



N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{SSS}	R _{SS(ON)} Max	I _S T _A = +25°C
12V	$3.2 \text{m}\Omega$ @ $V_{GS} = 4.5 \text{V}$	23.6A
12 V	$6.3 \text{m}\Omega$ @ $V_{GS} = 2.5 \text{V}$	16.8A

Description

This new generation MOSFET has been designed to minimize the onstate resistance (RSS(ON)) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- **Battery Management**
- Load Switch
- **Battery Protection**



4. Source 2

5. Gate 2

Features

- CSP with Footprint 3.54mm x 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

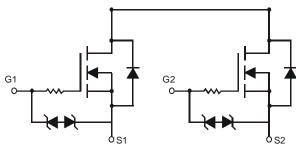
- Case: X3-DSN3518-6
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu. Solderable per MIL-STD-202, Method 208 (e4)







6. Source 2



Equivalent Circuit

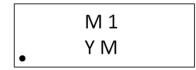
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN1003UCA6-7	X3-DSN3518-6	3000/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
- 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



M1 = Product Type Marking Code YM = Date Code Marking Y or \overline{Y} = Year (ex: F= 2018) M or \overline{M} = Month (ex: 9 = September)

Date Code Key

Year	2017	2018	20	019	2020	2021		2022	2023	202	24	2025
Code	Е	F		G	Н	- 1		J	K	L		M
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°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	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	Is	23.6 18.9	А
Continuous Source Current (Note 5) V _{GS} = 2.5V	Is	16.8 13.4	А		
Pulsed Source Current (Note 6)	I _{SM}	100	Α		

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P _D	1.05	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 7)	$R_{ heta JA}$	120.7	°C/W
Power Dissipation (Note 5)	P _D	2.67	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	$R_{ heta JA}$	46.8	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

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

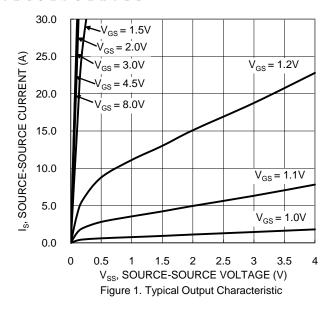
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Source-Source Breakdown Voltage	BVsss	12	-	-	٧	$V_{GS} = 0V$, $I_S = 1mA$	
Zero Gate Voltage Source Current T _J = +25°C	Isss	-	-	1	μΑ	$V_{SS} = 10V$, $V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	-	-	±10	μΑ	$V_{GS} = \pm 8V$, $V_{SS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V _{GS(TH)}	0.5	-	1.3	V	$V_{SS} = 6V$, $I_S = 1mA$	
		1.6	2.3	3.2		$V_{GS} = 4.5V, I_{S} = 5A$	
		1.7	2.4	3.2		$V_{GS} = 4.0V, I_S = 5A$	
Static Source-Source On-Resistance	Rss(ON)	1.8	2.5	3.2	mΩ	$V_{GS} = 3.8V, I_{S} = 5A$	
		1.9	2.7	4.4		$V_{GS} = 3.1V, I_S = 5A$	
		2.1	3.0	6.3		$V_{GS} = 2.5V, I_{S} = 5A$	
Diode Forward Voltage	Vss	-	0.7	1.2	V	$V_{GS} = 0V$, $I_S = 3A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C _{iss}	-	3315	-		., ., ., .,	
Output Capacitance	Coss	-	850	-	pF	$V_{SS} = 6V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	C _{rss}	-	248	-		1 = 1.000112	
Total Gate Charge	Q_g	-	56.5	-			
Gate-Source Charge	Q_{gs}	-	8.8	-	nC	$V_{SS} = 6V, V_{GS} = 4.5V,$	
Gate-Drain Charge	Q_{gd}	-	13.3	-	IIC	I _S = 27A	
Gate Charge at V _{TH}	$Q_{g(TH)}$	-	6.9	-			
Turn-On Delay Time	t _{D(ON)}	-	603	-			
Turn-On Rise Time	t _R	-	1694	-	ns	$V_{SS} = 6V, V_{GS} = 4.5V,$	
Turn-Off Delay Time	t _{D(OFF)}	-	4749	-	115	$I_S = 3A$	
Turn-Off Fall Time	t _F	-	6208	-			

Notes:

- 5. Device mounted on FR-4 material with 1-inch² (6.45-cm²), 2-oz. (0.071-mm 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.

DMN1003UCA6





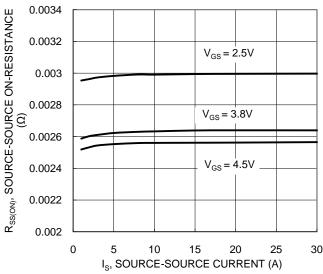


Figure 3. Typical On-Resistance vs. Source Current and Gate Voltage

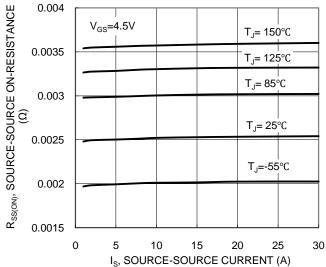
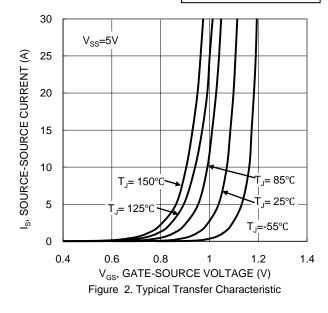
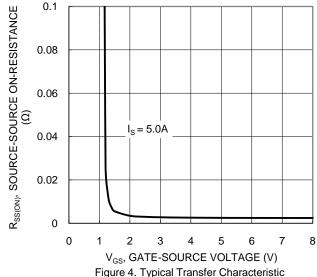


Figure 5. Typical On-Resistance vs. Source Current and Junction Temperature





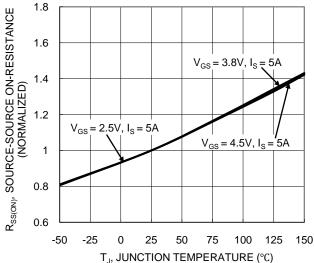
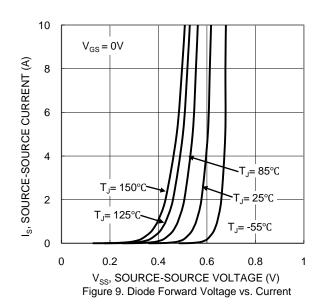


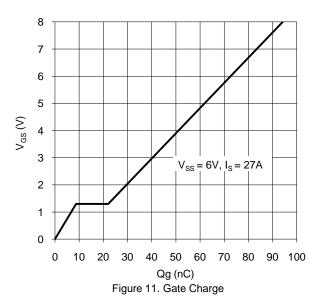
Figure 6. On-Resistance Variation with Junction Temperature



0.005 R_{SS(ON)}, SOURCE-SOURCE ON-RESISTANCE 0.004 $V_{GS} = 2.5V, I_{S} = 5A$ @ 0.003 $V_{GS} = 3.8V, I_{S}^{1} = 5A$ 0.002 $V_{GS} = 4.5 V, I_{S} = 5 A$ 0.001 0 -25 50 75 100 125 150 -50 25 T_J, JUNCTION TEMPERATURE (°C) Figure 7. On-Resistance Variation with Junction



Temperature



DMN1003UCA6

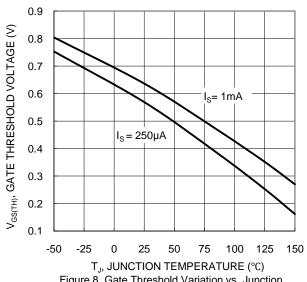
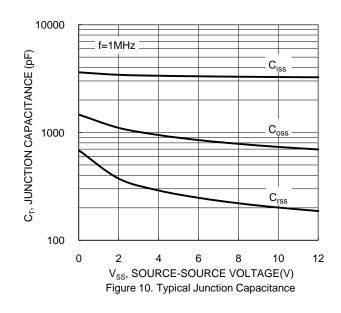
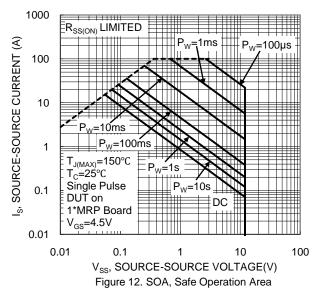


Figure 8. Gate Threshold Variation vs. Junction Temperature





February 2018

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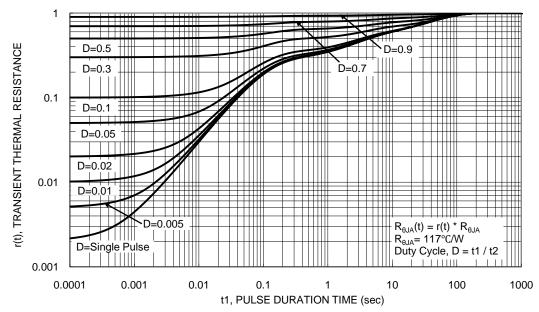


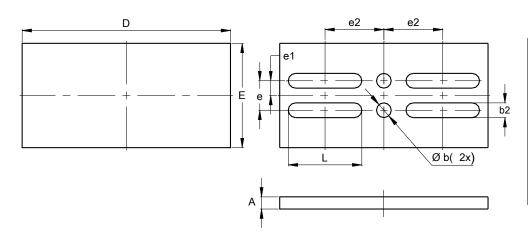
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

X3-DSN3518-6

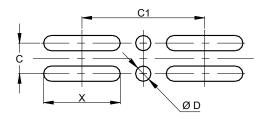


X3-DSN3518-6							
Dim	Min	Max	Тур				
Α	0.16	0.26	0.21				
b	0.22	0.28	0.25				
b2	0.22	0.28	0.25				
D	3.49	3.59	3.54				
Е	1.72	1.82	1.77				
е	0.47	0.53	0.50				
e1	0.22	0.28	0.25				
e2	0.97	1.03	1.00				
L 1.22 1.28 1.25							
All Dimensions in mm							

Suggested Pad Layout

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

X3-DSN3518-6



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



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