

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

Description

This new generation MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

Applications

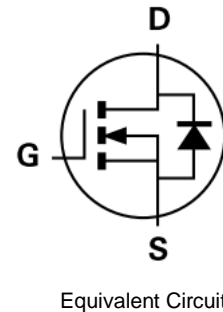
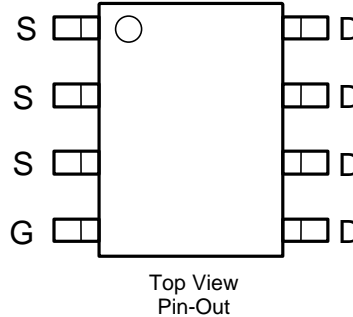
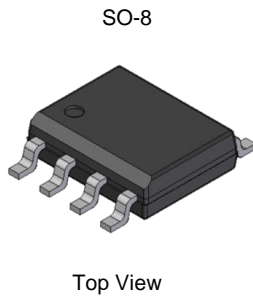
- Power-management functions
- Analog switches

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)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

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)

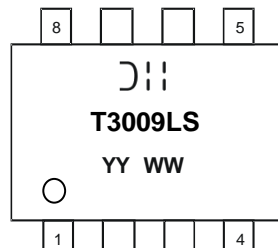


Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMT3009LSS-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: 24 = 2024)
 WW or WW = Week (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	30	V
Gate-Source Voltage	V_{GSS}	+20	V
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 6)	I_D	11 9	A
Continuous Drain Current, $V_{GS} = 10\text{V}$ (Note 7)	I_D	28 22	A
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	2	A
Pulsed Drain Current (380 μs Pulse, Duty Cycle = 1%)	I_{DM}	21	A
Pulsed Body Diode Forward Current (380 μs Pulse, Duty Cycle = 1%)	I_{SM}	21	A
Avalanche Current, $L = 0.1\text{mH}$ (Note 8)	I_{AS}	21.8	A
Avalanche Energy, $L = 0.1\text{mH}$ (Note 8)	E_{AS}	23.8	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	1.4	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	87.4	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	P_D	1.9	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	64.4	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$	10.1	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6.5	10	m Ω	$V_{GS} = 10\text{V}, I_D = 14.4\text{A}$
		—	11.6	16.6		$V_{GS} = 4.5\text{V}, I_D = 7\text{A}$
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	$V_{GS} = 0\text{V}, I_S = 10\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	807	—	pF	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	339	—		
Reverse Transfer Capacitance	C_{rss}	—	58	—		
Gate Resistance	R_g	—	1.1	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	6.2	—	nC	$V_{DS} = 15\text{V}, I_D = 14.4\text{A}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	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	$V_{DD} = 15\text{V}, V_{GS} = 10\text{V}, R_g = 1\Omega, I_D = 10\text{A}$
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:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

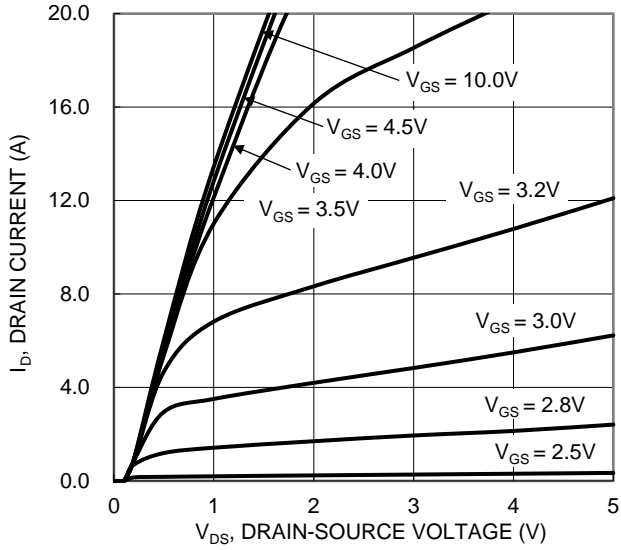


Figure 1. Typical Output Characteristic

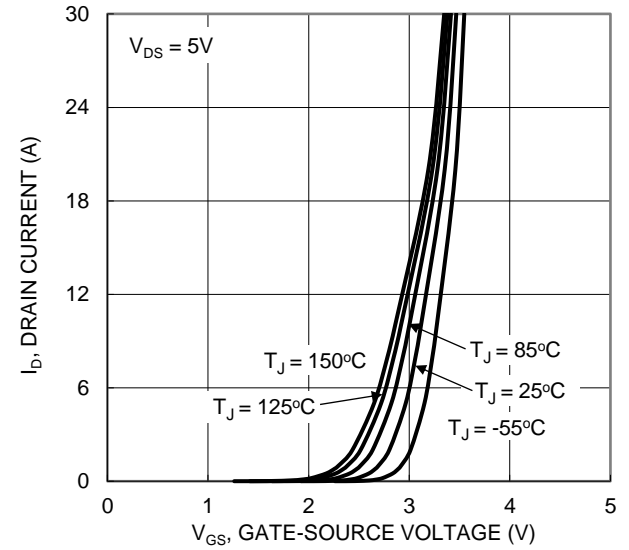


Figure 2. Typical Transfer Characteristic

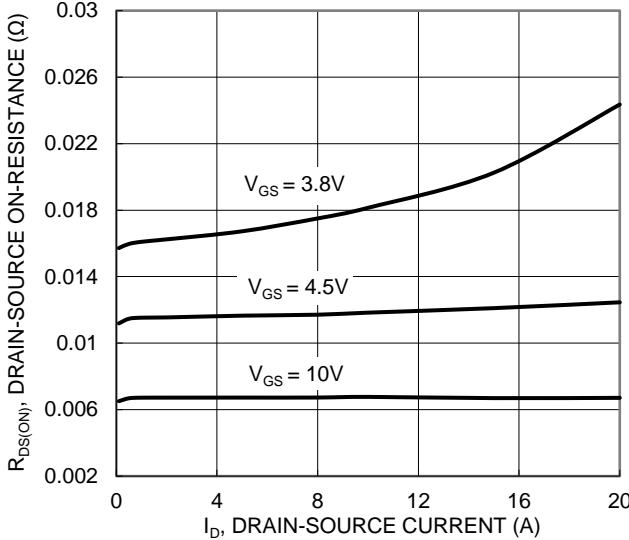


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

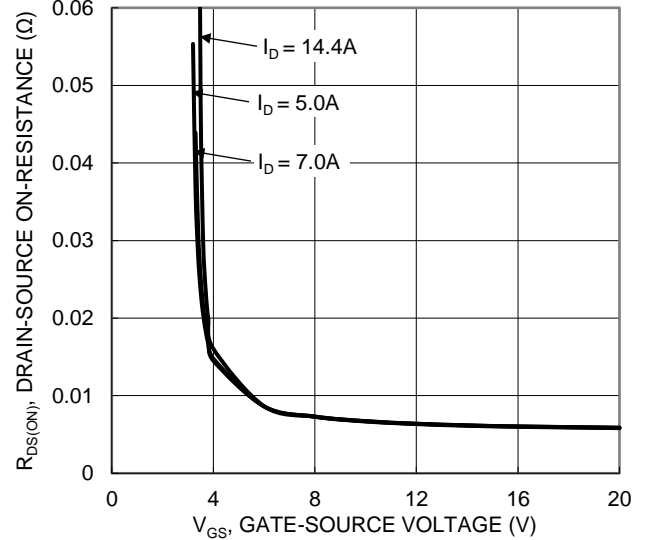


Figure 4. Typical Transfer Characteristic

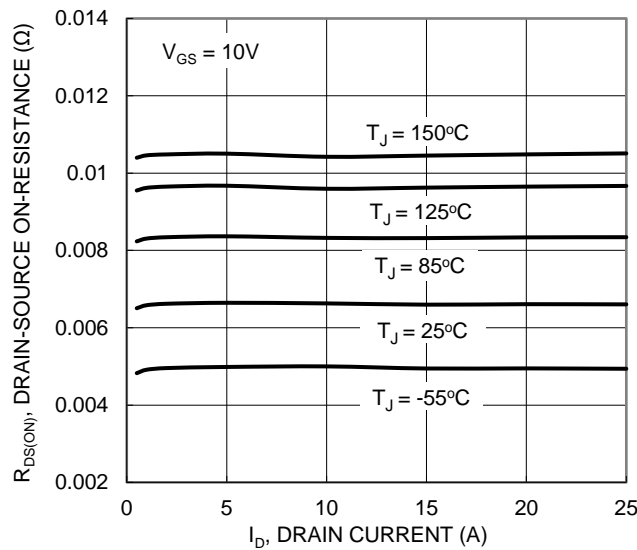


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

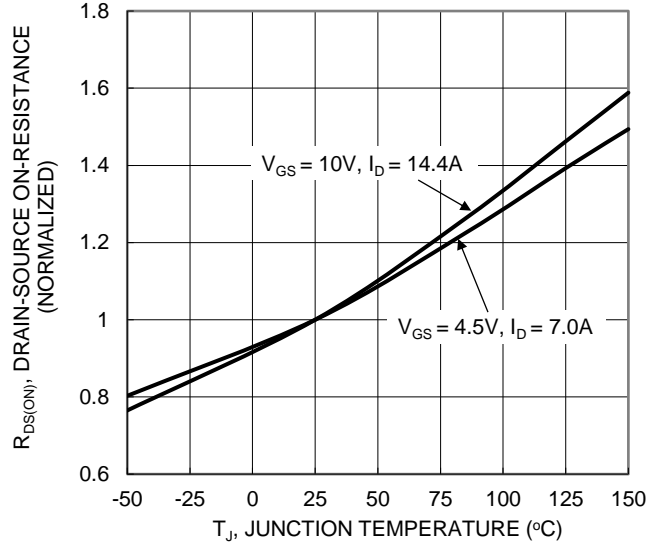


Figure 6. On-Resistance Variation with Junction Temperature

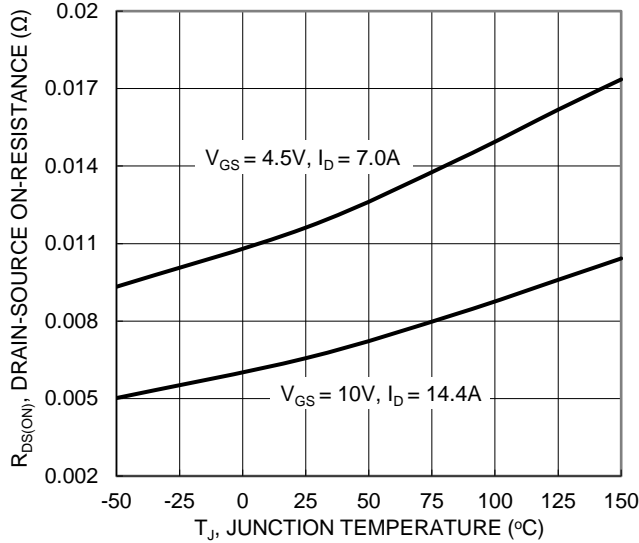


Figure 7. On-Resistance Variation with Junction Temperature

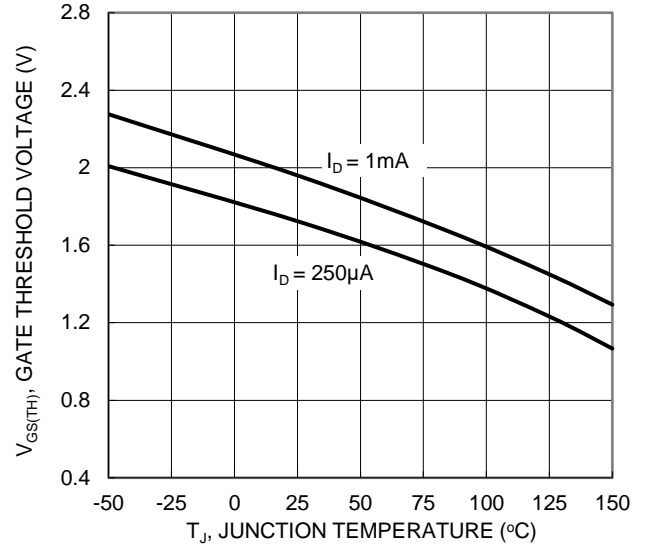


Figure 8. Gate Threshold Variation vs. Junction Temperature

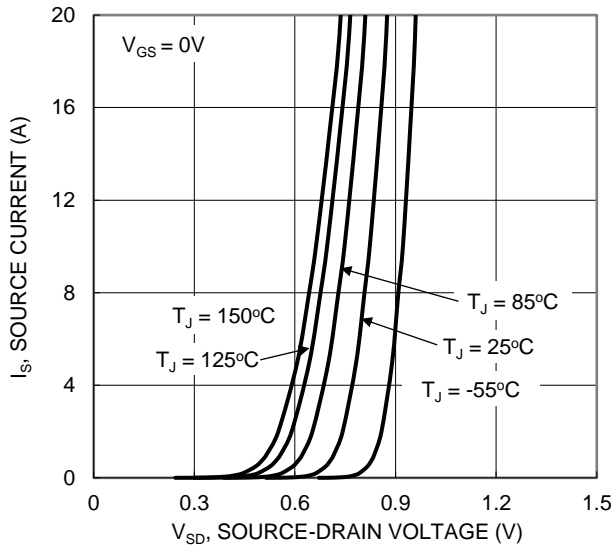


Figure 9. Diode Forward Voltage vs. Current

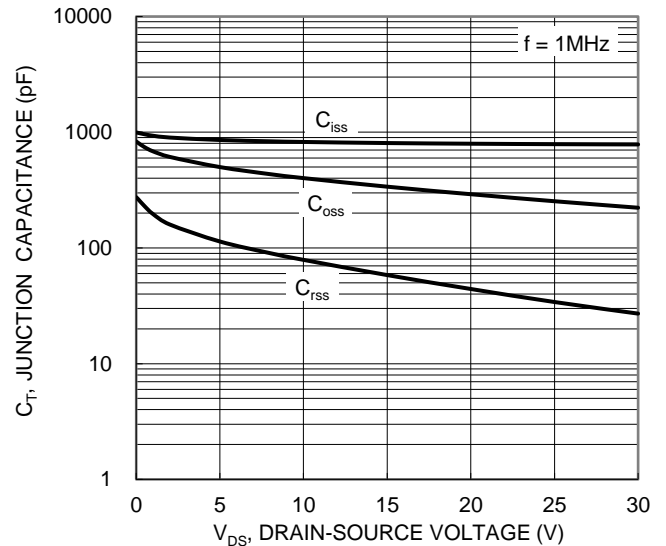


Figure 10. Typical Junction Capacitance

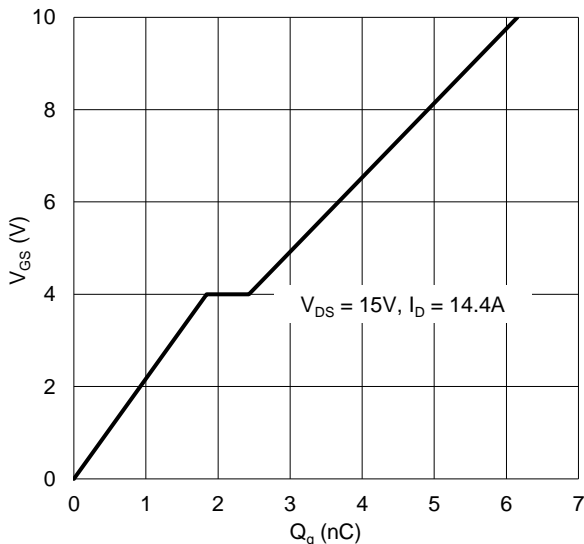


Figure 11. Gate Charge

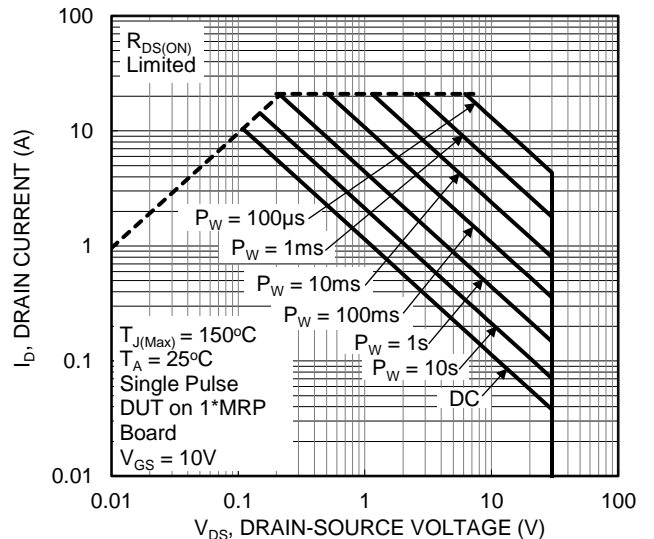


Figure 12. SOA, Safe Operation Area

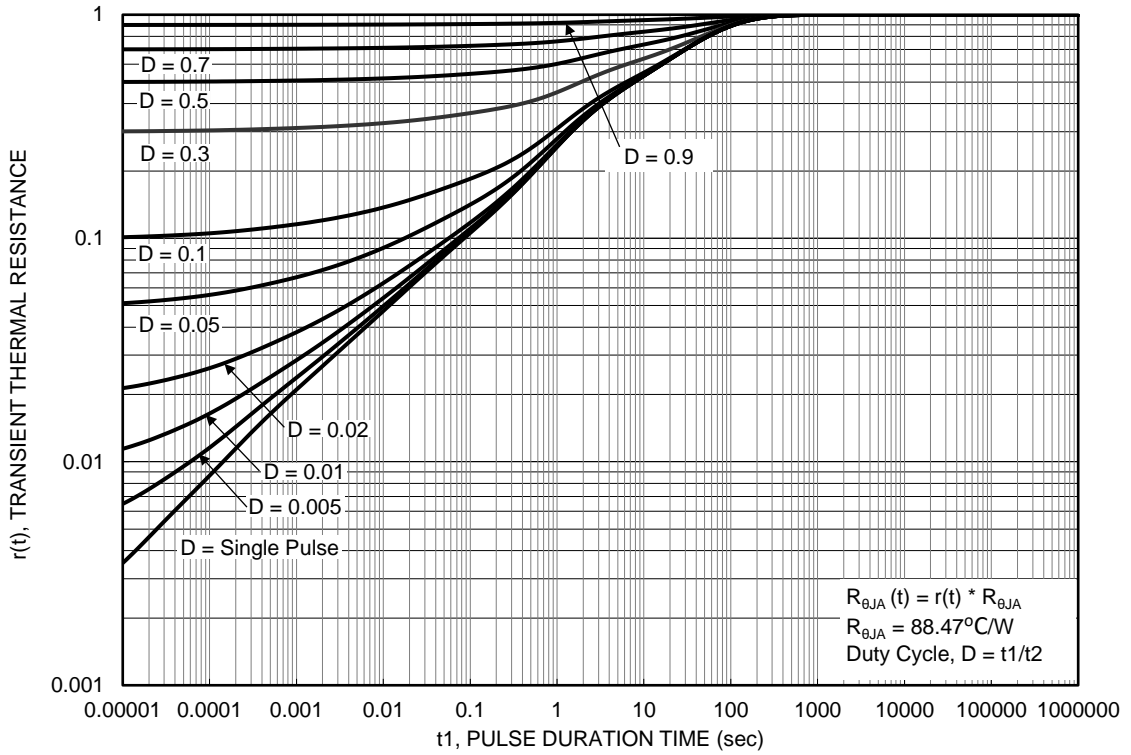
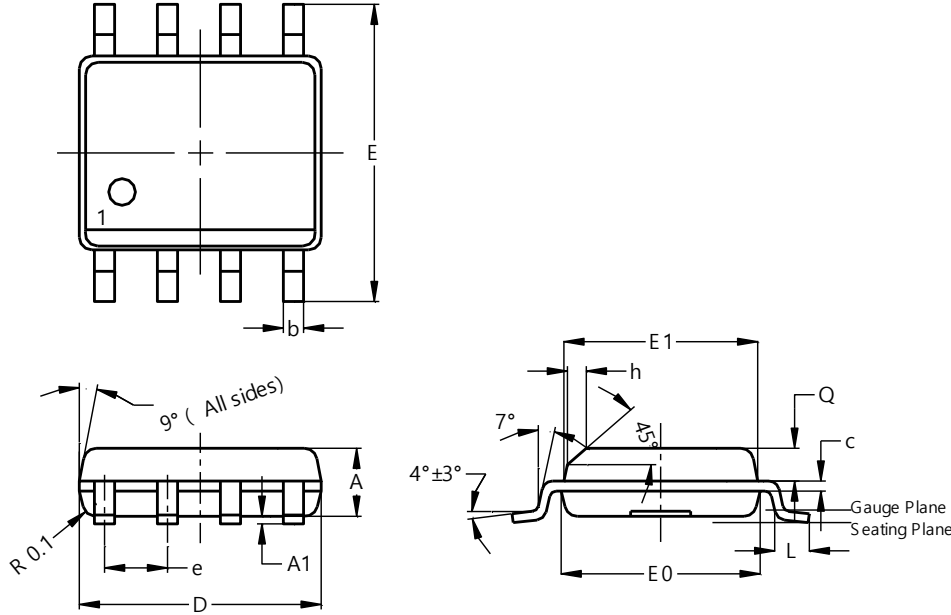


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SO-8

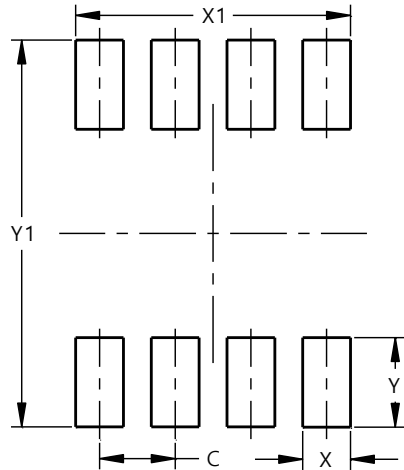


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

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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