

Product Summary

BV _{SSS}	R _{SS(ON)} Max	I _S Max T _A = +25°C
12V	2.75mΩ @ V _{GS} = 4.5V	20.2A
	6.1mΩ @ V _{GS} = 2.5V	13.6A

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

Features

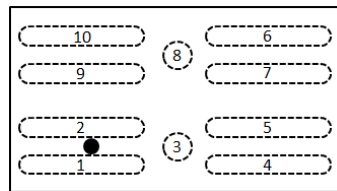
- CSP with Footprint 2.98mm × 1.49mm
- Height = 0.11mm for Low Profile
- ESD Protection of Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

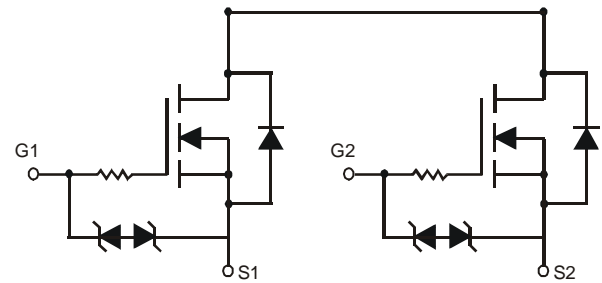
- Case: X4-DSN3015-10
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu or NiAu. Solderable per MIL-STD-202, Method 208 (e4)



X4-DSN3015-10



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



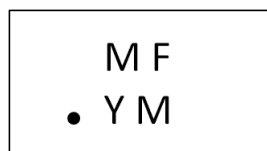
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN12M7UCA10-7	X4-DSN3015-10	5000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - 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.
 - 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



MF = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: F = 2018)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026
Code	F	G	H	I	J	K	L	M	N

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°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} = 4.5V	Steady State	T _A = +25°C	I _S	20.2	A
		T _A = +70°C		16.1	
Continuous Source Current (Note 5) V _{GS} = 2.5V	Steady State	T _A = +25°C	I _S	13.6	A
		T _A = +70°C		10.8	
Pulsed Source Current (Note 6)			I _{SM}	80	A

Thermal Characteristics

Characteristic			Symbol	Value	Unit
Power Dissipation (Note 7)			P _D	0.74	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 7)			R _{θJA}	171.9	°C/W
Power Dissipation (Note 5)			P _D	1.73	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)			R _{θJA}	74.4	°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}	12	—	—	V	V _{GS} = 0V, I _S = 1mA
Zero Gate Voltage Drain Current T _J = +25°C	I _{SSS}	—	—	1	μA	V _{SS} = 9.6V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	μA	V _{GS} = ±8V, V _{SS} = 0V
		—	—	±1	μA	V _{GS} = ±5V, V _{SS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.5	0.8	1.4	V	V _{SS} = 10V, I _S = 1.11mA
Static Source-Source On-Resistance	R _{SS(ON)}	1.55	2.19	2.75	mΩ	V _{GS} = 4.5V, I _S = 6A
		1.6	2.30	2.85		V _{GS} = 3.8V, I _S = 6A
		1.65	2.51	3.95		V _{GS} = 3.1V, I _S = 6A
		1.9	2.93	6.1		V _{GS} = 2.5V, I _S = 6A
Diode Forward Voltage	V _{SS}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 6A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{ISS}	—	3039	—	pF	V _{SS} = 10V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{OSS}	—	530	—		
Reverse Transfer Capacitance	C _{RSS}	—	141	—		
Total Gate Charge	Q _g	—	35.7	—	nC	V _{SS} = 6V, V _{GS} = 4V, I _S = 6A
Gate-Source Charge	Q _{gs}	—	6.7	—		
Gate-Drain Charge	Q _{gd}	—	9.2	—		
Gate Charge at V _{TH}	Q _{g(th)}	—	3.4	—		
Turn-On Delay Time	t _{D(ON)}	—	880	—	ns	V _{SS} = 6V, V _{GS} = 4V, I _S = 6A
Turn-On Rise Time	t _R	—	1468	—		
Turn-Off Delay Time	t _{D(OFF)}	—	2914	—		
Turn-Off Fall Time	t _F	—	2830	—		

- Notes:
5. Device mounted on FR-4 material with 1inch² (6.45cm²), 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.

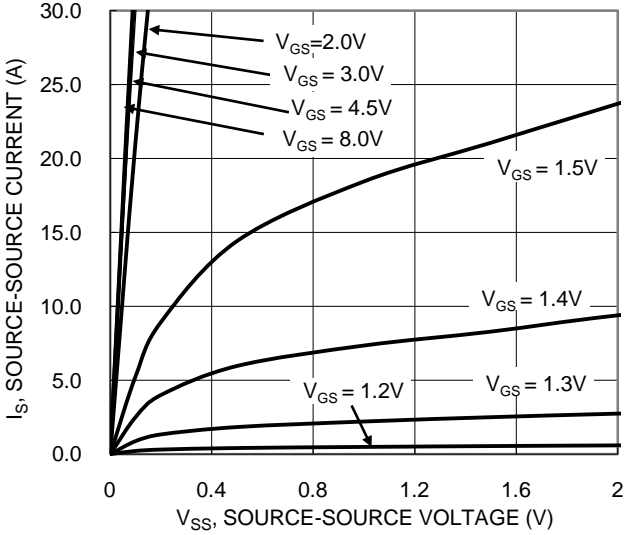


Figure 1. Typical Output Characteristic

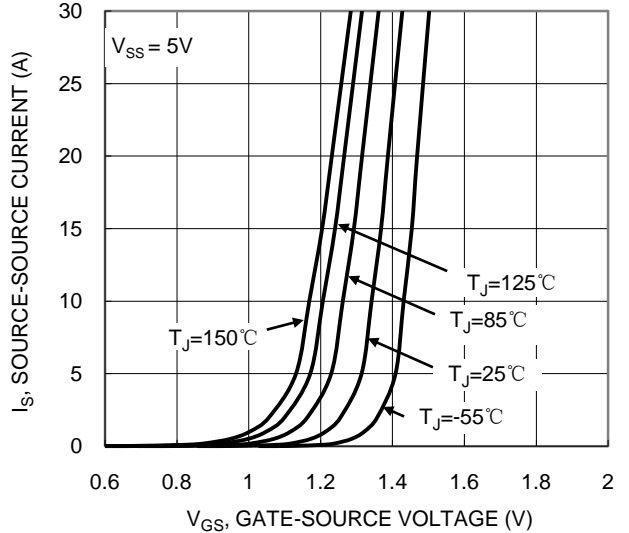


Figure 2. Typical Transfer Characteristic

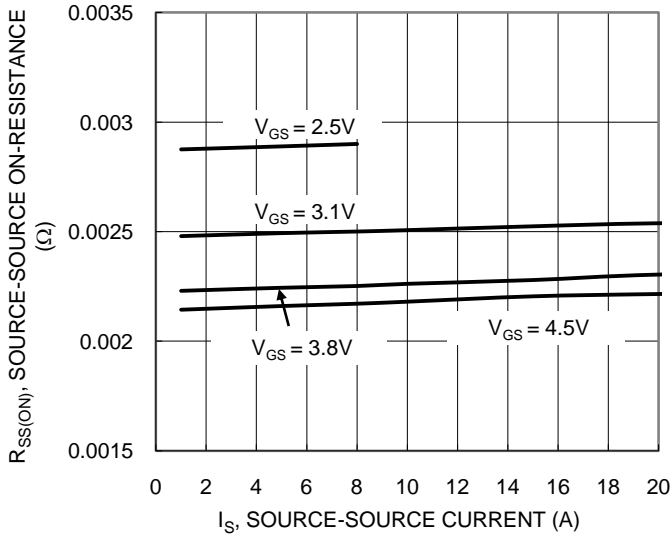


Figure 3. Typical On-Resistance vs. Source Current and Gate Voltage

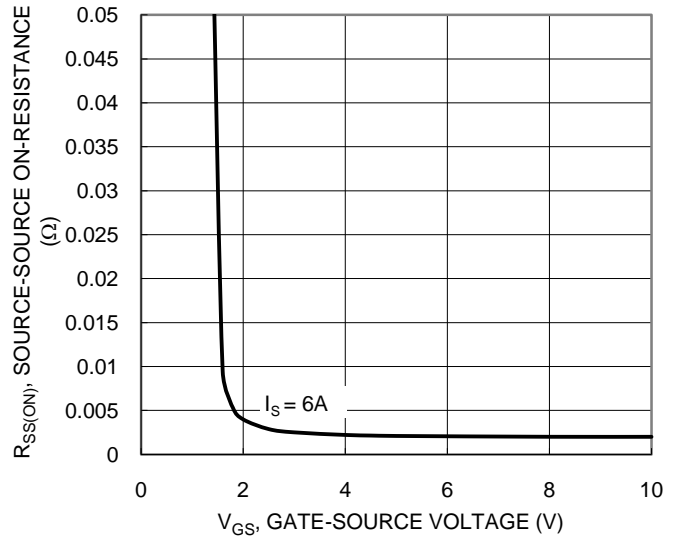


Figure 4. Typical Transfer Characteristic

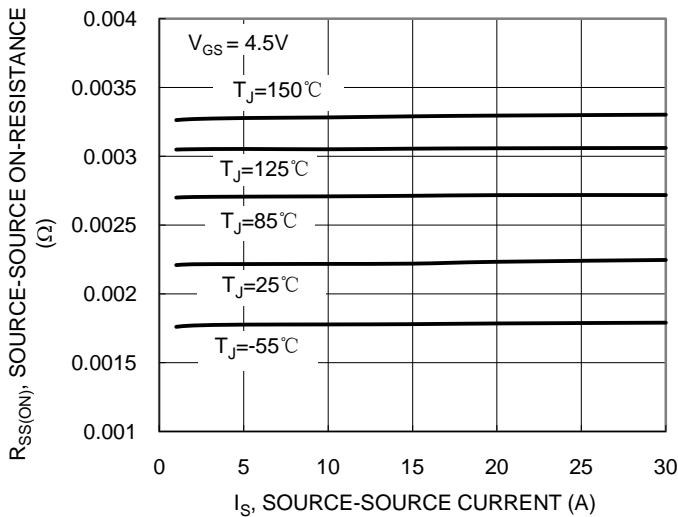


Figure 5. Typical On-Resistance vs. Source Current and Junction Temperature

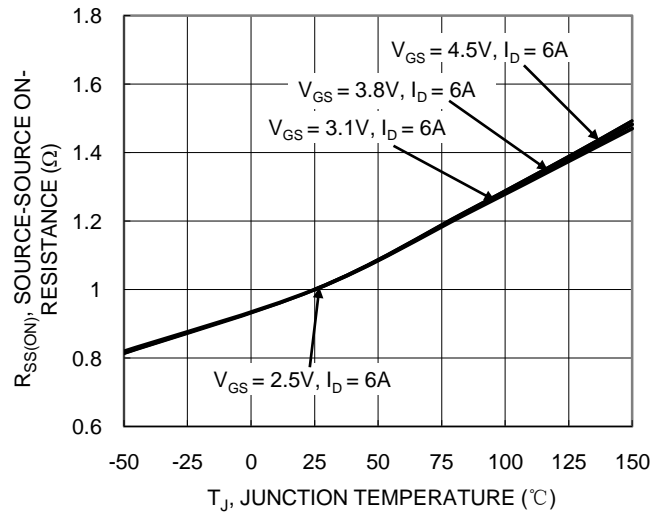
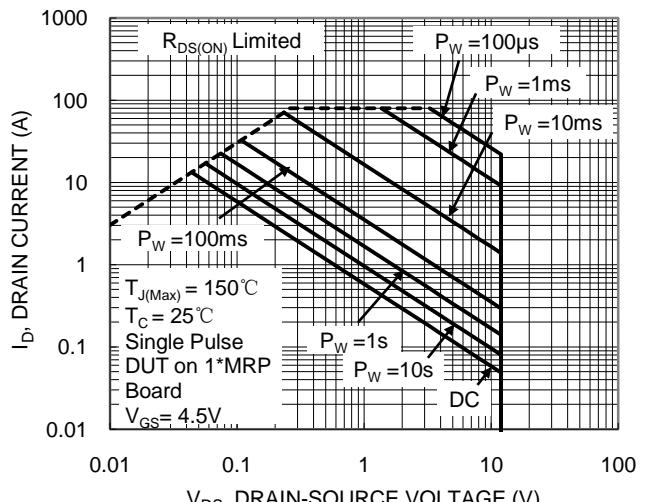
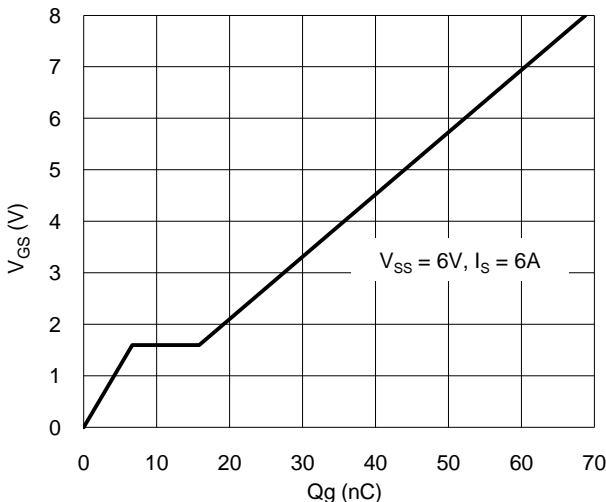
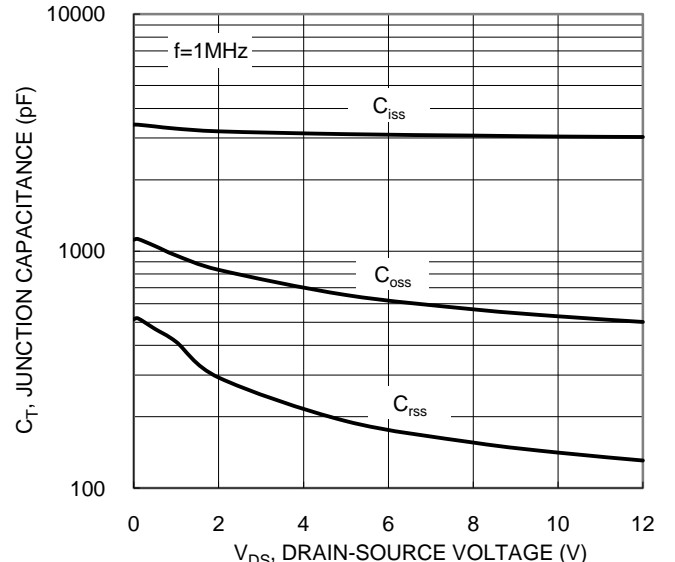
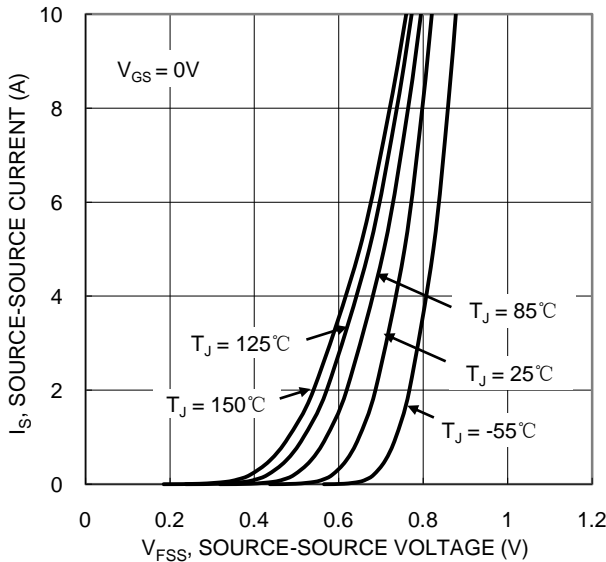
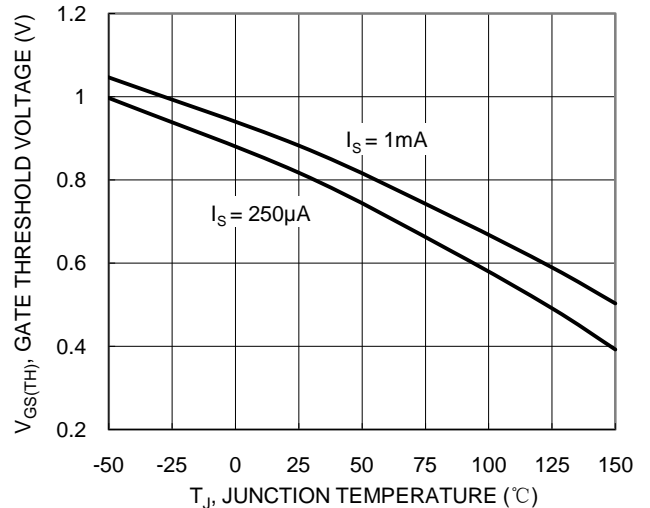
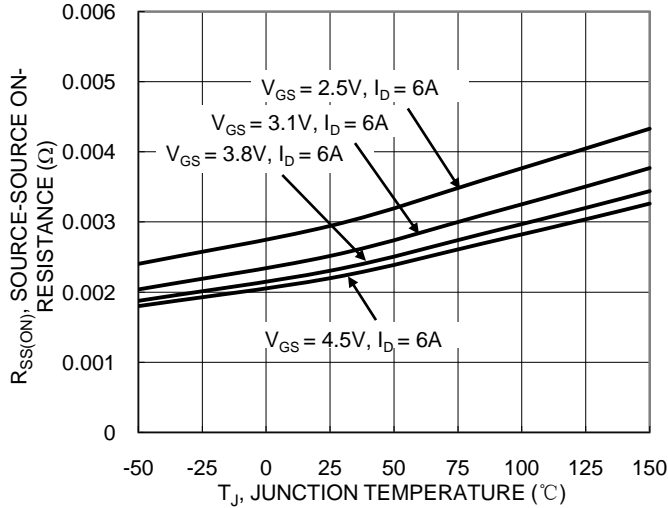
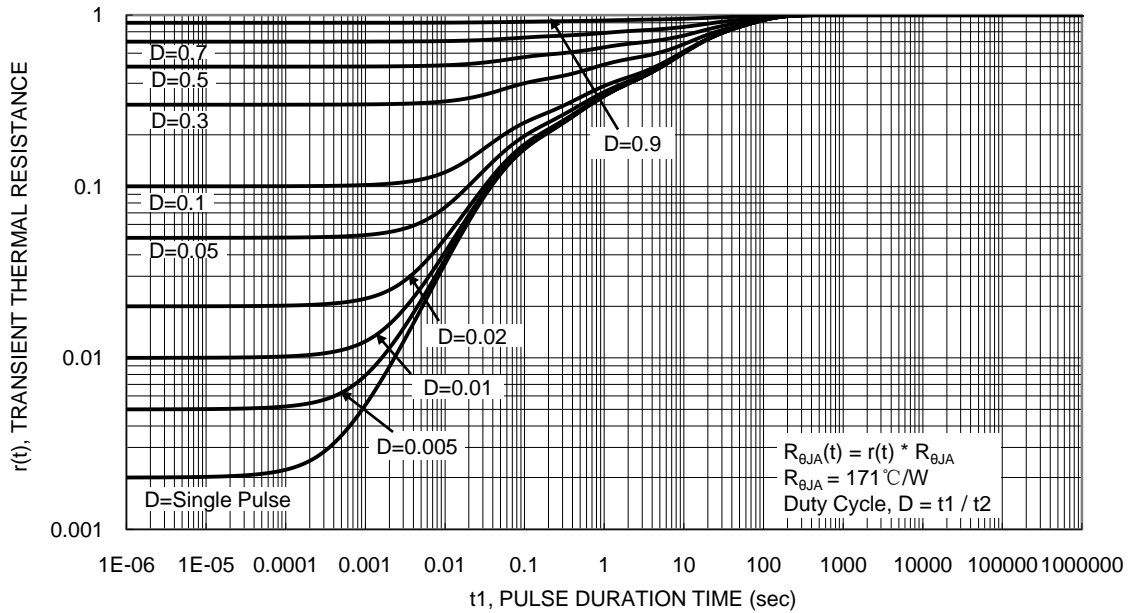


Figure 6. On-Resistance Variation with Junction Temperature

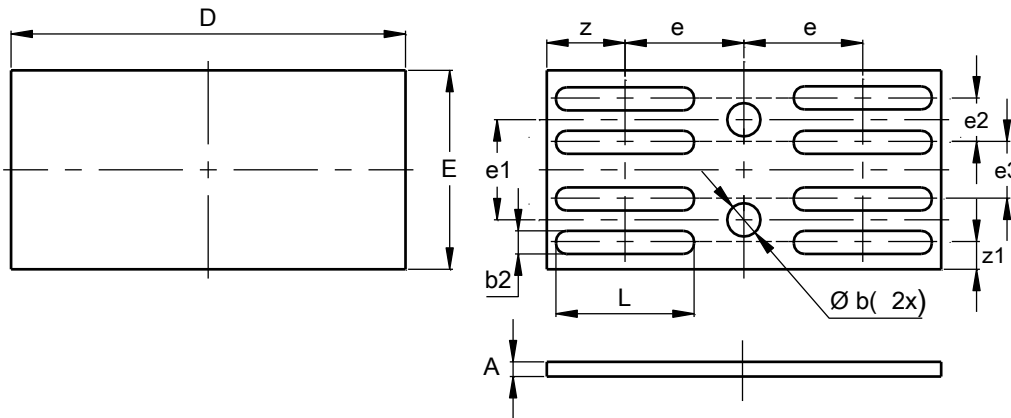




Package Outline Dimensions

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

X4-DSN3015-10



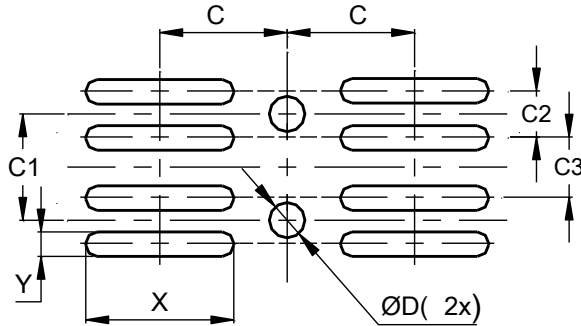
X4-DSN3015-10			
Dim	Min	Max	Typ
A	0.09	0.16	0.11
b	--	--	0.25
b2	--	--	0.175
D	2.93	3.03	2.98
E	1.44	1.54	1.49
e	--	--	0.895
e1	--	--	0.75
e2	--	--	0.325
e3	--	--	0.425
L	--	--	1.04
z	--	--	0.595
z1	--	--	0.2075

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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