

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _A = +25°C
-25V	40mΩ @ V _{GS} = -4.5V	-5.2

Description and Applications

This new generation 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.

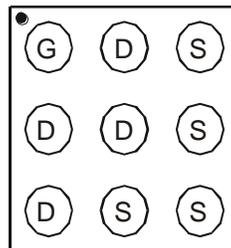
- Battery management
- Load switches
- Battery protections

Features and Benefits

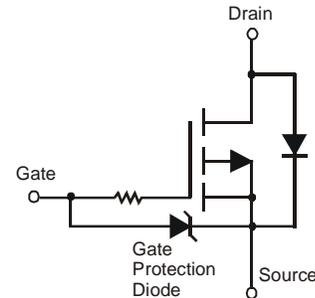
- Low Q_g & Q_{gd}
- Small Footprint 1.5mm × 1.5mm
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative.
<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Package: X2-DSN1515-9 (Note 4)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal: Finish - SnAg over Cu Pillar @1
- Solder Cap Material: SnAg (Ag: 2.0+/-0.5%)
- Terminal Connections: See Diagram Below
- UBM Size: 320μm
- Weight: 0.0015 grams (Approximate)



Top View
Pin Configuration



Equivalent Circuit

Ordering Information (Note 5)

Part Number	Package	Packing	
		Qty.	Carrier
DMP2541UCP9-7	X2-DSN1515-9 (Type B)	3,000	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. Device with exposed silicon sidewall is non-isolated area.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



3M = Product Type Marking Code
 YW = Date Code Marking
 Y or Y = Year (ex: 2 = 2022)
 W or 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-Source Voltage			V _{DSS}	-25	V
Gate-Source Voltage			V _{GSS}	-6	V
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	-3.8	A
		T _A = +70°C		-3.0	
Continuous Drain Current (Note 7) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	-5.2	A
		T _A = +70°C		-4.2	
Pulsed Drain Current (Pulse Duration 10μs, Duty Cycle ≤ 1%)			I _{DM}	-35	A
Continuous Source Pin Current (Note 7)			I _S	-1.5	A
Pulsed Source Pin Current (Pulse Duration 10μs, Duty Cycle ≤ 1%)			I _{SM}	-35	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	0.9	W
Total Power Dissipation (Note 7)	P _D	1.67	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	139	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	75	°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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-25	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current @T _C = +25°C	I _{DSS}	—	—	-1	μA	V _{DS} = -20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	-100	nA	V _{GS} = -6V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-0.4	-0.78	-1.1	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	28	40	mΩ	V _{GS} = -4.5V, I _D = -2A
			36	50		
			51	60		
Diode Forward Voltage (Note 6)	V _{SD}	—	-0.74	-1	V	V _{GS} = 0V, I _S = -2A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	566	—	pF	V _{DS} = -10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	343	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	20	—	pF	
Series Gate Resistance	R _g	—	12.1	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q _g	—	4.7	—	nC	V _{GS} = -4.5V, V _{DS} = -10V, I _D = -2A
Gate-Source Charge	Q _{gs}	—	0.6	—	nC	
Gate-Drain Charge	Q _{gd}	—	1.0	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.4	—	ns	V _{DD} = -10V, V _{GS} = -4.5V, I _{DS} = -2A, R _g = 2Ω
Turn-On Rise Time	t _R	—	6.5	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	55	—	ns	
Turn-Off Fall Time	t _F	—	43	—	ns	

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

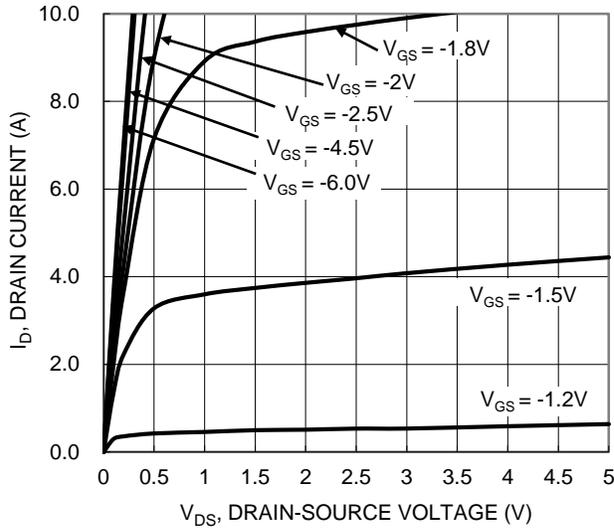


Figure 1. Typical Output Characteristic

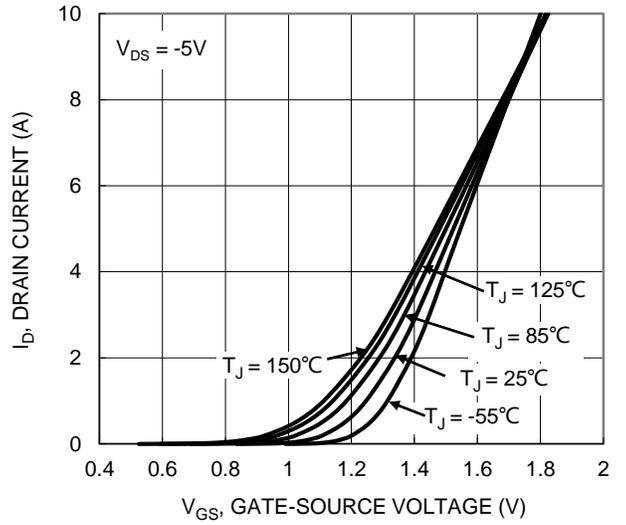


Figure 2. Typical Transfer Characteristic

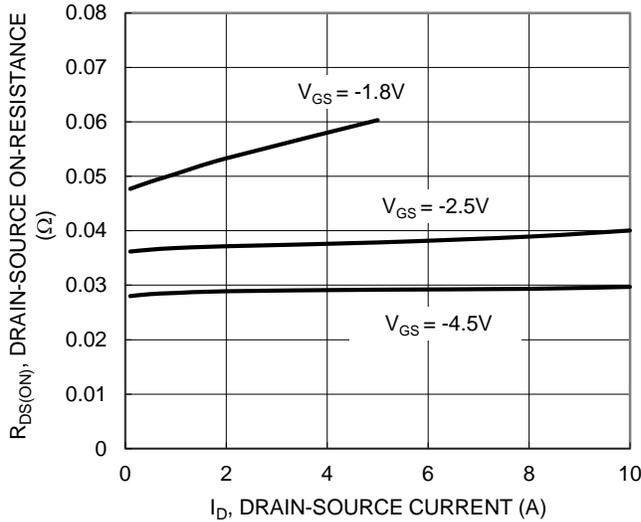


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

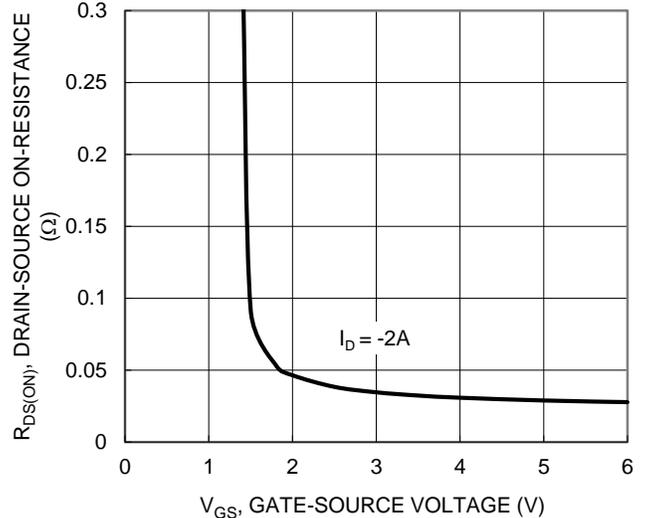


Figure 4. Typical Transfer Characteristic

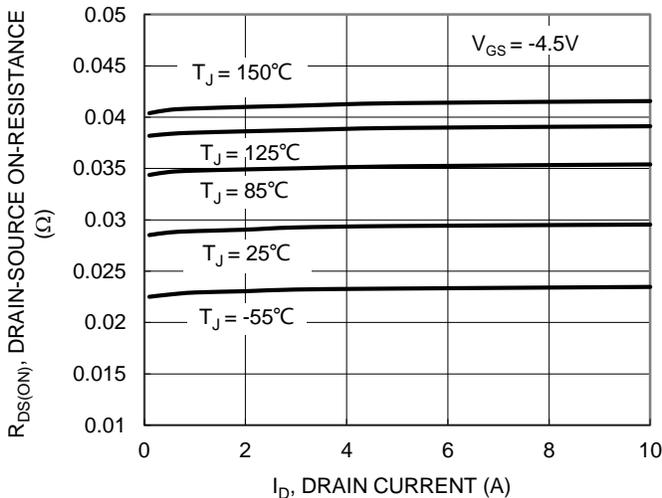


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

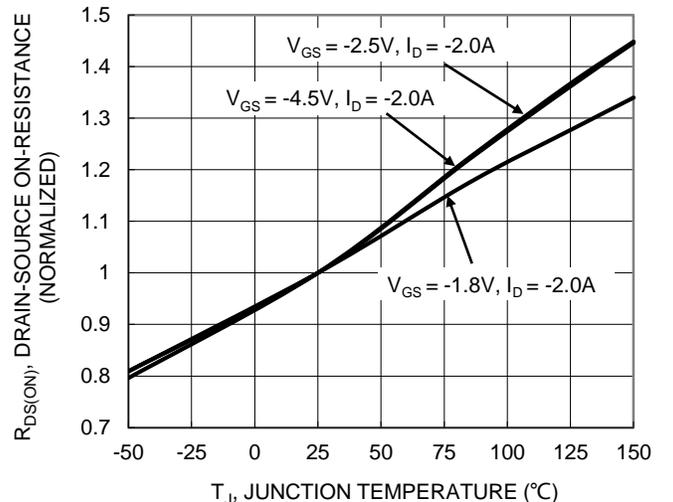


Figure 6. On-Resistance Variation with Junction Temperature

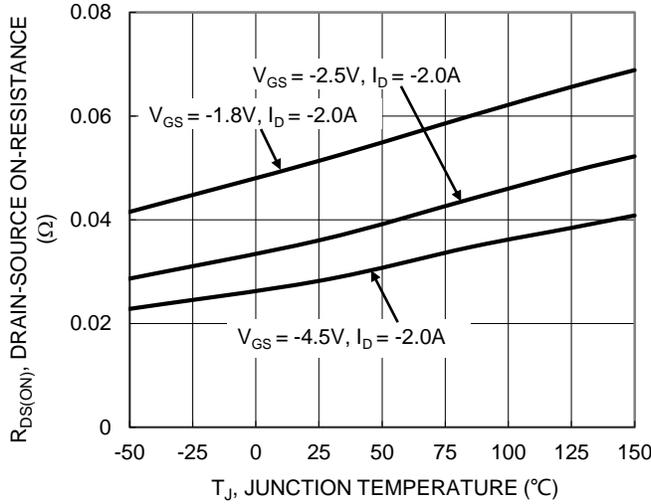


Figure 7. On-Resistance Variation with Junction Temperature

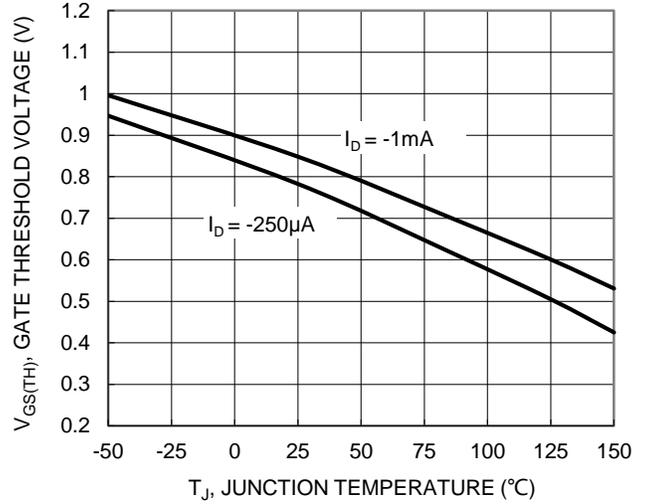


Figure 8. Gate Threshold Variation vs. Junction Temperature

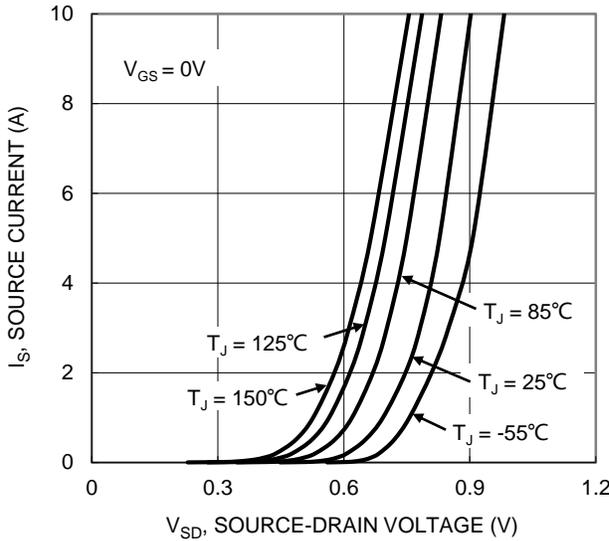


Figure 9. Diode Forward Voltage vs. Current

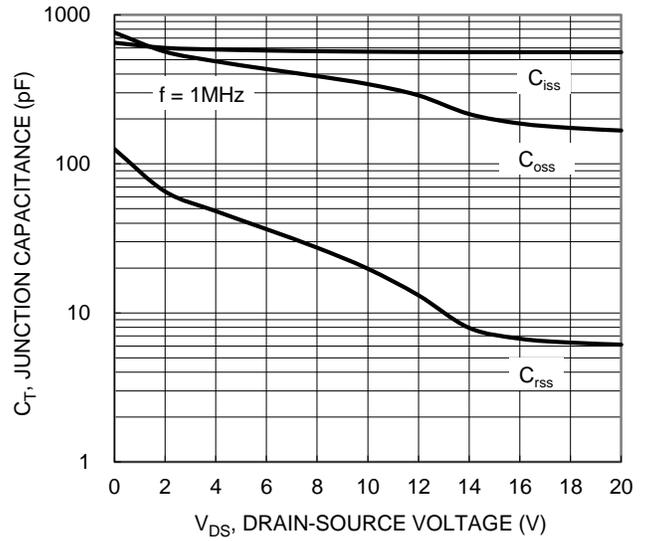


Figure 10. Typical Junction Capacitance

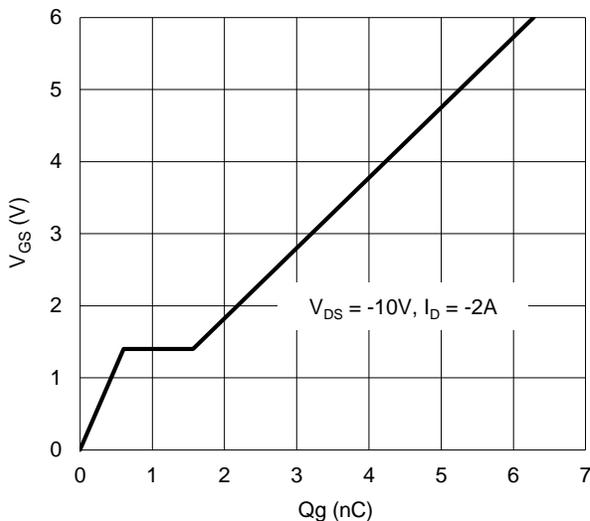


Figure 11. Gate Charge

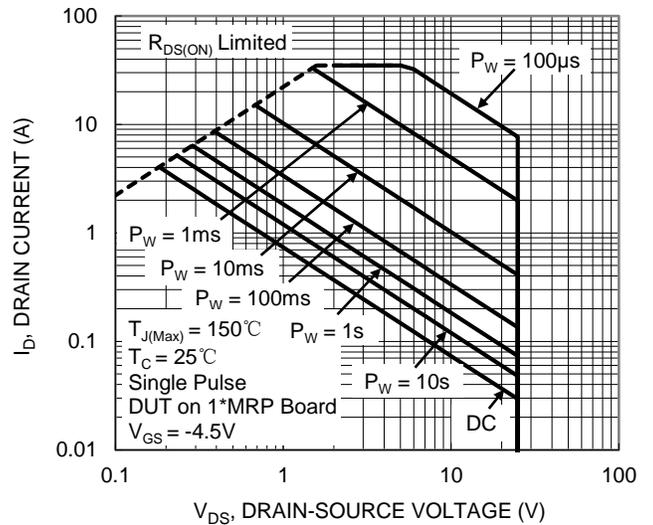


Figure 12. SOA, Safe Operation Area

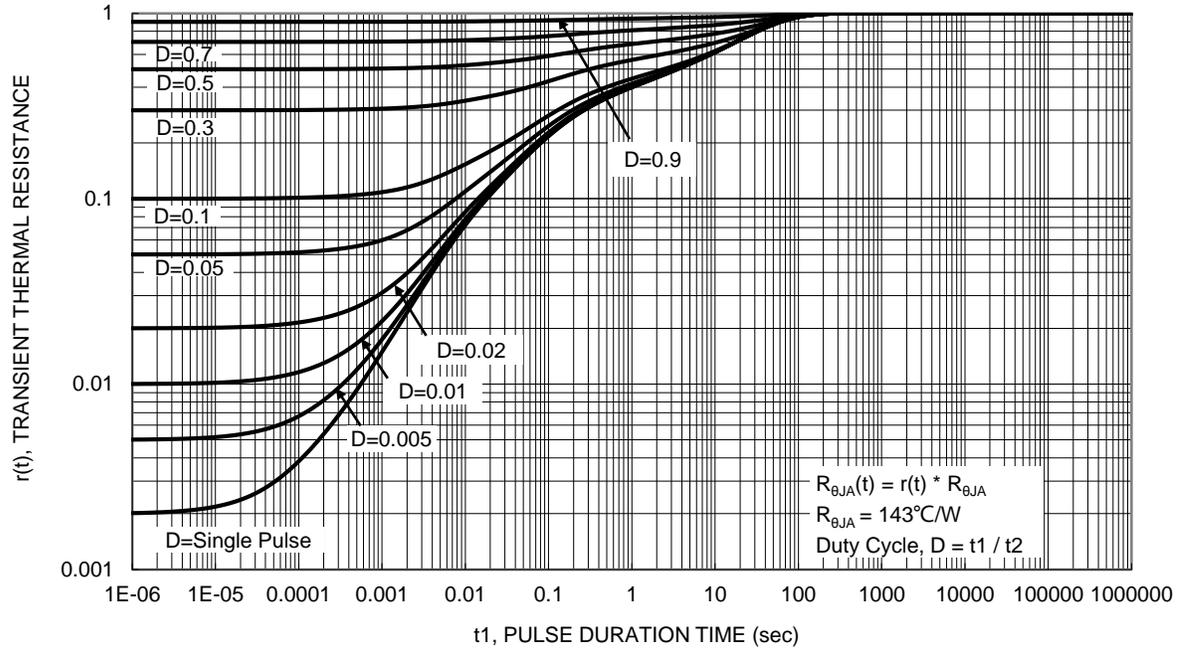
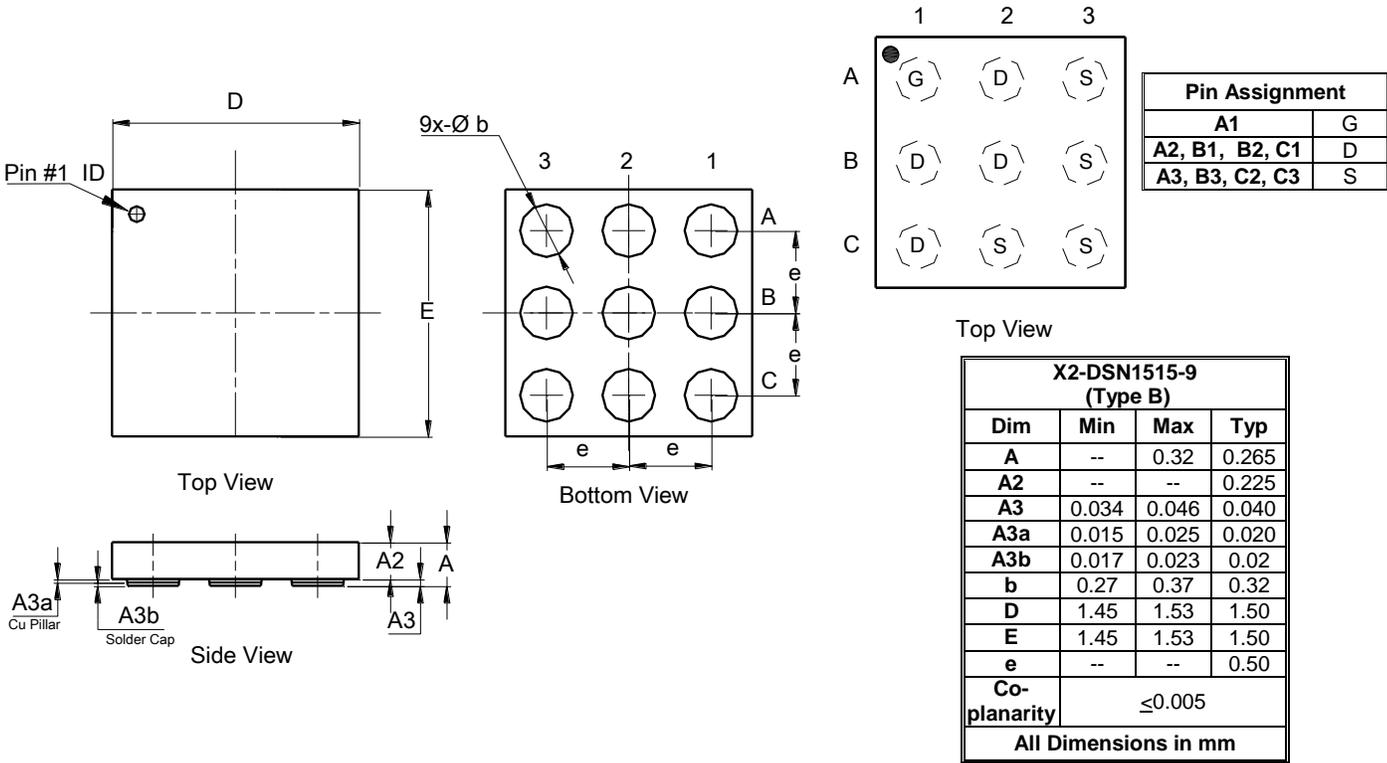


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

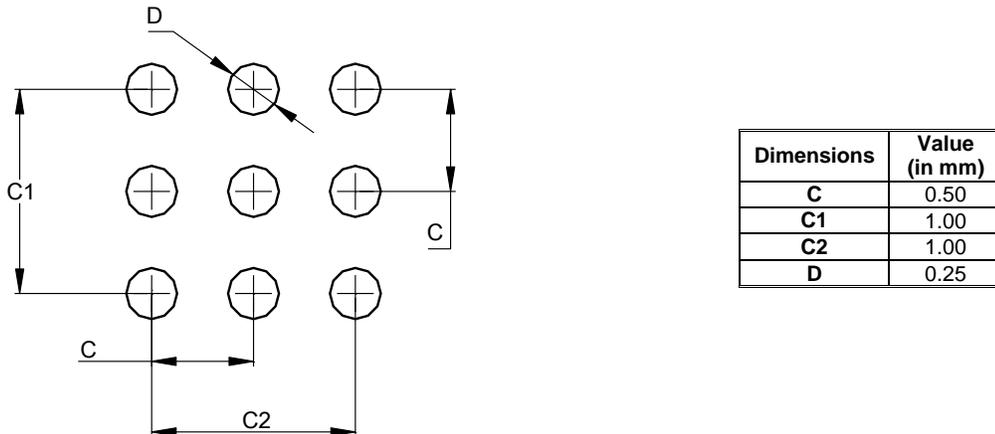
X2-DSN1515-9 (Type B)



Suggested Pad Layout

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

X2-DSN1515-9 (Type B)



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