

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
-40V	11mΩ @ V _{GS} = -10V	-10.1A
	15mΩ @ V _{GS} = -4.5V	-8.8A

Description & 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:

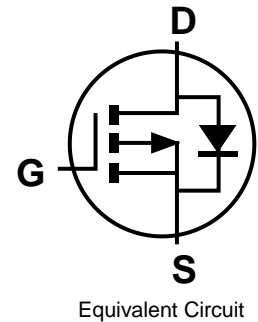
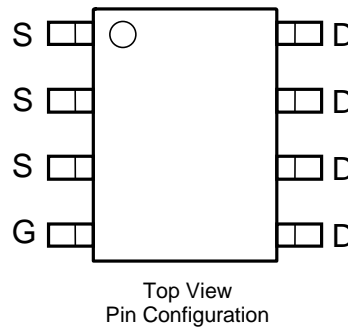
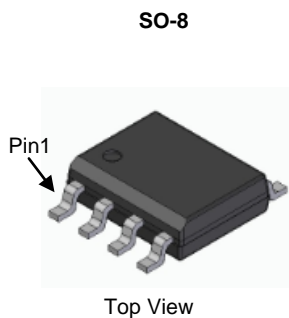
- DC-DC Converters
- Power Management Functions
- Analog Switch

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low Input Capacitance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMP4015SSSQ is suitable for automotive applications requiring specific change control and is AEC-Q101 qualified, is PPAP capable, and is manufactured in IATF16949:2016 certified facilities.**

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
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.074 grams (Approximate)

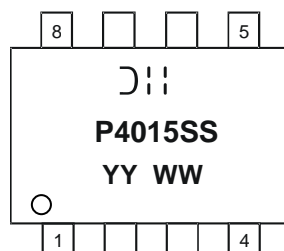


Ordering Information (Note 4)

Part Number	Qualification	Case	Packaging
DMP4015SSSQ-13	Automotive	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



☺☺☺ = Manufacturer's Marking
 P4015SS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 19 = 2019)
 WW = Week (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-40	V
Gate-Source Voltage			V _{GSS}	±25	V
Continuous Drain Current (Note 5) V _{GS} = -10V	Steady State	T _A = +25°C	I _D	-9.1	A
		T _A = +70°C		-7.2	
Continuous Drain Current (Note 5) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	-7.8	A
		T _A = +70°C		-6.2	
Continuous Drain Current (Note 6) V _{GS} = -10V	Steady State	T _A = +25°C	I _D	-10.1	A
		T _A = +70°C		-8	
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	-8.8	A
		T _A = +70°C		-7	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	-100	A
Avalanche Current (Note 7)			I _{AS}	-22	A
Avalanche Energy (Note 7)			E _{AS}	242	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	1.45	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	88	°C/W
Total Power Dissipation (Note 6)	P _D	1.82	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	70	°C/W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-40	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	µA	V _{DS} = -40V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±25V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-1.5	-2	-2.5	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	7	11	mΩ	V _{GS} = -10V, I _D = -9.8A
		—	9	15		V _{GS} = -4.5V, I _D = -9.8A
Forward Transfer Admittance	Y _{fs}	—	26	—	s	V _{DS} = -20V, I _D = -9.8A
Diode Forward Voltage (Note 5)	V _{SD}	—	-0.7	-1	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{ISS}	—	4,234	—	pF	V _{DS} = -20V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{OSS}	—	1,036	—		
Reverse Transfer Capacitance	C _{RSS}	—	526	—		
Gate Resistance	R _g	—	7.77	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge	Q _g	—	47.5	—	nC	V _{DS} = -20V, V _{GS} = -5V I _D = -9.8A
Gate-Source Charge	Q _{gs}	—	14.2	—		
Gate-Drain Charge	Q _{gd}	—	13.5	—		
Turn-On Delay Time	t _{D(ON)}	—	13.2	—	ns	V _{GS} = -10V, V _{DD} = -20V, R _g = 6Ω, I _D = -1A, R _L = 20Ω
Turn-On Rise Time	t _r	—	10	—		
Turn-Off Delay Time	t _{D(OFF)}	—	302.7	—		
Turn-Off Fall Time	t _f	—	137.9	—		

- 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 1-inch square copper plate.
 - UIS in production with L = 1mH, T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

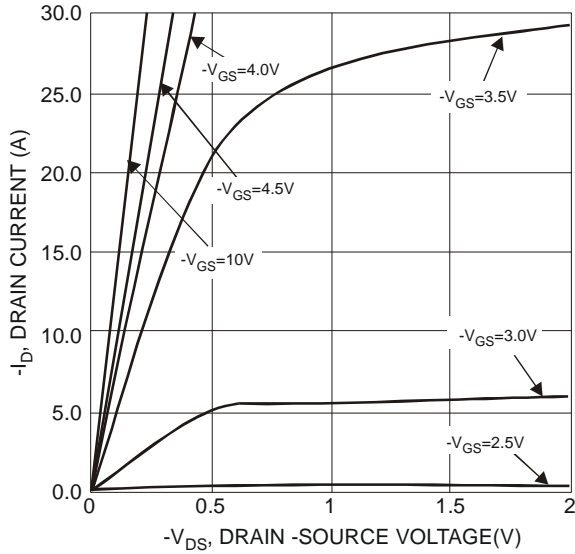


Fig. 1 Typical Output Characteristics

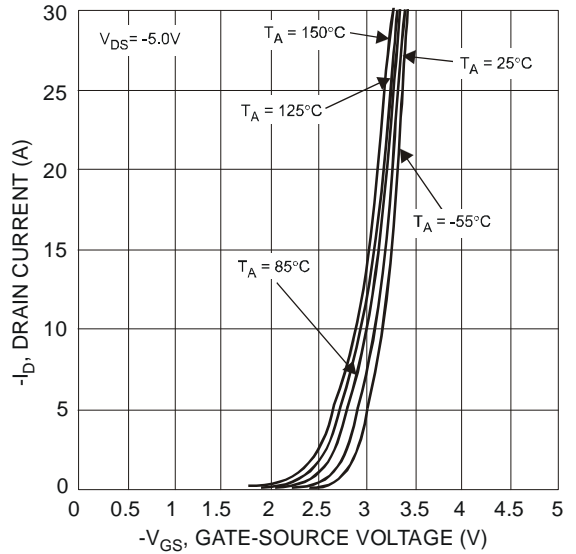


Fig. 2 Typical Transfer Characteristics

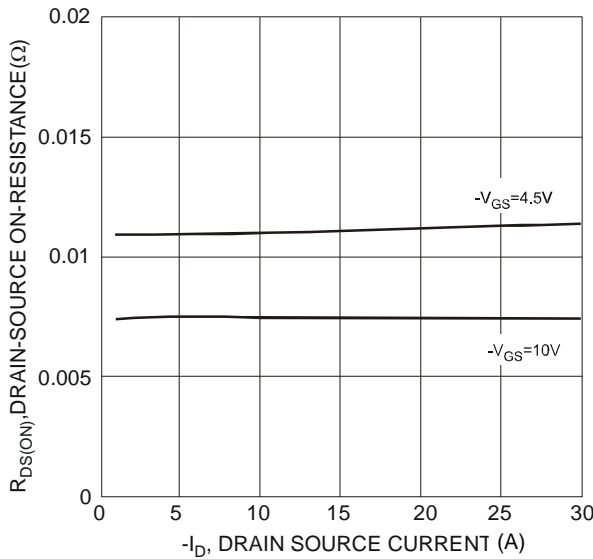


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

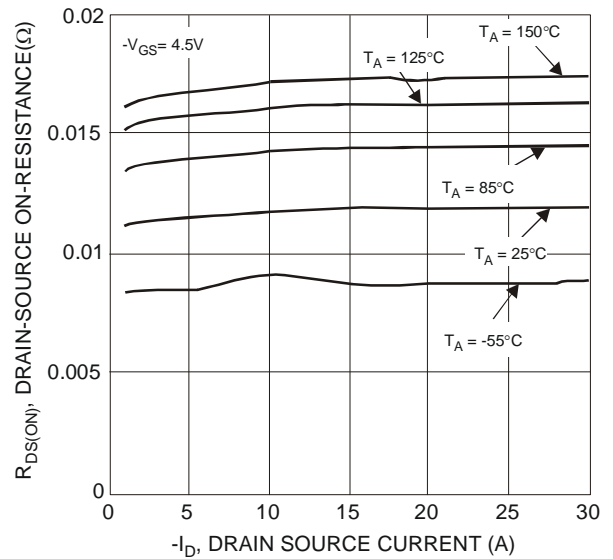


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

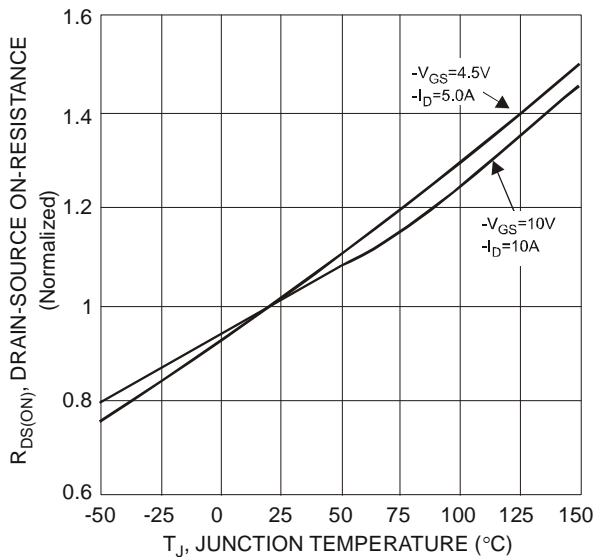


Fig. 5 On-Resistance Variation with Temperature

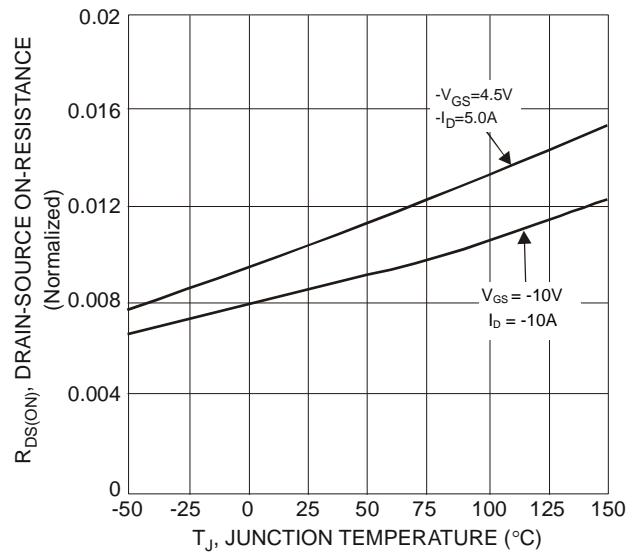


Fig. 6 On-Resistance Variation with Temperature

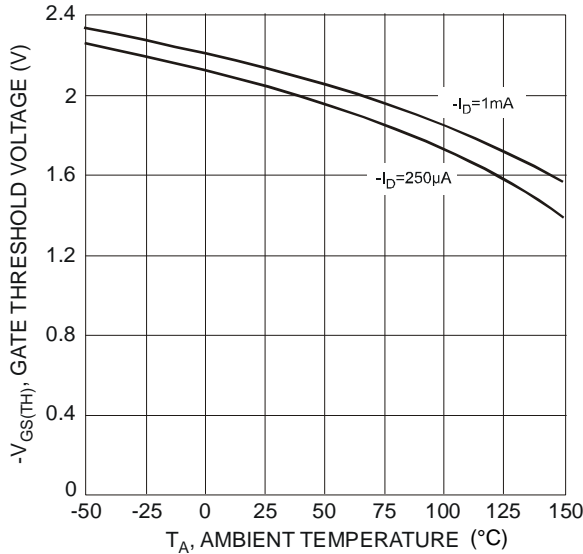


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

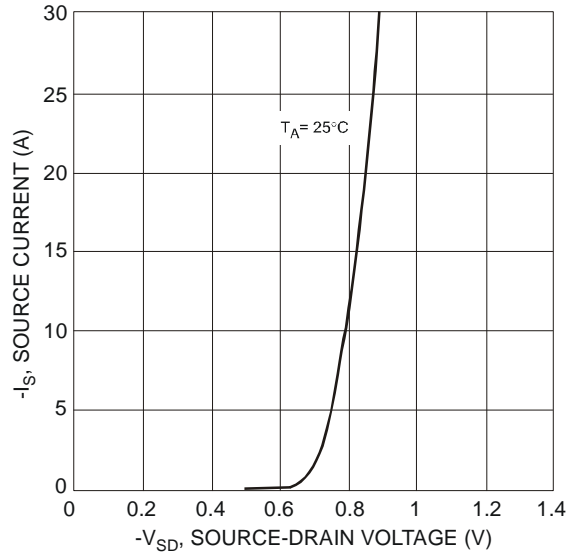


Fig. 8 Diode Forward Voltage vs. Current

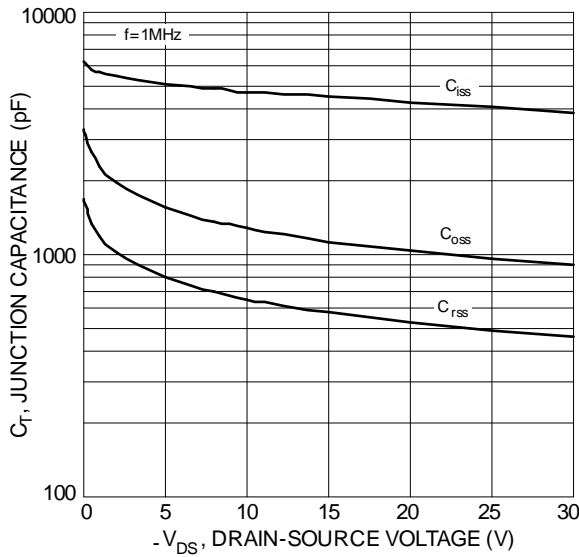


Fig. 9 Typical Junction Capacitance

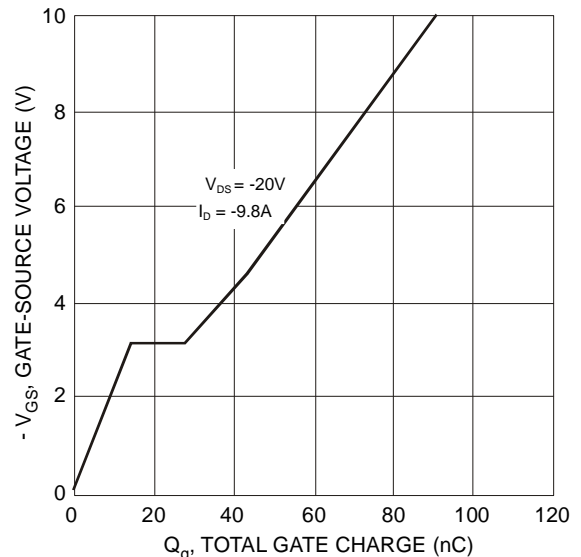


Fig. 10 Gate-Charge Characteristics

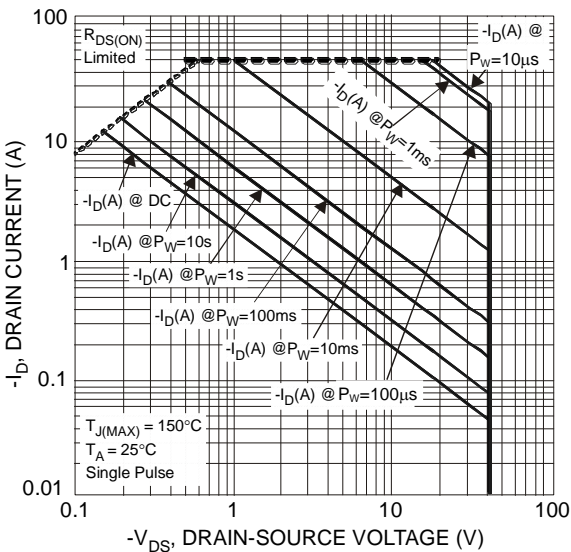


Fig. 11 SOA, Safe Operation Area

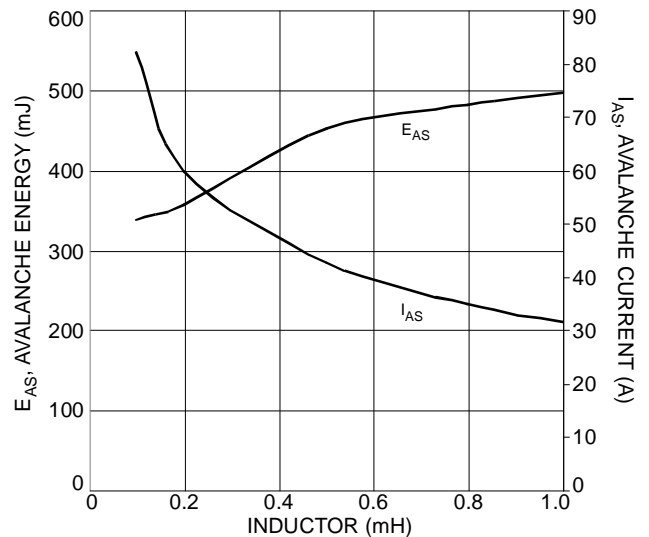


Fig. 12 Single-Pulse Avalanche Tested

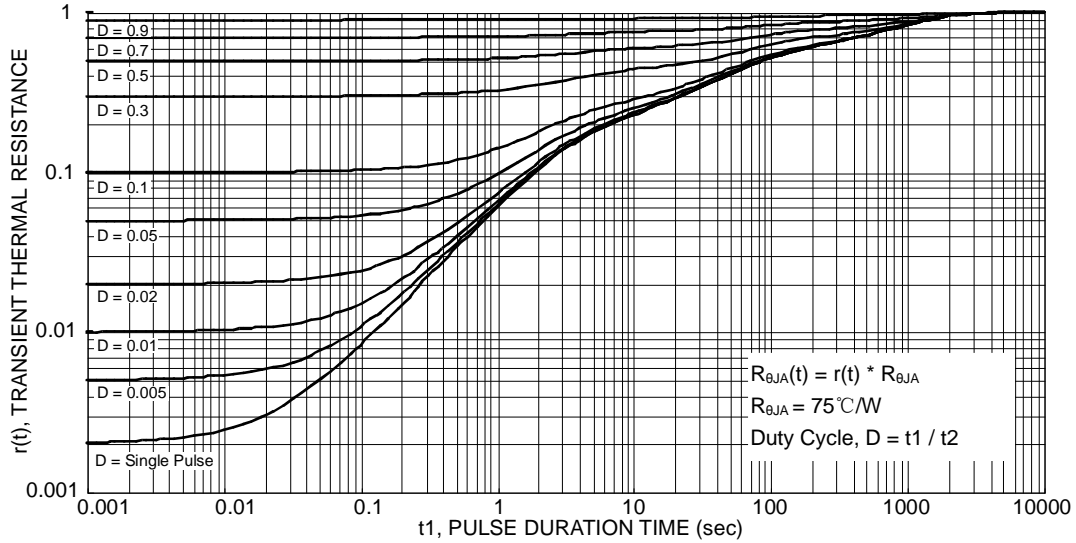
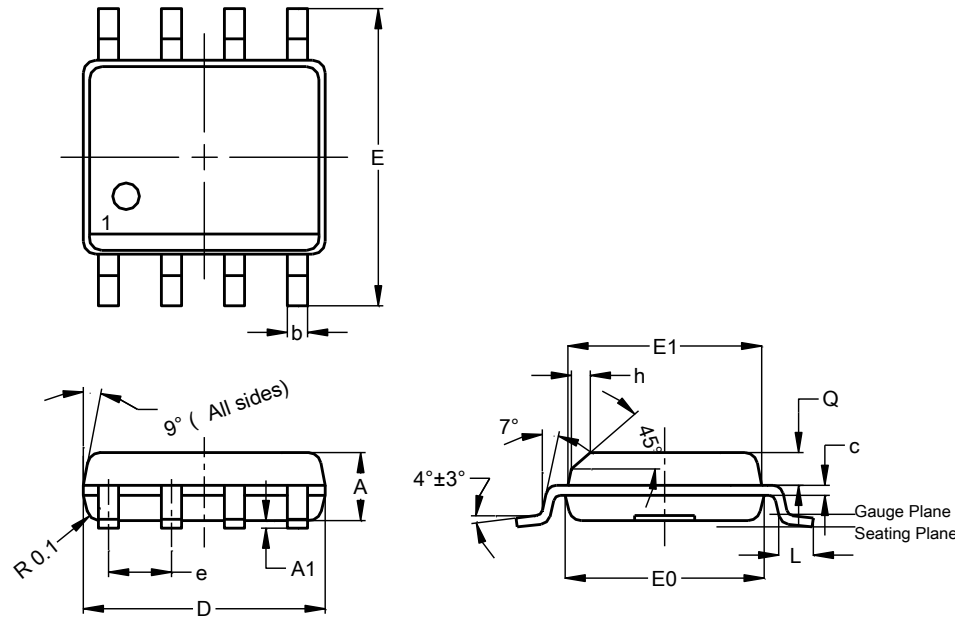


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

SO-8

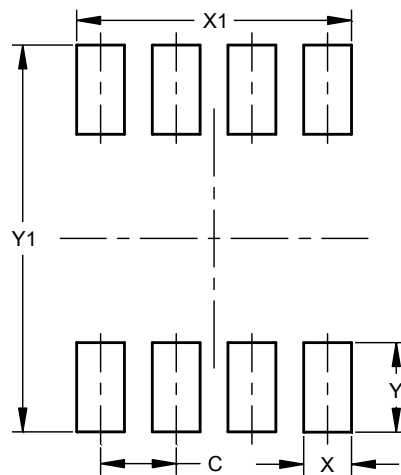


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

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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