



P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _A = +25°C
-20V	$78m\Omega$ @ $V_{GS} = -8V$	-3.4A
	100mΩ @ $V_{GS} = -4.5V$	-3.0A

Description

This new generation MOSFET is designed to minimize the footprint in handheld and mobile application. It can be used to replace many small signals MOSFET with as really small footprint.

Applications

- Battery Management
- Load Switch
- Battery Protection
- Handheld and Mobile Application

Features and Benefits

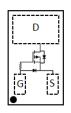
- Low Q_g & Q_{gd}
- Small Footprint
- Low Profile 0.225mm Height
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

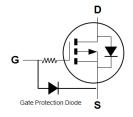
Mechanical Data

- Case: X4-DSN1006-3
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Backside Lamination: A Protective Polymer Film
- Terminals: Finish NiPdAu.or NiAu Solderable per MIL-STD-202, Method 208

X4-DSN1006-3 (Type B)







Top View

Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2079LCA3-7	X4-DSN1006-3 (Type B)	10k/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



 $\begin{array}{l} R = Product\ Type\ Marking\ Code \\ YM = Date\ Code\ Marking \\ Y\ or\ \overline{Y} = Year\ (ex:\ G=2019) \\ M\ or\ \overline{M} = Month\ (ex:\ 9=September) \end{array}$

Date Code Key

Υ	ear	2018	2019	2020	2021	2022	2023	2024	2025	2026
C	ode	F	G	Н	ı	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	0	N	D

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

Characteristic	Symbol	Value	Unit		
Drain-Source Voltage	V _{DSS}	-20	V		
Gate-Source Voltage	V _{GSS}	-12	V		
Continuous Drain Current (Note 5) V _{GS} = -8V	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I _D	-3.4 -2.7	А
Continuous Drain Current (Note 5) V _{GS} = -4.5V	I _D	-3.0 -2.4	А		
Pulsed Drain Current (Note 6)	I _{DM}	-13	Α		
Human Body Model (HBM)	$V_{(ESD)}$	4	kV		

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P _D	0.81	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 7)	$R_{ heta JA}$	155.4	°C/W
Power Dissipation (Note 5)	P _D	1.4	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{0JA}	90.4	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

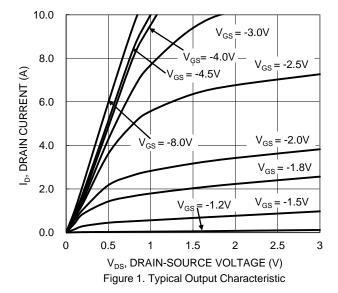
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition		
OFF CHARACTERISTICS (Note 8)					•	•		
Drain-Source Breakdown Voltage	BV _{DSS}	-20	_	_	V	$V_{GS} = 0V, I_{D} = -250\mu A$		
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	_	_	-100	nA	$V_{DS} = -16V, V_{GS} = 0V$		
Gate-Source Leakage	I _{GSS}	_	_	-50	nA	$V_{GS} = -12V, V_{DS} = 0V$		
ON CHARACTERISTICS (Note 8)								
Gate Threshold Voltage	V _{GS(TH)}	-0.7	-0.9	-1.2	V	$V_{DS} = V_{GS}$, $I_D = -250\mu A$		
		l	64	78		$V_{GS} = -8V, I_{D} = -0.5A$		
Static Drain-Source On-Resistance	D-s/s/	l	77	100	mΩ	$V_{GS} = -4.5V$, $I_{D} = -0.5A$		
Static Dialit-Source Off-Resistance	R _{DS(ON)}		113	165	11122	$V_{GS} = -2.5V, I_D = -0.5A$		
		_	188	600		$V_{GS} = -1.8V, I_D = -0.1A$		
Diode Forward Voltage	V _{SD}	_	-0.7	-1.0	V	$V_{GS} = 0V, I_{S} = -0.5A$		
Reverse Recovery Charge	Q _{RR}	_	1.3	_	nC	V _{DD} = -10V, I _F = -1A,		
Reverse Recovery Time	t _{RR}	_	7.7	_	ns	di/dt = 100A/μs		
DYNAMIC CHARACTERISTICS (Note 9)					•	•		
Input Capacitance	C _{iss}	_	152	_		101/11/101/		
Output Capacitance	Coss	_	78	_	pF	$V_{DS} = -10V, V_{GS} = 0V,$ f = 1MHz		
Reverse Transfer Capacitance	Crss	_	4.3	_		1 = 11011 12		
Series Gate Resistance	R_{G}	_	21	_	Ω	$f = 1MHz$, $V_{GS} = 0V$, $V_{DS} = 0V$		
Total Gate Charge	Qg	_	1.1	_				
Gate-Source Charge	Q _{gs}	_	0.2	_	nC	$V_{GS} = -4.5V$, $V_{DS} = -10V$,		
Gate-Drain Charge	Q _{gd}	_	0.2	_	iiC	$I_D = -0.5A$		
Gate Charge at V _{TH}	Q _{g(th)}	-	3.6	_				
Turn-On Delay Time	t _{D(ON)}	-	4.1	_				
Turn-On Rise Time	t _R		5.6	_		$V_{DS} = -10V, V_{GS} = -4.5V,$		
Turn-Off Delay Time	t _{D(OFF)}		9.5	_	ns	$R_G = 2\Omega, I_D = -0.5A$		
Turn-Off Fall Time	t _F	_	4.6	_				

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.





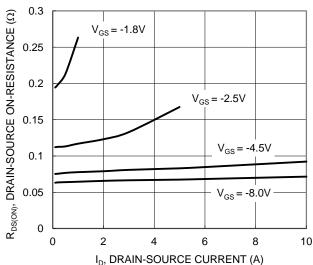


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

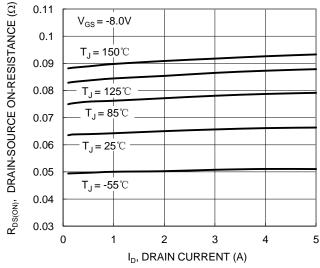


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

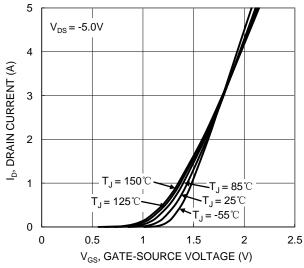


Figure 2. Typical Transfer Characteristic

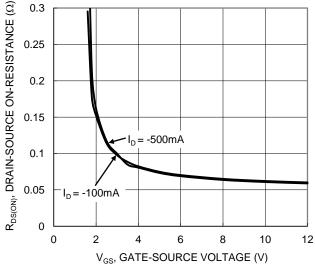


Figure 4. Typical Transfer Characteristic

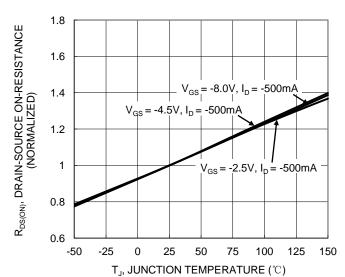
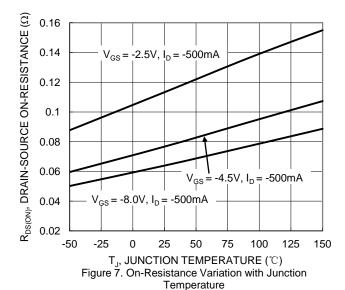
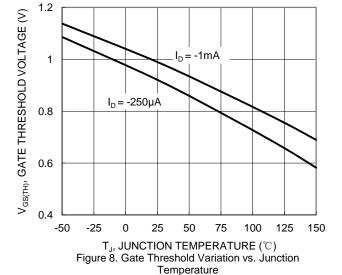


Figure 6. On-Resistance Variation with Junction Temperature







5
V_{GS} = 0V

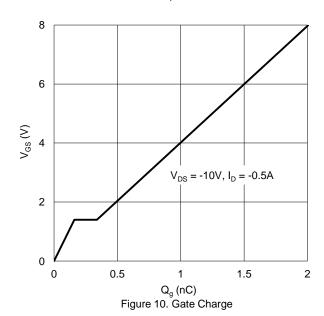
V_{GS} = 0V

T_J = 150°C

T_J = 25°C

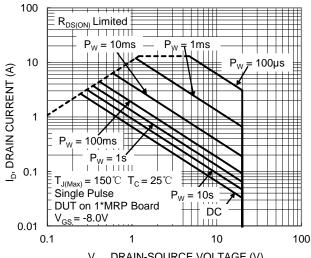
T_J = -55°C

T_J = -55°C



 $\rm V_{SD},$ SOURCE-DRAIN VOLTAGE (V) Figure 9. Diode Forward Voltage vs. Current

0.6



 $V_{\rm DS}$, DRAIN-SOURCE VOLTAGE (V) Figure 11. SOA, Safe Operation Area

0

0

0.3

1.5



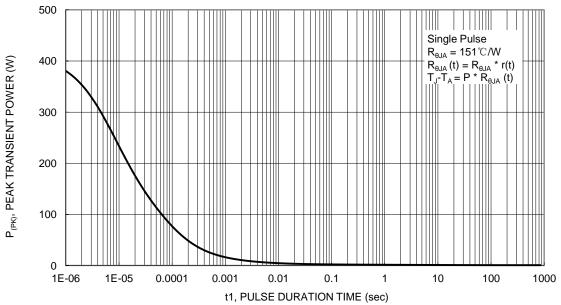
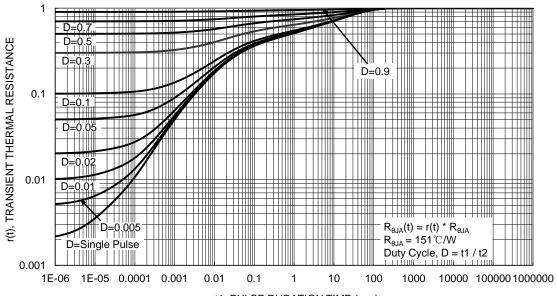


Figure 12. Single Pulse Maximum Power Dissipation



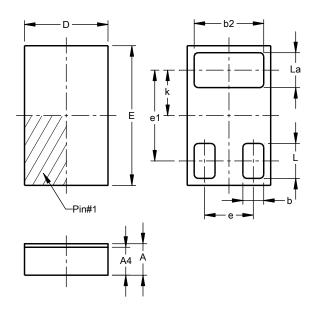
t1, PULSE DURATION TIME (sec) Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

X4-DSN1006-3 (Type B)

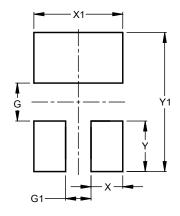


X4-DSN1006-3 (Type B)								
Dim	Min	Max	Тур					
Α	0.20	0.25	0.225					
A4	0.18	0.22	0.20					
b	0.14	0.16	0.15					
b2	0.49	0.51	0.50					
D	0.56	0.64	0.60					
Е	0.96	1.04	1.00					
е			0.35					
e1			0.65					
k			0.325					
L	0.24	0.26	0.25					
La	0.24	0.26	0.25					
All	Dimens	ions in	mm					

Suggested Pad Layout

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

X4-DSN1006-3 (Type B)



Dimensions	Value
Dillielisions	(in mm)
G	0.40
G1	0.20
Х	0.15
X1	0.50
Y	0.25
Y1	0.90



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