

SE30150B

**N-Channel Enhancement-Mode MOSFET**

Revision: A

**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

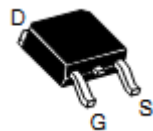
**Features**

For a single MOSFET

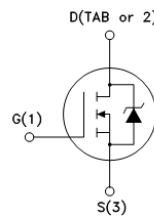
- $V_{DS} = 30V$
- $R_{DS(ON)} = 1.6m\Omega @ V_{GS}=10 @ I_{DS}=30A$
- $R_{DS(ON)} = 2.1m\Omega @ V_{GS}=4.5 @ I_{DS}=25A$

**Pin configurations**

See Diagram below



TO-252



**Absolute Maximum Ratings**

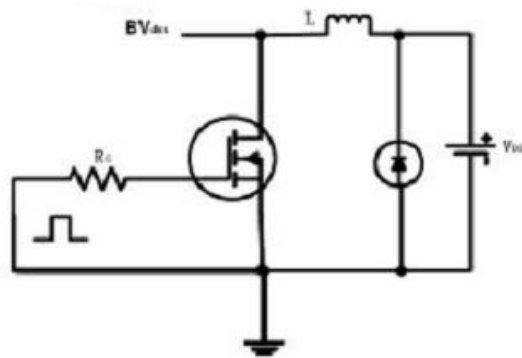
| Parameter                            |            | Symbol   | Rating     | Units |
|--------------------------------------|------------|----------|------------|-------|
| Drain-Source Voltage                 |            | $V_{DS}$ | 30         | V     |
| Gate-Source Voltage                  |            | $V_{GS}$ | $\pm 20$   | V     |
| Drain Current                        | Continuous | $I_D$    | 150        | A     |
|                                      | Pulsed     |          | 340        |       |
| Total Power Dissipation              | @TA=25°C   | $P_D$    | 90         | W     |
| Operating Junction Temperature Range |            | $T_J$    | -55 to 150 | °C    |

## SE30150B

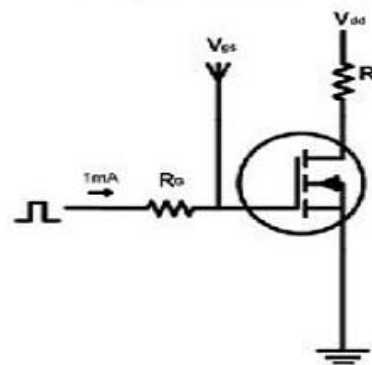
| Electrical Characteristics (T <sub>J</sub> =25°C unless otherwise noted) |                                                |                                                                                           |     |      |     |       |
|--------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------|-----|------|-----|-------|
| Symbol                                                                   | Parameter                                      | Test Conditions                                                                           | Min | Typ  | Max | Units |
| <b>OFF CHARACTERISTICS (Note 2)</b>                                      |                                                |                                                                                           |     |      |     |       |
| BV <sub>DSS</sub>                                                        | Drain-Source Breakdown Voltage                 | I <sub>D</sub> =250μA, V <sub>GS</sub> =0 V                                               | 30  |      |     | V     |
| I <sub>DSS</sub>                                                         | Drain to Source Leakage Current                | V <sub>DS</sub> = 24V, V <sub>GS</sub> =0V                                                |     |      | 1   | μA    |
| I <sub>GSS</sub>                                                         | Gate-Body Leakage Current                      | V <sub>GS</sub> =20 V                                                                     |     |      | 100 | nA    |
| V <sub>GS(th)</sub>                                                      | Gate Threshold Voltage                         | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA                                 | 1   | 1.7  | 3.0 | V     |
| R <sub>DS(ON)</sub>                                                      | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =4.5V, I <sub>D</sub> =25A                                                | -   | 2.1  |     | mΩ    |
|                                                                          |                                                | V <sub>GS</sub> =10V, I <sub>D</sub> =30A                                                 |     | 1.6  | 1.9 |       |
| <b>DYNAMIC PARAMETERS</b>                                                |                                                |                                                                                           |     |      |     |       |
| C <sub>iss</sub>                                                         | Input Capacitance                              | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V,<br>f=1MHz                                      |     | 7032 |     | pF    |
| C <sub>oss</sub>                                                         | Output Capacitance                             |                                                                                           |     | 898  |     | pF    |
| C <sub>rss</sub>                                                         | Reverse Transfer Capacitance                   |                                                                                           |     | 743  |     | pF    |
| <b>SWITCHING PARAMETERS</b>                                              |                                                |                                                                                           |     |      |     |       |
| Q <sub>g</sub>                                                           | Total Gate Charge <sup>2</sup>                 | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V,<br>I <sub>D</sub> =30A                        |     | 80   |     | nC    |
| Q <sub>gs</sub>                                                          | Gate Source Charge                             |                                                                                           |     | 19   |     | nC    |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                              |                                                                                           |     | 38   |     | nC    |
| t <sub>d(on)</sub>                                                       | Turn-On Delay Time                             | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V,<br>R <sub>GEN</sub> =1Ω<br>I <sub>D</sub> =1A |     | 20   |     | ns    |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time                            |                                                                                           |     | 80   |     | ns    |
| t <sub>d(r)</sub>                                                        | Turn-On Rise Time                              |                                                                                           |     | 36   |     | ns    |
| t <sub>d(f)</sub>                                                        | Turn-Off Fall Time                             |                                                                                           |     | 33   |     | ns    |
| <b>Thermal Resistance</b>                                                |                                                |                                                                                           |     |      |     |       |
| Symbol                                                                   | Parameter                                      |                                                                                           | Typ | Max  |     | Units |
| R <sub>θJC</sub>                                                         | Junction to Case                               |                                                                                           | -   | 2    |     | °C/W  |
| R <sub>θJA</sub>                                                         | Junction to Ambient (t ≤ 10s)                  |                                                                                           | -   | 50   |     | °C/W  |

Test Circuits and Waveform

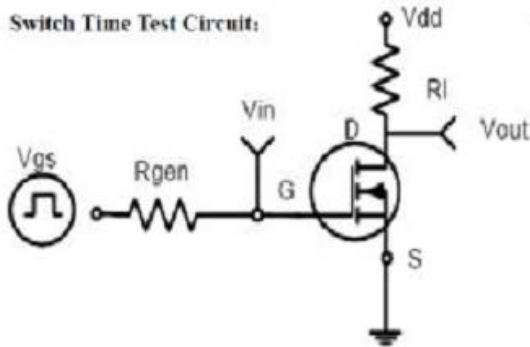
EAS test circuits:



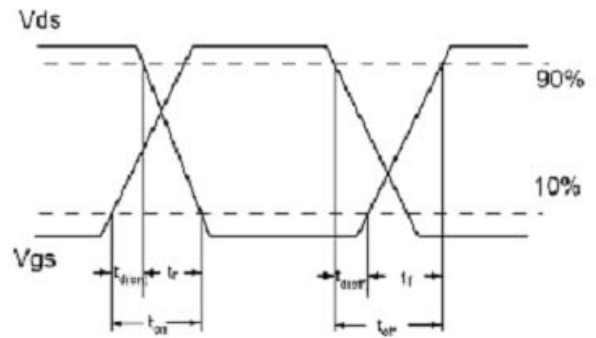
Gate charge test circuit:



Switch Time Test Circuit:



Waveforms:



Typical Characteristics

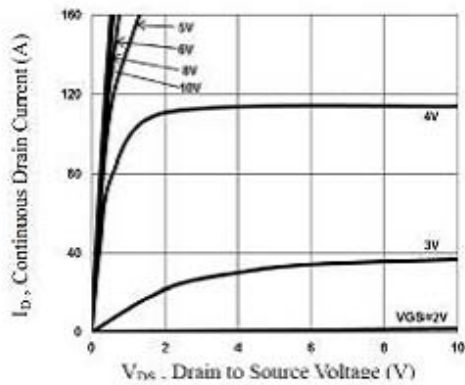


Figure 1: Typical Output Characteristics

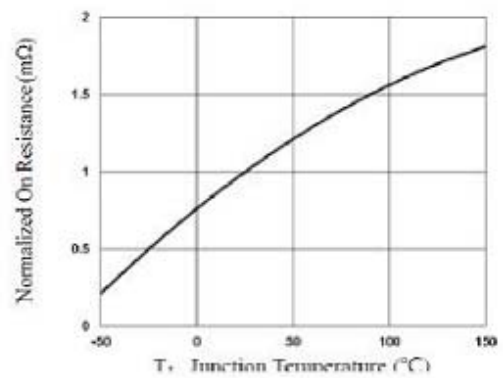


Figure 2: Normalized R\_DS(on) vs. T\_J

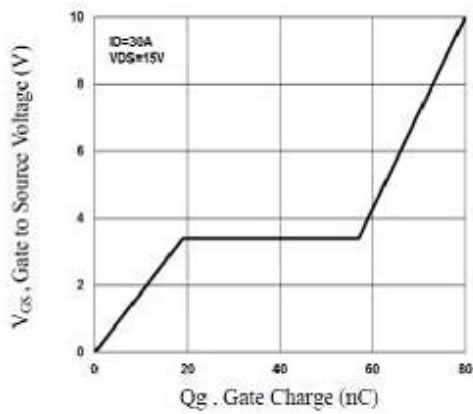


Figure 3: Gate-Charge Characteristics

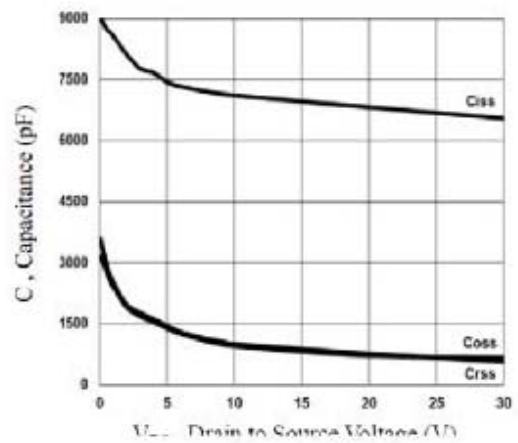


Figure 4: Capacitance Characteristics

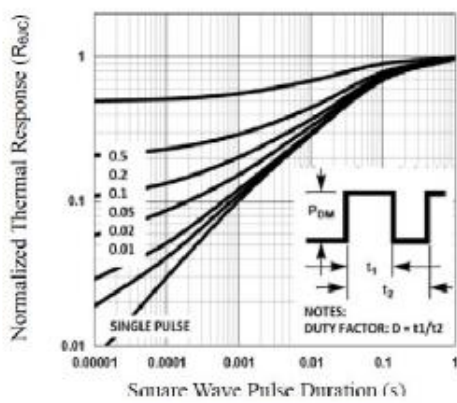


Figure 5: Normalized Thermal transient Impedance Curve

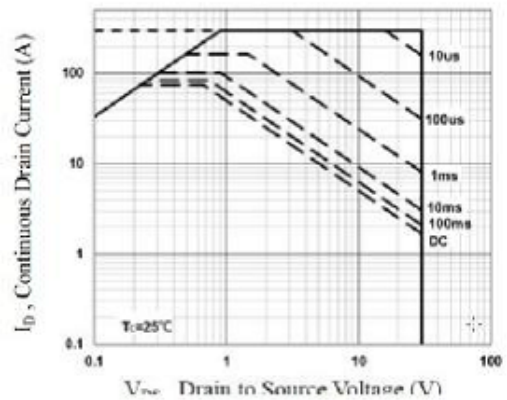
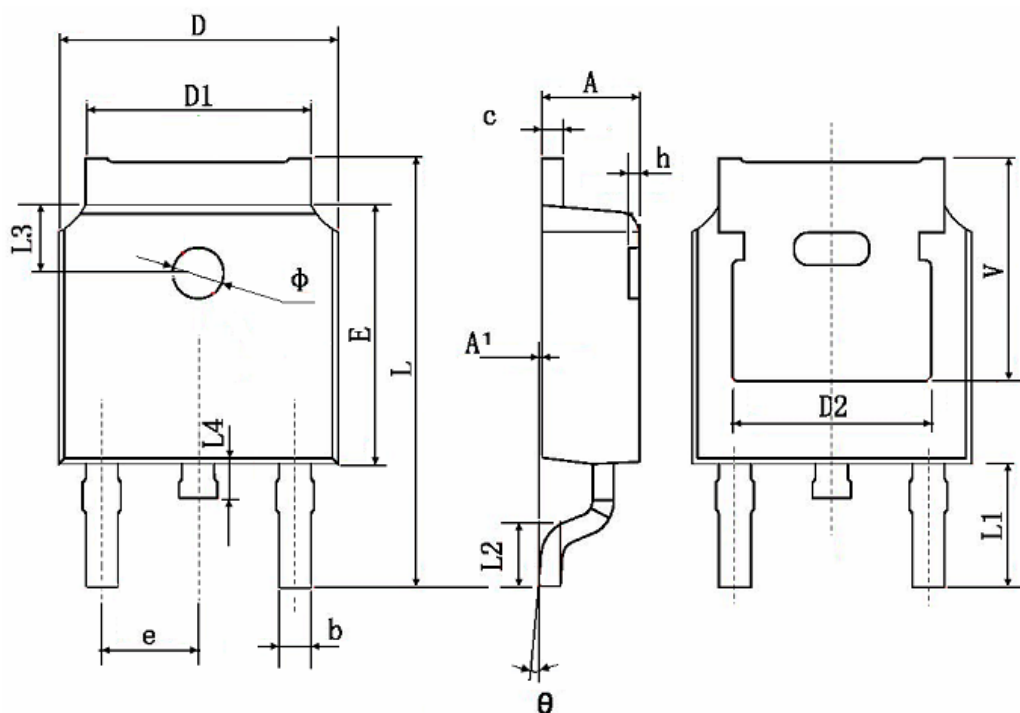


Figure 6: Maximum Safe Operation Area

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## Package Outline Dimension

### TO-252



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 2.200                     | 2.400  | 0.087                | 0.094 |
| A1     | 0.000                     | 0.127  | 0.000                | 0.005 |
| b      | 0.660                     | 0.860  | 0.026                | 0.034 |
| c      | 0.460                     | 0.580  | 0.018                | 0.023 |
| D      | 6.500                     | 6.700  | 0.256                | 0.264 |
| D1     | 5.100                     | 5.460  | 0.201                | 0.215 |
| D2     | 0.483 TYP.                |        | 0.190 TYP.           |       |
| E      | 6.000                     | 6.200  | 0.236                | 0.244 |
| e      | 2.186                     | 2.386  | 0.086                | 0.094 |
| L      | 9.800                     | 10.400 | 0.386                | 0.409 |
| L1     | 2.900 TYP.                |        | 0.114 TYP.           |       |
| L2     | 1.400                     | 1.700  | 0.055                | 0.067 |
| L3     | 1.600 TYP.                |        | 0.063 TYP.           |       |
| L4     | 0.600                     | 1.000  | 0.024                | 0.039 |
| Φ      | 1.100                     | 1.300  | 0.043                | 0.051 |
| θ      | 0°                        | 8°     | 0°                   | 8°    |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| V      | 5.350 TYP.                |        | 0.211 TYP.           |       |

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