



N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{SSS}	R _{SS(ON) Max}	I _{S Max} T _A = +25°C
401/	$2.75 \text{m}\Omega$ @ $V_{GS} = 4.5 \text{V}$	20.2A
12V	6.1mΩ @ V _{GS} = 2.5V	13.6A

Features

- CSP with Footprint 2.98mm x 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)

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.

Mechanical Data

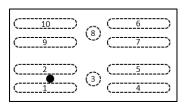
- Case: X4-DSN3015-10
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu or NiAu. Solderable per MIL-STD-202, Method 208 @4

Applications

- Battery Management
- Load Switch
- Battery Protection

ESD PROTECTED



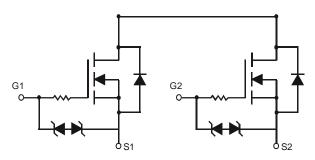


Source 1: 1,2,4,5

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.

Top View

- 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



 $\begin{array}{l} MF = Product\ Type\ Marking\ Code \\ YM = Date\ Code\ Marking \\ Y\ or\ \overline{Y} = Year\ (ex:\ F = 2018) \\ M\ or\ \overline{M} = Month\ (ex:\ 9 = September) \end{array}$

Date Code Key

Date Code Ite	<i>-</i>											
Year	2018	2019	20	020	2021	2022	2	2023	2024	20:	25	2026
Code	F	G		Н		J		K	L	N	1	N
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D



Maximum Ratings ($@T_A = +25^{\circ}C$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit		
Source-Source Voltage	Vsss	12	V		
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Source Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	Is	20.2 16.1	А
Continuous Source Current (Note 5) V _{GS} = 2.5V	Steady State	T _A = +25°C T _A = +70°C	Is	13.6 10.8	А
Pulsed Source Current (Note 6)	I _{SM}	80	Α		

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)	$R_{\theta JA}$	171.9	°C/W
Power Dissipation (Note 5)	P _D	1.73	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	$R_{\theta JA}$	74.4	°C/W
Operating and Storage Temperature Range	T_{J}, T_{STG}	-55 to +150	°C

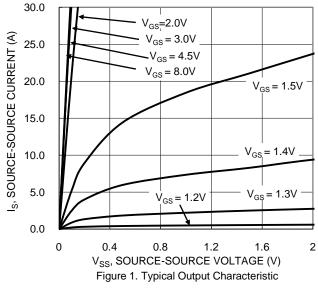
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)	- Cymiaei		. , , ,	max	<u> </u>	root containen	
Source-Source Breakdown Voltage	BV _{SSS}	12	_	_	V	$V_{GS} = 0V$, $I_S = 1mA$	
Zero Gate Voltage Drain Current T _J = +25°C	Isss	_	_	1	μΑ	V _{SS} = 9.6V, V _{GS} = 0V	
Cata Cauraa Laakaga		_	_	±10	μΑ	$V_{GS} = \pm 8V$, $V_{SS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±1	μΑ	$V_{GS} = \pm 5V$, $V_{SS} = 0V$	
ON CHARACTERISTICS (Note 8)						•	
Gate Threshold Voltage	V _{GS(TH)}	0.5	0.8	1.4	V	Vss = 10V, Is = 1.11mA	
		1.55	2.19	2.75		$V_{GS} = 4.5V, I_{S} = 6A$	
Static Source Source On Desintence	_	1.6	2.30	2.85		$V_{GS} = 3.8V, I_S = 6A$	
Static Source-Source On-Resistance	R _{SS(ON)}	1.65	2.51	3.95	mΩ	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	_		10/1/	
Output Capacitance	Coss	_	530	_	pF	$V_{SS} = 10V, V_{GS} = 0V,$ f = 1MHz	
Reverse Transfer Capacitance	C _{rss}	_	141	_		1 - 11/11/2	
Total Gate Charge	Qg	_	35.7	_			
Gate-Source Charge	Q _{gs}	_	6.7	_	nC	$V_{SS} = 6V$, $V_{GS} = 4V$,	
Gate-Drain Charge	Q _{gd}	_	9.2	_	IIC	$I_S = 6A$	
Gate Charge at V _{TH}	Q _{g(th)}	_	3.4	_			
Turn-On Delay Time	t _{D(ON)}	_	880	_			
Turn-On Rise Time	t _R	_	1468	_		$V_{SS} = 6V, V_{GS} = 4V,$	
Turn-Off Delay Time	t _{D(OFF)}	_	2914	_	ns	Is = 6A	
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.





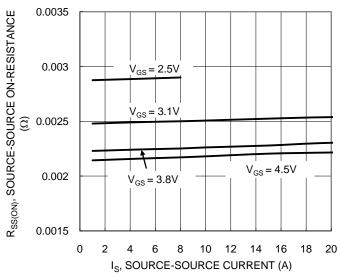


Figure 3. Typical On-Resistance vs. Source Current and Gate Voltage

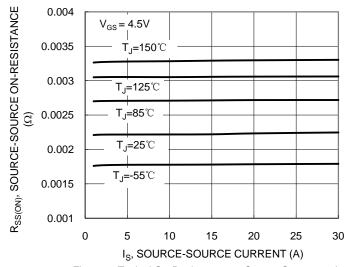


Figure 5. Typical On-Resistance vs. Source Current and Junction Temperature

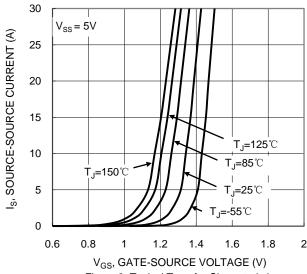
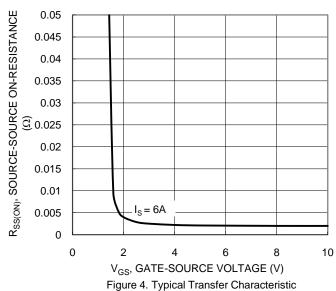


Figure 2. Typical Transfer Characteristic



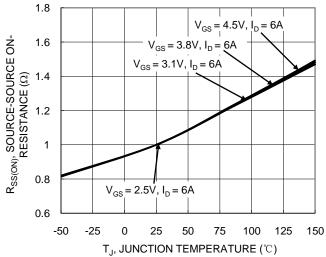
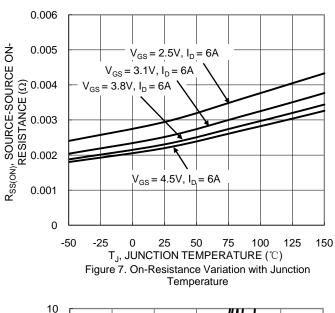
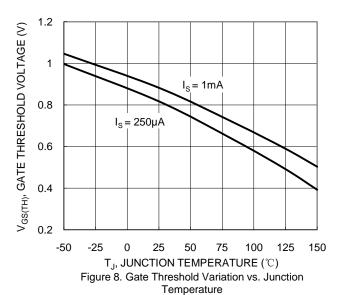


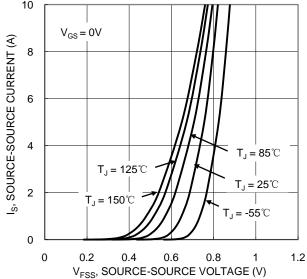
Figure 6. On-Resistance Variation with Junction Temperature

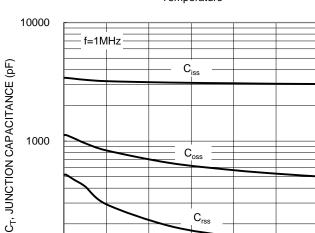












 $\mathsf{C}_{\mathsf{rss}}$

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V_{DS}, DRAIN-SOURCE VOLTAGE (V)

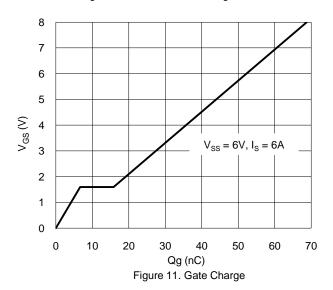
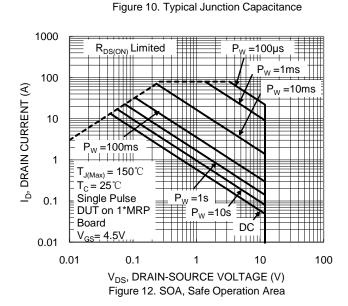


Figure 9. Diode Forward Voltage vs. Current



100

0

2

10

12



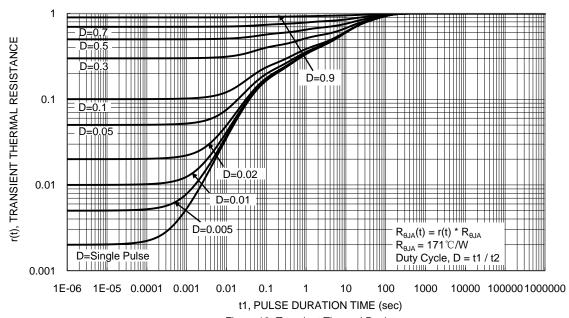
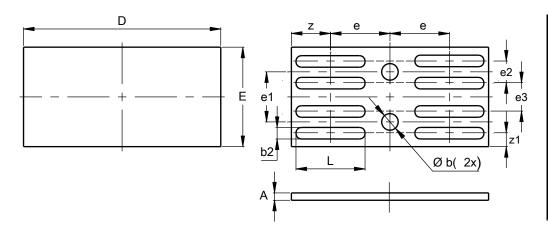


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X4-DSN3015-10



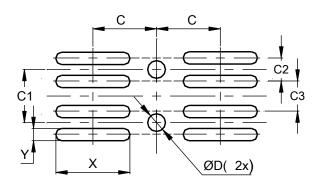
X4-DSN3015-10							
Dim	Min	Max	Тур				
Α	0.09	0.16	0.11				
b			0.25				
b2			0.175				
D	2.93	3.03	2.98				
Е	1.44	1.54	1.49				
е			0.895				
e1			0.75				
e2			0.325				
е3			0.425				
L			1.04				
Z			0.595				
z 1			0.2075				
All Dimensions in mm							



Suggested Pad Layout

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

X4-DSN3015-10



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

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