



#### P-CHANNEL ENHANCEMENT MODE MOSFET

## Product Summary (Typ @V<sub>GS</sub> = -4.5V, T<sub>A</sub> = +25°C)

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub>
201/	$37m\Omega @ V_{GS} = -4.5V$	-4.6A
-20V	49mΩ @ V <sub>GS</sub> = -2.5V	-3.7A

#### **Features and Benefits**

- Low Qg & Qgd
- **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)

### **Description and Applications**

This new generation MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

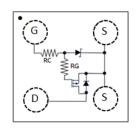
- **Battery Management**
- Load Switch
- **Battery Protection**

### **Mechanical Data**

- Case: U-WLB1010-4 (Type C)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal: Finish SnAgCu. Solderable per MIL-STD-202 Method
- Terminal Connections: See Diagram Below

U-WLB1010-4 (Type C)





Top View **Equivalent Circuit** 

### Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2042UCB4-7	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.

- 2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and
- 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

2A

2A = Product Type Marking Code YM = Date Code Marking Y or  $\overline{Y}$  = Year (ex: F = 2018) M or  $\overline{M}$  = Month (ex: 9 = September)

Date Code Key

Year	201	6	2017		2018	20	19	2020		2021	2	2022
Code	D		Е		F		3	Н		ı		J
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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# **Maximum Ratings** (@ $T_A = +25$ °C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	-20	V
Gate-Source Voltage	V <sub>GSS</sub>	-6	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = -4.5V	I <sub>D</sub>	-4.6	Α
Continuous Drain Current (Note 5) V <sub>GS</sub> = -2.5V	I <sub>D</sub>	-3.7	Α
Pulsed Drain Current (Note 6)	I <sub>DM</sub>	-16	Α

### **Thermal Characteristics**

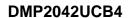
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P <sub>D</sub>	0.75	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 7)	R <sub>0JA</sub>	165	°C/W
Power Dissipation (Note 5)	P <sub>D</sub>	1.4	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 5)	R <sub>0JA</sub>	87	°C/W
Operating and Storage Temperature Range	$T_{J}, T_{STG}$	-55 to +150	°C

# Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

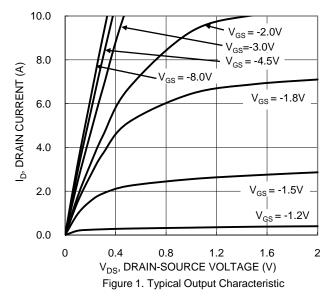
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)	, ,			l	I.		
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	_	_	V	$V_{GS} = 0V, I_D = -250\mu A$	
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	_	_	-1	μΑ	V <sub>DS</sub> = -16V, V <sub>GS</sub> = 0V	
Gate-Source Leakage	I <sub>GSS</sub>	_	_	-100	nA	$V_{GS} = -6V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.4	-0.8	-1.2	V	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	
Static Drain-Source On-Resistance		_	37	45	mΩ	$V_{GS} = -4.5V, I_D = -1A$	
Static Dialif-Source Off-Resistance	R <sub>DS(ON)</sub>	_	49	65	11122	$V_{GS} = -2.5V, I_D = -1A$	
Forward Transfer Admittance	Y <sub>FS</sub>	_	6.6	-	S	$V_{DS} = -10V, I_{D} = -1A$	
Diode Forward Voltage	V <sub>SD</sub>	_	-0.7	-1.0	V	$V_{GS} = 0V, I_{S} = -1A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C <sub>iss</sub>	_	218	_		10)/ )/ 0)/	
Output Capacitance	Coss	_	148	_	pF	$V_{DS} = -10V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	$C_{rss}$	_	11	_		I = 1.0IVIH2	
Series Gate Resistance	Rg	_	20	_	Ω	$f = 1MHz$ , $V_{GS} = 0V$ , $V_{DS} = 0V$	
Series Clamp Resistance	Rc	_	5,000	_	12		
Total Gate Charge	Qg	_	2.5	_			
Gate-Source Charge	Qgs	_	0.4	_	nC	$V_{GS} = -4.5V$ , $V_{DS} = -10V$ ,	
Gate-Drain Charge	Q <sub>gd</sub>	_	0.4	_	nc nc	I <sub>D</sub> =-1A	
Gate Charge at V <sub>TH</sub>	$Q_{g(TH)}$	_	0.2	_			
Turn-On Delay Time	t <sub>D(ON)</sub>	_	0.6	_			
Turn-On Rise Time	t <sub>R</sub>	_	0.8	_		$V_{DS} = -10V, V_{GS} = -2.5V,$ $R_G = 10\Omega, I_D = -1A$	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	_	1.4	_	μs		
Turn-Off Fall Time	t <sub>F</sub>	_	0.8	_			
Reverse Recovery Charge	Q <sub>RR</sub>	_	2.2	_	nC	$V_{DD} = -10V, I_F = -1.0A,$	
Reverse Recovery Time	t <sub>RR</sub>	_	10	_	ns	di/dt =100A/µs	

Notes:

- 5. Device mounted on FR-4 material with 1-inch² (6.45-cm²), 2-oz. (0.071-mm thick) Cu.
- Device mounted on FR-4 material with 1-inch (6.49-cm), 2-02. (0.071-inin 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.







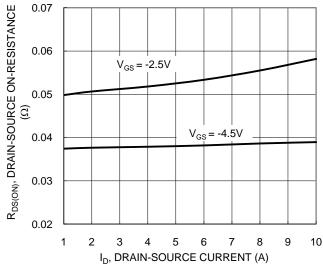
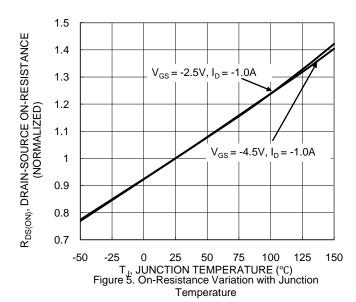


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage



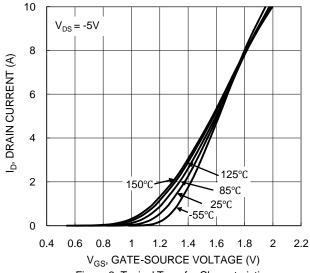


Figure 2. Typical Transfer Characteristic

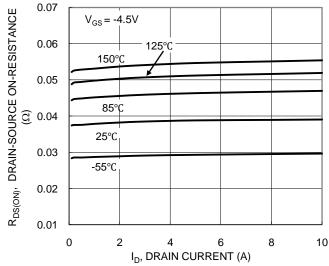
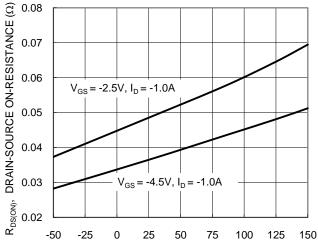
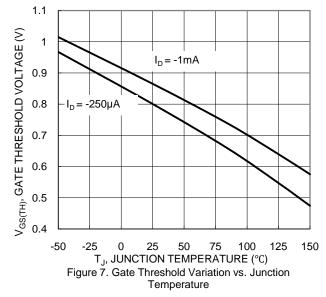


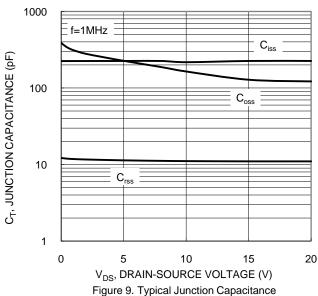
Figure 4. Typical On-Resistance vs. Drain Current and Junction Temperature

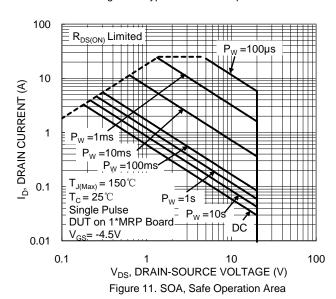


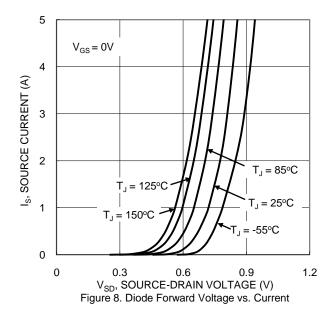
 $\rm T_{J}, \, JUNCTION \, TEMPERATURE \, (^{\circ}C)$  Figure 6. On-Resistance Variation with Junction Temperature

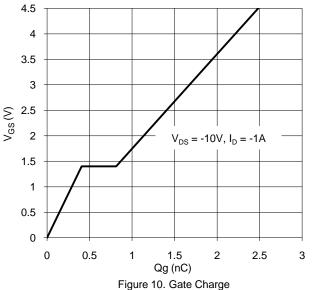




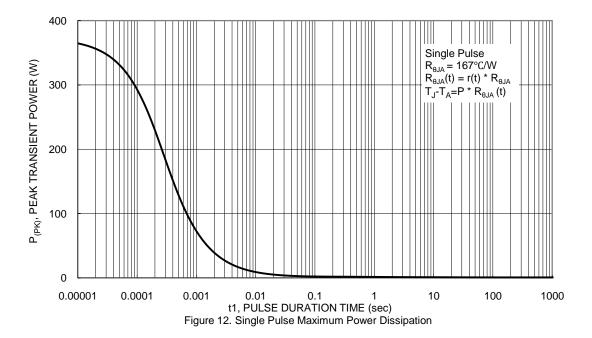












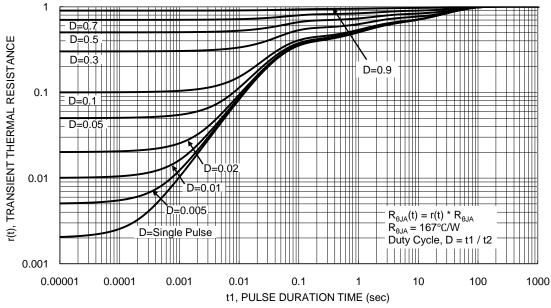


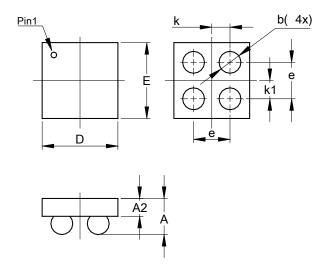
Figure 13. Transient Thermal Resistance



# **Package Outline Dimensions**

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

#### U-WLB1010-4 (Type C)

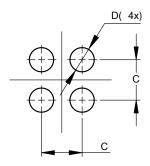


U-WLB1010-4 (Type C)					
Dim	Min	Max	Тур		
Α		0.62			
A2			0.38		
b	0.25	0.35	0.30		
D	0.92	1.00	0.96		
E	0.92	1.00	0.96		
е			0.50		
k			0.25		
k1			0.25		
All Dimensions in mm					

# **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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