

## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$ Max	$I_D$ Max $T_A = +25^\circ C$
60V	87m $\Omega$ @ $V_{GS} = 10V$	2.7A
	100m $\Omega$ @ $V_{GS} = 4.5V$	2.5A

## Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Backlighting
- Power Management Functions
- DC-DC Converters

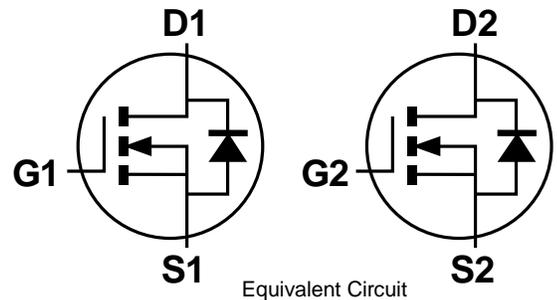
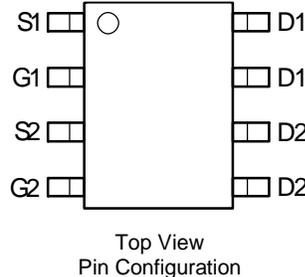
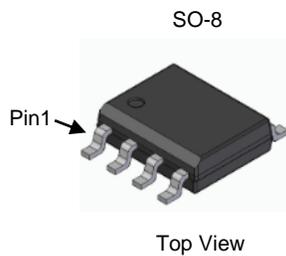
## Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMN6070SSDQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

## 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  $\text{e3}$
- Weight: 0.074 grams (Approximate)

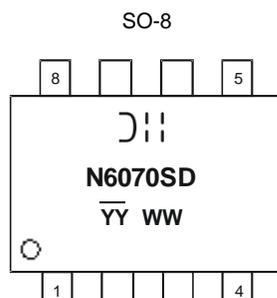


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN6070SSDQ-13	SO-8	2,500/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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



$\text{J} \parallel \text{I}$  = Manufacturer's Marking  
 N6070SD = Product Type Marking Code  
 $\text{YYWW}$  = Date Code Marking  
 YY = Year (ex: 20 = 2020)  
 WW = Week (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	60	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	2.7	A
		T <sub>A</sub> = +70°C		2.1	
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	2.7	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	12	A
Avalanche Current (Note 7) L=0.1mH			I <sub>AS</sub>	10	A
Avalanche Energy (Note 7) L=0.1mH			E <sub>AS</sub>	5	mJ

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)			P <sub>D</sub>	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)		Steady State	R <sub>θJA</sub>	104	°C/W
Total Power Dissipation (Note 6)			P <sub>D</sub>	1.5	W
Thermal Resistance, Junction to Ambient (Note 6)		Steady State	R <sub>θJA</sub>	83	°C/W
Thermal Resistance, Junction to Case (Note 6)			R <sub>θJC</sub>	14.5	
Operating and Storage Temperature Range			T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	V	I <sub>D</sub> = 250µA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.0	—	3.0	V	I <sub>D</sub> = 250µA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	68	87	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.5A
			70	100		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.75	1.1	V	I <sub>S</sub> = 12A, V <sub>GS</sub> = 0V
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	588	—	pF	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	26.5	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	20	—		
Gate Resistance	R <sub>g</sub>	—	1.5	—	Ω	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	5.6	—	nC	V <sub>DS</sub> = 30V, I <sub>D</sub> = 3A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	12.3	—		
Gate-Source Charge	Q <sub>gs</sub>	—	1.7	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	1.9	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	3.5	—	ns	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V R <sub>L</sub> ≅ 50Ω, R <sub>G</sub> ≅ 20Ω
Turn-On Rise Time	t <sub>r</sub>	—	4.1	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	35	—		
Turn-Off Fall Time	t <sub>f</sub>	—	11	—		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	18	—	ns	I <sub>S</sub> = 3A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	12	—	nC	I <sub>S</sub> = 3A, di/dt = 100A/µs

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

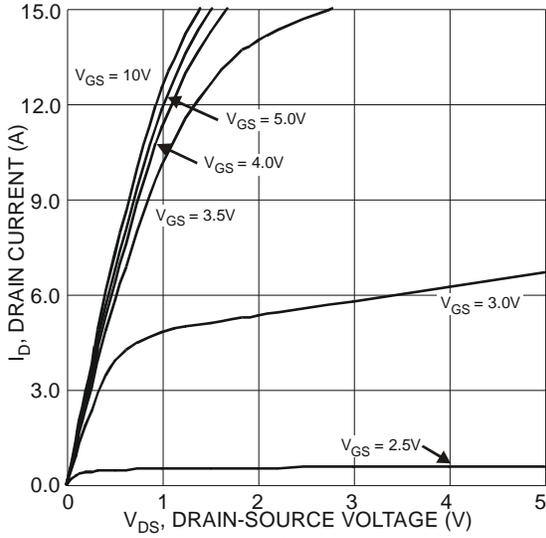


Figure 1 Typical Output Characteristic

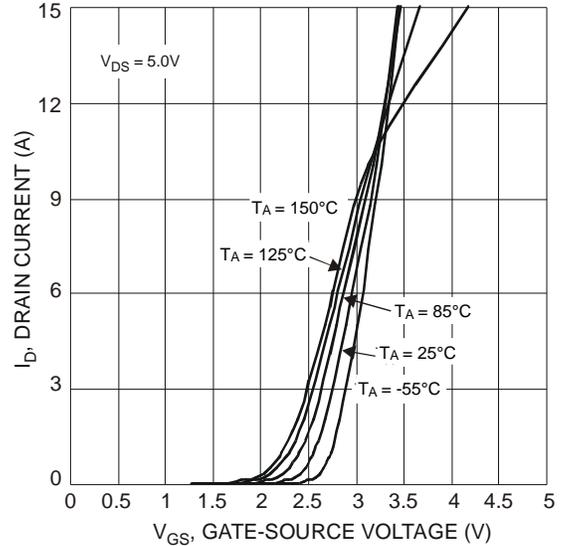


Figure 2 Typical Transfer Characteristics

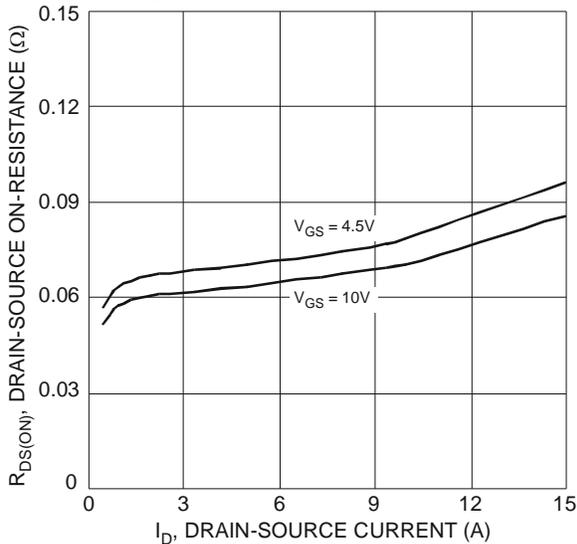


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

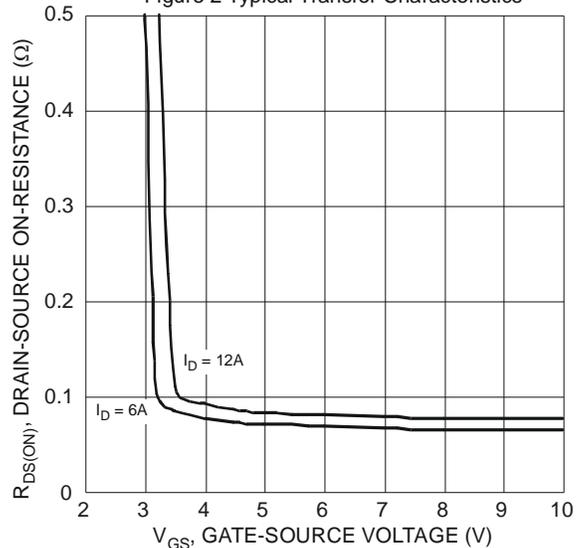


Figure 4 Typical Transfer Characteristics

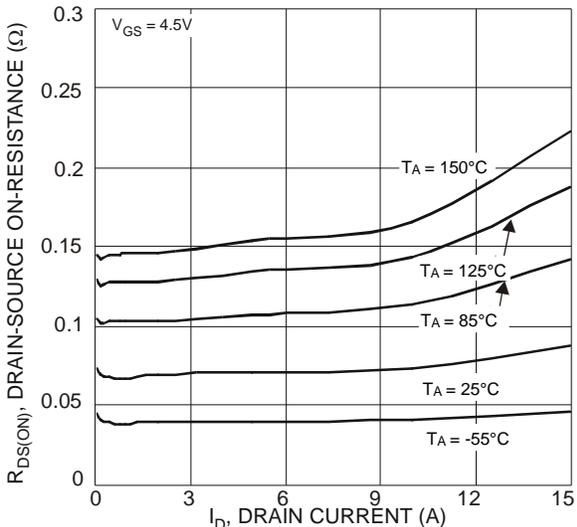


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

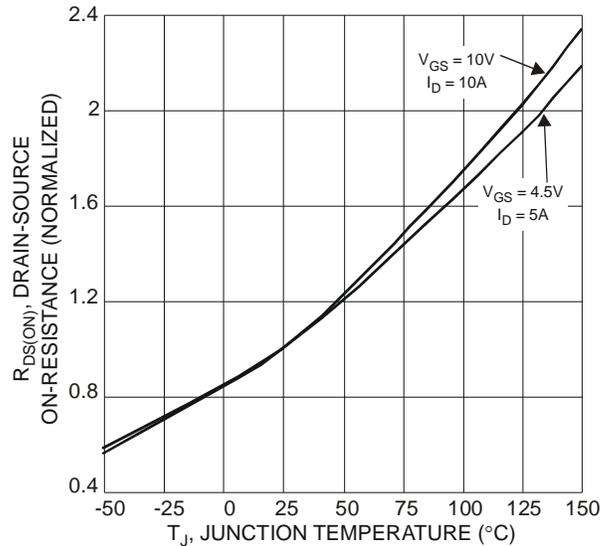


Figure 6 On-Resistance Variation with Temperature

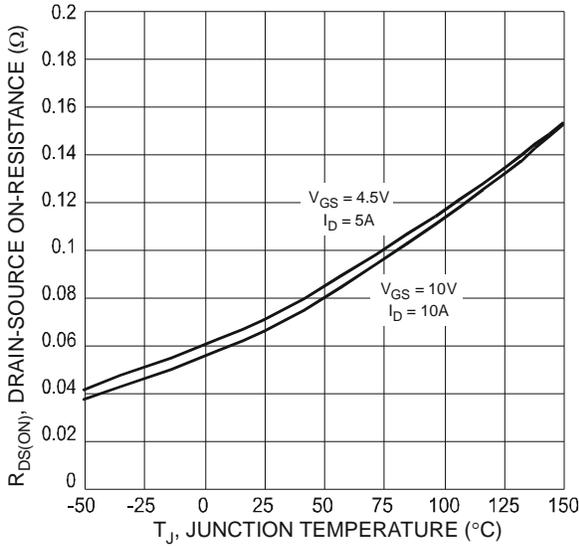


Figure 7 On-Resistance Variation with Temperature

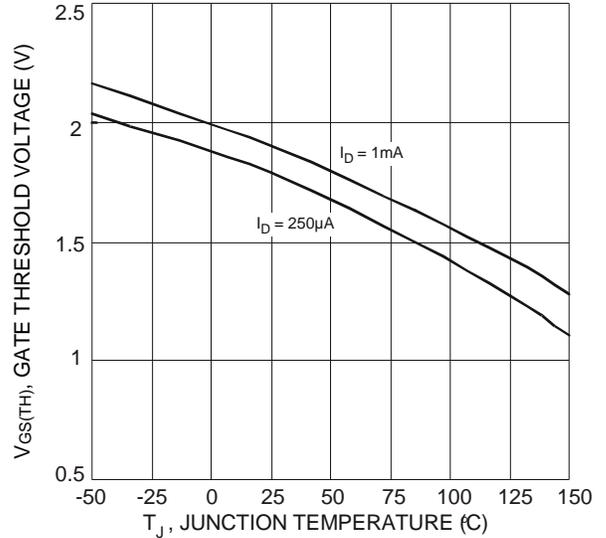


Figure 8 Gate Threshold Variation vs. Junction Temperature

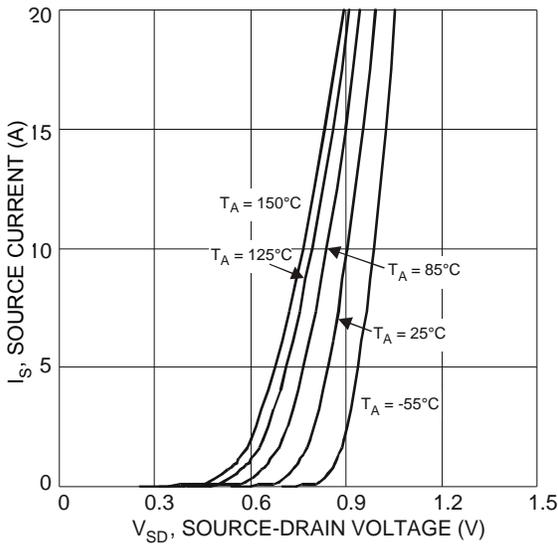


Figure 9 Diode Forward Voltage vs. Current

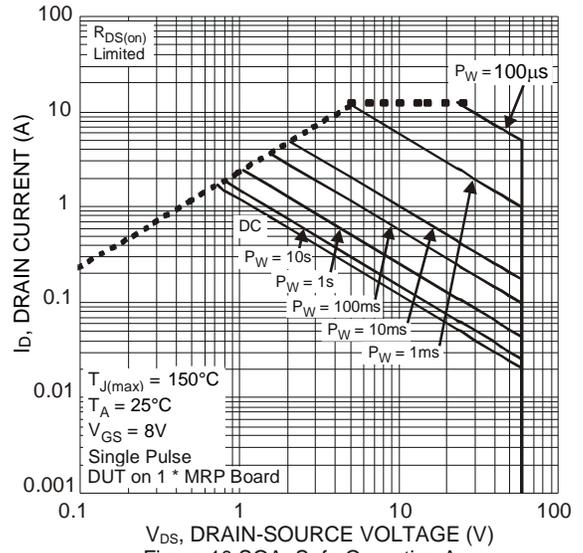


Figure 10 SOA, Safe Operation Area

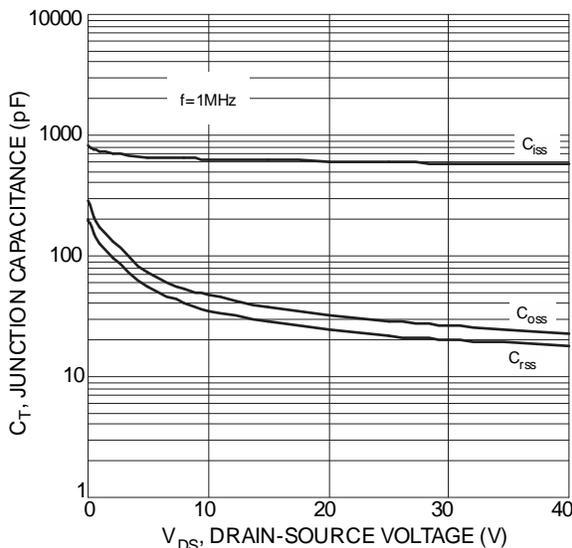


Figure 11 Typical Junction Capacitance

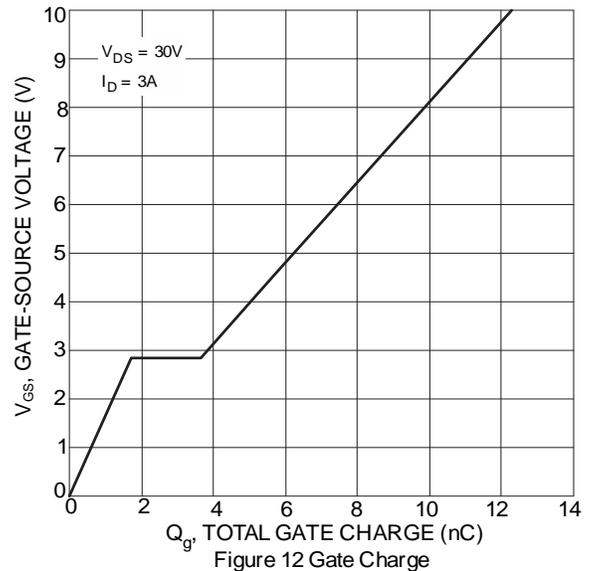
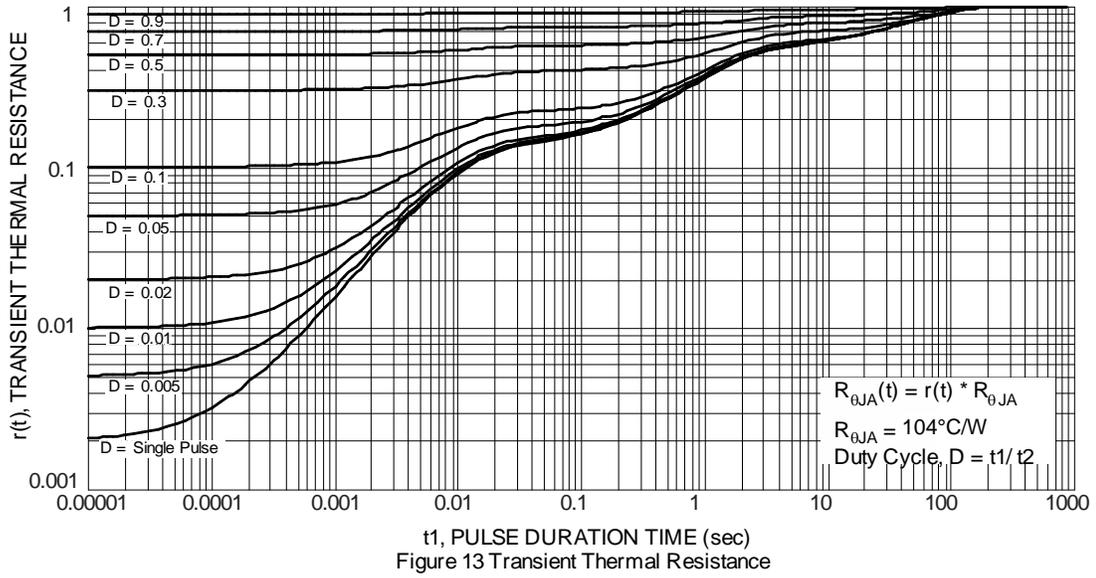


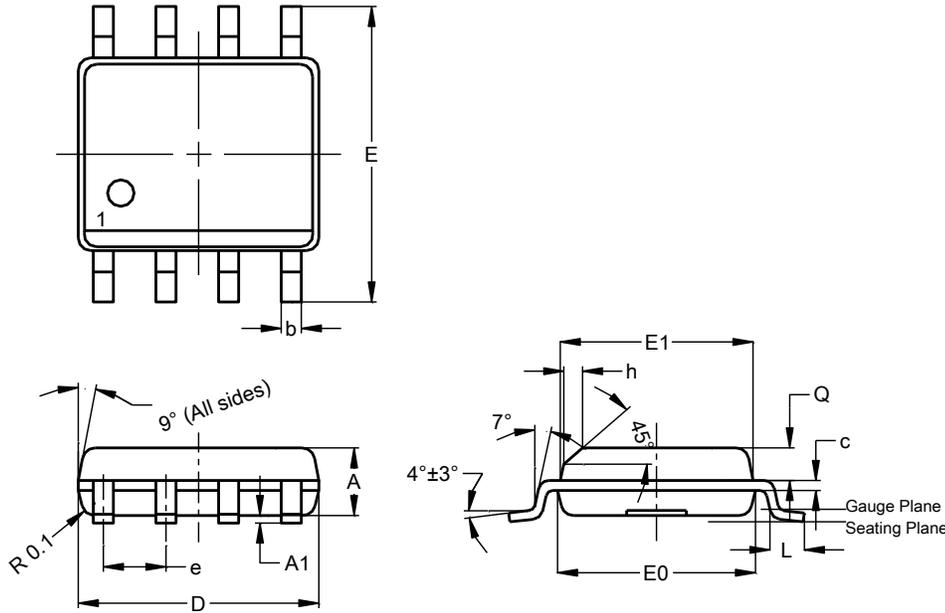
Figure 12 Gate Charge



**Package Outline Dimensions**

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

SO-8



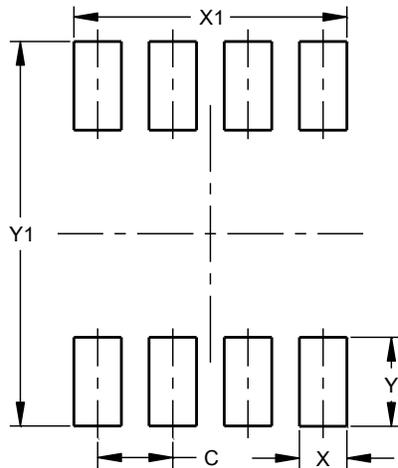
SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65

**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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