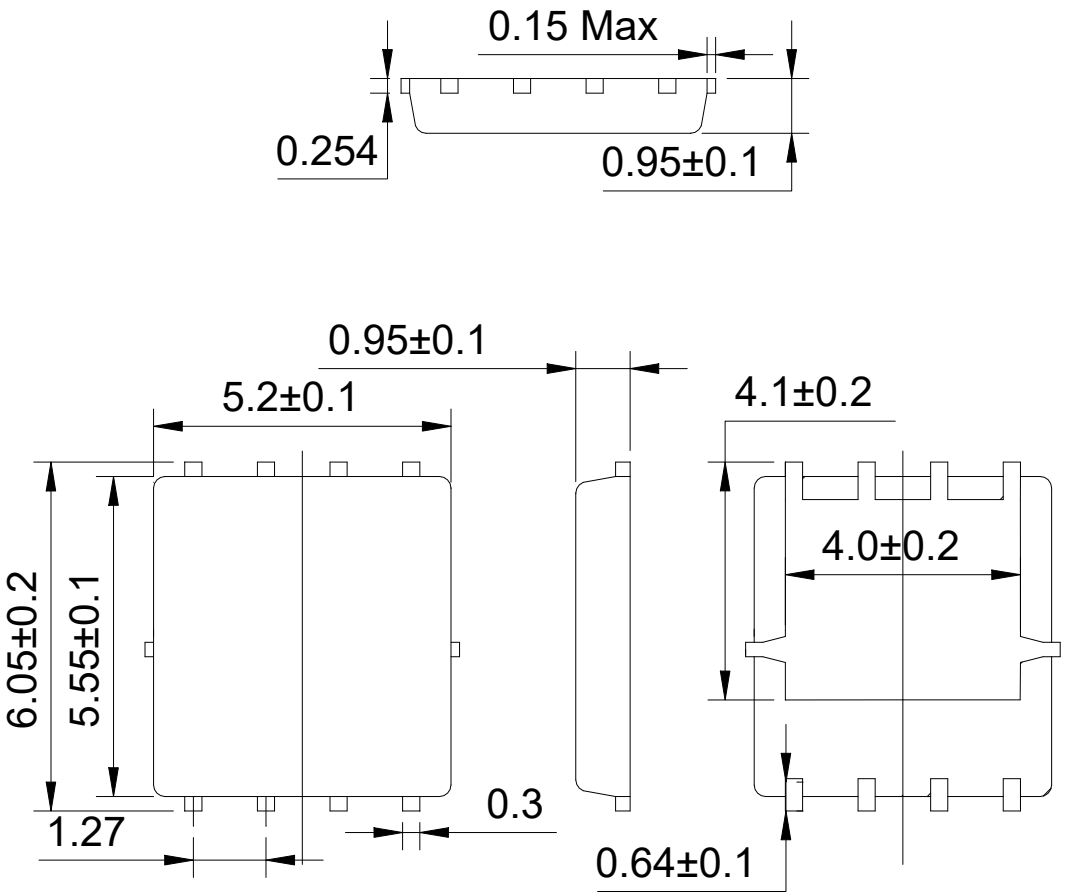



Fig.8 EAS Waveform

## DFN5X6-8L Package Information

**Unit:mm**



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