DIODES INCORPORATED

Lead-free Green

DMN2022UCA4

N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{SSS}	$R_{SS(ON)}$ Min	I_S Max T_A = +25°C
24V	12mΩ @ V_{GS} = 4.5V	7.8A

Description

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

Applications

- Battery managements
- Load switches
- Battery protections

Features

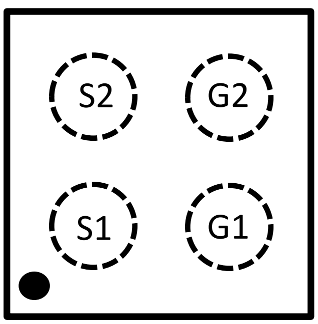
- CSP with Footprint 1.75mm × 1.75mm
- Height = 0.120mm (Typical) for Low Profile
- ESD Protection of Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts 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/**

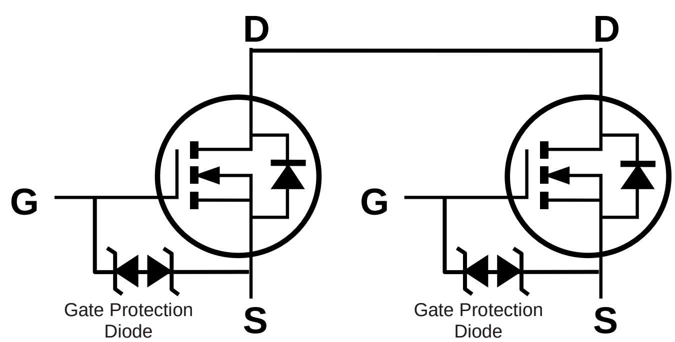
Mechanical Data

- Package: X4-DSN1717-4
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiAu. Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.0012 grams (Approximate)

ESD PROTECTED

Top View





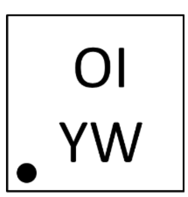
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Package	Packing Qty.	Packing Carrier
DMN2022UCA4-7	X4-DSN1717-4	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



OI = 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
Source-Source Voltage			V_{SSS}	24	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Source Current (Note 5) V_{GS} = 4.5V	Steady State	T_A = +25°C	I_S	7.8	A
		T_A = +70°C		6.3	
Continuous Source Current (Note 5) V_{GS} = 2.5V	Steady State	T_A = +25°C	I_S	6.0	A
		T_A = +70°C		4.8	
Pulsed Source Current (Note 6)			I_{SM}	65	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P_D	1.0	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 7)	$R_{\theta JA}$	117	°C/W
Power Dissipation (Note 5)	P_D	2.0	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	62	°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)						
Source -Source Breakdown Voltage	BV_{SSS}	24	—	—	V	V_{GS} = 0V, I_S = 1mA
Zero Gate Voltage Drain Current T_J = +25°C	I_{SSS}	—	—	1	µA	V_{SS} = 19.2V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±8V, V_{SS}=0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	—	1.4	V	V_{SS} = 10V, I_S = 1mA
Static Source-Source On-Resistance	$R_{SS(ON)}$	12	12.1	22	mΩ	V_{GS} = 4.5V, I_S = 3A
		13	13.7	28		V_{GS} = 3.1V, I_S = 3A
		15	16.6	37		V_{GS} = 2.5V, I_S = 3A
Diode Forward Voltage	V_{SS}	—	—	1.2	V	V_{GS} = 0V, I_S = 6A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1438	—	pF	V_{SS} = 10V, V_{GS} = 0V, f = 1.0kHz
Output Capacitance	C_{oss}	—	182	—		
Reverse Transfer Capacitance	C_{rss}	—	108	—		
Total Gate Charge	Q_g	—	12.5	—	nC	V_{DD} = 10V, V_{GS} = 4V, I_S = 6A
Gate-Source Charge	Q_{gs}	—	3.8	—		
Gate-Drain Charge	Q_{gd}	—	2.7	—		
Turn-On Delay Time	$t_{D(ON)}$	—	0.20	—	µs	V_{DD} = 10V, V_{GS} = 4V, I_S = 3A
Turn-On Rise Time	t_R	—	0.38	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	0.83	—		
Turn-Off Fall Time	t_F	—	0.46	—		

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

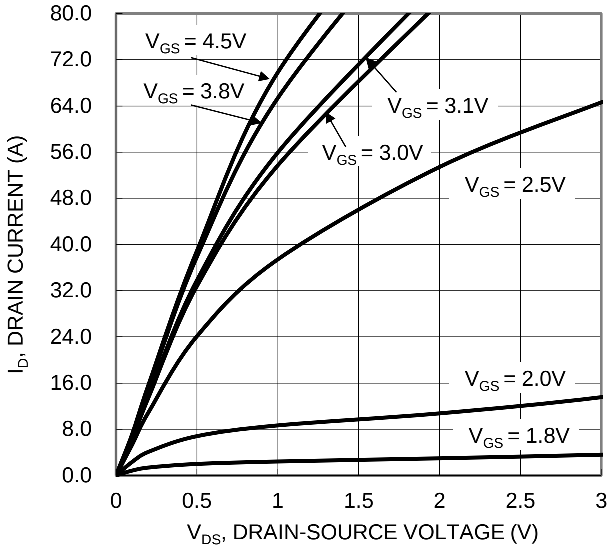


Figure 1. Typical Output Characteristic

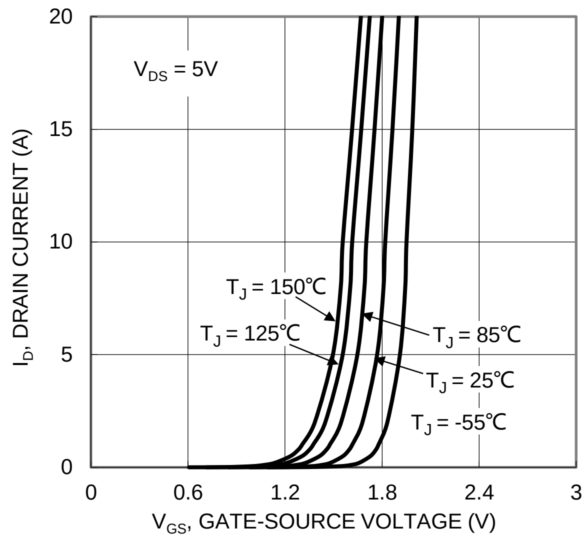


Figure 2. Typical Transfer Characteristic

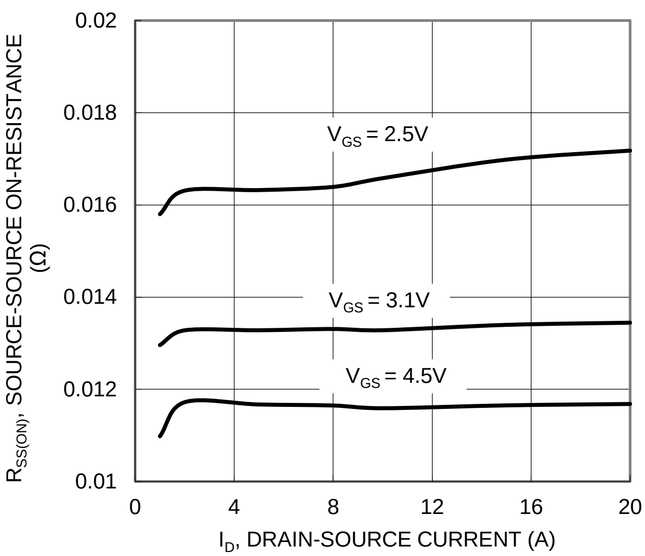


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

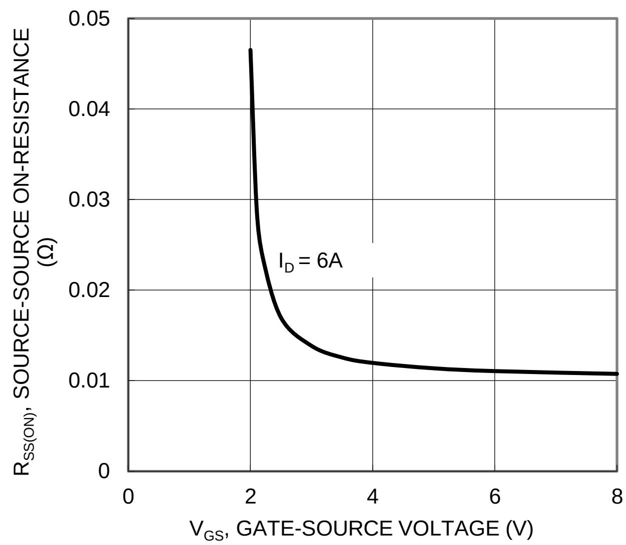


Figure 4. Typical Transfer Characteristic

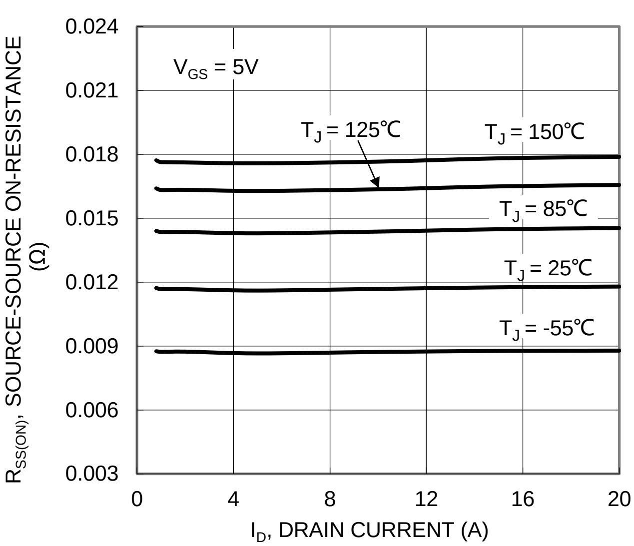


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

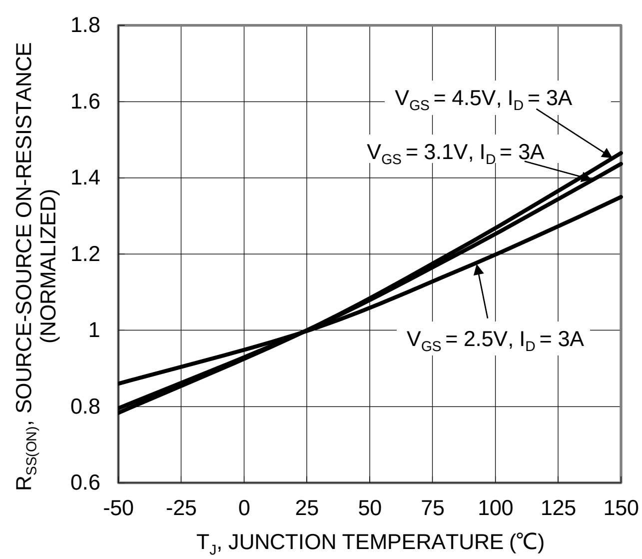


Figure 6. On-Resistance Variation with Temperature

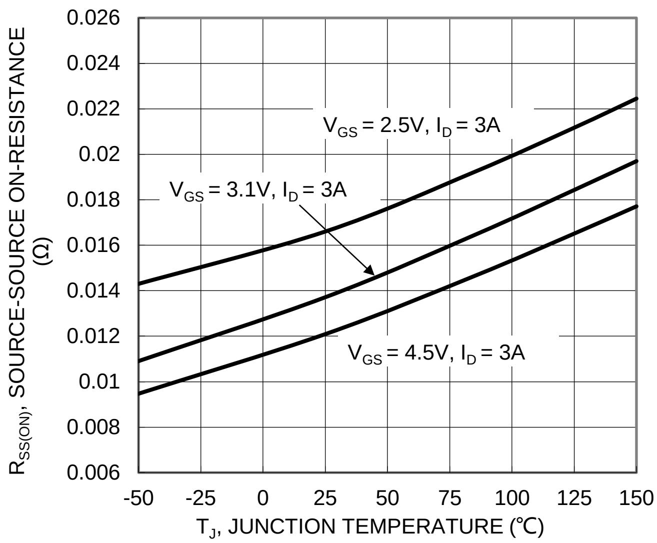


Figure 7. On-Resistance Variation with Temperature

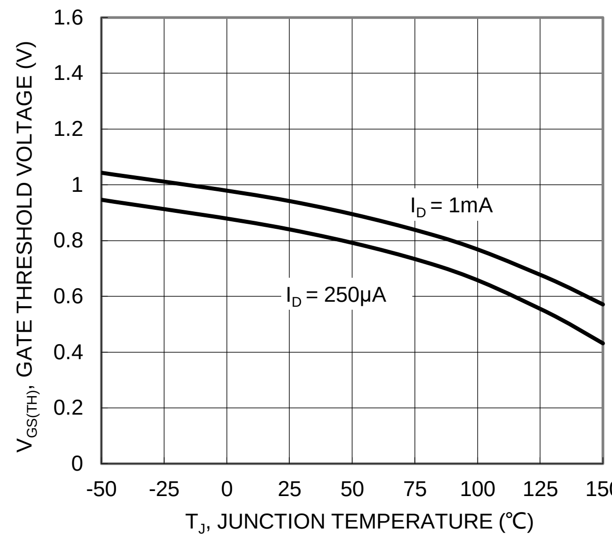


Figure 8. Gate Threshold Variation vs. Junction Temperature

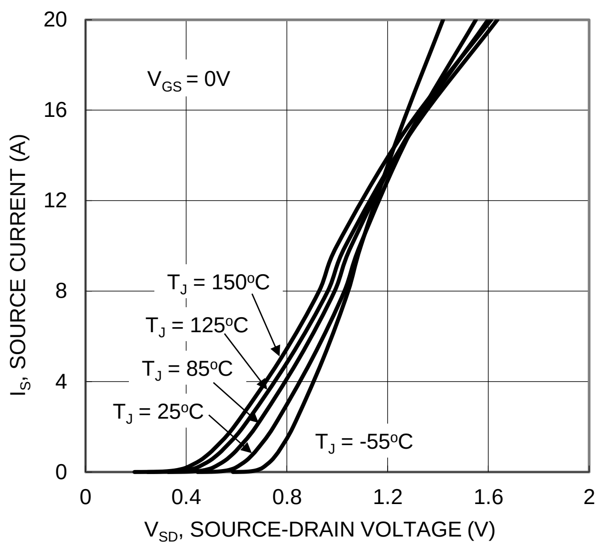


Figure 9. Diode Forward Voltage vs. Current

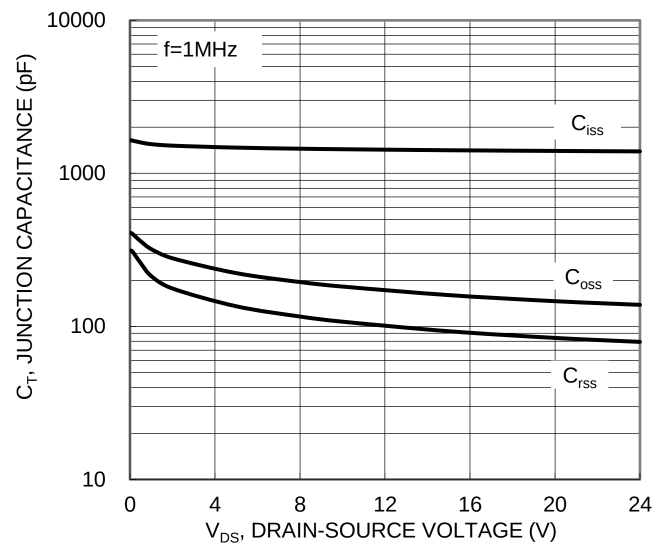


Figure 10. Typical Junction Capacitance

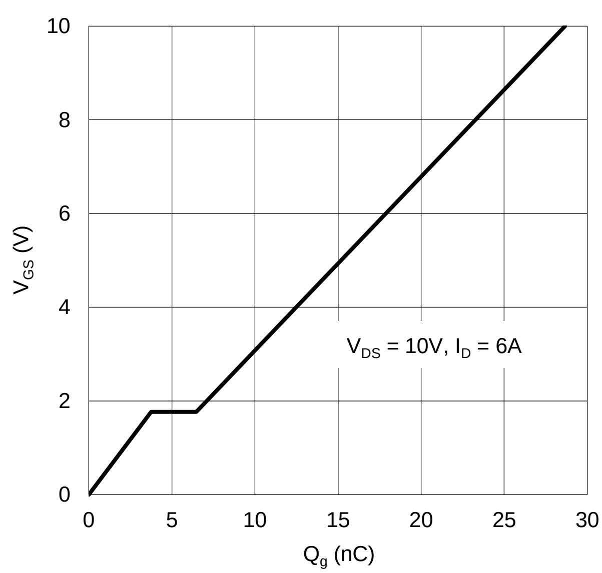


Figure 11. Gate Charge

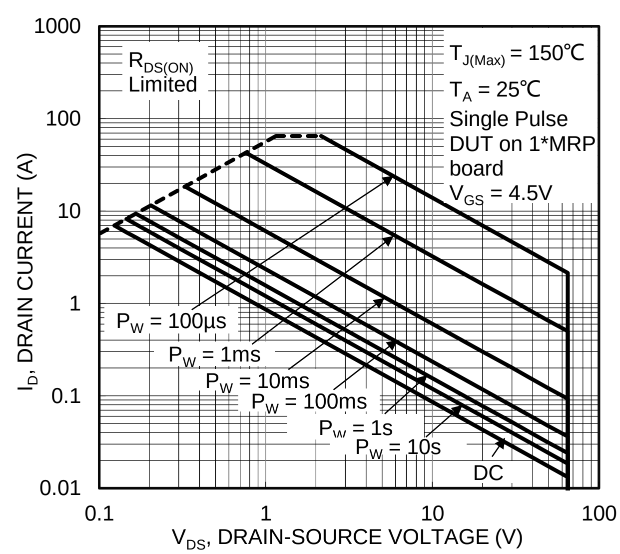


Figure 12. SOA, Safe Operation Area

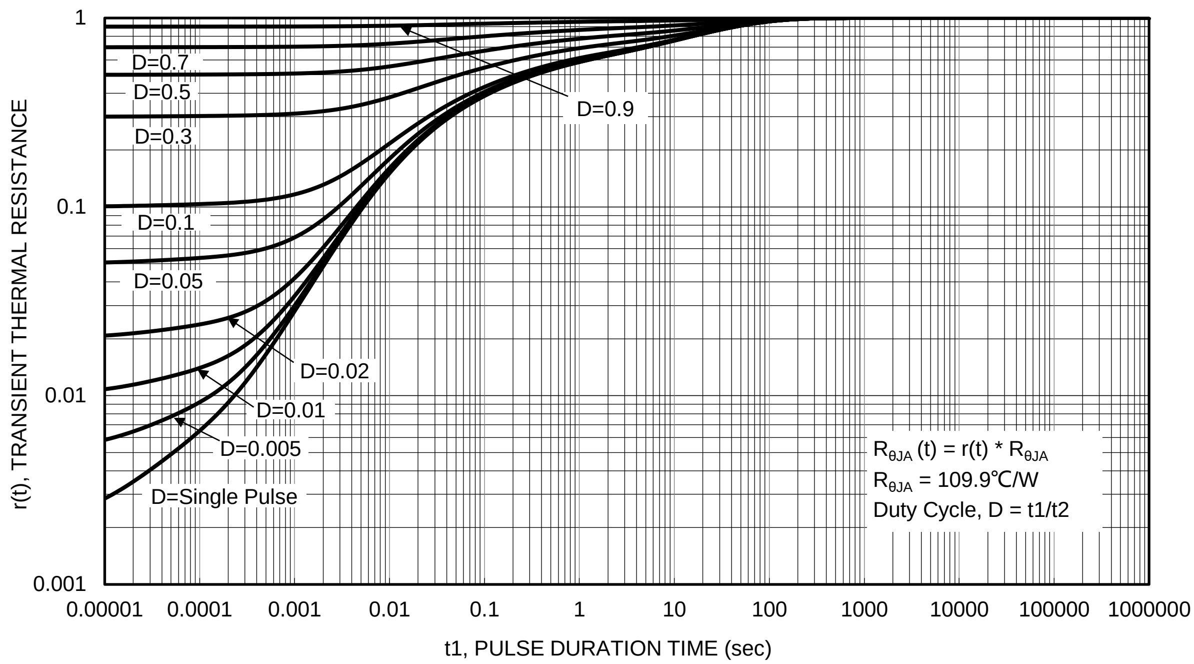
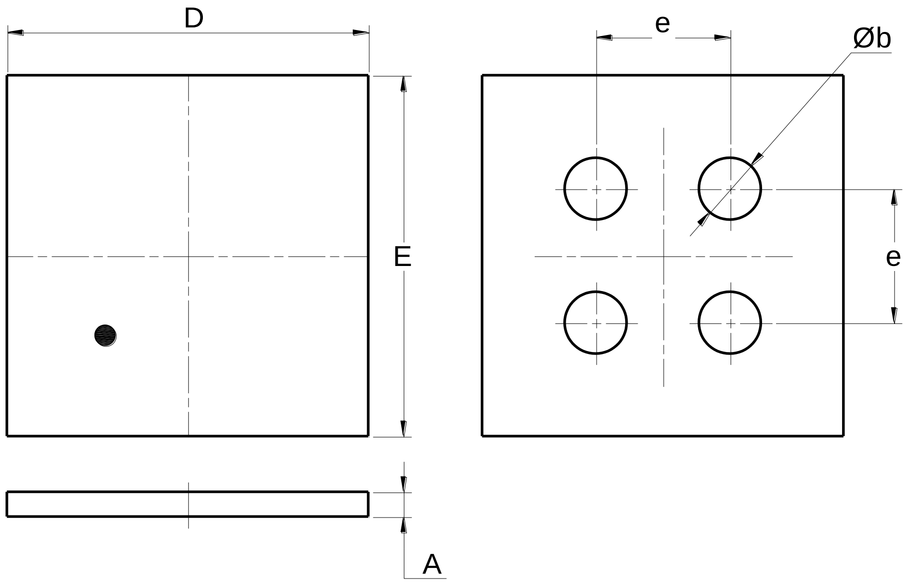


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X4-DSN1717-4

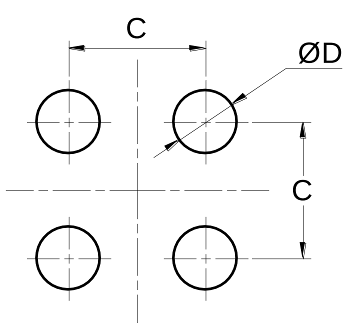


X4-DSN1717-4			
Dim	**Min**	**Max**	**Typ**
A	0.080	0.150	0.120
b	0.270	0.330	0.300
D	1.710	1.790	1.750
E	1.710	1.790	1.750
e	0.650 BSC		
All Dimensions in mm			

Suggested Pad Layout

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

X4-DSN1717-4



Dimensions	Value (in mm)
C	0.650
D	0.300

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