

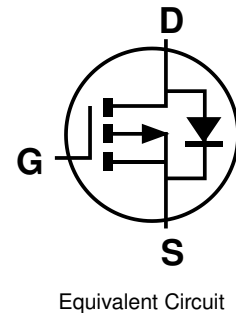
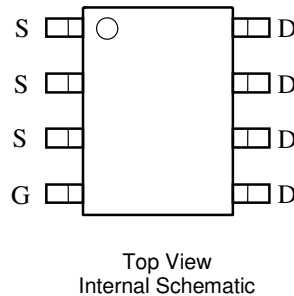
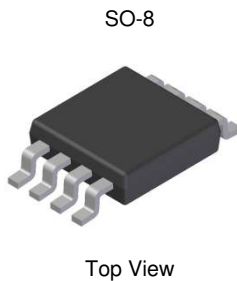
Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
-12V	15mΩ @ V _{GS} = -4.5V	-8.5A
	20mΩ @ V _{GS} = -3.7V	-7.3A
	25mΩ @ V _{GS} = -3.3V	-6.6A
	30mΩ @ V _{GS} = -2.5V	-6.0A
	40mΩ @ V _{GS} = -1.8V	-5.2A

Description and Applications

This MOSFET is 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.

- Motor Control
- Backlighting
- Power Management Functions
- DC-DC Converters



Features and Benefits

- 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)**

Mechanical Data

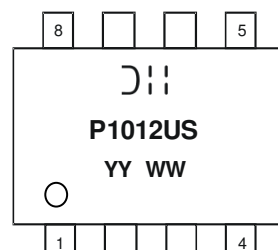
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections Indicator: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208^(e3)
- Weight: 0.074 grams (Approximate)

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP1012USS-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
 P1012US = 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}	-12	V
Gate-Source Voltage	V _{GSS}	±8	V
Continuous Drain Current (Note 6) V _{GS} = -4.5V	I _D	-8.5	A
Steady State T _A = +25°C T _A = +70°C		-6.8	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	-40	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	-2	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)	I _{SM}	-40	A
Avalanche Current (Note 7) L = 0.1mH	I _{AS}	-21	A
Avalanche Energy (Note 7) L = 0.1mH	E _{AS}	22	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	1.3	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	99	°C/W
Total Power Dissipation (Note 6)	P _D	1.6	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	77	°C/W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	13	
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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-12	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	V _{DS} = -9.6V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-0.4	—	-1.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	9	15	mΩ	V _{GS} = -4.5V, I _D = -9A
			10	20		
			11	25		
			13	30		
			18	40		
Diode Forward Voltage	V _{SD}	—	-0.8	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{ISS}	—	1344	—	pF	V _{DS} = -10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{OSS}	—	342	—		
Reverse Transfer Capacitance	C _{RSS}	—	297	—		
Gate Resistance	R _g	—	15	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	19.5	—	nC	V _{DS} = -6V, I _D = -10A
Total Gate Charge (V _{GS} = -8V)	Q _g	—	31	—		
Gate-Source Charge	Q _{gs}	—	2.1	—		
Gate-Drain Charge	Q _{gd}	—	7.9	—		
Turn-On Delay Time	t _{D(ON)}	—	6.0	—	ns	V _{DS} = -6V, V _{GS} = -4.5V, R _g = 1Ω, I _D = -8A
Turn-On Rise Time	t _R	—	32	—		
Turn-Off Delay Time	t _{D(OFF)}	—	71	—		
Turn-Off Fall Time	t _F	—	85	—		
Reverse Recovery Time	t _{RR}	—	46	—	ns	I _F = -12A, di/dt = 500A/μs
Reverse Recovery Charge	Q _{RR}	—	44	—	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.
 - 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.

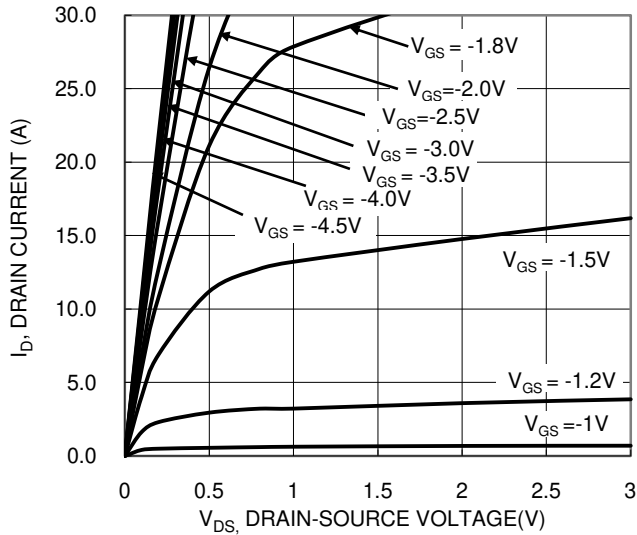


Figure 1. Typical Output Characteristic

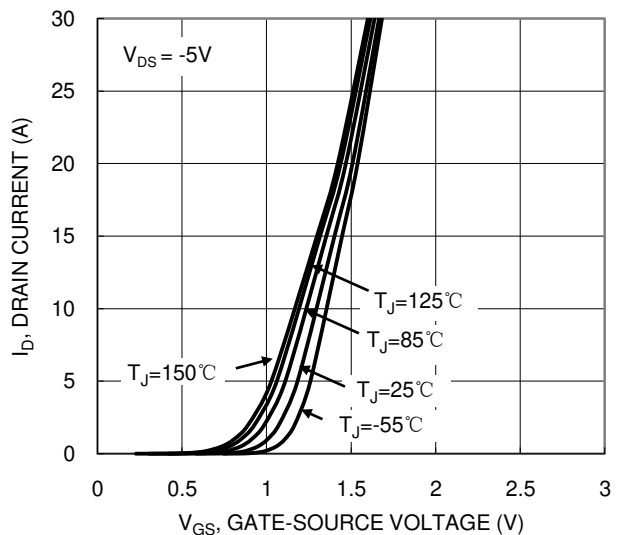


Figure 2. Typical Transfer Characteristic

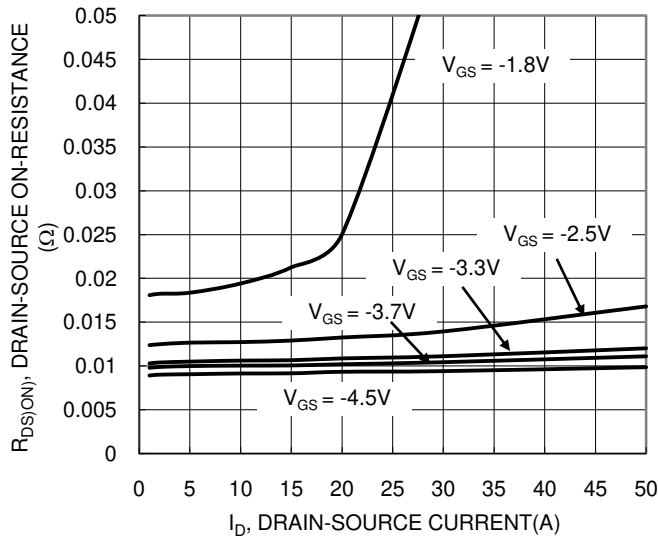


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

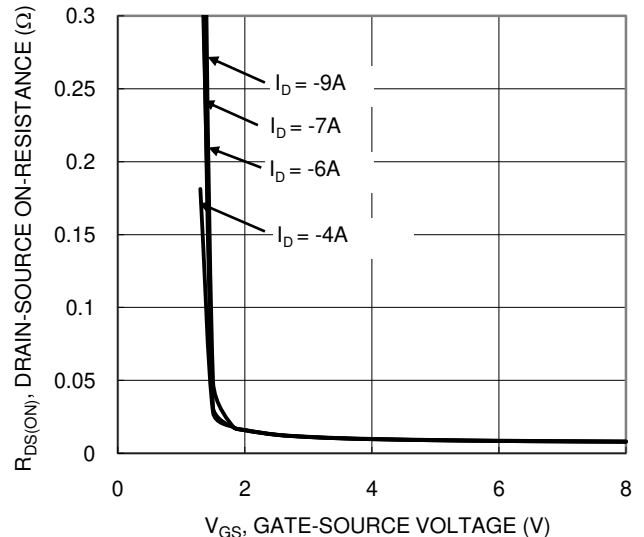


Figure 4. Typical Transfer Characteristic

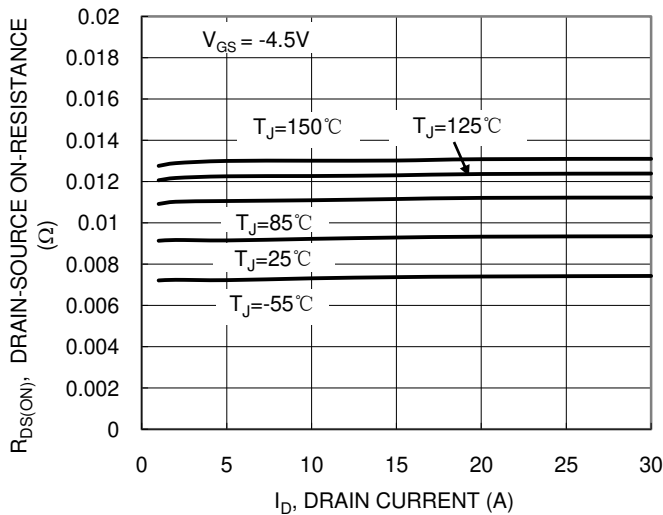


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

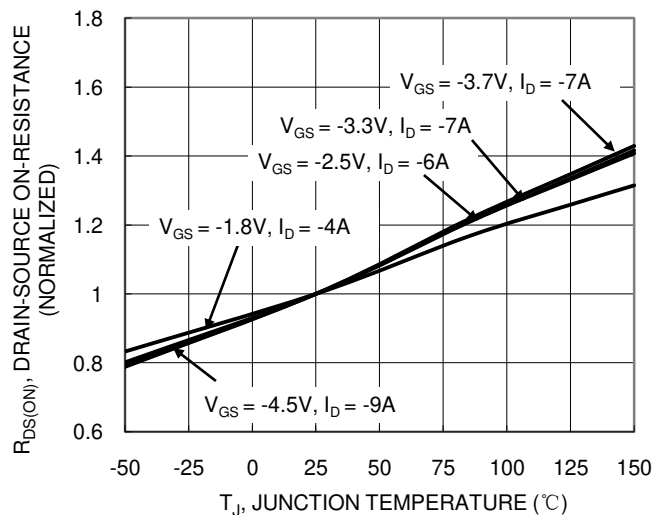
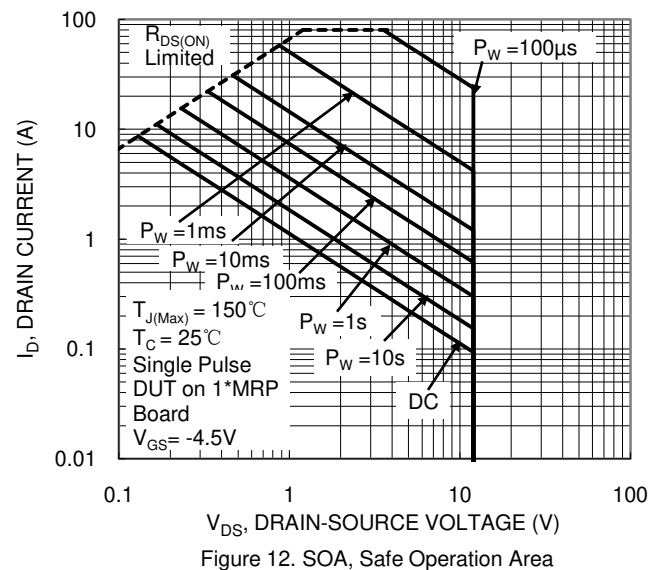
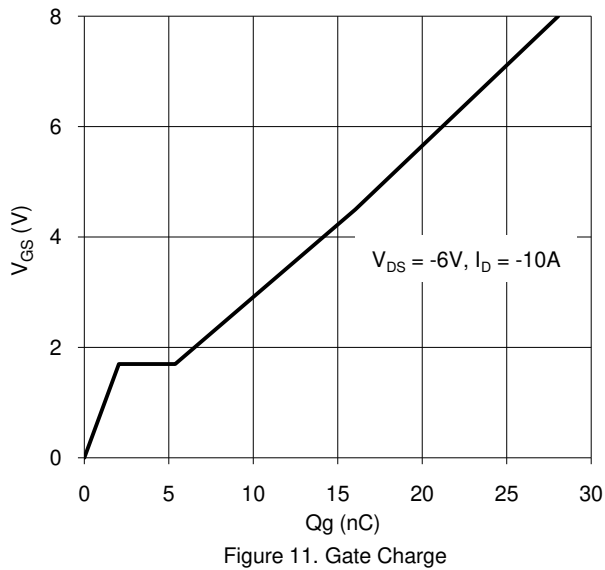
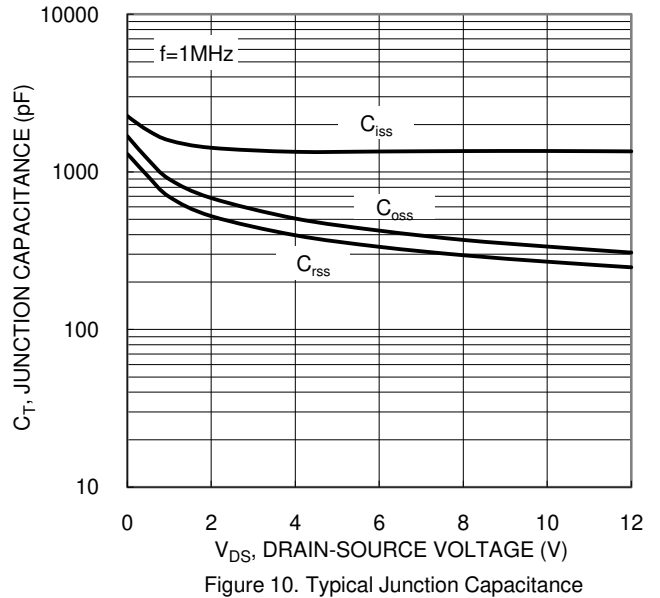
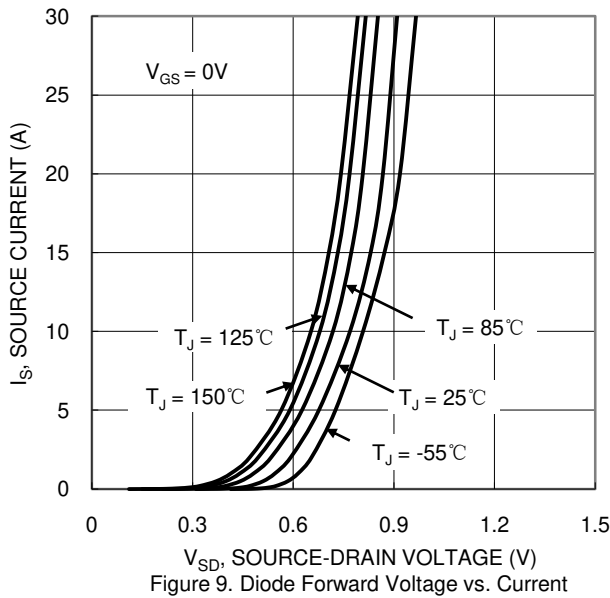
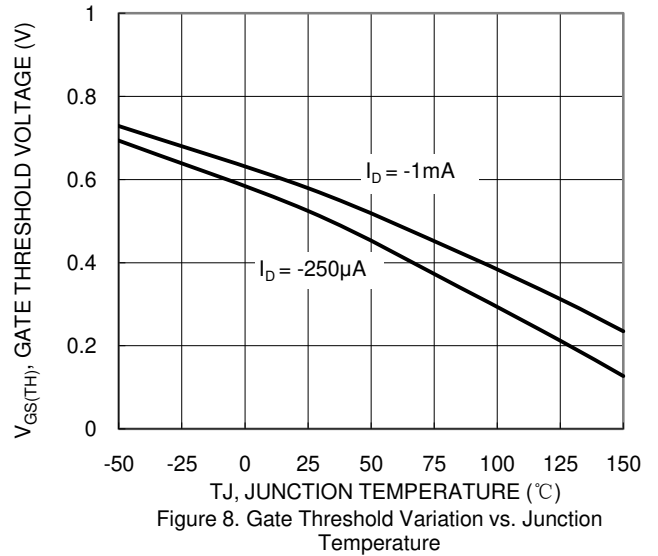
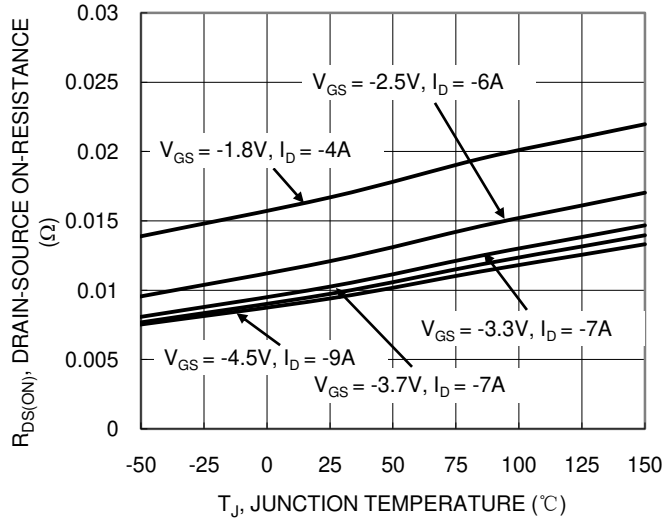


Figure 6. On-Resistance Variation with Junction Temperature



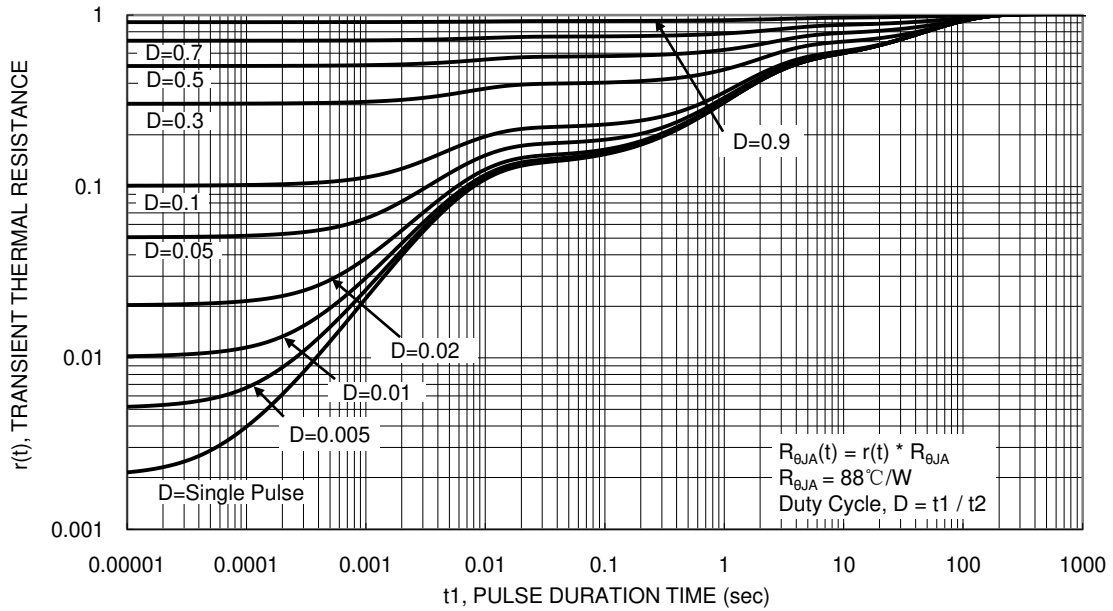
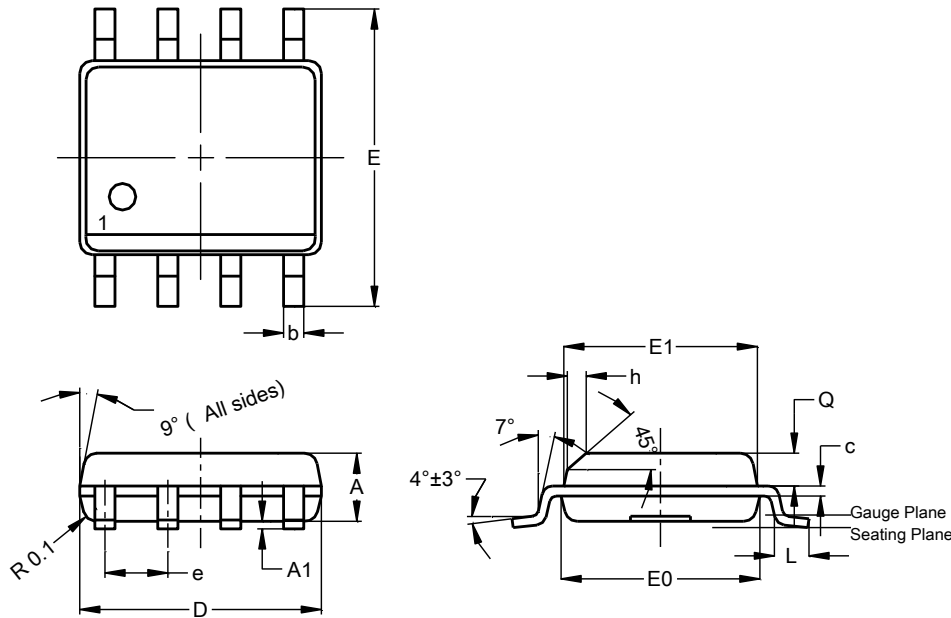


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

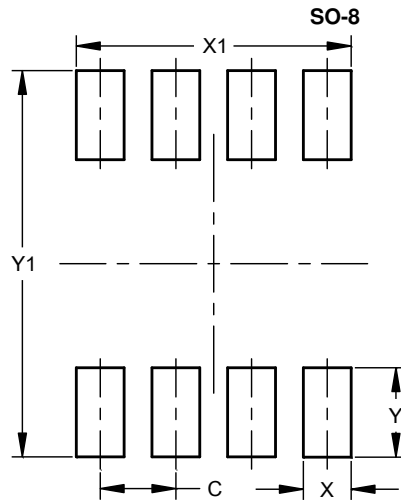
SO-8



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.



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

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