

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

BV_{DSS}	$R_{DS(ON)} \text{ Max}$	I_D $T_A = +25^\circ\text{C}$
30V	20m Ω @ $V_{GS} = 10\text{V}$	16A
	32m Ω @ $V_{GS} = 4.5\text{V}$	13A

Description

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

Applications

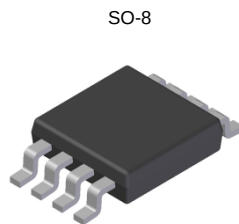
- Backlighting
- Power Management Functions
- DC-DC Converters

Features

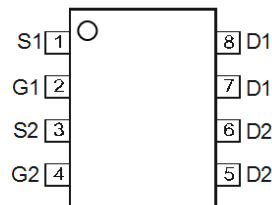
- Dual N-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

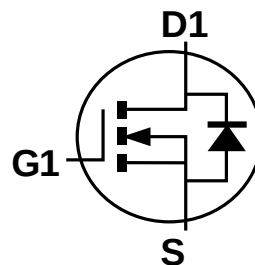
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections Indicator: See Diagram
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 
- Weight: 0.072 grams (Approximate)



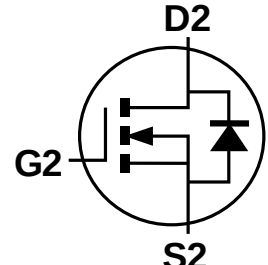
Top View



Internal Schematic



N-Channel MOSFET

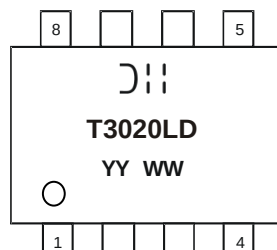


N-Channel MOSFET

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT3020LSD-13	SO-8	2500/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
 T3020LD = Product Type Marking Code
 YYWW = Date Code Marking
 YY or YY= Year (ex: 18 = 2018)
 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 7)	Steady State	T _C = +25°C T _C = +70°C	I _D	16 13	A
Maximum Body Diode Forward Current (Note 7)			I _S	8	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	50	A
Pulsed Drain Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)			I _{SM}	50	A
Avalanche Current (L = 0.1mH) (Note 8)			I _{AS}	13	A
Avalanche Energy (L = 0.1mH) (Note 8)			E _{AS}	8.5	mJ

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

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)			P _D	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)		Steady State	R _{θJA}	117	°C/W
Total Power Dissipation (Note 6)			P _D	1.5	W
Thermal Resistance, Junction to Ambient (Note 6)		Steady State	R _{θJA}	81	°C/W
Thermal Resistance, Junction to Case (Note 7)			R _{θJC}	20	
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}	30.0	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1.0	µA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	1.0	—	2.5	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	20	mΩ	V _{GS} = 10V, I _D = 9.0A
			—	32		V _{GS} = 4.5V, I _D = 7.0A
Diode Forward Voltage	V _{SD}	—	—	1.2	V	V _{GS} = 0V, I _S = 2A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	393	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	173	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	27	—	pF	
Gate Resistance	R _g	—	1.1	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 10V)	Q _g	—	7.0	—	nC	V _{DD} = 15V, I _D = 9A
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	3.6	—	nC	
Gate-Source Charge	Q _{gs}	—	0.9	—	nC	
Gate-Drain Charge	Q _{gd}	—	1.5	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	1.8	—	ns	V _{DD} = 15V, V _{GS} = 10V, R _G = 6Ω, I _D = 9A
Turn-On Rise Time	t _r	—	1.9	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	7.5	—	ns	
Turn-Off Fall Time	t _f	—	2.4	—	ns	
Reverse Recovery Time	t _{RR}	—	10	—	ns	I _F = 9A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	2.6	—	nC	

- 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.
 - 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°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

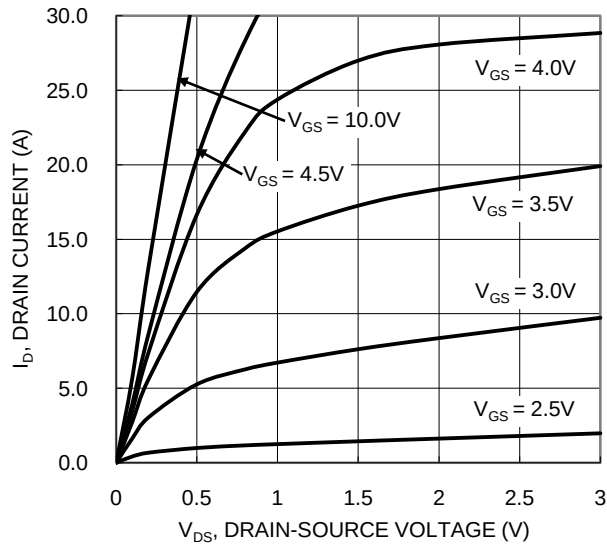


Figure 1. Typical Output Characteristic

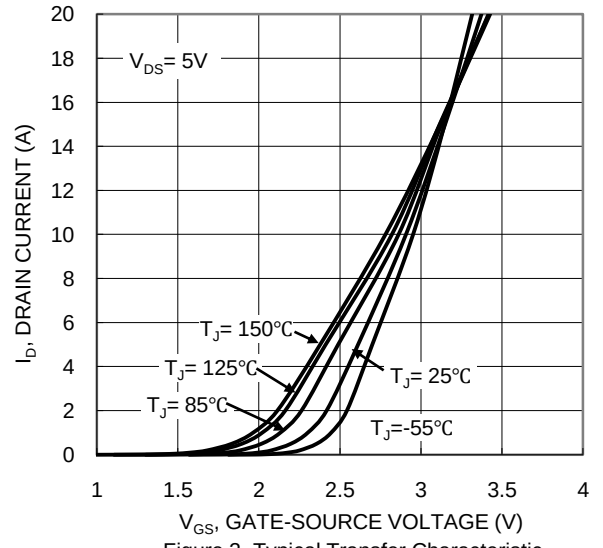


Figure 2. Typical Transfer Characteristic

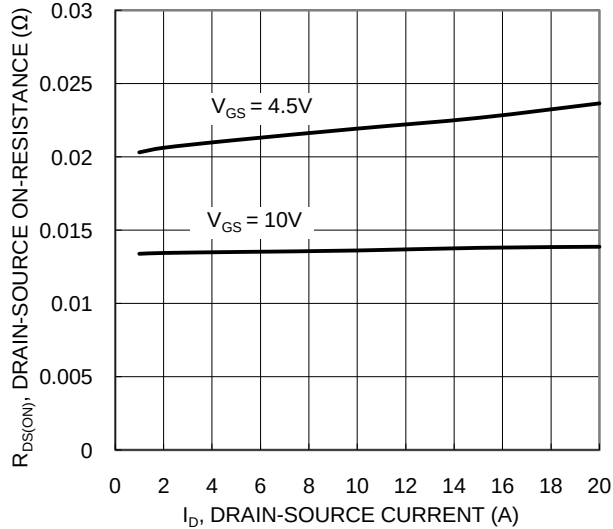


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

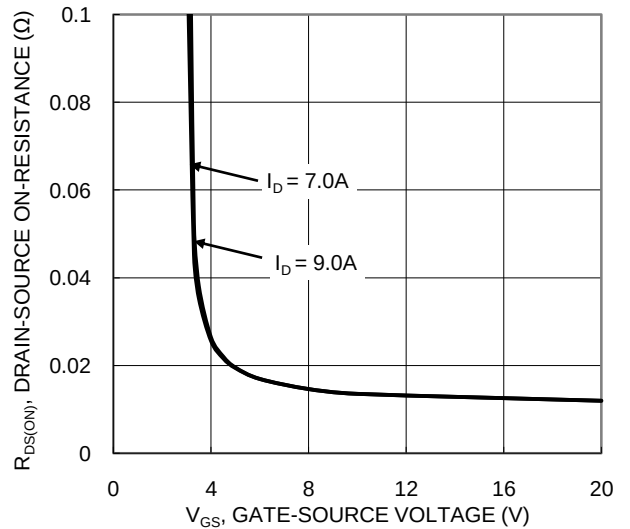


Figure 4. Typical Transfer Characteristic

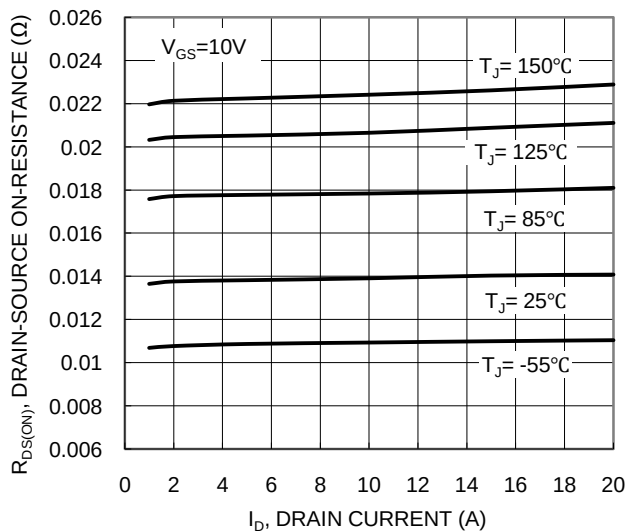


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

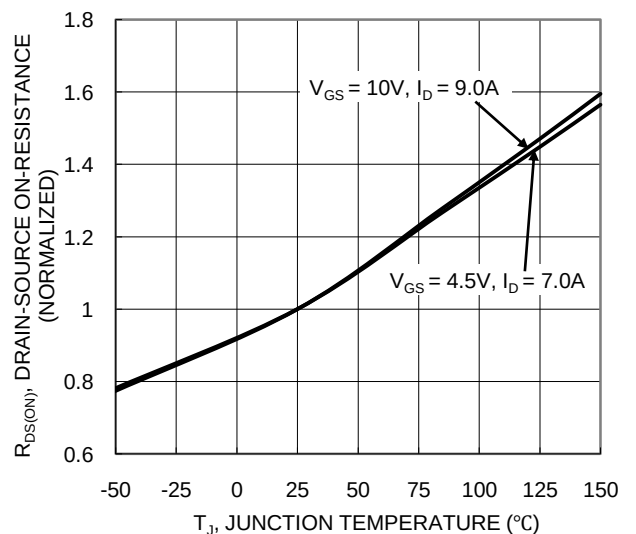
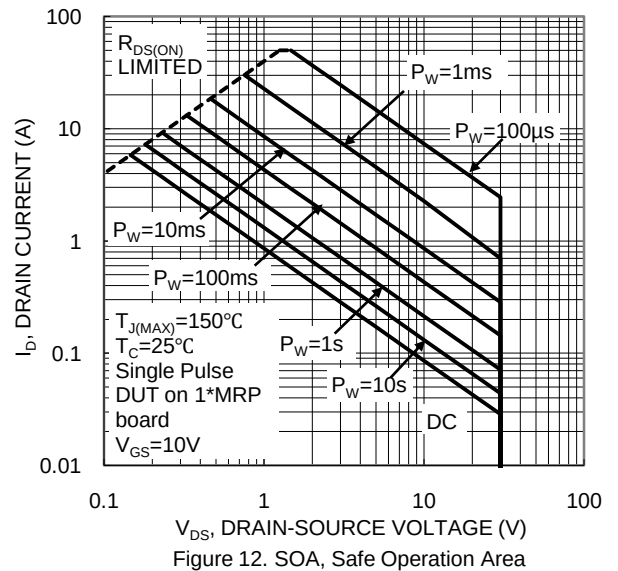
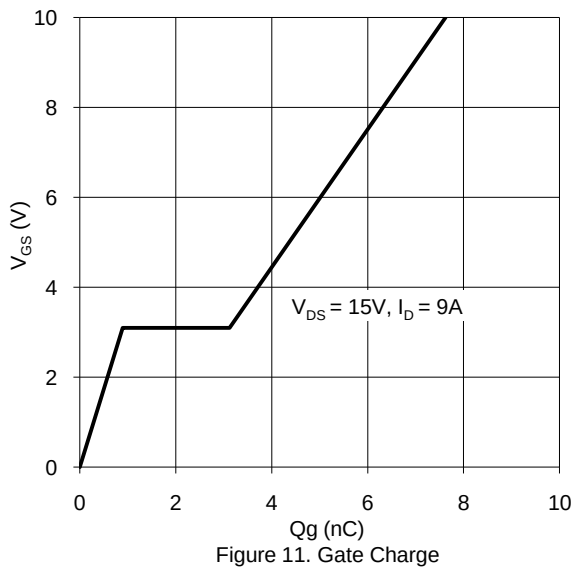
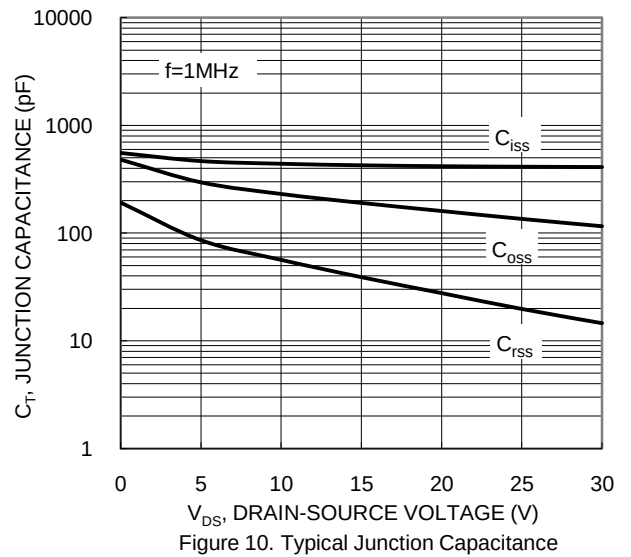
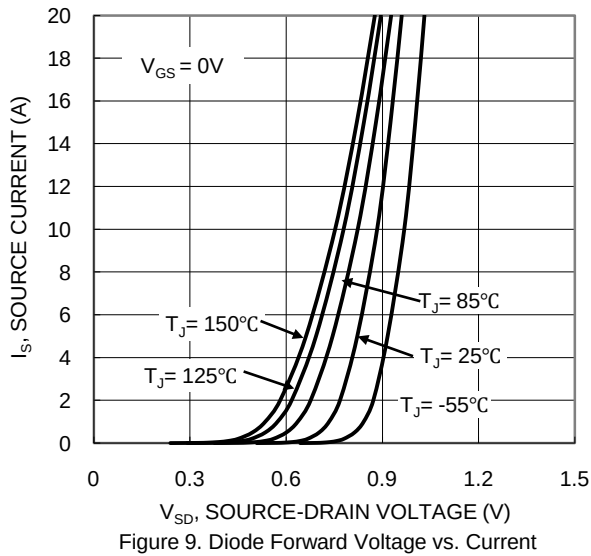
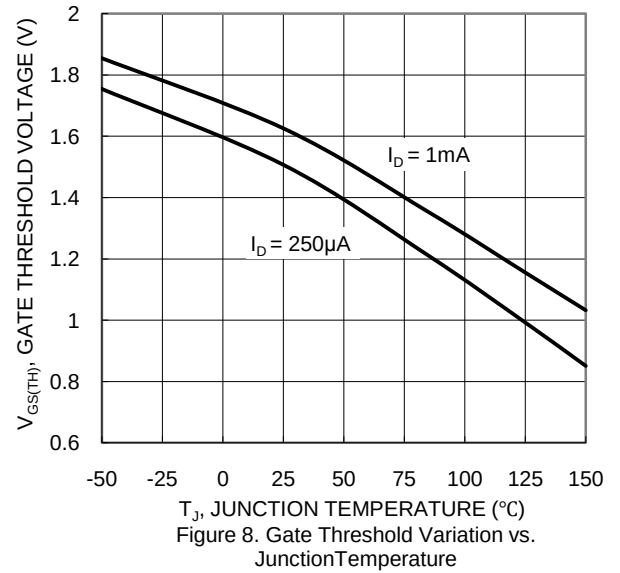
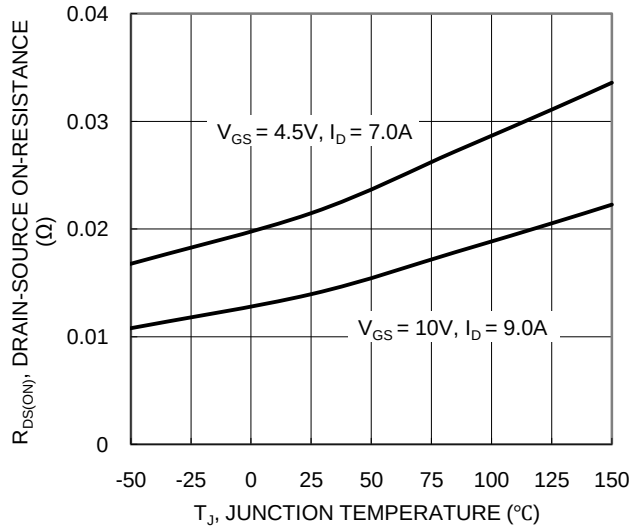


Figure 6. On-Resistance Variation with Temperature



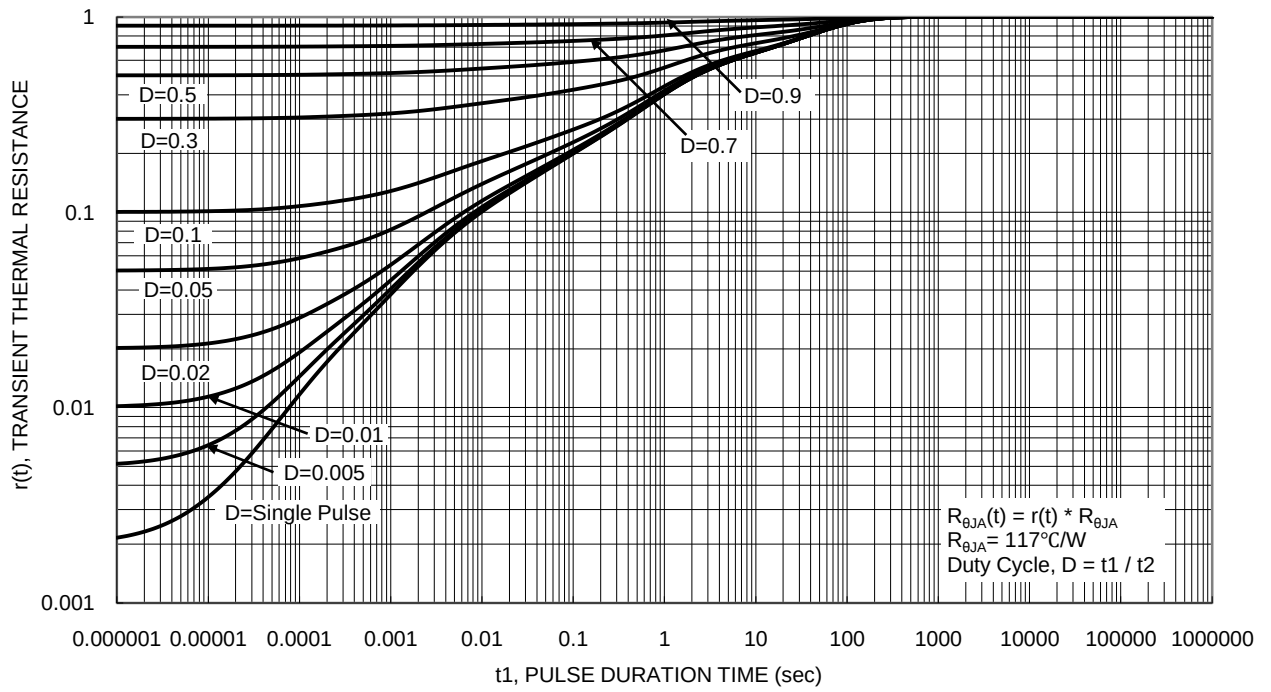
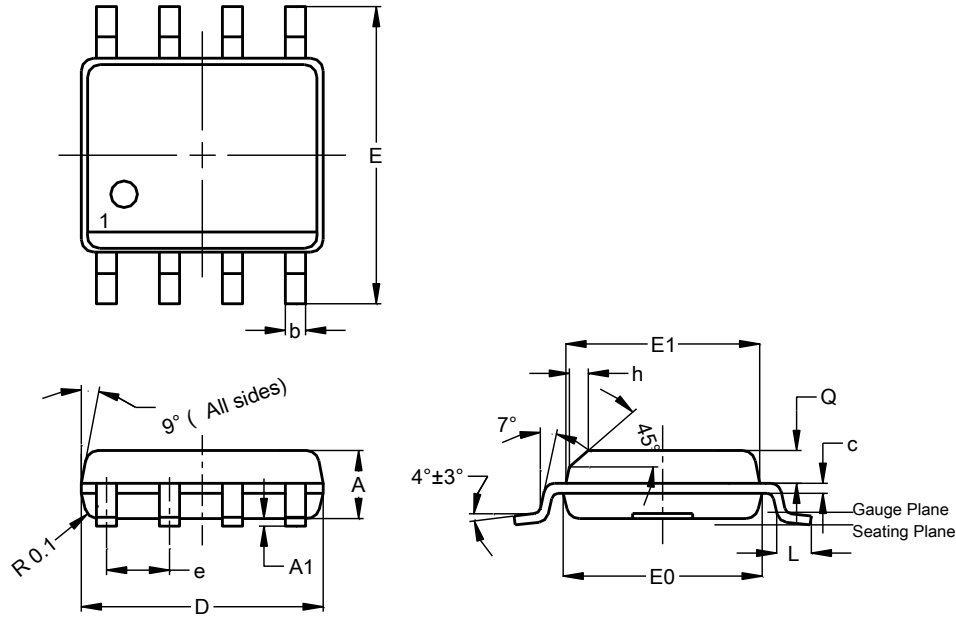


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SO-8

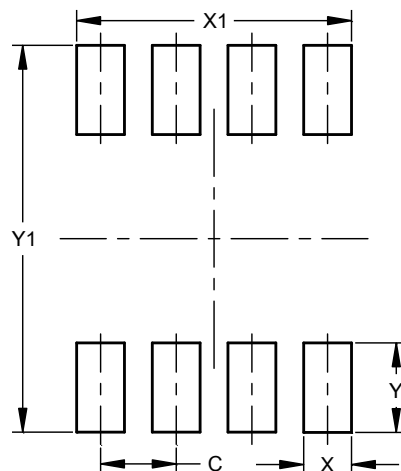


SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

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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