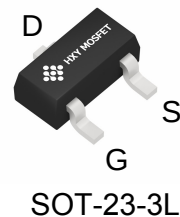




## Description

The Si2308BDS-T1-GE3 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



## General Features

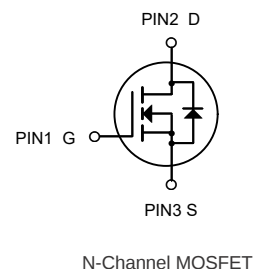
$V_{DS} = 60V, I_D = 4.5A$

$R_{DS(ON)} < 85m\Omega @ V_{GS}=10V$

$R_{DS(ON)} < 93m\Omega @ V_{GS}=4.5V$

## Application

High power and current handing capability  
Lead free product is acquired  
Surface mount package  
PWM applications  
Load switch  
Power management



## Ordering Information

| Product ID       | Pack      | Brand      | Qty(PCS) |
|------------------|-----------|------------|----------|
| Si2308BDS-T1-GE3 | SOT-23-3L | HXY MOSFET | 3000     |

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

| Symbol          | Parameter                                        | Limit      | Unit          |
|-----------------|--------------------------------------------------|------------|---------------|
| $V_{DS}$        | Drain-Source Voltage                             | 60         | V             |
| $V_{GS}$        | Gate-Source Voltage                              | $\pm 20$   | V             |
| $I_D$           | Drain Current-Continuous                         | 4.5        | A             |
| $I_{DM}$        | Drain Current-Pulsed (Note 1)                    | 15         | A             |
| $P_D$           | Maximum Power Dissipation                        | 8          | W             |
| $T_J, T_{STG}$  | Operating Junction and Storage Temperature Range | -55 To 150 | $^{\circ}C$   |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 89         | $^{\circ}C/W$ |



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

| Symbol       | Parameter                                      | Conditions                                          | Min. | Typ. | Max.      | Unit      |
|--------------|------------------------------------------------|-----------------------------------------------------|------|------|-----------|-----------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage                 | $V_{GS}=0V, I_D=250\mu A$                           | 60   | ---  | ---       | V         |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance <sup>2</sup> | $V_{GS}=10V, I_D=5A$                                | ---  | 73   | 85        | $m\Omega$ |
|              |                                                | $V_{GS}=4.5V, I_D=5A$                               | ---  | 82   | 93        |           |
| $V_{GS(th)}$ | Gate Threshold Voltage                         | $V_{GS}=V_{DS}, I_D=250\mu A$                       | 1.2  | ---  | 2.5       | V         |
| $I_{DSS}$    | Drain-Source Leakage Current                   | $V_{DS}=48V, V_{GS}=0V, T_J=25^{\circ}\text{C}$     | ---  | ---  | 1         | $\mu A$   |
|              |                                                | $V_{DS}=48V, V_{GS}=0V, T_J=55^{\circ}\text{C}$     | ---  | ---  | 5         |           |
| $I_{GSS}$    | Gate-Source Leakage Current                    | $V_{GS}=\pm 20V, V_{DS}=0V$                         | ---  | ---  | $\pm 100$ | nA        |
| $g_{fs}$     | Forward Transconductance                       | $V_{DS}=5V, I_D=5A$                                 | ---  | 7    | ---       | S         |
| $Q_g$        | Total Gate Charge (10V)                        | $V_{DS}=12V, V_{GS}=10V, I_D=5A$                    | ---  | 5.5  | ---       | nC        |
| $Q_{gs}$     | Gate-Source Charge                             |                                                     | ---  | 1.8  | ---       |           |
| $Q_{gd}$     | Gate-Drain Charge                              |                                                     | ---  | 2.4  | ---       |           |
| $T_{d(on)}$  | Turn-On Delay Time                             | $V_{DD}=12V, V_{GS}=10V, R_G=3.3\Omega$<br>$I_D=5A$ | ---  | 6    | ---       | ns        |
| $T_r$        | Rise Time                                      |                                                     | ---  | 10   | ---       |           |
| $T_{d(off)}$ | Turn-Off Delay Time                            |                                                     | ---  | 15   | ---       |           |
| $T_f$        | Fall Time                                      |                                                     | ---  | 7    | ---       |           |
| $C_{iss}$    | Input Capacitance                              | $V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$              | ---  | 695  | ---       | pF        |
| $C_{oss}$    | Output Capacitance                             |                                                     | ---  | 148  | ---       |           |
| $C_{rss}$    | Reverse Transfer Capacitance                   |                                                     | ---  | 7    | ---       |           |
| $I_S$        | Continuous Source Current <sup>1,5</sup>       | $V_G=V_D=0V, \text{Force Current}$                  | ---  | ---  | 17        | A         |
| $I_{SM}$     | Pulsed Source Current <sup>2,5</sup>           |                                                     | ---  | ---  | 50        | A         |
| $V_{SD}$     | Diode Forward Voltage <sup>2</sup>             | $V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$         | ---  | ---  | 1.2       | V         |

Note :

1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$

3.The EAS data shows Max. rating . The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=15A$

4.The power dissipation is limited by  $150^{\circ}\text{C}$  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

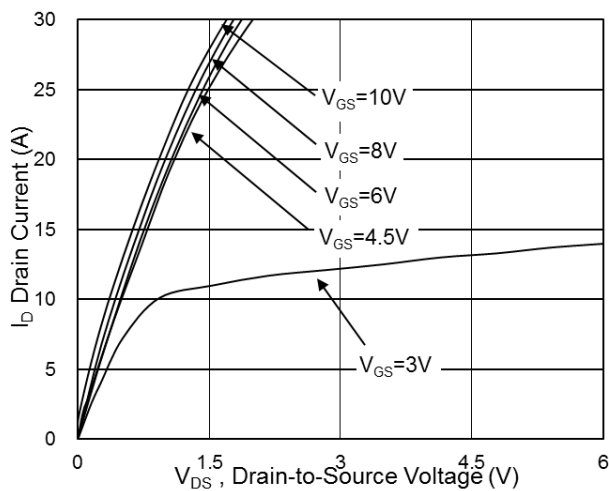


Fig.1 Typical Output Characteristics

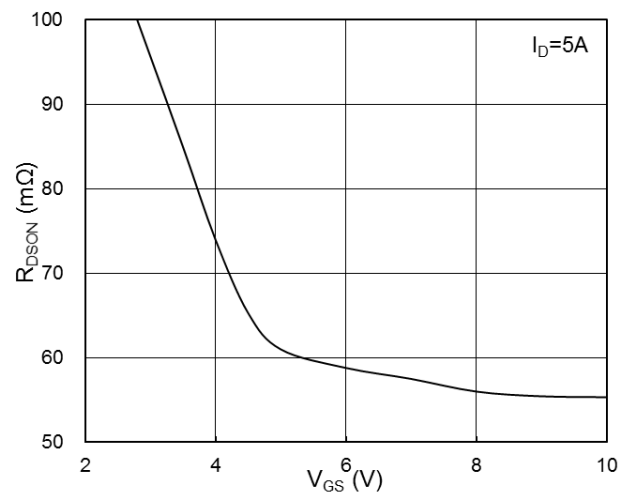


Fig.2 On-Resistance vs. Gate-Source Voltage

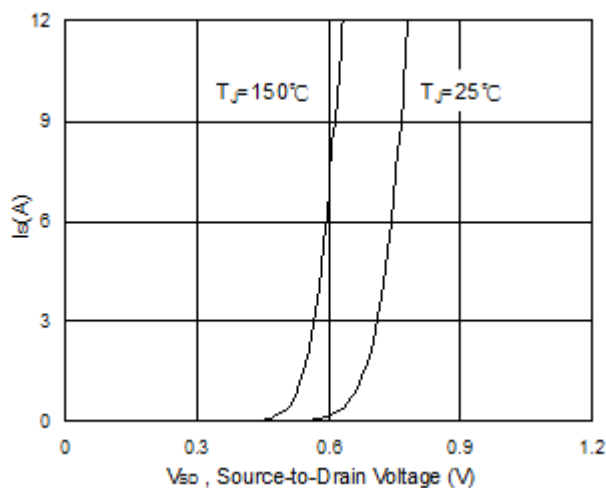


Fig.3 Forward Characteristics of Reverse

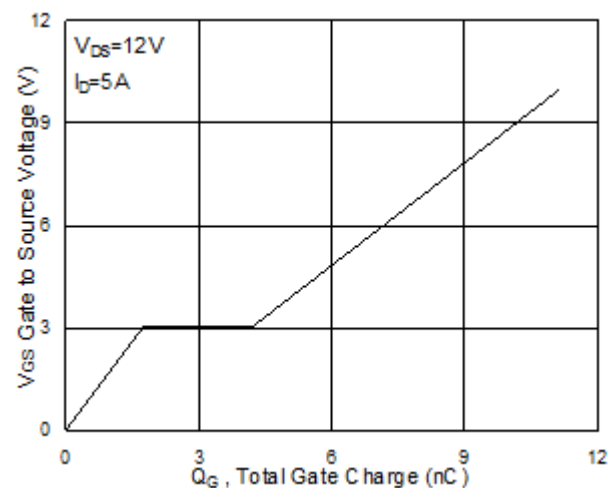


Fig.4 Gate-Charge Characteristics

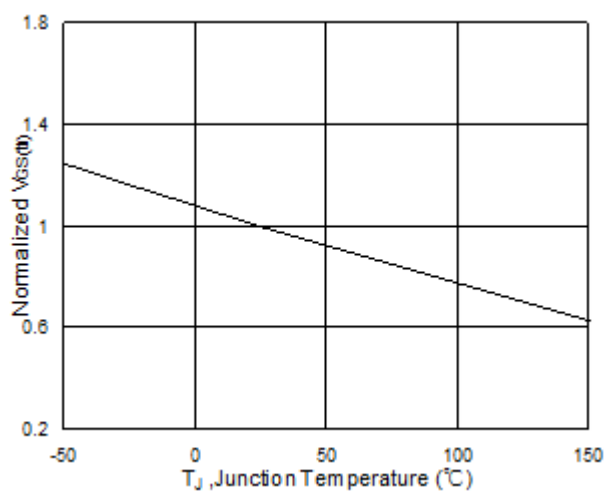


Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$

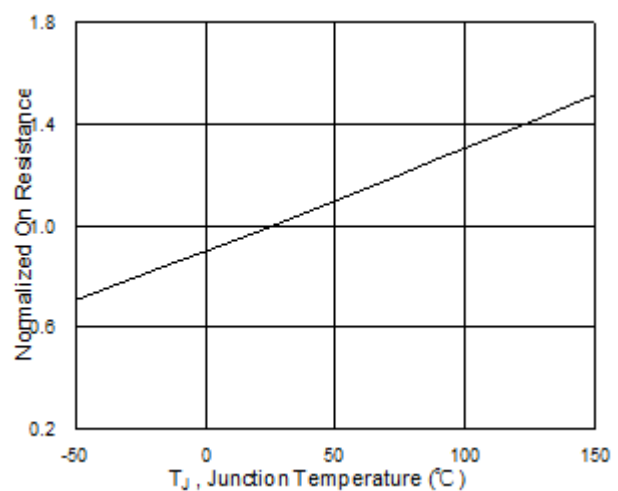


Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$

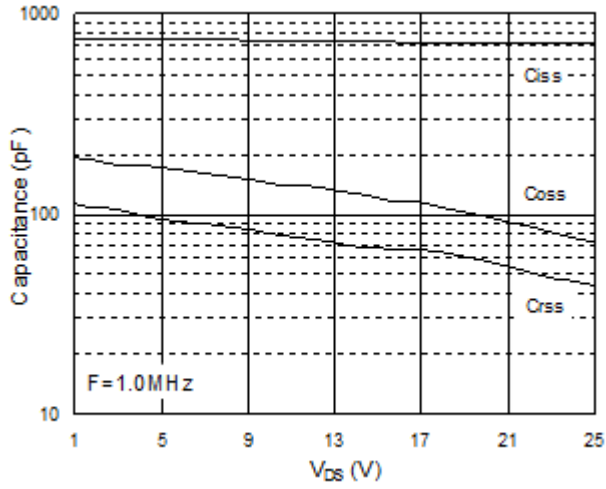


Fig.7 Capacitance

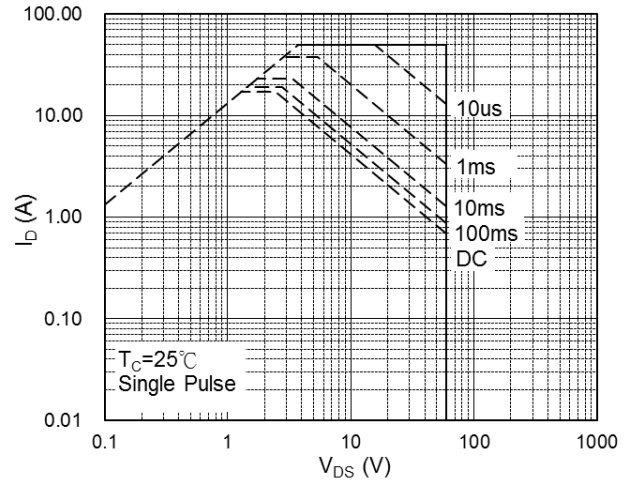


Fig.8 Safe Operating Area

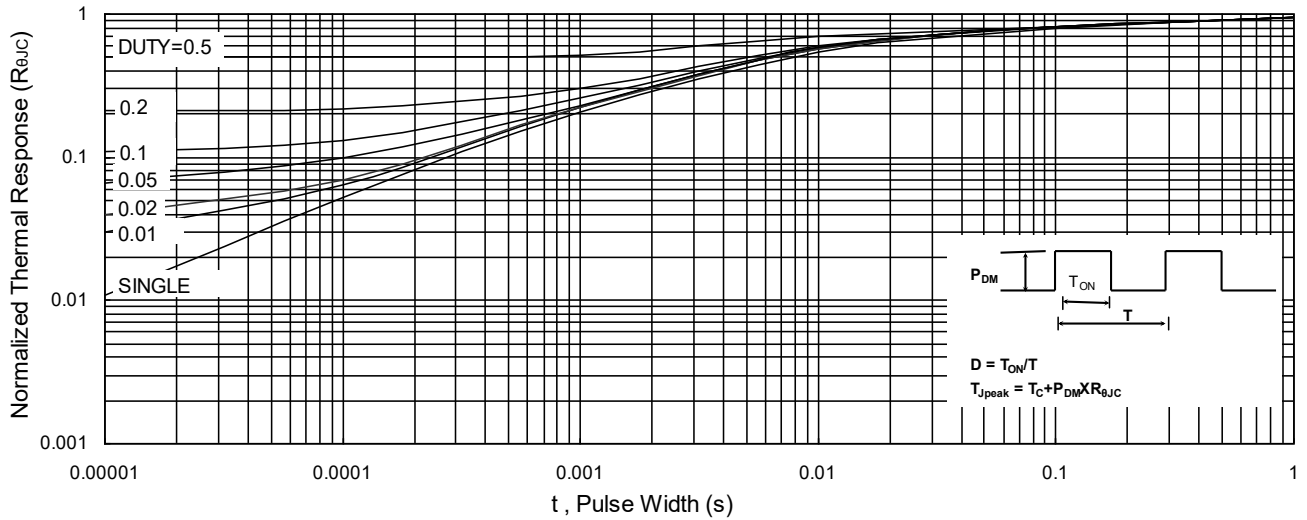


Fig.9 Normalized Maximum Transient Thermal Impedance

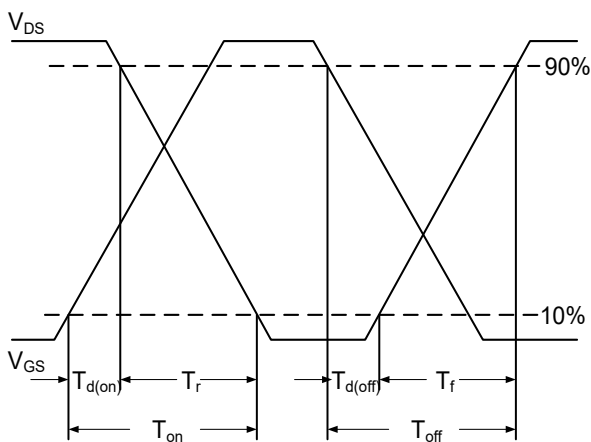


Fig.10 Switching Time Waveform

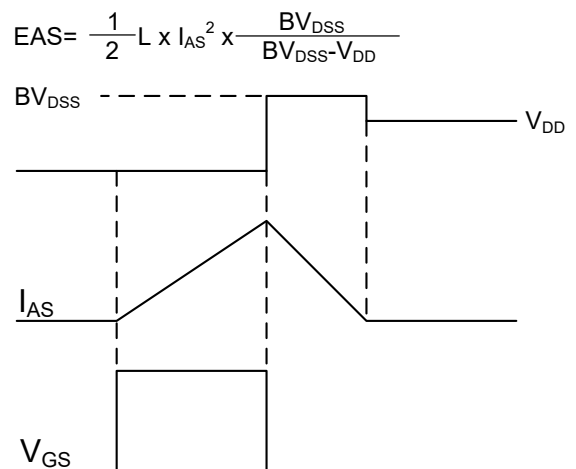
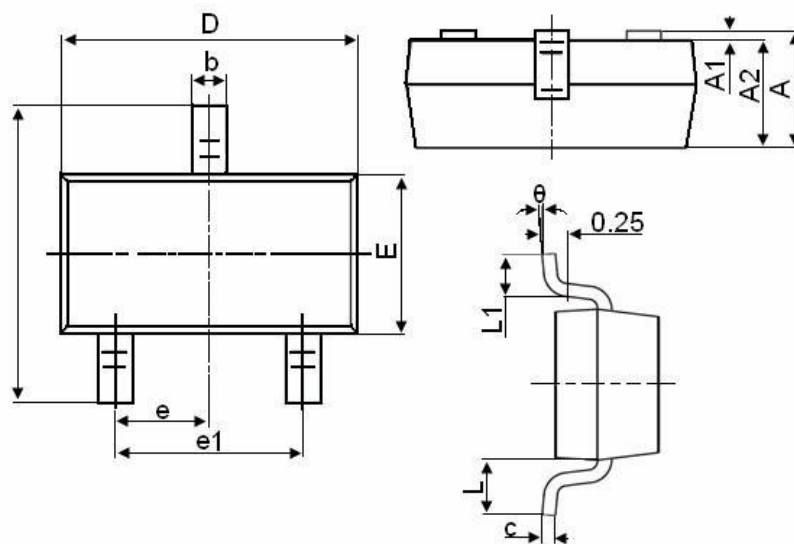


Fig.11 Unclamped Inductive Switching Waveform



## SOT-23-3L Package Information



| Symbol | Dimensions in Millimeters |       |
|--------|---------------------------|-------|
|        | MIN.                      | MAX.  |
| A      | 1.050                     | 1.250 |
| A1     | 0.000                     | 0.100 |
| A2     | 1.050                     | 1.150 |
| b      | 0.300                     | 0.500 |
| c      | 0.100                     | 0.200 |
| D      | 2.800                     | 3.000 |
| E      | 1.500                     | 1.700 |
| E1     | 2.650                     | 2.950 |
| e      | 0.950TYP                  |       |
| e1     | 1.800                     | 2.000 |
| L      | 0.550REF                  |       |
| L1     | 0.300                     | 0.600 |
| θ      | 0°                        | 8°    |



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