

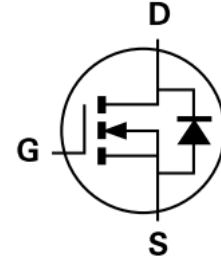
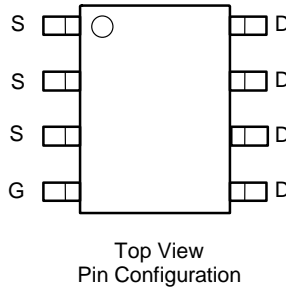
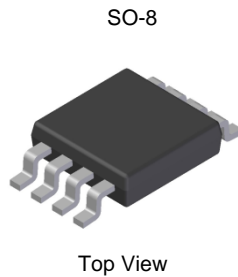
Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
30V	2.7mΩ @ V _{GS} = 10V	78A
	4mΩ @ V _{GS} = 4.5V	64A

Description and Applications

This 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.

- Backlighting
- Power Management Functions
- DC-DC Converters



Features and Benefits

- 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-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact_us) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>

Mechanical Data

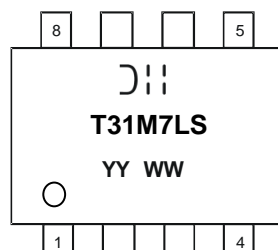
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections Indicator: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.074 grams (Approximate)

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT31M7LSS-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
 T31M7LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY or YY = Year (ex: 21 = 2021)
 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)	I _D	T _A = +25°C	25
		T _A = +70°C	20
Continuous Drain Current, V _{GS} = 10V (Note 7)	I _D	T _C = +25°C	78
		T _C = +70°C	63
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	3.3	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)	I _{DM}	150	A
Pulsed Body Diode Forward Current (380µs Pulse, Duty Cycle = 1%)	I _{SM}	150	A
Avalanche Current, L=0.1mH (Note 8)	I _{AS}	59	A
Avalanche Energy, L=0.1mH (Note 8)	E _{AS}	176	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	1.7	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	73	°C/W
Total Power Dissipation (Note 6)	P _D	2.2	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	56	°C/W
Thermal Resistance, Junction to Case (Note 7)	R _{θJC}	5.9	°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} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±16V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	1.0	—	3.0	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	2.1	2.7	mΩ	V _{GS} = 10V, I _D = 20A
		—	2.6	4		V _{GS} = 4.5V, I _D = 20A
Diode Forward Voltage	V _{SD}	—	0.7	1.0	V	V _{GS} = 0V, I _S = 2A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	5492	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	2261	—		
Reverse Transfer Capacitance	C _{rss}	—	317	—		
Gate Resistance	R _g	—	1.6	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 10V)	Q _g	—	84	—	nC	V _{DD} = 15V, I _D = 20A
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	43	—		
Gate-Source Charge	Q _{gs}	—	13	—		
Gate-Drain Charge	Q _{gd}	—	12	—		
Turn-On Delay Time	t _{d(ON)}	—	15	—	ns	V _{DD} = 15V, V _{GS} = 10V, R _g = 3Ω, I _D = 20A
Turn-On Rise Time	t _r	—	7	—		
Turn-Off Delay Time	t _{d(OFF)}	—	55	—		
Turn-Off Fall Time	t _f	—	41	—		
Reverse Recovery Time	t _{RR}	—	33	—	ns	I _F = 15A, dI/dt = 500A/µs
Reverse Recovery Charge	Q _{RR}	—	55	—	nC	I _F = 15A, dI/dt = 500A/µs

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

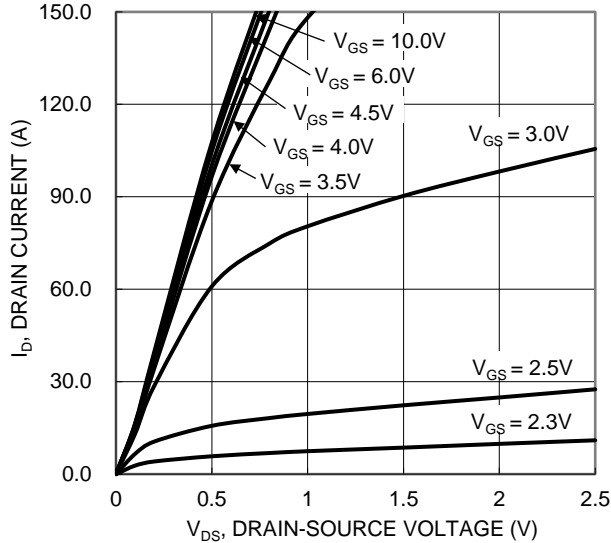


Figure 1. Typical Output Characteristic

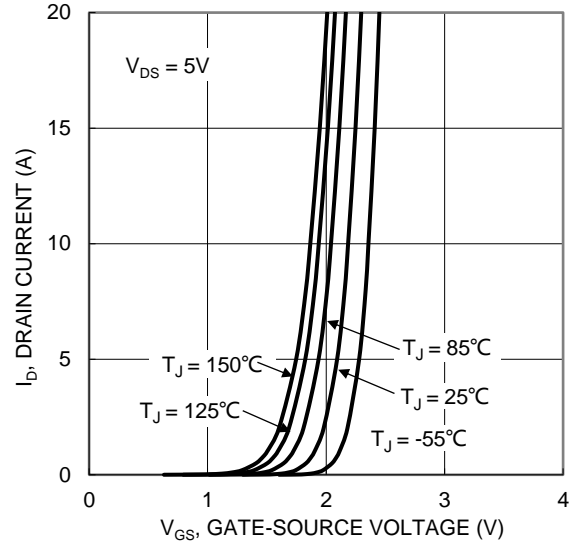


Figure 2. Typical Transfer Characteristic

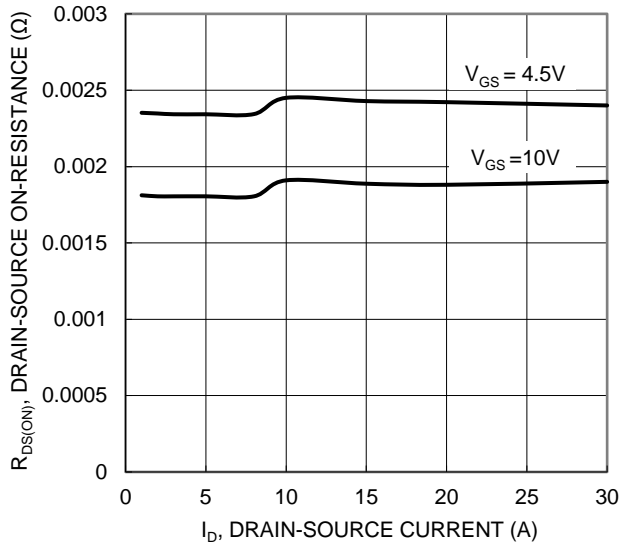


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

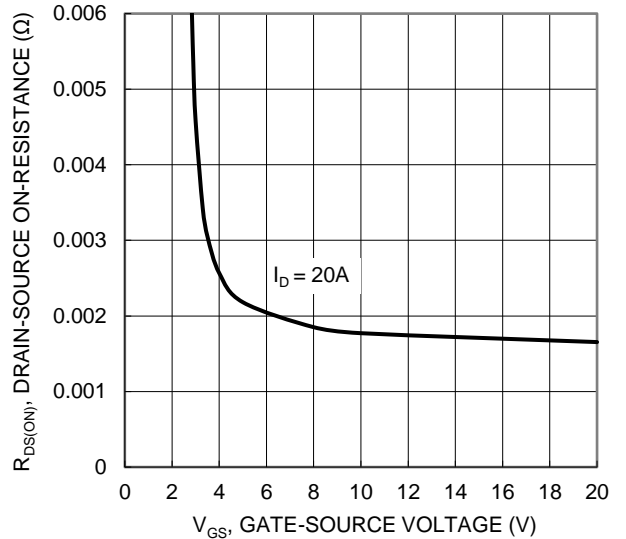


Figure 4. Typical Transfer Characteristic

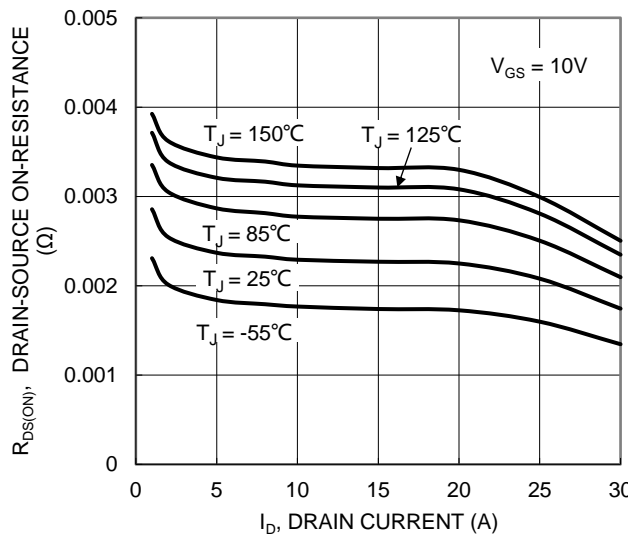


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

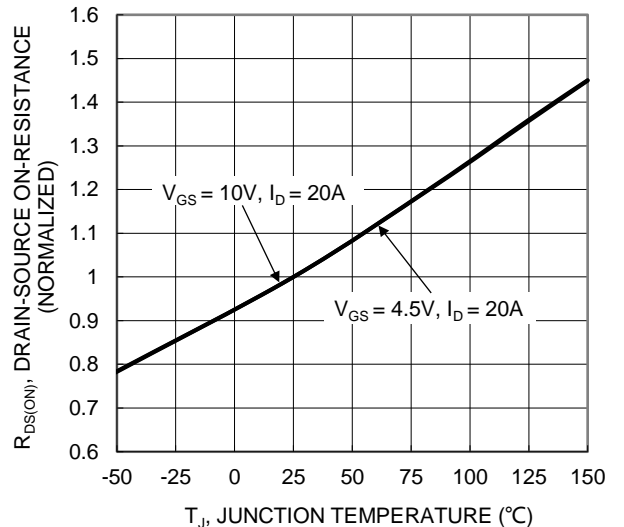
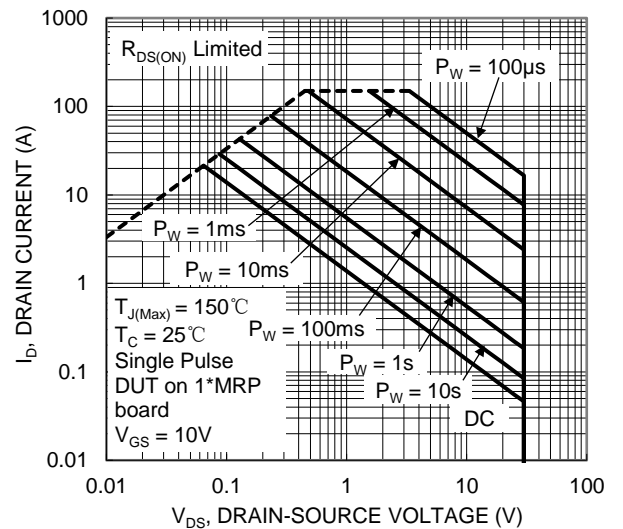
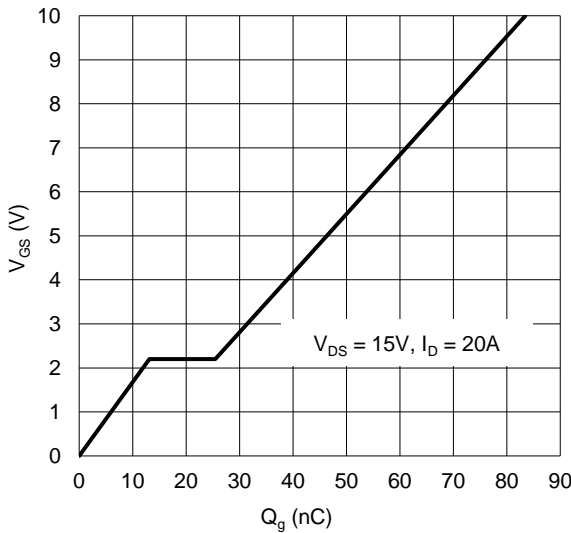
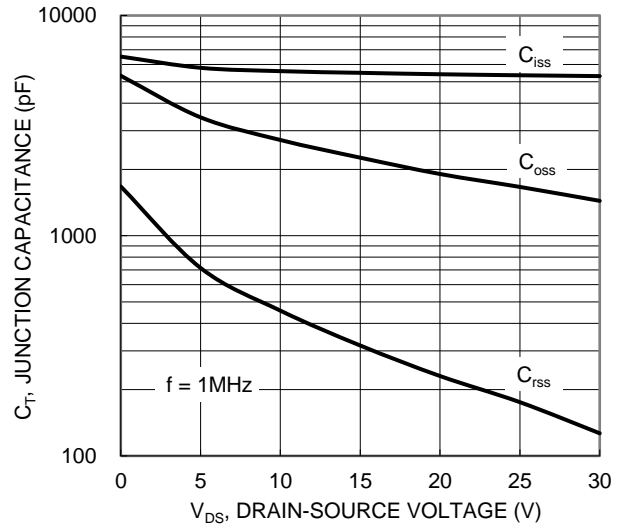
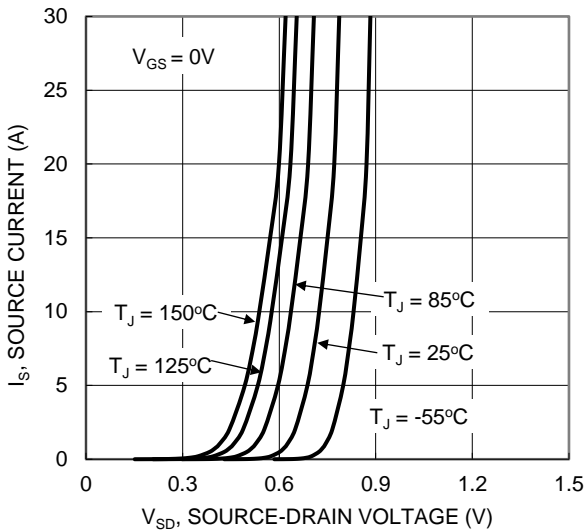
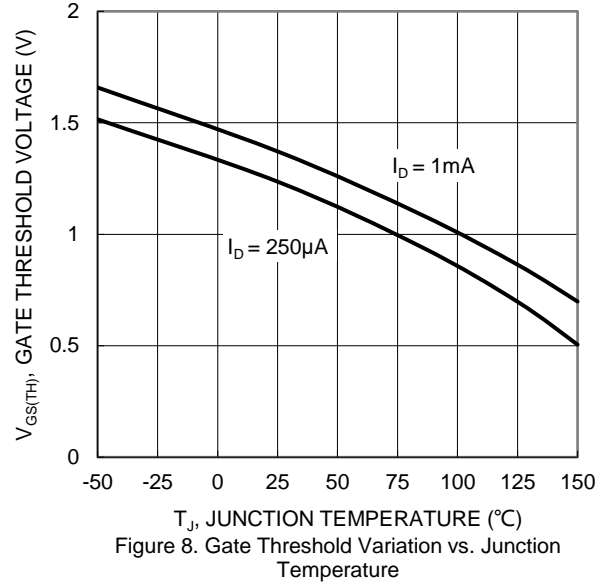
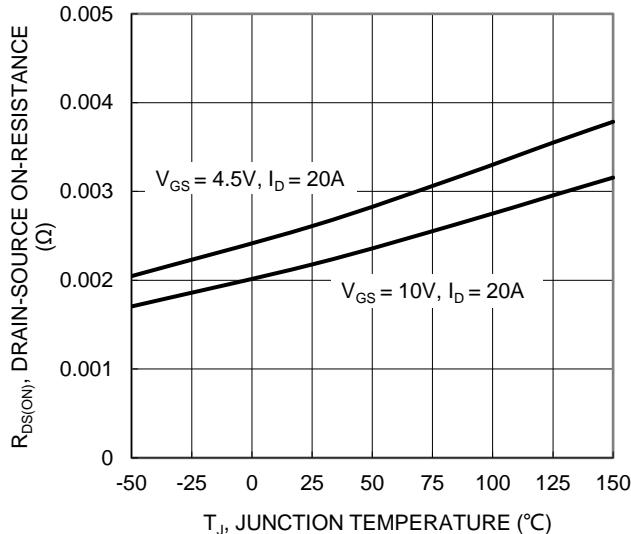


Figure 6. On-Resistance Variation with Temperature



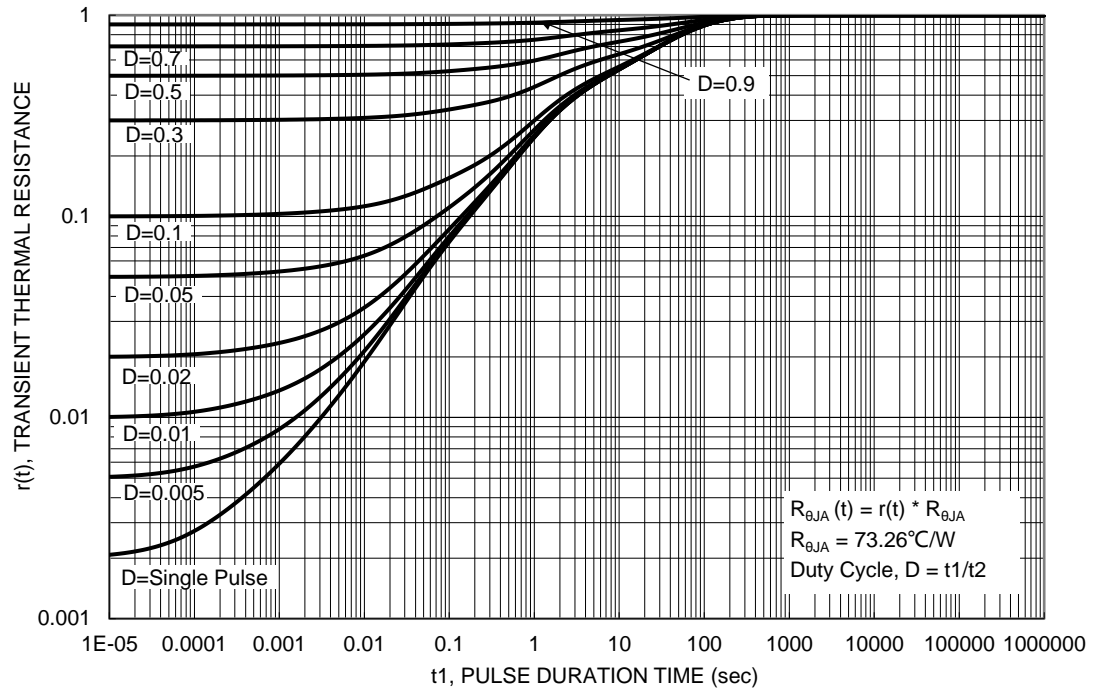
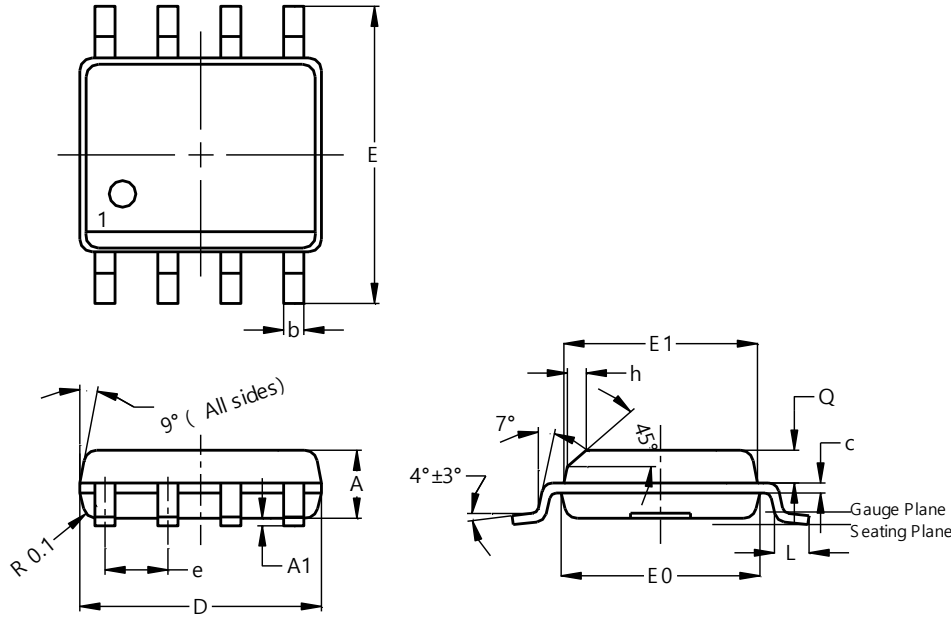


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

SO-8

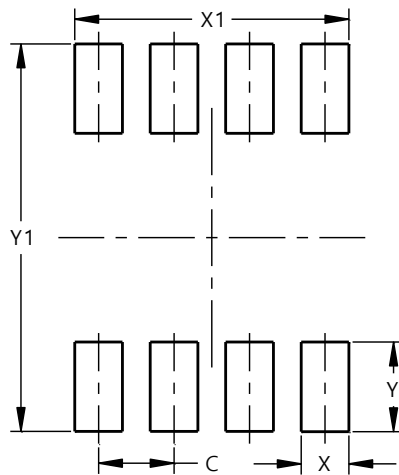


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Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	--	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

Suggested Pad Layout

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

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Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50

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