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Lead-free Green

DMN3006SCA6

N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{SSS}	$R_{SS(ON)\ Typ}$	$I_{S\ Max}$ T_A = +25°C
30V	4.8mΩ @ V_{GS} = 8V	13.0A
	6.3mΩ @ V_{GS} = 4.5V	11.5A

Features

- CSP with Footprint 3.5mm × 1.9mm
- Height = 0.11mm for Low Profile
- ESD Protection of Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen- and Antimony-Free. "Green" Device (Note 3)**

Description

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

Mechanical Data

- Case: X4-DSN3519-6
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu or NiAu. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.0012 grams (Approximate)

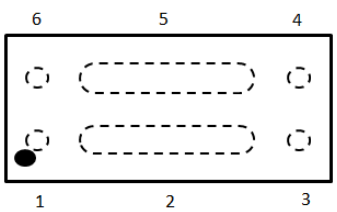
Applications

- Battery Management
- Load Switch
- Battery Protection



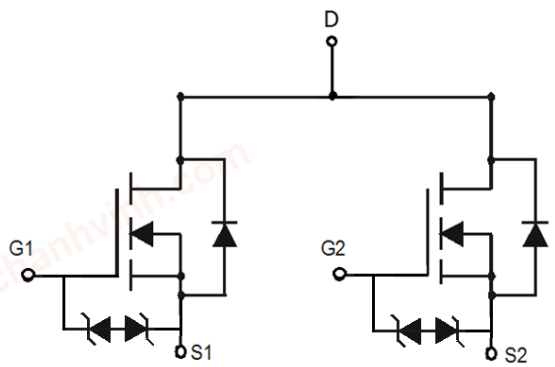
ESD PROTECTED

X4-DSN3519-6



1. Gate 1
2. Source 1
3. Drain
4. Drain
5. Source 2
6. Gate 2

Top View



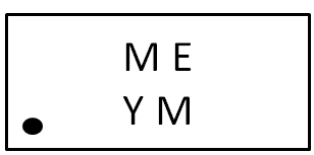
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3006SCA6-7	X4-DSN3519-6	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



ME = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: H = 2020)
M or $\overline{M}$ = Month (ex: 9 = September)

Date Code Key

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028
Code	H	I	J	K	L	M	N	O	P

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

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Maximum Ratings (@ T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Source-Source Voltage			V_{SSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Source Current (Note 5) V_{GS} = 8V	Steady State	T_A = +25°C T_A = +70°C	I_S	13.0 10.5	A
Continuous Source Current (Note 5) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_S	11.5 9.0	A
Pulsed Source Current (Note 6)			I_{SM}	80	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P_D	0.8	W
Thermal Resistance, Junction to Ambient @ T_A = +25°C (Note 7)	$R_{\theta JA}$	162	°C/W
Power Dissipation (Note 5)	P_D	1.8	W
Thermal Resistance, Junction to Ambient @ T_A = +25°C (Note 5)	$R_{\theta JA}$	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 8)						
Source-Source Breakdown Voltage	BV_{SSS}	30	—	—	V	V_{GS} = 0V, I_S = 1mA
Zero Gate Voltage Drain Current T_J = +25°C	I_{SSS}	—	—	1	μA	V_{SS} = 24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	μA	V_{GS} = ±20V, V_{SS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.3	—	2.2	V	V_{SS} = 10V, I_S = 1mA
Static Source-Source On-Resistance	$R_{SS(ON)}$	2.5	4.6	5.5	mΩ	V_{GS} = 10V, I_S = 5A
		2.7	4.8	7.2		V_{GS} = 8V, I_S = 5A
		3.0	6.3	9.0		V_{GS} = 4.5V, I_S = 5A
Diode Forward Voltage	V_{SS}	—	0.95	1.2	V	V_{GS} = 0V, I_S = 5A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	2235	—	pF	V_{SS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	414	—		
Reverse Transfer Capacitance	C_{rss}	—	274	—		
Total Gate Charge	Q_g	—	17.7	—	nC	V_{SS} = 15V, V_{GS} = 4.5V, I_S = 5A
Gate-Source Charge	Q_{gs}	—	4.9	—		
Gate-Drain Charge	Q_{gd}	—	6.1	—		
Gate Charge at V_{TH}	$Q_{g(TH)}$	—	3.0	—		
Turn-On Delay Time	$t_{D(ON)}$	—	5.6	—	ns	V_{SS} = 15V, V_{GS} = 10V, I_S = 5A
Turn-On Rise Time	t_R	—	8.7	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	41.6	—		
Turn-Off Fall Time	t_F	—	20.9	—		

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.

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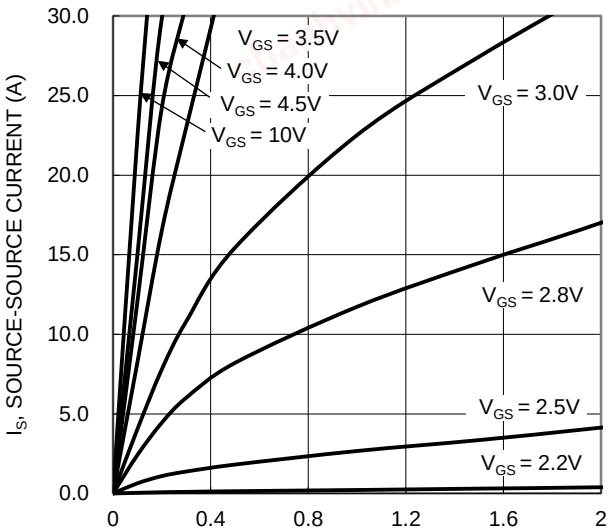


Figure 1. Typical Output Characteristic

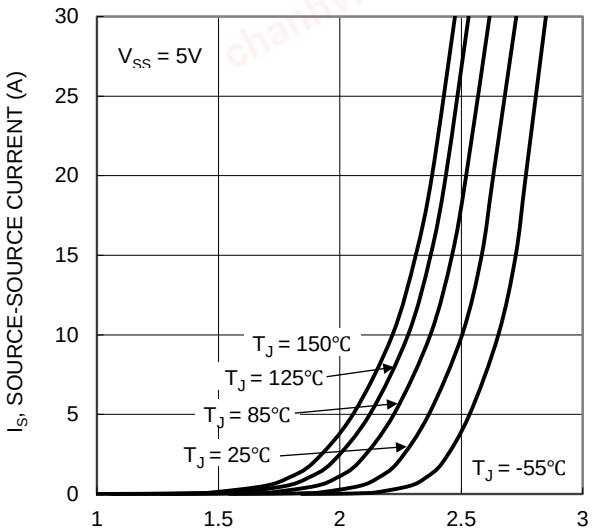


Figure 2. Typical Transfer Characteristic

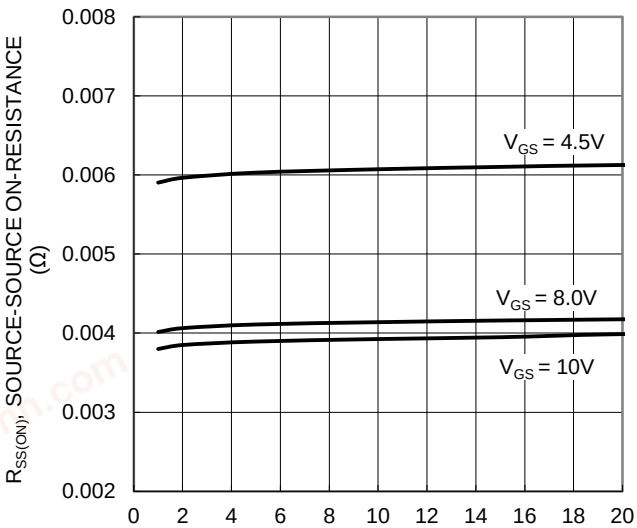


Figure 3. Typical On-Resistance vs. Source Current and Gate Voltage

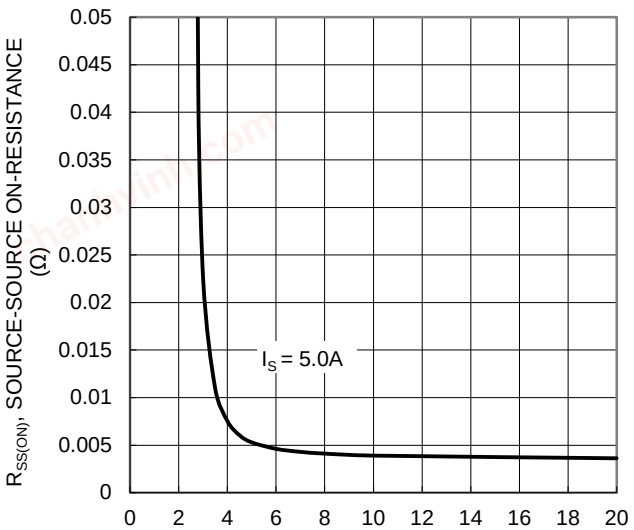


Figure 4. Typical Transfer Characteristic

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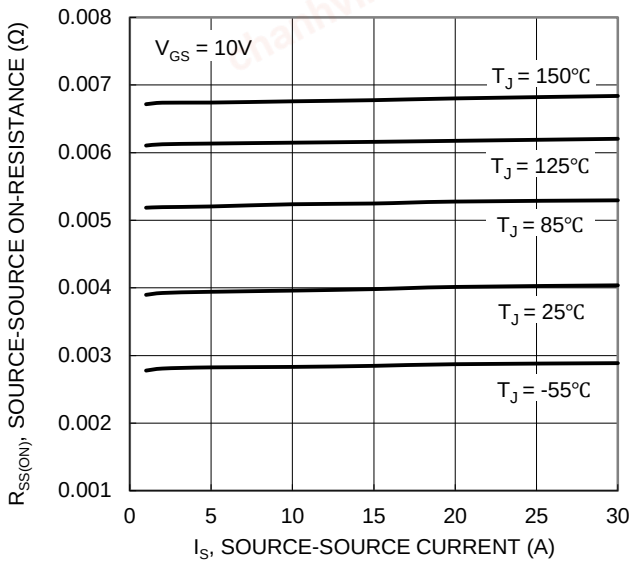


Figure 5. Typical On-Resistance vs. Source Current and Junction Temperature

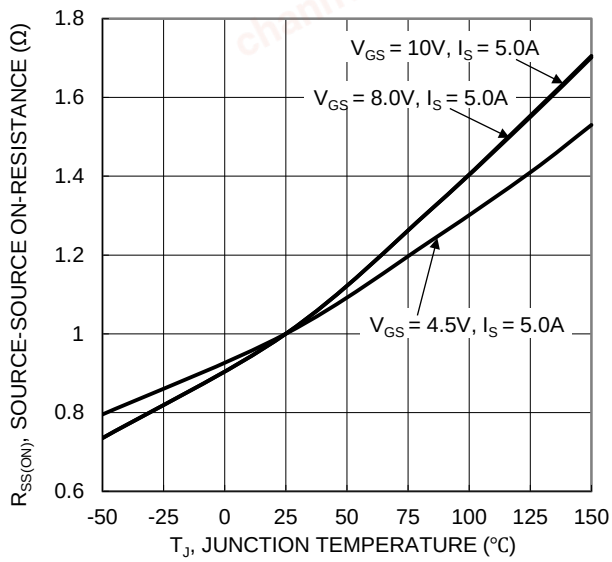


Figure 6. On-Resistance Variation with Junction Temperature

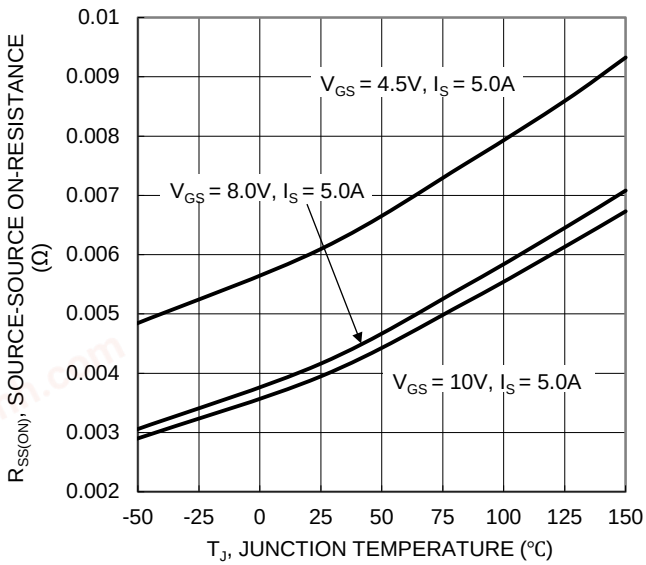


Figure 7. On-Resistance Variation with Junction Temperature

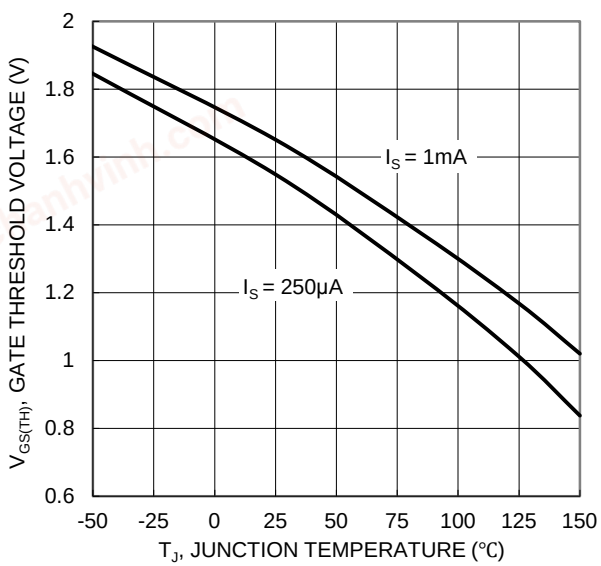


Figure 8. Gate Threshold Variation vs. Junction Temperature

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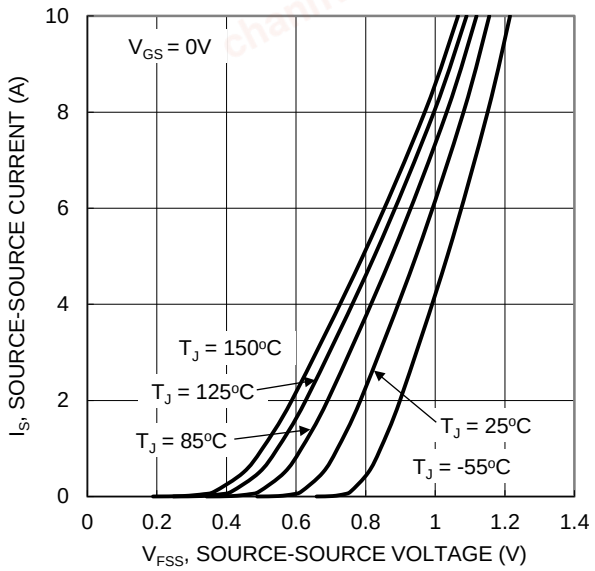


Figure 9. Diode Forward Voltage vs. Current

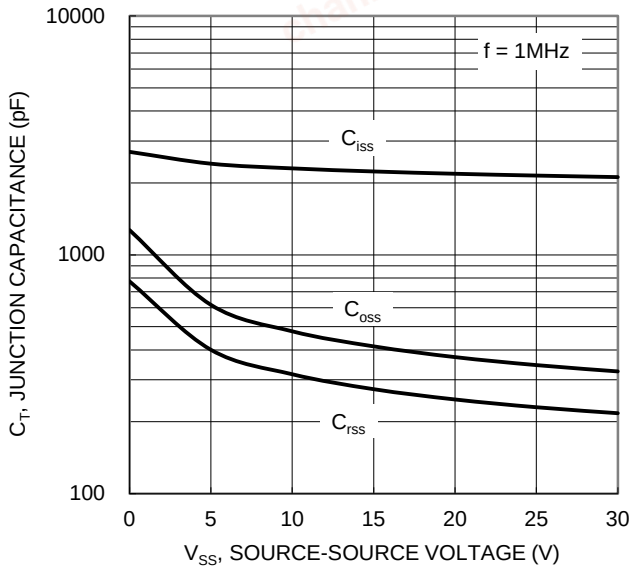


Figure 10. Typical Junction Capacitance

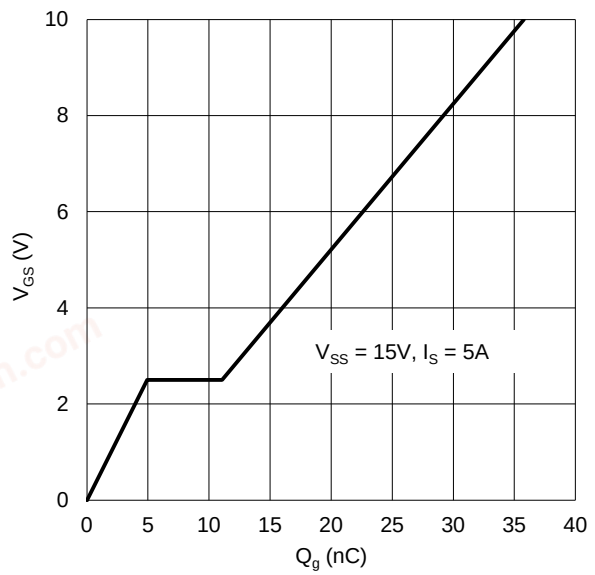


Figure 11. Gate Charge

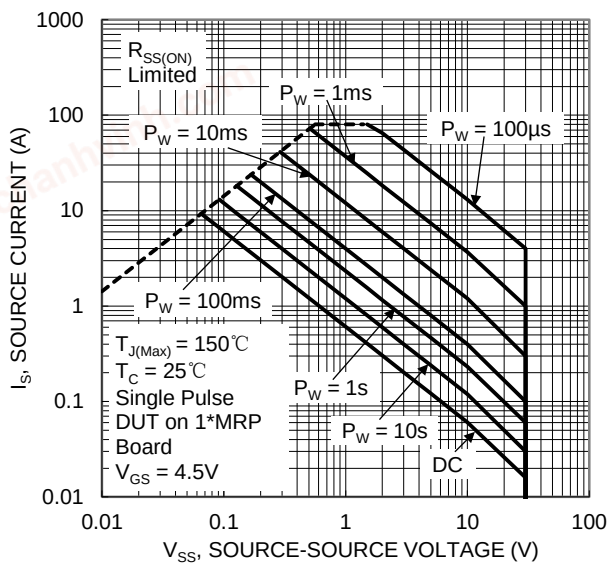


Figure 12. SOA, Safe Operation Area

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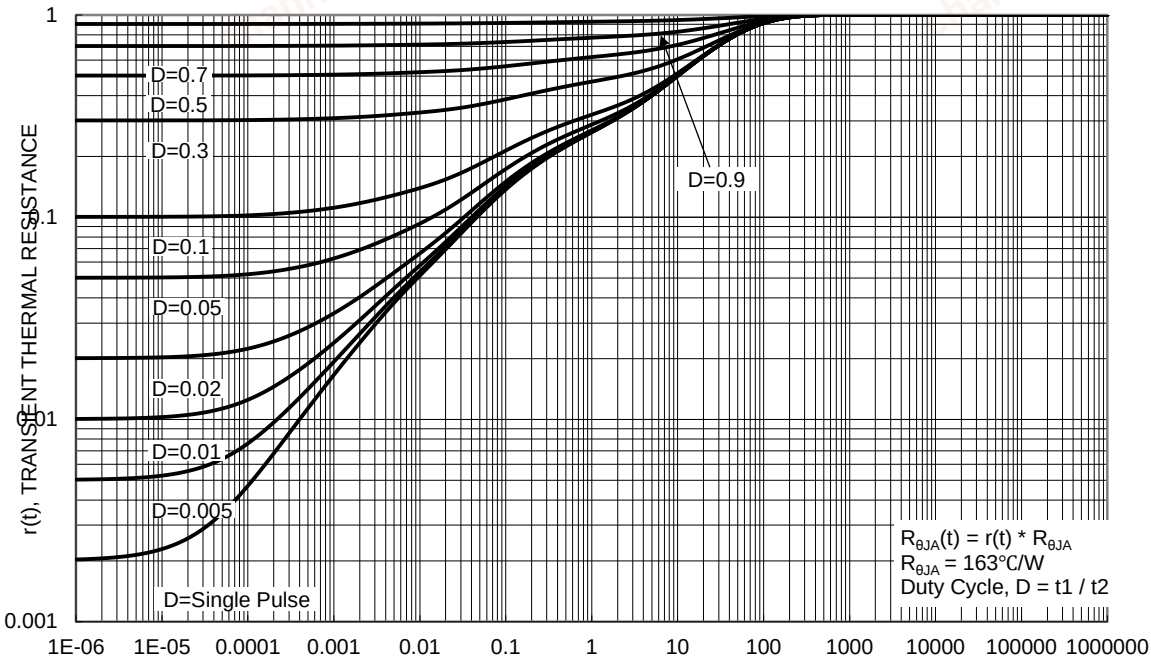


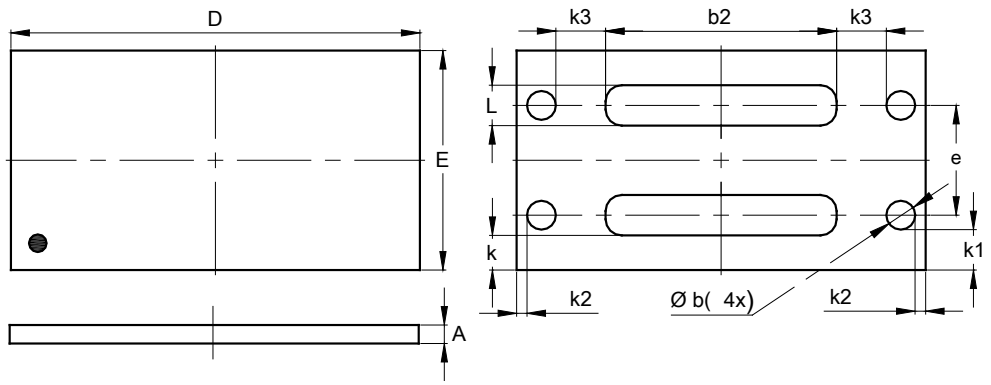
Figure 13. Transient Thermal Resistance

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Package Outline Dimensions

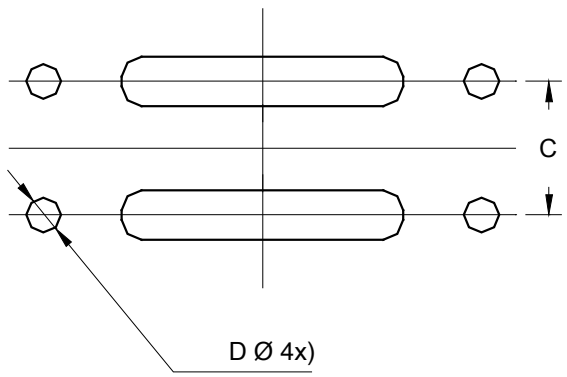
Please see http://www.diodes.com/package-outlines.html for the latest version.



X4-DSN3519-6			
Dim	**Min**	**Max**	**Typ**
A	0.09	0.16	0.11
b	--	--	0.25
b2	--	--	2.00
D	3.45	3.55	3.50
E	1.85	1.95	1.90
e	--	--	0.95
k	--	--	0.30
k1	--	--	0.35
k2	--	--	0.085
k3	--	--	0.415
L	--	--	0.35
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
C	0.95
X	0.25

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