

Product Summary

BV_{D1D2}	$R_{D1D2(ON)}$ Typ.	I_{D1D2} $T_A = +25^\circ\text{C}$
-20V	63m Ω @ $V_{GS} = -4.5\text{V}$	-3.2A

Description

This new generation MOSFET is designed to minimize the on-state resistance ($R_{D1D2(ON)}$) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

Applications

- Battery Management
- Load Switch
- Battery Protection

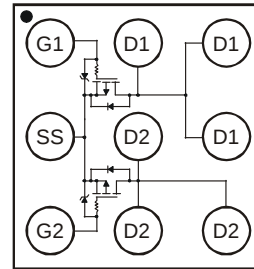


Features and Benefits

- LD-MOS Technology with the Lowest Figure of Merit:
 - $R_{D1D2(ON)} = 63\text{m}\Omega$ to Minimize On-State Losses
 - $Q_g = 3.2\text{nC}$ for Ultra-Fast Switching
- $V_{GS(TH)} = -0.74\text{V}$ Typ. for a Low Turn-On Potential
- CSP with Footprint 1.5mm $\times$ 1.5mm
- Height = 0.62mm for Low Profile
- Gate ESD Protection <HBM Class 3A>
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: U-WLB1515-9 (Type E)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal: Finish - SnAgCu. Solderable per MIL-STD-202 Method 208 ^(e1)
- Terminal Connections: See Diagram Below
- Weight: 0.0018 grams (Approximate)



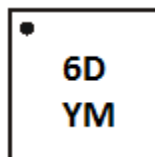
Top View

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2101UCB9-7	U-WLB1515-9 (Type E)	3000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



6D = 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 (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-to-Drain Voltage			V _{D1D2}	-20	V
Gate-to-Source Voltage			V _{GS}	-6	V
Continuous Drain Current (Note 5) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _{D1D2}	-2.2	A
		T _A = +70°C		-1.7	
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _{D1D2}	-3.2	A
		T _A = +70°C		-2.5	
Continuous Source Pin Current (Note 6)			I _S	-1.6	A
Pulsed Source Pin Current (Pulse Duration 10μs, Duty Cycle ≤ 1%)			I _{SM}	-25	A
Pulsed Drain Current (Pulse Duration 10μs, Duty Cycle ≤ 1%)			I _{DM}	-25	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	0.74	W
Total Power Dissipation (Note 6)	P _D	1.56	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	170	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	81	°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)						
Drain-to-Drain Breakdown Voltage	BV _{D1D2}	-20	—	—	V	V _{GS} = 0V, I _{D1D2} = -250μA
Zero Gate Voltage Drain Current @T _C = +25°C	I _{DD5}	—	—	-1	μA	V _{D1D2} = -16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	-100	nA	V _{GS} = -6V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	-0.4	-0.74	-0.9	V	V _{D1D2} = V _{GS} , I _{DS} = -250μA
Static Drain-to-Drain On-Resistance	R _{D1D2(ON)}	—	63	100	mΩ	V _{GS} = -4.5V, I _{D1D2} = -1A
		—	72	130		V _{GS} = -2.5V, I _{D1D2} = -1A
		—	87	175		V _{GS} = -1.8V, I _{D1D2} = -1A
DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 6)	V _{SD}	—	-0.7	-1	V	V _{GS} = 0V, I _{D1D2} = -1A
Reverse Recovery Charge	Q _{RR}	—	4.1	—	nC	V _{D1D2} = -9.5V, I _F = -1A, di/dt = 200A/μs
Reverse Recovery Time	t _{RR}	—	10.5	—	ns	
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iSS}	—	392	588	pF	V _{D1D2} = -10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oSS}	—	183	274	pF	
Reverse Transfer Capacitance	C _{rSS}	—	8.4	12.6	pF	
Series Gate Resistance	R _g	—	5.2	10	Ω	V _{GS} = 0V, V _{D1D2} = 0V, f = 1.0MHz
Total Gate Charge (-4.5V)	Q _g	—	3.2	4.8	nC	V _{GS} = -4.5V, V _{D1D2} = -10V, I _{D1D2} = -1A
Gate-Source Charge	Q _{gs}	—	0.3	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.6	—	nC	
Gate Charge at V _{th}	Q _{g(th)}	—	0.18	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.6	7	ns	V _{D1D2} = -10V, V _{GS} = -4.5V, I _{D1D2} = -1A, R _G = 30Ω
Turn-On Rise Time	t _R	—	5.3	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	40	80	ns	
Turn-Off Fall Time	t _F	—	20	—	ns	

- Notes:
5. Device mounted on FR-4 PCB with minimum recommended pad layout.
 6. Device mounted on FR-4 material with 1-inch² (6.45-cm²), 2-oz. (0.071-mm thick) Cu.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to production testing.

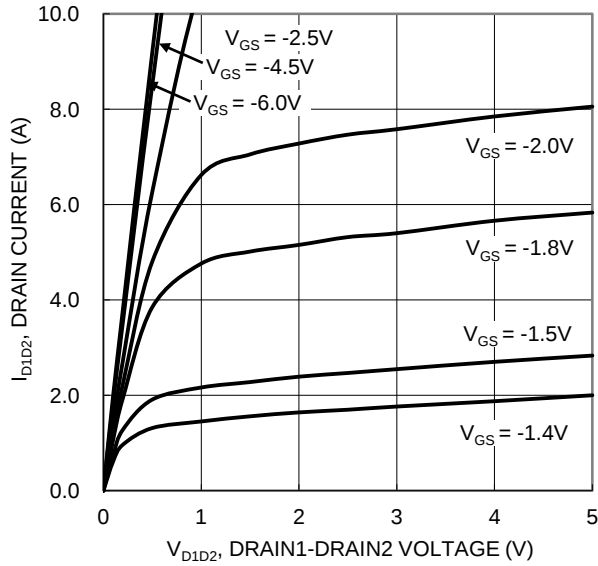


Figure 1. Typical Output Characteristic

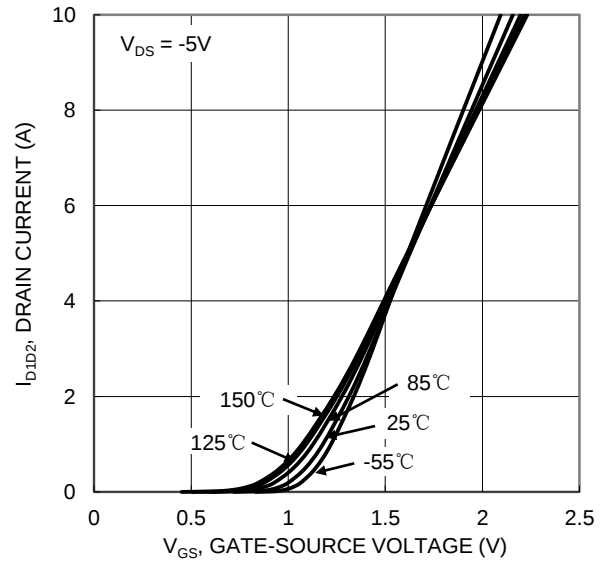


Figure 2. Typical Transfer Characteristic

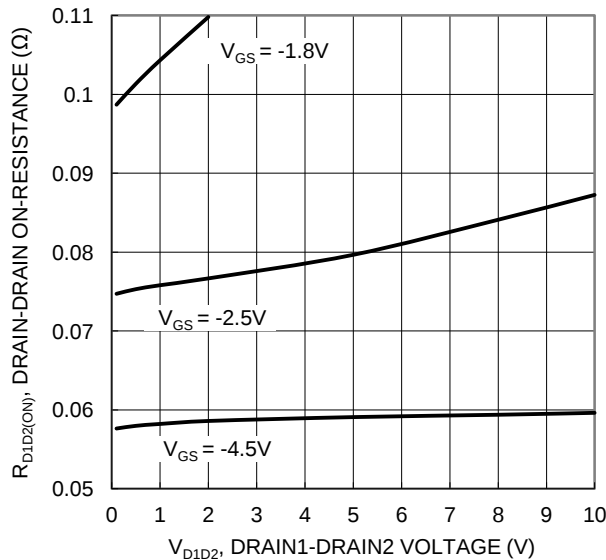


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

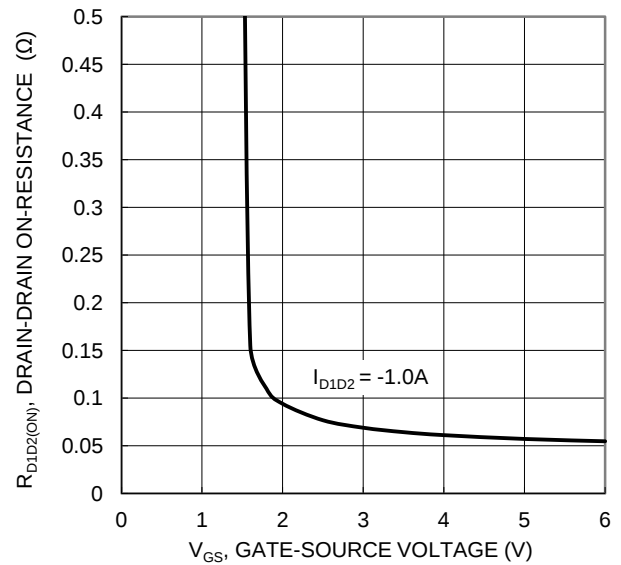


Figure 4. Typical Transfer Characteristic

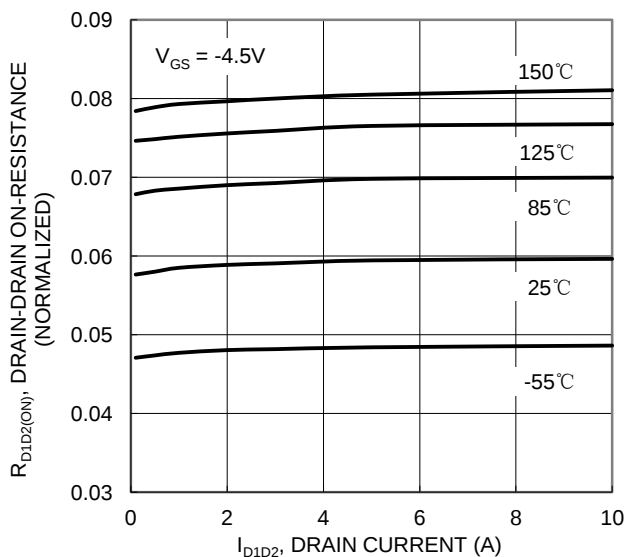


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

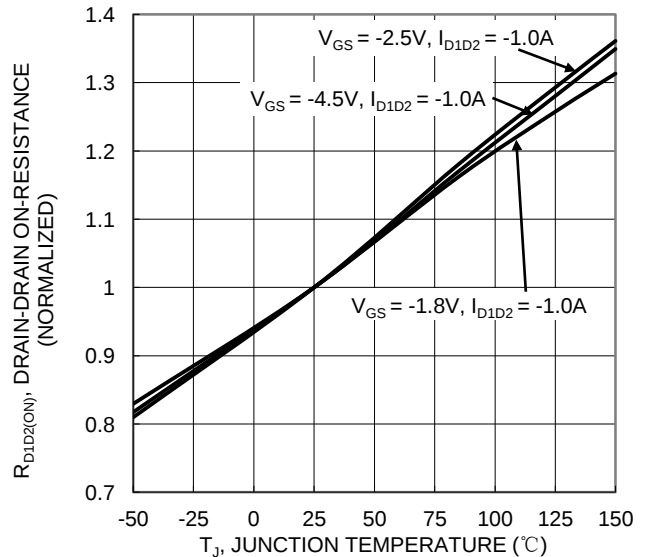


Figure 6. On-Resistance Variation with Junction Temperature

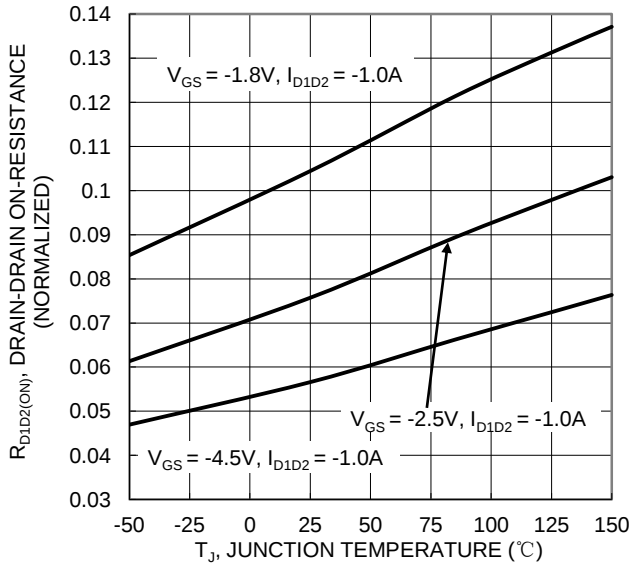


Figure 7. On-Resistance Variation with Junction Temperature

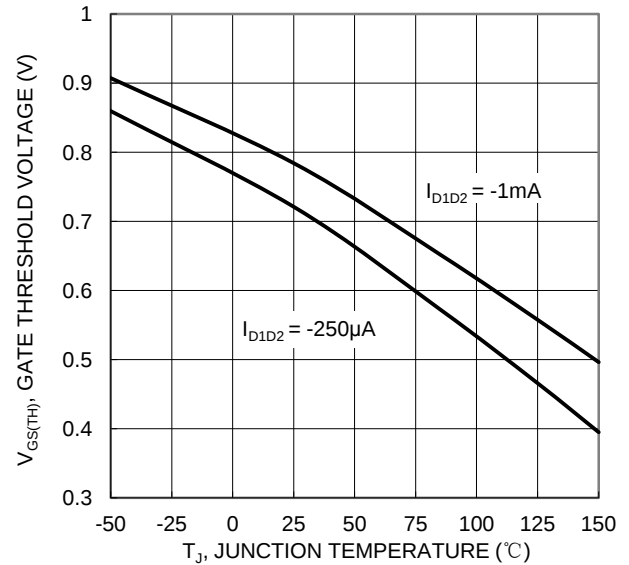


Figure 8. Gate Threshold Variation vs. Junction Temperature

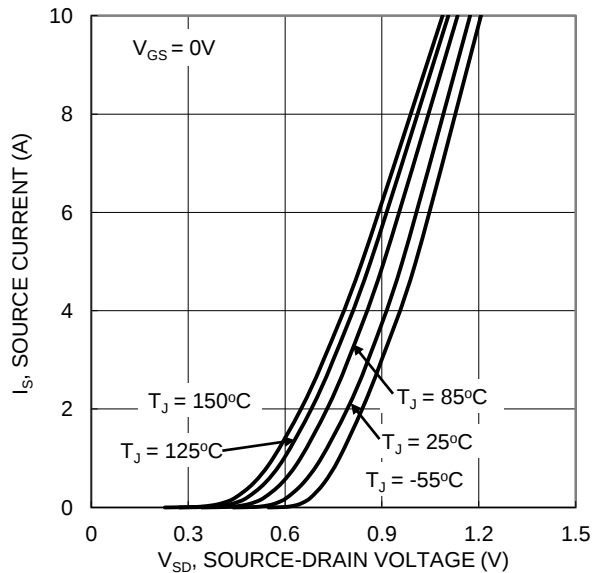


Figure 9. Diode Forward Voltage vs. Current

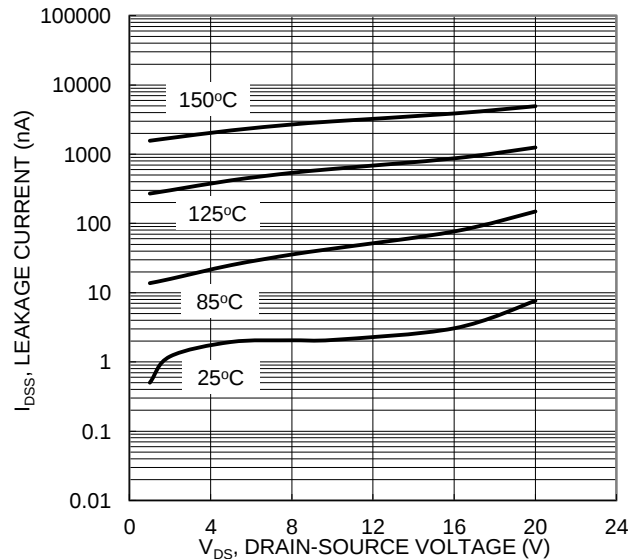


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

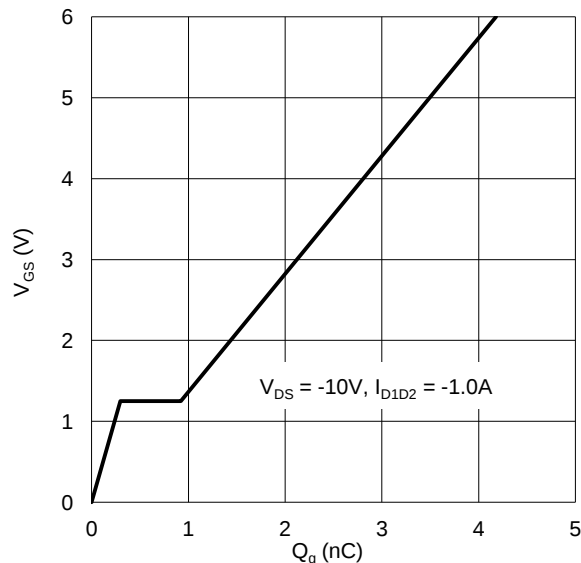


Figure 11. Gate Charge

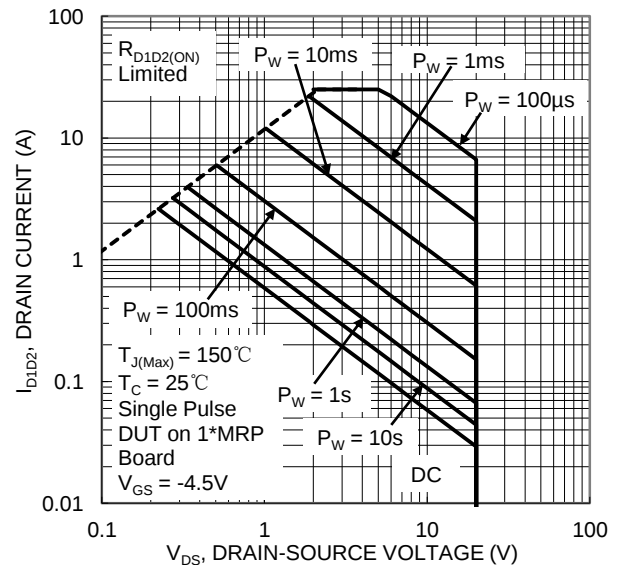


Figure 12. SOA, Safe Operation Area

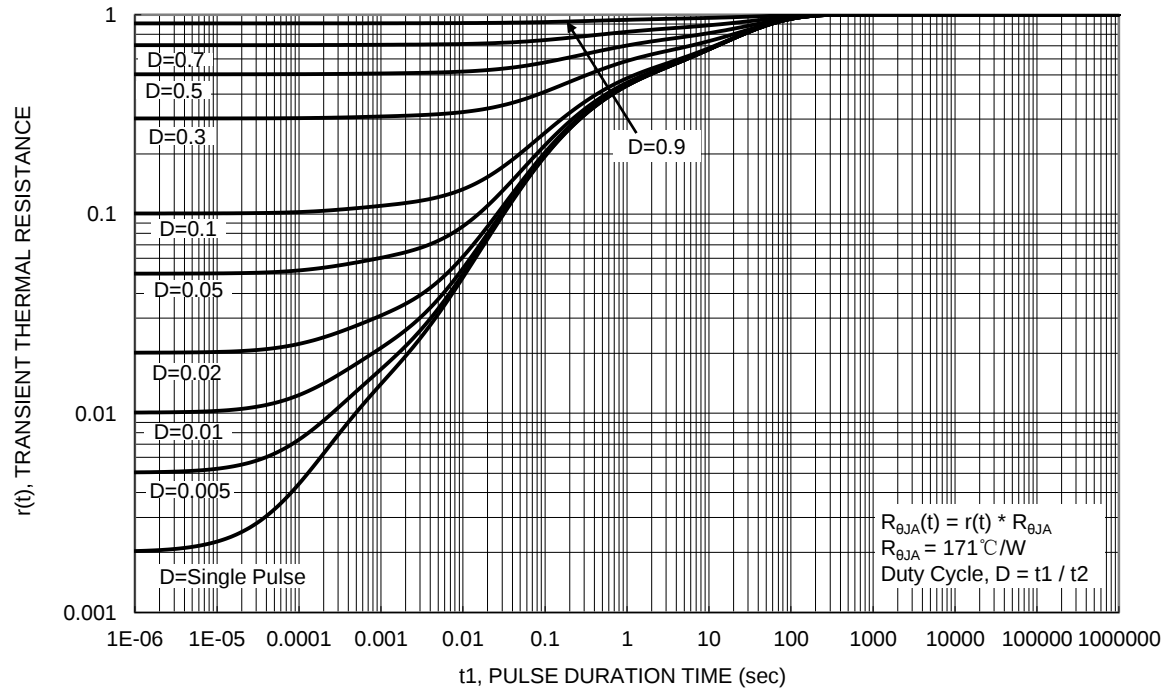
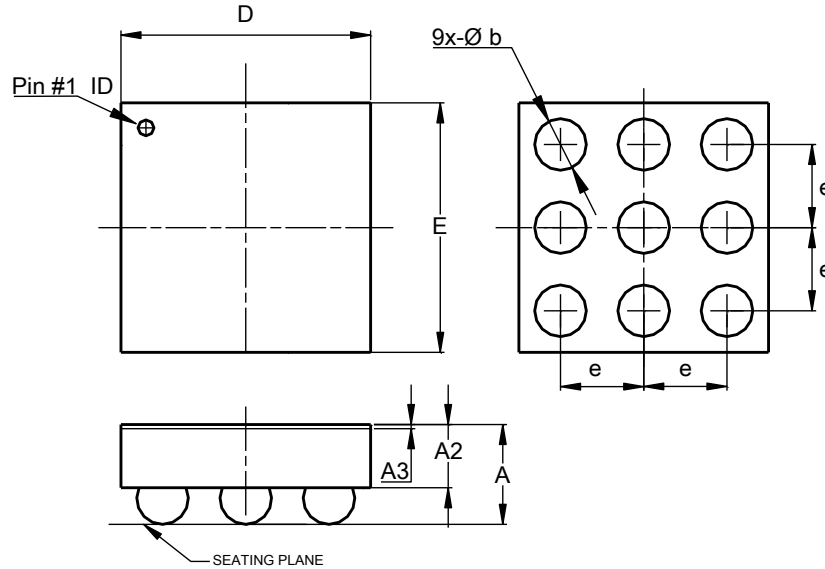


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

U-WLB1515-9 (Type E)

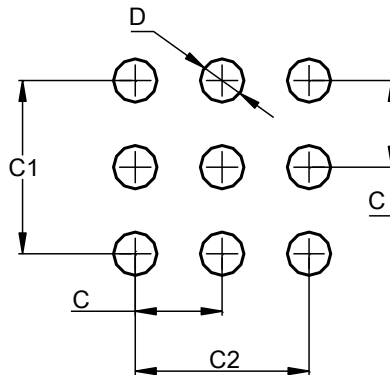


U-WLB1515-9 (Type E)			
Dim	Min	Max	Typ
A	--	0.62	--
A2	--	0.36	0.36
A3	0.020	0.030	0.025
b	0.27	0.37	0.32
D	1.47	1.51	1.49
E	1.47	1.51	1.49
e	--	--	0.50
All Dimensions in mm			

Suggested Pad Layout

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

U-WLB1515-9 (Type E)



Dimensions	Value (in mm)
C	0.50
C1	1.00
C2	1.00
D	0.25

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