Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_A = +25°C
-60V	105mΩ @ V_{GS} = -10V	-3.3A
	130mΩ @ V_{GS} = -4.5V	-3.0A

Features

- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Description and Applications

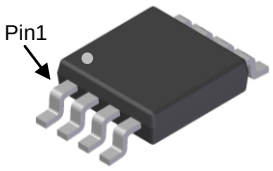
This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

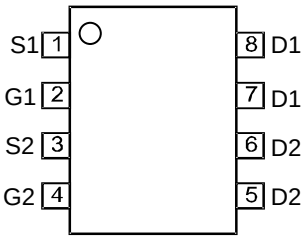
Mechanical Data

- 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: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.074 grams (Approximate)

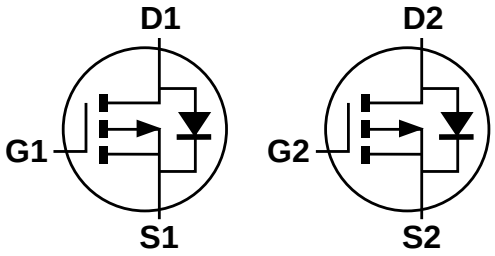
SO-8



Top View



Top View
Pin Configuration



Equivalent Circuit

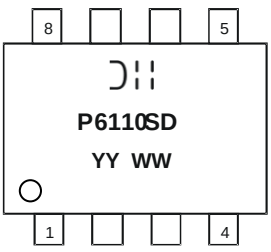
Ordering Information (Note 5)

Part Number	Case	Packaging
DMP6110SSDQ-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) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

SO-8



= Manufacturer's Marking
P6110SD = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 16 = 2016)
WW = Week (01 to 53)

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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 7) V_{GS} = -10V	T_C = +25°C T_C = +70°C	I_D	-7.8 -6.3	A
	T_A = +25°C T_A = +70°C	I_D	-3.3 -2.7	A
Pulsed Drain Current (380µs Pulse, 1% Duty Cycle)		I_{DM}	-24	A
Maximum Continuous Body Diode Forward Current (Note 7)		I_S	-1.8	A
Avalanche Current (Note 10) L = 0.1mH		I_{AS}	-19	A
Avalanche Energy (Note 10) L = 0.1mH		E_{AS}	18	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Notes 6 & 8)	T_A = +25°C	P_D	1.2	W
	T_A = +70°C		0.9	
Total Power Dissipation (Notes 6 & 9)	T_A = +25°C		1.2	
Thermal Resistance, Junction to Ambient (Notes 6 & 8)	Steady State	$R_{\theta JA}$	104	°C/W
	t<10s		45	
Thermal Resistance, Junction to Ambient (Notes 6 & 9)	Steady State		100	
Total Power Dissipation (Notes 7 & 8)	T_A = +25°C	P_D	1.7	W
	T_A = +70°C		1.1	
Total Power Dissipation (Notes 7 & 9)	T_A = +25°C		1.8	
Thermal Resistance, Junction to Ambient (Notes 7 & 8)	Steady State	$R_{\theta JA}$	74	°C/W
	t<10s		37	
Thermal Resistance, Junction to Ambient (Notes 7 & 9)	Steady State		71	
Thermal Resistance, Junction to Case (Notes 7 & 8)		$R_{\theta JC}$	15	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
8. For a dual device with one active die.
9. For a device with two active die running at equal power.
10. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 11)						
Drain-Source Breakdown Voltage	BV_{DSS}	-60	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	-1	µA	V_{DS} = -48V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	100	nA	V_{GS} = ±16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 11)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1	—	-3	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	80	105	mΩ	V_{GS} = -10V, I_D = -4.5A
		—	95	130		V_{GS} = -4.5V, I_D =-3.5A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 12)						
Input Capacitance	C_{ISS}	—	969	—	pF	V_{DS} = -30V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{OSS}	—	57	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	44	—	pF	
Gate Resistance	R_G	—	13.7	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_G	—	8.2	—	nC	V_{DS} = -30V, I_D = -12A
Total Gate Charge (V_{GS} = -10V)	Q_G	—	17.2	—	nC	V_{DS} = -30V, I_D = -12A
Gate-Source Charge	Q_{GS}	—	3.0	—	nC	
Gate-Drain Charge	Q_{GD}	—	3.1	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.4	—	ns	V_{GS} = -10V, V_{DS} = -30V, R_{GEN} = 3Ω, I_D= -12A
Turn-On Rise Time	t_R	—	23	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	34	—	ns	
Turn-Off Fall Time	t_F	—	42	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	13.2	—	ns	I_S = -12A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	6.18	—	nC	

Notes: 11. Short duration pulse test used to minimize self-heating effect.
12. Guaranteed by design. Not subject to product testing.

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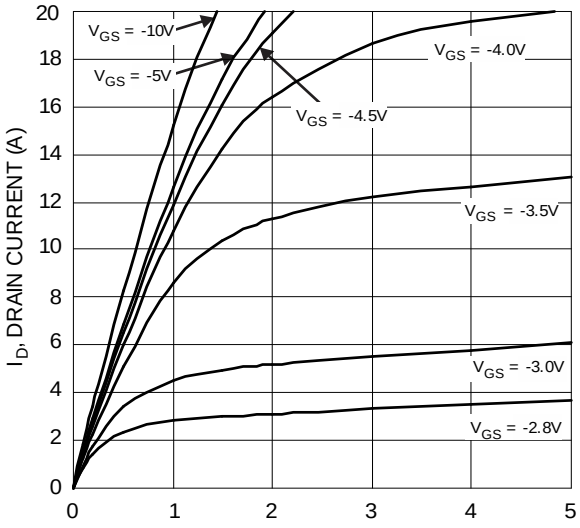


Figure 1 Typical Output Characteristics

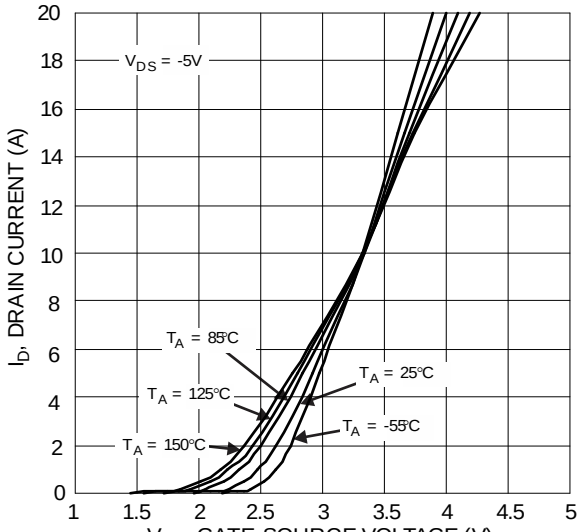


Figure 2 Typical Transfer Characteristics

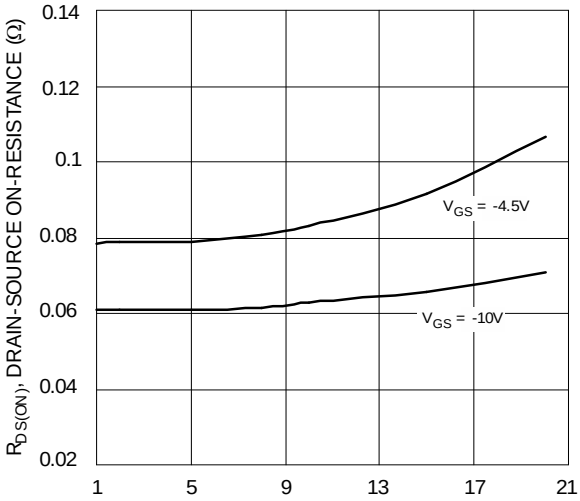


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

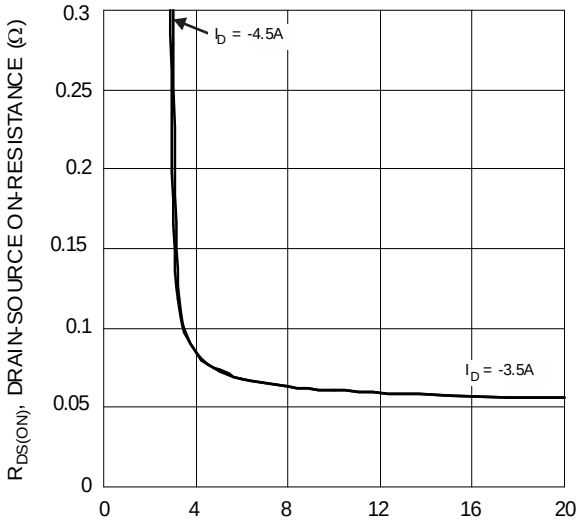


Figure 4 Typical Transfer Characteristics

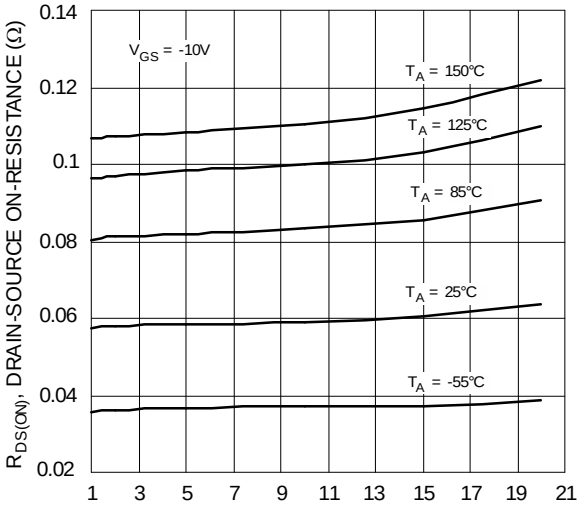


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

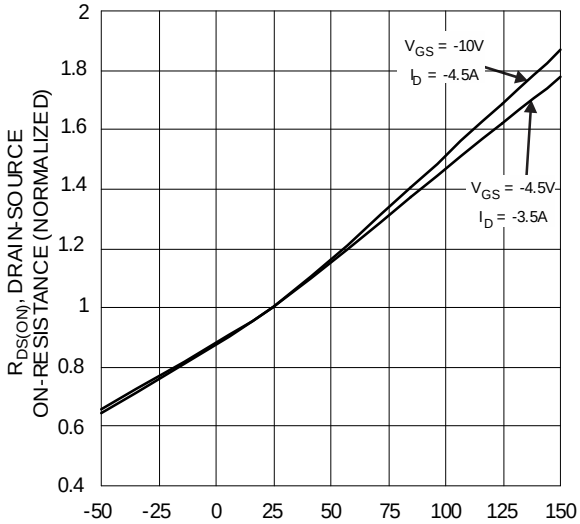


Figure 6 On-Resistance Variation with Temperature

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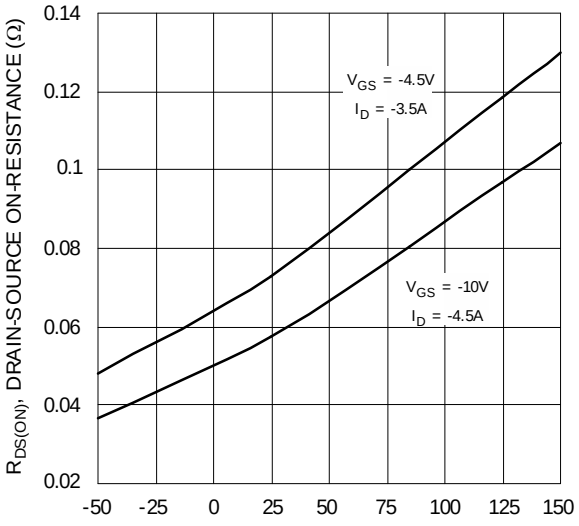


Figure 7 On-Resistance Variation with Temperature

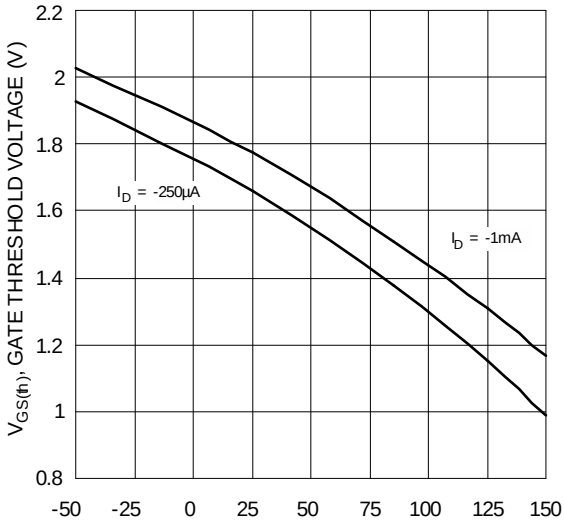


Figure 8 Gate Threshold Variation vs. Junction Temperature

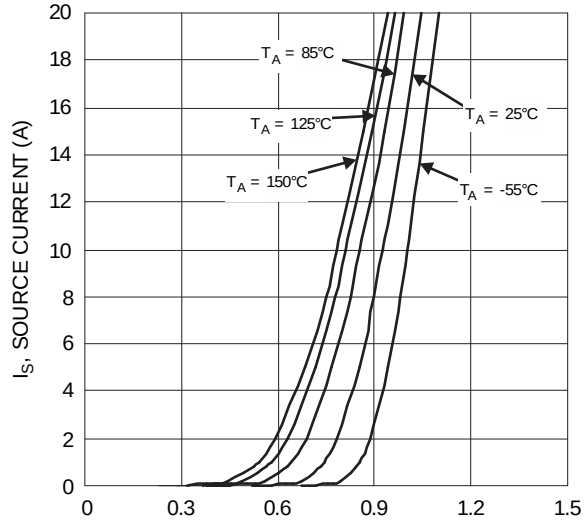


Figure 9 Diode Forward Voltage vs. Current

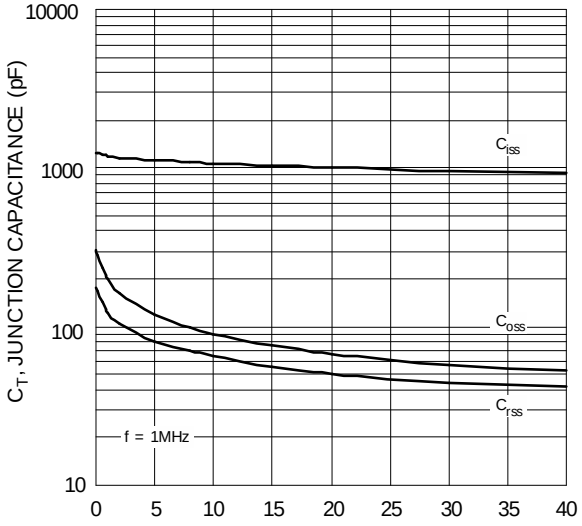


Figure 10 Typical Junction Capacitance

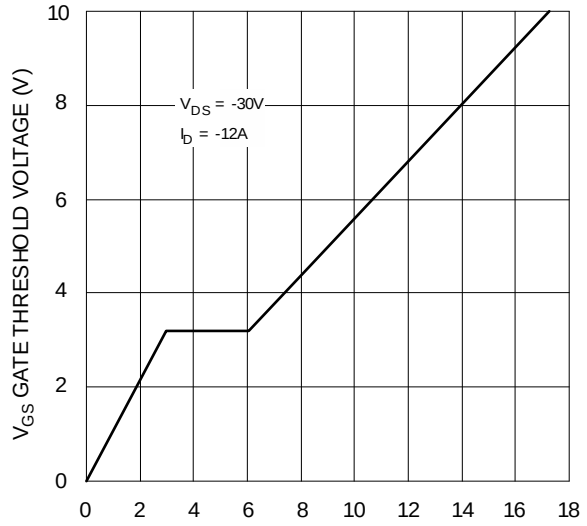


Figure 11 Gate Charge

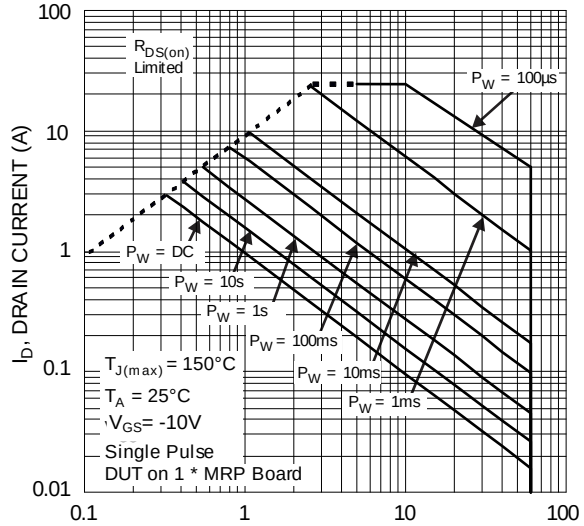


Figure 12 SOA, Safe Operation Area

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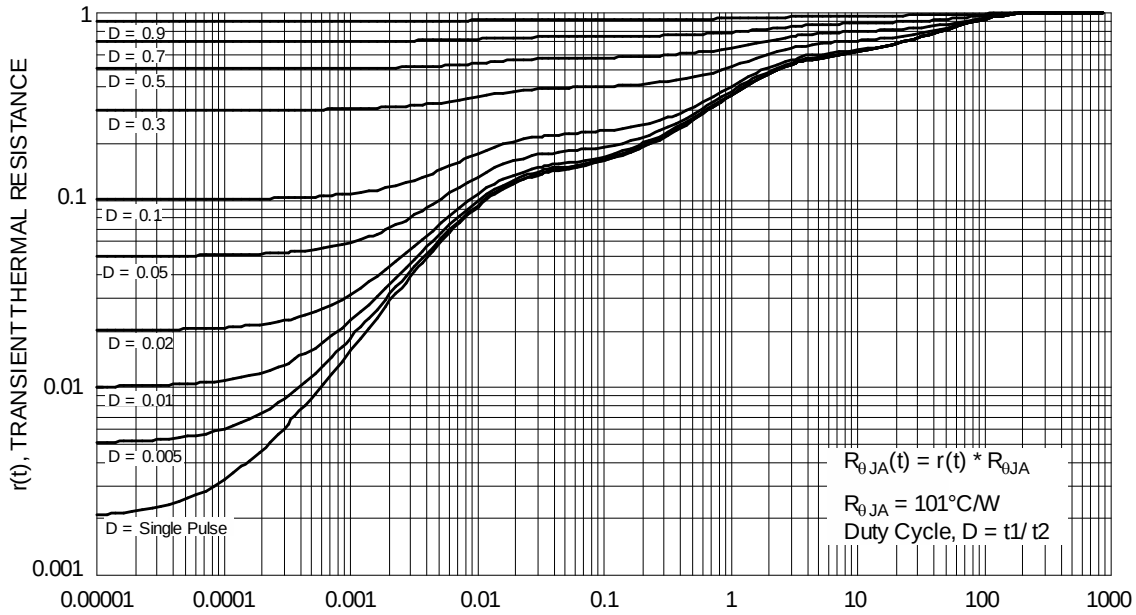


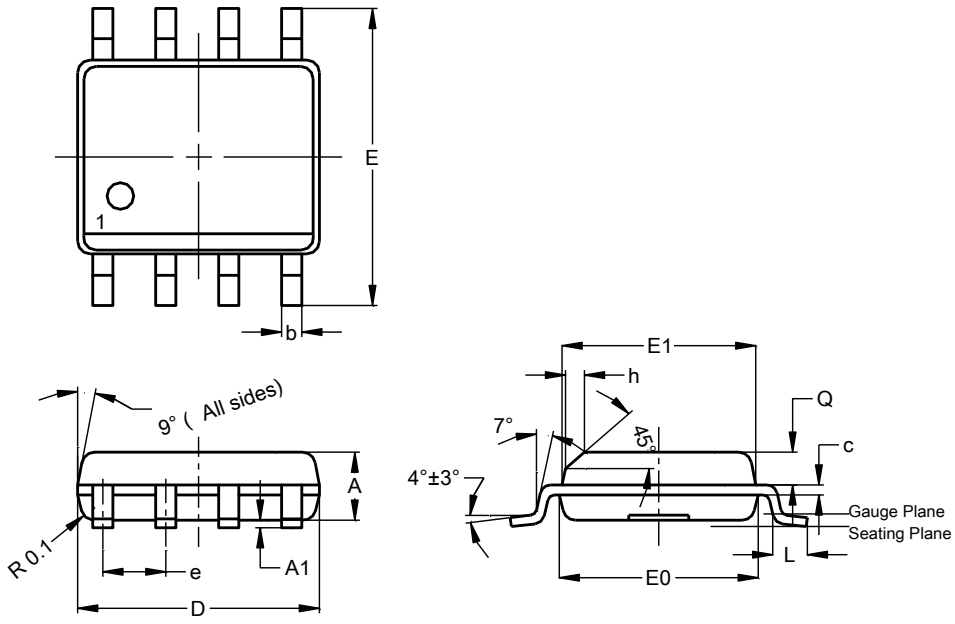
Figure 13 Transient Thermal Resistance

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Package Outline Dimensions

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

SO-8

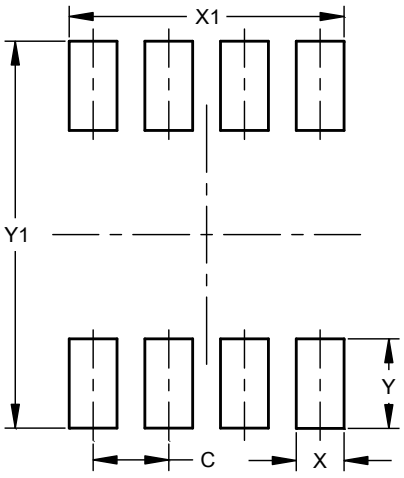


SO-8			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

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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