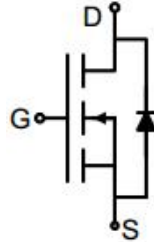
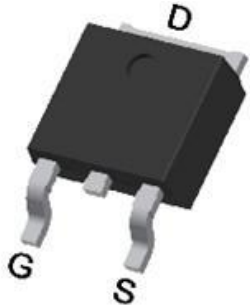


## N-Channel Enhancement Mode Power MOSFET

|   |                |  |                  |
|---|----------------|--|------------------|
| <p><b>Description</b></p> <p>The 66N03 uses advanced trench technology to provide excellent <math>R_{DS(ON)}</math>, low gate charge. It can be used in a wide variety of applications.</p> <p><b>General Features</b></p> <ul style="list-style-type: none"> <li>● <math>V_{DS}</math> 30V</li> <li>● <math>I_D</math> (at <math>V_{GS} = 10V</math>) 36A</li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = 10V</math>) &lt; 8.5mΩ</li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = 4.5V</math>) &lt; 14mΩ</li> <li>● 100% Avalanche Tested</li> <li>● RoHS Compliant</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>● Power switch</li> <li>● DC/DC converters</li> </ul> |                |  <p>Schematic Diagram</p>  <p>TO-252</p> |                  |
| <b>Device</b>   | <b>Package</b> | <b>Marking</b>   | <b>Packaging</b> |
| 66N03   | TO-252         | 66N03  | 2500pcs/Reel     |

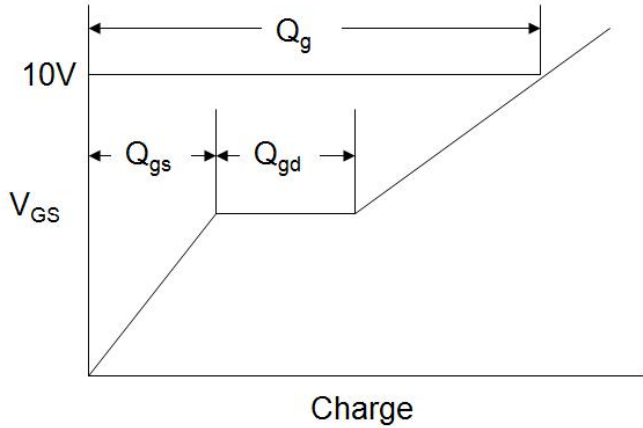
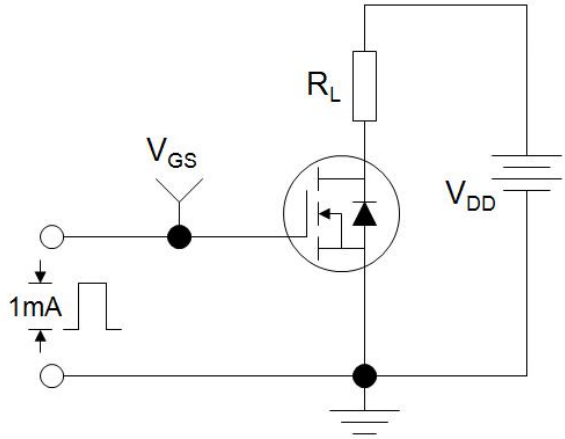
| <b>Absolute Maximum Ratings</b> $T_C = 25^\circ C$ , unless otherwise noted |                |            |      |
|---|----------------|------------|------|
| Parameter   | Symbol         | Value      | Unit |
| Drain-Source Voltage  | $V_{DS}$       | 30         | V    |
| Continuous Drain Current  | $I_D$          | 36         | A    |
| Pulsed Drain Current (note1)  | $I_{DM}$       | 144        | A    |
| Gate-Source Voltage   | $V_{GS}$       | ±20        | V    |
| Power Dissipation   | $P_D$          | 31         | W    |
| Single pulse avalanche energy (note2)                                       | $E_{AS}$       | 36         | mJ   |
| Operating Junction and Storage Temperature Range                            | $T_J, T_{stg}$ | -55 To 150 | °C   |
| <b>Thermal Resistance</b>   |                |            |      |
| Parameter   | Symbol         | Value      | Unit |
| Thermal Resistance, Junction-to-Case  | $R_{thJA}$     | 50         | °C/W |
| Maximum Junction-to-Case  | $R_{thJC}$     | 4          | °C/W |

| Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted |               |   |       |      |           |            |
|--|---------------|---|-------|------|-----------|------------|
| Parameter  | Symbol        | Test Conditions                                     | Value |      |           | Unit       |
|  |               |   | Min.  | Typ. | Max.      |            |
| <b>Static Parameters</b>   |               |   |       |      |           |            |
| Drain-Source Breakdown Voltage                                   | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                       | 30    | --   | --        | V          |
| Zero Gate Voltage Drain Current                                  | $I_{DSS}$     | $V_{DS} = 30V, V_{GS} = 0V$                         | --    | --   | 1         | $\mu A$    |
| Gate-Source Leakage  | $I_{GSS}$     | $V_{GS} = \pm 20V$                                  | --    | --   | $\pm 100$ | nA         |
| Gate-Source Threshold Voltage                                    | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                   | 1.0   | 1.6  | 2.2       | V          |
| Drain-Source On-Resistance                                       | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 20A$                           | --    | 7    | 8.5       | m $\Omega$ |
|  |               | $V_{GS} = 4.5V, I_D = 15A$                          | --    | 11   | 14        | m $\Omega$ |
| Forward Transconductance   | $g_{FS}$      | $V_{GS} = 5V, I_D = 20A$                            | --    | 30   | --        | S          |
| <b>Dynamic Parameters</b>  |               |   |       |      |           |            |
| Input Capacitance  | $C_{iss}$     | $V_{GS} = 0V,$<br>$V_{DS} = 15V,$<br>$f = 1.0MHz$   | --    | 1040 | --        | pF         |
| Output Capacitance   | $C_{oss}$     |   | --    | 150  | --        |            |
| Reverse Transfer Capacitance                                     | $C_{rss}$     |   | --    | 136  | --        |            |
| Total Gate Charge  | $Q_g$         | $V_{DD} = 15V,$<br>$I_D = 20A,$<br>$V_{GS} = 10V$   | --    | 14   | --        | nC         |
| Gate-Source Charge   | $Q_{gs}$      |   | --    | 3    | --        |            |
| Gate-Drain Charge  | $Q_{gd}$      |   | --    | 2.5  | --        |            |
| Turn-on Delay Time   | $t_{d(on)}$   | $V_{DD} = 15V,$<br>$I_D = 20A,$<br>$R_G = 3\Omega$  | --    | 7    | --        | ns         |
| Turn-on Rise Time  | $t_r$         |   | --    | 13.5 | --        |            |
| Turn-off Delay Time  | $t_{d(off)}$  |   | --    | 18.5 | --        |            |
| Turn-off Fall Time   | $t_f$         |   | --    | 4    | --        |            |
| <b>Drain-Source Body Diode Characteristics</b>                   |               |   |       |      |           |            |
| Continuous Body Diode Current                                    | $I_S$         | $T_C = 25^\circ\text{C}$                            | --    | --   | 30        | A          |
| Body Diode Voltage   | $V_{SD}$      | $T_J = 25^\circ\text{C}, I_{SD} = 20A, V_{GS} = 0V$ | --    | --   | 1.2       | V          |
| Reverse Recovery Charge  | $Q_{rr}$      | $I_F = 20A, V_{GS} = 0V$<br>$di/dt=500A/us$         | --    | 20   | --        | nC         |
| Reverse Recovery Time  | $T_{rr}$      |   | --    | 12   | --        | ns         |

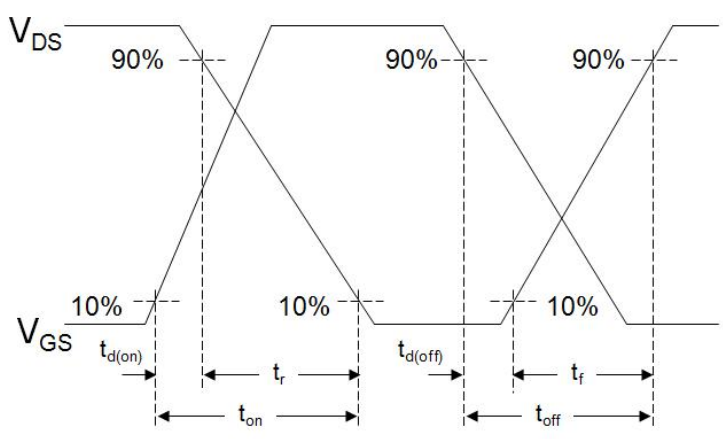
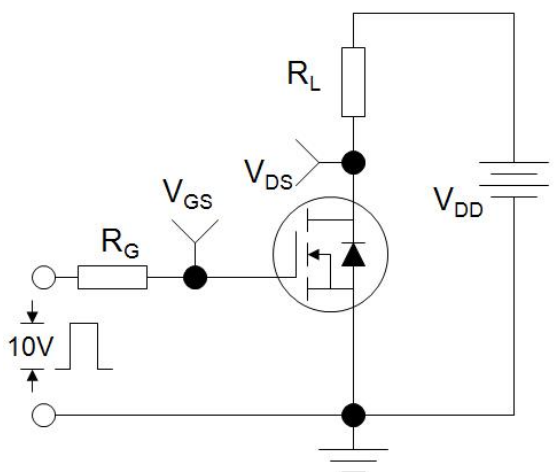
**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical  $R_G$
3. EAS condition :  $T_J=25^\circ\text{C}, V_{DD}=30V, V_{GS}=10V, L=0.5mH, R_g=25\Omega$

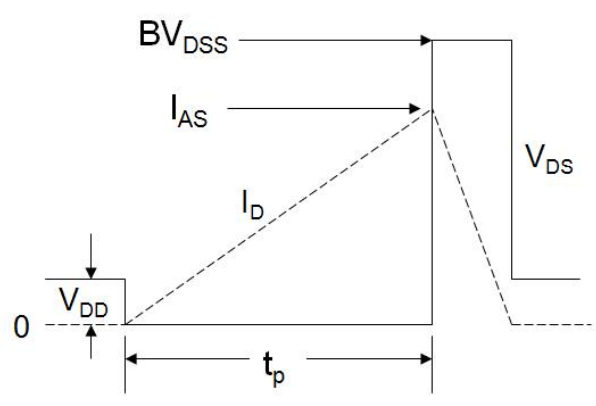
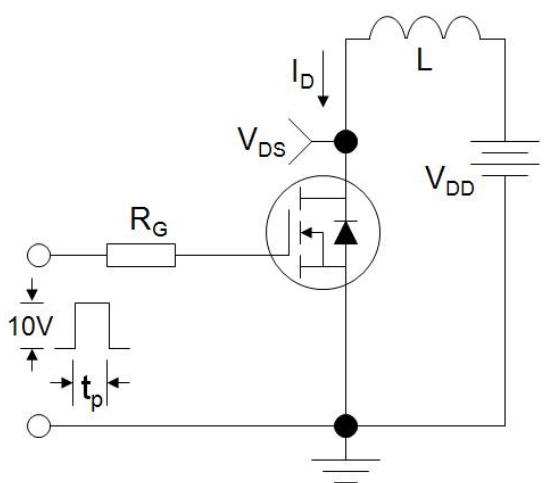
Gate Charge Test Circuit



Switch Time Test Circuit

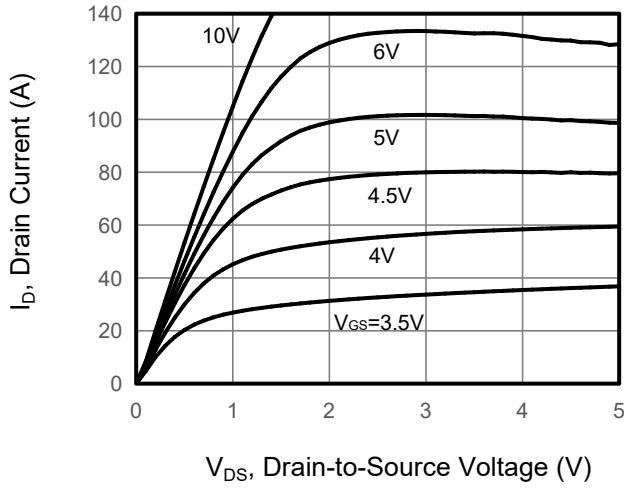


EAS Test Circuit

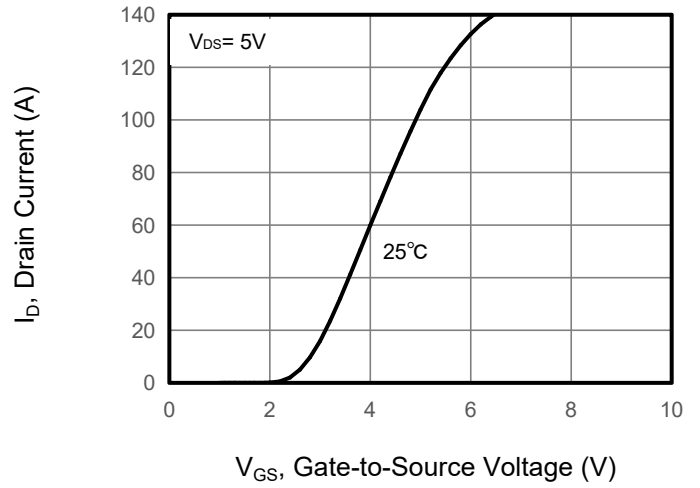


**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

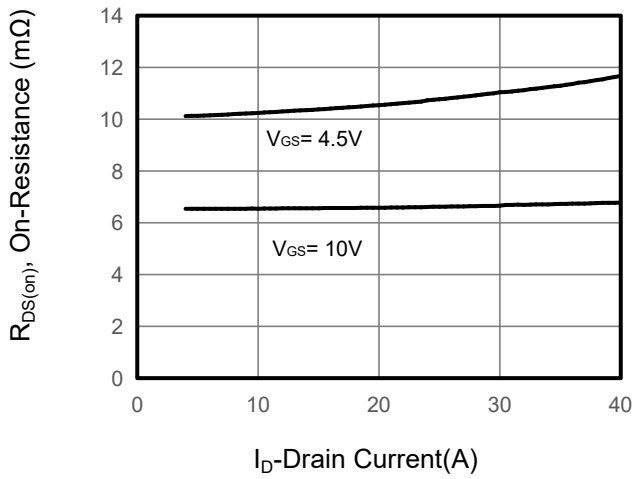
**Figure 1. Output Characteristics**



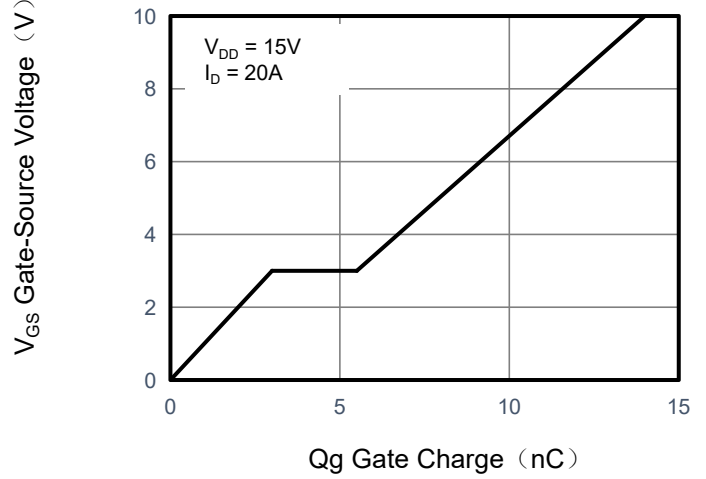
**Figure 2. Transfer Characteristics**



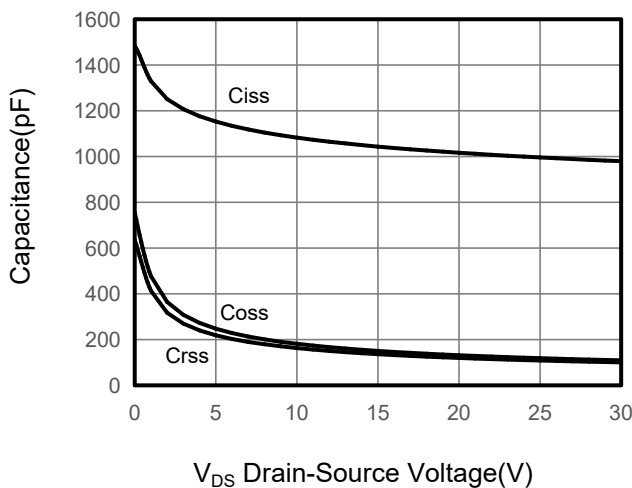
**Figure 3. Drain Source On Resistance**



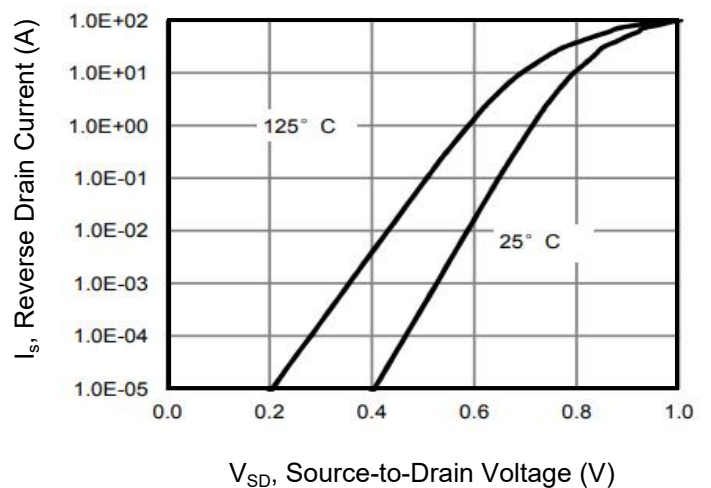
**Figure 4. Gate Charge**



**Figure 5. Capacitance**

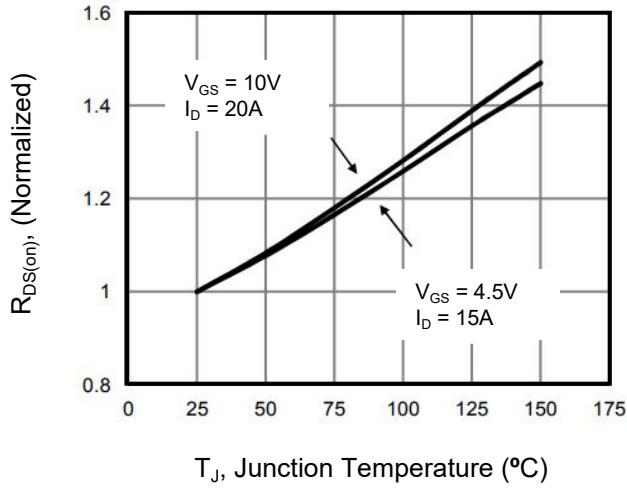


**Figure 6. Source-Drain Diode Forward**

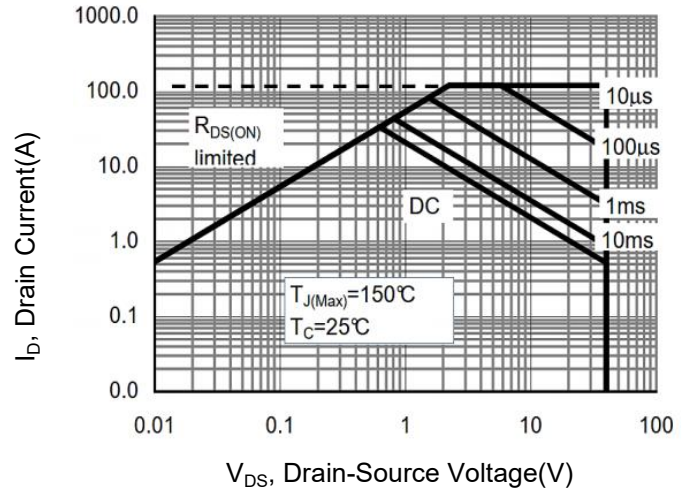


**Typical Characteristics**  $T_J = 25^\circ\text{C}$ , unless otherwise noted

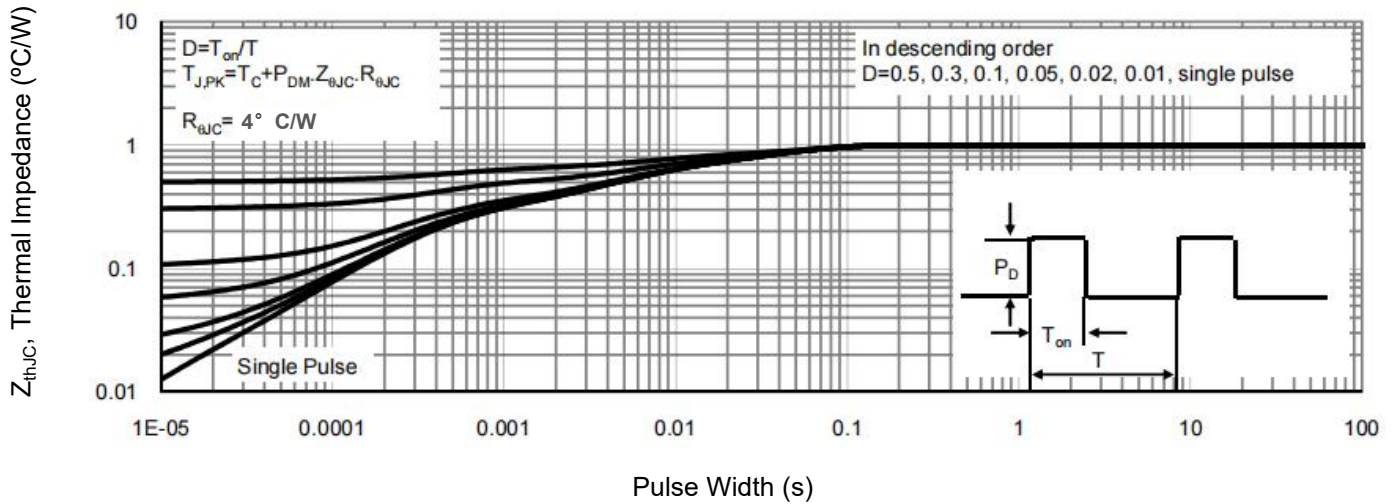
**Figure 7. Drain-Source On-Resistance**



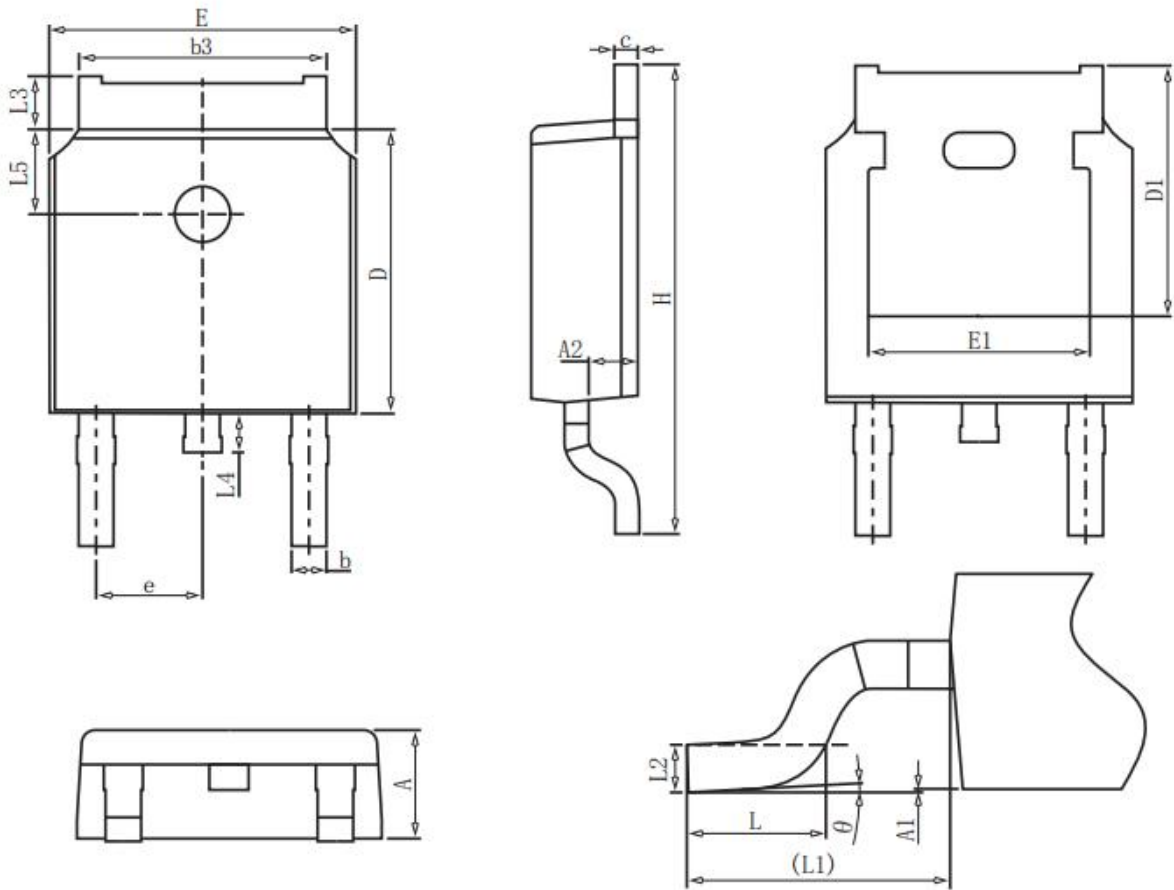
**Figure 8. Safe Operation Area**



**Figure 9. Normalized Maximum Transient Thermal Impedance**



**TO-252 Package Information**



**COMMON DIMENSIONS**

| SYMBOL   | mm       |       |       |
|----------|----------|-------|-------|
|          | MIN      | NOM   | MAX   |
| A        | 2.20     | 2.30  | 2.40  |
| A1       | 0.00     | -     | 0.20  |
| A2       | 0.97     | 1.07  | 1.17  |
| b        | 0.68     | 0.78  | 0.90  |
| b3       | 5.20     | 5.33  | 5.50  |
| c        | 0.43     | 0.53  | 0.63  |
| D        | 5.98     | 6.10  | 6.22  |
| D1       | 5.30REF  |       |       |
| E        | 6.40     | 6.60  | 6.80  |
| E1       | 4.63     | -     | -     |
| e        | 2.286BSC |       |       |
| H        | 9.40     | 10.10 | 10.50 |
| L        | 1.38     | 1.50  | 1.75  |
| L1       | 2.90REF  |       |       |
| L2       | 0.51BSC  |       |       |
| L3       | 0.88     | -     | 1.28  |
| L4       | 0.50     | -     | 1.00  |
| L5       | 1.65     | 1.80  | 1.95  |
| $\theta$ | 0°       | -     | 8°    |

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