

Product Summary (Typ. @ $V_{GS} = -4.5V$, $T_A = +25^\circ C$)

V_{DS}	$R_{DS(on)}$	Q_g	Q_{gd}	I_D
-12V	85m Ω	3.7nC	0.6nC	-2.6A

Description

This new generation MOSFET is designed to minimize the on-state 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

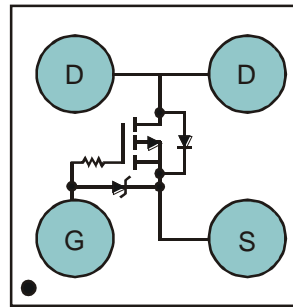
Features

- LD-MOS Technology with the Lowest Figure of Merit:
 $R_{DS(on)} = 85m\Omega$ to Minimize On-State Losses
 $Q_g = 3.7nC$ for Ultra-Fast Switching
- $V_{GS(th)} = -0.6V$ typ. for a Low Turn-On Potential
- CSP with Footprint 1.0mm x 1.0mm
- Height = 0.62mm for Low Profile
- ESD = 3kV HBM Protection of Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: U-WLB1010-4
- Terminal Connections: See Diagram Below
- Weight: 0.005 grams (Approximate)

U-WLB1010-4



Top View
Equivalent Circuit

Ordering Information (Note 3)

Part Number	Case	Packaging
DMP1096UCB4-7	U-WLB1010-4	3000/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



1W = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: X = 2010)
M = Month (ex: 9 = September)



BW = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: X = 2010)
M = Month (ex: 9 = September)

Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
Code	X	Y	Z	A	B	C	D	E	F

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°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-12	V
Gate-Source Voltage			V _{GSS}	-5	V
Continuous Drain Current (Note 5) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-2.6 -2.1	A
Continuous Drain Current (Note 5) V _{GS} = -2.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-2.4 -1.9	A
Pulsed Drain Current (Note 6)			I _{DM}	-10	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	0.82	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	150	°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	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	-12	-	-	V	V _{GS} = 0V, I _D = -250μA
Gate-Source Breakdown Voltage	BV _{GSS}	-6.0	-	-	V	V _{DS} = 0V, I _G = -250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	-	-	-1	μA	V _{DS} = -9.6V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	-500	nA	V _{GS} = -5V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	-0.4	-0.6	-1.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(on)}	-	85	102	mΩ	V _{GS} = -4.5V, I _D = -500mA
		-	97	116		V _{GS} = -2.5V, I _D = -500mA
		-	127	152		V _{GS} = -1.5V, I _D = -500mA
Forward Transfer Admittance	Y _{fs}	-	4	-	S	V _{DS} = -6V, I _D = -500mA
Diode Forward Voltage	V _{SD}	-	-0.6	-1.0	V	V _{GS} = 0V, I _S = -500mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	-	251	-	pF	V _{DS} = -6V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	359	-		
Reverse Transfer Capacitance	C _{rss}	-	70	-		
Total Gate Charge	Q _g	-	3.7	-	nC	V _{GS} = -4.5V, V _{DS} = -6V, I _D = -500mA
Gate-Source Charge	Q _{gs}	-	0.4	-		
Gate-Drain Charge	Q _{gd}	-	0.6	-		
Gate Charge at V _{th}	Q _{g(th)}	-	0.2	-		
Turn-On Delay Time	t _{D(on)}	-	17.6	-	ns	V _{DS} = -6V, V _{GS} = -2.5V, R _G = 20Ω, I _D = -500mA
Turn-On Rise Time	t _r	-	26.9	-		
Turn-Off Delay Time	t _{D(off)}	-	37.5	-		
Turn-Off Fall Time	t _f	-	32.3	-		

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
 - Repetitive rating, pulse width limited by junction temperature.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

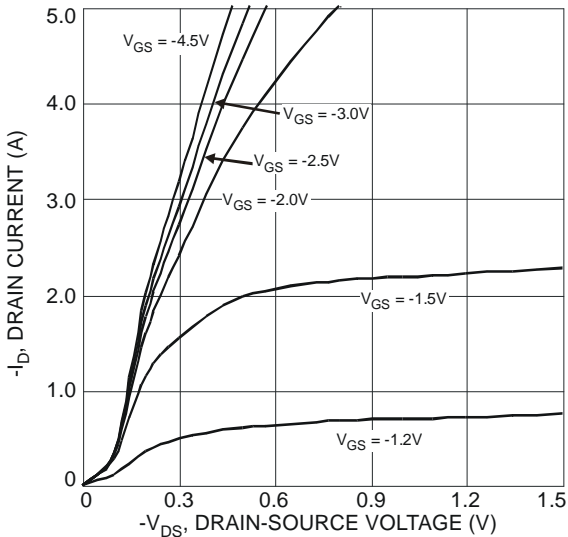


Fig. 1 Typical Output Characteristic

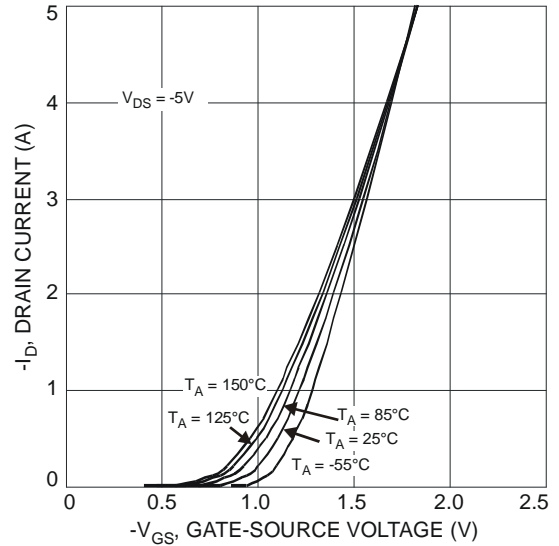


Fig. 2 Typical Transfer Characteristic

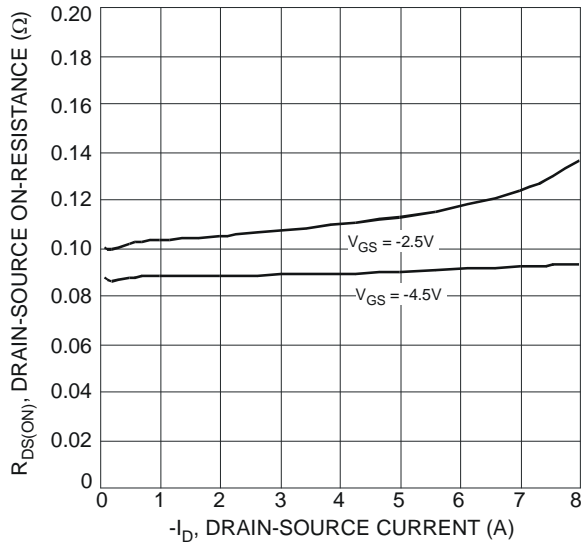


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

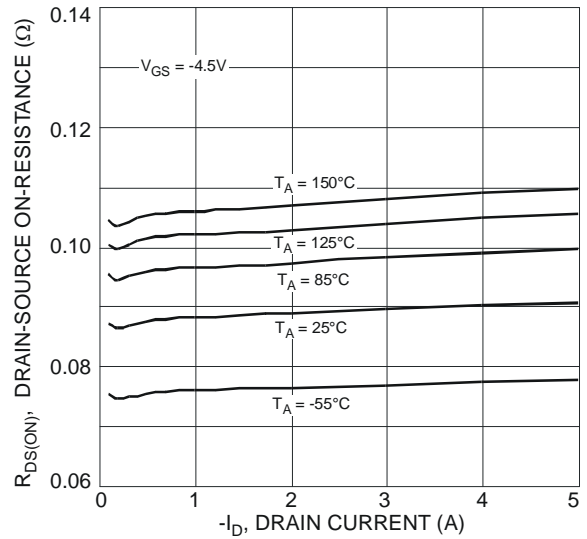


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

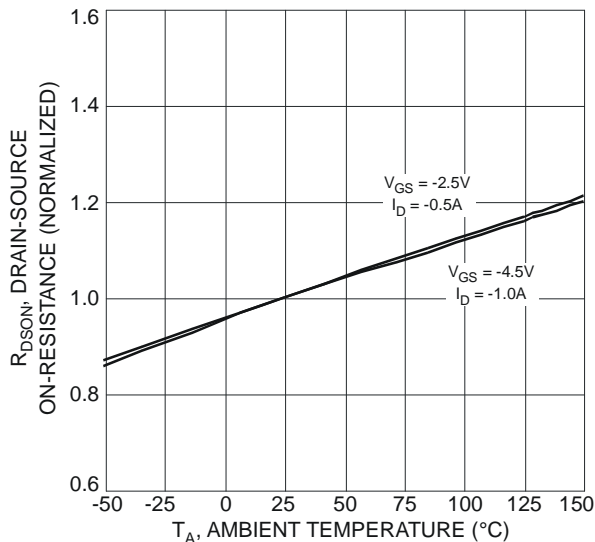


Fig. 5 On-Resistance Variation with Temperature

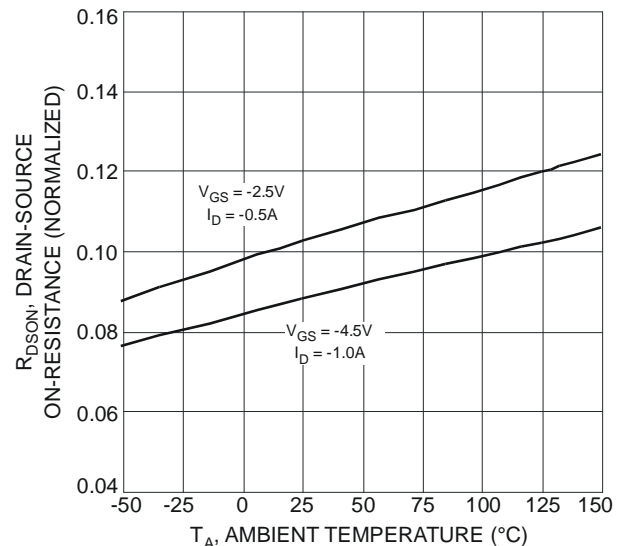


Fig. 6 On-Resistance Variation with Temperature

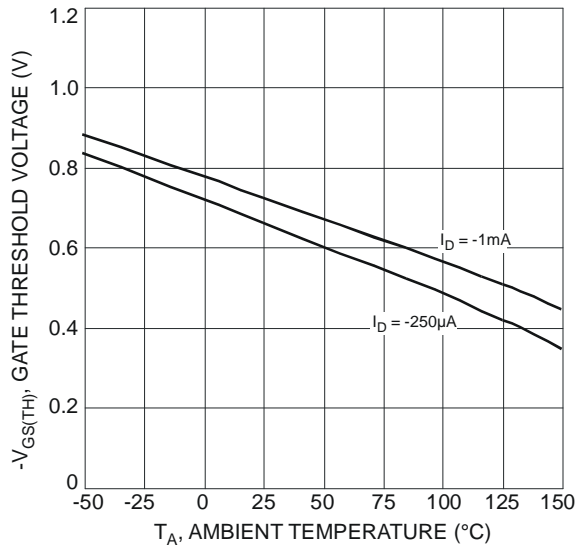


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

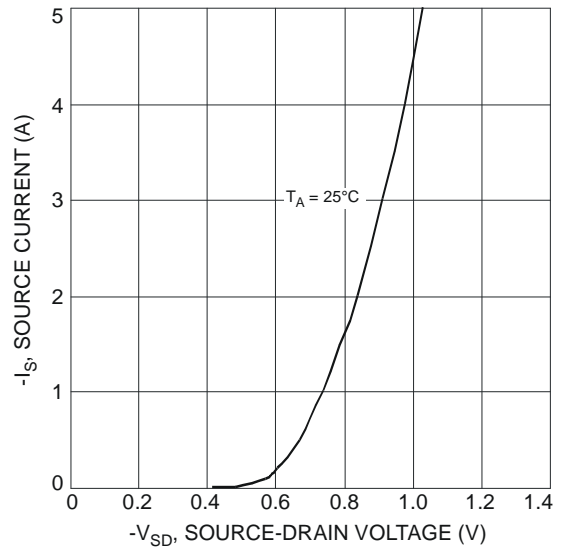


Fig. 8 Diode Forward Voltage vs. Current

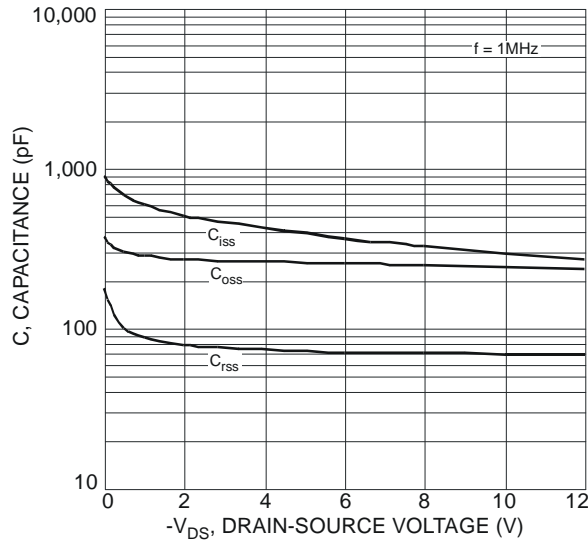


Fig. 9 Typical Total Capacitance

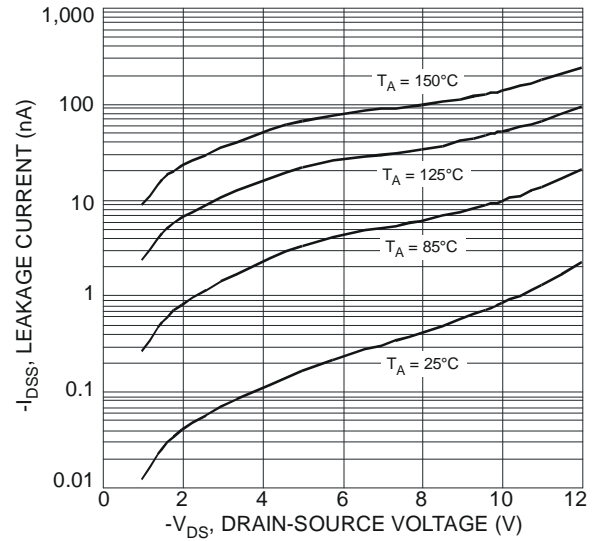


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

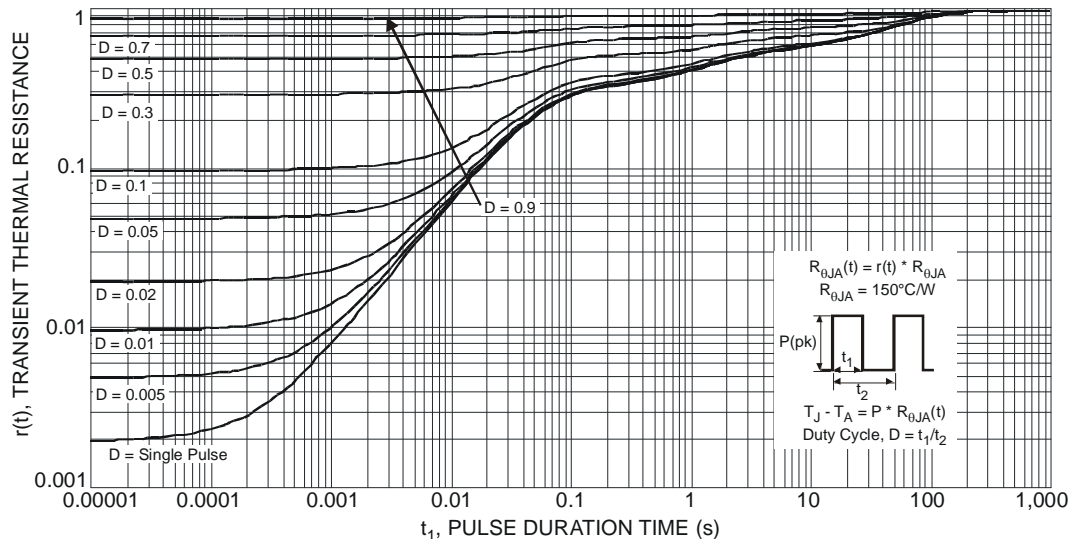
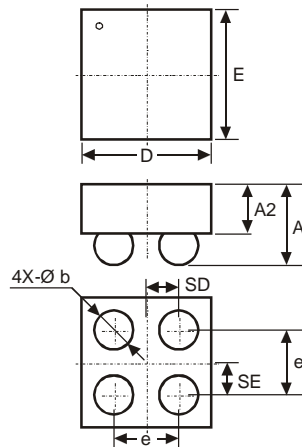


Fig. 11 Transient Thermal Response

Package Outline Dimensions

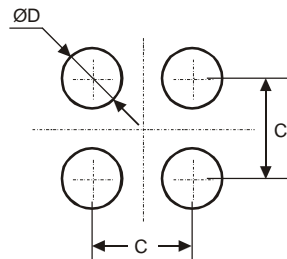
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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
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.



Dimensions	Value (in mm)
C	0.50
D	0.25

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