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XINBOLE

# Product Specification

## XBLW SI2333

P-Channel Enhancement Mode MOSFET

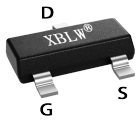
WEB | www.xinboleic.com

## Description

The SI2333 uses advanced trench technology to provide excellent RDS(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

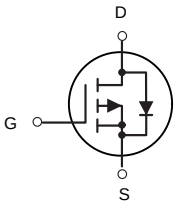
- VDS = -20V,ID = -7A
- RDS(ON) < 22mΩ @ VGS=4.5V



SOT-23-3L

## Application

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



P-Channel MOSFET

## Package Marking and Ordering Information

| Product Model | Package Type | Marking | Packing | Packing Qty |
|---|---|---|---|---|
| XBLW SI2333 | SOT-23-3L | 20P07 | Tape | 3000Pcs/Reel |
| | | | | |
| | | | | |
| | | | | |

## Absolute Maximum Ratings (TA=25°Cunless otherwise noted)

| Symbol | Parameter | Limit | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -20 | V |
| $V_{GS}$ | Gate-Source Voltage | ±12 | V |
| $I_D$ | Drain Current-Continuous | -7 | A |
| $I_{DM}$ | Drain Current-Pulsed (Note 1) | -18.8 | A |
| $P_D$ | Maximum Power Dissipation | 1 | W |
| $T_J$,$T_{STG}$ | Operating Junction and Storage Temperature Range | -55 To 150 | ℃ |
| $R_{\theta JA}$ | Thermal Resistance,Junction-to-Ambient (Note 2) | 125 | ℃/W |

## Electrical Characteristics (TJ=25 °C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=-250uA | -20 | --- | --- | V |
| $\triangle BV_{DSS}/\triangle T_J$ | BVDSS Temperature Coefficient | Reference to 25℃ , $I_D$=-1mA | --- | -0.01 | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=-4.5V , $I_D$=-6.5A | --- | 18 | 22 | mΩ |
| | | $V_{GS}$=-2.5V , $I_D$=-5A | --- | 25 | 39 | |
| | | $V_{GS}$=-1.8V , $I_D$=-1.5A | --- | --- | --- | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =-250uA | -0.6 | -0.8 | -1.4 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | --- | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=-20V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | -1 | uA |
| | | $V_{DS}$=-16V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | --- | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$ =±12V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=-5V , $I_D$=-3A | --- | 10 | --- | S |
| $Q_g$ | Total Gate Charge (-4.5V) | $V_{DS}$=-10V , $V_{GS}$=-4.5V , $I_D$=-6A | --- | 10 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 1.5 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 3 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=-10V , $V_{GS}$=-4.5V , $R_G$=6.0Ω $I_D$=-1A | --- | 30 | --- | ns |
| $T_r$ | Rise Time | | --- | 25 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 70 | --- | |
| $T_f$ | Fall Time | | --- | 50 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-10V , $V_{GS}$=0V , f=1MHz | --- | 1210 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 310 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 290 | --- | |

### Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,4] | $V_G$=$V_D$=0V , Force Current | --- | --- | -7.0 | A |
| $I_{SM}$ | Pulsed Source Current[2,4] | | --- | --- | -18.8 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=-1A , $T_J$=25℃ | --- | --- | -1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=-4A , dI/dt=100A/μs , $T_J$=25℃ | --- | 52 | --- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 28 | --- | 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

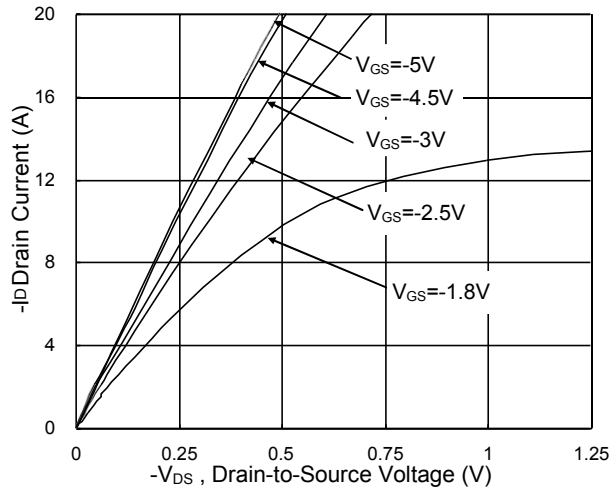



Fig.1 Typical Output Characteristics

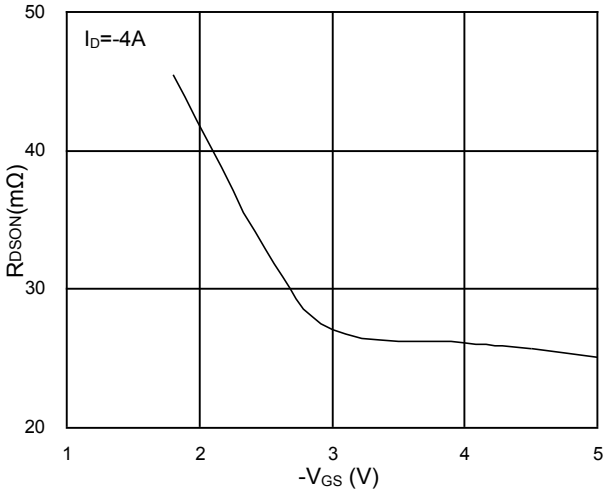



Fig.2 On-Resistance vs. Gate-Source

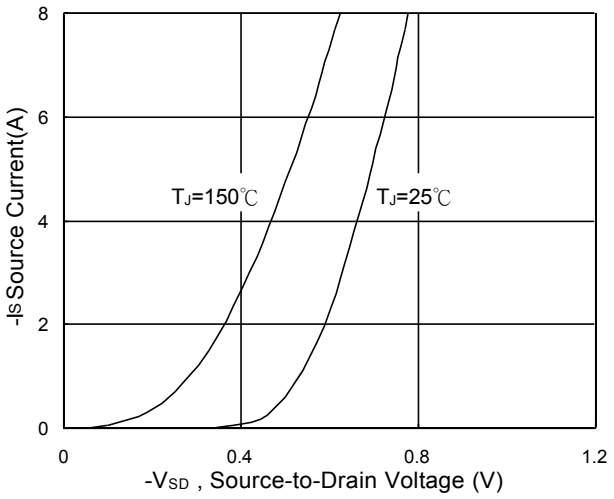



Fig.3 Forward Characteristics Of Reverse

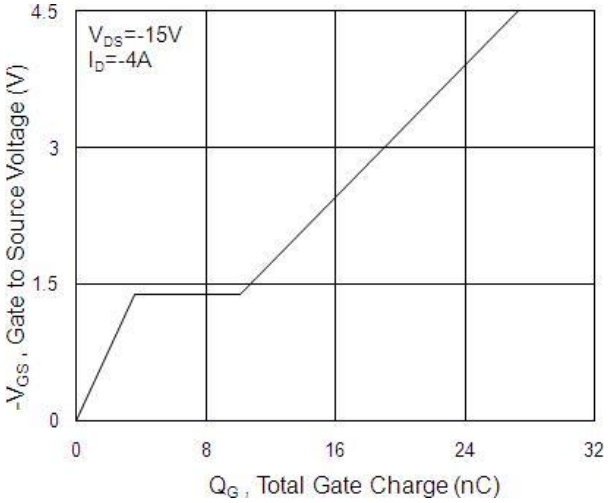



Fig.4 Gate-Charge Characteristics

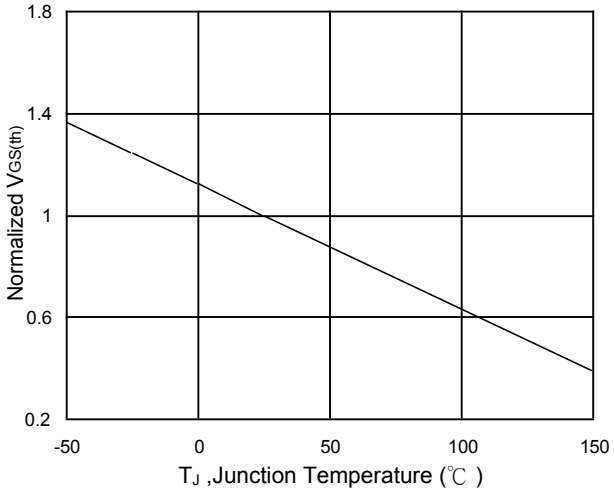



Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$

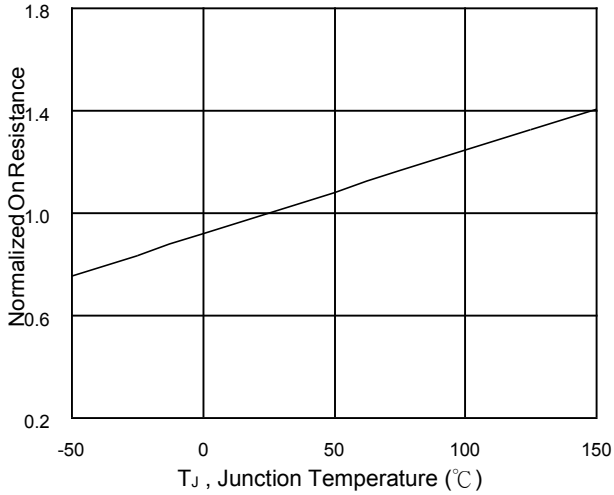



Fig.6 Normalized $R_{DSON}$ vs. $T_J$

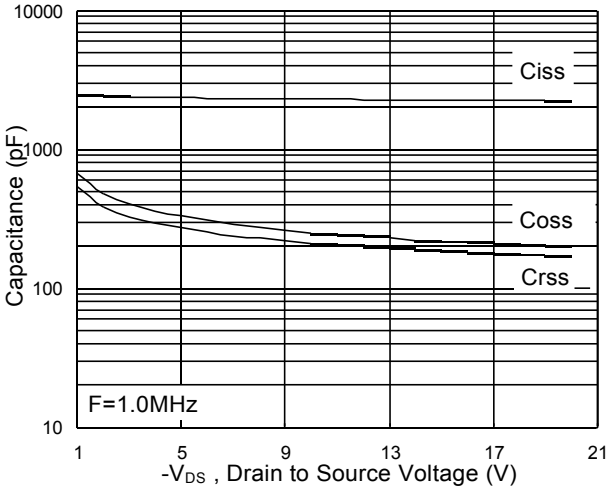



Fig.7 Capacitance

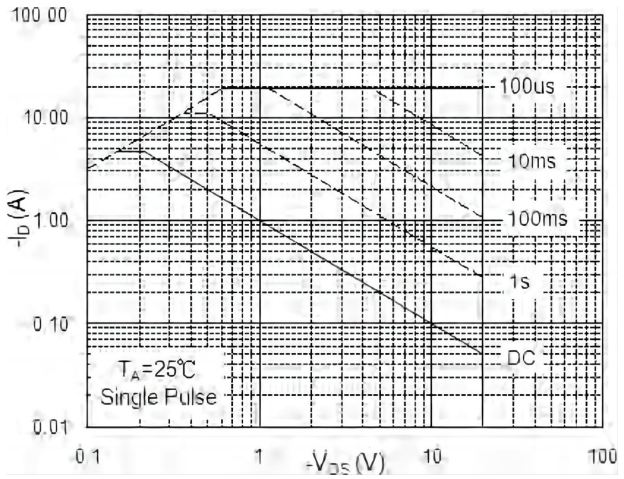



Fig.8 Safe Operating Area

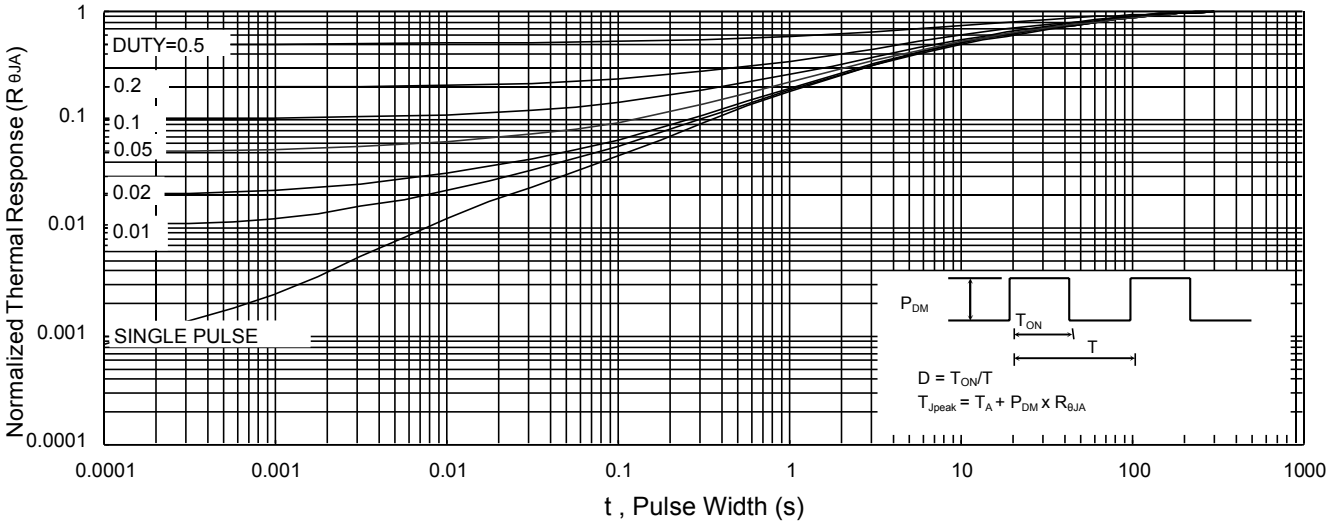



Fig.9 Normalized Maximum Transient Thermal Impedance

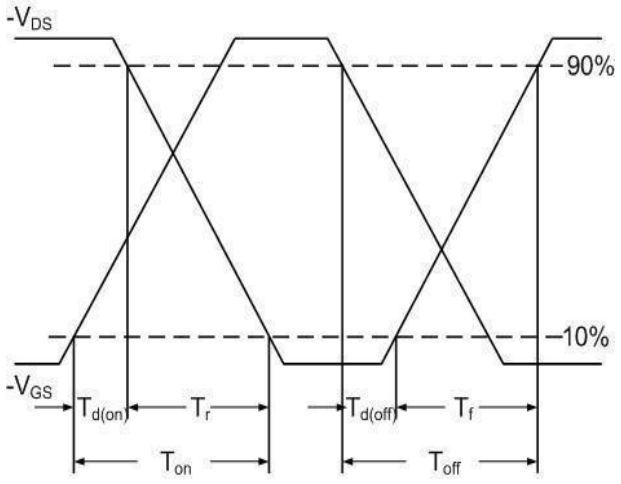



Fig.10 Switching Time Waveform

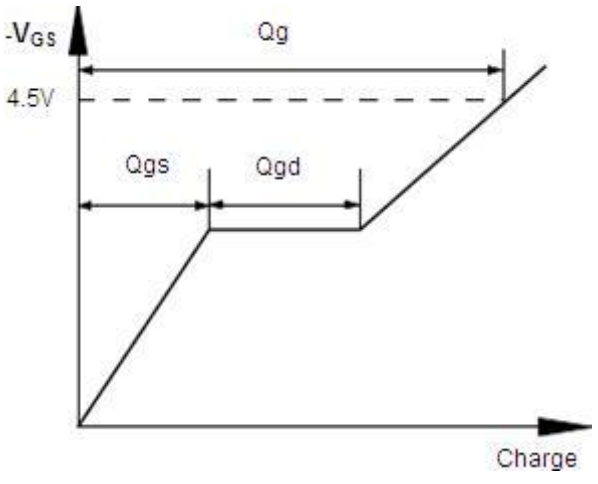
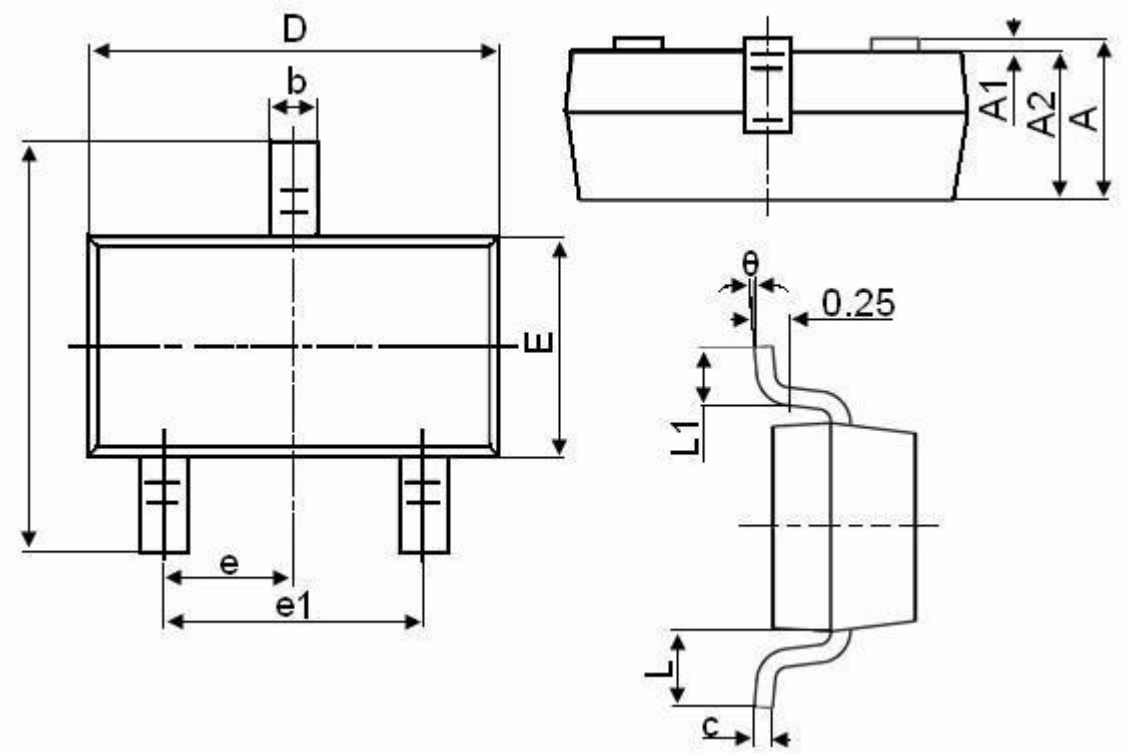



Fig.11 Gate Charge Waveform

## Package Information

### SOT23-3L




| 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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