



YOUSHANG SEMICONDUCTOR

**设计研发新型功率器件**

**各类小信号开关**

**中低压及高压大电流等场效应管**

0755-83047638  
ysbdt@szyoushang.cn  
www.szyoushang.cn



企业微信二维码



企业QQ二维码

## Product Summary

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max       | I <sub>D</sub> Max<br>T <sub>A</sub> = +25°C |
|-------------------|-------------------------------|--|
| 60V               | 6.5mΩ @ V <sub>GS</sub> = 10V | 14.6A  |
|                   | 10mΩ @ V <sub>GS</sub> = 4.5V | 11.8A  |

## Features and Benefits

- 100% Unclamped Inductive Switching (UIS) Test in Production — Ensures More Reliable and Robust End Application
- High Conversion Efficiency
- Low R<sub>DS(ON)</sub> — Minimizes On-State Losses
- Low Input Capacitance
- Fast Switching Speed

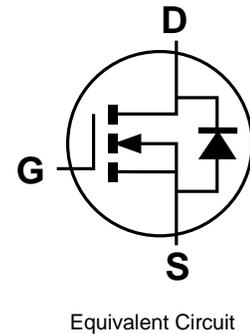
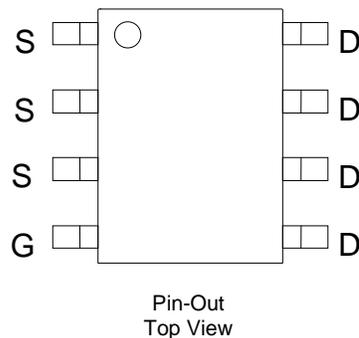
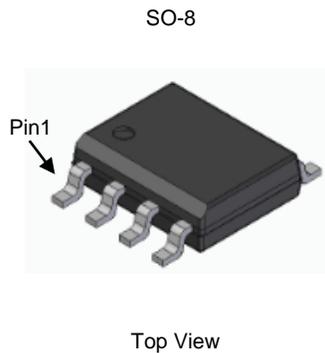
## Description and Applications

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) and maintain superior switching performance, which makes it ideal for high-efficiency power management applications.

- High-Frequency Switching
- Synchronous Rectification
- DC-DC Converters

## Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.076 grams (Approximate)



**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic  | Symbol    | Value  | Unit         |   |
|---|-----------|--|--------------|---|
| Drain-Source Voltage  | $V_{DSS}$ | 60   | V            |   |
| Gate-Source Voltage   | $V_{GSS}$ | $\pm 20$   | V            |   |
| Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$                     | $I_D$     | $T_A = +25^\circ\text{C}$<br>$T_A = +70^\circ\text{C}$ | 11.9<br>9.5  | A |
| Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$                     |           | $T_A = +25^\circ\text{C}$<br>$T_A = +70^\circ\text{C}$ | 14.6<br>11.7 | A |
| Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)              | $I_{DM}$  | 110  | A            |   |
| Maximum Continuous Body Diode Forward Current (Note 6)                      | $I_S$     | 10   | A            |   |
| Pulsed Body Diode Forward Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%) | $I_{SM}$  | 110  | A            |   |
| Avalanche Current, $L = 0.1\text{mH}$                                       | $I_{AS}$  | 28.5   | A            |   |
| Avalanche Energy, $L = 0.1\text{mH}$  | $E_{AS}$  | 40.7   | mJ           |   |

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                                   | Symbol          | Value       | Unit               |
|--|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 5)                 | $P_D$           | 1.38        | W                  |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 90.3        | $^\circ\text{C/W}$ |
| Total Power Dissipation (Note 6)                 | $P_D$           | 2.08        | W                  |
| Thermal Resistance, Junction to Ambient (Note 6) | $R_{\theta JA}$ | 60.1        | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case (Note 6)    | $R_{\theta JC}$ | 6.5         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range          | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

| Characteristic                               | Symbol       | Min | Typ  | Max       | Unit          | Test Condition  |
|--|--------------|-----|------|-----------|---------------|---|
| <b>OFF CHARACTERISTICS (Note 7)</b>          |              |     |      |           |               |   |
| Drain-Source Breakdown Voltage               | $BV_{DSS}$   | 60  | —    | —         | V             | $V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$                                  |
| Zero Gate Voltage Drain Current              | $I_{DSS}$    | —   | —    | 1         | $\mu\text{A}$ | $V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$                                   |
| Gate-Source Leakage                          | $I_{GSS}$    | —   | —    | $\pm 100$ | nA            | $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$                               |
| <b>ON CHARACTERISTICS (Note 7)</b>           |              |     |      |           |               |   |
| Gate Threshold Voltage                       | $V_{GS(TH)}$ | 1.3 | 1.74 | 2.5       | V             | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$                                     |
| Static Drain-Source On-Resistance            | $R_{DS(ON)}$ | —   | 5.0  | 6.5       | m $\Omega$    | $V_{GS} = 10\text{V}, I_D = 20\text{A}$                                     |
|  |              | —   | 6.7  | 10        |               | $V_{GS} = 4.5\text{V}, I_D = 10\text{A}$                                    |
| Diode Forward Voltage                        | $V_{SD}$     | —   | 0.8  | 1.2       | V             | $V_{GS} = 0\text{V}, I_S = 20\text{A}$                                      |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>      |              |     |      |           |               |   |
| Input Capacitance                            | $C_{iss}$    | —   | 2162 | —         | pF            | $V_{DS} = 30\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$                  |
| Output Capacitance                           | $C_{oss}$    | —   | 761  | —         |               |   |
| Reverse Transfer Capacitance                 | $C_{rss}$    | —   | 58   | —         |               |   |
| Gate Resistance                              | $R_g$        | —   | 0.7  | —         | $\Omega$      | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$                   |
| Total Gate Charge ( $V_{GS} = 4.5\text{V}$ ) | $Q_g$        | —   | 18.1 | —         | nC            | $V_{DS} = 30\text{V}, I_D = 20\text{A}$                                     |
| Total Gate Charge ( $V_{GS} = 10\text{V}$ )  | $Q_g$        | —   | 34.9 | —         |               |   |
| Gate-Source Charge                           | $Q_{gs}$     | —   | 6.1  | —         |               |   |
| Gate-Drain Charge                            | $Q_{gd}$     | —   | 7.3  | —         |               |   |
| Turn-On Delay Time                           | $t_{D(ON)}$  | —   | 6.0  | —         | ns            | $V_{GS} = 10\text{V}, V_{DD} = 30\text{V}, R_G = 3\Omega, I_D = 20\text{A}$ |
| Turn-On Rise Time                            | $t_R$        | —   | 5.4  | —         |               |   |
| Turn-Off Delay Time                          | $t_{D(OFF)}$ | —   | 20.4 | —         |               |   |
| Turn-Off Fall Time                           | $t_F$        | —   | 7.8  | —         |               |   |
| Reverse Recovery Time                        | $t_{RR}$     | —   | 35.8 | —         | ns            | $I_F = 10\text{A}, di/dt = 100\text{A}/\mu\text{s}$                         |
| Reverse Recovery Charge                      | $Q_{RR}$     | —   | 40.2 | —         | nC            |   |

- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PCB, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

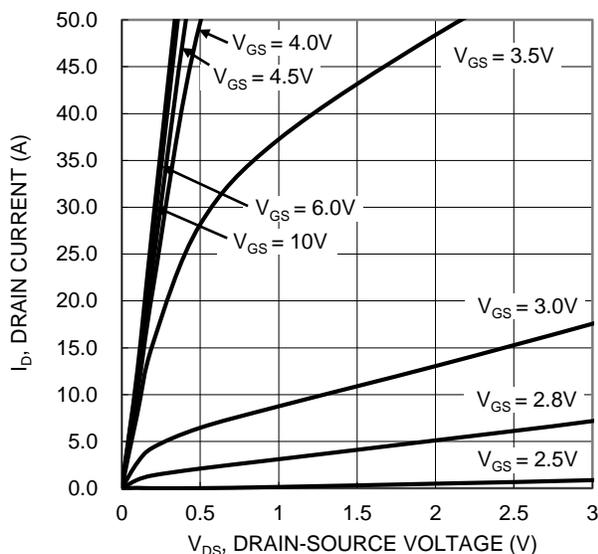


Figure 1. Typical Output Characteristic

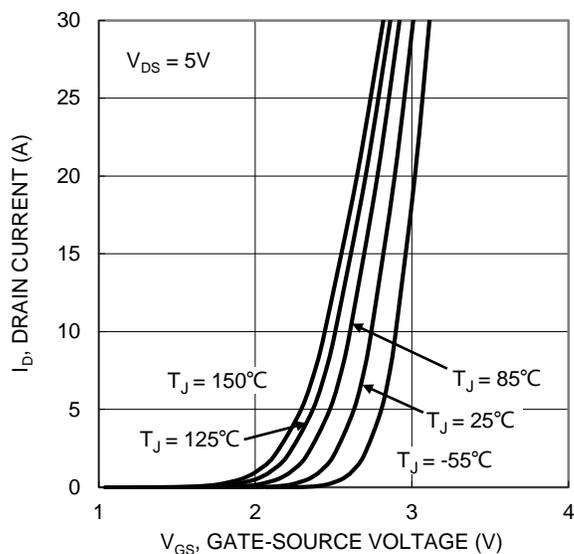


Figure 2. Typical Transfer Characteristic

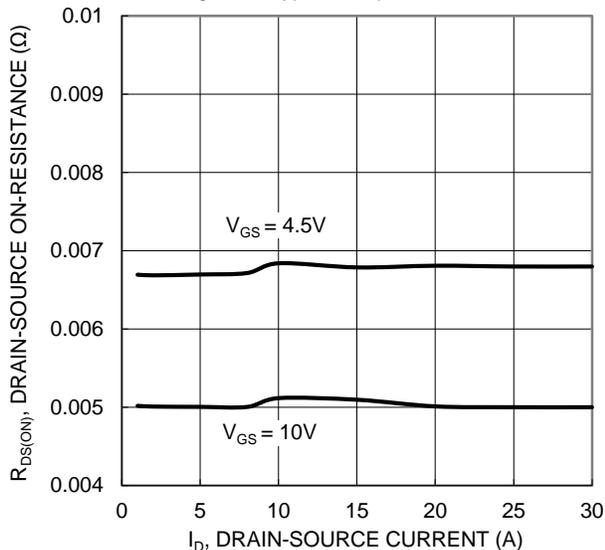


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

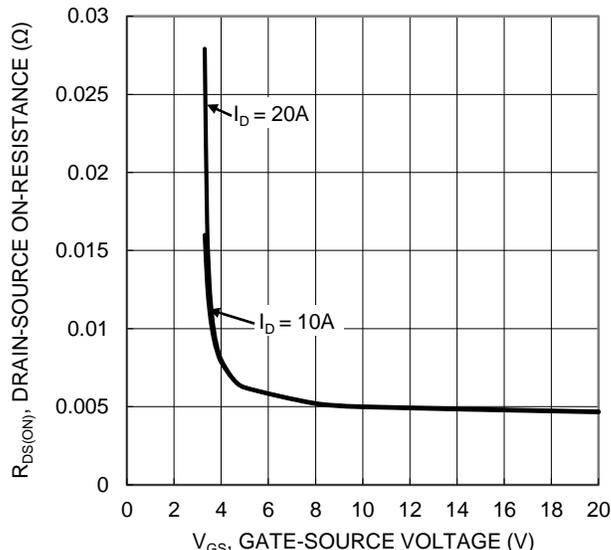


Figure 4. Typical Transfer Characteristic

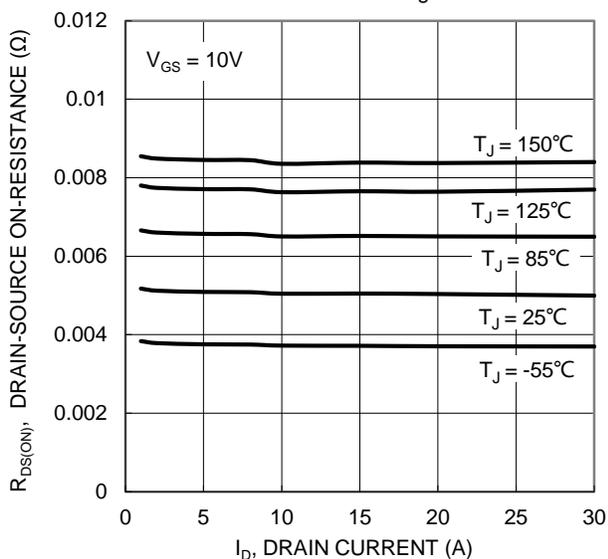


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

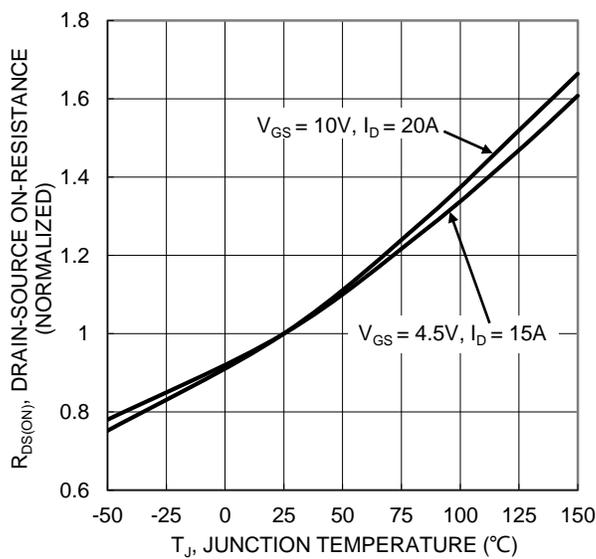


Figure 6. On-Resistance Variation with Junction Temperature

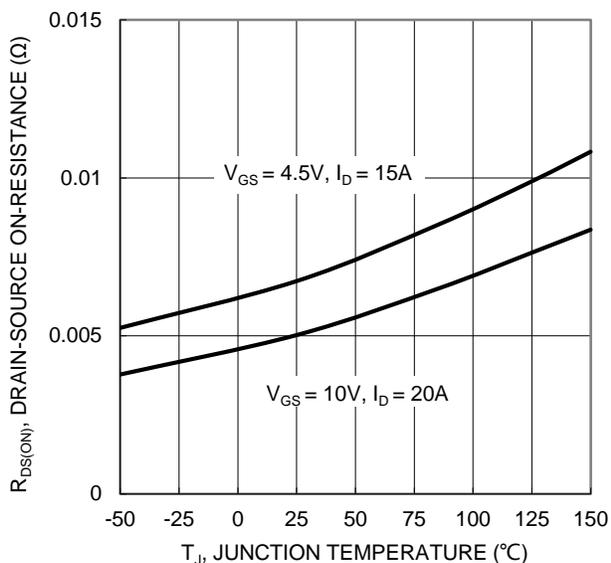


Figure 7. On-Resistance Variation with Junction Temperature

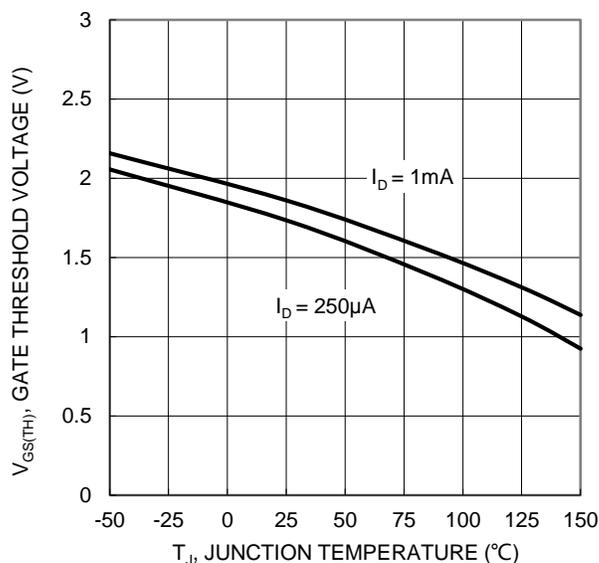


Figure 8. Gate Threshold Variation vs. Junction Temperature

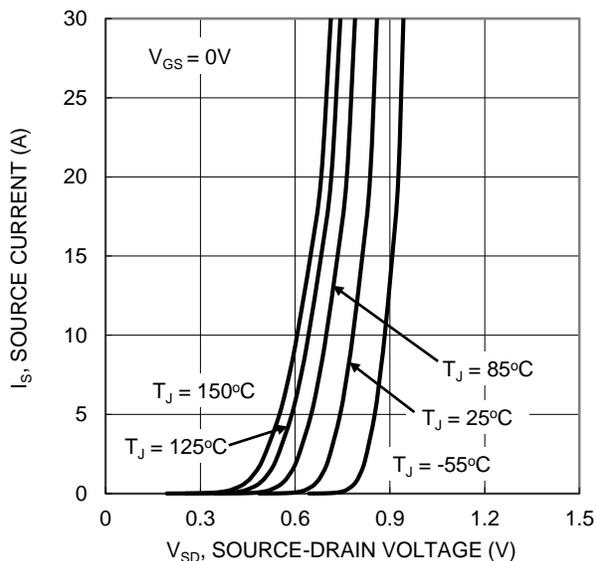


Figure 9. Diode Forward Voltage vs. Current

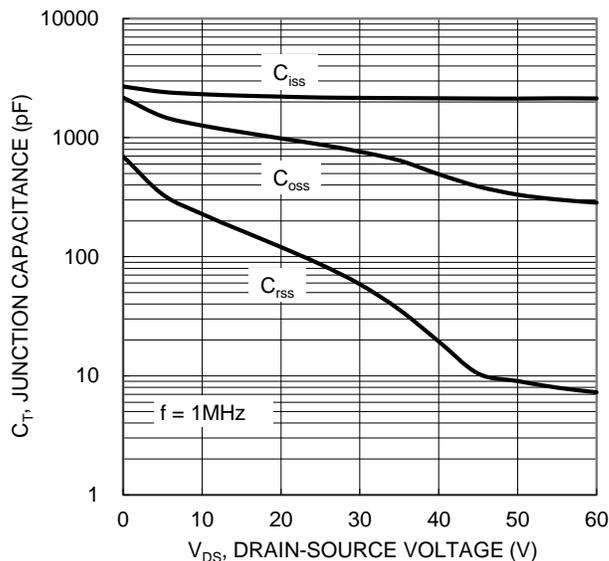


Figure 10. Typical Junction Capacitance

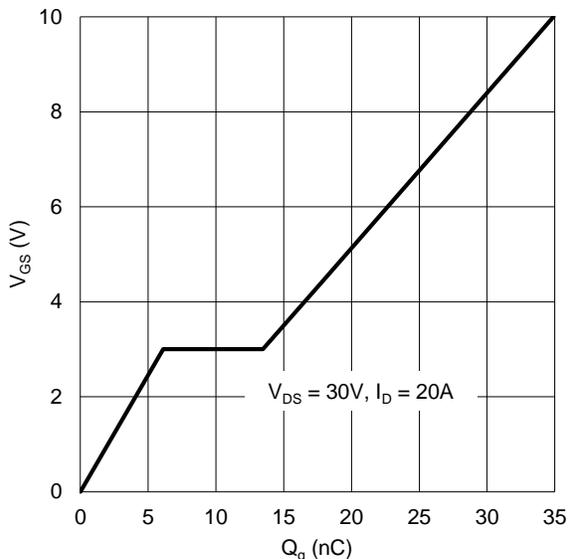


Figure 11. Gate Charge

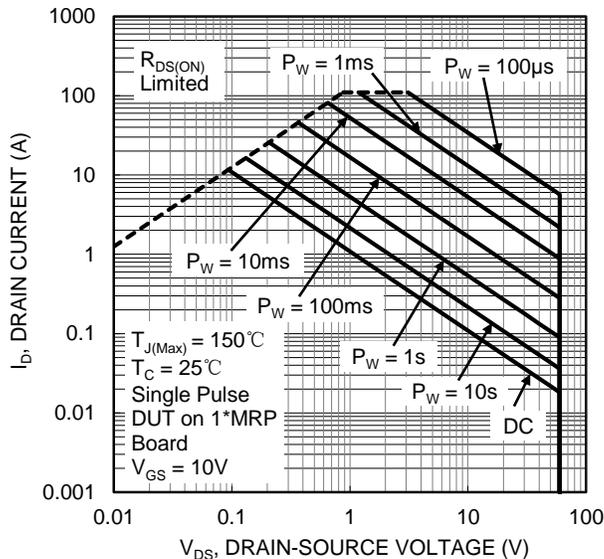


Figure 12. SOA, Safe Operation Area

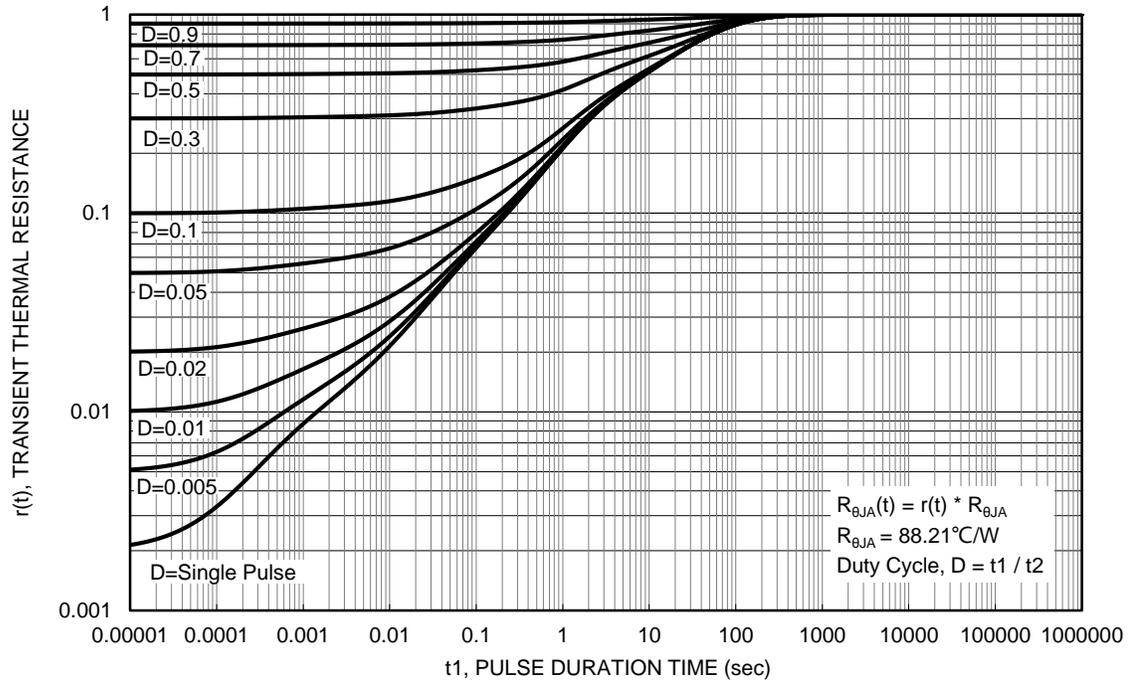
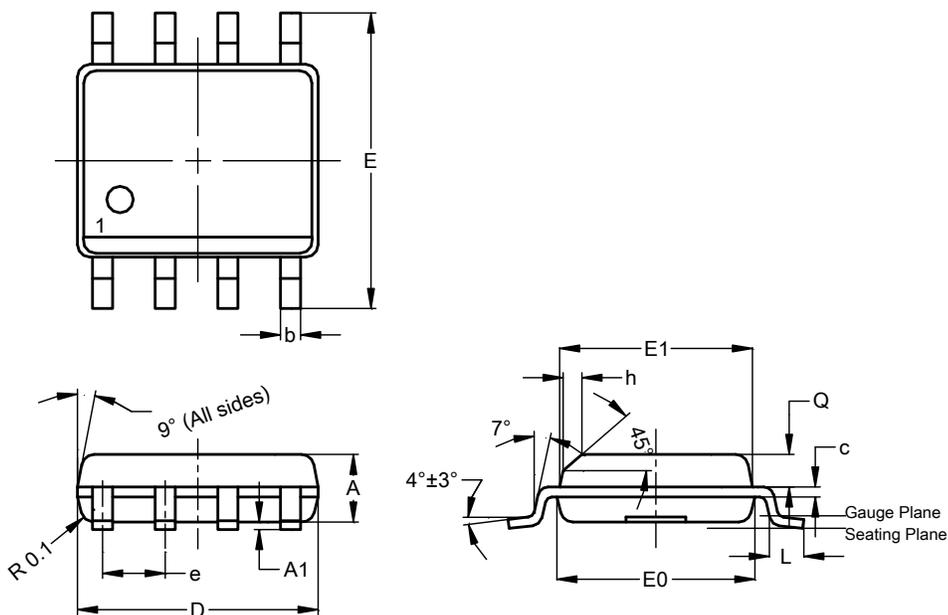


Figure 13. Transient Thermal Resistance

### Package Outline Dimensions

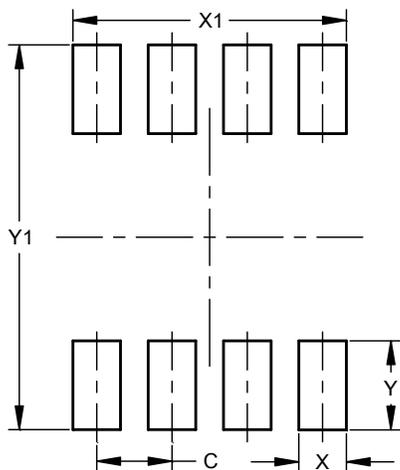
SO-8



| SO-8                 |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 1.40 | 1.50 | 1.45 |
| A1                   | 0.10 | 0.20 | 0.15 |
| b                    | 0.30 | 0.50 | 0.40 |
| c                    | 0.15 | 0.25 | 0.20 |
| D                    | 4.85 | 4.95 | 4.90 |
| E                    | 5.90 | 6.10 | 6.00 |
| E1                   | 3.80 | 3.90 | 3.85 |
| E0                   | 3.85 | 3.95 | 3.90 |
| e                    | --   | --   | 1.27 |
| h                    | -    | --   | 0.35 |
| L                    | 0.62 | 0.82 | 0.72 |
| Q                    | 0.60 | 0.70 | 0.65 |
| All Dimensions in mm |      |      |      |

### Suggested Pad Layout

SO-8



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 1.27          |
| X          | 0.802         |
| X1         | 4.612         |
| Y          | 1.505         |
| Y1         | 6.50          |