

Product Summary

V _{DSS}	R _{DS(on)}	Q _g	Q _{gd}	I _D
12V	18mΩ	3.2nC	0.3nC	4.8A

 Typ. @ V_{GS} = 4.5V, T_A = +25°C

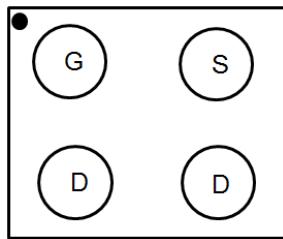
Description

This 2nd generation Lateral MOSFET (LD-MOS) is engineered to minimize on-state losses and switch ultra-fast, making it ideal for high efficiency power transfer. It uses Chip-Scale Package (CSP) to increase power density by combining low thermal impedance with minimal R_{DS(on)} per footprint area.

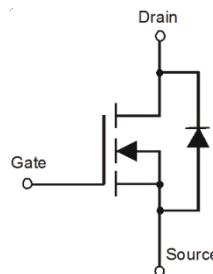
Applications

- DC-DC Converters
- Battery Management
- Load Switch

U-WLB1010-4



Top View



Equivalent Circuit

Ordering Information (Note 4)

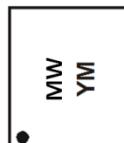
Part Number	Case	Packaging
DMN1032UCB4-7	U-WLB1010-4	3,000/Tape & Reel

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

U-WLB1010-4



MW = Product Type Marking Code
 YM = Date Code Marking
 Y or Y = Year (ex: B = 2014)
 M or M = Month (ex: 9 = September)

Date Code Key

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	B	C	D	E	F	G	H	I	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	O	N	D

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	12	V
Gate-Source Voltage			V_{GSS}	± 8	V
Continuous Drain Current (Note 5) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	4.8 3.8	A
Continuous Drain Current (Note 5) $V_{GS} = 2.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	4.5 3.6	A
Pulsed Drain Current (Note 6)			I_{DM}	15	A

Thermal Characteristics

Characteristic			Symbol	Value	Unit
Power Dissipation (Note 7)			P_D	0.9	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 7)			$R_{\theta JA}$	138.81	°C/W
Thermal Resistance, Junction to Case @ $T_C = +25^\circ\text{C}$ (Note 7)			$R_{\theta JC}$	31.77	°C/W
Power Dissipation (Note 5)			P_D	1.16	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5)			$R_{\theta JA}$	107.59	°C/W
Operating and Storage Temperature Range			T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	12	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	1.0	μA	$V_{DS} = 9.6\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GS}	—	—	± 100	nA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	0.4	0.8	1.2	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	18	26	mΩ	$V_{GS} = 4.5\text{V}, I_D = 1\text{A}$
		—	21	29		$V_{GS} = 2.5\text{V}, I_D = 1\text{A}$
		—	27	38		$V_{GS} = 1.8\text{V}, I_D = 1\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	8.1	—	S	$V_{DS} = 6\text{V}, I_D = 1\text{A}$
Diode Forward Voltage	V_{SD}	—	0.7	1.0	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
Reverse Recovery Charge	Q_{rr}	—	1.2	—	nC	$V_{dd} = 5\text{V}, I_F = 1\text{A}, dI/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Time	t_{rr}	—	10.5	—	ns	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	325	450	pF	$V_{DS} = 6\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	183	250		
Reverse Transfer Capacitance	C_{rss}	—	31	47		
Series Gate Resistance	R_G	—	3.1	—	Ω	$f=1\text{MHz}, V_{GS}=0\text{V}, V_{DS}=0\text{V}$
Total Gate Charge	Q_g	—	3.2	4.5	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 6\text{V}, I_D = 1\text{A}$
Gate-Source Charge	Q_{gs}	—	0.4	—		
Gate-Drain Charge	Q_{gd}	—	0.3	—		
Gate Charge at V_{th}	$Q_{g(th)}$	—	0.2	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.3	10	ns	$V_{DS} = 6\text{V}, V_{GS} = 4.5\text{V}, R_G = 20\Omega, I_D = 1\text{A}$
Turn-On Rise Time	t_r	—	5.6	—		
Turn-Off Delay Time	$t_{D(off)}$	—	24	36		
Turn-Off Fall Time	t_f	—	9	—		

Notes: 5. Device mounted on FR4 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.

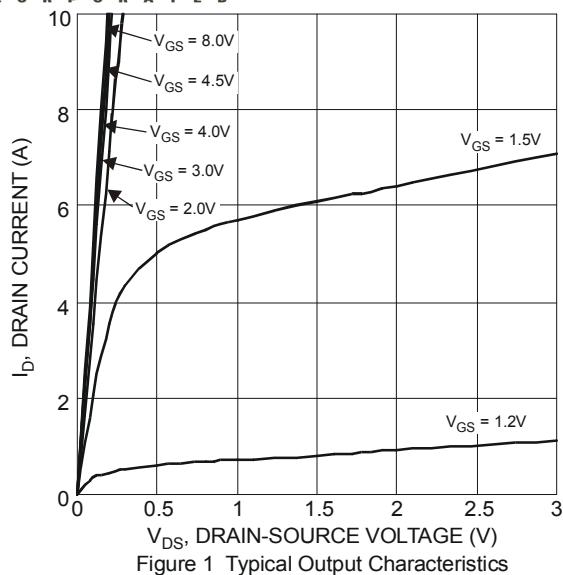


Figure 1 Typical Output Characteristics

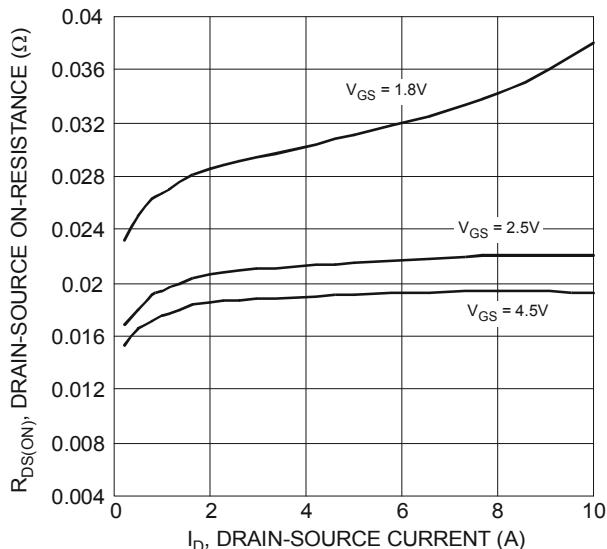


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

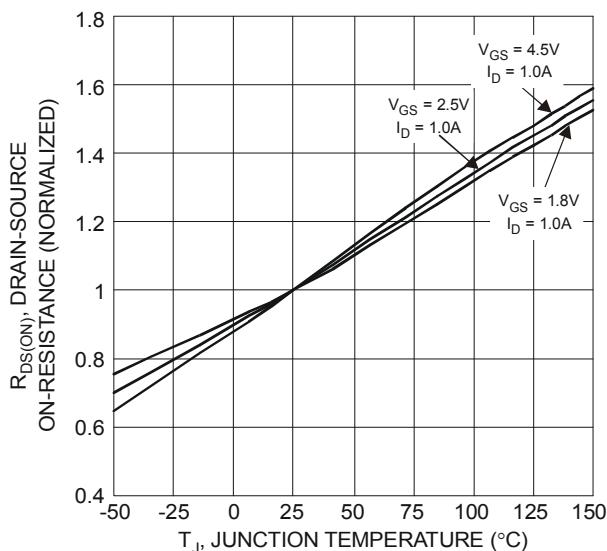


Figure 5 On-Resistance Variation with Temperature

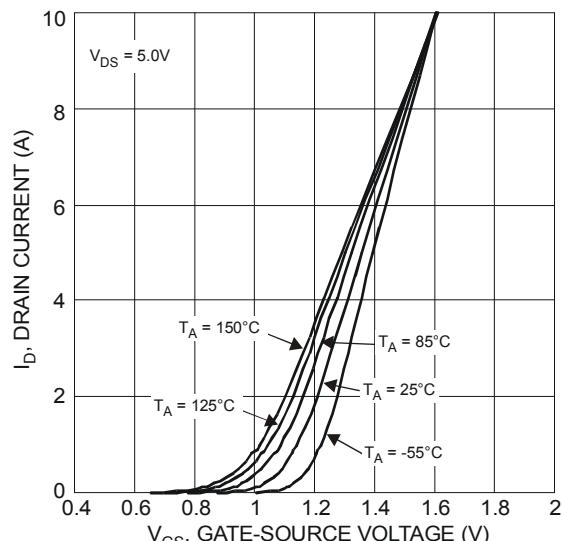


Figure 2 Typical Transfer Characteristics

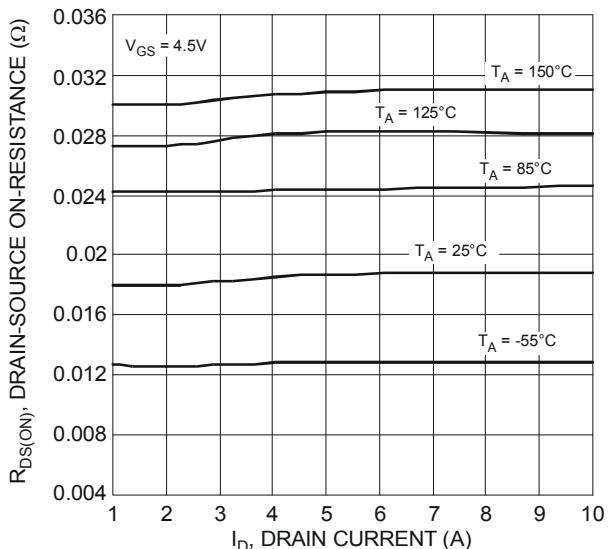


Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

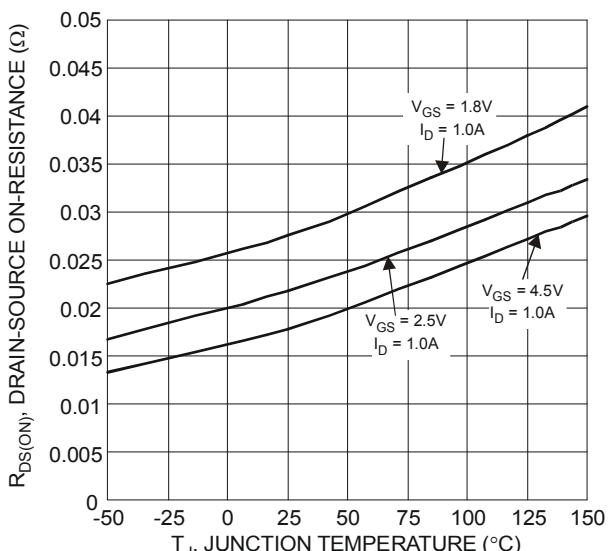


Figure 6 On-Resistance Variation with Temperature

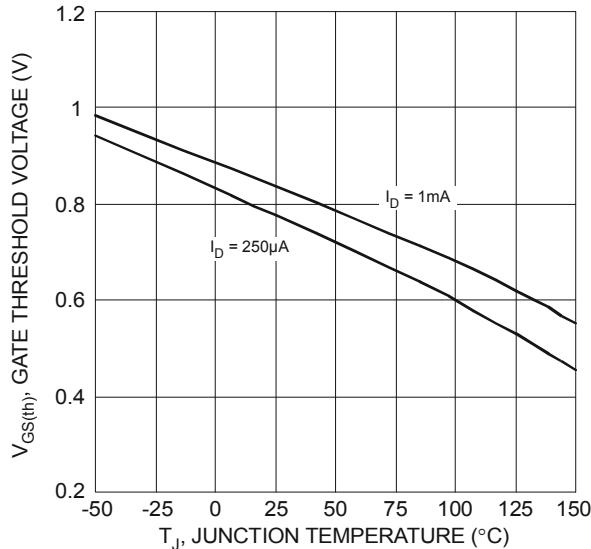


Figure 7 Gate Threshold Variation vs. Ambient Temperature

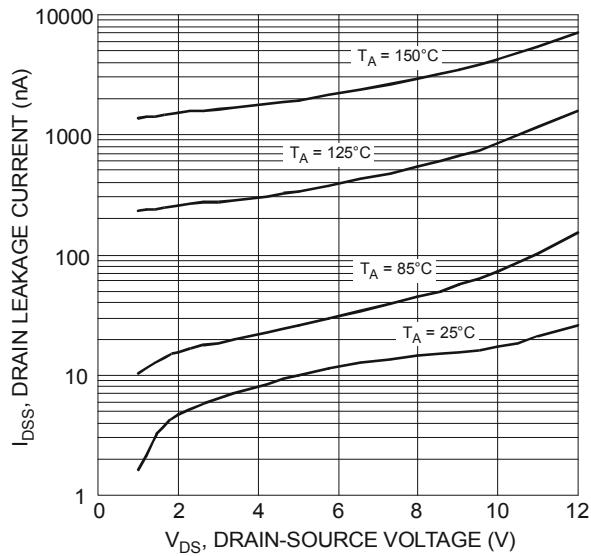


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

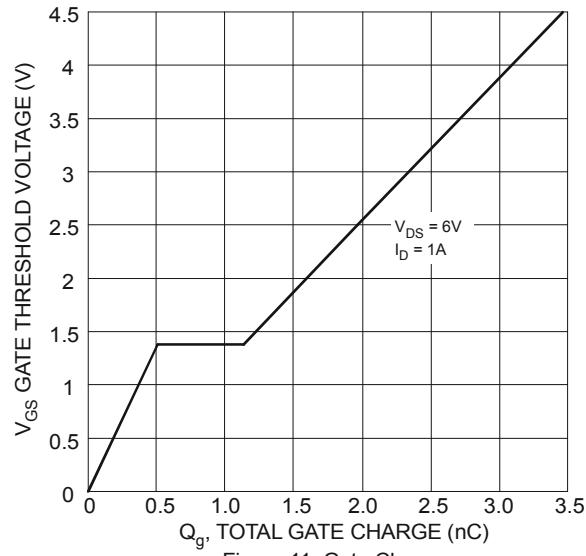


Figure 11 Gate Charge

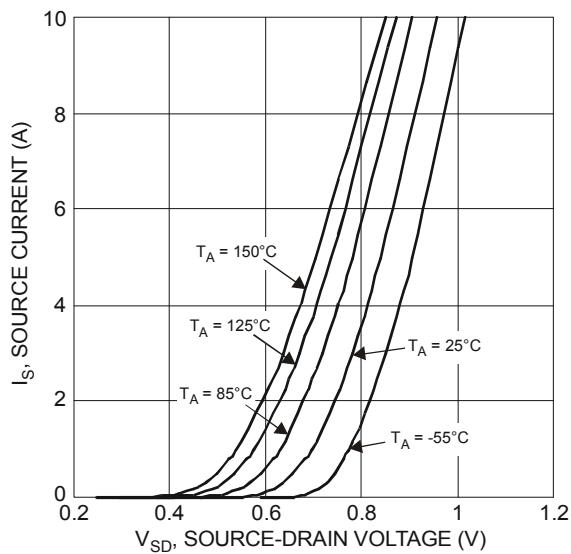


Figure 8 Diode Forward Voltage vs. Current

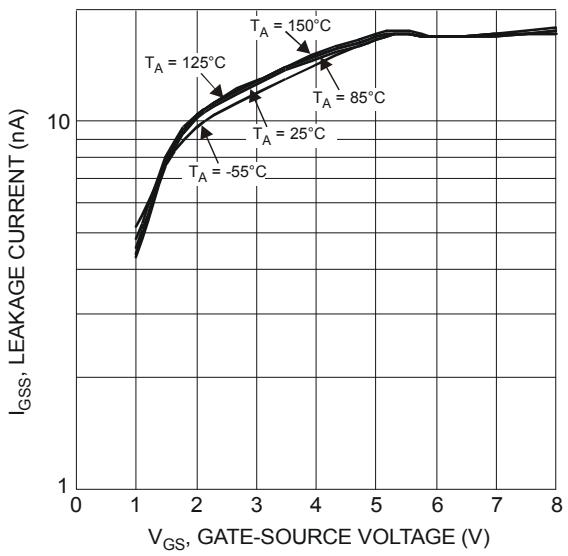


Figure 10 Gate-Source Leakage Current vs. Voltage

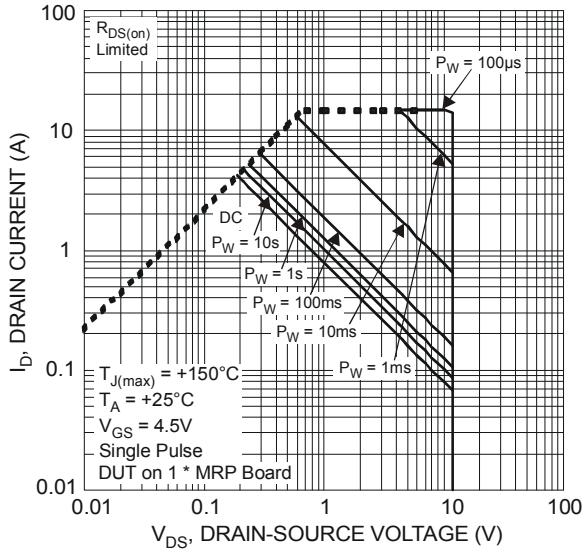
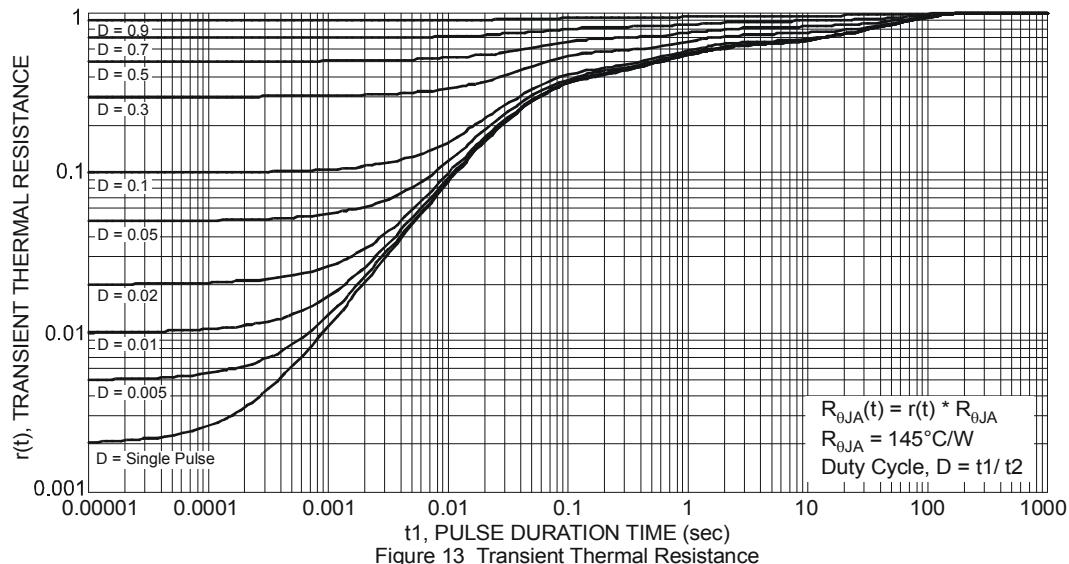
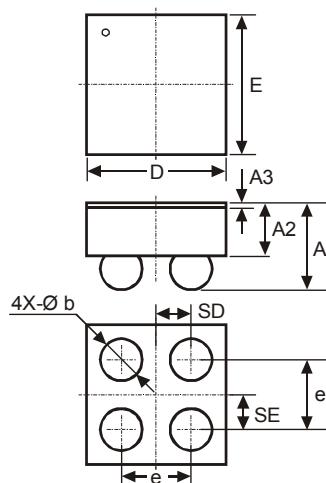


Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



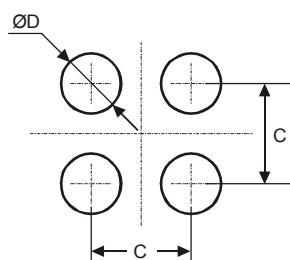
U-WLB1010-4			
Dim	Min	Max	Typ
D	0.95	1.05	1.00
E	0.95	1.05	1.00
A	—	0.62	—
A2	—	—	0.38
A3	0.015	0.025	0.025
b	0.25	0.35	0.30
e	—	—	0.50
SD	—	—	0.25
SE	—	—	0.25

All Dimensions in mm

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

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Dimensions	Value (in mm)
C	0.50
D	0.25

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