Product Summary

V_{SSS}	$R_{SS(ON)\ Max}$	I_S T_A = +25°C
24V	36mΩ @ V_{GS} = 4.5V	5A

Features and Benefits

- Built-in G-S Protection Diode against ESD 2kV HBM
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Description and Applications

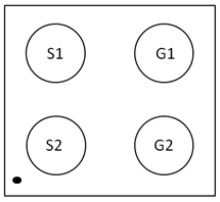
This new generation MOSFET is designed to minimize the on-state resistance ($R_{SS(ON)}$) and making it ideal for high efficiency power management.

- Battery Management
- Load Switch
- Battery Protection

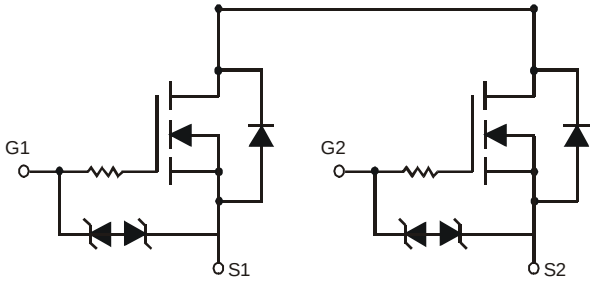
Mechanical Data

- Case: X2-WLB1616-4
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminal Material: SnAgCu Ball
- Weight: 0.0023 grams (Approximate)

ESD PROTECTED TO 2kV



Top View



N-Channel N-Channel

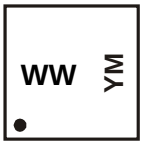
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2036UCB4-7	X2-WLB1616-4	3000/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



VW/WW = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: F = 2018)
M = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021
Code	C	D	E	F	G	H	I

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings

Characteristic			Symbol	Value	Unit
Source-Source Voltage			V_{SSS}	24	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Source Current @ T_A = +25°C (Note 5)	Steady State	T_A = +25°C T_A = +70°C	I_S	5.0 4.0	A
Pulsed Source Current @ T_A = +25°C (Notes 5 & 6)			I_{SM}	30	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation, @T_A = +25°C (Note 5)	P_D	1.45	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	86.68	°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 7)						
Source to Source Breakdown Voltage T_J = +25°C	$V_{(BR)SS}$	24	—	—	V	I_S = 1mA, V_{GS} = 0V
Zero Gate Voltage Source Current T_J = +25°C	I_{SSS}	—	—	1.0	µA	V_{SS} = 20V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±8V, V_{SS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	—	1.3	V	V_{SS} = 10V, I_S = 1.0mA
Static Source-Source On-Resistance	$R_{SS(ON)}$	20 20.5 21 22 23	29 30 31 33 36	36 37 39 44 52	mΩ	V_{GS} = 4.5V, I_S = 3.0A V_{GS} = 4.0V, I_S = 3.0A V_{GS} = 3.7V, I_S = 3.0A V_{GS} = 3.1V, I_S = 3.0A V_{GS} = 2.5V, I_S = 3.0A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	9.4	—	S	V_{SS} = 10V, I_S = 3.0A
Body Diode Forward Voltage	$V_{F(S-S)}$	—	0.8	1.2	V	I_F = 3.0A, V_{GS} = 0V
DYNAMIC CHARACTERISTICS (Note 8)						
Total Gate Charge	Q_g	—	12.6	—	nC	V_{GS} = 4.5V, V_{SS} = 10V, I_S = 6A
Turn-On Delay Time	$t_{D(ON)}$	—	183	—	ns	V_{DD} = 10V, R_L = 3.33Ω, I_S = 3.0A
Turn-On Rise Time	t_R	—	278	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	738	—	ns	
Turn-Off Fall Time	t_F	—	572	—	ns	

Notes: 5. Device mounted on FR-4 material with 1-inch^2 (6.45-cm^2), 2-oz. (0.071-mm thick) Cu.
6. Repetitive rating, pulse width limited by junction temperature.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

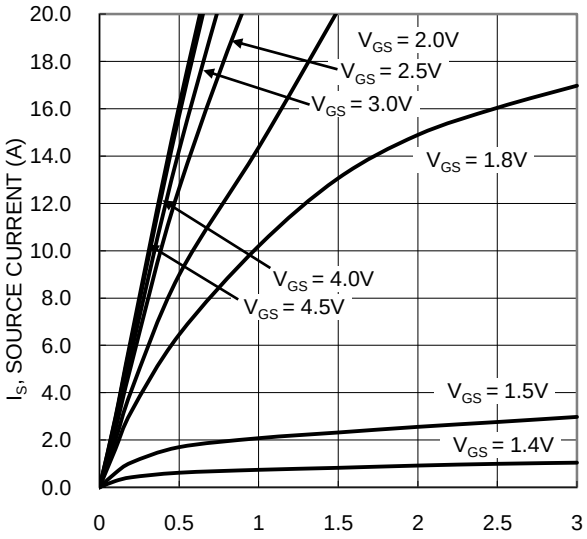


Figure 1. Typical Output Characteristic

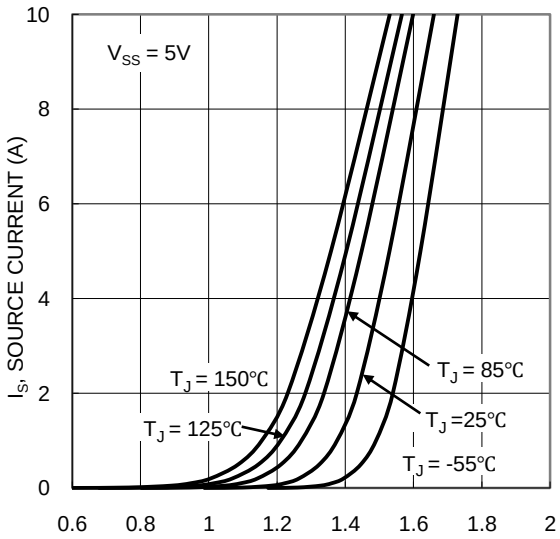


Figure 2. Typical Transfer Characteristic

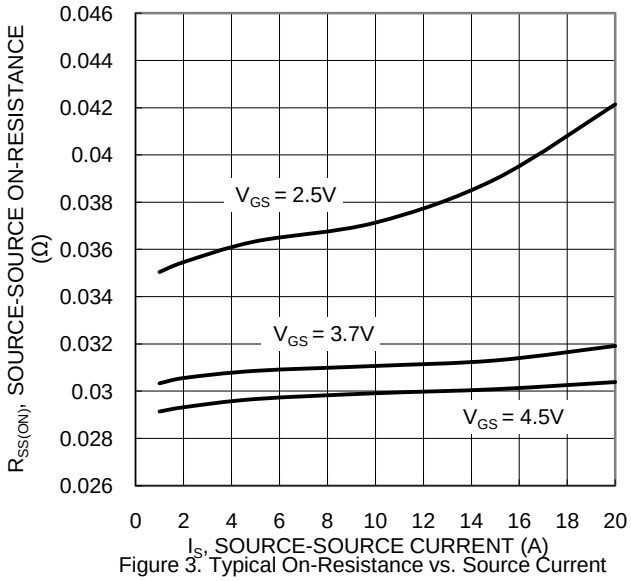


Figure 3. Typical On-Resistance vs. Source Current and Gate Voltage

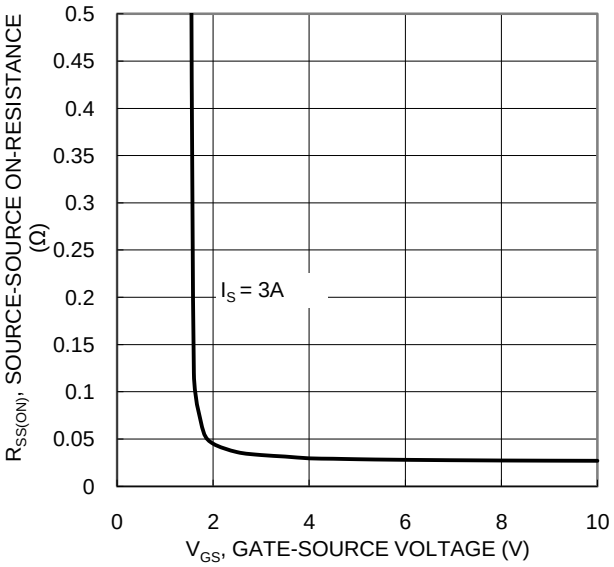


Figure 4. Typical Transfer Characteristic

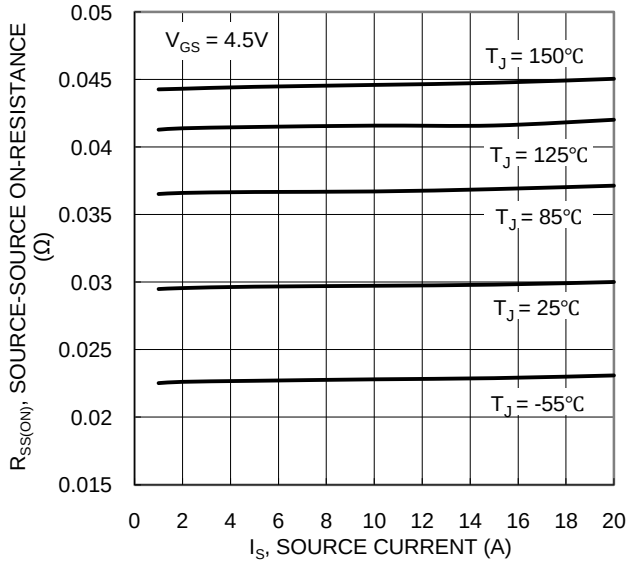


Figure 5. Typical On-Resistance vs. Source Current and Junction Temperature

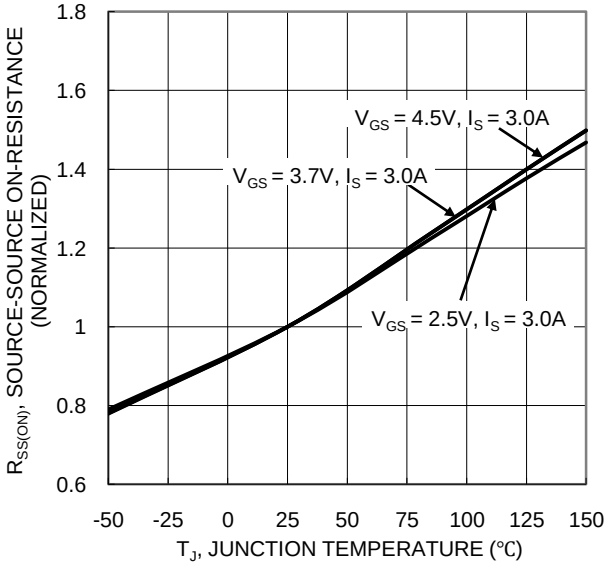


Figure 6. On-Resistance Variation with Junction Temperature

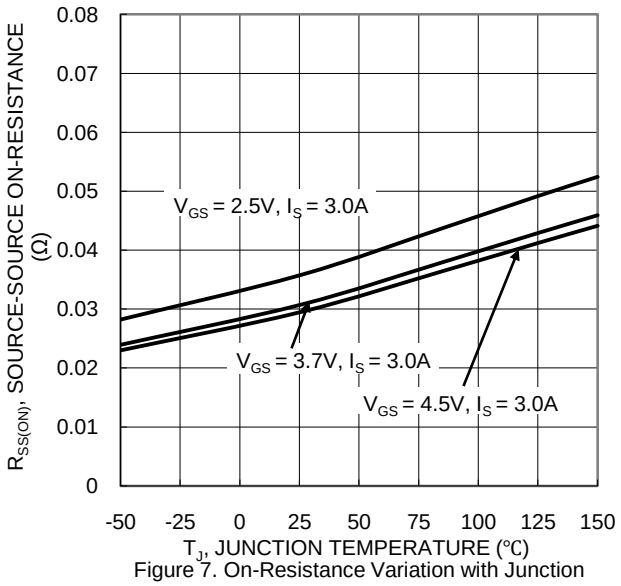


Figure 7. On-Resistance Variation with Junction Temperature

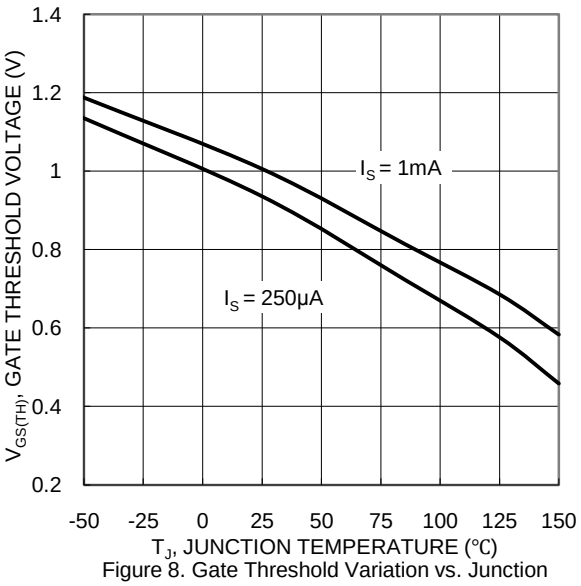


Figure 8. Gate Threshold Variation vs. Junction Temperature

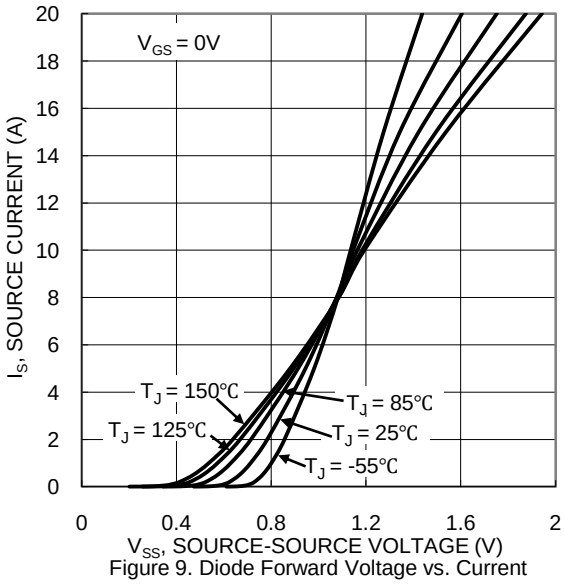


Figure 9. Diode Forward Voltage vs. Current

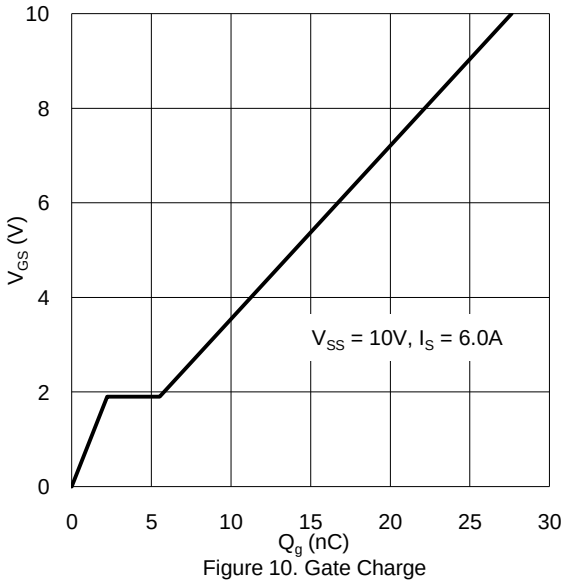


Figure 10. Gate Charge

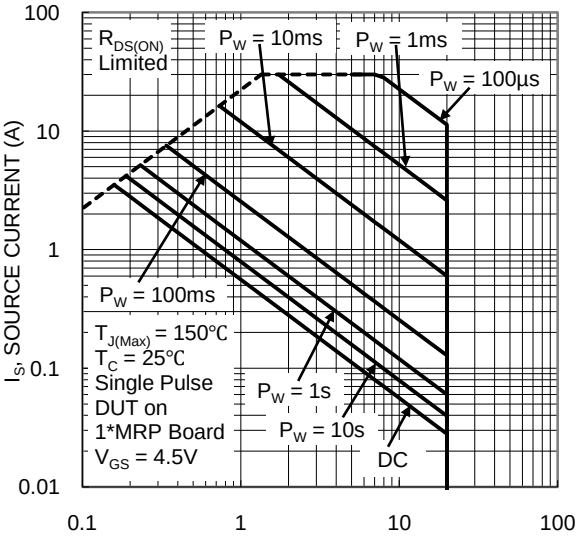


Figure 11. SOA, Safe Operation Area

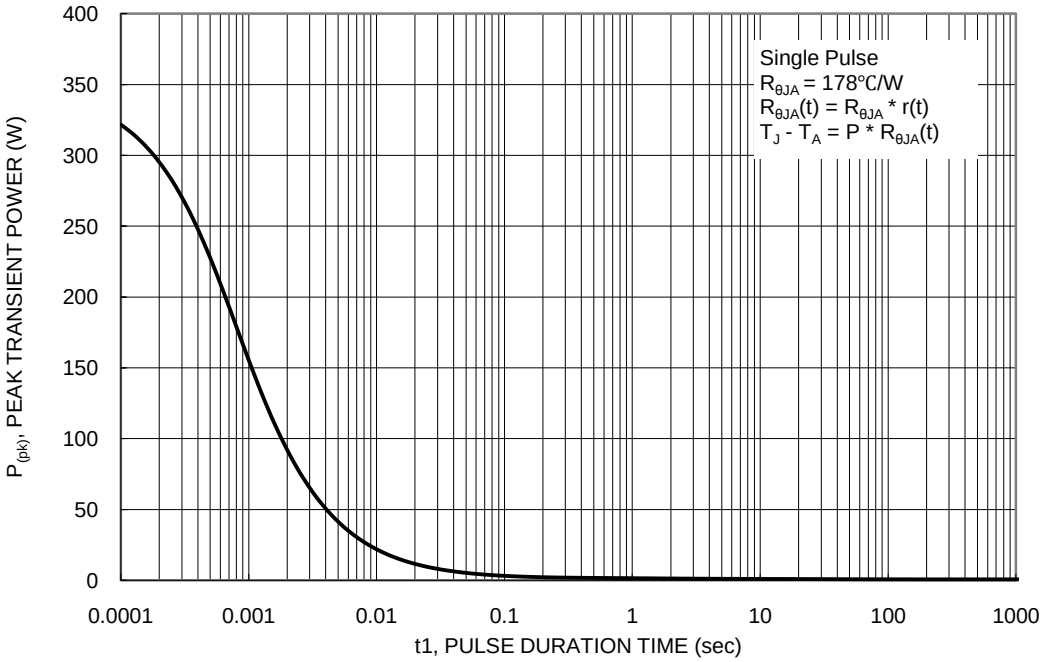


Figure 12. Single Pulse Maximum Power Dissipation

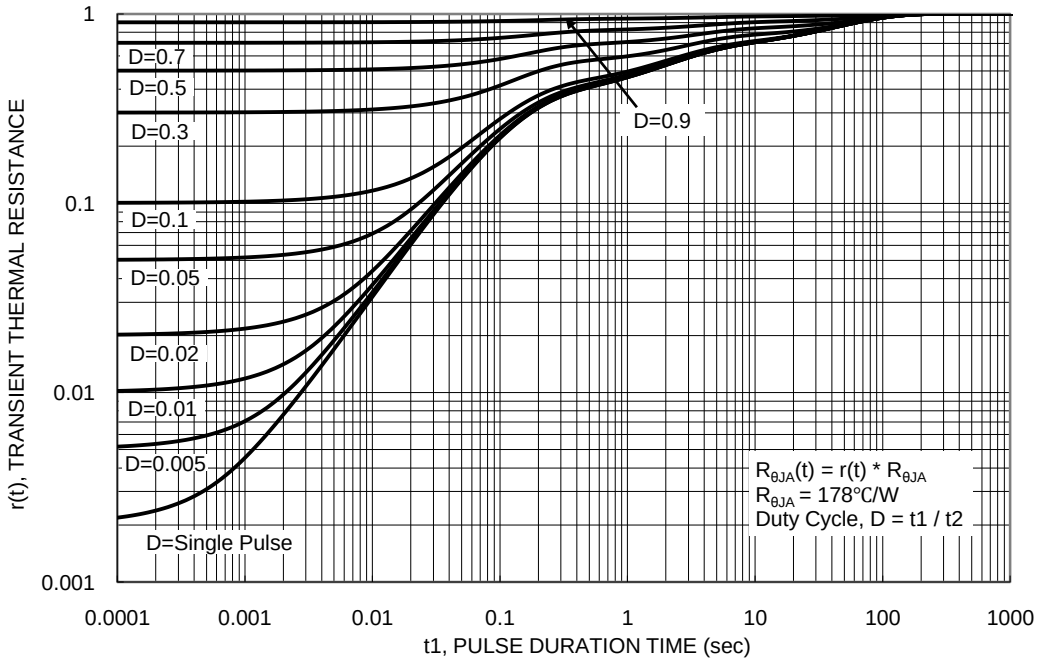
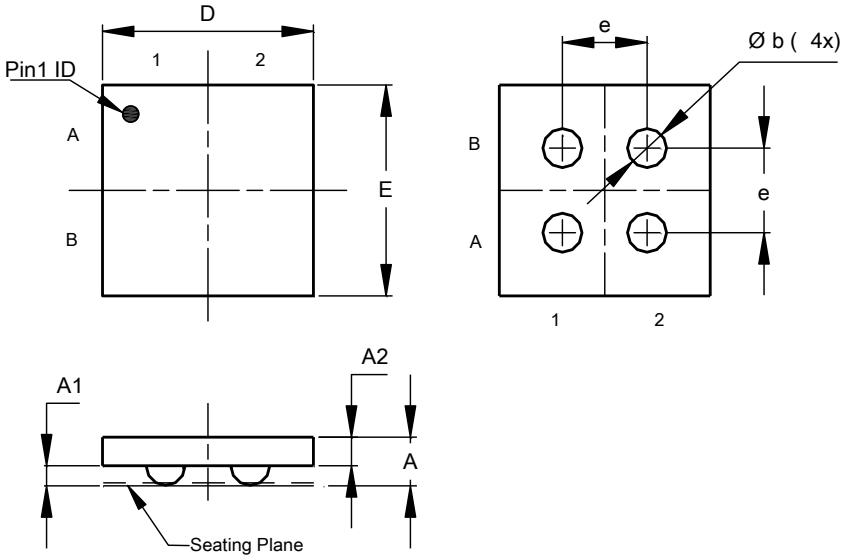


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X2-WLB1616-4

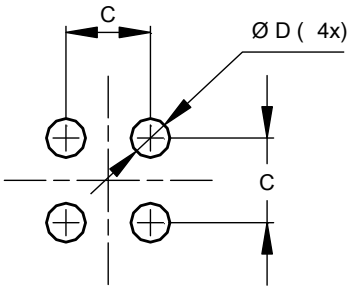


X2-WLB1616-4			
Dim	**Min**	**Max**	**Typ**
A	--	0.40	0.37
A1	--	--	0.15
A2	--	--	0.22
b	0.25	0.35	0.30
D	1.58	1.66	1.62
E	1.58	1.66	1.62
e	-	-	0.65
All Dimensions in mm			

Suggested Pad Layout

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

X2-WLB1616-4



Dimensions	Value (in mm)
C	0.65
D	0.30

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