



Description

The SI7386DP-T1-E3 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

$V_{DS} = 30V$ $I_D = 80A$

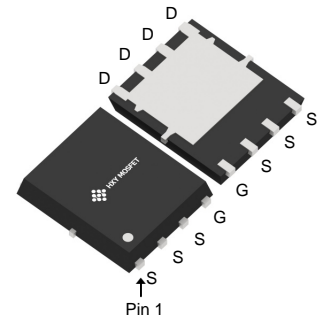
$R_{DS(ON)} < 6m\Omega$ $V_{GS} = 10V$

Application

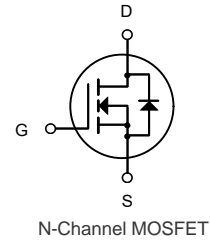
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L
(PowerPAK-SO-8)



Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|----------------|------------------------------|------------|----------|
| SI7386DP-T1-E3 | DFN5X6-8L (PowerPAK-SO-8) | 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 | ± 20 | V |
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 80 | A |
| $I_D @ T_C = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 45 | A |
| I_{DM} | Pulsed Drain Current ² | 280 | A |
| EAS | Single Pulse Avalanche Energy ³ | 56 | mJ |
| $P_D @ T_C = 25^\circ C$ | Total Power Dissipation ⁴ | 37 | 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 ¹ | 30 | $^\circ C/W$ |



Electrical Characteristics @T_j=25°C(unless otherwise specified)

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Unit |
|--|--|---|------|------|------|------|
| Static Electrical Characteristics @ T_j=25°C (unless otherwise stated) | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 30 | -- | -- | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =30V, V _{GS} =0V | -- | -- | 0.1 | μA |
| | Zero Gate Voltage Drain Current(T _j =125°C) | V _{DS} =30V, V _{GS} =0V | -- | -- | 100 | μA |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} =±20V, V _{DS} =0V | -- | -- | ±100 | nA |
| V _{GS(TH)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1.0 | 1.7 | 2.5 | V |
| R _{DS(ON)} | Drain-Source On-State Resistance ^③ | V _{GS} =10V, I _D =20A | -- | 4.7 | 6 | mΩ |
| R _{DS(ON)} | Drain-Source On-State Resistance ^③ | V _{GS} =4.5V, I _D =16A | -- | 5.4 | 8 | mΩ |
| Dynamic Electrical Characteristics @ T_j = 25°C (unless otherwise stated) | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =15V, V _{GS} =0V, f=1MHz | -- | 1930 | -- | pF |
| C _{oss} | Output Capacitance | | -- | 310 | -- | pF |
| C _{rss} | Reverse Transfer Capacitance | | -- | 260 | -- | pF |
| R _g | Gate Resistance | f=1MHz | -- | 0.85 | -- | |
| Q _g | Total Gate Charge | V _{DS} =15V, I _D =20A, V _{GS} =10V | -- | 38 | -- | nC |
| Q _{gs} | Gate-Source Charge | | -- | 5.1 | -- | nC |
| Q _{gd} | Gate-Drain Charge | | -- | 12 | -- | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =15V, I _D =20A, R _G =3, V _{GS} =10V | -- | 8.5 | -- | nS |
| t _r | Turn-on Rise Time | | -- | 9 | -- | nS |
| t _{d(off)} | Turn-Off Delay Time | | -- | 31 | -- | nS |
| t _f | Turn-Off Fall Time | | -- | 9 | -- | nS |
| Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated) | | | | | | |
| V _{SD} | Forward on voltage | I _{SD} =20A, V _{GS} =0V | -- | 0.8 | 1.2 | V |
| t _{rr} | Reverse Recovery Time | T _j =25°C, I _{sd} =20A, V _{GS} =0V | -- | 16 | -- | nS |
| Q _{rr} | Reverse Recovery Charge | di/dt=500A/μs | | 42 | | nC |

NOTE:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25 , I_{AS} = 15A, V_{GS} =10V. Part not recommended for use above this value
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.



Typical Electrical and Thermal Characteristics (Curves)

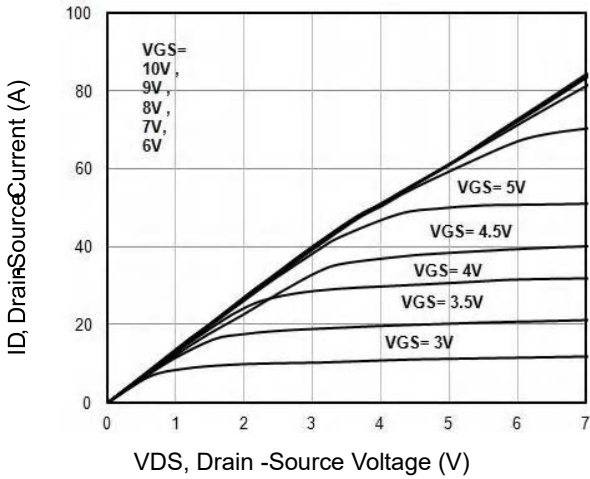


Fig1. Typical Output Characteristics

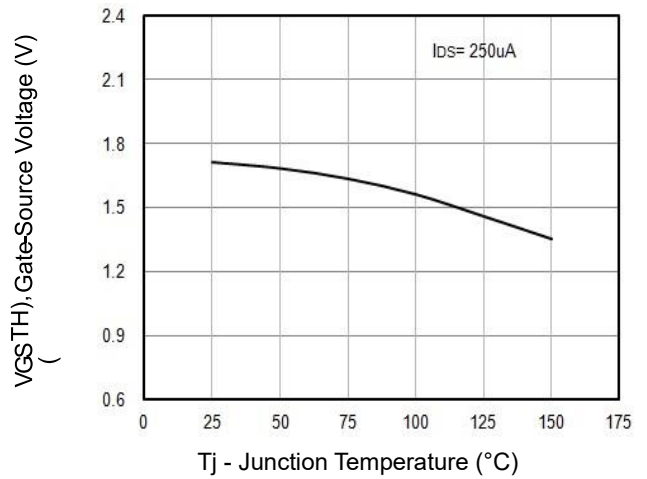


Fig2. $V_{GS(TH)}$ Gate-Source Voltage Vs. T_j

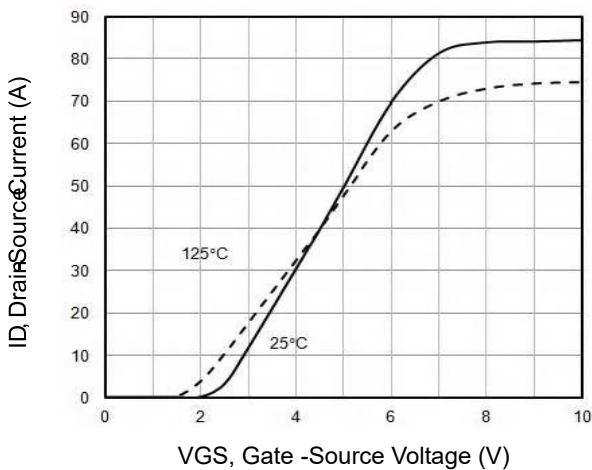


Fig3. Typical Transfer Characteristics

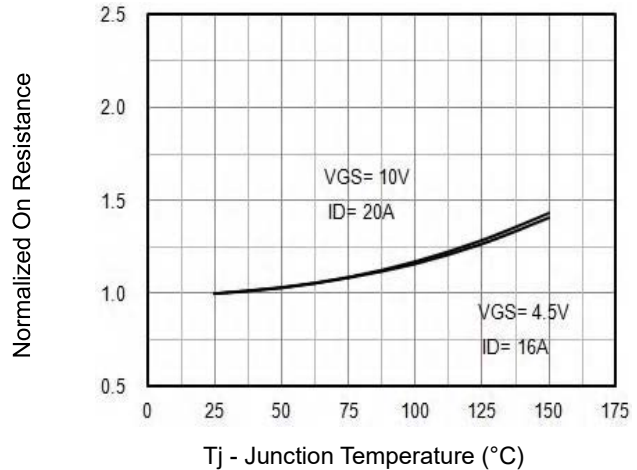


Fig4. Normalized On-Resistance Vs. T_j

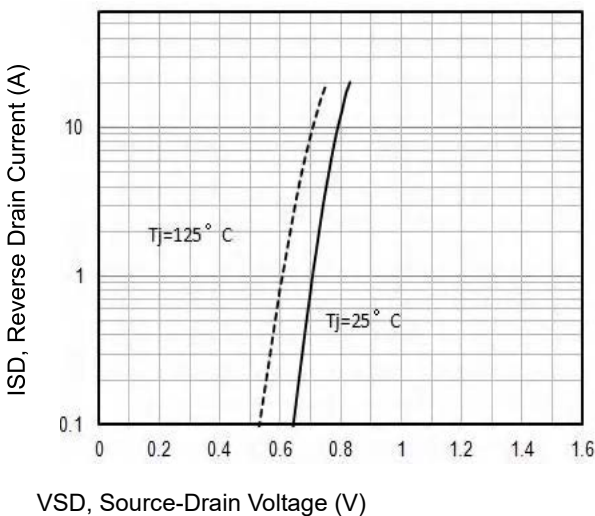


Fig6. Maximum Safe Operating Area Voltage

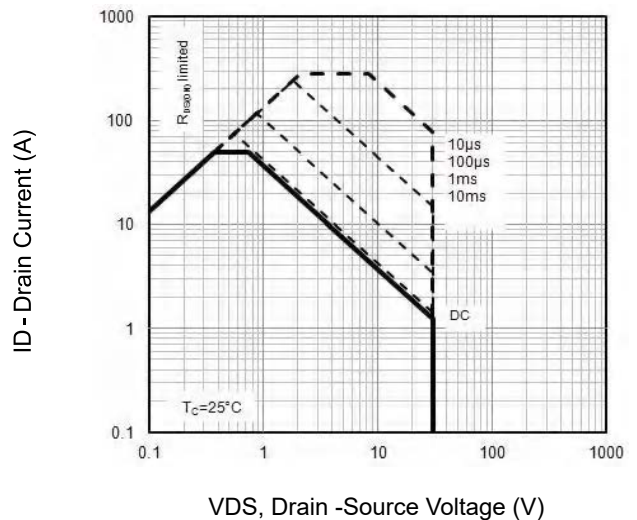


Fig5. Typical Source-Drain Diode Forward

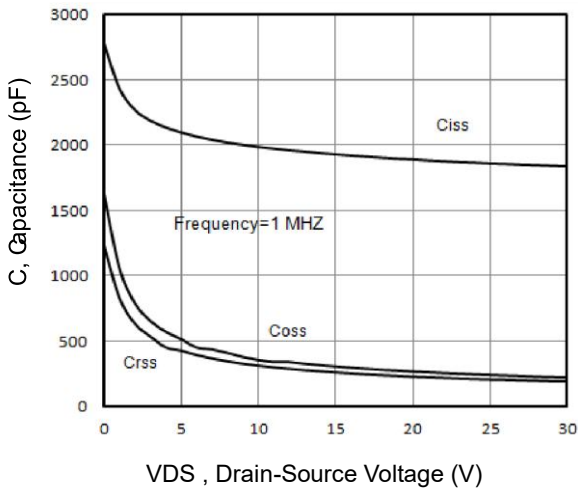


Fig7. Typical Capacitance Vs. Drain-Source Voltage

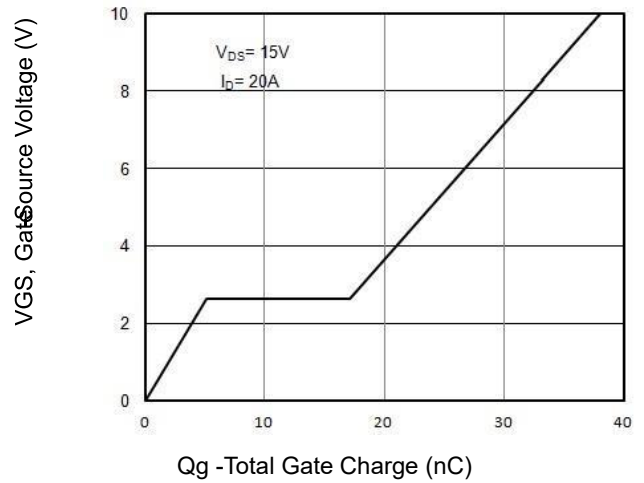


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

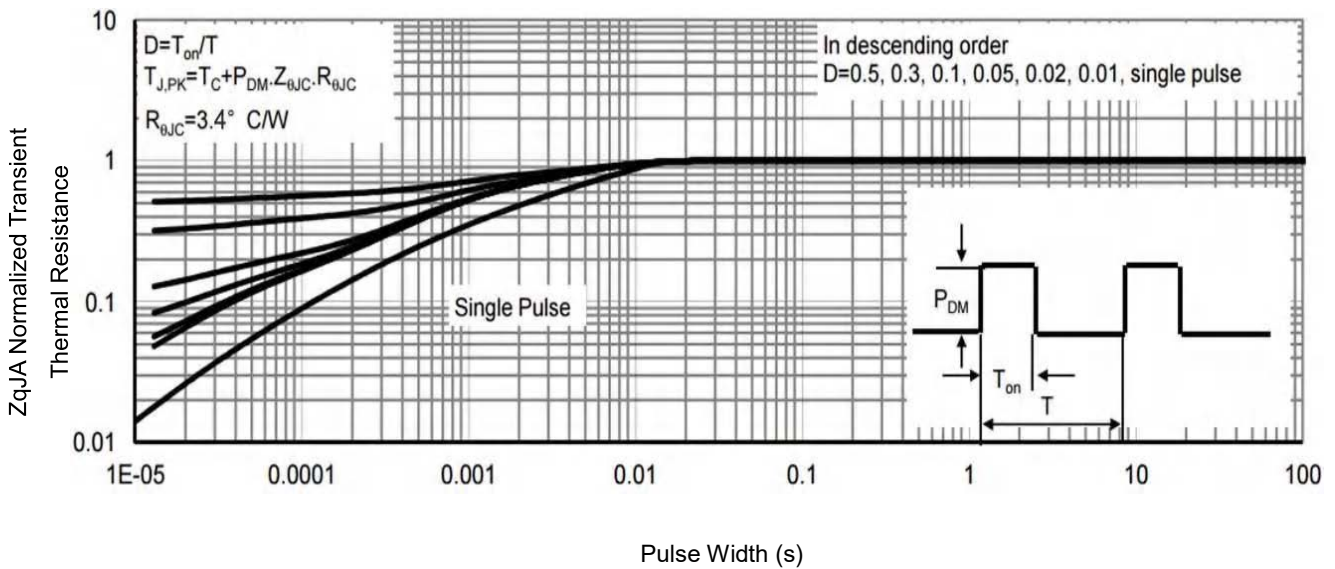


Fig9. Normalized Maximum Transient Thermal Impedance

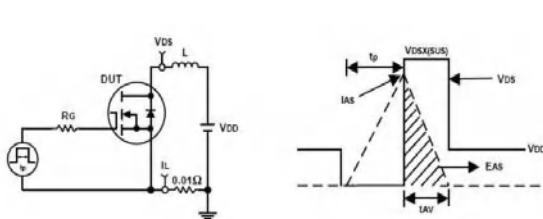


Fig10. Unclamped Inductive Test Circuit and waveforms

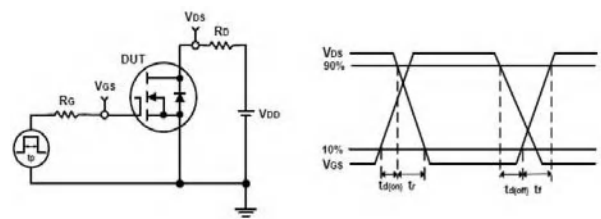


Fig11. Switching Time Test Circuit and waveforms



DFN3X3-8L(PowerPAK-SO-8) 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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