

## N-Channel Enhancement Mode MOSFET

### GENERAL DESCRIPTION

The SI2302 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.

### FEATURES

$V_{DS} = 20V$   $I_D = 2.3A$

$R_{DS(ON)} < 75m\Omega$  @  $V_{GS}=4.5V$

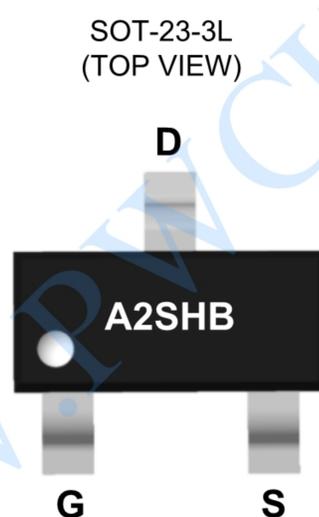
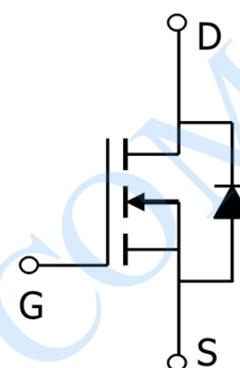
Available in a 3-Pin SOT23-3 Package

### Application

Battery protection

Load switch

Uninterruptible power supply



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

| Parameter   | Symbol      | Rating     | Unit         |
|---|-------------|------------|--------------|
| Drain-Source Voltage  | $V_{DS}$    | 20         | V            |
| Gate-Source Voltage   | $V_{GS}$    | $\pm 12$   | V            |
| Drain current-continuous <sup>note1</sup> @ $T_J=125^\circ C$ | $I_D$       | 2.3        | A            |
| -pulse d <sup>note2</sup>                                     | $I_{DM}$    | 8          | A            |
| Drain-source Diode forward current                            | $I_S$       | 2          | A            |
| maximum Power Dissipation                                     | $P_D$       | 1.25       | W            |
| Operating Junction Temperature Range                          | $T_J$       | -55 To 150 | $^\circ C$   |
| Thermal Resistance Junction-to ambient                        | $R_{th JA}$ | 100        | $^\circ C/W$ |

**Note :**

- 1、 surface mounted on FR4 board,  $t \leq 10sec$
- 2、 pulse test: pulse width  $\leq 300\mu s$ , duty  $\leq 2\%$



## ELECTRICAL CHARACTERISTICS

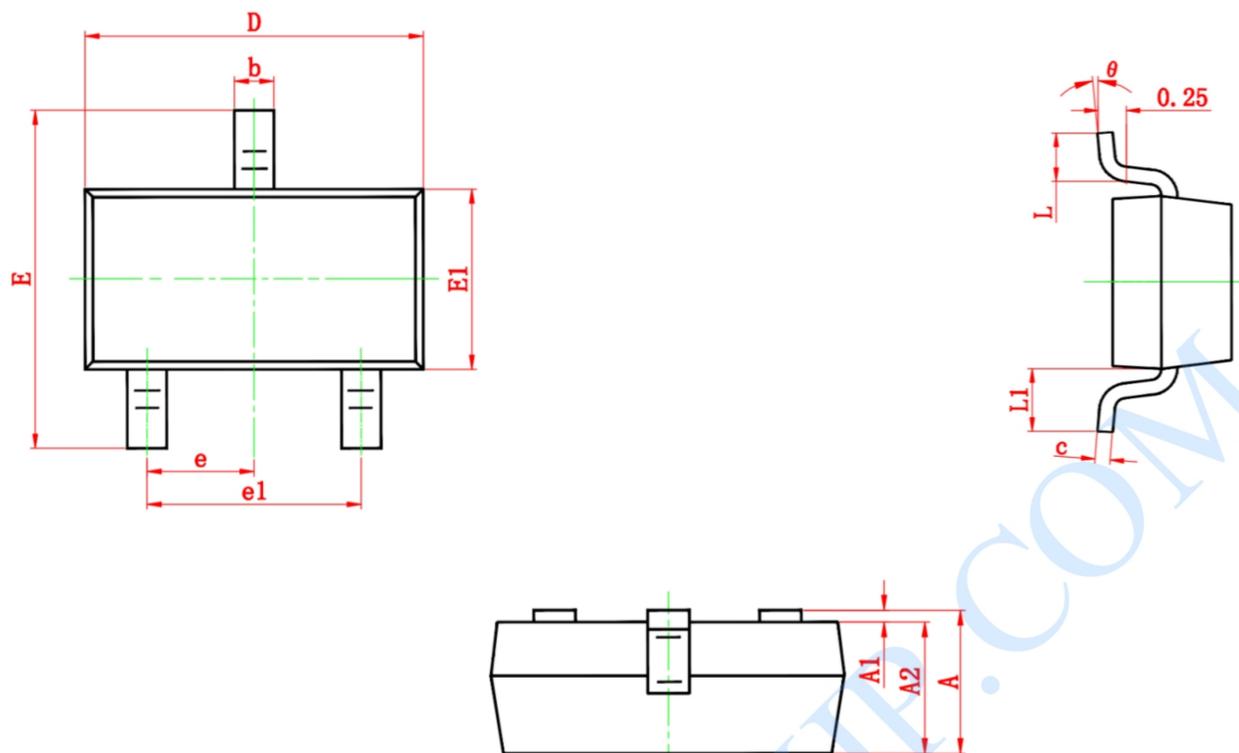
(TA = 25°C, unless otherwise noted.)

| Parameter                              | Symbol              | Condition   | Min | Typ  | Max  | Unit |
|--|---------------------|---|-----|------|------|------|
| <b>Off Characteristics</b>             |                     |   |     |      |      |      |
| Drain-Source Breakdown Voltage         | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V I <sub>D</sub> =250μA   | 20  | -    | -    | V    |
| Zero Gate Voltage Drain Current        | I <sub>DSS</sub>    | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V   | -   | -    | -1   | μA   |
| Gate-Body Leakage                      | I <sub>GSS</sub>    | V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V  | -   | -    | ±100 | nA   |
| Gate Threshold Voltage                 | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                | 0.5 | 0.75 | 1.2  | V    |
| Drain-Source On-State Resistance       | R <sub>DS(ON)</sub> | V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A   | -   | 55   | 75   | mΩ   |
|  |                     | V <sub>GS</sub> =2.5V, I <sub>D</sub> =1A   | -   | 68   | 90   | mΩ   |
| Forward Transconductance               | g <sub>FS</sub>     | V <sub>DS</sub> =5V, I <sub>D</sub> =2A   | -   | 5    | -    | S    |
| <b>Dynamic Characteristics</b> (Note4) |                     |   |     |      |      |      |
| Input Capacitance                      | C <sub>iss</sub>    | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V,<br>F=1.0MHz                                  | -   | 180  | -    | PF   |
| Output Capacitance                     | C <sub>oss</sub>    |   | -   | 38   | -    | PF   |
| Reverse Transfer Capacitance           | C <sub>rss</sub>    |   | -   | 20   | -    | PF   |
| <b>Switching Characteristics</b>       |                     |   |     |      |      |      |
| Turn-on Delay Time                     | t <sub>d(on)</sub>  | V <sub>DD</sub> =10V, R <sub>L</sub> =3Ω<br>V <sub>GS</sub> =4.5V, R <sub>GEN</sub> =6Ω | -   | 8    | -    | nS   |
| Turn-on Rise Time                      | t <sub>r</sub>      |   | -   | 7    | -    | nS   |
| Turn-Off Delay Time                    | t <sub>d(off)</sub> |   | -   | 30   | -    | nS   |
| Turn-Off Fall Time                     | t <sub>f</sub>      |   | -   | 7    | -    | nS   |
| Total Gate Charge                      | Q <sub>g</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =3A,<br>V <sub>GS</sub> =4.5V                      | -   | 3.5  | -    | nC   |
| Gate-Source Charge                     | Q <sub>gs</sub>     |   | -   | 0.6  | -    | nC   |
| Gate-Drain Charge                      | Q <sub>gd</sub>     |   | -   | 0.45 | -    | nC   |
| Diode Forward Voltage                  | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =3A   | -   | 0.76 | 1.16 | V    |

**Note :**

- 1、 guaranteed by design, not subject to production testing

## PACKAGE DESCRIPTION



| 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        | 2.250                     | 2.550 | 0.089                | 0.100 |
| E1       | 1.200                     | 1.400 | 0.047                | 0.055 |
| e        | 0.950 TYP.                |       | 0.037 TYP.           |       |
| e1       | 1.800                     | 2.000 | 0.071                | 0.079 |
| L        | 0.300                     | 0.500 | 0.012                | 0.020 |
| L1       | 0.550 REF.                |       | 0.022 REF.           |       |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |

## Notes

1. All dimensions are in millimeters.
2. Tolerance  $\pm 0.10\text{mm}$  (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.



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