



**THE DATASHEET OF
DMG4812SSS-13**



Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ | $I_D \text{ max}$ $T_A = +25^\circ\text{C}$ |
|---------------|---|--|
| 30V | 15m Ω @ $V_{GS} = 10\text{V}$ | 10.7A |
| | 18.5m Ω @ $V_{GS} = 4.5\text{V}$ | 9.6A |

Description

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

Applications

- DC-DC Converters
- Power Management Functions

Features

- DIOFET Utilizes a Unique Patented Process to Monolithically Integrate a MOSFET and a Schottky in a Single Die to Deliver:
 - Low $R_{DS(ON)}$ —Minimizes Conduction Losses
 - Low V_{SD} —Reduces Losses due to Body Diode Conduction
 - Low Q_{rr} —Lower Q_{rr} of the Integrated Schottky Reduces Body Diode Switching Losses
 - Low Gate Capacitance (Q_g/Q_{gs}) Ratio—Reduces Risk of SHOOT-THROUGH or Cross Conduction Currents at High Frequencies
 - Avalanche Rugged— I_{AR} and E_{AR} Rated
- **ESD Protected**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

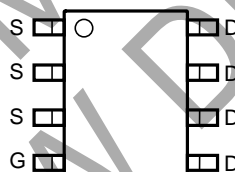
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.072 grams (approximate)



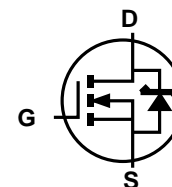
DIOFET



Top View



Top View
Internal Schematic



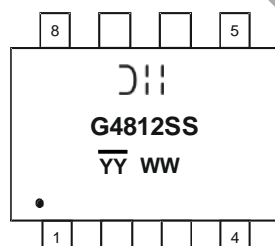
Equivalent Circuit

Ordering Information (Note 4)

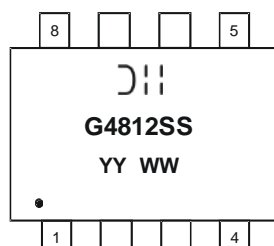
| Part Number | Case | Packaging |
|---------------|------|------------------|
| DMG4812SSS-13 | SO-8 | 2500/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



Chengdu A/T Site



Shanghai A/T Site

- ⌋⌋ = Manufacturer's Marking
- G4812SS = Product Type Marking Code
- YYWW = Date Code Marking
- YY or \overline{YY} = Year (ex: 13 = 2013)
- WW = Week (01 - 53)
- YY = Date Code Marking for SAT (Shanghai Assembly/ Test site)
- YY = Date Code Marking for CAT (Chengdu Assembly/ Test site)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|--|--------------|------------------------|------------------|-------|------|
| Drain-Source Voltage | | | V _{DSS} | 30 | V |
| Gate-Source Voltage | | | V _{GSS} | ±12 | V |
| Continuous Drain Current (Note 5) V _{GS} = 10V | Steady State | T _A = +25°C | I _D | 8 | A |
| | | T _A = +85°C | | 6.4 | |
| Continuous Drain Current (Note 6) V _{GS} = 10V | t ≤ 10 sec | T _A = +25°C | I _D | 10.7 | A |
| | | T _A = +85°C | | 8.6 | |
| Continuous Drain Current (Note 6) V _{GS} = 4.5V | t ≤ 10 sec | T _A = +25°C | I _D | 9.6 | A |
| | | T _A = +85°C | | 7.7 | |
| Pulsed Drain Current (Note 7) | | | I _{DM} | 45 | A |
| Avalanche Current (Notes 7 & 8) | | | I _{AR} | 13 | A |
| Repetitive Avalanche Energy (Notes 7 & 8) L = 0.3mH | | | E _{AR} | 25.4 | mJ |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 1.54 | W |
| Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5) | R _{θJA} | 81 | °C/W |
| Power Dissipation (Note 6) | P _D | 2.8 | W |
| Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6) | R _{θJA} | 45 | °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 9) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | — | — | V | V _{GS} = 0V, I _D = 1mA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 150 | μA | V _{DS} = 30V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±12V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 9) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1.0 | — | 2.3 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 11 | 15 | mΩ | V _{GS} = 10V, I _D = 10.7A |
| | | — | 16.5 | 18.5 | | V _{GS} = 4.5V, I _D = 9.6A |
| Forward Transfer Admittance | Y _{fs} | — | 20 | — | S | V _{DS} = 5V, I _D = 10.7A |
| Diode Forward Voltage | V _{SD} | — | 0.36 | 0.5 | V | V _{GS} = 0V, I _S = 1A |
| Maximum Body-Diode + Schottky Continuous Current | I _S | — | — | 5 | A | — |
| DYNAMIC CHARACTERISTICS (Note 10) | | | | | | |
| Input Capacitance | C _{iss} | — | 1849 | — | pF | V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 158 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 123 | — | pF | |
| Gate Resistance | R _g | 0.54 | 2.0 | 4.0 | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge V _{GS} = 4.5V | Q _g | — | 18.5 | — | nC | V _{DS} = 15V, V _{GS} = 10V, I _D = 9.6A |
| Total Gate Charge V _{GS} = 10V | Q _g | — | 43 | — | nC | |
| Gate-Source Charge | Q _{gs} | — | 4.7 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 4.0 | — | nC | |
| Turn-On Delay Time | t _{D(on)} | — | 6.62 | — | ns | V _{GS} = 10V, V _{DS} = 15V, R _G = 3Ω, R _L = 15Ω, I _D = 1A |
| Turn-On Rise Time | t _r | — | 8.73 | — | ns | |
| Turn-Off Delay Time | t _{D(off)} | — | 36.41 | — | ns | |
| Turn-Off Fall Time | t _f | — | 4.69 | — | ns | |

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout. The value in any given application depends on the user's specific board design.
 - Device mounted on 1" x 1" FR-4 PCB with high coverage 1 oz. Copper, single sided, device is measured at t ≤ 10 sec.
 - Repetitive rating, pulse width limited by junction temperature.
 - I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = +25°C
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

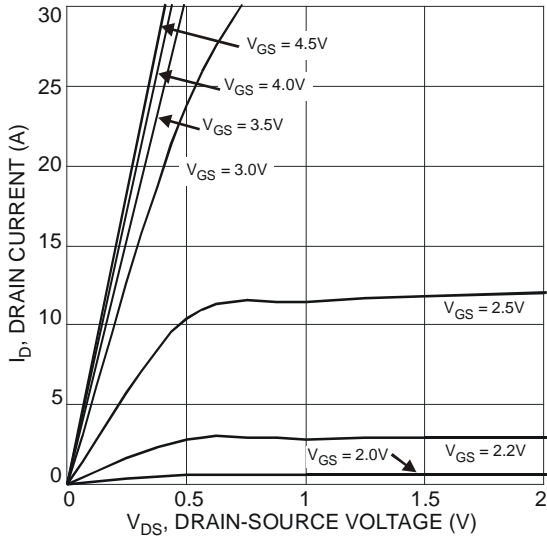


Fig. 1 Typical Output Characteristic

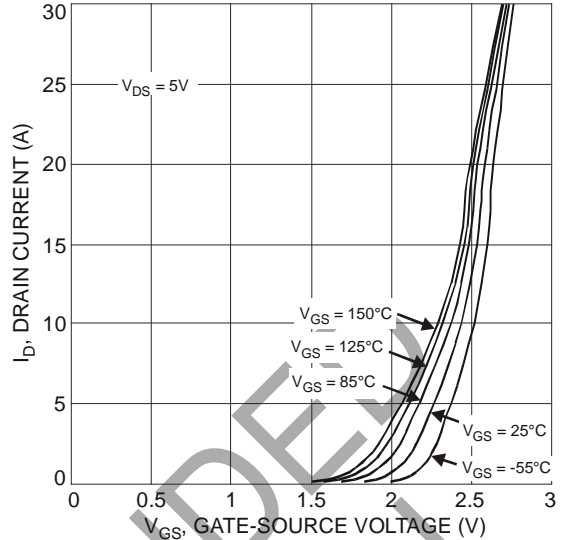


Fig. 2 Typical Transfer Characteristic

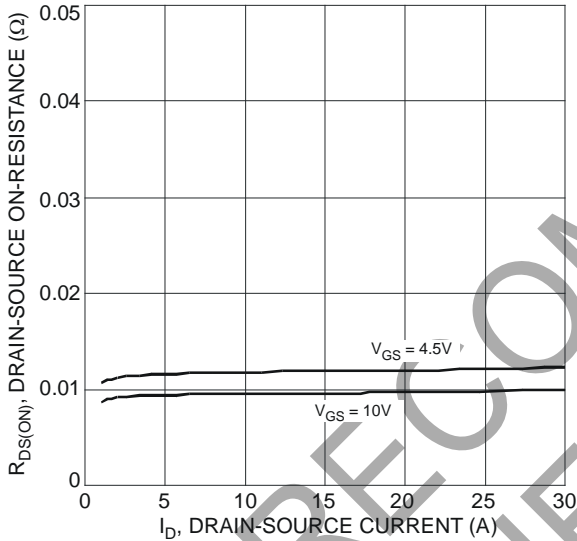


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

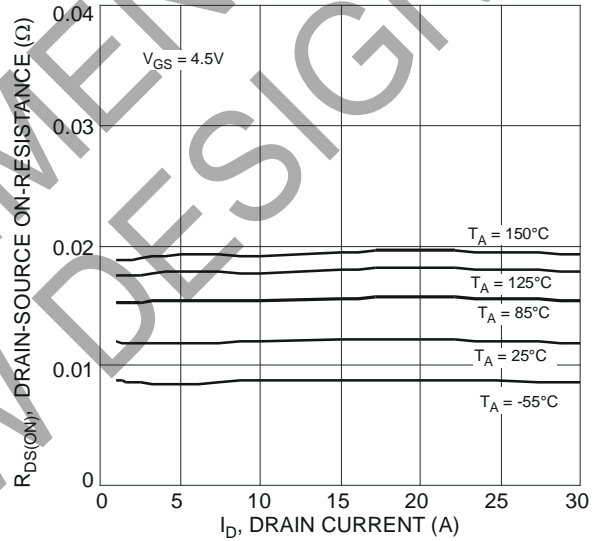


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

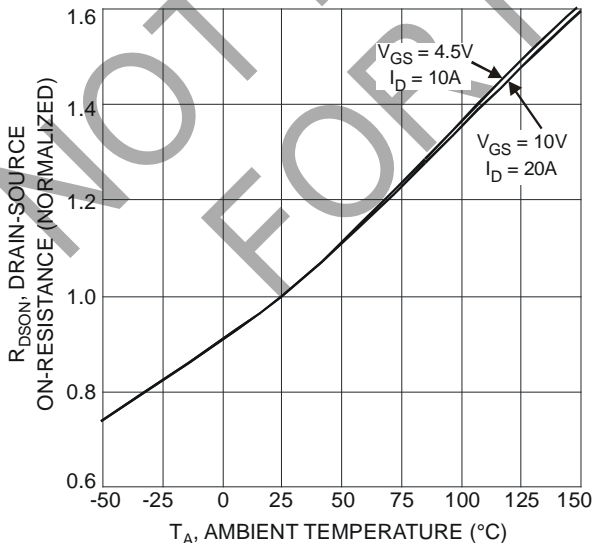


Fig. 5 On-Resistance Variation with Temperature

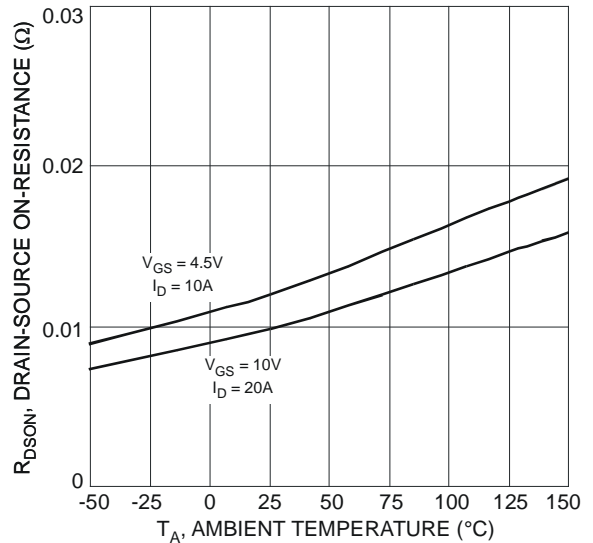


Fig. 6 On-Resistance Variation with Temperature

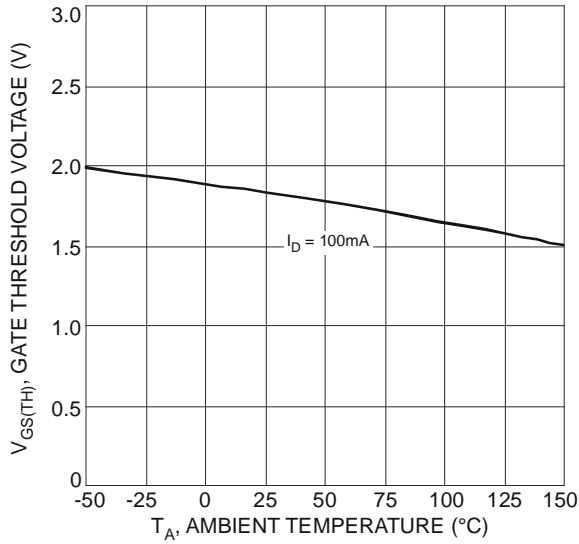


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

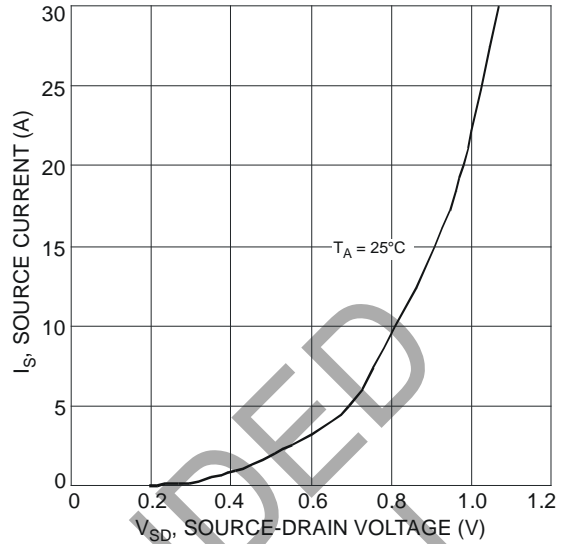


Fig. 8 Diode Forward Voltage vs. Current

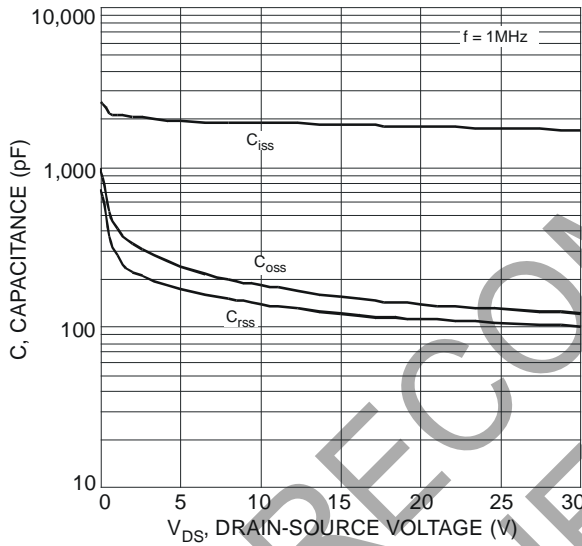


Fig. 9 Typical Total Capacitance

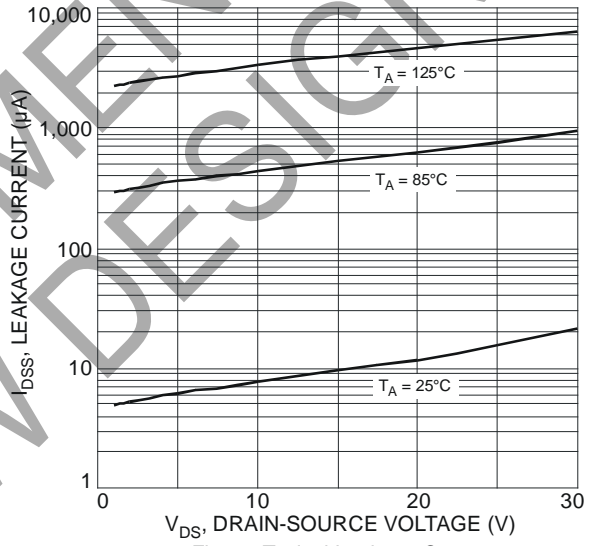


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

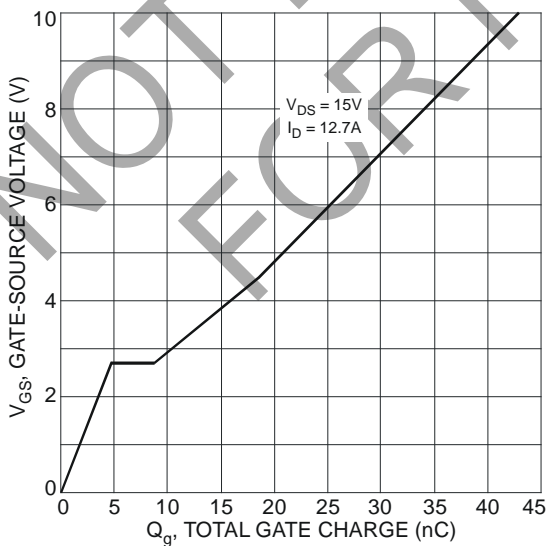


Fig. 11 Gate-Charge Characteristics

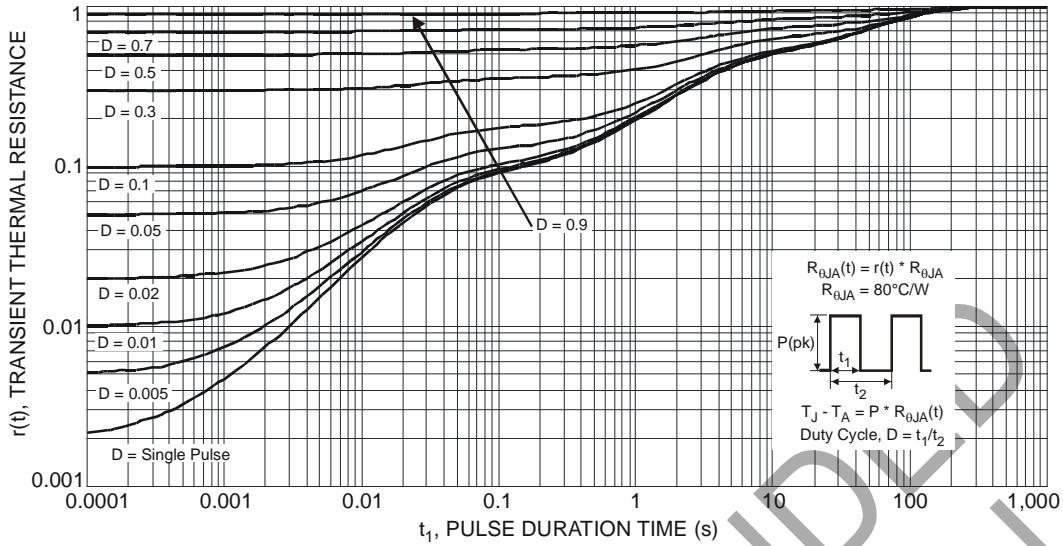


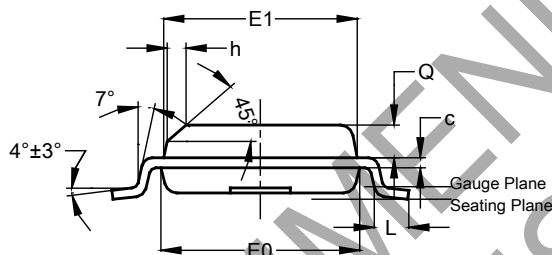
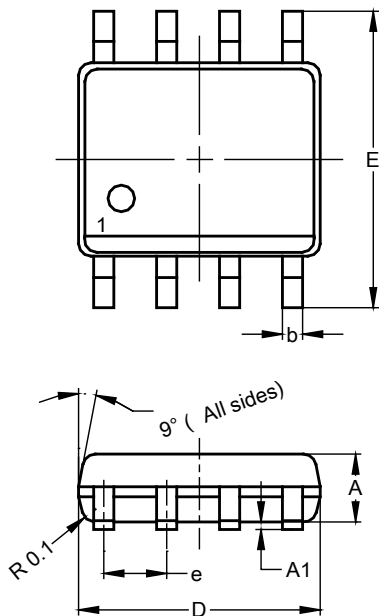
Fig. 12 Transient Thermal Response

NOT RECOMMENDED FOR NEW DESIGN

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version

SO-8

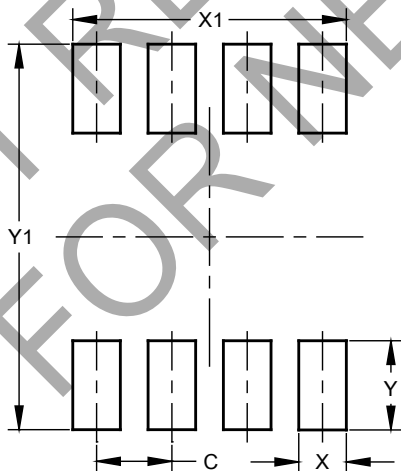


| SO-8 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 1.40 | 1.50 | 1.45 |
| A1 | 0.10 | 0.20 | 0.15 |
| b | 0.30 | 0.50 | 0.40 |
| c | 0.15 | 0.25 | 0.20 |
| D | 4.85 | 4.95 | 4.90 |
| E | 5.90 | 6.10 | 6.00 |
| E1 | 3.80 | 3.90 | 3.85 |
| E0 | 3.85 | 3.95 | 3.90 |
| 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

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8



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

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