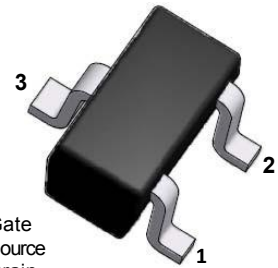


## 150mW SOT-523 SURFACE MOUNT Plastic Package N-Channel 1.8-V (G-S) MOSFET

Green Product



SOT-523

### Absolute Maximum Ratings T<sub>A</sub> = 25°C unless otherwise noted

| Symbol           | Parameter  | 5 secs      | Steady State | Units |
|------------------|--|-------------|--------------|-------|
| V <sub>DS</sub>  | Drain-Source Voltage   | 60          |              | V     |
| V <sub>GS</sub>  | Gate-Source Voltage  | ±6V         |              | V     |
| I <sub>D</sub>   | Continuous Drain Current <sup>e</sup> T <sub>A</sub> =25°C<br>T <sub>A</sub> =85°C | 900<br>600  | 800<br>550   | mA    |
| I <sub>DM</sub>  | Pulsed Drain Current <sup>d</sup>  | 1500        |              | mA    |
| I <sub>S</sub>   | Continuous Source Current <sup>e</sup>   | 275         | 250          | mA    |
| P <sub>D</sub>   | Power Dissipation <sup>e</sup> T <sub>A</sub> =25°C<br>T <sub>A</sub> =85°C        | 175<br>90   | 150<br>80    | mW    |
| T <sub>STG</sub> | Storage Temperature Range  | -55 to +150 |              | °C    |
| T <sub>J</sub>   | Operating Junction Temperature   | +150        |              | °C    |
| ESD              | Gate-source ESD Rating<br>(HBM, Method 3015)                                       | 2000        |              | V     |

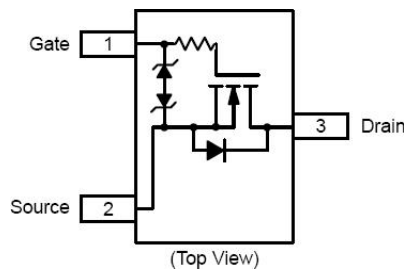
These ratings are limiting values above which the serviceability of the device may be impaired. Notes:

- d. Pulse width limited by maximum junction temperature.
- e. Surface mounted on FR4 board.

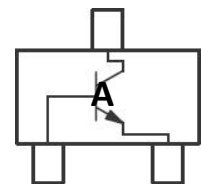
### FEATURES

- TrenchFET<sup>®</sup> Power MOSFET: 1.8-V Rated
- Gate-Source ESD Protected: 2000V
- High-side Switching
- Low On-Resistance: 0.7Ω
- Low Threshold: 0.8V (Typ.)
- Fast Switching Speed: 10ns
- S-Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- RoHS Compliant
- Green EMC
- Matte Tin(Sn) Lead Finish
- Weight: approx. 0.002g

### Electrical Symbol:



### Device Marking Code:



### BENEFITS

- Ease in Driving Switches
- Low Offset(Error) Voltage
- Low-Voltage operation
- High-Speed Circuits
- Low Battery Voltage Operation

### APPLICATIONS

- Drivers: Relays, Solenoids, Lamps, Hammers, displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, agers

### Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

#### Static

| Symbol              | Parameter                               | Test Condition  | Limits |      |      | Unit  |
|---------------------|---|---|--------|------|------|-------|
|                     |   |   | Min    | Typ  | Max  |       |
| V <sub>th(GS)</sub> | Gate-Threshold Voltage                  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250uA | 0.45   |      | 0.9  | Volts |
| I <sub>GSS</sub>    | Gate-Body Leakage                       | V <sub>DS</sub> =0V, V <sub>GS</sub> =±4.5V               |        | ±0.5 | ±1.0 | uA    |
| I <sub>DSS</sub>    | Zero Gate Voltage Drain Current         | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V                 |        | 0.3  | 100  | nA    |
| I <sub>D(ON)</sub>  | On-state Drain Current <sup>a</sup>     | V <sub>DS</sub> =5V, V <sub>GS</sub> =4.5V                | 700    |      |      | mA    |
| R <sub>DS(on)</sub> | Drain-Source On-Resistance <sup>a</sup> | V <sub>GS</sub> =4.5V, I <sub>D</sub> =600mA              |        | 0.41 | 0.70 | Ω     |
|                     |   | V <sub>GS</sub> =2.5V, I <sub>D</sub> =500mA              |        | 0.53 | 0.85 |       |
|                     |   | V <sub>GS</sub> =1.8V, I <sub>D</sub> =350mA              |        | 0.70 | 1.25 |       |
| g <sub>fs</sub>     | Forward Trans Conductance <sup>a</sup>  | V <sub>DS</sub> =10V, I <sub>D</sub> =400mA               |        | 1    |      | ms    |
| V <sub>SD</sub>     | Diode Forward Voltage <sup>a</sup>      | I <sub>S</sub> =150mA, V <sub>GS</sub> =0V                |        | 0.8  | 1.2  | V     |

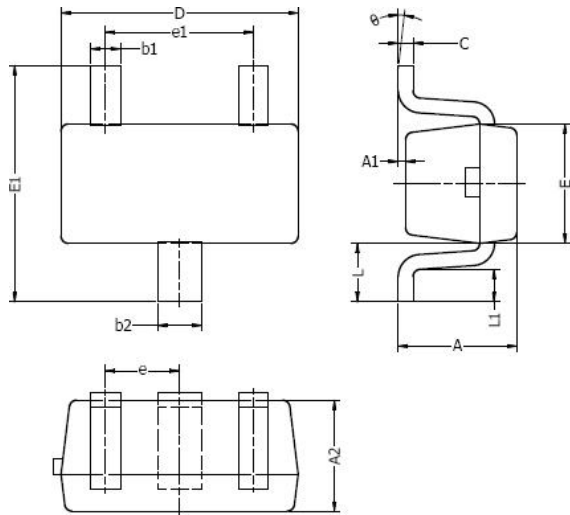
#### Dynamic <sup>b</sup>

| Symbol              | Parameter           | Test Condition   | Limits |     |     | Unit |
|---------------------|---------------------|--|--------|-----|-----|------|
|                     |                     |  | Min    | Typ | Max |      |
| Q <sub>g</sub>      | Total Gate Charge   | V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V,<br>I <sub>D</sub> =250mA  | --     | 750 | --  | pC   |
| Q <sub>gs</sub>     | Gate-Source Charge  |  | --     | 75  | --  |      |
| Q <sub>gd</sub>     | Gate-Drain Charge   |  | --     | 225 | --  |      |
| T <sub>d(on)</sub>  | Turn-On Delay Time  | V <sub>DD</sub> =10V, R <sub>L</sub> =47Ω,<br>I <sub>D</sub> =200mA, V <sub>GEN</sub> =4.5V<br>R <sub>G</sub> =10Ω | --     | 5   | --  | ns   |
| t <sub>r</sub>      | Rise Time           |  | --     | 5   | --  |      |
| t <sub>d(off)</sub> | Turn-Off Delay Time |  | --     | 25  | --  |      |
| t <sub>f</sub>      | Fall Time           |  | --     | 11  | --  |      |

Notes:

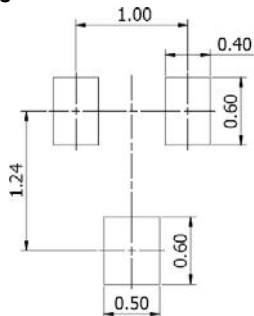
- a. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

**SOT-523 Package Outline**



| DIM | MILLIMETERS |      | INCHES     |       |
|-----|-------------|------|------------|-------|
|     | MIN         | MAX  | MIN        | MAX   |
| A   | 0.70        | 0.90 | 0.028      | 0.035 |
| A1  | 0.00        | 0.10 | 0.000      | 0.004 |
| A2  | 0.70        | 0.80 | 0.028      | 0.031 |
| b1  | 0.15        | 0.25 | 0.006      | 0.010 |
| b2  | 0.25        | 0.35 | 0.010      | 0.014 |
| c   | 0.10        | 0.20 | 0.004      | 0.008 |
| D   | 1.50        | 1.70 | 0.059      | 0.067 |
| E   | 0.70        | 0.90 | 0.028      | 0.035 |
| E1  | 1.45        | 1.75 | 0.057      | 0.069 |
| e   | 0.50 TYP.   |      | 0.020 TYP. |       |
| e1  | 0.90        | 1.10 | 0.035      | 0.043 |
| L   | 0.40 REF.   |      | 0.016 REF. |       |
| L1  | 0.10        | 0.30 | 0.004      | 0.012 |
| θ   | 0°          | 8°   | 0°         | 8°    |

**Typical Soldering Pattern:**



**NOTES:**

1. Above package outline conforms to JEITA EAIJ ED-7500A SC-75A.
2. Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.