

Product Summary

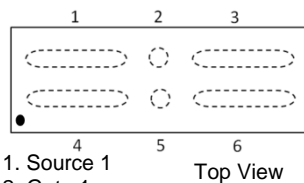
BV _{SSS}	R _{SS(ON)} Max	I _S T _A = +25°C
12V	3.2mΩ @ V _{GS} = 4.5V	23.6A
	6.5mΩ @ V _{GS} = 2.5V	16.8A

Description

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

Applications

- Battery Management
- Load Switch
- Battery Protection



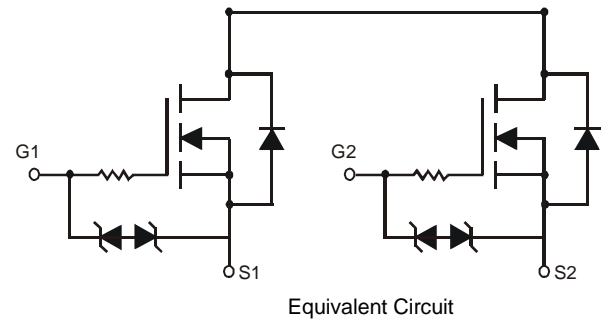
- Source 1
- Gate 1
- Source 1
- Source 2
- Gate 2
- Source 2

Features

- CSP with Footprint 3.54mm × 1.77mm
- Height = 0.21mm for Low Profile
- ESD Protection of Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: X3-DSN3518-6 (Type B)
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu. Solderable per MIL-STD-202, Method 208 (4)

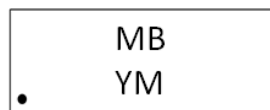
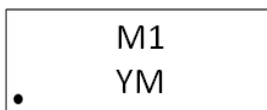


Ordering Information (Note 4)

Part Number	Case	Packaging
DMN13M9UCA6-7	X3-DSN3518-6 (Type B)	3000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - See http://www.diodes.com/quality/lead_free.html 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



M1 / MB= Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: E= 2017)
 M or \bar{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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Source-Source Voltage			V_{SSS}	12	V
Gate-Source Voltage			V_{GSS}	± 8	V
Continuous Source Current (Note 5) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	I_S	23.6	A
		$T_A = +70^\circ\text{C}$		18.9	
Continuous Source Current (Note 5) $V_{GS} = 2.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	I_S	16.8	A
		$T_A = +70^\circ\text{C}$		13.4	
Pulsed Source Current (Note 6)			I_{SM}	100	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P_D	1.05	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 7)	$R_{\theta JA}$	120.7	$^\circ\text{C/W}$
Power Dissipation (Note 5)	P_D	2.67	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5)	$R_{\theta JA}$	46.8	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Source-Source Breakdown Voltage	BV_{SSS}	12	-	-	V	$V_{GS} = 0\text{V}, I_S = 1\text{mA}$
Zero Gate Voltage Source Current $T_J = +25^\circ\text{C}$	I_{SSS}	-	-	1	μA	$V_{SS} = 10\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	-	-	± 10	μA	$V_{GS} = \pm 8\text{V}, V_{SS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	-	1.3	V	$V_{SS} = 6\text{V}, I_S = 1\text{mA}$
Static Source-Source On-Resistance	$R_{SS(ON)}$	1.2	2.3	3.2	m Ω	$V_{GS} = 4.5\text{V}, I_S = 5\text{A}$
		1.2	2.4	3.2		$V_{GS} = 4.0\text{V}, I_S = 5\text{A}$
		1.3	2.5	3.4		$V_{GS} = 3.8\text{V}, I_S = 5\text{A}$
		1.3	2.7	4.6		$V_{GS} = 3.1\text{V}, I_S = 5\text{A}$
		1.4	3.0	6.5		$V_{GS} = 2.5\text{V}, I_S = 5\text{A}$
Diode Forward Voltage	V_{SS}	-	0.7	1.2	V	$V_{GS} = 0\text{V}, I_S = 3\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	-	3315	-	pF	$V_{SS} = 6\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	-	850	-		
Reverse Transfer Capacitance	C_{rss}	-	248	-		
Total Gate Charge	Q_g	-	56.5	-	nC	$V_{SS} = 6\text{V}, V_{GS} = 4.5\text{V}, I_S = 27\text{A}$
Gate-Source Charge	Q_{gs}	-	8.8	-		
Gate-Drain Charge	Q_{gd}	-	13.3	-		
Gate Charge at V_{TH}	$Q_{g(TH)}$	-	6.9	-		
Turn-On Delay Time	$t_{D(ON)}$	-	603	-	ns	$V_{SS} = 6\text{V}, V_{GS} = 4.5\text{V}, I_S = 3\text{A}$
Turn-On Rise Time	t_R	-	1694	-		
Turn-Off Delay Time	$t_{D(OFF)}$	-	4749	-		
Turn-Off Fall Time	t_F	-	6208	-		

- Notes:
- Device mounted on FR-4 material with 1-inch² (6.45-cm²), 2-oz. (0.071-mm thick) Cu.
 - Repetitive rating, pulse width limited by junction temperature.
 - Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

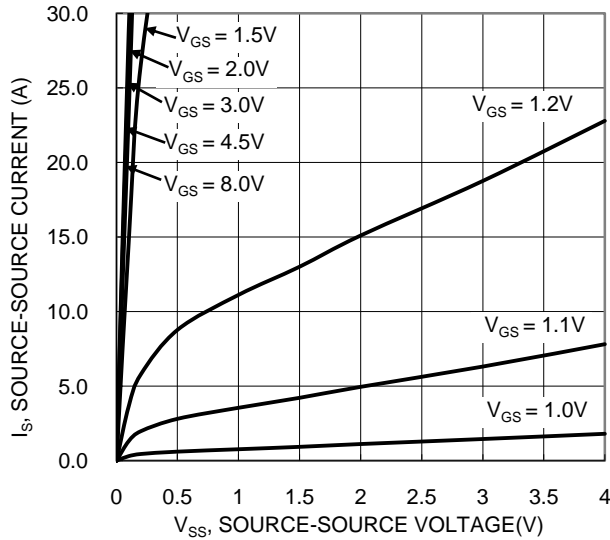


Figure 1. Typical Output Characteristic

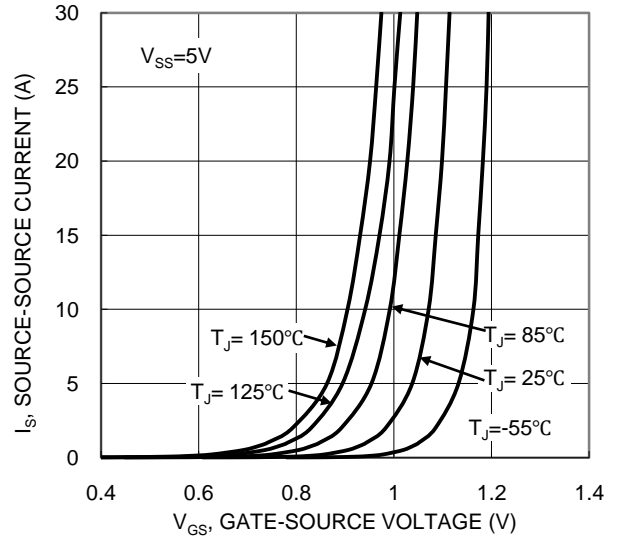


Figure 2. Typical Transfer Characteristic

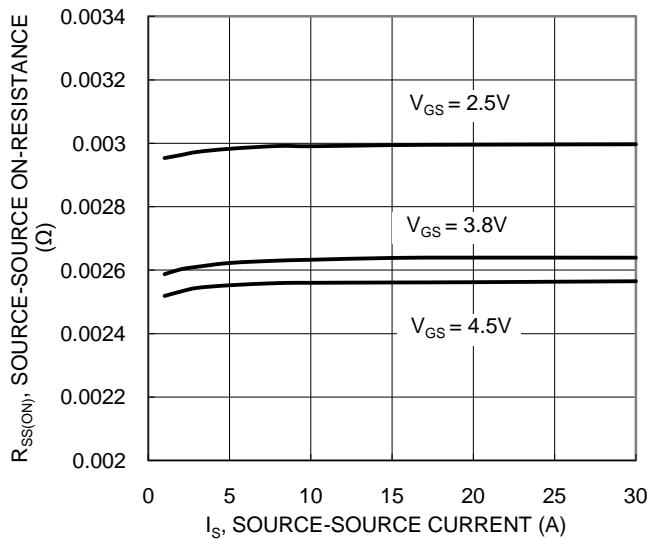


Figure 3. Typical On-Resistance vs. Source Current and Gate Voltage

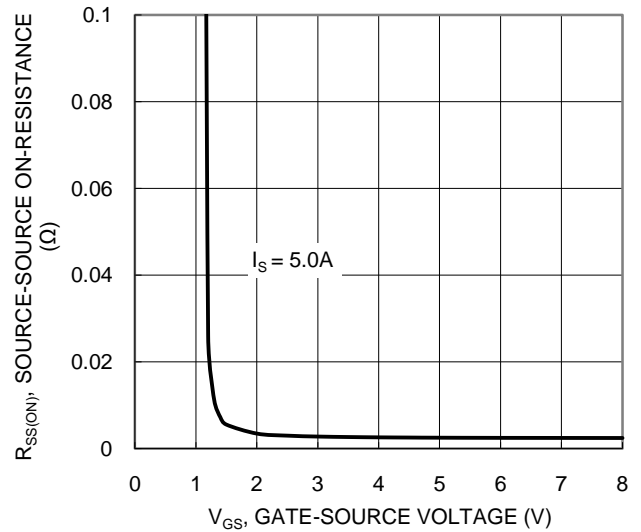


Figure 4. Typical Transfer Characteristic

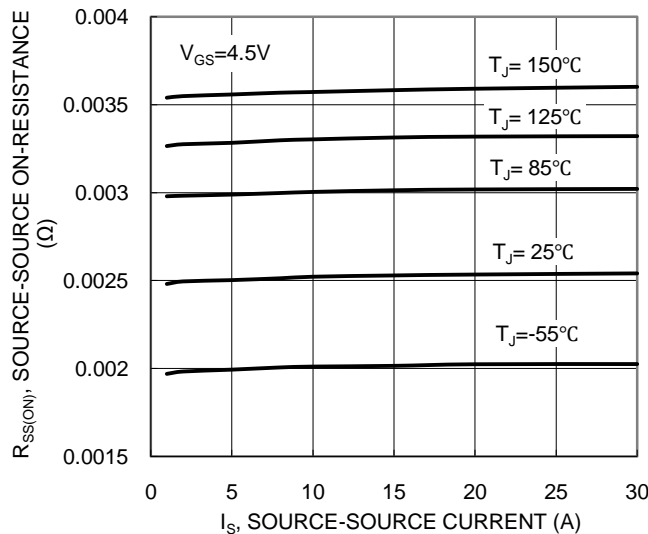


Figure 5. Typical On-Resistance vs. Source Current and Junction Temperature

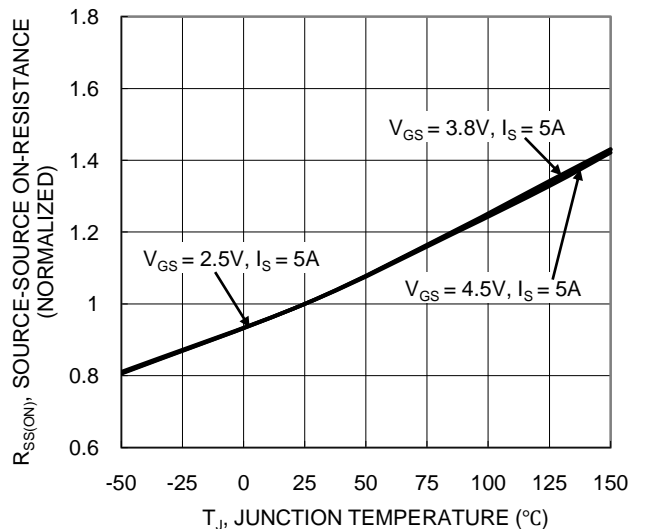
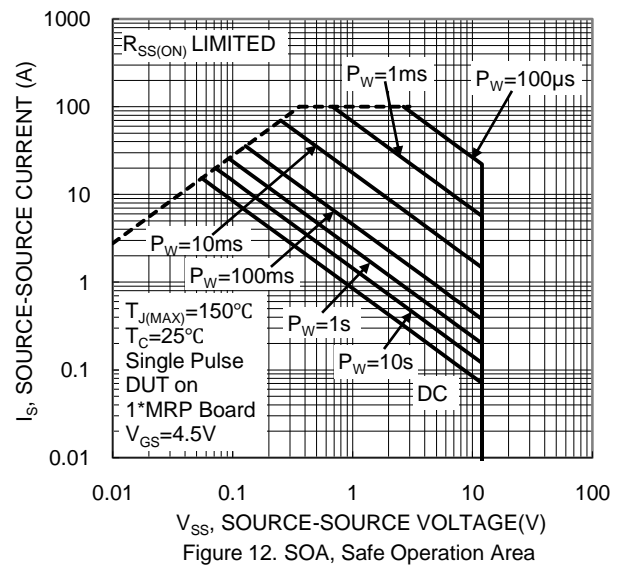
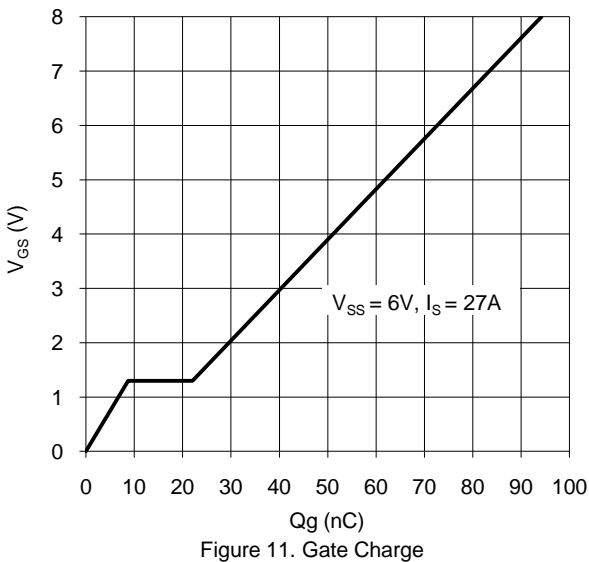
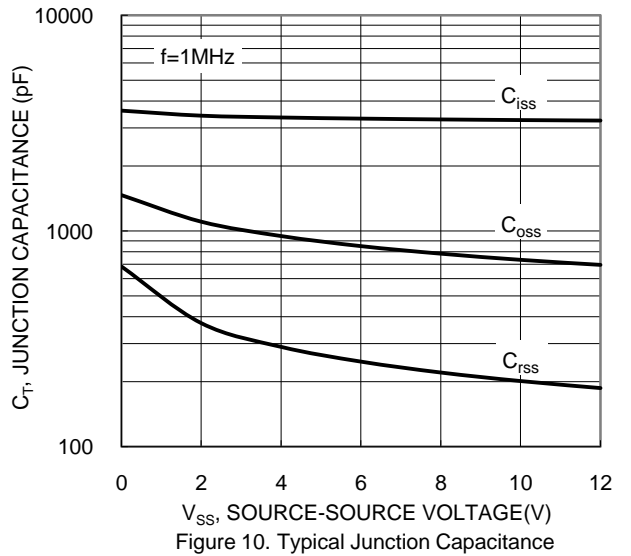
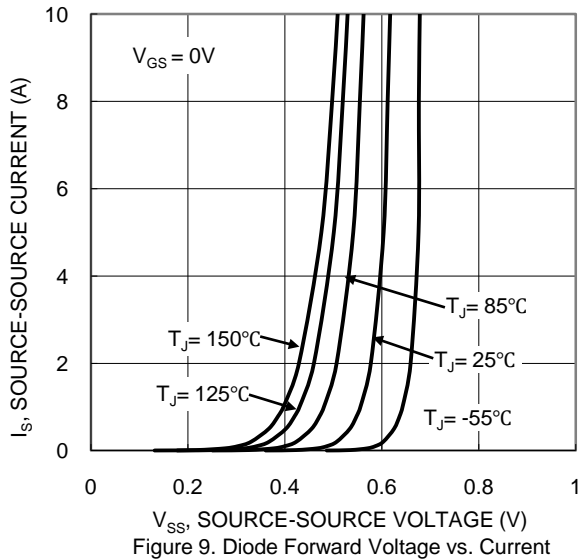
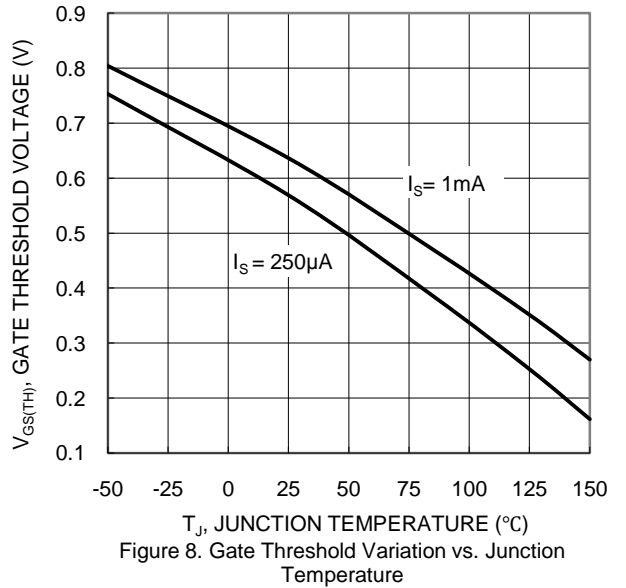
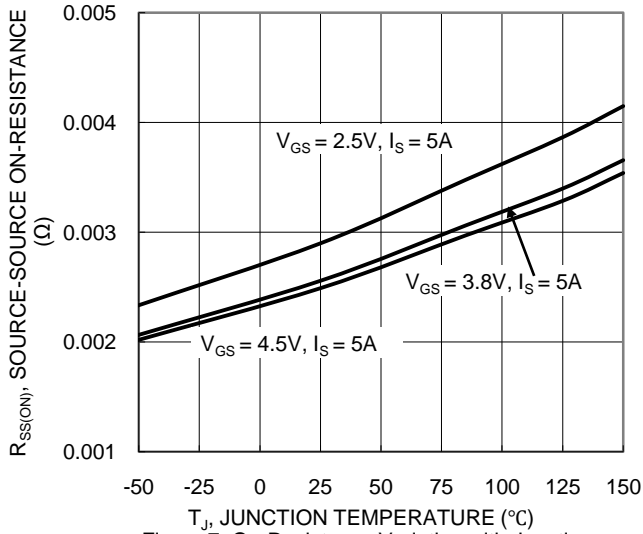


Figure 6. On-Resistance Variation with Junction Temperature



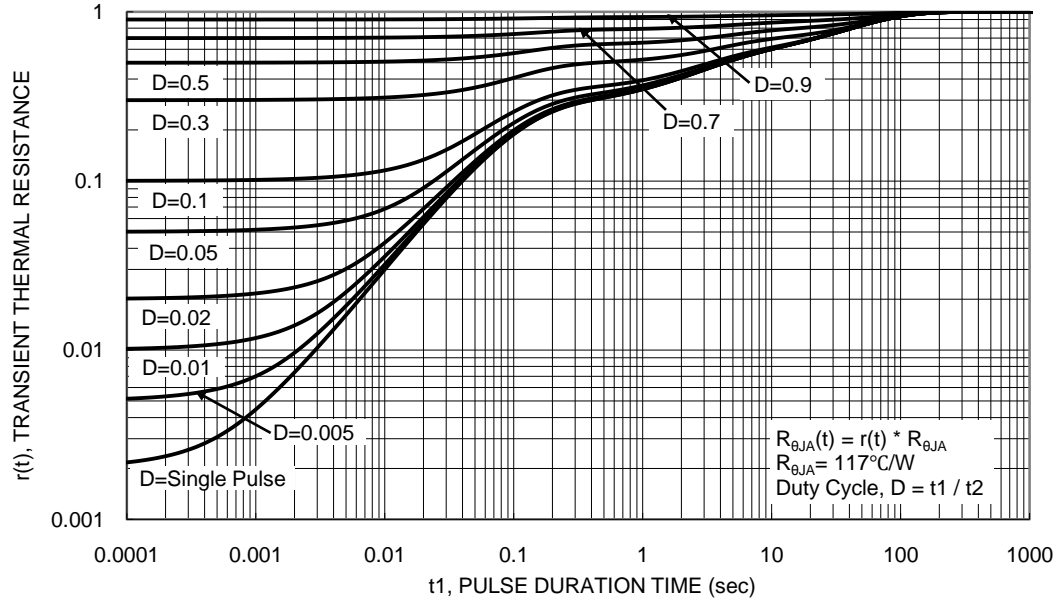
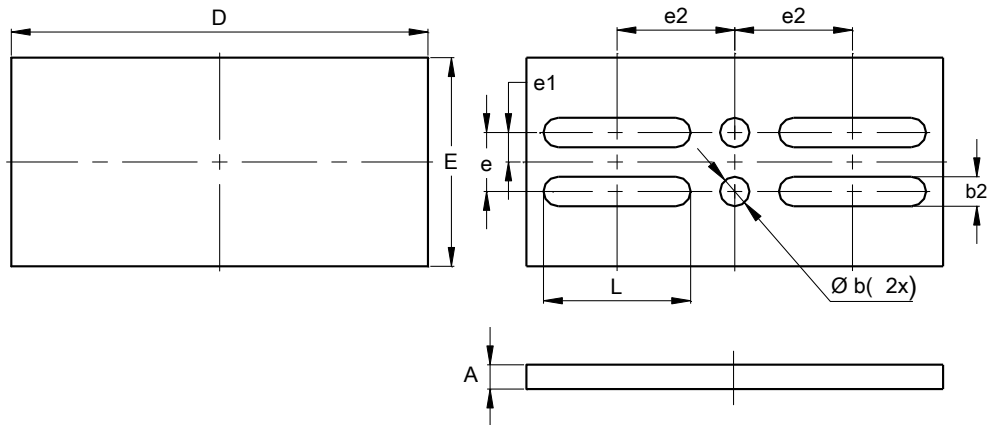


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X3-DSN3518-6 (Type B)

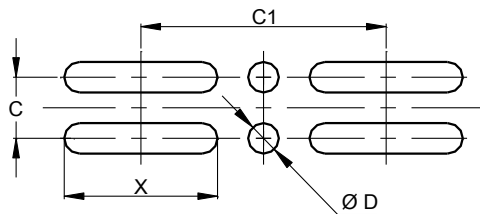


X3-DSN3518-6 (Type B)			
Dim	Min	Max	Typ
A	0.15	0.27	0.21
b	0.22	0.28	0.25
b2	0.22	0.28	0.25
D	3.48	3.60	3.54
E	1.71	1.83	1.77
e	0.47	0.53	0.50
e1	0.22	0.28	0.25
e2	0.97	1.03	1.00
L	1.22	1.28	1.25
All Dimensions in mm			

Suggested Pad Layout

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

X3-DSN3518-6 (Type B)



Dimensions	Value (in mm)
C	0.50
C1	2.00
D	0.25
X	1.25

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