# 30V N-CHANNEL ENHANCEMENT MODE MOSFET

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | $I_D$ max<br>$T_A$ = 25°C |
|---|---|---|
| 30V | 21mΩ @ $V_{GS}$ = 10V | 7.3A |
| | 35mΩ @ $V_{GS}$ = 4.5V | 5.5A |

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected Gate**
- **"Green" component and RoHS compliant (Notes 1 & 2)**
- **Qualified to AEC-Q101 standards for High Reliability**

## Description and Applications

This MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

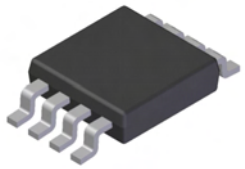
- Backlighting
- Power Management Functions
- DC-DC Converters

## Mechanical Data

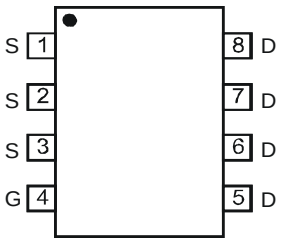
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)



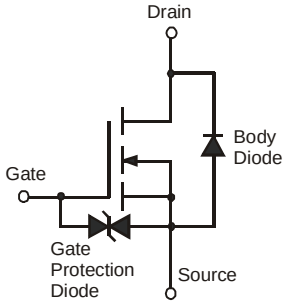

SO-8



Top View




Top View
Pin Configuration



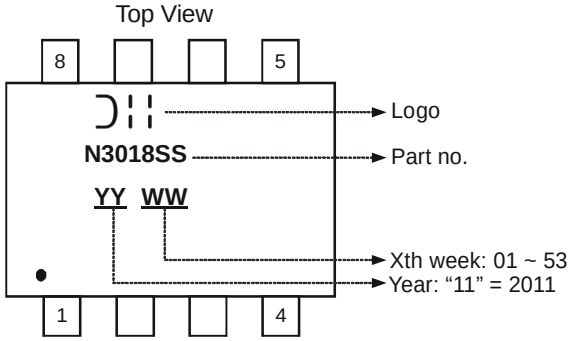

Equivalent Circuit Per Element

## Ordering Information (Note 3)

| Part Number | Case | Packaging |
|---|---|---|
| DMN3018SSS-13 | SO-8 | 2500/Tape & Reel |

Notes: 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

## Marking Information





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## Maximum Ratings @$T_A$ = 25°C unless otherwise specified

| Characteristic | | | Symbol | Value | Units |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | 30 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±25 | V |
| Continuous Drain Current (Note 5) $V_{GS}$ = 10V | Steady State | $T_A$ = 25°C<br>$T_A$ = 70°C | $I_D$ | 7.3<br>5.7 | A |
| | t<10s | $T_A$ = 25°C<br>$T_A$ = 70°C | $I_D$ | 9.7<br>7.8 | A |
| Continuous Drain Current (Note 5) $V_{GS}$ = 4.5V | Steady State | $T_A$ = 25°C<br>$T_A$ = 70°C | $I_D$ | 5.5<br>4.3 | A |
| | t<10s | $T_A$ = 25°C<br>$T_A$ = 70°C | $I_D$ | 7.6<br>5.8 | A |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%) | | | $I_{DM}$ | 60 | A |
| Maximum Body Diode continuous Current | | | $I_S$ | 2.5 | A |

## Thermal Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Units |
|---|---|---|---|---|
| Total Power Dissipation (Note 4) | $T_A$ = 25°C | $P_D$ | 1.4 | W |
| | $T_A$ = 70°C | | 0.9 | |
| Thermal Resistance, Junction to Ambient (Note 4) | Steady state | $R_{\theta JA}$ | 90 | °C/W |
| | t<10s | | 50 | °C/W |
| Total Power Dissipation (Note 5) | $T_A$ = 25°C | $P_D$ | 1.7 | W |
| | $T_A$ = 70°C | | 1.1 | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state | $R_{\theta JA}$ | 75 | °C/W |
| | t<10s | | 42 | °C/W |
| Thermal Resistance, Junction to Case (Note 5) | | $R_{\theta JC}$ | 7.6 | °C/W |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## Electrical Characteristics $T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 6)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 30 | - | - | V | $V_{GS}$ = 0V, $I_D$ = 250µA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | - | - | 1 | µA | $V_{DS}$ = 24V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | - | - | ±10 | µA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 6)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1 | 1.7 | 2.1 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA |
| Static Drain-Source On-Resistance | $R_{DS\ (ON)}$ | - | 15 | 21 | mΩ | $V_{GS}$ = 10V, $I_D$ = 10A |
| | | - | 20 | 35 | | $V_{GS}$ = 4.5V, $I_D$ = 8.5A |
| Forward Transfer Admittance | $\|Y_{fs}\|$ | - | 8.3 | - | S | $V_{DS}$ = 5V, $I_D$ = 6.9A |
| Diode Forward Voltage | $V_{SD}$ | 0.5 | - | 1.2 | V | $V_{GS}$ = 0V, $I_S$ = 1A |
| **DYNAMIC CHARACTERISTICS (Note 7)** | | | | | | |
| Input Capacitance | $C_{iss}$ | - | 697 | - | pF | $V_{DS}$ = 15V, $V_{GS}$ = 0V, f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | - | 97 | - | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 67 | - | pF | |
| Gate resistance | $R_g$ | - | 1.47 | - | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1.0MHz |
| Total Gate Charge ($V_{GS}$ = 4.5V) | $Q_g$ | - | 6.0 | - | nC | $V_{GS}$ = 10V, $V_{DS}$ = 15V, $I_D$ = 9A |
| Total Gate Charge ($V_{GS}$ = 10V) | $Q_g$ | - | 13.2 | - | nC | |
| Gate-Source Charge | $Q_{gs}$ | - | 2.2 | - | nC | |
| Gate-Drain Charge | $Q_{gd}$ | - | 1.8 | - | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | - | 4.3 | - | ns | $V_{DD}$ = 15V, $V_{GS}$ = 10V, $R_L$ = 15Ω, $I_D$ = 1A, $R_G$ = 6Ω |
| Turn-On Rise Time | $t_r$ | - | 4.4 | - | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | - | 20.1 | - | ns | |
| Turn-Off Fall Time | $t_f$ | - | 4.1 | - | ns | |
| Reverse Recovery Time | $T_{rr}$ | - | 7.3 | - | ns | $I_F$ = 9A, di/dt = 500A/µs |
| Reverse Recovery Charge | $Q_{rr}$ | - | 7.9 | - | nC | |

Notes: 4. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.


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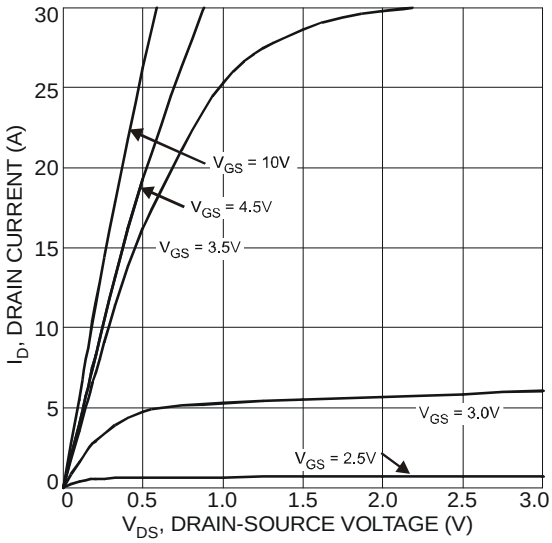



Fig.1 Typical Output Characteristic

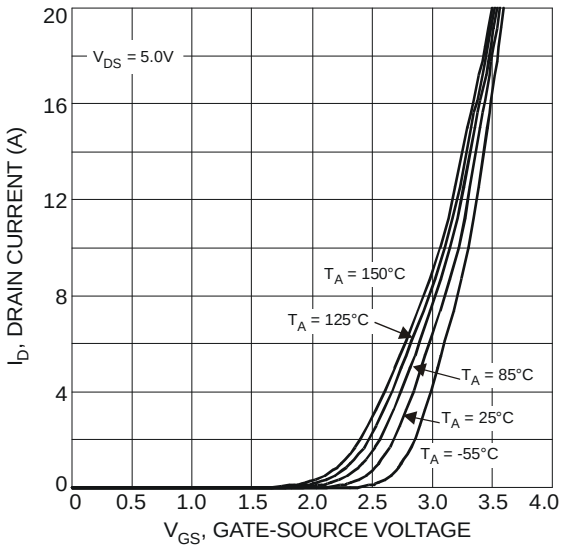



Fig.2 Typical Transfer Characteristics

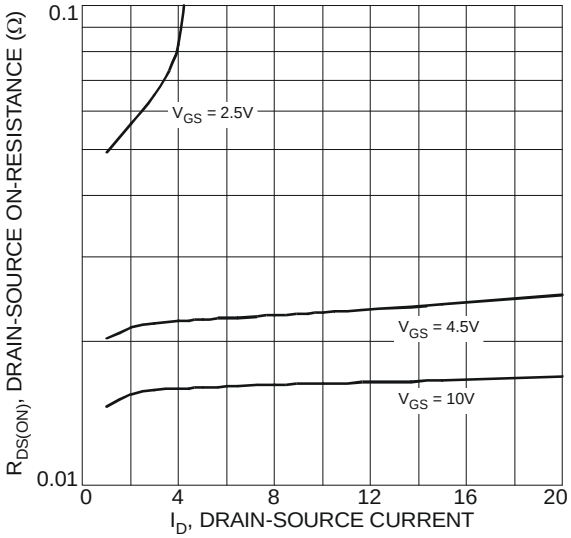



Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

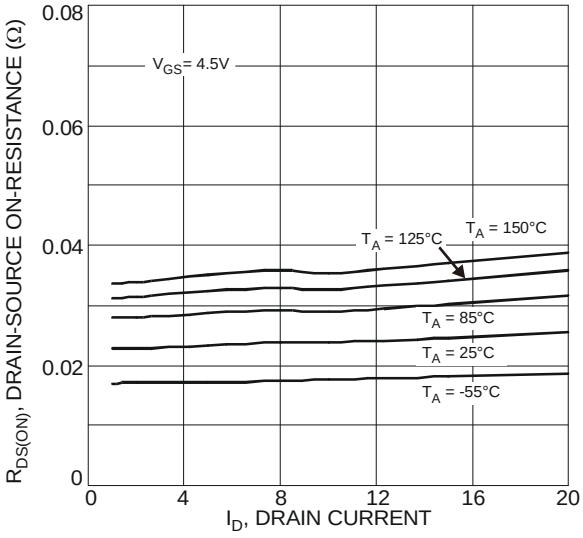



Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

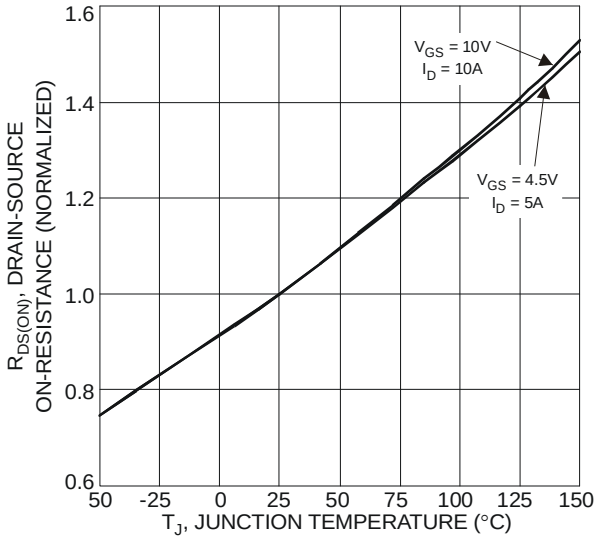



Fig. 5 On-Resistance Variation with Temperature

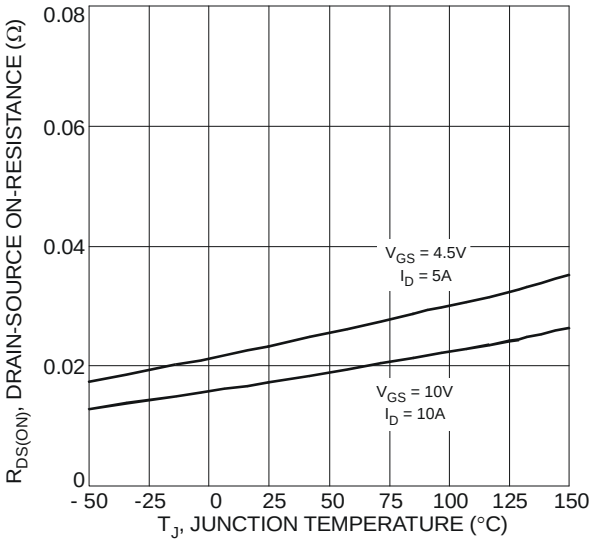



Fig. 6 On-Resistance Variation with Temperature


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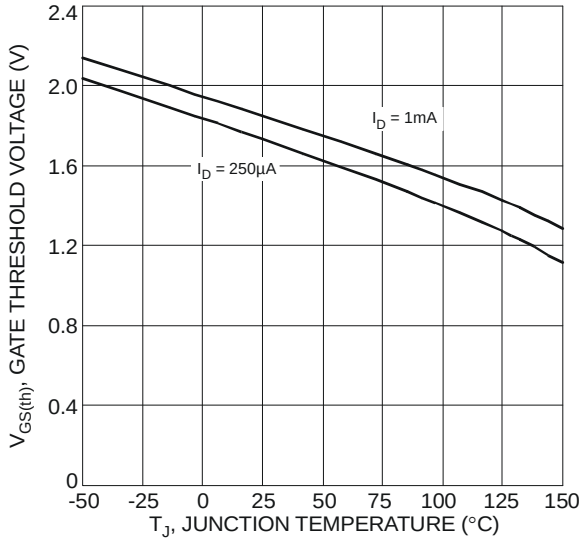



Fig. 7 Gate Threshold Variation vs. Ambient Temperature

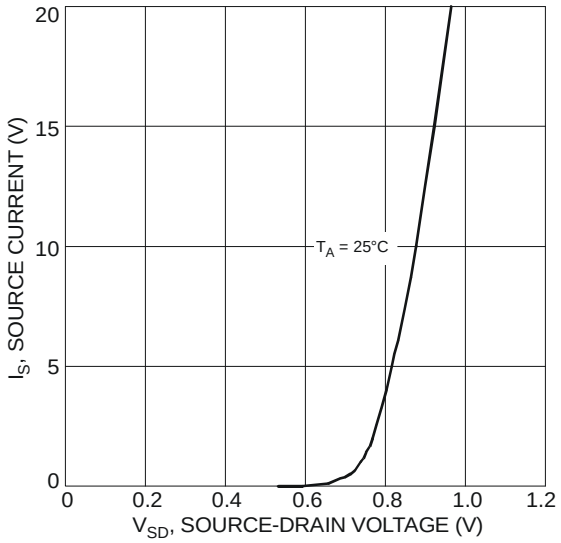



Fig.8 Diode Forward Voltage vs. Current

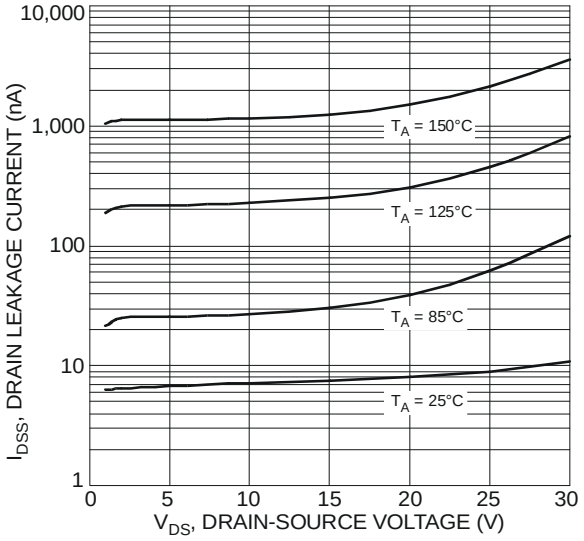



Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

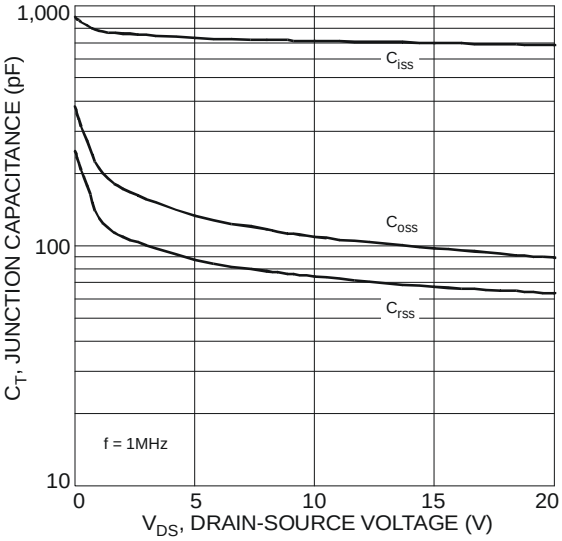



Fig. 10 Typical Junction Capacitance

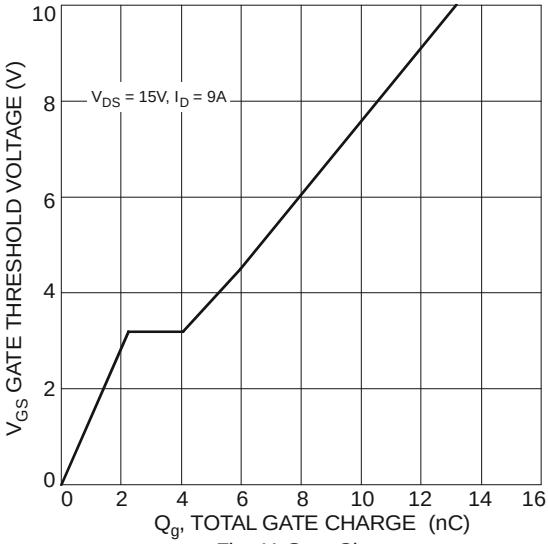



Fig. 11 Gate Charge


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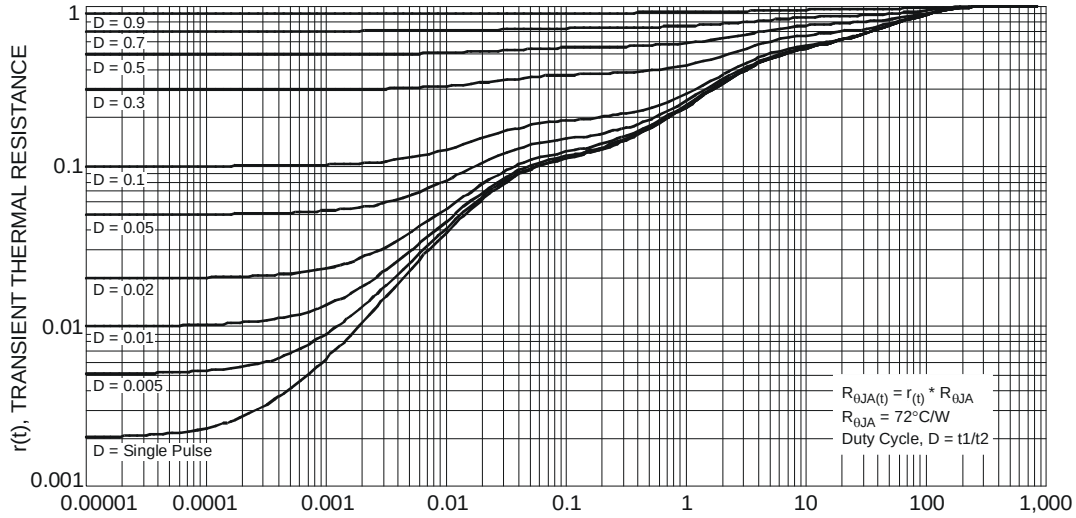
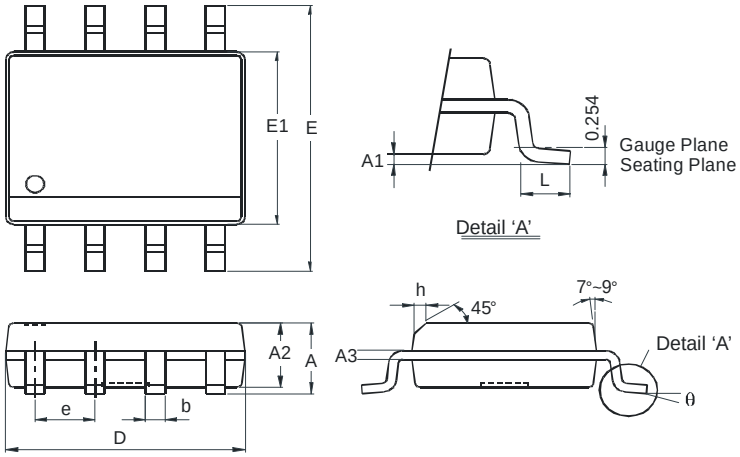


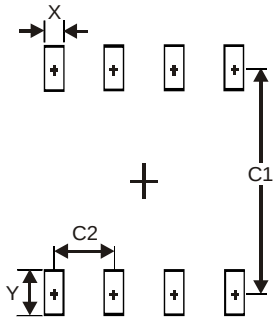
Fig. 12 Transient Thermal Resistance

## Package Outline Dimensions




| SO-8 | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | - | 1.75 |
| **A1** | 0.10 | 0.20 |
| **A2** | 1.30 | 1.50 |
| **A3** | 0.15 | 0.25 |
| **b** | 0.3 | 0.5 |
| **D** | 4.85 | 4.95 |
| **E** | 5.90 | 6.10 |
| **E1** | 3.85 | 3.95 |
| **e** | 1.27 Typ | |
| **h** | - | 0.35 |
| **L** | 0.62 | 0.82 |
| **θ** | 0° | 8° |
| All Dimensions in mm | | |

## Suggested Pad Layout




| Dimensions | Value (in mm) |
|---|---|
| **X** | 0.60 |
| **Y** | 1.55 |
| **C1** | 5.4 |
| **C2** | 1.27 |


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