

### General Description

Thigh Density Cell Design For Ultra Low On-Resistance Fully Characterized Avalanche Voltage and Current Improved Shoot-Through FOM

- Simple Drive Requirement
- Small Package Outline
- Surface Mount Device

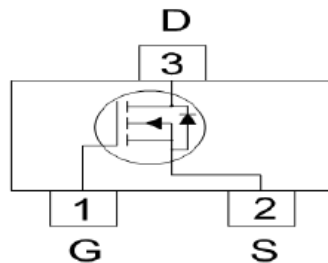
### Features

For a single MOSFET

- $V_{DS} = 50V$
- $R_{DS(ON)} = 2.3\Omega @ V_{GS}=4.5$

### Pin configurations

See Diagram below



SOT-323

### Absolute Maximum Ratings

| Parameter                            |            | Symbol   | Rating     | Units |
|--------------------------------------|------------|----------|------------|-------|
| Drain-Source Voltage                 |            | $V_{DS}$ | 50         | V     |
| Gate-Source Voltage                  |            | $V_{GS}$ | $\pm 20$   | V     |
| Drain Current                        | Continuous | $I_D$    | 0.3        | A     |
|                                      | Pulsed     |          | 14         |       |
| Total Power Dissipation              | @TA=25°C   | $P_D$    | 0.35       | W     |
| Operating Junction Temperature Range |            | $T_J$    | -55 to 150 | °C    |

| Electrical Characteristics (T <sub>J</sub> =25°C unless otherwise noted) |  |   |      |       |      |       |
|--|--|---|------|-------|------|-------|
| Symbol   | Parameter                                  | Test Conditions   | Min  | Typ   | Max  | Units |
| <b>OFF CHARACTERISTICS (Note 2)</b>                                      |  |   |      |       |      |       |
| B <sub>V</sub> DSS   | Drain-Source Breakdown Voltage             | I <sub>D</sub> =250μA, V <sub>GS</sub> =0 V                         | 50   |       |      | V     |
| I <sub>DSS</sub>   | Drain to Source Leakage Current            | V <sub>DS</sub> = 50V, V <sub>GS</sub> =0V                          |      |       | 1    | μA    |
| I <sub>GSS</sub>   | Gate-Body Leakage Current                  | V <sub>GS</sub> =12V  |      |       | 100  | nA    |
| V <sub>GS(th)</sub>  | Gate Threshold Voltage                     | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA           | 1    |       | 2.5  | V     |
| R <sub>DS(ON)</sub>  | Static Drain-Source On-Resistance          | V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A                          | -    | 2.3   | 4    | Ω     |
| <b>DYNAMIC PARAMETERS</b>  |  |   |      |       |      |       |
| C <sub>iss</sub>   | Input Capacitance                          | V <sub>GS</sub> =0V, V <sub>DS</sub> =10V,<br>f=1MHz                | 3080 | 3860  | 4630 | pF    |
| C <sub>oss</sub>   | Output Capacitance                         |   | 520  | 740   | 960  | pF    |
| C <sub>rss</sub>   | Reverse Transfer Capacitance               |   | 350  | 580   | 810  | pF    |
| <b>SWITCHING PARAMETERS</b>  |  |   |      |       |      |       |
| Q <sub>g</sub>   | Total Gate Charge <sup>2</sup>             | V <sub>GS</sub> =10V, V <sub>DS</sub> =10V,<br>I <sub>D</sub> =20A  | 28   | 36    | 43   | nC    |
| Q <sub>gs</sub>  | Gate Source Charge                         |   | 7    | 9     | 11   | nC    |
| Q <sub>gd</sub>  | Gate Drain Charge                          |   | 7    | 12    | 17   | nC    |
| t <sub>d(on)</sub>   | Turn-On Delay Time                         | V <sub>GS</sub> =10V, V <sub>DS</sub> =10V,<br>R <sub>GEN</sub> =3Ω |      | 7     |      | ns    |
| t <sub>d(off)</sub>  | Turn-Off Delay Time                        |   |      | 70    |      | ns    |
| t <sub>d(r)</sub>  | Turn-On Rise Time                          |   |      | 8     |      | ns    |
| t <sub>d(f)</sub>  | Turn-Off Fall Time                         |   |      | 18    |      | ns    |
| <b>Thermal Resistance</b>  |  |   |      |       |      |       |
| Symbol   | Parameter                                  | Typ   | Max  | Units |      |       |
| R <sub>θJC</sub>   | Thermal Resistance Junction to Case(t≤10s) | 30  | 40   | °C/W  |      |       |

Typical Characteristics

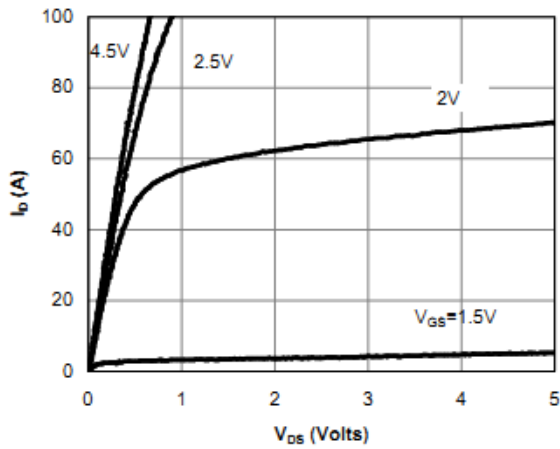


Fig 1: On-Region Characteristics (Note E)

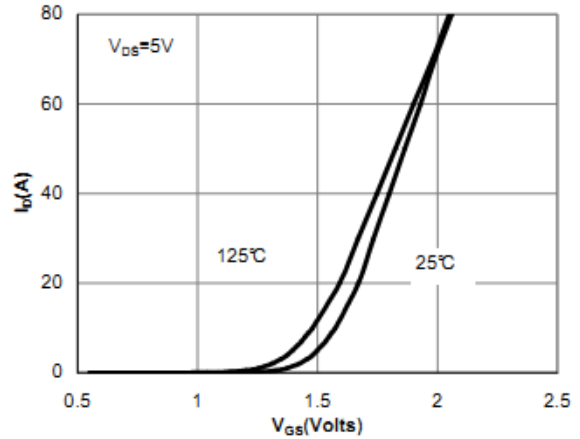


Figure 2: Transfer Characteristics (Note E)

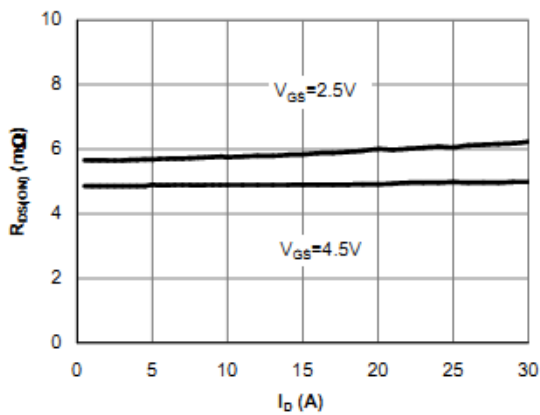


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

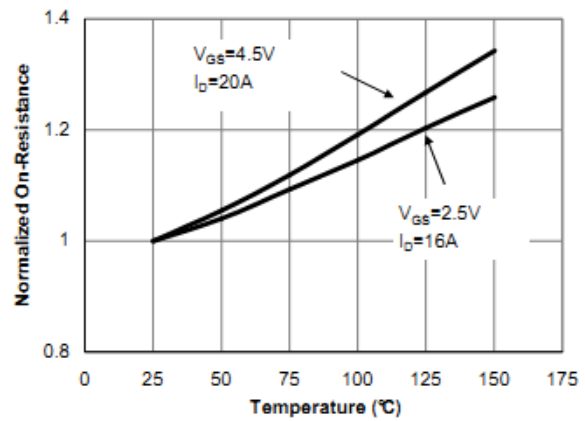


Figure 4: On-Resistance vs. Junction Temperature (Note E)

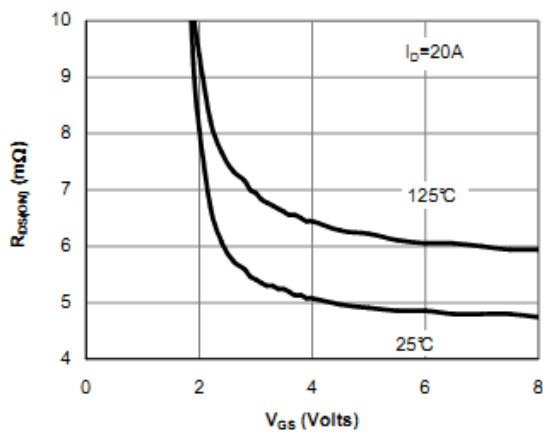


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

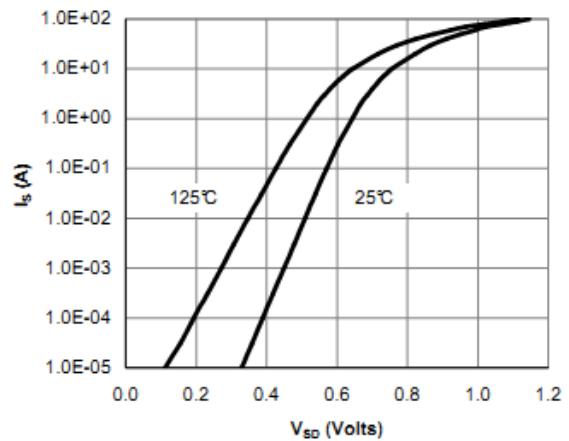


Figure 6: Body-Diode Characteristics (Note E)

Typical Characteristics

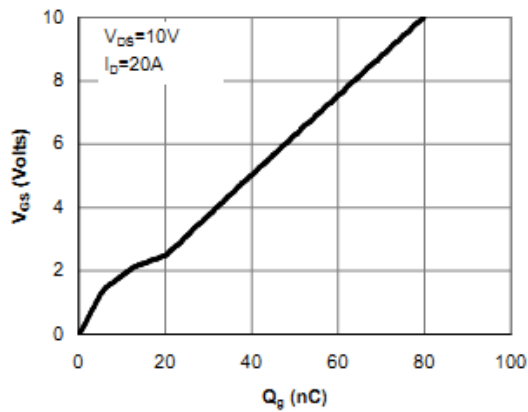


Figure 7: Gate-Charge Characteristics

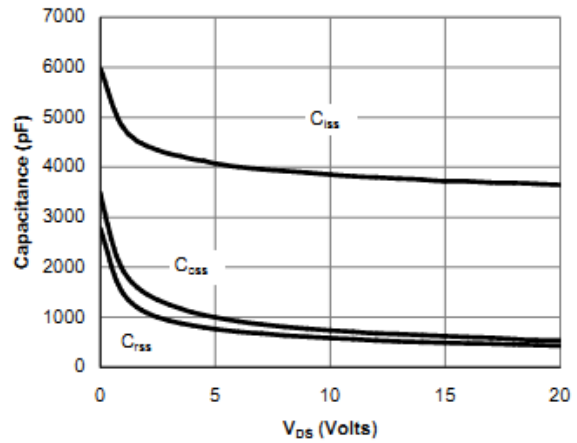


Figure 8: Capacitance Characteristics

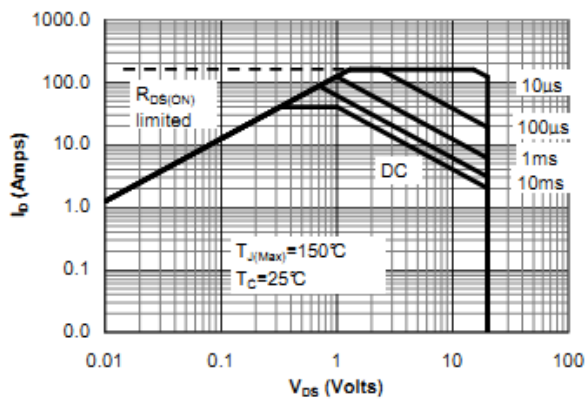


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

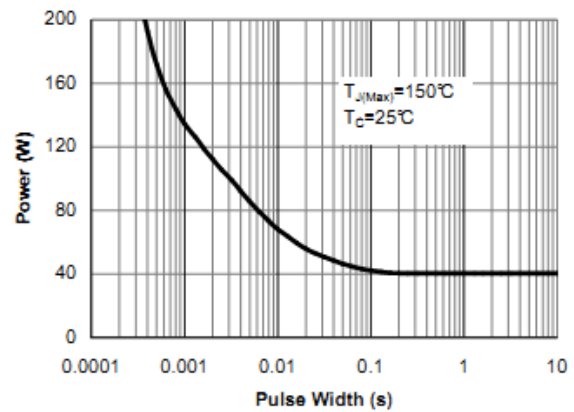


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

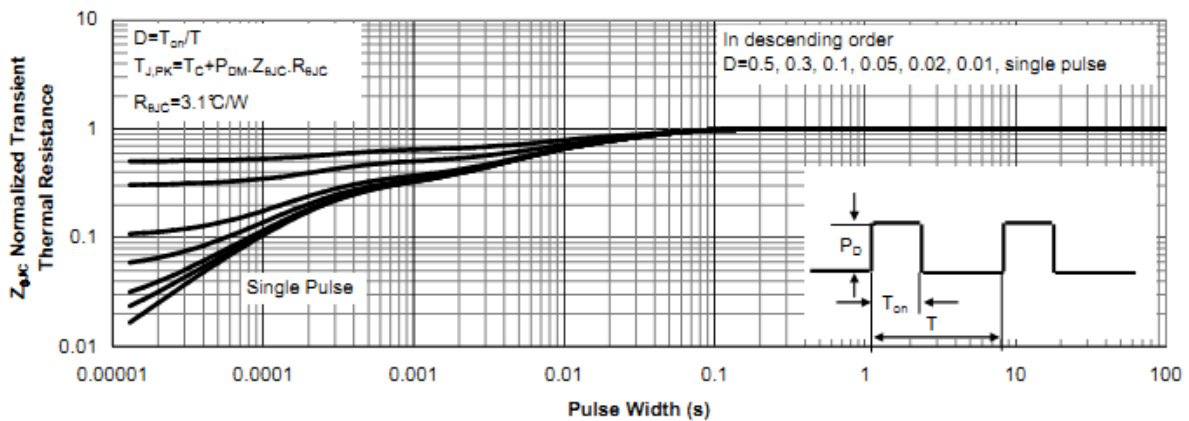
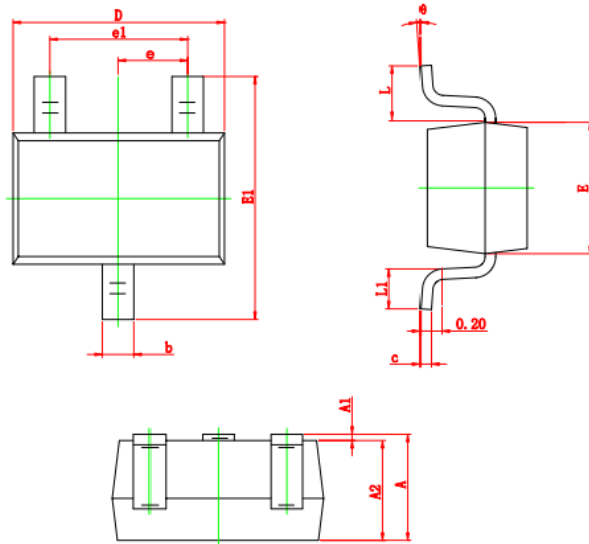


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Package Outline Dimension

SOT-323



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.100 | 0.035                | 0.043 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.000 | 0.035                | 0.039 |
| b      | 0.200                     | 0.400 | 0.008                | 0.016 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.000                     | 2.200 | 0.079                | 0.087 |
| E      | 1.150                     | 1.350 | 0.045                | 0.053 |
| E1     | 2.150                     | 2.450 | 0.085                | 0.096 |
| e      | 0.650 TYP                 |       | 0.026 TYP            |       |
| e1     | 1.200                     | 1.400 | 0.047                | 0.055 |
| L      | 0.525 REF                 |       | 0.021 REF            |       |
| L1     | 0.260                     | 0.460 | 0.010                | 0.018 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

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