



N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _A = +25°C
12V	$23m\Omega$ @ $V_{GS} = 4.5V$	5.1A
120	$29m\Omega$ @ $V_{GS} = 2.5V$	4.8A

Description

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

Applications

- Battery Management
- Load Switch
- Battery Protection

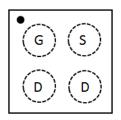
Features and Benefits

- Low Q_g & Q_{gd}
- Small Footprint
- Low Profile 0.62mm Height
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

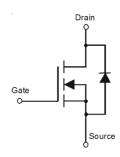
Mechanical Data

- Case: U-WLB1010-4 (Type C)
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020

U-WLB1010-4 (Type C)







Equivalent Circuit

Ordering Information (Note 4)

Ī	Part Number	Case	Packaging
	DMN1023UCB4-7	U-WLB1010-4 (Type C)	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.

- 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



1A = Product Type Marking Code YM = Date Code Marking Y or \overline{Y} = Year (ex: F = 2018) M or \overline{M} = Month (ex: O = October)

Date Code Key

Year	201	5	2016		2017	20	18	2019		2020	2	2021
Code	С		D		Е		=	G		Н		1
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



Characteristic	Symbol	Value	Unit		
Drain-Source Voltage	V _{DSS}	12	V		
Gate-Source Voltage	V_{GSS}	±8	V		
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	5.1 4.1	А
Continuous Drain Current (Note 5) V _{GS} = 2.5V	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I _D	4.8 3.9	А
Pulsed Drain Current (Note 6)	I _{DM}	15	Α		

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	PD	0.8	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 7)	R _{θJA}	149	°C/W
Power Dissipation (Note 5)	P _D	1.2	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	102	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

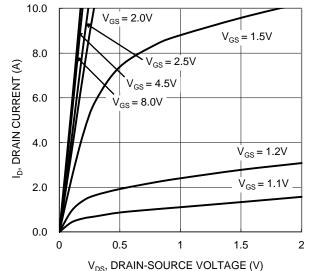
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

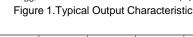
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)				•	•		
Drain-Source Breakdown Voltage	BV _{DSS}	12	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	_	_	1.0	μΑ	$V_{DS} = 9.6V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 8V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V _{GS(TH)}	0.4	0.7	1.2	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
		_	18	23		$V_{GS} = 4.5V, I_{D} = 1A$	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	22	29	mΩ	$V_{GS} = 2.5V, I_D = 1A$	
		_	29	42		V _{GS} = 1.8V, I _D = 1A	
Forward Transfer Admittance	Y _{fs}	_	8	_	S	$V_{DS} = 6V, I_{D} = 1A$	
Diode Forward Voltage	V _{SD}	_	0.7	1.0	V	V _{GS} = 0V, I _S = 1A	
Reverse Recovery Charge	Q _{RR}	_	1.3	_	nC	$V_{DD} = 6V, I_F = 1A,$	
Reverse Recovery Time	t _{RR}	_	11.2	_	ns	di/dt =100A/µs	
DYNAMIC CHARACTERISTICS (Note 9)	•					•	
Input Capacitance	C _{iss}	_	288	440			
Output Capacitance	Coss	_	204	310	pF	$V_{DS} = 6V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	C _{rss}	_	20	30		I = I.OMHZ	
Series Gate Resistance	R_{G}	_	3.3	6.6	Ω	f=1MHz,V _{GS} =0V, V _{DS} =0V	
Total Gate Charge	Qg	_	2.3	3.0			
Gate-Source Charge	Q _{gs}	-	0.27	_		$V_{GS} = 4.5V, V_{DS} = 6V,$	
Gate-Drain Charge	Q _{gd}	_	0.15	_	nC	I _D =1A	
Gate Charge at V _{TH}	Q _{g(TH)}	-	0.13	_			
Turn-On Delay Time	t _{D(ON)}	_	3	5			
Turn-On Rise Time			6		ns	$V_{DS} = 6V, V_{GS} = 4.5V,$	
Turn-Off Delay Time	t _{D(OFF)}	_	18	27	115	$R_G = 20\Omega$, $I_D = 1A$	
Turn-Off Fall Time	t _F	1	9	_			

Notes:

- Device mounted on FR-4 material with 1-inch² (6.45-cm²), 2-oz. (0.071-mm thick) Cu.
 Repetitive rating, pulse width limited by junction temperature.
 Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 Short duration pulse test used to minimize self-heating effect.
 Guaranteed by design. Not subject to production testing.







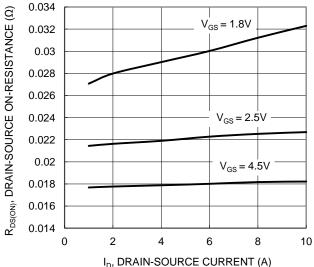


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

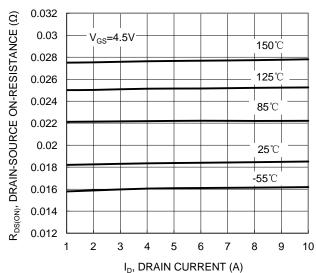
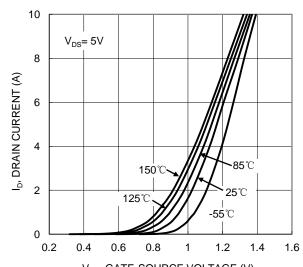


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature



 $\rm V_{GS},\,GATE\text{-}SOURCE\,VOLTAGE\,(V)$ Figure 2. Typical Transfer Characteristic

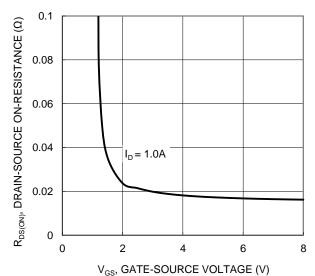


Figure 4. Typical Transfer Characteristic

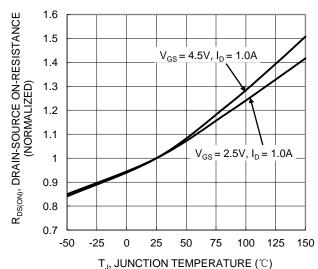
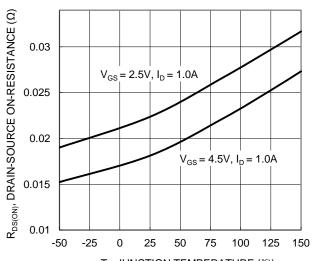


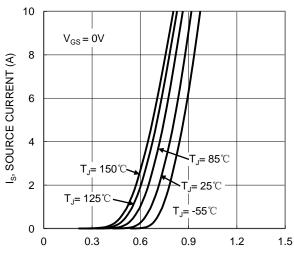
Figure 6. On-Resistance Variation with Junction Temperature



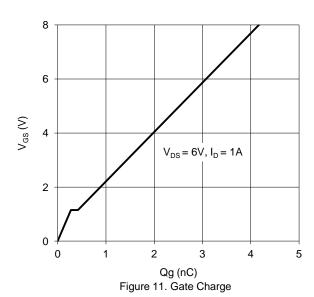




 ${\rm T_{J},\,JUNCTION\,TEMPERATURE}$ (°C) Figure 7. On-Resistance Variation with Junction Temperature



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



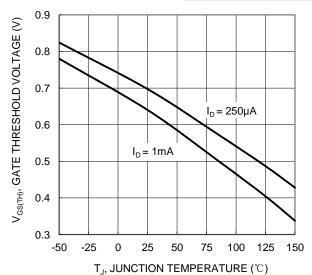
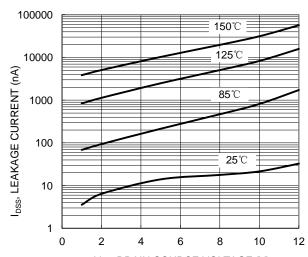
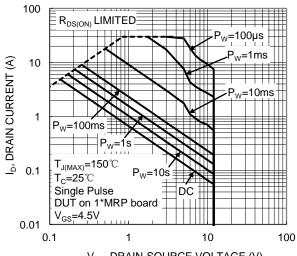


Figure 8. Gate Threshold Variation vs. Junction Temperature



 V_{DS} , DRAIN-SOURCE VOLTAGE (V) Figure 10. Typical Drain-Source Leakage Current vs. Voltage



V_{DS}, DRAIN-SOURCE VOLTAGE (V) Figure 12. SOA, Safe Operation Area



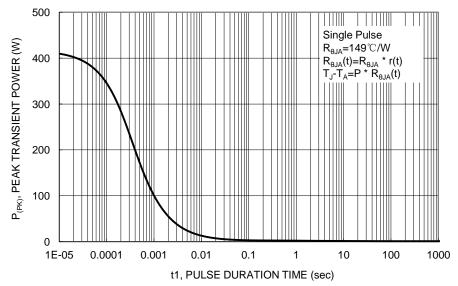


Figure 13. Single Pulse Maximum Power Dissipation

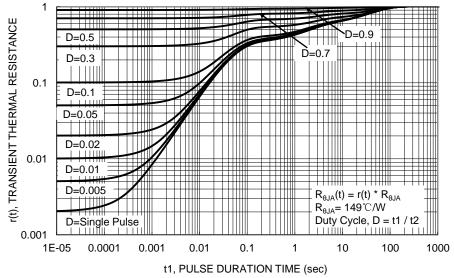


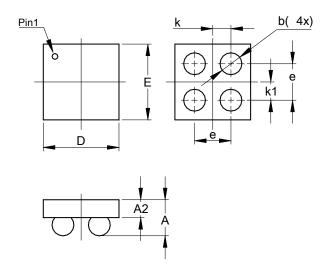
Figure 14. Transient Thermal Resistance



Package Outline Dimensions

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

U-WLB1010-4 (Type C)

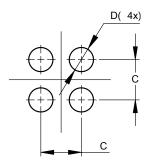


U-WLB1010-4 (Type C)							
Dim Min Max Typ							
A 0.62							
A2			0.38				
b	0.25	0.35	0.30				
D	0.92	1.00	0.96				
E	0.92	1.00	0.96				
е	e 0.50						
k		0.25					
k1	k1 0.25						
All Dimensions in mm							

Suggested Pad Layout

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

U-WLB1010-4 (Type C)



Dimensions	Value (in mm)			
С	0.500			
D	0.300			



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