

**Product Summary**

<b>BV<sub>SSS</sub></b>	<b>R<sub>SS(ON)</sub> Typ</b>	<b>I<sub>S</sub> Max T<sub>A</sub> = +25°C</b>
12V	2.3 mΩ @ V <sub>GS</sub> = 3.8V	20.2A

**Description**

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

**Applications**

- Battery Management
- Load Switch
- Battery Protection

**Features**

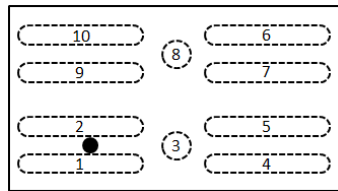
- CSP with Footprint 2.98mm × 1.49mm
- Height = 0.11mm for Low Profile
- ESD Protection of Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**  
<https://www.diodes.com/quality/product-definitions/>

**Mechanical Data**

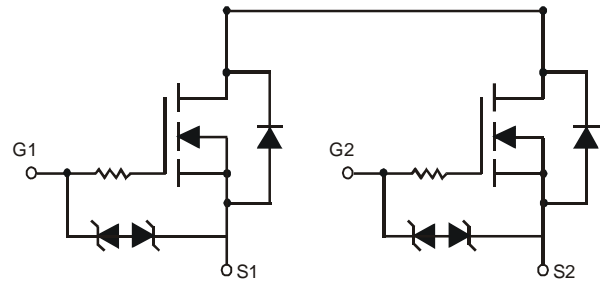
- Case: X4-DSN3015-10
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu or NiAu. Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.0012 grams (Approximate)



X4-DSN3015-10



Source 1: 1,2,4,5    Top View  
Gate 1: 3  
Source 2: 6, 7, 9, 10  
Gate 2: 8



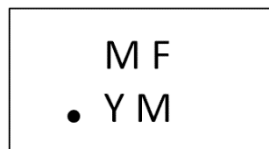
Equivalent Circuit

**Ordering Information (Note 4)**

Part Number	Case	Packaging
DMN12M7UCA10-7	X4-DSN3015-10	5000/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**



MF = Product Type Marking Code  
YM = Date Code Marking  
Y or  $\bar{Y}$  = Year (ex: G = 2019)  
M or  $\bar{M}$  = Month (ex: 9 = September)

Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	F	G	H	I	J	K	L	M	N	O	P	R

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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Source-Source Voltage			V <sub>SSS</sub>	12	V
Gate-Source Voltage			V <sub>GSS</sub>	±8	V
Continuous Source Current (Note 5) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C	I <sub>S</sub>	20.2	A
		T <sub>A</sub> = +70°C		16.1	
Continuous Source Current (Note 5) V <sub>GS</sub> = 2.5V	Steady State	T <sub>A</sub> = +25°C	I <sub>S</sub>	13.6	A
		T <sub>A</sub> = +70°C		10.8	
Pulsed Source Current (Note 6)			I <sub>SM</sub>	80	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P <sub>D</sub>	0.74	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 7)	R <sub>θJA</sub>	171.9	°C/W
Power Dissipation (Note 5)	P <sub>D</sub>	1.73	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 5)	R <sub>θJA</sub>	74.4	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Source-Source Breakdown Voltage	BV <sub>SSS</sub>	12	—	—	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1mA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>SSS</sub>	—	—	1	μA	V <sub>SS</sub> = 9.6V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±8V, V <sub>SS</sub> = 0V
		—	—	±1	μA	V <sub>GS</sub> = ±5V, V <sub>SS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.5	0.8	1.4	V	V <sub>SS</sub> = 10V, I <sub>S</sub> = 1.11mA
Static Source-Source On-Resistance	R <sub>SS(ON)</sub>	1.55	2.19	2.75	mΩ	V <sub>GS</sub> = 4.5V, I <sub>S</sub> = 6A
		1.6	2.30	2.85		V <sub>GS</sub> = 3.8V, I <sub>S</sub> = 6A
		1.65	2.51	3.95		V <sub>GS</sub> = 3.1V, I <sub>S</sub> = 6A
		1.9	2.93	6.1		V <sub>GS</sub> = 2.5V, I <sub>S</sub> = 6A
Diode Forward Voltage	V <sub>SS</sub>	—	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 6A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>ISS</sub>	—	3039	—	pF	V <sub>SS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>OSS</sub>	—	530	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	141	—		
Total Gate Charge	Q <sub>g</sub>	—	35.7	—	nC	V <sub>SS</sub> = 6V, V <sub>GS</sub> = 4V, I <sub>S</sub> = 6A
Gate-Source Charge	Q <sub>gs</sub>	—	6.7	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	9.2	—		
Gate Charge at V <sub>TH</sub>	Q <sub>g(th)</sub>	—	3.4	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	880	—	ns	V <sub>SS</sub> = 6V, V <sub>GS</sub> = 4V, I <sub>S</sub> = 6A
Turn-On Rise Time	t <sub>r</sub>	—	1468	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	2914	—		
Turn-Off Fall Time	t <sub>f</sub>	—	2830	—		

- Notes:
- Device mounted on FR-4 material with 1inch<sup>2</sup> (6.45cm<sup>2</sup>), 2oz. (0.071mm 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.

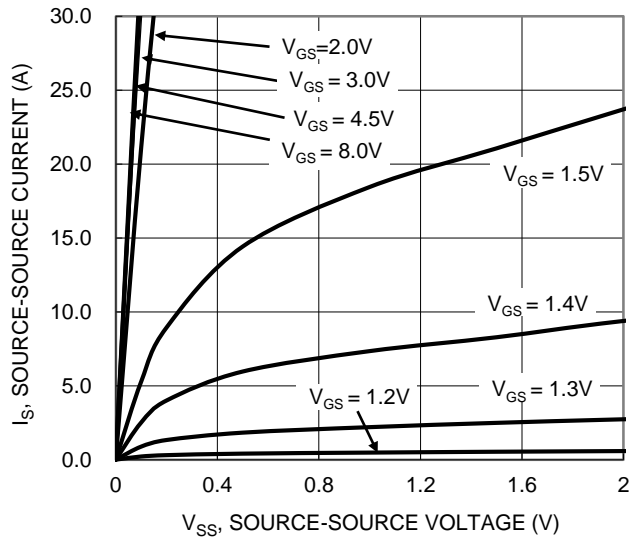


Figure 1. Typical Output Characteristic

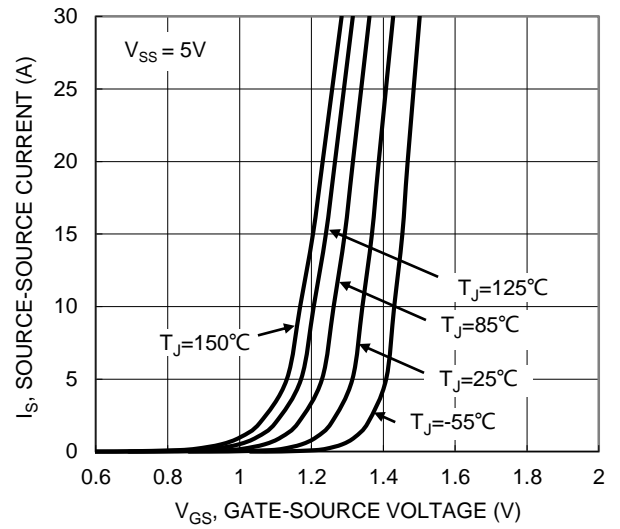


Figure 2. Typical Transfer Characteristic

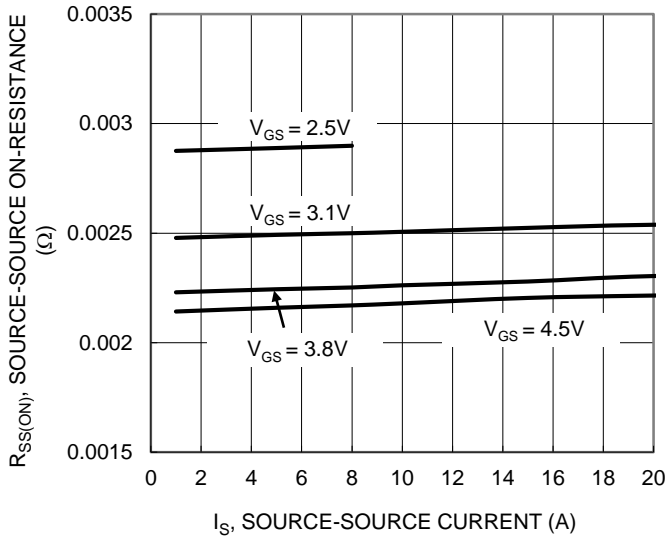


Figure 3. Typical On-Resistance vs. Source Current and Gate Voltage

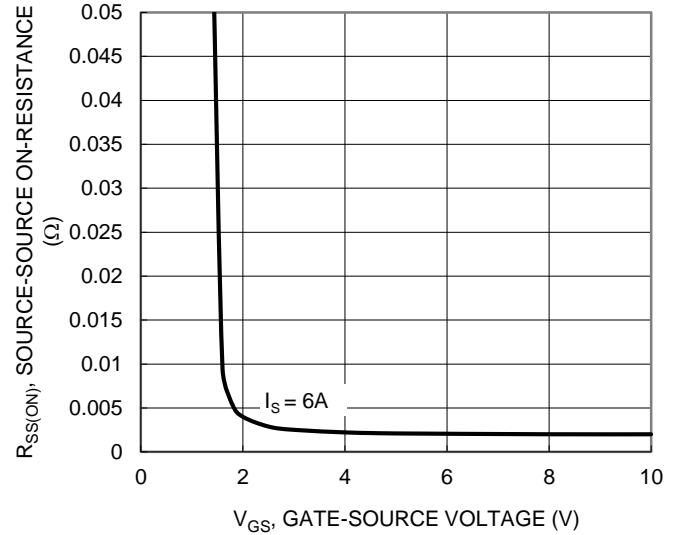


Figure 4. Typical Transfer Characteristic

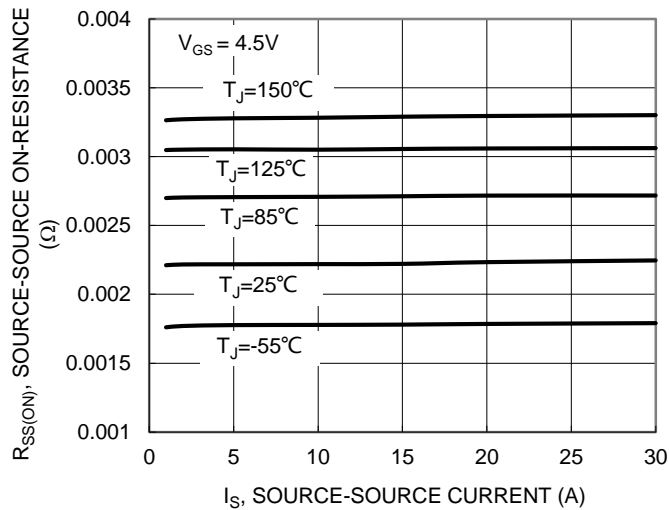


Figure 5. Typical On-Resistance vs. Source Current and Junction Temperature

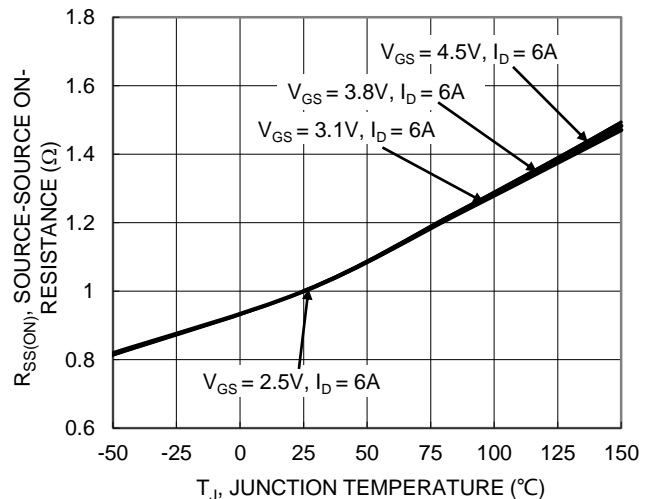
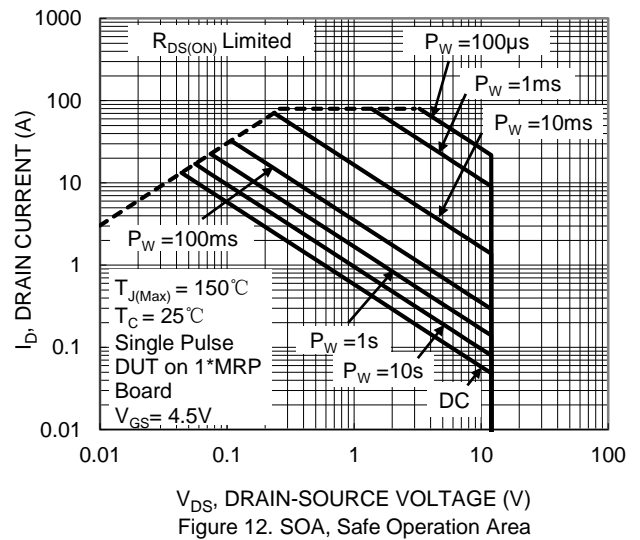
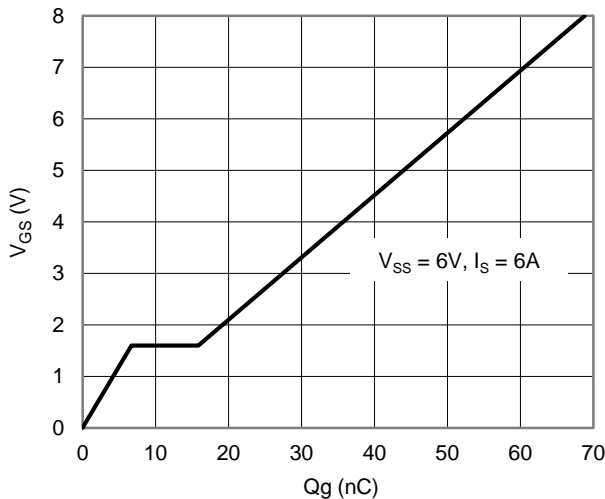
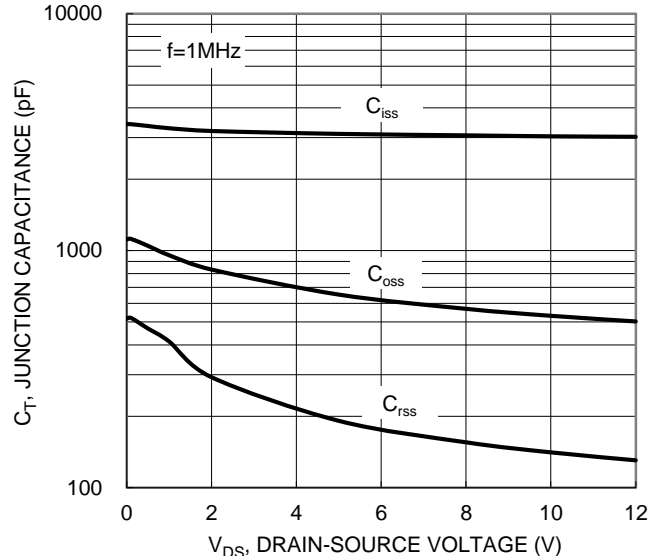
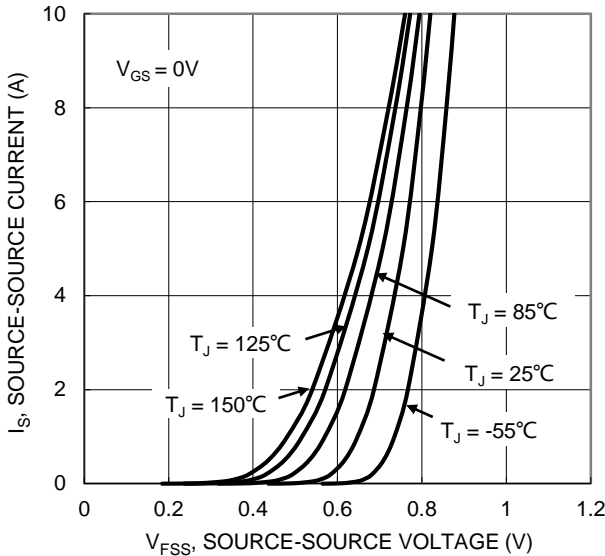
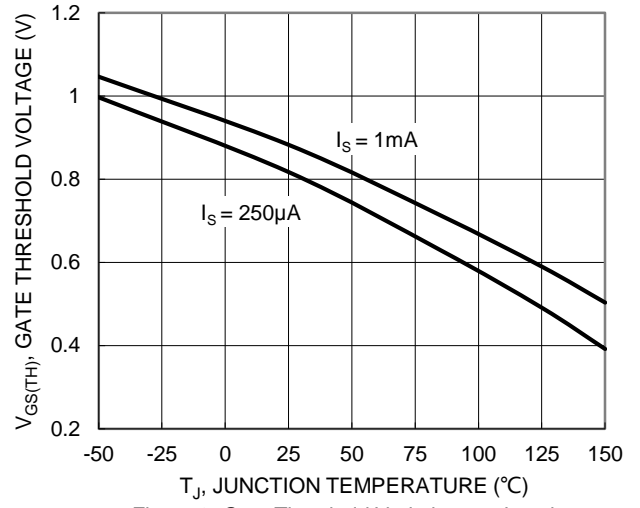
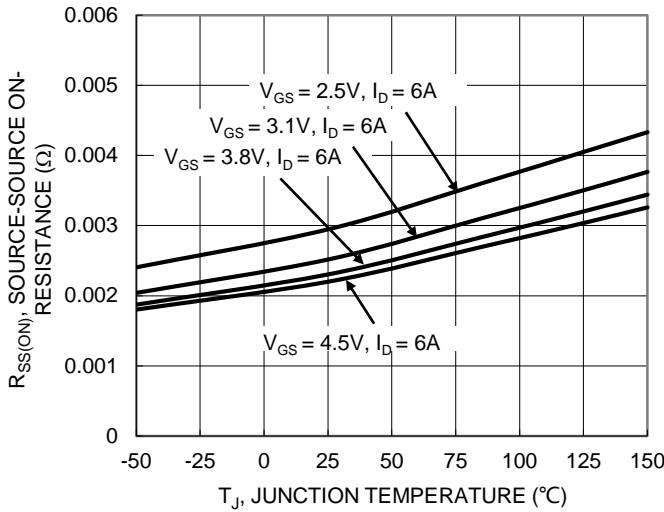


Figure 6. On-Resistance Variation with Junction Temperature



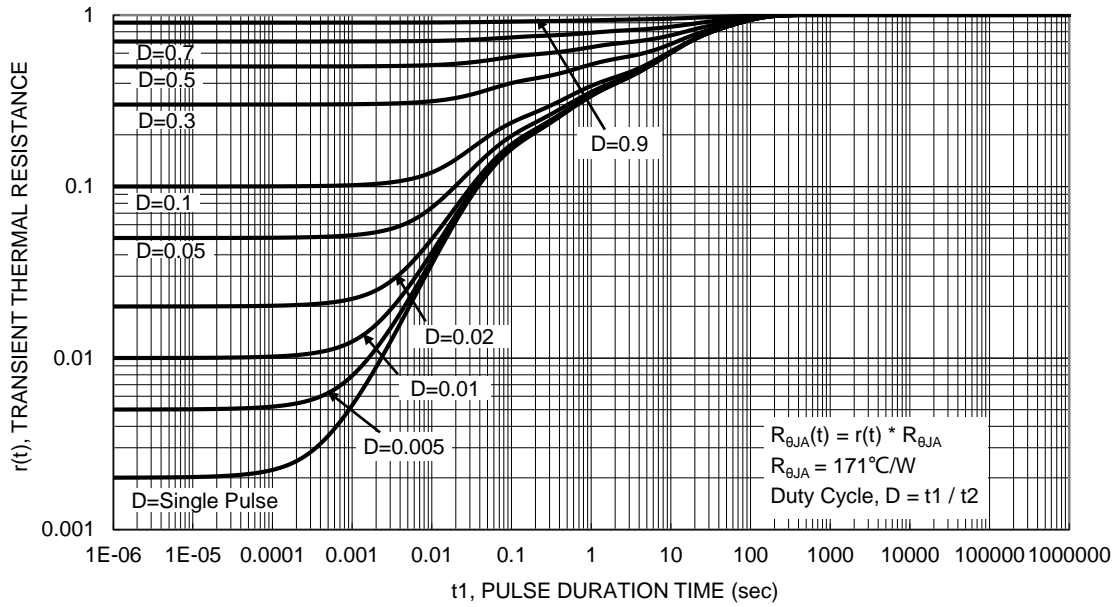
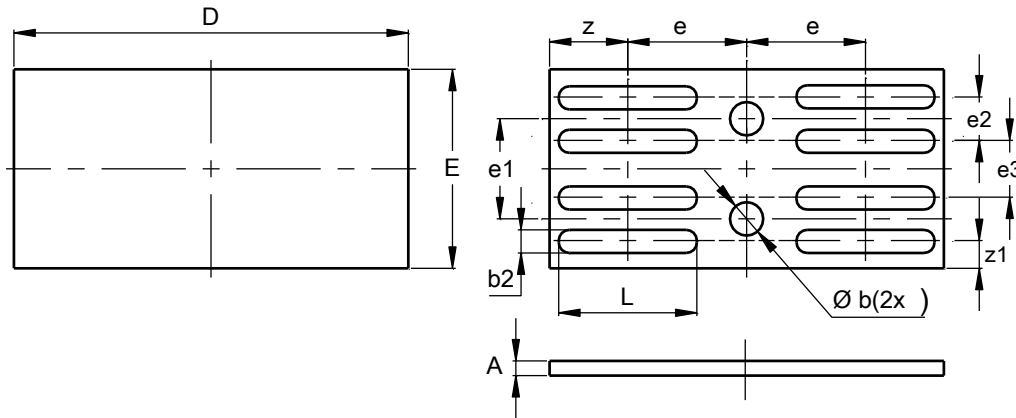


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**X4-DSN3015-10**

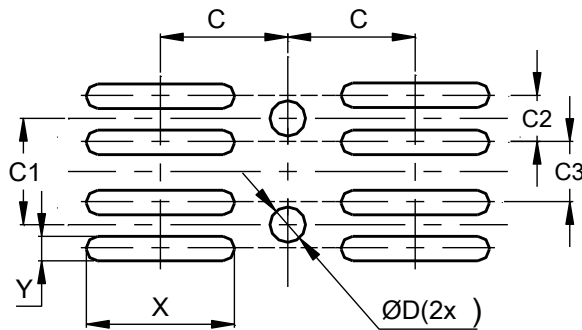


X4-DSN3015-10			
Dim	Min	Max	Typ
A	0.09	0.16	0.11
b	--	--	0.25
b2	--	--	0.175
D	2.93	3.03	2.98
E	1.44	1.54	1.49
e	--	--	0.895
e1	--	--	0.75
e2	--	--	0.325
e3	--	--	0.425
L	--	--	1.04
z	--	--	0.595
z1	--	--	0.2075
All Dimensions in mm			

**Suggested Pad Layout**

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

**X4-DSN3015-10**



Dimensions	Value (in mm)
C	0.895
C1	0.750
C2	0.325
C3	0.425
D	0.25
X	1.04
Y	0.175

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