

Product Summary

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

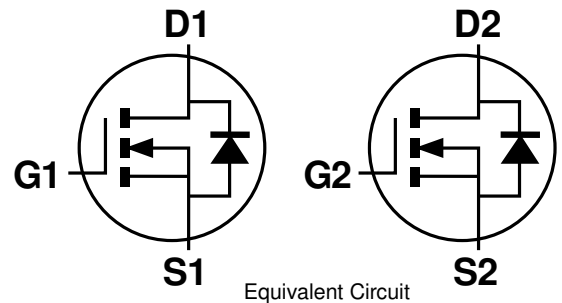
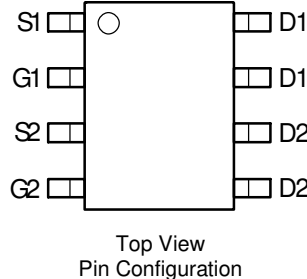
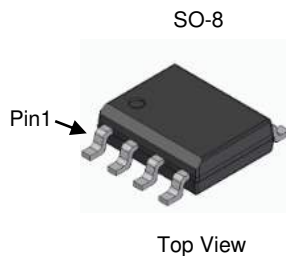
Features and Benefits

- 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 e3
- Weight: 0.074 grams (Approximate)

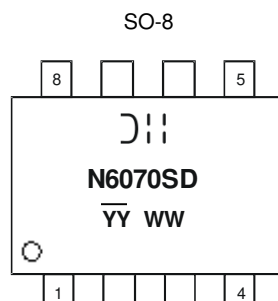


Ordering Information (Note 4)

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
 YYWW = Date Code Marking
 YY = Year (ex: 20 = 2020)
 WW = Week (01 to 53)

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	60	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = 10V	I _D	2.7	A
		T _A = +25°C T _A = +70°C	
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	2.7	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	12	A
Avalanche Current (Note 7) L=0.1mH	I _{AS}	10	A
Avalanche Energy (Note 7) L=0.1mH	E _{AS}	5	mJ

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	104	°C/W
Total Power Dissipation (Note 6)	P _D	1.5	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	83	°C/W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	14.5	
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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	I _D = 250µA, V _{GS} = 0V
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 60V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±16V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1.0	—	3.0	V	I _D = 250µA, V _{DS} = V _{GS}
Static Drain-Source On-Resistance	R _{DS(ON)}	—	68	87	mΩ	V _{GS} = 10V, I _D = 4.5A
			70	100		V _{GS} = 4.5V, I _D = 3.5A
Diode Forward Voltage	V _{SD}	—	0.75	1.1	V	I _S = 12A, V _{GS} = 0V
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	588	—	pF	V _{DS} = 30V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	26.5	—		
Reverse Transfer Capacitance	C _{rss}	—	20	—		
Gate Resistance	R _g	—	1.5	—	Ω	V _{GS} = 0V, V _{DS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	5.6	—	nC	V _{DS} = 30V, I _D = 3A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	12.3	—		
Gate-Source Charge	Q _{gs}	—	1.7	—		
Gate-Drain Charge	Q _{gd}	—	1.9	—		
Turn-On Delay Time	t _{D(ON)}	—	3.5	—	ns	V _{DD} = 30V, V _{GS} = 10V R _L ≅ 50Ω, R _G ≅ 20Ω
Turn-On Rise Time	t _r	—	4.1	—		
Turn-Off Delay Time	t _{D(OFF)}	—	35	—		
Turn-Off Fall Time	t _f	—	11	—		
Body Diode Reverse Recovery Time	t _{RR}	—	18	—	ns	I _S = 3A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{RR}	—	12	—	nC	I _S = 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_{AS} and E_{AS} ratings 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 product testing.

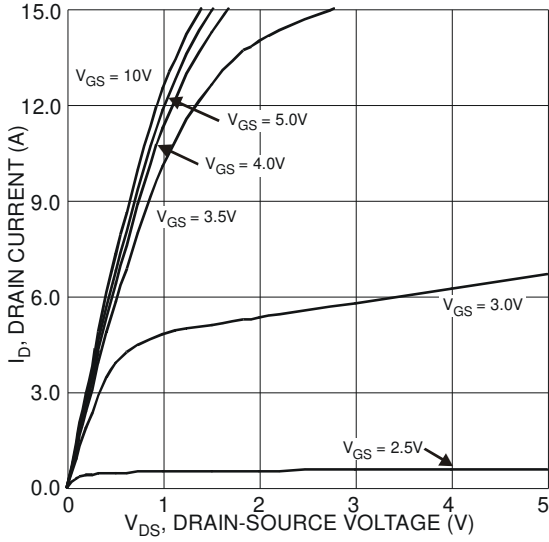


Figure 1 Typical Output Characteristic

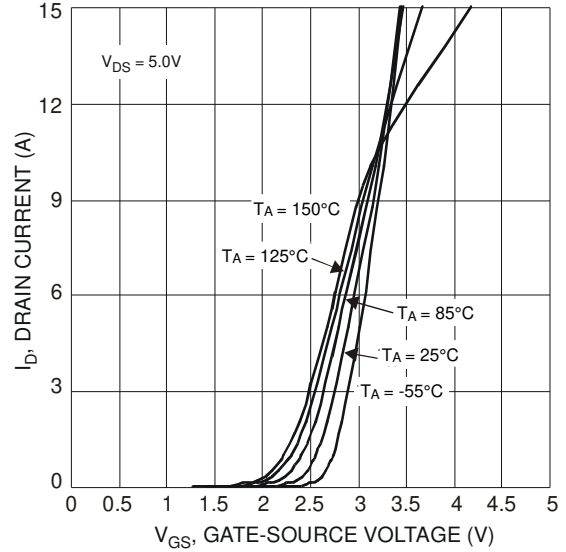


Figure 2 Typical Transfer Characteristics

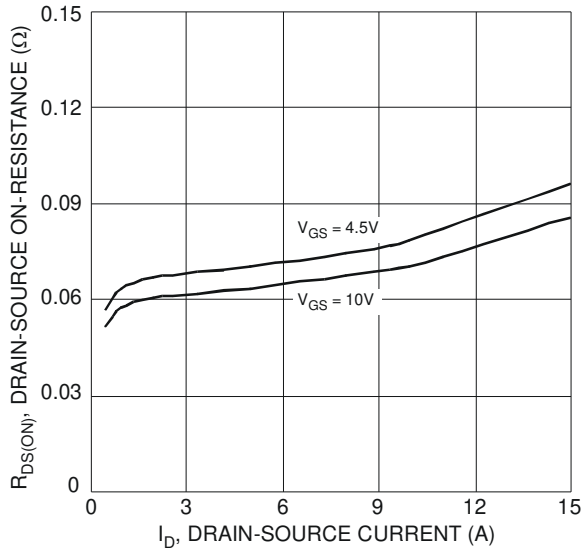


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

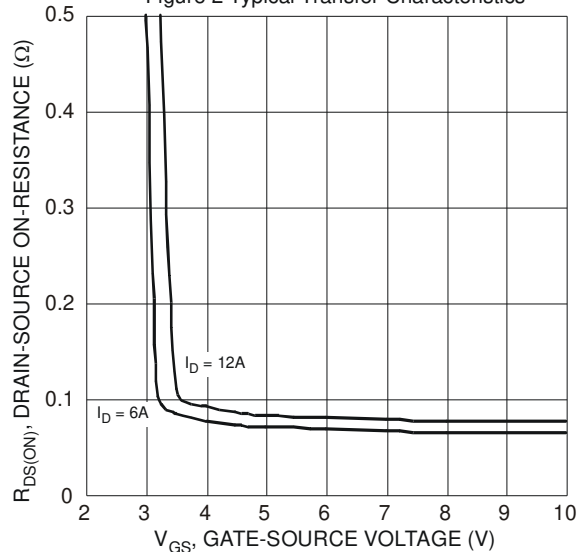


Figure 4 Typical Transfer Characteristics

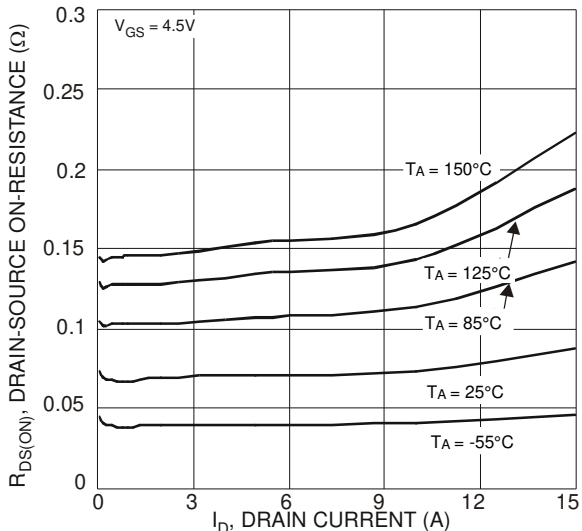


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

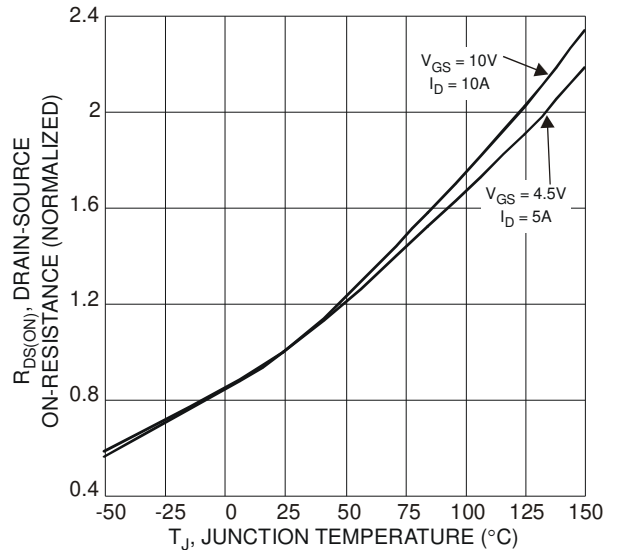


Figure 6 On-Resistance Variation with Temperature

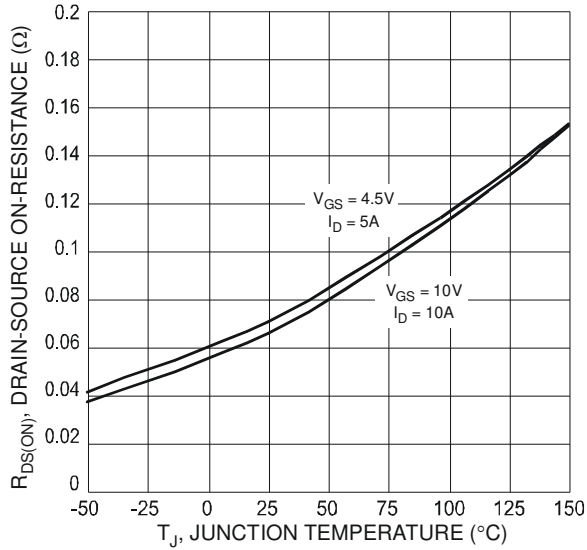


Figure 7 On-Resistance Variation with Temperature

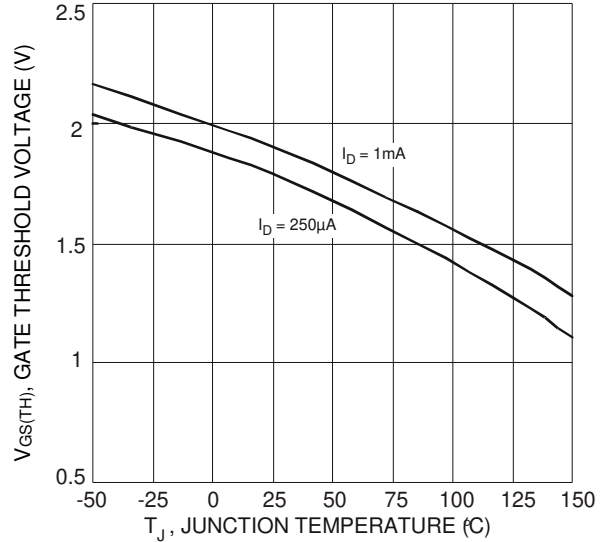


Figure 8 Gate Threshold Variation vs. Junction Temperature

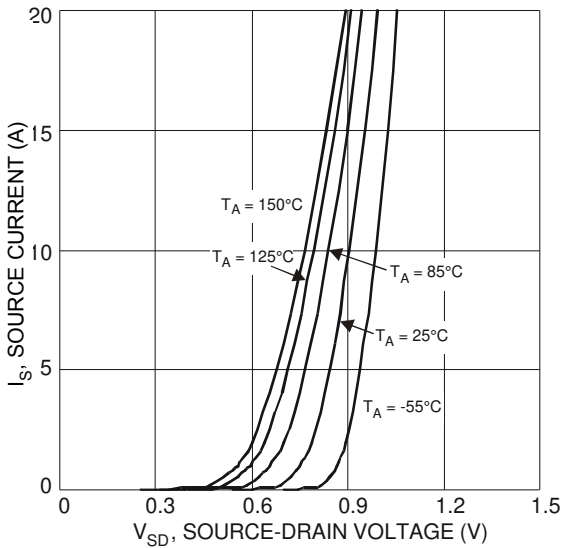


Figure 9 Diode Forward Voltage vs. Current

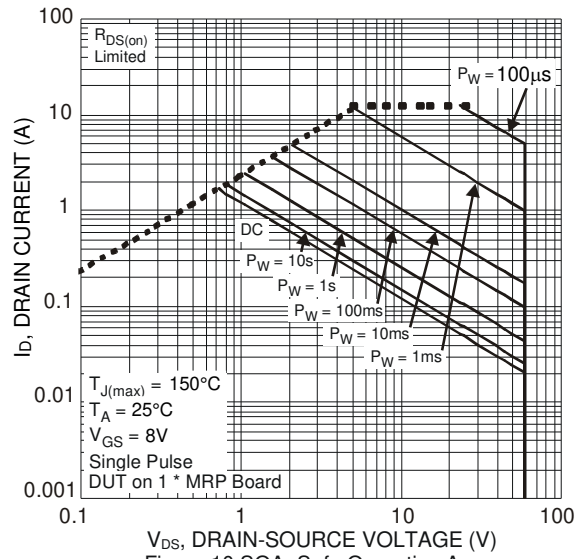


Figure 10 SOA, Safe Operation Area

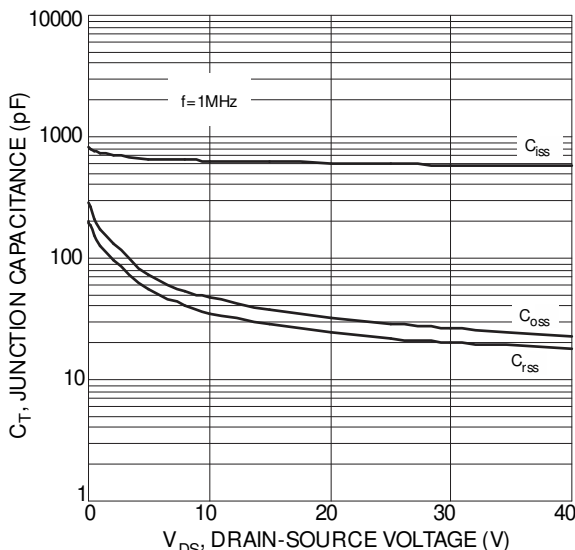


Figure 11 Typical Junction Capacitance

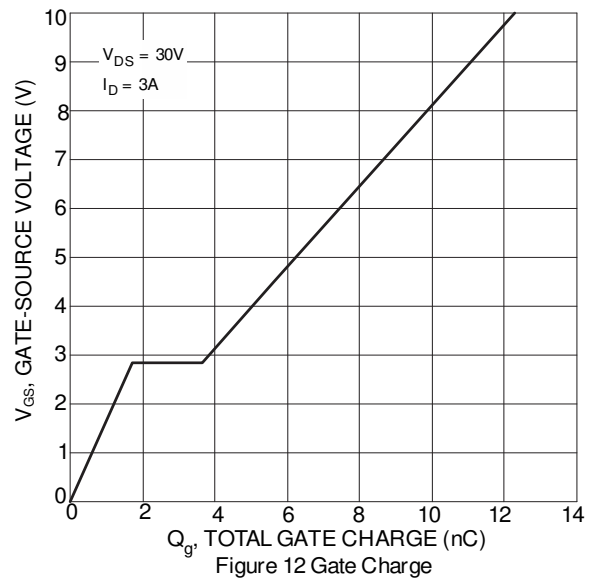
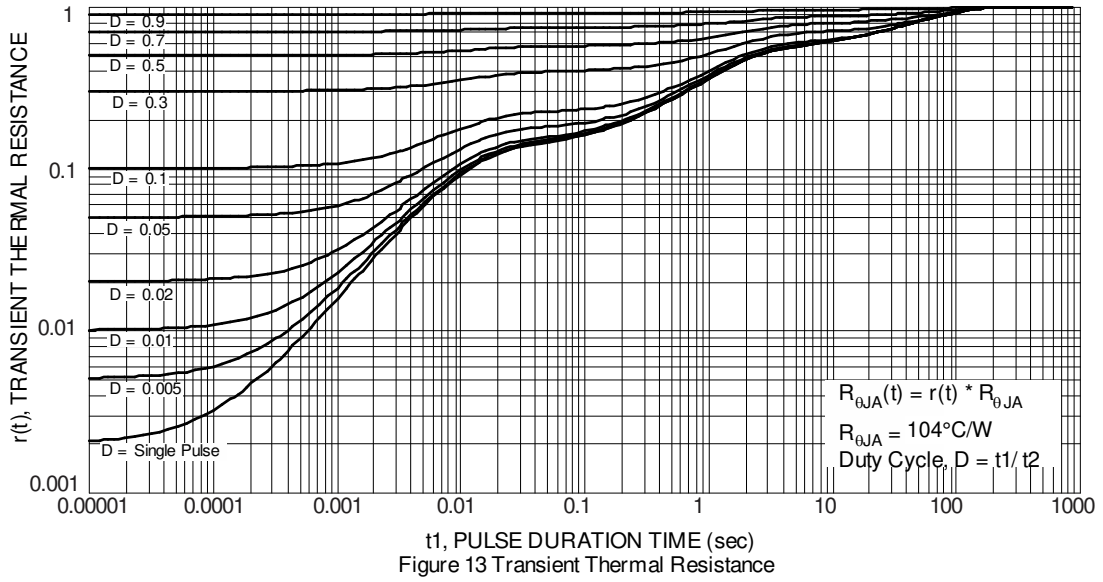


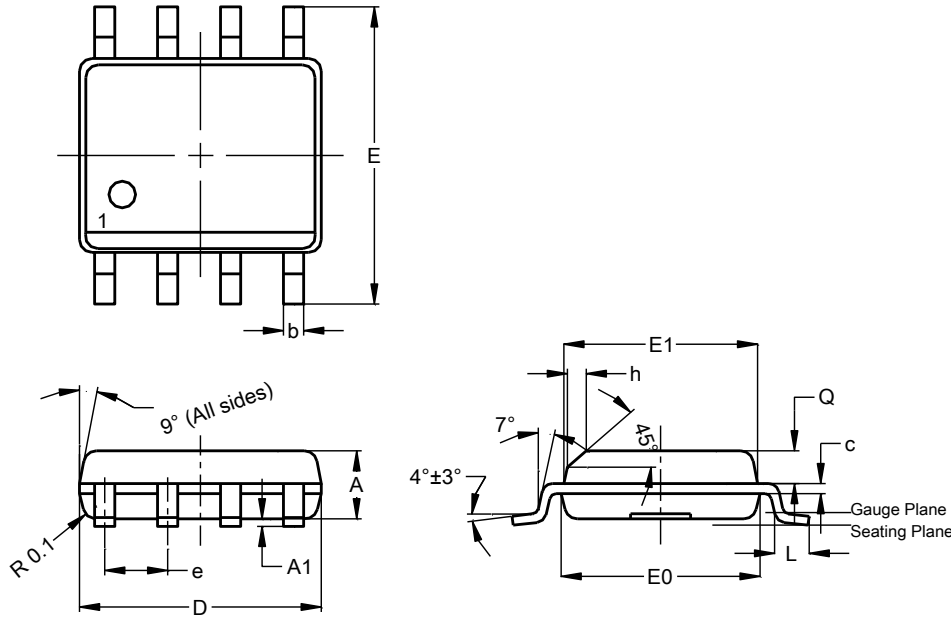
Figure 12 Gate Charge



Package Outline Dimensions

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

SO-8



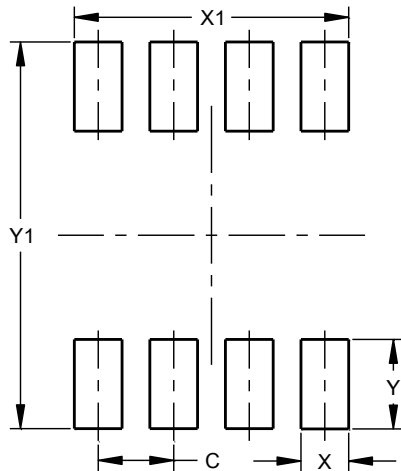
SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65

All Dimensions in mm

Suggested Pad Layout

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

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

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