DUAL P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{D1D2}	$R_{D1D2(ON)}$ Typ	I_{D1D2} T_A = +25°C
-20V	63mΩ @V_{GS} = -4.5V	-3.1A

Description

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

Applications

- Battery management
- Load switches
- Battery protections

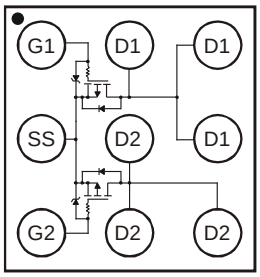
ESD PROTECTED

Features and Benefits

- LD-MOS Technology with the Lowest Figure of Merit:
  - $R_{D1D2(ON)}$ = 63mΩ to Minimize On-State Losses
  - Q_g = 3.2nC for Ultra-Fast Switching
- $V_{GS(TH)}$ = -0.74V typ for a Low Turn-On Potential
- CSP with Footprint 1.5mm × 1.5mm
- Height = 0.32mm for Low Profile
- **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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Mechanical Data

- Package: X2-DSN1515-9
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal: Finish - SnAg over Cu Pillar (e1)
- Solder Cap Material: SnAg (Ag: 2.0+/-0.5%)
- Terminal Connections: See Diagram Below
- Weight: 0.0015 grams (Approximate)



Top View

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP2101UCP9-7	X2-DSN1515-9 (Type B)	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

6M = Product Type Marking Code
YW = Date Code Marking
Y or $\overline{Y}$ = Year (ex: 3 = 2023)
W or $\overline{W}$ = Week (ex: a = week 27; z represents week 52 and 53)

Date Code Key

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	2	3	4	5	6	7	8	9	0	1	2	3

Week	1-26	27-52	53
Code	A-Z	a-z	z

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 T_A = +70°C	I_{D1D2}	-2.5 -2.0	A
Continuous Drain Current (Note 6) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_{D1D2}	-3.1 -2.5	A
Continuous Source Pin Current (Note 6)			I_S	-1.65	A
Pulsed Source Pin Current (Pulse Duration 10µs, Duty Cycle ≤ 1%)			I_{SM}	-22	A
Pulsed Drain Current (Pulse Duration 10µs, Duty Cycle ≤ 1%)			I_{DM}	-22	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	0.97	W
Total Power Dissipation (Note 6)	P_D	1.47	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	130.3	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	84.8	°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_{DDS}	—	—	-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 Forward Voltage (Note 6)	V_{SD}	—	-0.7	-1	V	V_{GS} = 0V, I_{D1D2} = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	392	—	pF	V_{D1D2} = -10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	183	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	8.4	—	pF	
Total Gate Charge	Q_g	—	3.2	—	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	—	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	—	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 1inch^2 (6.45cm^2), 2oz (0.071mm thick) Cu.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

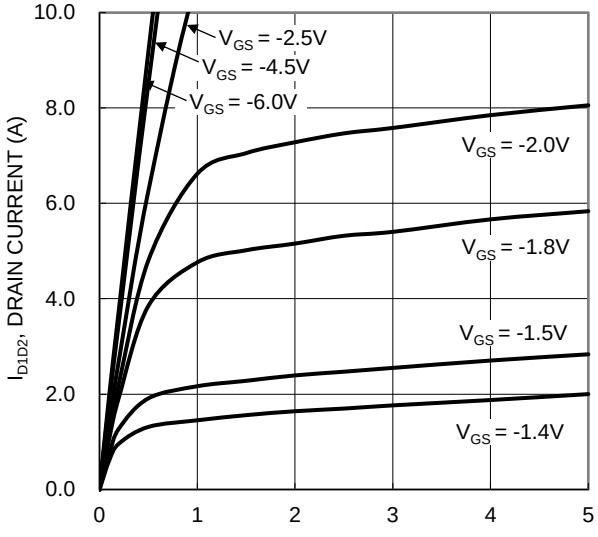


Figure 1. Typical Output Characteristic

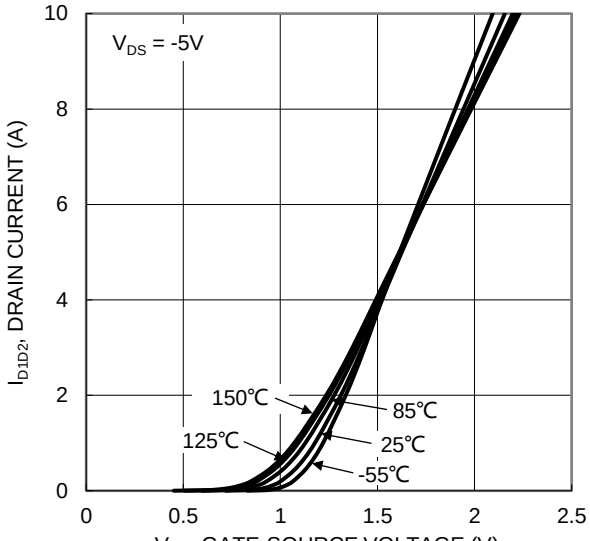


Figure 2. Typical Transfer Characteristic

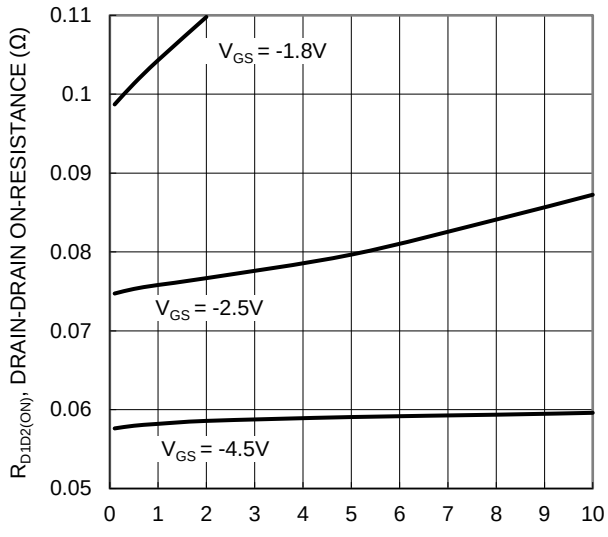


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

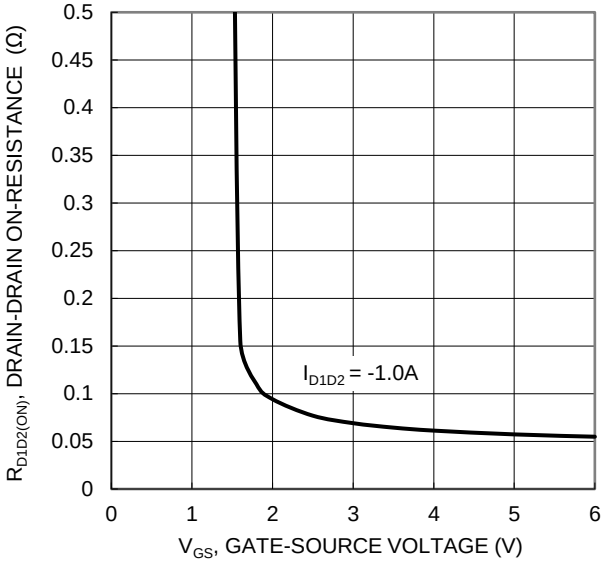


Figure 4. Typical Transfer Characteristic

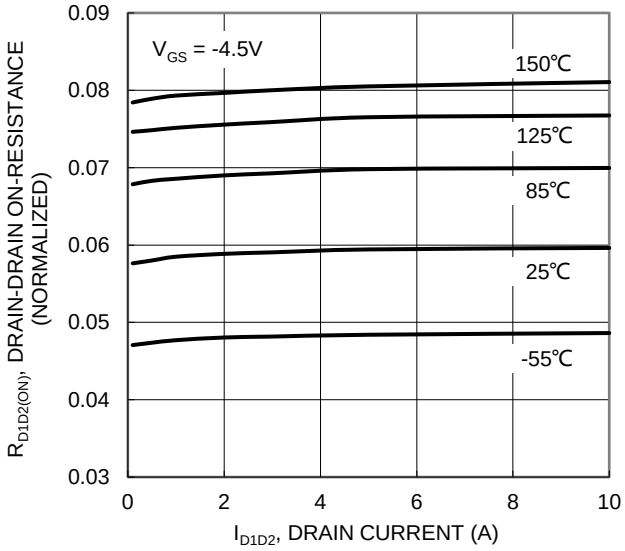


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

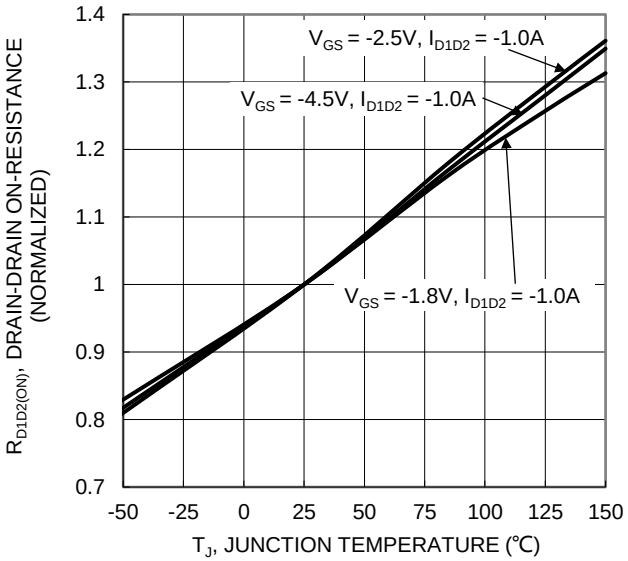


Figure 6. On-Resistance Variation with Junction Temperature

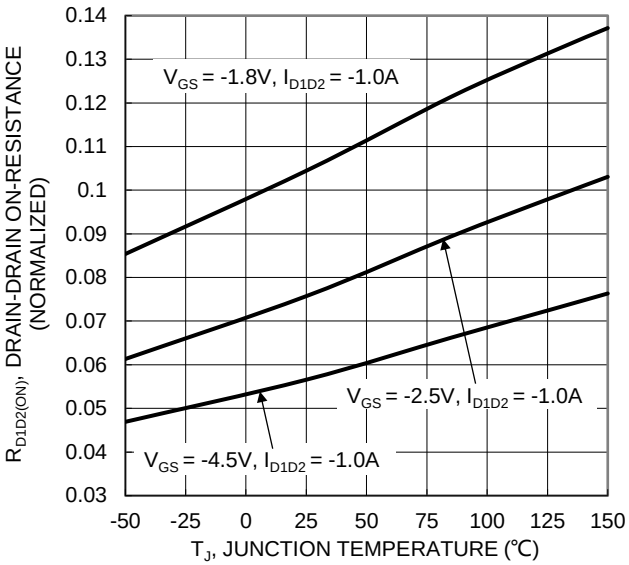


Figure 7. On-Resistance Variation with Junction Temperature

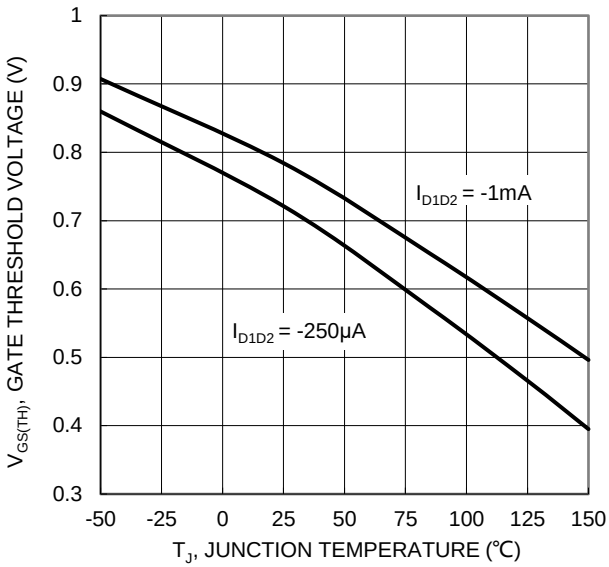


Figure 8. Gate Threshold Variation vs. Junction Temperature

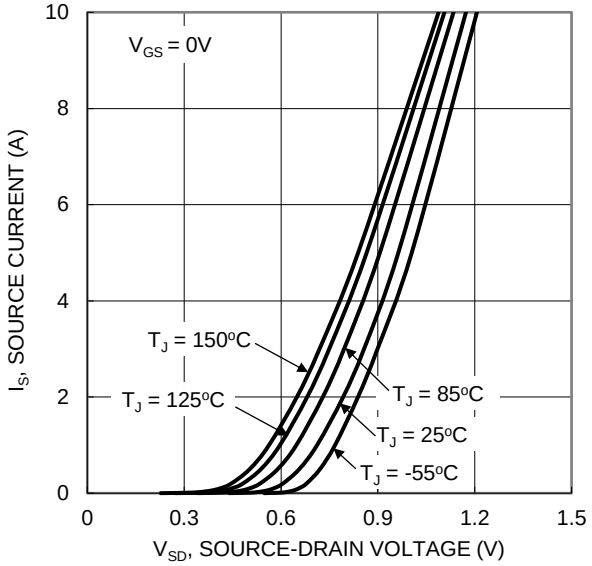


Figure 9. Diode Forward Voltage vs. Current

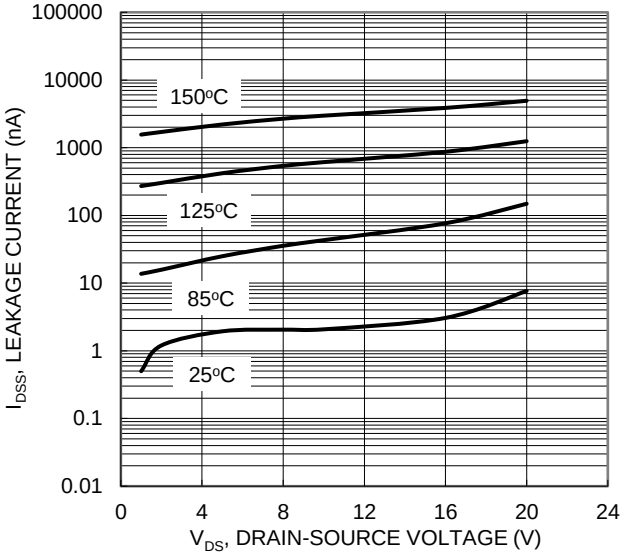


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

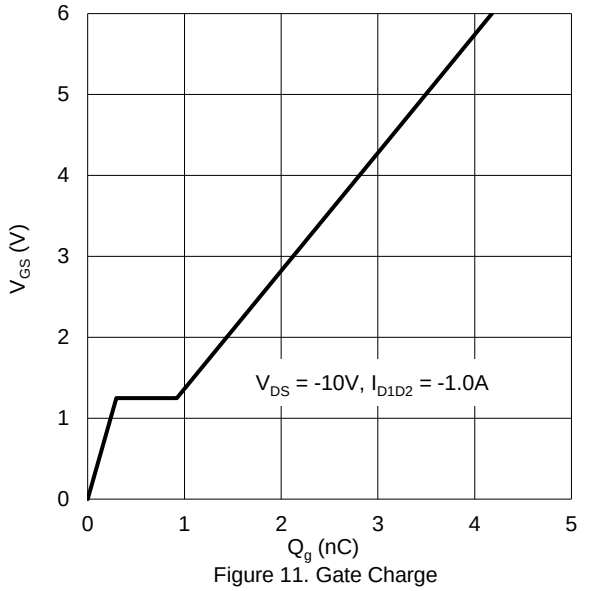


Figure 11. Gate Charge

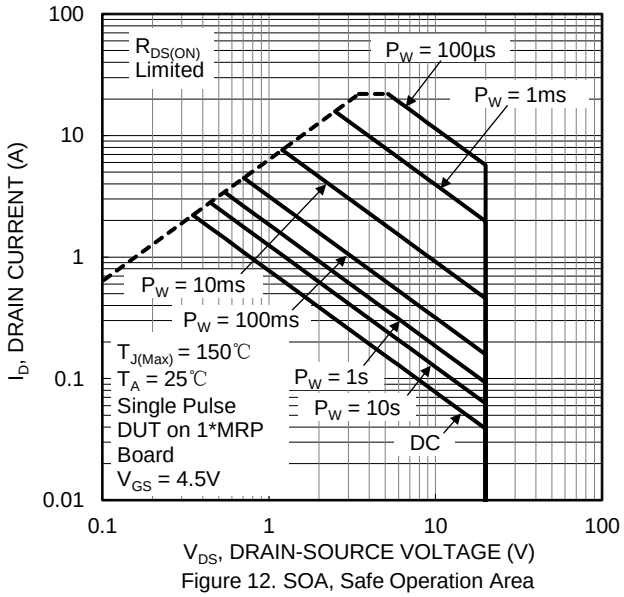


Figure 12. SOA, Safe Operation Area

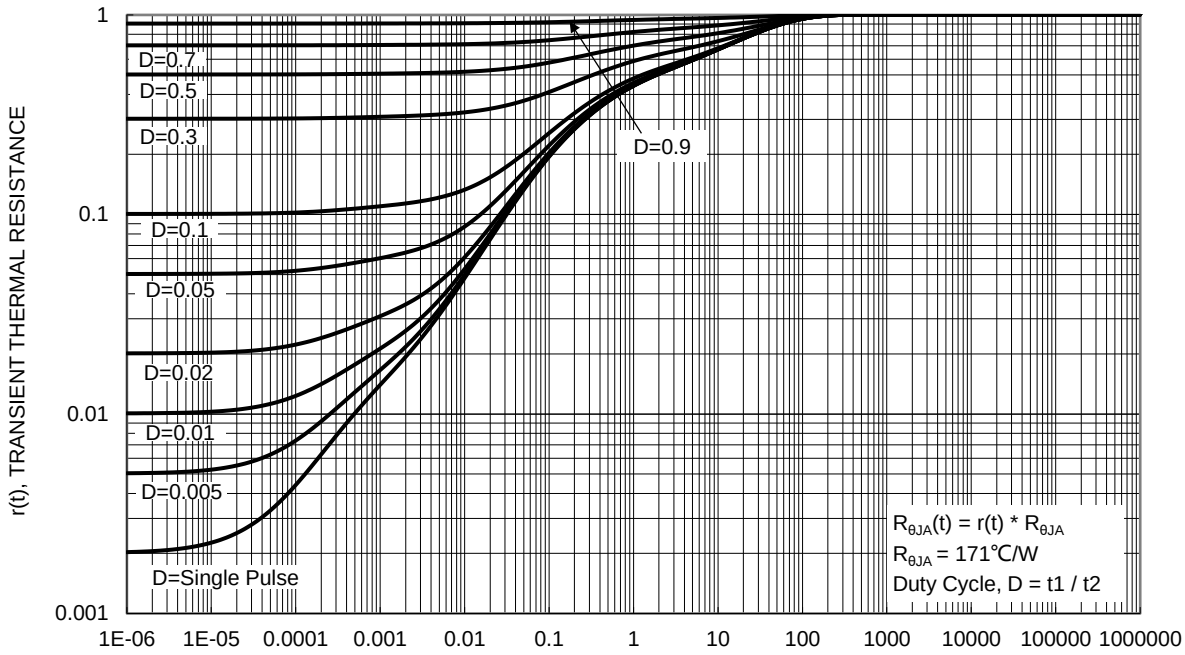
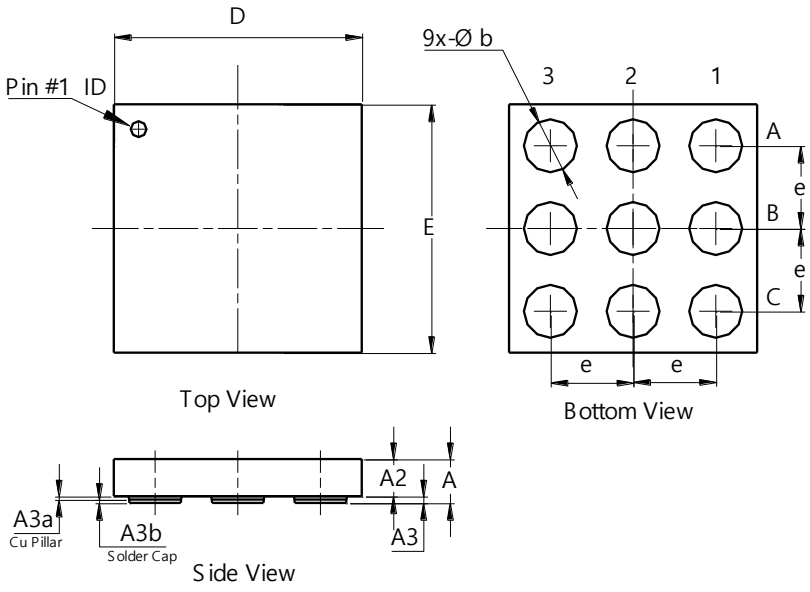


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X2-DSN1515-9 (Type B)

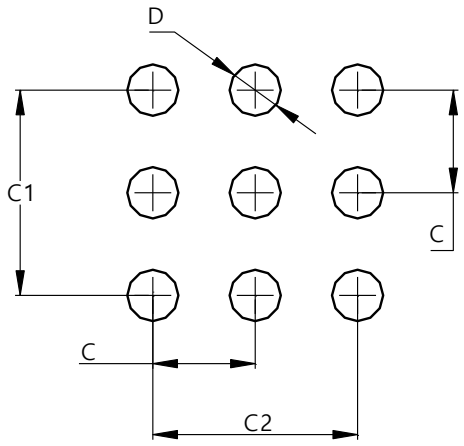


X2-DSN1515-9 (Type B)			
Dim	**Min**	**Max**	**Typ**
A	--	0.32	0.265
A2	--	--	0.225
A3	0.034	0.046	0.040
A3a	0.015	0.025	0.020
A3b	0.017	0.023	0.02
b	0.27	0.37	0.32
D	1.45	1.53	1.50
E	1.45	1.53	1.50
e	--	--	0.50
Co-planarity	≤0.005		
All Dimensions in mm			

Suggested Pad Layout

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

X2-DSN1515-9 (Type B)



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

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