Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D T_A = +25°C
12V	20mΩ @ V_{GS} = 4.5V	6.6A
	23mΩ @ V_{GS} = 2.5V	6.1A

Features and Benefits

- Low Q_G & Q_{GD}
- Small Footprint
- Low Profile 0.62mm Height
- **Totally Lead-Free & Full RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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.

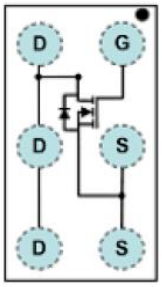
Mechanical Data

- Case: U-WLB1510-6
- Terminal Connections: See Diagram Below
- Terminals: Finished – SnAgCu Ball (e1)
- Weight: 0.0018 grams (Approximate)

Applications

- Battery Management
- Load Switch
- Battery Protection

U-WLB1510-6



Top View

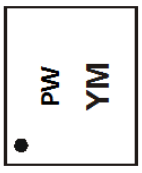
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN1016UCB6-7	U-WLB1510-6	3,000/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. 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.
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 http://www.diodes.com/products/packages.html.

Marking Information

U-WLB1510-6



PW = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: D = 2016)
M = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021
Code	C	D	E	F	G	H	I

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	Units
Drain-Source Voltage			V_{DSS}	12	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 5) V_{GS} =4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	5.5 4.2	A
Continuous Drain Current (Note 6) V_{GS} =4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	6.6 5.3	A
Pulsed Drain Current (Note 7)			I_{DM}	30	A

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	0.92	W
Total Power Dissipation (Note 6)	P_D	1.47	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	136	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	94	°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
Zero Gate Voltage Drain Current (@T_C = +25°C)	I_{DSS}	—	—	1.0	µA	V_{DS} = 9.6V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±8V, 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	$R_{DS(ON)}$	—	16	20	mΩ	V_{GS} = 4.5V, I_D = 1.5A
		—	20	23		V_{GS} = 2.5V, I_D = 1.5A
Forward Transfer Admittance	$\|Y_{FS}\|$	—	14	—	S	V_{DS} = 6V, I_D = 1.5A
Diode Forward Voltage (Note 6)	V_{SD}	—	0.7	1.0	V	V_{GS} = 0V, I_S = 1.5A
Reverse Recovery Charge	Q_{RR}	—	8	—	nC	V_{DD} = 6V, I_F = 1.5A, di/dt =200A/µs
Reverse Recovery Time	t_{RR}	—	43.6	—	ns	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{ISS}	—	423	550	pF	V_{DS} = 6V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{OSS}	—	238	310	pF	
Reverse Transfer Capacitance	C_{RSS}	—	41	55	pF	
Series Gate Resistance	R_G	—	3	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (4.5V)	Q_G	—	4.2	5.5	nC	V_{GS} = 4.5V, V_{DS} = 6V, I_D =1.5A
Gate-Source Charge	Q_{GS}	—	0.6	—	nC	
Gate-Drain Charge	Q_{GD}	—	0.4	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	5	8	ns	V_{DS} = 6V, V_{GS} = 4.5V, R_G = 4Ω, I_D = 1.5A
Turn-On Rise Time	t_R	—	10	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	25	40	ns	
Turn-Off Fall Time	t_F	—	10	—	ns	

Notes:
5. Device mounted on FR-4 PCB with minimum recommended pad layout.
6. Device mounted on FR4 material with 1-inch^2 (6.45-cm^2), 2-oz (0.071-mm thick) Cu.
7. 300ms pulse, pulse duty cycle<=2%.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

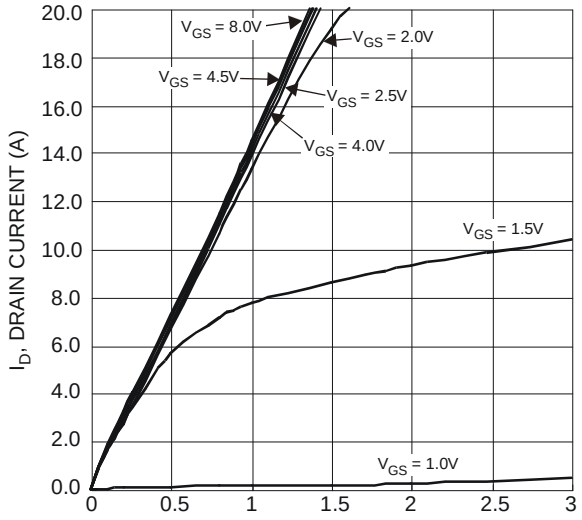


Figure 1 Typical Output Characteristics

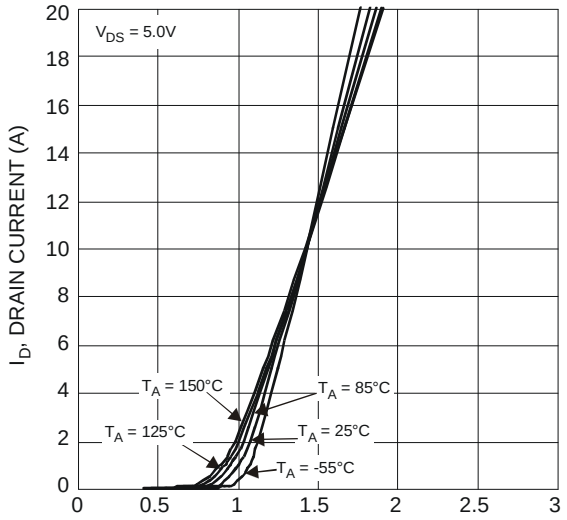


Figure 2 Typical Transfer Characteristics

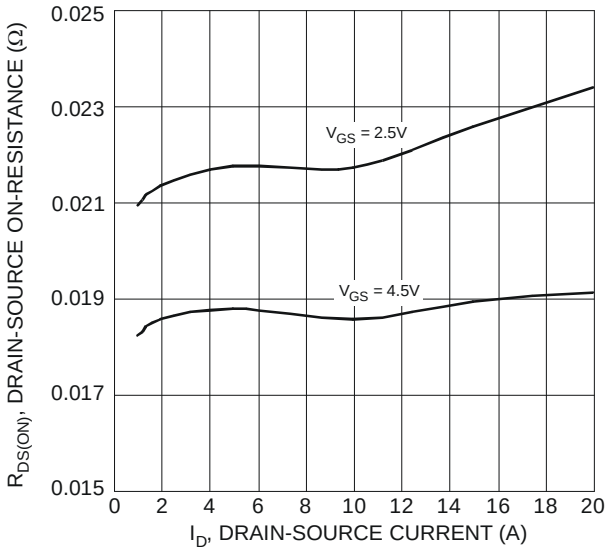


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

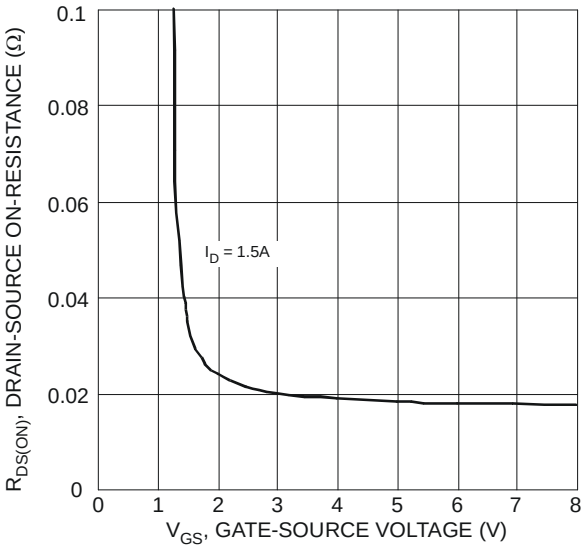


Figure 4 Typical Transfer Characteristics

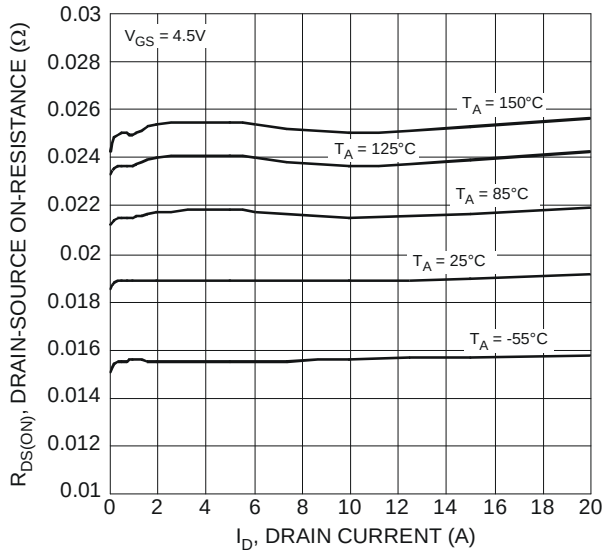


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

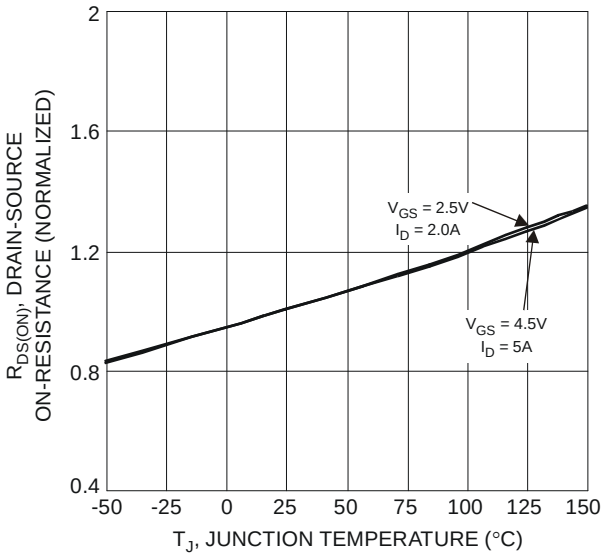


Figure 6 On-Resistance Variation with Temperature

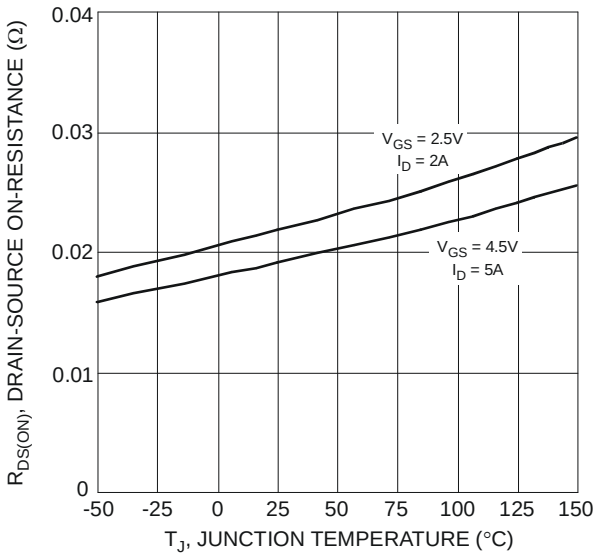


Figure 7 On-Resistance Variation with Temperature

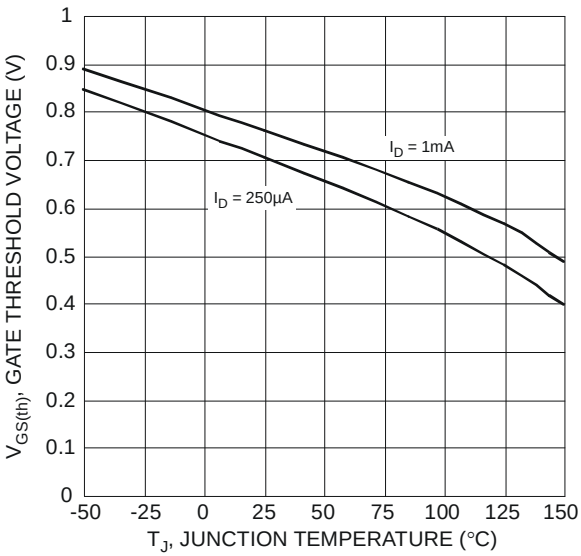


Figure 8 Gate Threshold Variation vs. Ambient Temperature

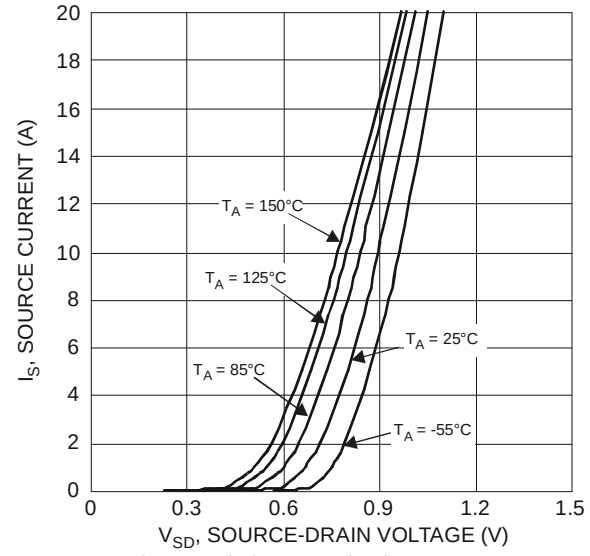


Figure 9 Diode Forward Voltage vs. Current

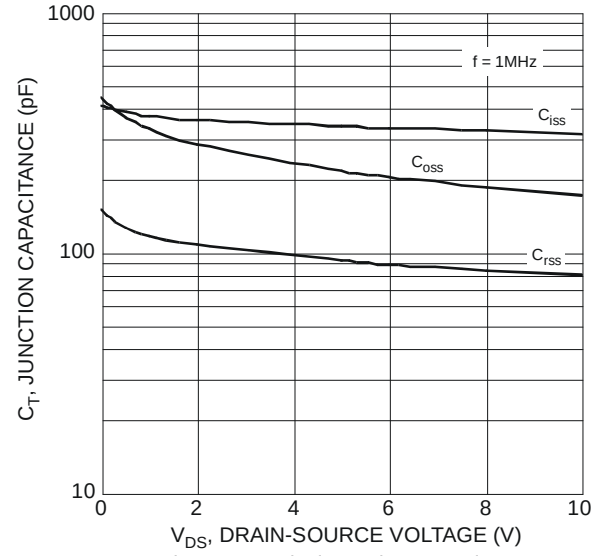


Figure 10 Typical Junction Capacitance

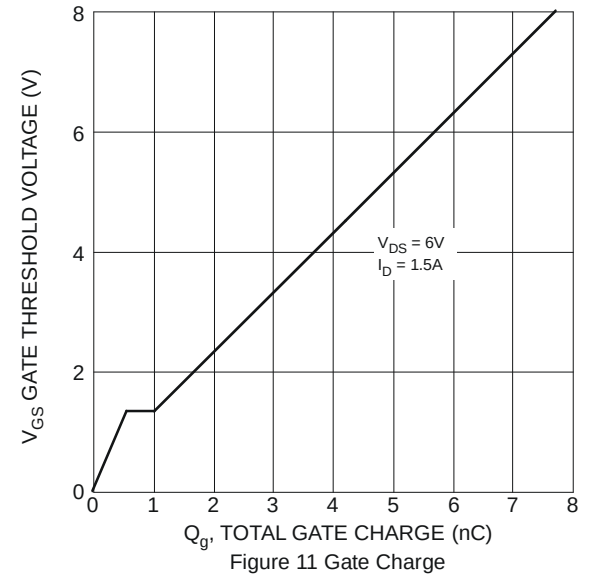


Figure 11 Gate Charge

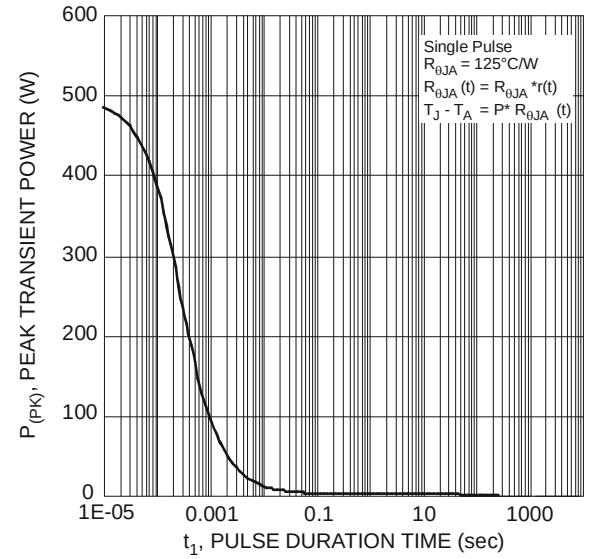


Figure 12 Single Pulse Maximum Power Dissipation

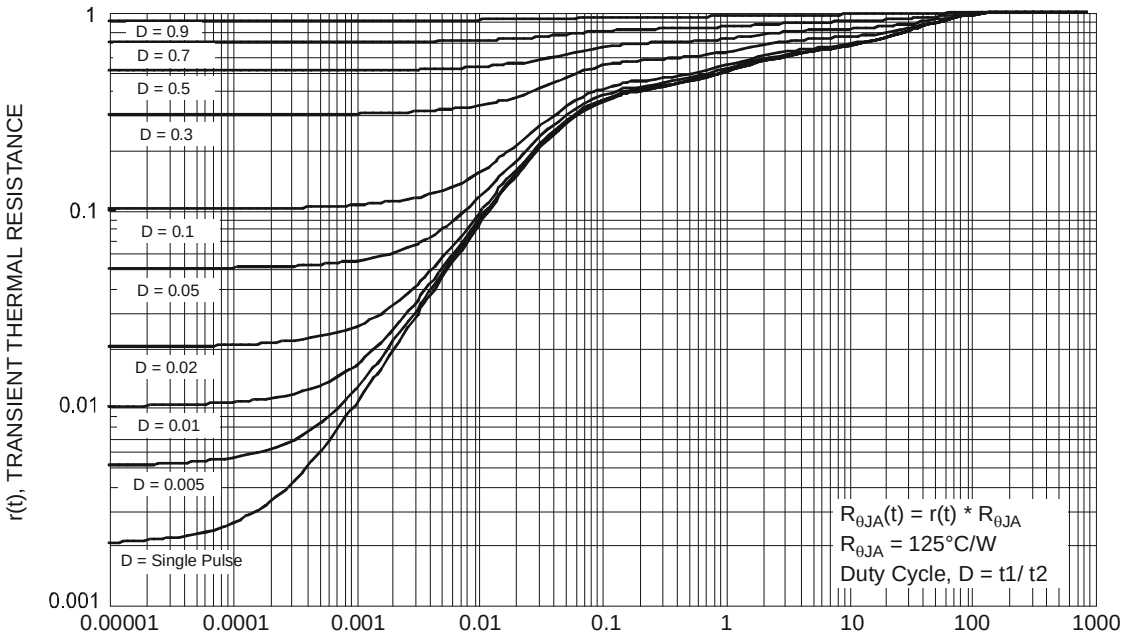
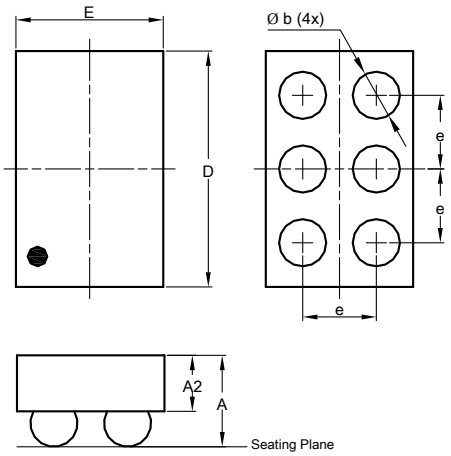


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

U-WLB1510-6

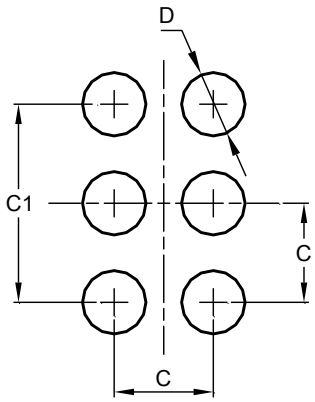


U-WLB1510-6			
Dim	**Min**	**Max**	**Typ**
A	—	0.62	—
A2	—	—	0.038
b	0.27	0.37	0.32
D	1.40	1.50	1.50
E	0.90	1.00	1.00
e	—	—	0.50
All Dimensions in mm			

Suggested Pad Layout

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

U-WLB1510-6



Dimensions	Value (in mm)
C	0.50
C1	1.00
D	0.25

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