DMN12M8UCA10

N-CHANNEL ENHANCEMENT MODE MOSFET

Lead-free Green

Product Summary

BV$_{SSS}$	R$_{SS(ON)}$ Typ	I$_S$ Max T$_A$ = +25°C
12V	2.4 mΩ @ V$_{GS}$ = 3.8V	25A

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 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 or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**
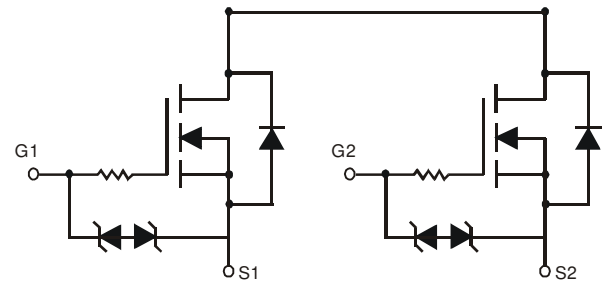
Mechanical Data

- Package: X4-DSN3015-10
- 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
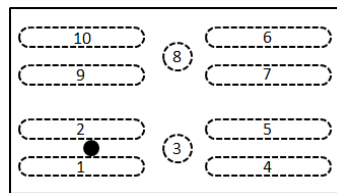
X4-DSN3015-10

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

Top View

Equivalent Circuit

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN12M8UCA10-7	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
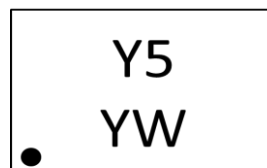
Y5 = Product Type Marking Code
YW = Date Code Marking
Y or $\overline{Y}$ = Year (ex: 1 = 2021)
W or $\overline{W}$ = Week (ex: a = Week 27; z Represents Week 52 and 53)

Date Code Key

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	1	2	3	4	5	6	7	8	9	0	1	2

Week	1-26	27-52	53
Code	A-Z	a-z	z

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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$_S$	25	A
		T$_A$ = +70°C			20	
Continuous Source Current (Note 5) V$_{GS}$ = 2.5V	Steady State	T$_A$ = +25°C		I$_S$	17	A
		T$_A$ = +70°C			14	
Pulsed Source Current (Note 6)				I$_{SM}$	110	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P$_D$	1.4	W
Thermal Resistance, Junction to Ambient @T$_A$ = +25°C (Note 7)	R$_{θJA}$	90.5	°C/W
Power Dissipation (Note 5)	P$_D$	2.75	W
Thermal Resistance, Junction to Ambient @T$_A$ = +25°C (Note 5)	R$_{θJA}$	45.5	°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	0.75	1.4	V	V$_{SS}$ = 10V, I$_S$ = 1.11mA
Static Source-Source On-Resistance	R$_{SS(ON)}$	1.55	2.3	2.8	mΩ	V$_{GS}$ = 4.5V, I$_S$ = 6A
		1.6	2.4	2.9		V$_{GS}$ = 3.8V, I$_S$ = 6A
		1.65	2.7	4.0		V$_{GS}$ = 3.1V, I$_S$ = 6A
		1.9	3.2	6.2		V$_{GS}$ = 2.5V, I$_S$ = 6A
Diode Forward Voltage	V$_{SS}$	—	0.75	1.2	V	V$_{GS}$ = 0V, I$_S$ = 6A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C$_{iss}$	—	2504	—	pF	V$_{SS}$ = 10V, V$_{GS}$ = 0V, f = 1MHz
Output Capacitance	C$_{oss}$	—	679	—		
Reverse Transfer Capacitance	C$_{rss}$	—	202	—		
Total Gate Charge	Q$_g$	—	36.4	—	nC	V$_{SS}$ = 6V, V$_{GS}$ = 4V, I$_S$ = 6A
Gate-Source Charge	Q$_{gs}$	—	6.8	—		
Gate-Drain Charge	Q$_{gd}$	—	7.4	—		
Gate Charge at V$_{TH}$	Q$_{g(th)}$	—	4.0	—		
Turn-On Delay Time	t$_{D(ON)}$	—	419	—	ns	V$_{SS}$ = 6V, V$_{GS}$ = 4V, I$_S$ = 6A
Turn-On Rise Time	t$_R$	—	1788	—		
Turn-Off Delay Time	t$_{D(OFF)}$	—	5412	—		
Turn-Off Fall Time	t$_F$	—	3900	—		

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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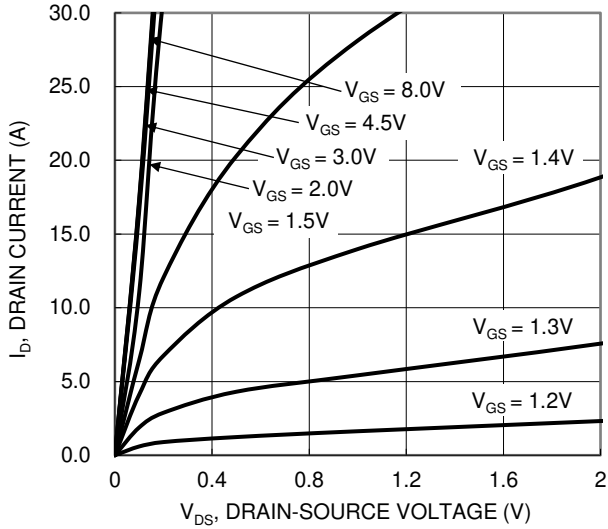**www.diodes.com**

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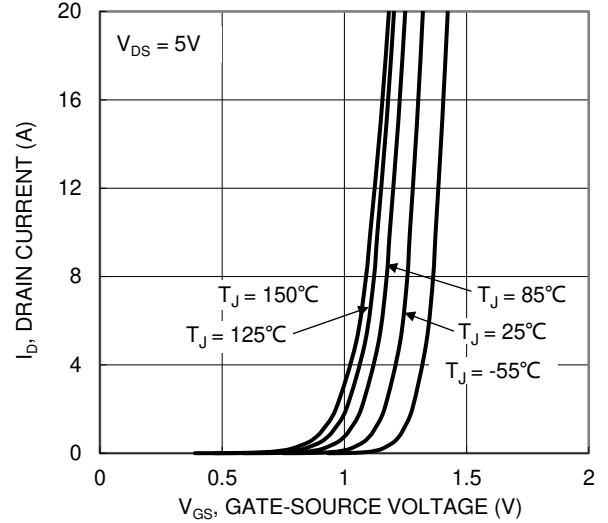Figure 1. Typical Output Characteristic

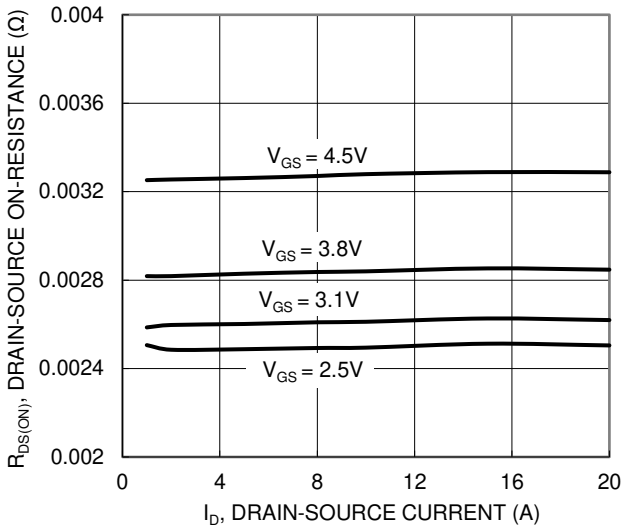Figure 2. Typical Transfer Characteristic

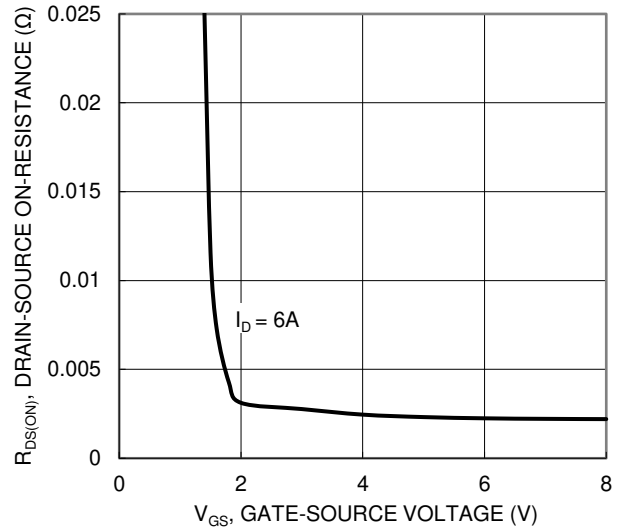Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

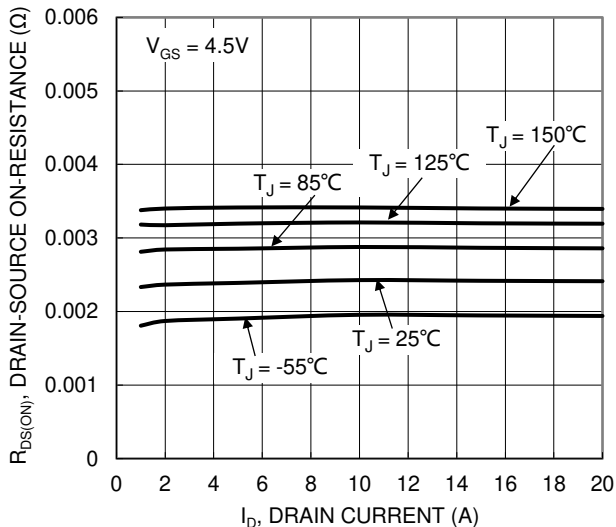Figure 4. Typical Transfer Characteristic

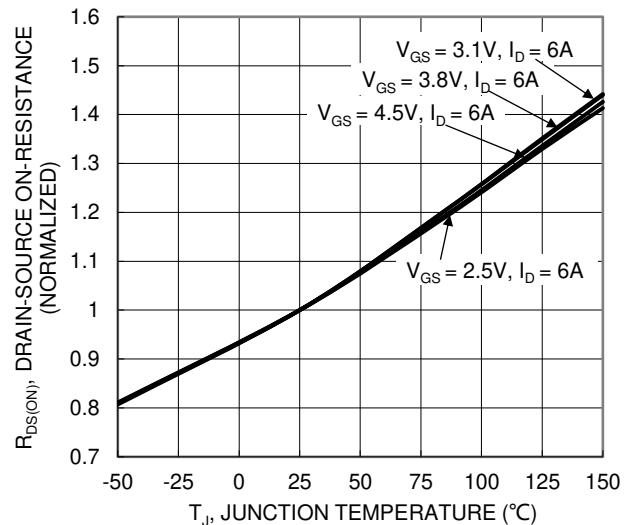Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

Figure 6. On-Resistance Variation with Junction Temperature

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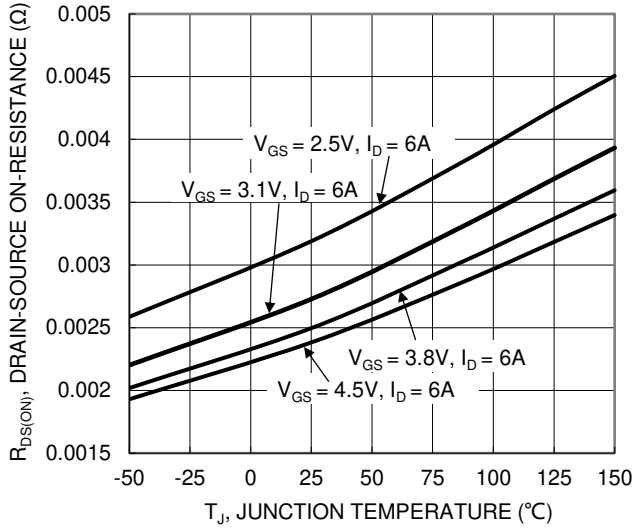
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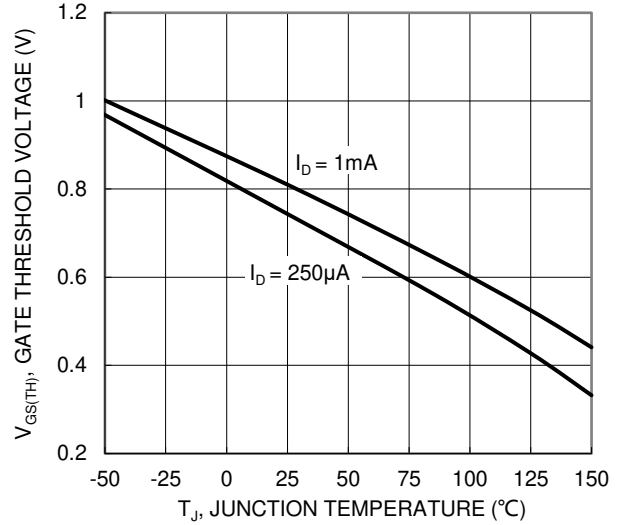Figure 7. On-Resistance Variation with Junction Temperature

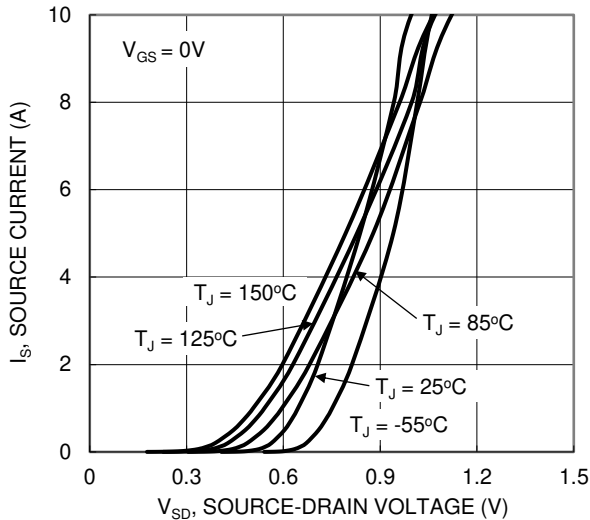Figure 8. Gate Threshold Variation vs. Junction Temperature

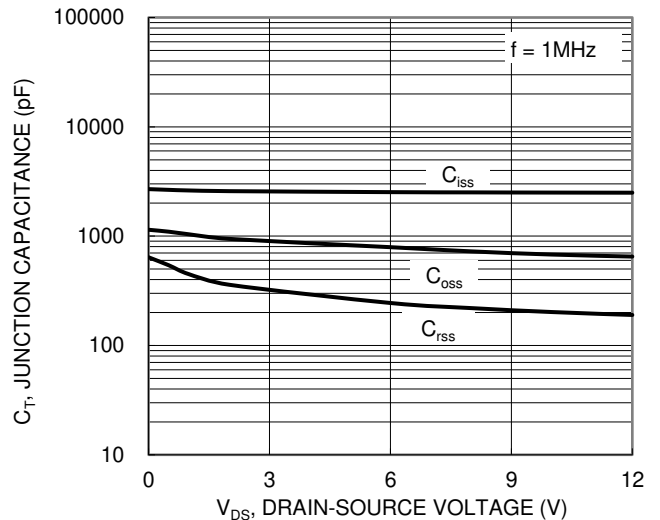Figure 9. Diode Forward Voltage vs. Current
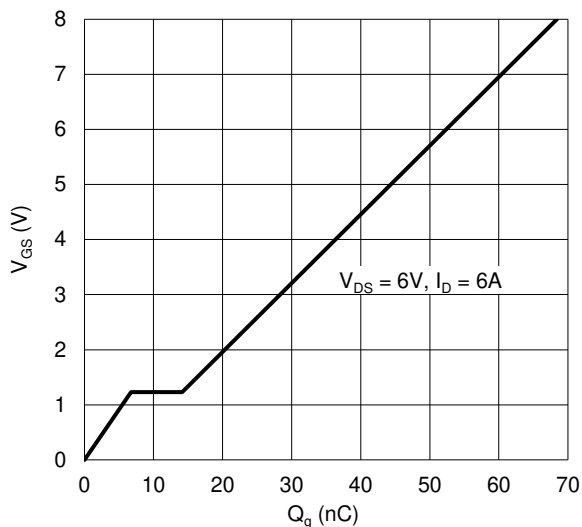

Figure 10. Typical Junction Capacitance

Figure 11. Gate Charge
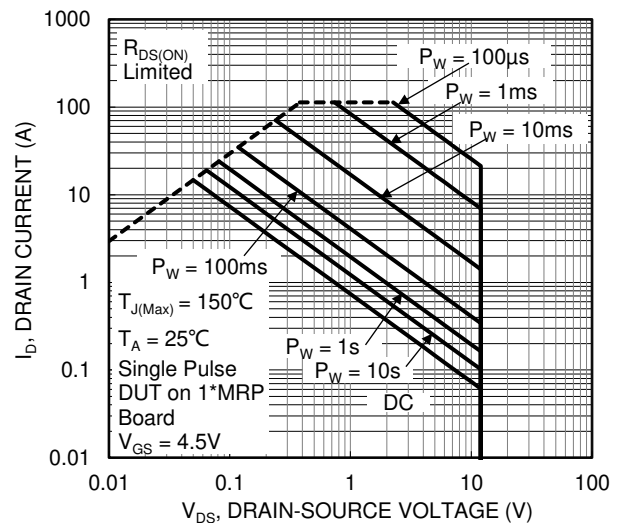
Figure 12. SOA, Safe Operation Area

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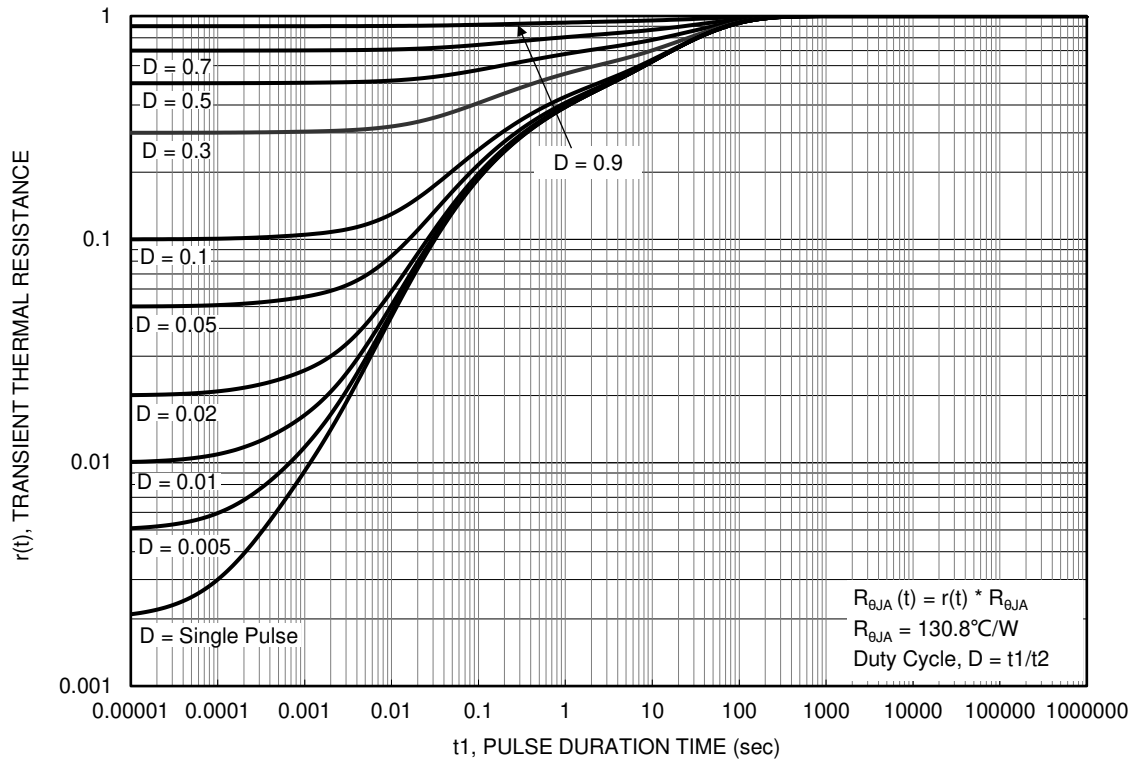
Figure 13. Transient Thermal Resistance

The chart shows r(t), TRANSIENT THERMAL RESISTANCE on the y-axis (from 0.001 to 1) versus t1, PULSE DURATION TIME (sec) on the x-axis (from 0.00001 to 1000000), with curves labeled:

- D = 0.9
- D = 0.7
- D = 0.5
- D = 0.3
- D = 0.1
- D = 0.05
- D = 0.02
- D = 0.01
- D = 0.005
- D = Single Pulse

$R_{\theta JA}(t) = r(t) * R_{\theta JA}$

$R_{\theta JA} = 130.8°C/W$

Duty Cycle, $D = t1/t2$

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Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.
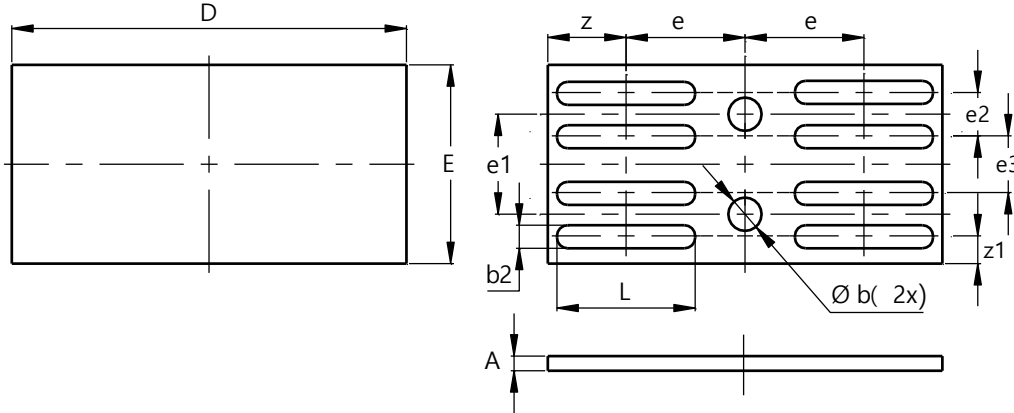
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X4-DSN3015-10			
Dim	Min	Max	Typ
A	0.09	0.16	0.11
b	--	--	0.25
b2	--	--	0.175
D	2.93	3.03	2.98
E	1.44	1.54	1.49
e	--	--	0.895
e1	--	--	0.75
e2	--	--	0.325
e3	--	--	0.425
L	--	--	1.04
z	--	--	0.595
z1	--	--	0.2075
All Dimensions in mm			

Suggested Pad Layout

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

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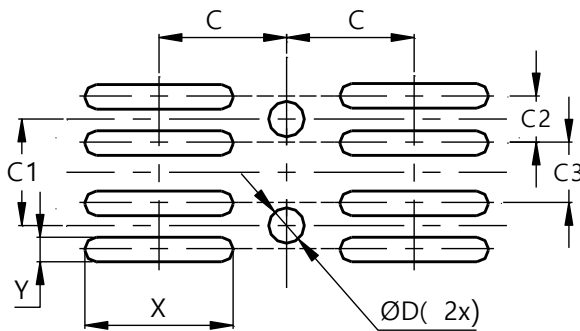
Dimensions	Value (in mm)
C	0.895
C1	0.750
C2	0.325
C3	0.425
D	0.25
X	1.04
Y	0.175

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