30V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_C = +25°C
30V	10mΩ @ V_{GS} = 10V	28A
	16.6mΩ @ V_{GS} = 4.5V	22A

Features

- Low $R_{DS(ON)}$ – Minimizes On-State Losses
- Excellent Q_{gd} x $R_{DS(ON)}$ Product (FOM)
- Advanced Technology for DC-DC Converters
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMT3009LSSQ 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/

Description and Applications

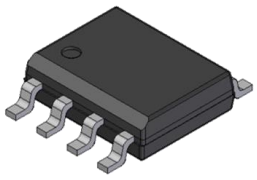
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Power-management functions
- Analog switches

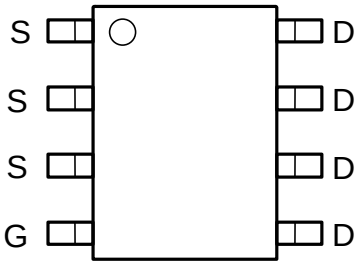
Mechanical Data

- Package: SO-8
- Package 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 Below
- Terminals: Finish — Matte Tin Annealed over Copper Lead-Frame. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.074 grams (Approximate)

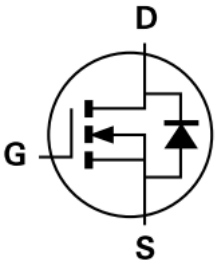
SO-8



Top View



Top View
Pinout



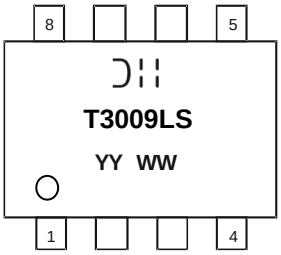
Equivalent Circuit

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMT3009LSSQ-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



= Manufacturer's Marking
T3009LS = Product Type Marking Code
YYWW = Date Code Marking
YY or YY = Year (ex: 25 = 2025)
WW or WW = Week (01 to 53)

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}	+20	V
Continuous Drain Current, V_{GS} = 10V (Note 6)	T_A = +25°C T_A = +70°C	I_D	11 9	A
Continuous Drain Current, V_{GS} = 10V (Note 7)	T_C = +25°C T_C = +70°C	I_D	28 22	A
Maximum Continuous Body Diode Forward Current (Note 6)		I_S	2	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)		I_{DM}	21	A
Pulsed Body Diode Forward Current (380µs Pulse, Duty Cycle = 1%)		I_{SM}	21	A
Avalanche Current, L = 0.1mH (Note 8)		I_{AS}	21.8	A
Avalanche Energy, L = 0.1mH (Note 8)		E_{AS}	23.8	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	1.4	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	87.4	°C/W
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	1.9	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	64.4	°C/W
Thermal Resistance, Junction to Case (Note 7)	T_C = +25°C	$R_{\theta JC}$	10.1	°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} = 0, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 24V, V_{GS} = 0
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±16V, V_{DS} = 0
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6.5	10	mΩ	V_{GS} = 10V, I_D = 14.4A
		—	11.6	16.6		V_{GS} = 4.5V, I_D = 7A
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	V_{GS} = 0, I_S = 10A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	807	—	pF	V_{DS} = 15V, V_{GS} = 0, f = 1.0MHz
Output Capacitance	C_{oss}	—	339	—		
Reverse Transfer Capacitance	C_{rss}	—	58	—		
Gate Resistance	R_g	—	1.1	—	Ω	V_{DS} = 0, V_{GS} = 0, f = 1.0MHz
Total Gate Charge (V_{GS} = 10V)	Q_g	—	6.2	—	nC	V_{DS} = 15V, I_D = 14.4A
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	2.7	—		
Gate-Source Charge	Q_{gs}	—	1.8	—		
Gate-Drain Charge	Q_{gd}	—	0.6	—		
Turn-On Delay Time	$t_{D(ON)}$	—	2.8	—	ns	V_{DD} = 15V, V_{GS} = 10V, R_g = 1Ω, I_D = 10A
Turn-On Rise Time	t_R	—	11.6	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	9.7	—		
Turn-Off Fall Time	t_F	—	3.6	—		

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. Thermal resistance from junction to soldering point (on the exposed drain pad).
8. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

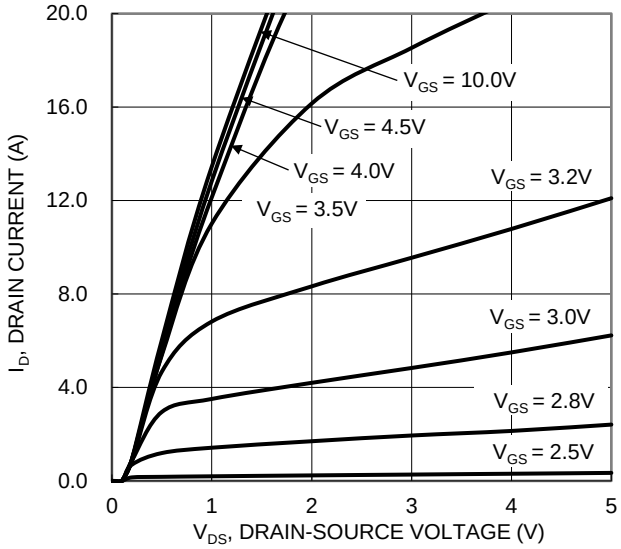


Figure 1. Typical Output Characteristic

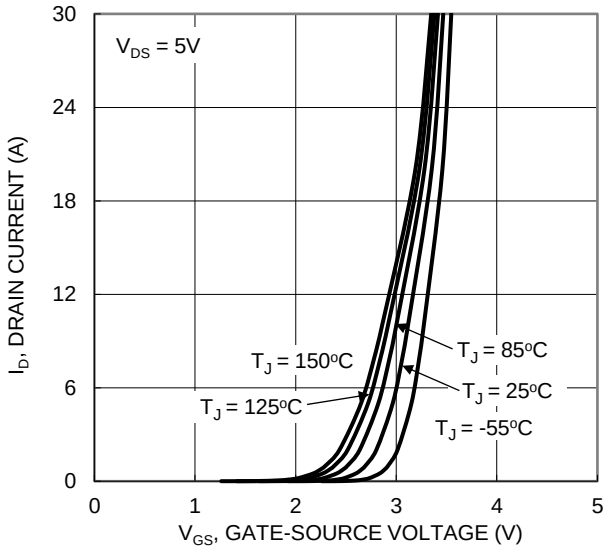


Figure 2. Typical Transfer Characteristic

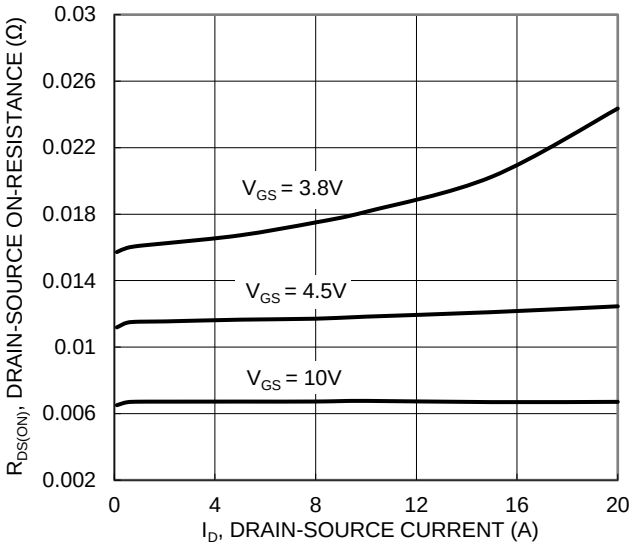


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

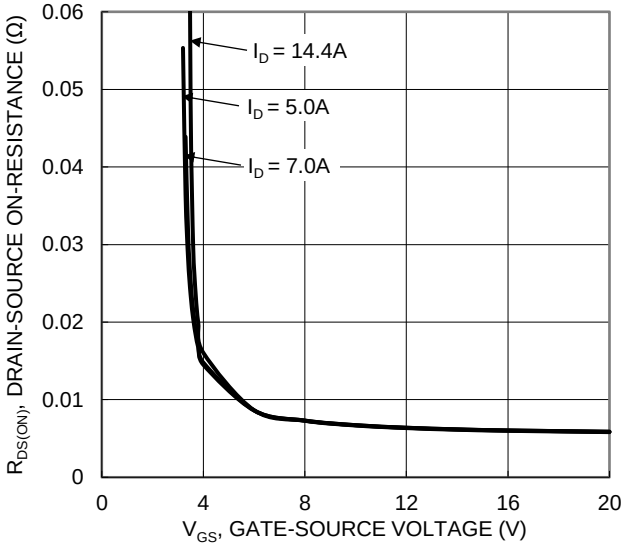


Figure 4. Typical Transfer Characteristic

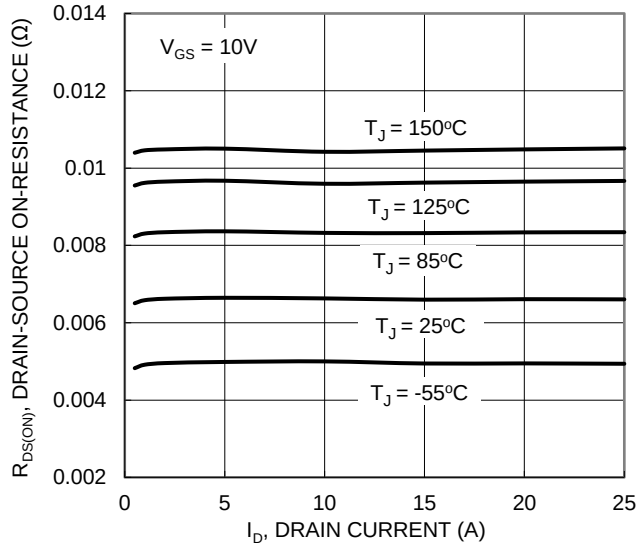


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

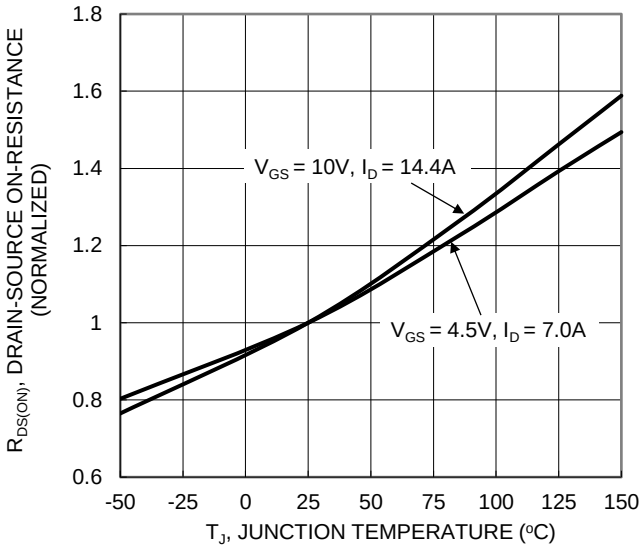


Figure 6. On-Resistance Variation with Junction Temperature

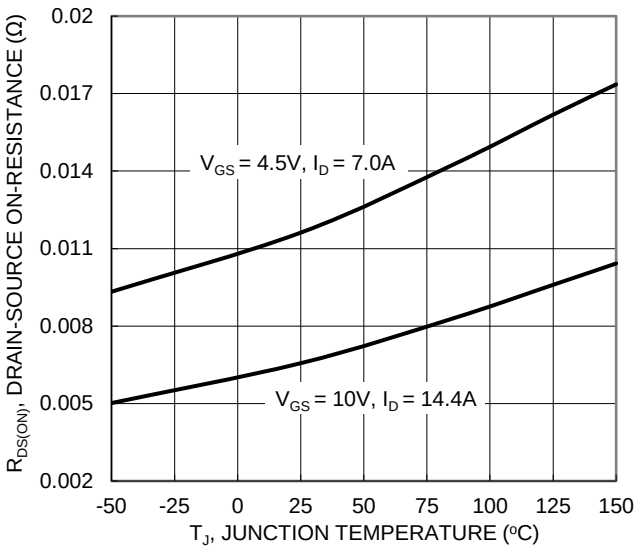


Figure 7. On-Resistance Variation with Junction Temperature

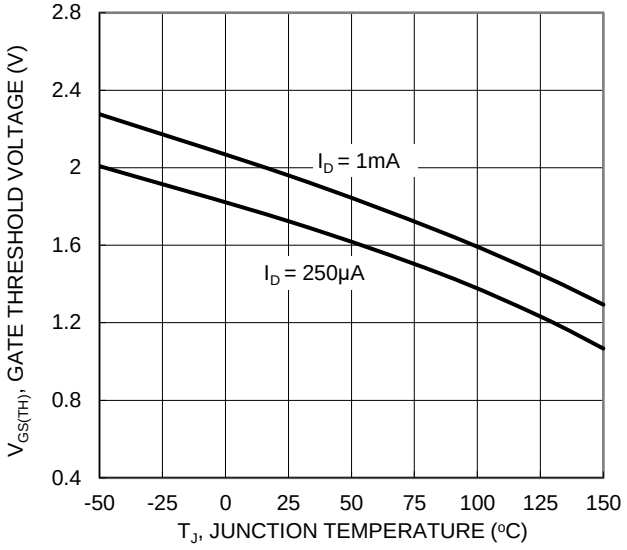


Figure 8. Gate Threshold Variation vs. Junction Temperature

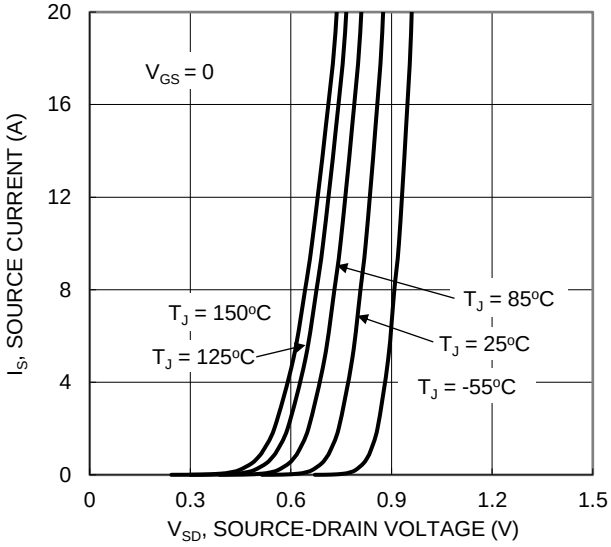


Figure 9. Diode Forward Voltage vs. Current

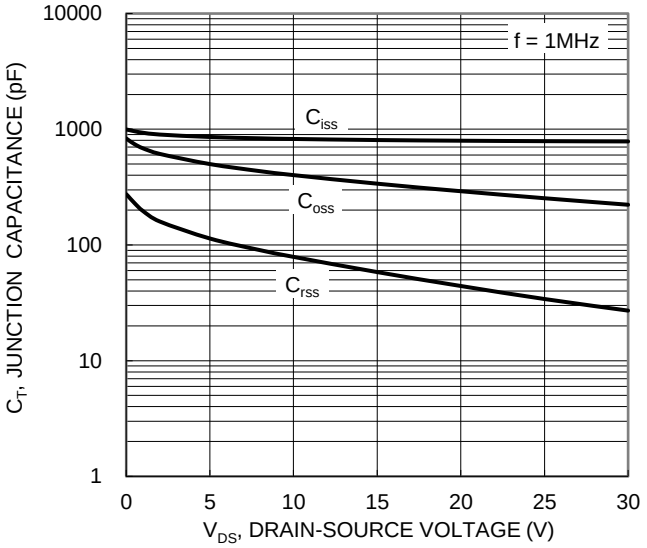


Figure 10. Typical Junction Capacitance

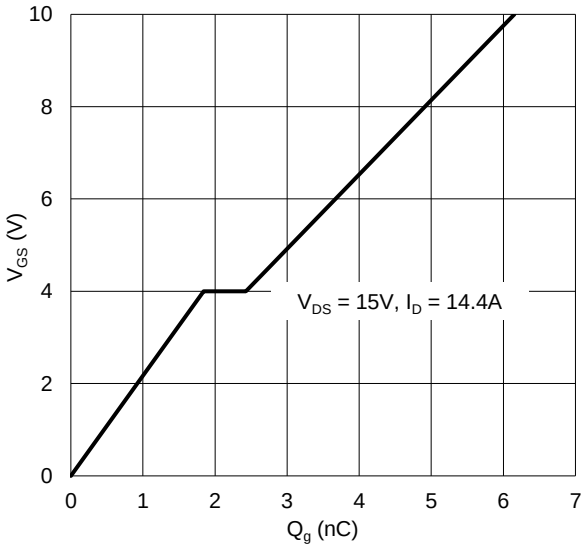


Figure 11. Gate Charge

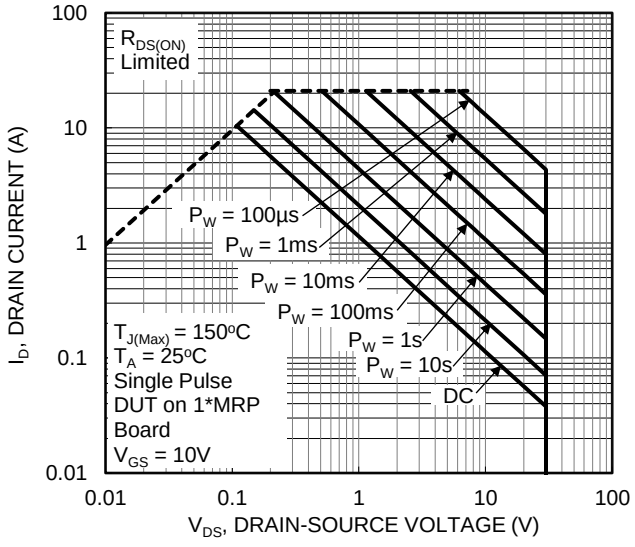


Figure 12. SOA, Safe Operation Area

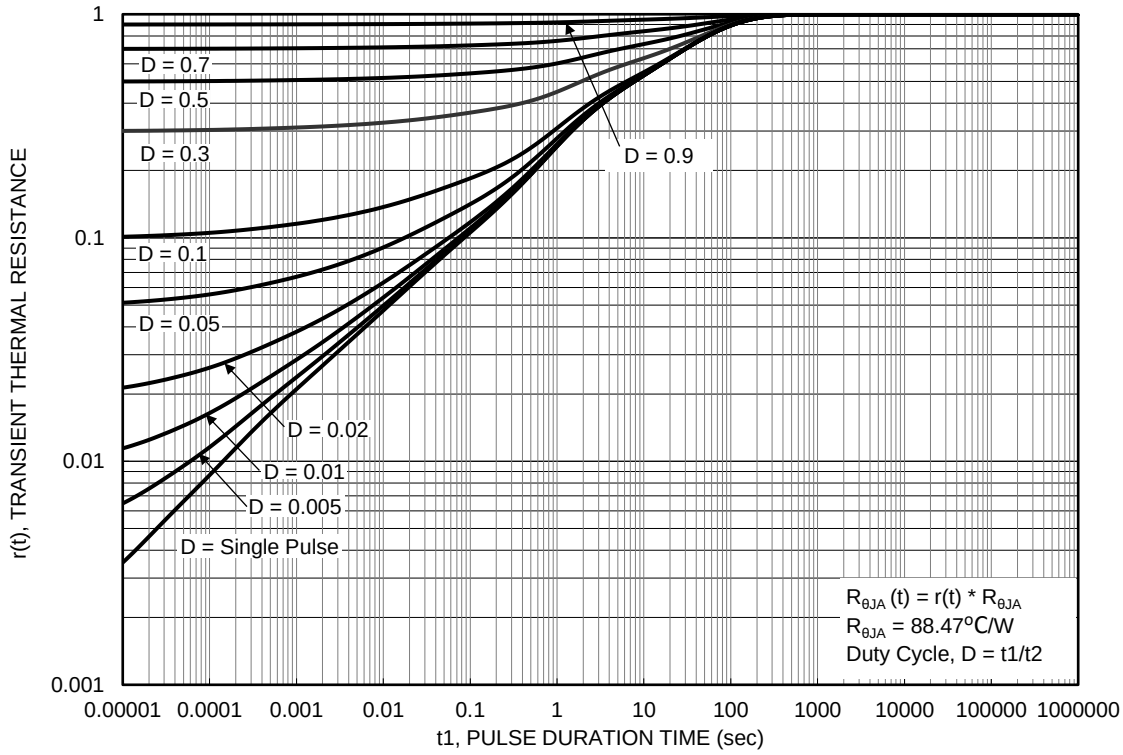


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

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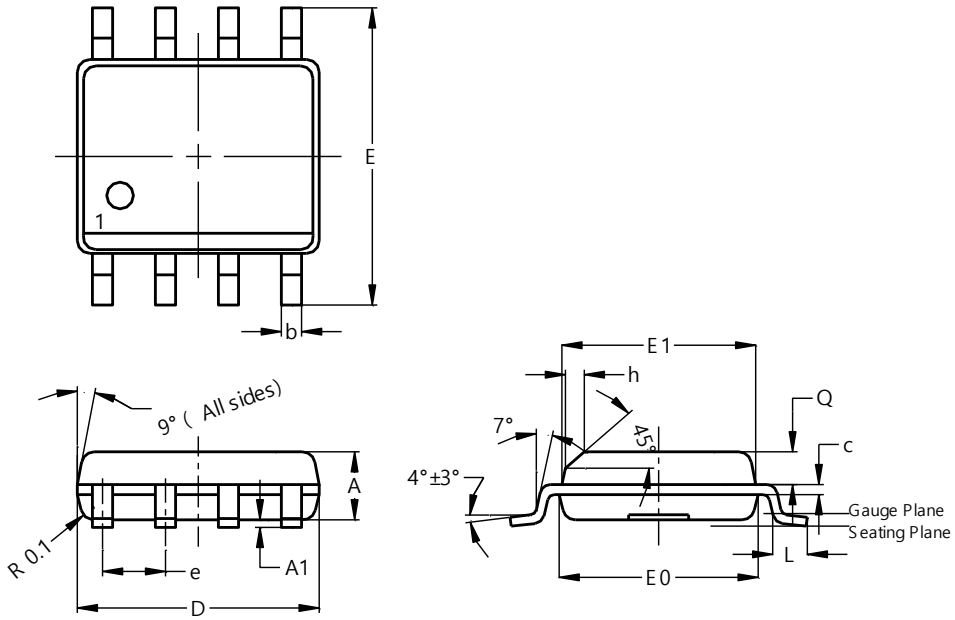
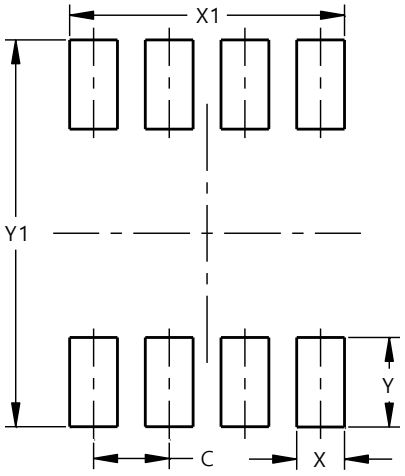


SO-8			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

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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