

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

V_{DS}	$R_{DS(ON)}$	Q_g	Q_{gd}	I_D
-12V	65m Ω	2.5nC	0.6nC	-3.3A

Description

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

Applications

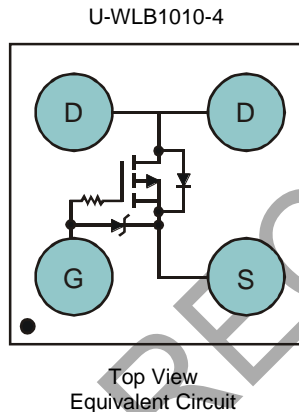
- Battery managements
- Load switches
- Battery protections

Features

- LD-MOS Technology with the Lowest Figure of Merit:
 $R_{DS(ON)} = 65m\Omega$ to Minimize On-State Losses
 $Q_g = 2.5nC$ 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)**
- For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at**
<https://www.diodes.com/products/automotive/automotive-products/>.
- This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.**
<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Package: U-WLB1010-4
- Terminal Connections: See Diagram Below
- Weight: 0.0018 grams (Approximate)

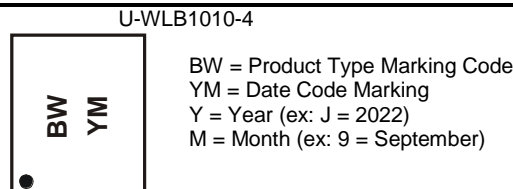


Ordering Information (Note 4)

Part Number	Package	Packaging	
		Qty.	Carrier
DMP1080UCB4-7	U-WLB1010-4	3,000	Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 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.
 - 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



Date Code Key

Year	2011	...	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	Y	...	J	K	L	M	N	O	P	R	S	T

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}	-6	V
Continuous Drain Current (Note 5) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	-3.3	A
		T _A = +70°C		-2.7	
Continuous Drain Current (Note 5) V _{GS} = -2.5V	Steady State	T _A = +25°C	I _D	-3.0	A
		T _A = +70°C		-2.4	
Pulsed Drain Current (Note 6)			I _{DM}	-20	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P _D	0.82	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 7)	R _{θJA}	150	°C/W
Thermal Resistance, Junction to Case @T _C = +25°C (Note 7)	R _{θJC}	42.66	°C/W
Power Dissipation (Note 5)	P _D	1.59	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	80.29	°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}	-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}	—	—	-100	nA	V _{GS} = -6V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
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)}	—	65	80	mΩ	V _{GS} = -4.5V, I _D = -500mA
		—	77	93		V _{GS} = -2.5V, I _D = -500mA
		—	108	130		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
Reverse Recovery Charge	Q _{RR}	—	2.0	—	nC	V _{dd} = -4.0V, I _F = -0.5A, di/dt = 100A/μs
Reverse Recovery Time	t _{RR}	—	9.5	—	ns	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	213	350	pF	V _{DS} = -6V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	119	250		
Reverse Transfer Capacitance	C _{rss}	—	54.4	90		
Total Gate Charge	Q _g	—	2.5	5	nC	V _{GS} = -4.5V, V _{DS} = -6V, I _D = -500mA
Gate-Source Charge	Q _{gs}	—	0.3	—		
Gate-Drain Charge	Q _{gd}	—	0.6	—		
Gate Charge at V _{th}	Q _{g(th)}	—	0.15	—		
Turn-On Delay Time	t _{D(ON)}	—	16.7	—	ns	V _{DS} = -6V, V _{GS} = -2.5V, R _G = 20Ω, I _D = -500mA
Turn-On Rise Time	t _r	—	20.6	—		
Turn-Off Delay Time	t _{D(OFF)}	—	38.4	—		
Turn-Off Fall Time	t _f	—	28.4	—		

- 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.

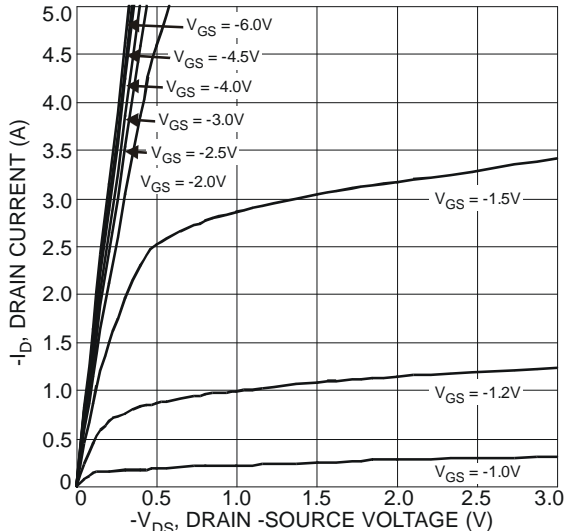


Fig. 1 Typical Output Characteristics

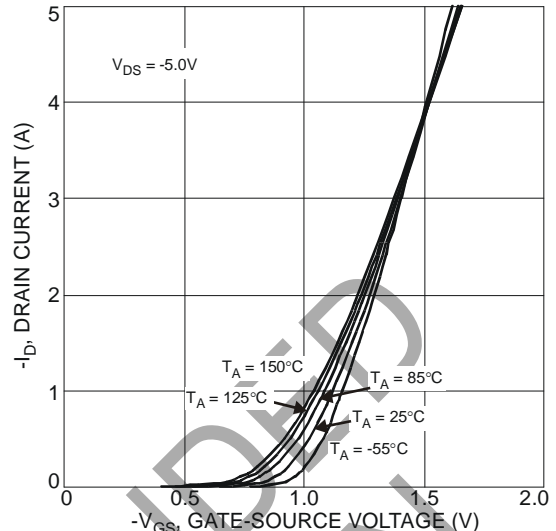


Fig. 2 Typical Transfer Characteristics

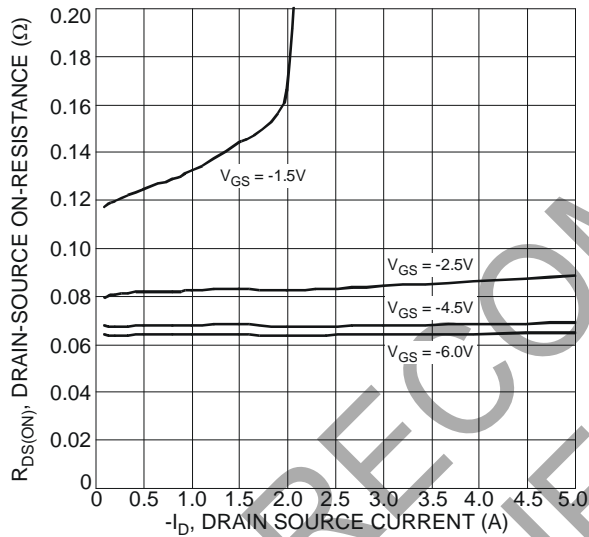


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

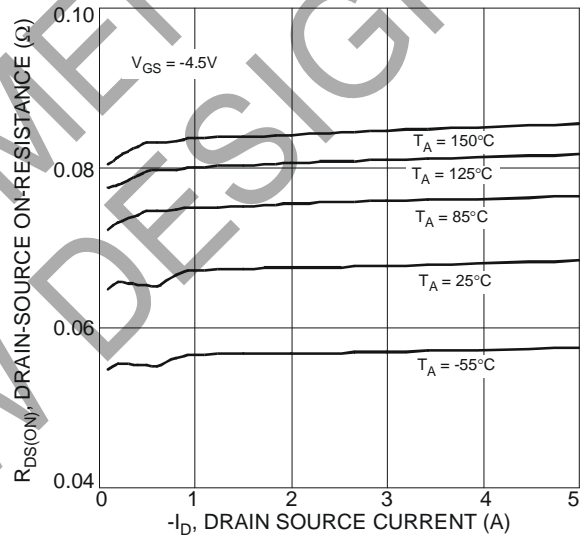


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

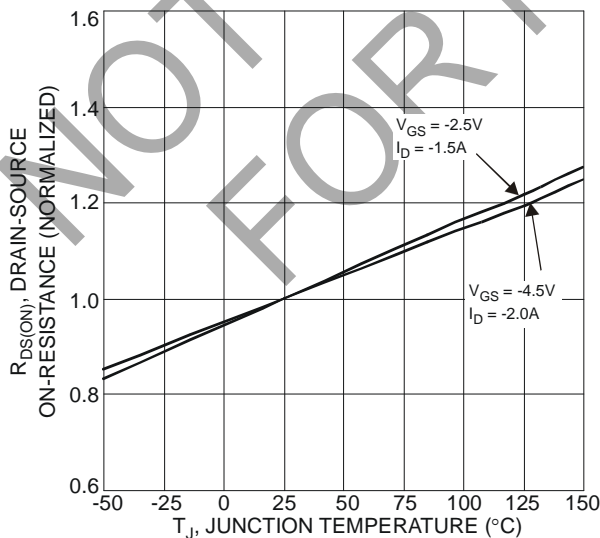


Fig. 5 On-Resistance Variation with Temperature

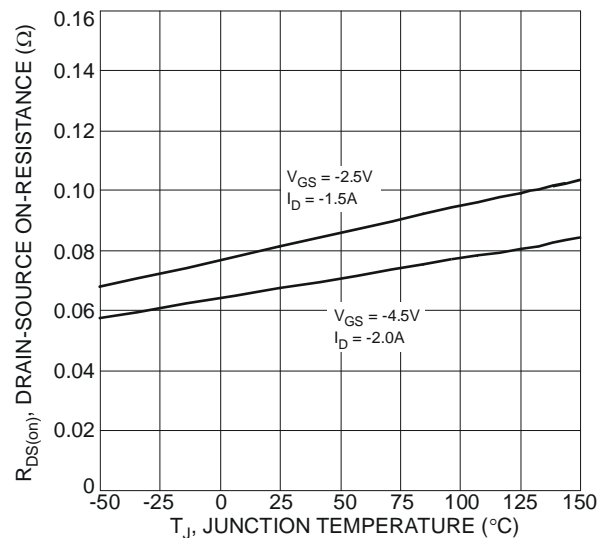


Fig. 6 On-Resistance Variation with Temperature

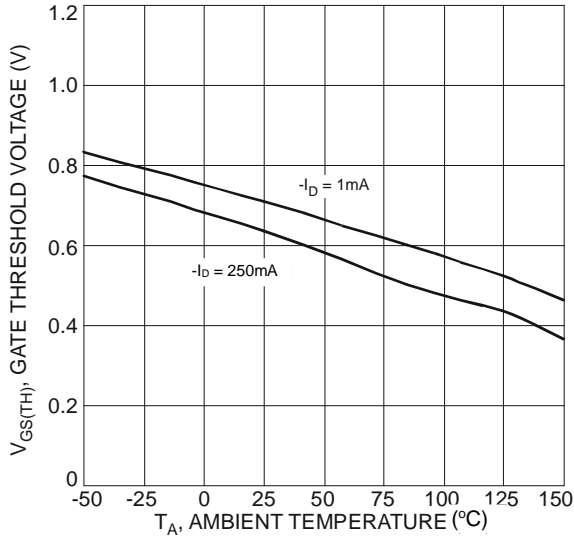


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

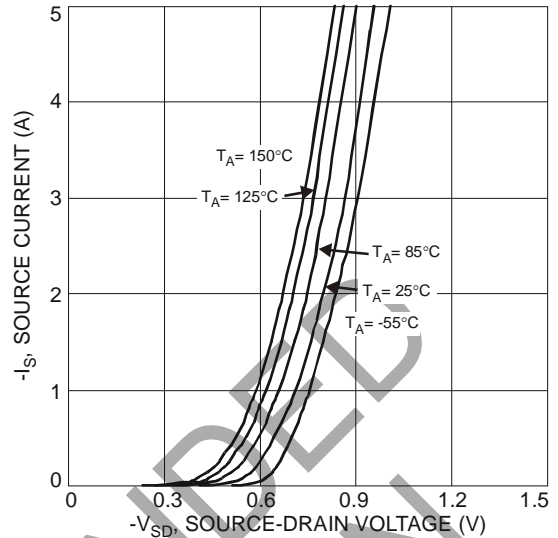


Fig. 8 Diode Forward Voltage vs. Current

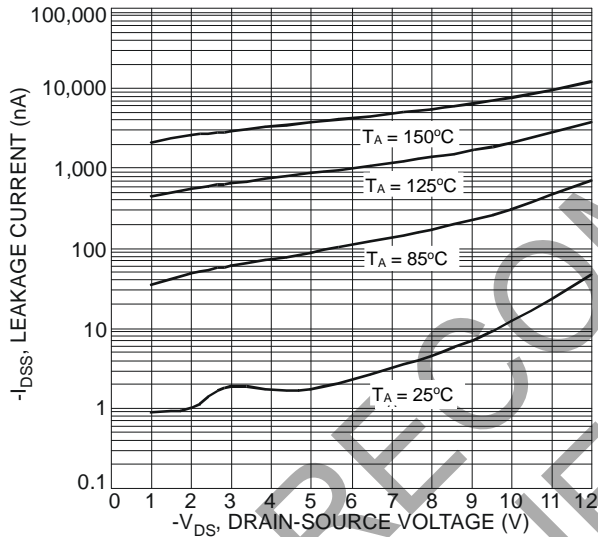


Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

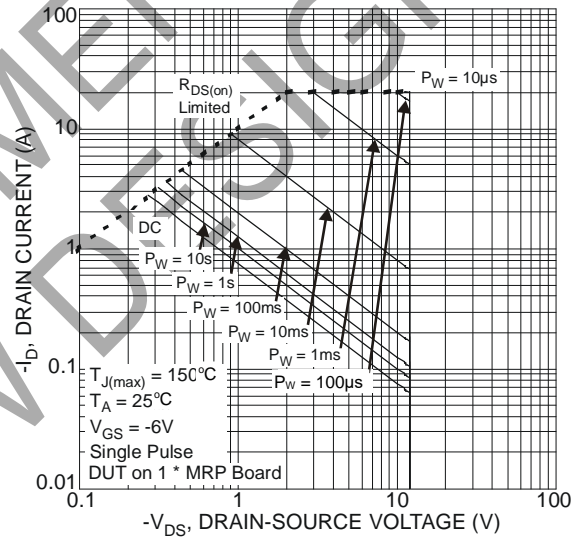


Fig. 10 SOA, Safe Operation Area

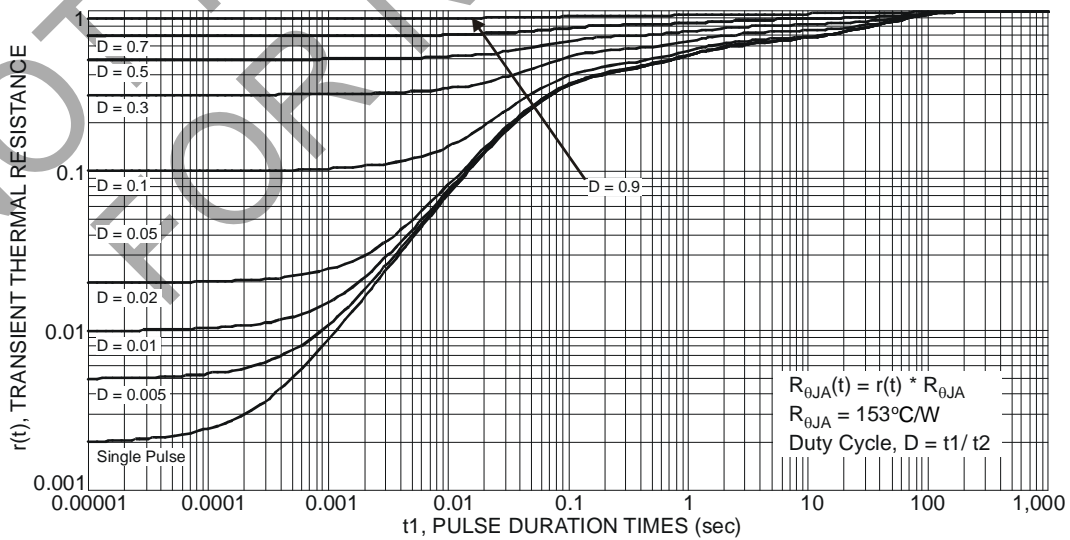


Fig. 11 Transient Thermal Resistance

$$R_{\theta JA}(t) = r(t) * R_{\theta JA}$$

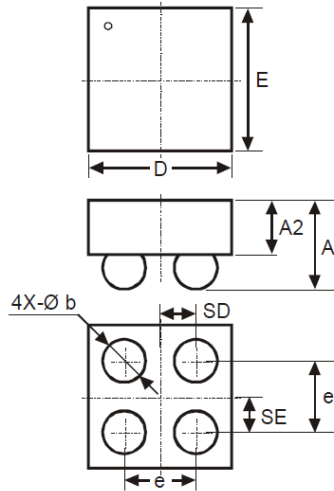
$$R_{\theta JA} = 153^{\circ}\text{C/W}$$

$$\text{Duty Cycle, } D = t1 / t2$$

Package Outline Dimensions

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

U-WLB1010-4

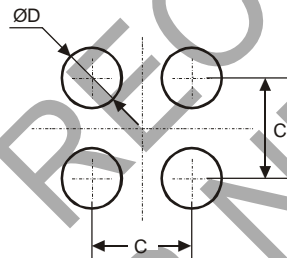


U-WLB1010-4			
Dim	Min	Max	Typ
D	0.95	1.05	1.00
E	0.95	1.05	1.00
A	—	0.62	—
A2	—	—	0.38
b	0.25	0.35	0.30
e	—	—	0.50
SD	—	—	0.25
SE	—	—	0.25
All Dimensions in mm			

Suggested Pad Layout

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

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Dimensions	Value (in mm)
C	0.50
D	0.25

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