

## SOT-523 Plastic-Encapsulate MOSFET

### 20V N-Channel MOSFET

#### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| 20V           | 170mΩ@-4.5V     | 0.75A |
|               | 230mΩ@-2.5V     |       |
|               | 330mΩ@-1.8V     |       |

#### Feature

- Trench Technology Power MOSFET
- Low  $R_{DS(on)}$
- Low Gate Charge
- ESD Protected

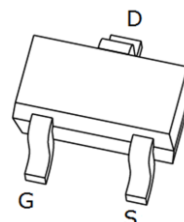
#### Application

- Load Switch
- DC/DC Converter

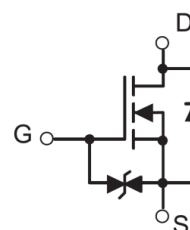
#### MARKING:



SOT-523



Schematic diagram



#### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter                                                | Symbol          | Value     | Unit               |
|----------------------------------------------------------|-----------------|-----------|--------------------|
| Drain - Source Voltage                                   | $V_{DS}$        | 20        | V                  |
| Gate - Source Voltage                                    | $V_{GS}$        | $\pm 12$  | V                  |
| Continuous Drain Current <sup>1,5</sup>                  | $I_D$           | 0.75      | A                  |
| Pulsed Drain Current <sup>2</sup>                        | $I_{DM}$        | 3.0       | A                  |
| Power Dissipation <sup>4,5</sup>                         | $P_D$           | 150       | mW                 |
| Thermal Resistance from Junction to Ambient <sup>5</sup> | $R_{\theta JA}$ | 833       | $^\circ\text{C/W}$ |
| Junction Temperature                                     | $T_J$           | 150       | $^\circ\text{C}$   |
| Storage Temperature                                      | $T_{STG}$       | -55~ +150 | $^\circ\text{C}$   |

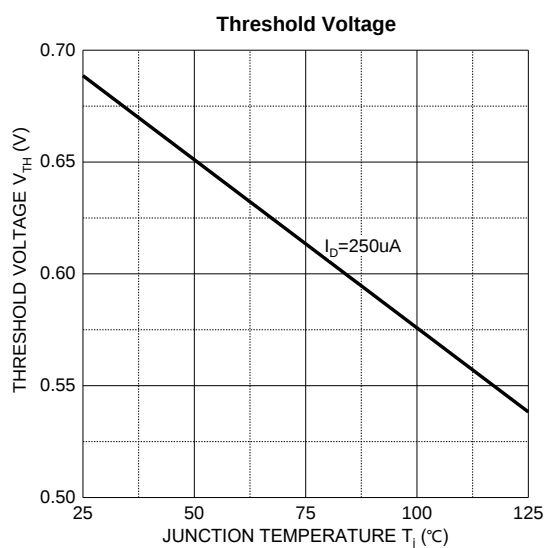
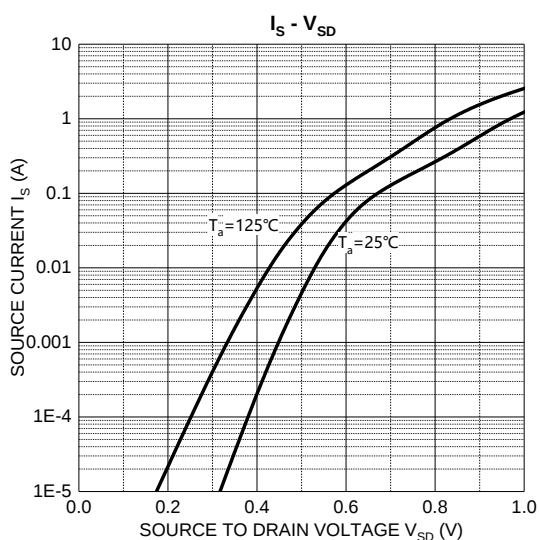
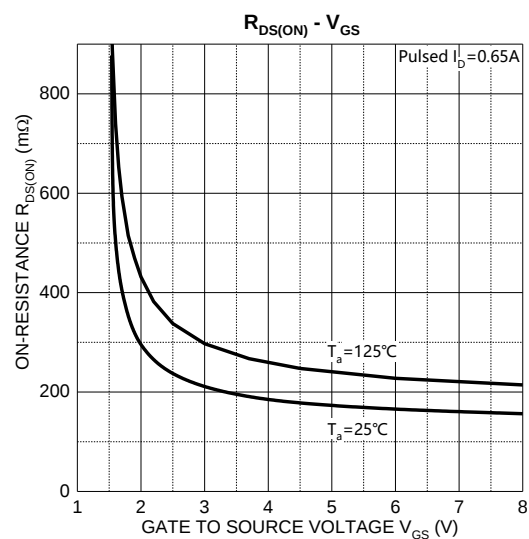
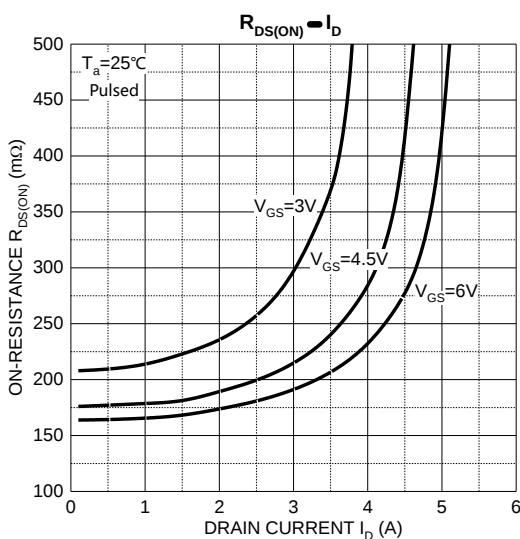
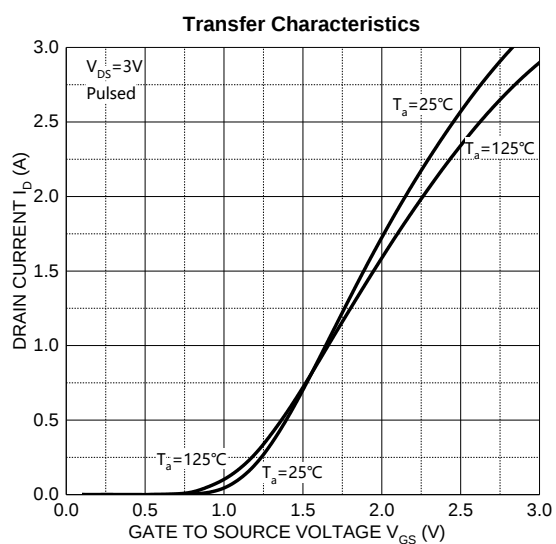
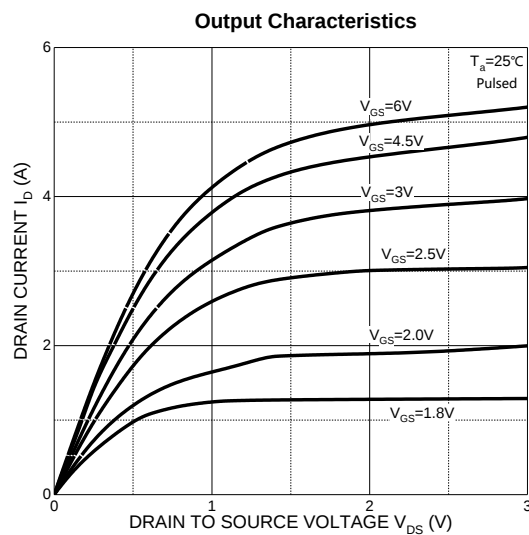
## Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                            | Symbol               | Test Condition                                                                                | Min | Type | Max | Unit |
|--------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|-----|------|-----|------|
| Off Characteristics                  |                      |                                                                                               |     |      |     |      |
| Drain - Source Breakdown Voltage     | V <sub>(BR)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 Current          | I <sub>GSS</sub>     | V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V                                                  |     |      | ±10 | μA   |
| On Characteristics <sup>3</sup>      |                      |                                                                                               |     |      |     |      |
| Gate Threshold Voltage               | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                    | 0.4 | 0.7  | 1   | V    |
| Drain-source On-resistance           | R <sub>DS(on)</sub>  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> = 0.65A                                                |     | 170  | 380 | mΩ   |
|                                      |                      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 0.55A                                                |     | 230  | 450 |      |
|                                      |                      | V <sub>GS</sub> = 1.8V, I <sub>D</sub> =0.45A                                                 |     | 330  | 590 |      |
| Dynamic Characteristics              |                      |                                                                                               |     |      |     |      |
| Input Capacitance                    | C <sub>iss</sub>     | V <sub>DS</sub> = 10V, f = 1MHz                                                               |     | 55.6 |     | pF   |
| Output Capacitance                   | C <sub>oss</sub>     |                                                                                               |     | 15.2 |     |      |
| Reverse Transfer Capacitance         | C <sub>rss</sub>     |                                                                                               |     | 10.3 |     |      |
| Switching Characteristics            |                      |                                                                                               |     |      |     |      |
| Total Gate Charge                    | Q <sub>g</sub>       | V <sub>DD</sub> = 10V, V <sub>GS</sub> = 4.5V, I <sub>D</sub> =0.65A                          |     | 0.78 |     | nC   |
| Gate-source Charge                   | Q <sub>gs</sub>      |                                                                                               |     | 0.23 |     |      |
| Gate-drain Charge                    | Q <sub>gd</sub>      |                                                                                               |     | 0.01 |     |      |
| Turn-on Delay Time                   | t <sub>d(on)</sub>   | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 4.5V<br>I <sub>D</sub> = 0.5A, R <sub>GEN</sub> =10Ω |     | 6.7  |     | ns   |
| Turn-on Rise Time                    | t <sub>r</sub>       |                                                                                               |     | 4.8  |     |      |
| Turn-off Delay Ttime                 | t <sub>d(off)</sub>  |                                                                                               |     | 17.3 |     |      |
| Turn-off Fall Time                   | t <sub>f</sub>       |                                                                                               |     | 7.4  |     |      |
| Source - Drain Diode Characteristics |                      |                                                                                               |     |      |     |      |
| Diode Forward Voltage <sup>3</sup>   | V <sub>SD</sub>      | V <sub>GS</sub> = 0V, I <sub>S</sub> = 0.15A                                                  |     |      | 1.2 | V    |

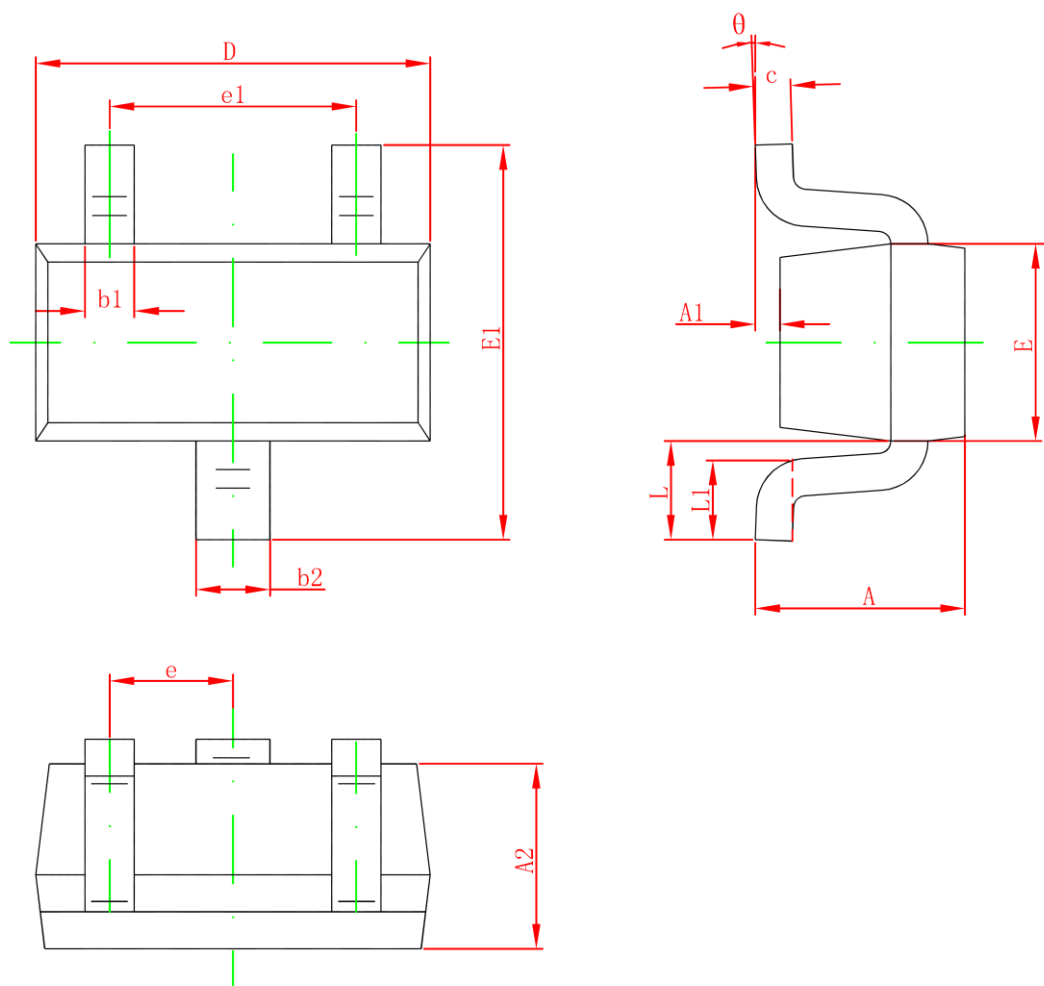
Notes :

- 1.The maximum current rating is limited by package.
- 2.Pulse Test : Pulse Width  $\leq 10\mu s$ , duty cycle  $\leq 1\%$ .
- 3.Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- 4.The power dissipation  $P_D$  is limited by  $T_{J(MAX)} = 150^{\circ}\text{C}$ .
- 5.Device mounted on  $1in^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^{\circ}\text{C}$ .

## Typical Characteristics



## SOT-523 Package Outline Dimensions



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min.                      | Max.  | Min.                 | Max.  |
| A        | 0.700                     | 0.900 | 0.028                | 0.035 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 0.700                     | 0.800 | 0.028                | 0.031 |
| b1       | 0.150                     | 0.250 | 0.006                | 0.010 |
| b2       | 0.250                     | 0.350 | 0.010                | 0.014 |
| c        | 0.100                     | 0.200 | 0.004                | 0.008 |
| D        | 1.500                     | 1.700 | 0.059                | 0.067 |
| E        | 0.700                     | 0.900 | 0.028                | 0.035 |
| E1       | 1.450                     | 1.750 | 0.057                | 0.069 |
| e        | 0.900                     | 1.100 | 0.035                | 0.043 |
| e1       | 0.500TYP                  |       | 0.020TYP             |       |
| L        | 0.400REF                  |       | 0.016REF             |       |
| L1       | 0.260                     | 0.460 | 0.010                | 0.018 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |