

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ\text{C}$
-20V	47mΩ @ $V_{GS} = -4.5\text{V}$	-4.1A
	60mΩ @ $V_{GS} = -2.5\text{V}$	-3.6A

Description

This new generation MOSFET has been 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

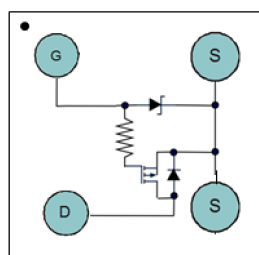
- Low Q_g & Q_{gd}
- Small Footprint
- Low Profile 0.62mm height
- ESD Protected Up To -3KV
- Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: U-WLB1010-4
- Terminal Connections: See Diagram Below
- Weight: 0.0018 grams (approximate)



U-WLB1010-4

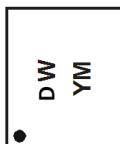

 Top View
 Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2047UCB4-7	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



DW = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: Z = 2012)
 M = Month (ex: 9 = September)

Date Code Key

Year	2012	2013	2014	2015	2016	2017	2018
Code	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}	-20	V
Gate-Source Voltage			V _{GSS}	-6	V
Continuous Drain Current (Note 5) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-4.1 -3.2	A
Continuous Drain Current (Note 5) V _{GS} = -2.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-3.6 -2.8	A
Pulsed Drain Current (Note 6)			I _{DM}	16	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P _D	1.0	W
Thermal Resistance, Junction to Ambient @ T _A = +25°C (Note 7)	R _{θJA}	127	°C/W
Thermal Resistance, Junction to Case @ T _C = +25°C (Note 7)	R _{θJC}	25.8	°C/W
Power Dissipation (Note 5)	P _D	1.66	W
Thermal Resistance, Junction to Ambient @ T _A = +25°C (Note 5)	R _{θJA}	77	°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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-20	—	—	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} = -16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	-100	nA	V _{GS} = -6V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(th)}	-0.4	-0.8	-1.2	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	—	47	mΩ	V _{GS} = -4.5V, I _D = -1A
		—	—	60		V _{GS} = -2.5V, I _D = -1A
Forward Transfer Admittance	Y _{fs}	—	3.7	—	S	V _{DS} = -10V, I _D = -1A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.0	V	V _{GS} = 0V, I _S = -1A
Reverse Recovery Charge	Q _{rr}	—	3.07	—	nC	V _{DD} = -10V, I _F = -1A,
Reverse Recovery Time	t _{rr}	—	13.14	—	ns	di/dt = 100A/μs
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	218	—	pF	V _{DS} = -10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	116	—		
Reverse Transfer Capacitance	C _{rss}	—	11	—		
Total Gate Charge	Q _g	—	2.3	—	nC	V _{GS} = -4.5V, V _{DS} = -10V, I _D = -1A
Gate-Source Charge	Q _{gs}	—	0.2	—		
Gate-Drain Charge	Q _{gd}	—	0.4	—		
Gate Charge at V _{th}	Q _{g(th)}	—	0.2	—		
Turn-On Delay Time	t _{D(on)}	—	7.9	—	ns	V _{DS} = -10V, V _{GS} = -2.5V, R _G = 20Ω, I _D = -1A
Turn-On Rise Time	t _r	—	10.7	—		
Turn-Off Delay Time	t _{D(off)}	—	48	—		
Turn-Off Fall Time	t _f	—	38	—		

- Notes:
- Device mounted on FR4 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.

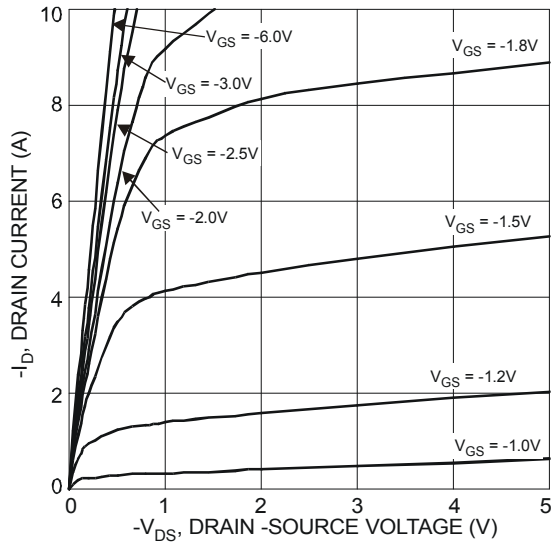


Figure 1 Typical Output Characteristics

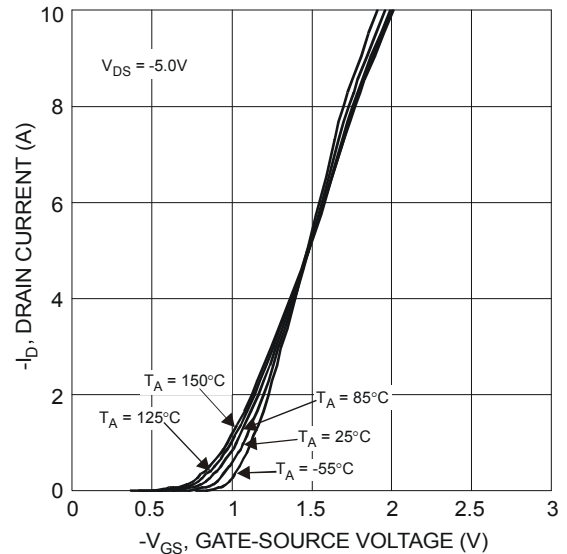


Figure 2 Typical Transfer Characteristics

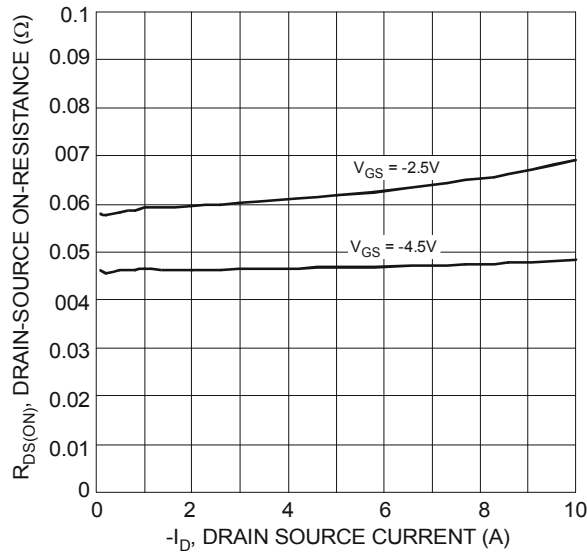


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

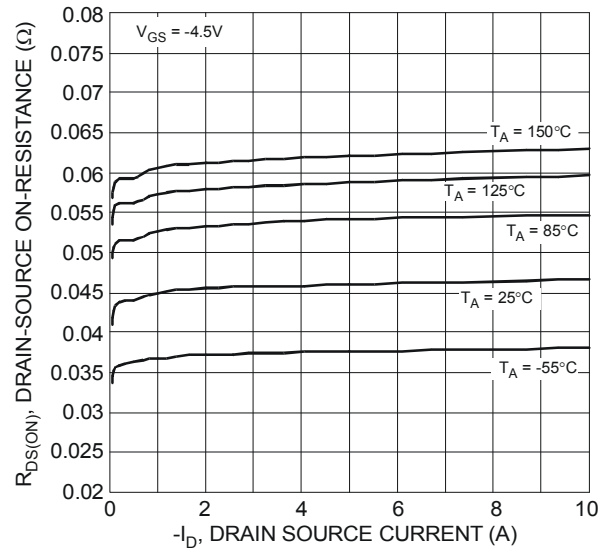


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

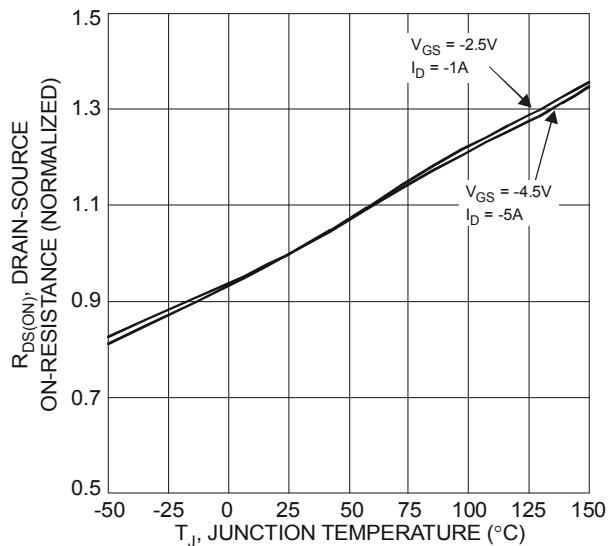


Figure 5 On-Resistance Variation with Temperature

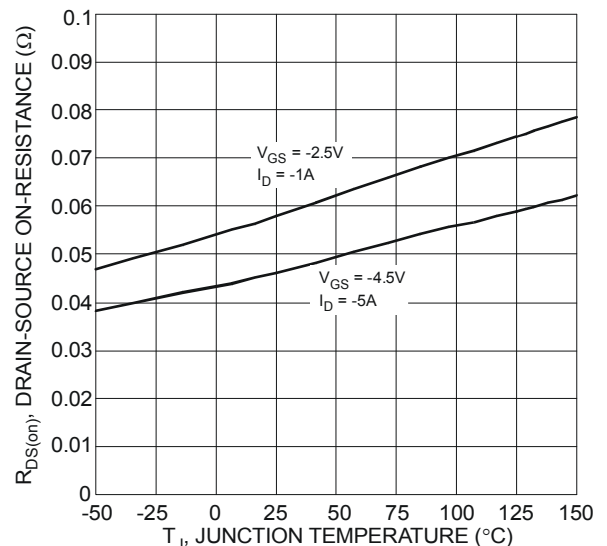


Figure 6 On-Resistance Variation with Temperature

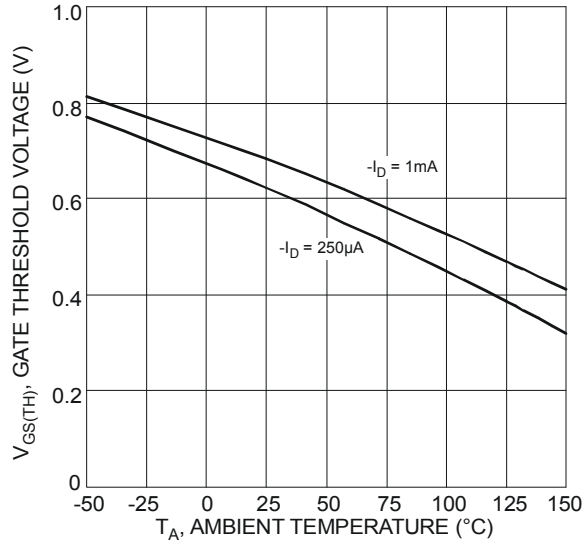


Figure 7 Gate Threshold Variation vs. Ambient Temperature

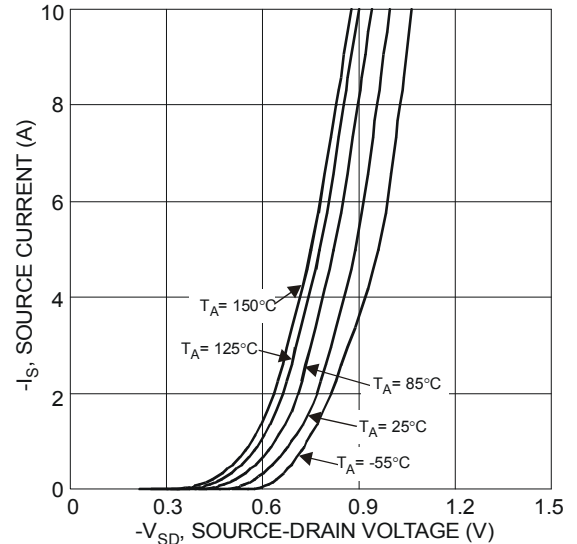


Figure 8 Diode Forward Voltage vs. Current

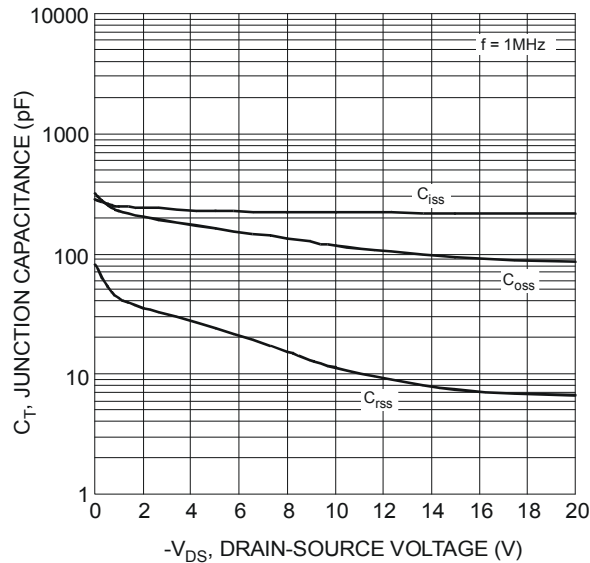


Figure 9 Typical Junction Capacitance

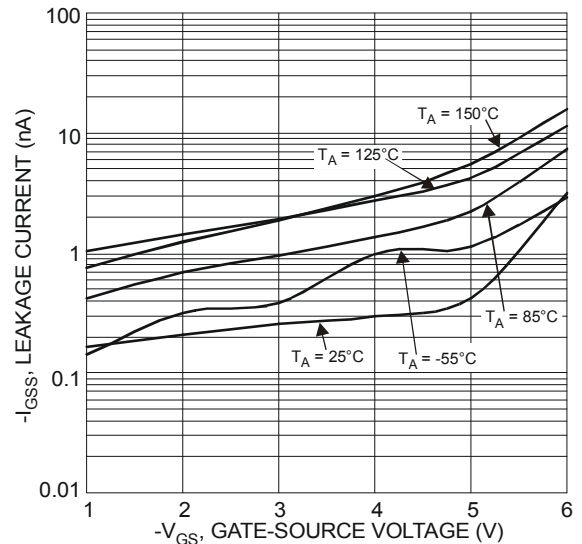


Figure 10 Typical Gate-Source Leakage Current vs. Voltage

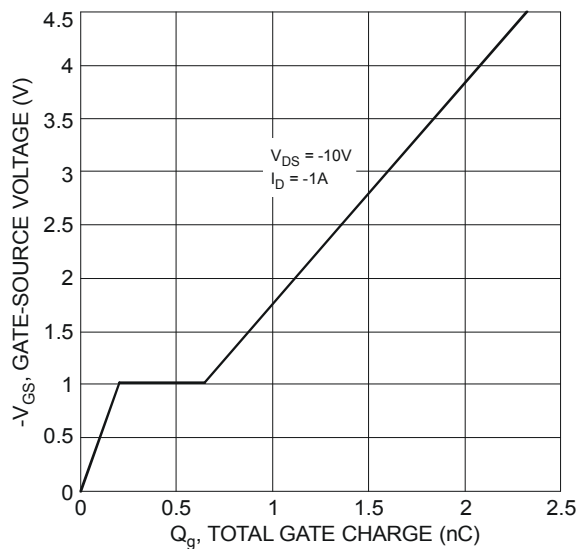


Figure 11 Gate-Charge Characteristics

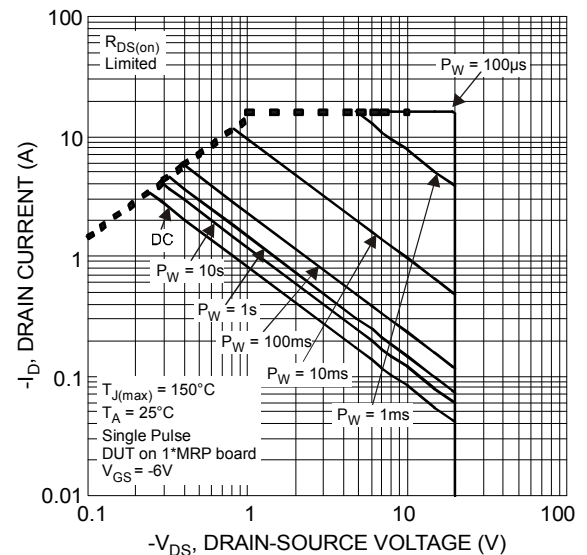
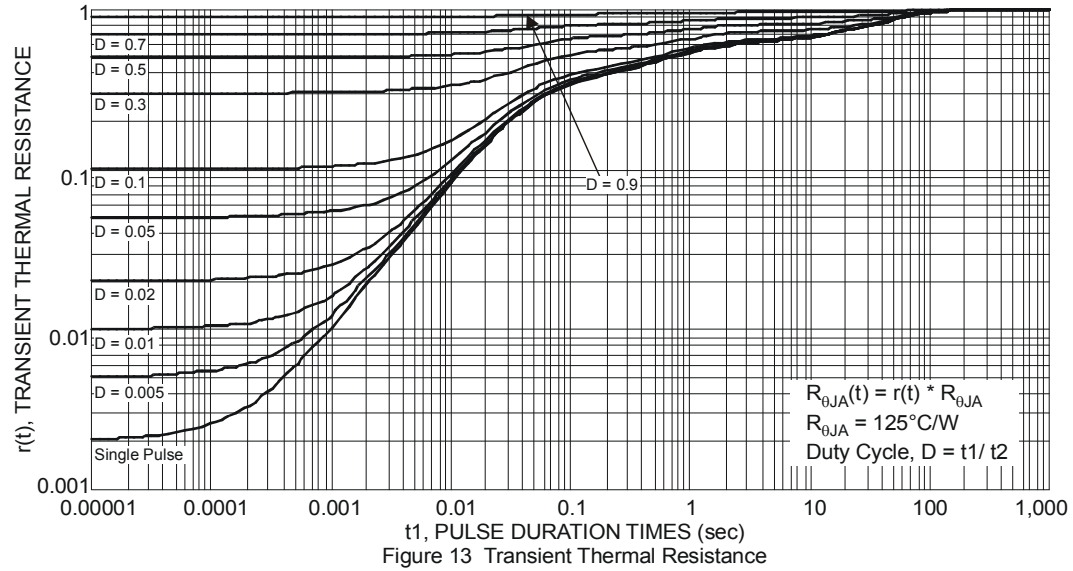
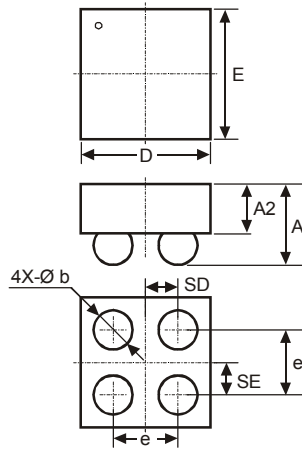


Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

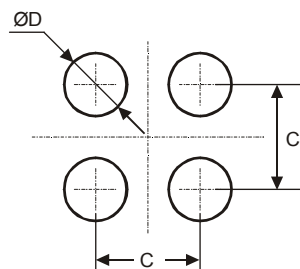
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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