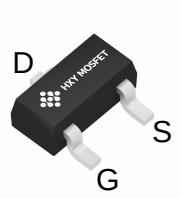
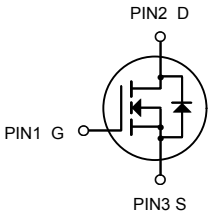
## Description

The SQ2348ES-T1_BE3 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.




**SOT-23**




N-Channel MOSFET

## General Features

$V_{DS}$ = 30V $I_D$ = 5.8A

$R_{DS(ON)}$ < 28mΩ @ $V_{GS}$=10V

## Application

Battery protection

Load switch

Uninterruptible power supply

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| SQ2348ES-T1_BE3 | SOT-23 | HXY MOSFET | 3000 |

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

| Symbol | Parameter | Limit | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$ | Drain Current-Continuous | 5.8 | A |
| $I_{DM}$ | Drain Current-Pulsed (Note 1) | 18.4 | A |
| $P_D$ | Maximum Power Dissipation | 1 | W |
| $T_J$,$T_{STG}$ | Operating Junction and Storage Temperature Range | -55 To 150 | °C |
| $R_{\theta JA}$ | Thermal Resistance,Junction-to-Ambient (Note 2) | 125 | °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 , $I_D$=250uA | 30 | --- | --- | V |
| $\triangle BV_{DSS}/\triangle T$ | BVDSS Temperature Coefficient | Reference to 25℃ , $I_D$=1mA | --- | 0.023 | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=4A | --- | 22 | 28 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=3A | --- | 26 | 32 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.0 | 1.5 | 2.5 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | -4.2 | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=24V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_D$=4A | --- | 7 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 2.3 | 4.6 | Ω |
| $Q_g$ | Total Gate Charge (4.5V) | $V_{DS}$=15V , $V_{GS}$=4.5V , $I_D$=4A | --- | 5.0 | 6.9 | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 1.1 | 2.2 | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 2.6 | 2.8 | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=15V , $V_{GS}$=10V , $R_G$=3.3Ω $I_D$=4A | --- | 2 | 4 | ns |
| $T_r$ | Rise Time | | --- | 34.4 | 62 | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 13.2 | 26 | |
| $T_f$ | Fall Time | | --- | 4.8 | 9.6 | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 420 | 582 | pF |
| $C_{oss}$ | Output Capacitance | | --- | 60 | 87 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 53 | 71 | |
| $I_S$ | Continuous Source Current[1,4] | $V_G$=$V_D$=0V , Force Current | --- | --- | 4.6 | A |
| $I_{SM}$ | Pulsed Source Current[2,4] | | --- | --- | 18.4 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ =4A , dI/dt=100A/μs , $T_J$=25℃ | --- | 8.7 | --- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 2.3 | --- | nC |

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 power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

## Typical Characteristics

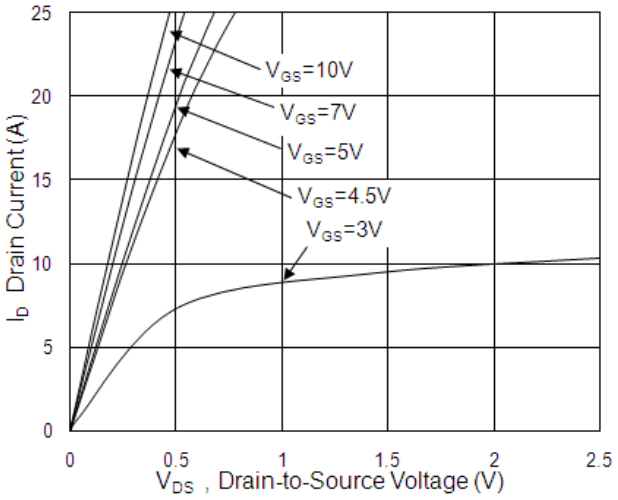



**Fig.1 Typical Output Characteristics**

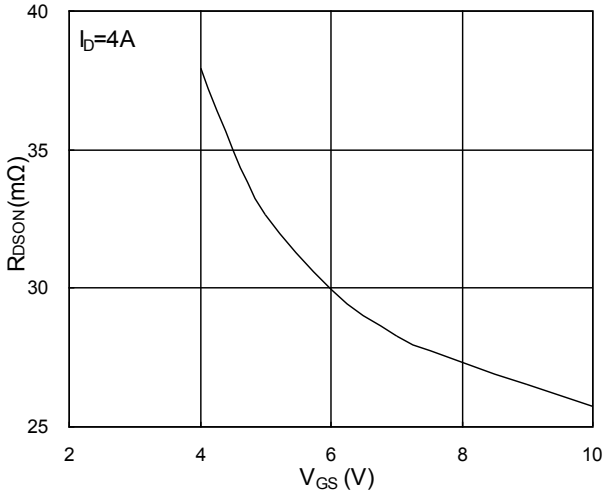



**Fig.2 On-Resistance vs. Gate-Source**

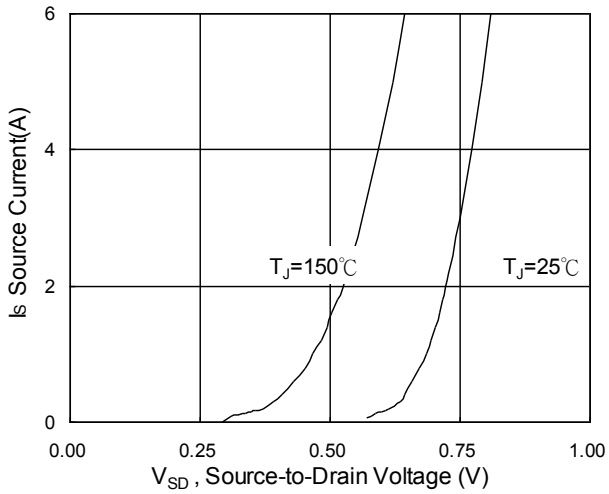



**Fig.3 Forward Characteristics Of Reverse**

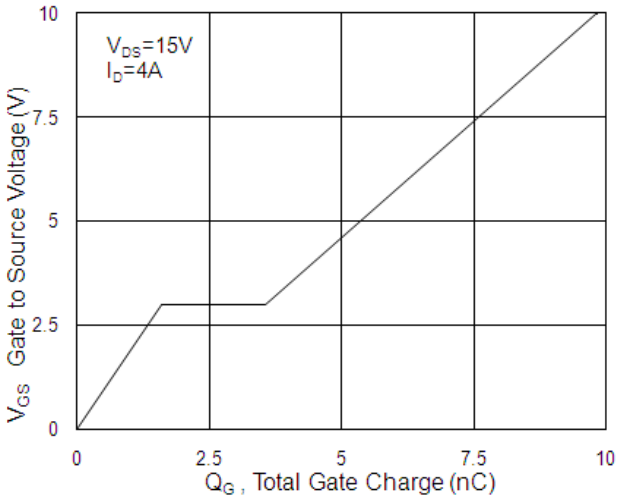



**Fig.4 Gate-Charge Characteristics**

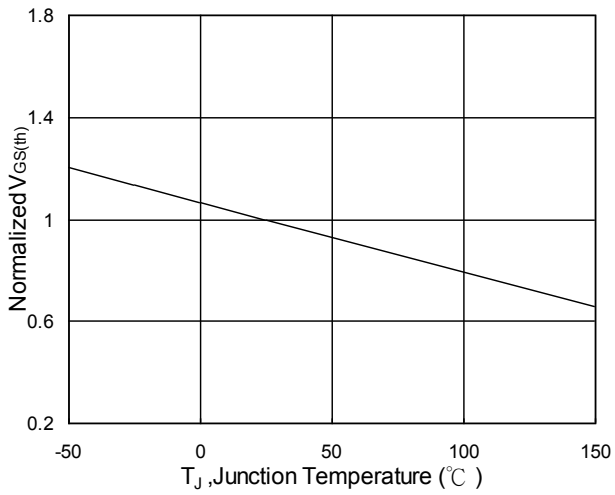



**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

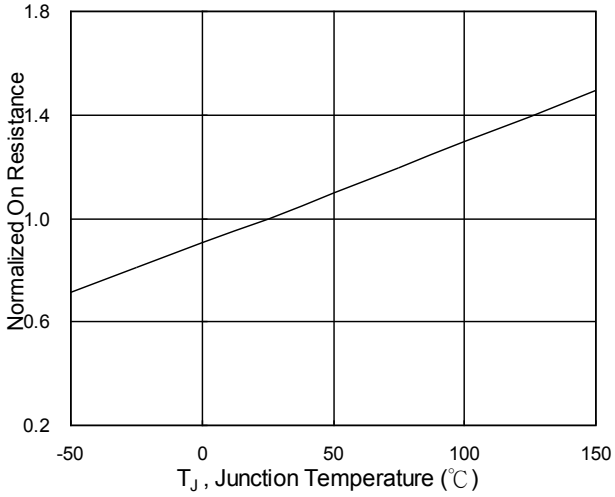



**Fig.6 Normalized $R_{DSON}$ vs. $T_J$**

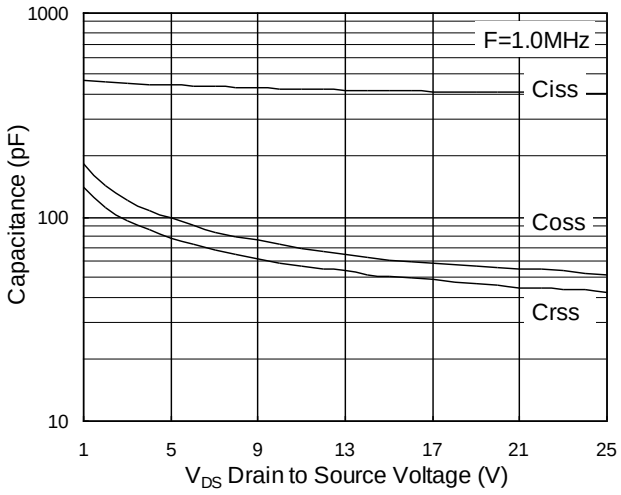



**Fig.7 Capacitance**

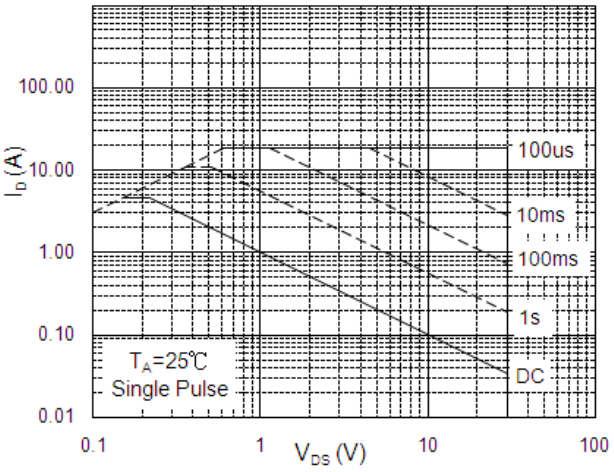



**Fig.8 Safe Operating Area**

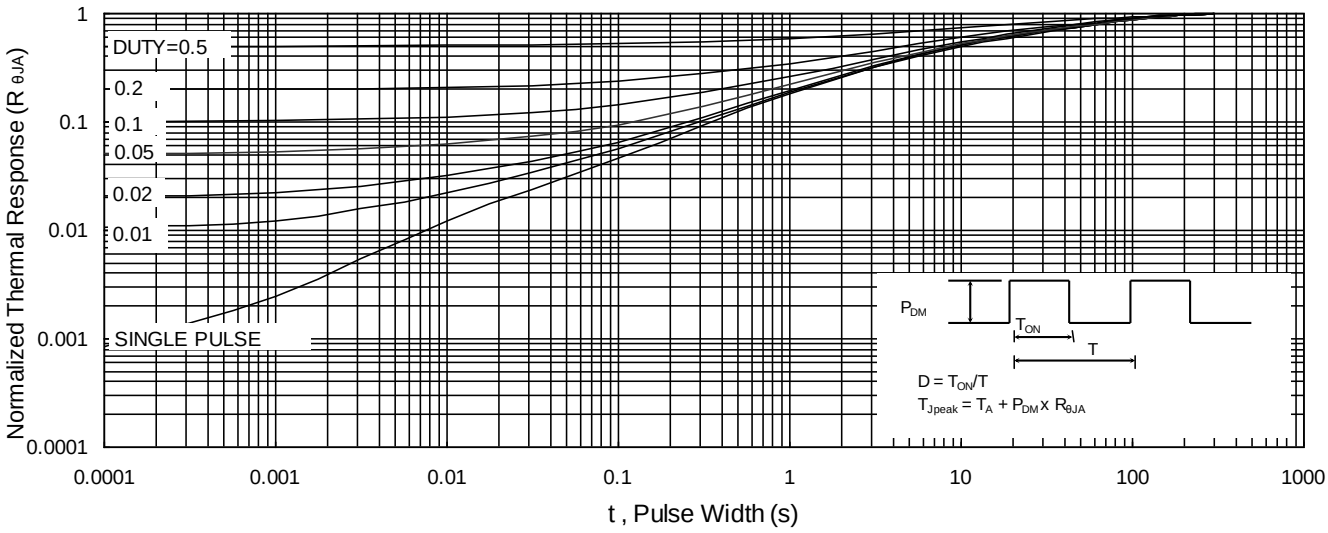



**Fig.9 Normalized Maximum Transient Thermal Impedance**

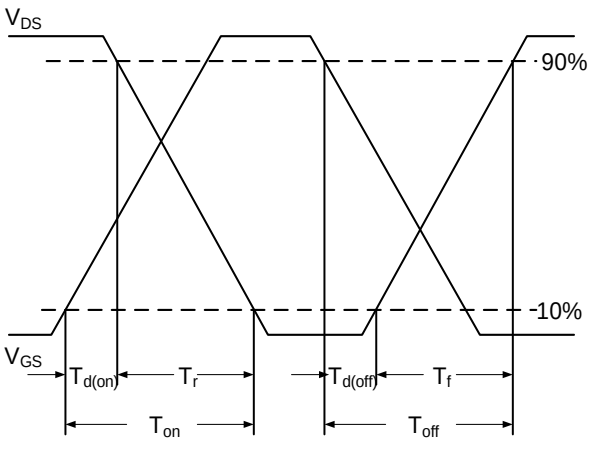



**Fig.10 Switching Time Waveform**

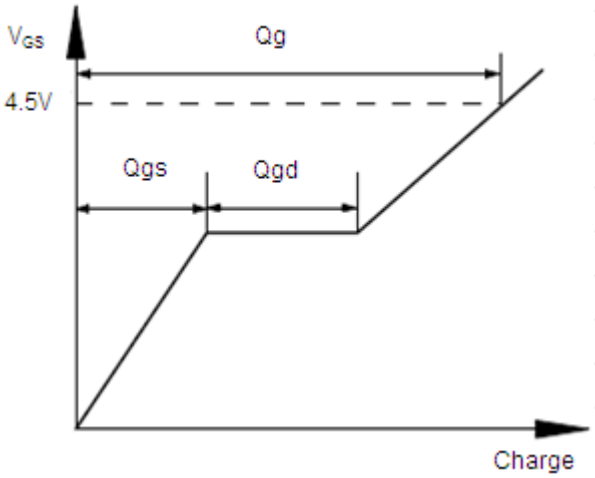
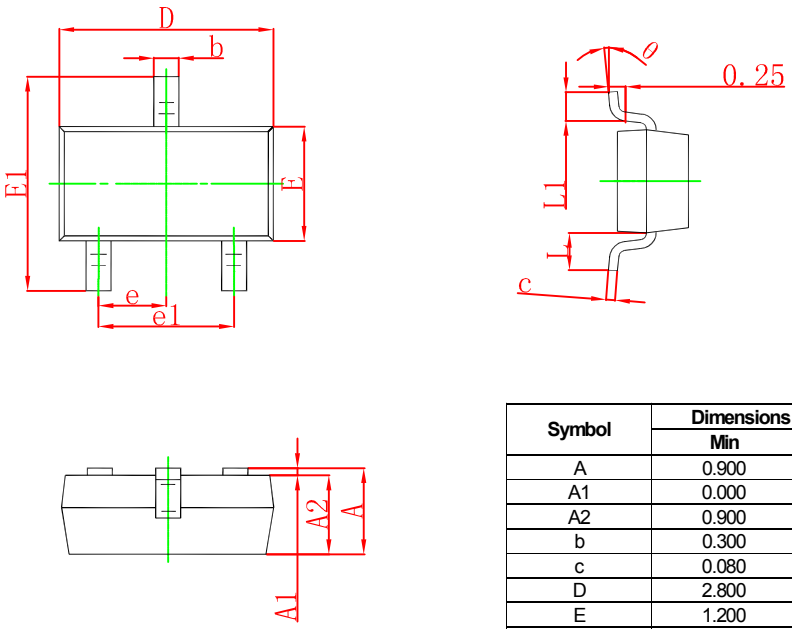


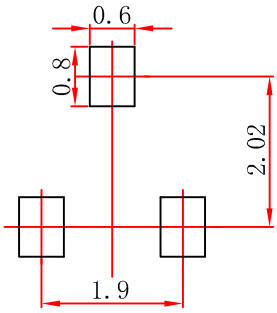

**Fig.11 Gate Charge Waveform**

## SOT-23 Package Outline Dimensions




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

## SOT-23 Suggested Pad Layout




Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

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