Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_A = +25°C t =10s
20V	40mΩ @ V_{GS} = 4.5V	4.5A
	50mΩ @ V_{GS} = 2.5V	4.2A
	56mΩ @ V_{GS} = 1.8V	4.0A
	70mΩ @ V_{GS} = 1.5V	1.5A

Features and Benefits

- Ultra Small 1.0mm x 1.0mm Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

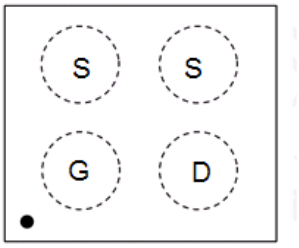
Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications. It is a high performance MOSFET in ultra-small 1.0mm x 1.0mm package.

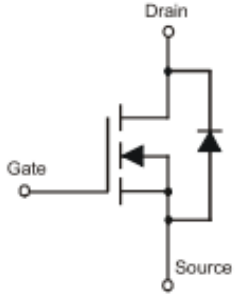
- Portable Applications
- Load Switch
- Power Management Functions

Mechanical Data

- Case: U-WLB1010-4 (Type B)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal: Finish —SnAgCu. Solderable per MIL-STD-202 Method 208 e1
- Terminal Connections: See Diagram



Top View



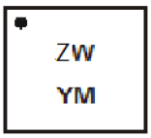
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2044UCB4-7	U-WLB1010-4 (Type B)	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 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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



ZW = 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	2016	2017	2018	2019	2020	2021	2022
Code	D	E	F	G	H	I	J

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

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Maximum Ratings

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	20	V
Gate-Source Voltage		V_{GSS}	±8	V
Continuous Source Current @ V_{GS} = 4.5V, t=10s (Note 5)	T_A = +25°C T_A = +70°C	I_D	3.3 2.6	A
Continuous Source Current @ V_{GS} = 4.5V, t=10s (Note 6)	T_A = +25°C T_A = +70°C	I_D	4.5 3.6	A
Pulsed Drain Current (Pulse Duration 10µs, Duty Cycle ≤1%)		I_{DM}	16	A
Continuous Source-Drain Diode Current		I_S	1.2	A
Pulse Diode Forward Current		I_{SM}	10	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	0.72	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	175	°C/W
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	40	°C/W
Total Power Dissipation (Note 6)	P_D	1.18	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	106	°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}	20	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	µA	V_{DS} = 20V, V_{GS} = 0V
		—	—	1.0	mA	V_{DS} = 20V, V_{GS} = 0V , T_J= +150°C
Gate-Body Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	—	0.9	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	29 32 36 43	40 50 56 70	mΩ	V_{GS} = 4.5V, I_D = 1.5A V_{GS} = 2.5V, I_D = 1.0A V_{GS} = 1.8V, I_D = 1.0A V_{GS} = 1.5V, I_D = 0.5A
Body Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 1.5A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	1056	1400	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	117	160	pF	
Reverse Transfer Capacitance	C_{rss}	—	105	140	pF	
Gate Resistance	R_g	—	0.98	1.5	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	13.1	26.5	nC	V_{DS} = 10V, I_D = 1.5A
Total Gate Charge (V_{GS} = 8V)	Q_g	—	23.2	47	nC	
Gate-Source Charge	Q_{gs}	—	1.4	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.1	—	nC	
Reverse Recovery Charge	Q_{RR}	—	2.16	6	nC	I_F = 1.5A, di/dt = 100A/µs
Body Diode Reverse Recovery Time	t_{RR}	—	7.92	18	ns	
Reverse Recovery Fall Time	t_A	—	6.5	—	ns	
Reverse Recovery Rise Time	t_B	—	4.12	—	ns	
Turn-On Delay Time	$t_{D(ON)}$	—	4.57	10	ns	V_{DD} = 10V, I_D = 1.5A V_{GEN} = 4.5V, R_G = 1Ω, R_L = 6.7Ω
Turn-On Rise Time	t_R	—	6.33	15	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	19.84	42	ns	
Turn-Off Fall Time	t_F	—	2.96	6	ns	
Turn-On Delay Time	$t_{D(ON)}$	—	2.88	6	ns	V_{DD} = 10V, I_D = 1.5A V_{GEN} = 8V, R_G = 1Ω, R_L = 6.7Ω
Turn-On Rise Time	t_R	—	6.31	14	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	14.9	30	ns	
Turn-Off Fall Time	t_F	—	1.71	4	ns	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

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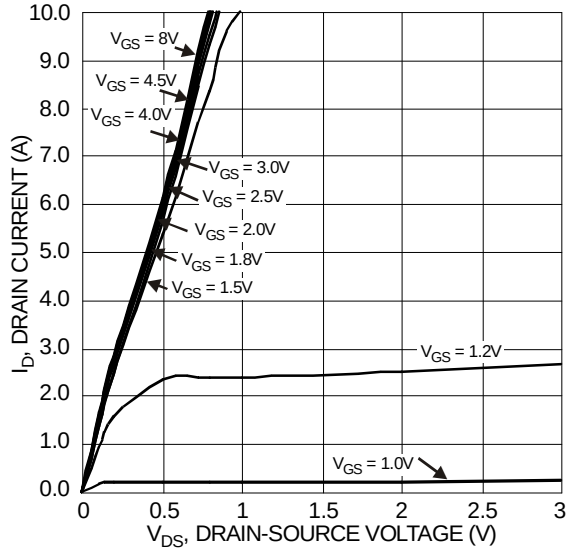


Figure 1 Typical Output Characteristic

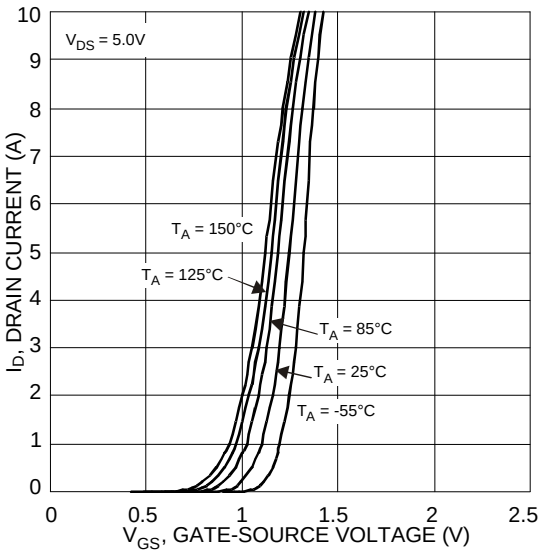


Figure 2 Typical Transfer Characteristics

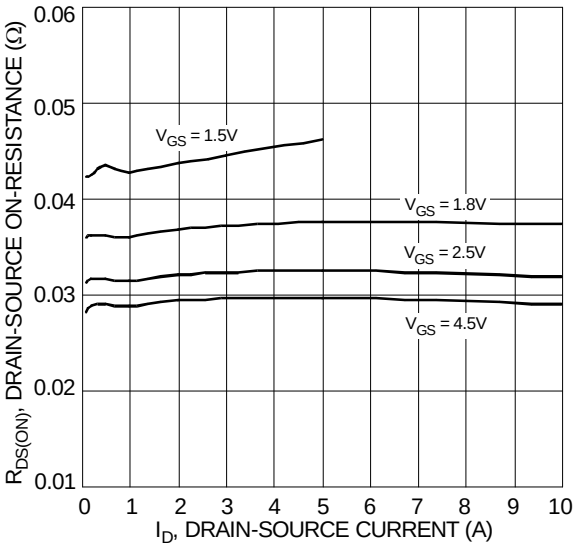


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

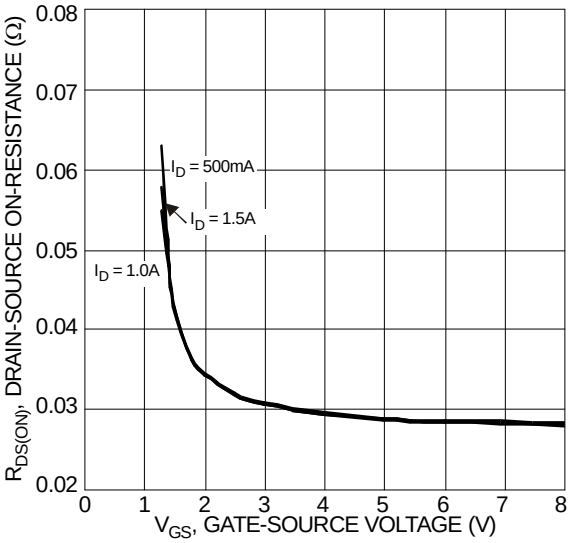


Figure 4 Typical Transfer Characteristics

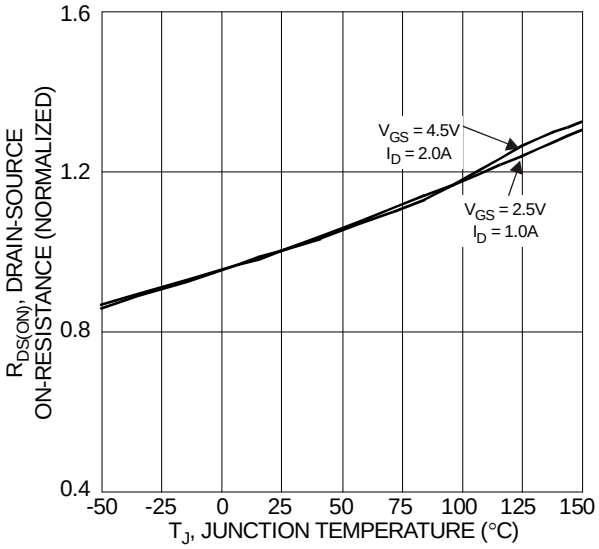


Figure 5 On-Resistance Variation with Temperature

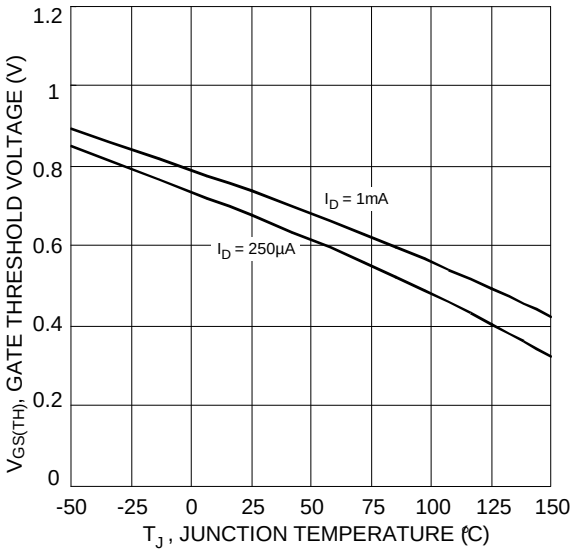


Figure 6 Gate Threshold Variation vs. Junction Temperature

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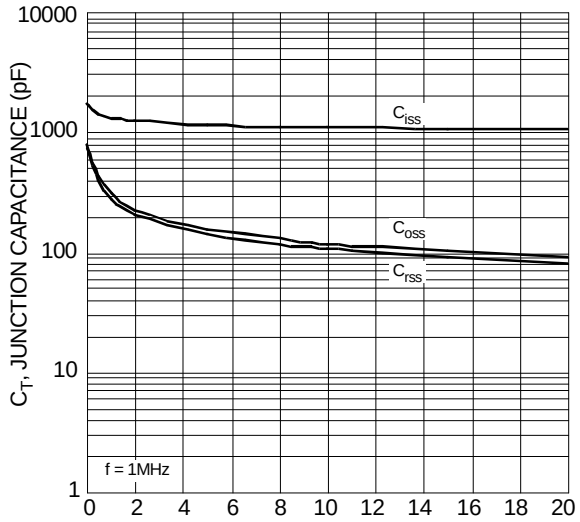


Figure 7 Typical Junction Capacitance

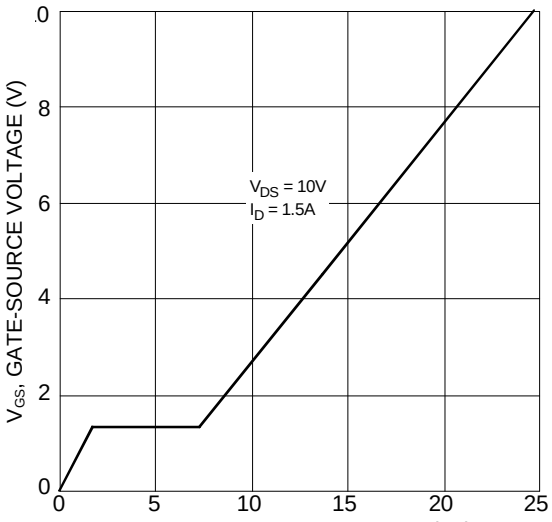


Figure 8 Gate Charge

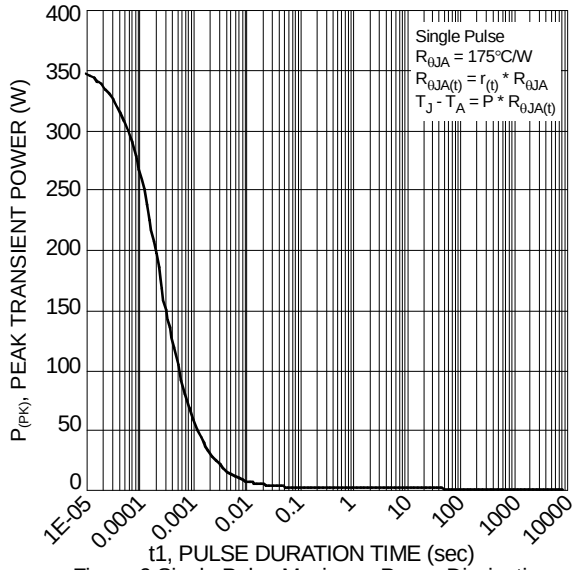


Figure 9 Single Pulse Maximum Power Dissipation

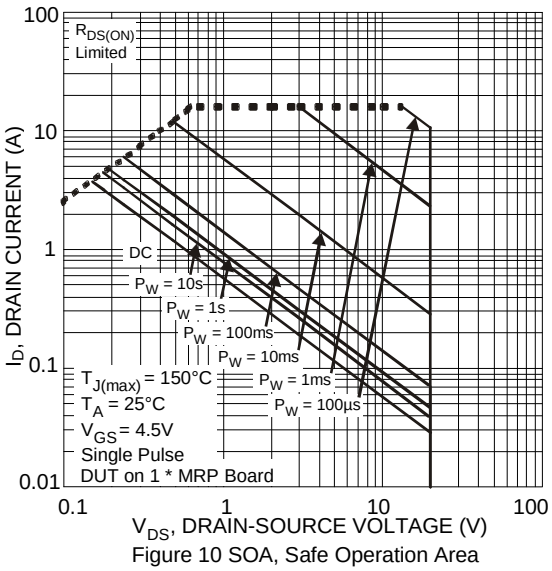


Figure 10 SOA, Safe Operation Area

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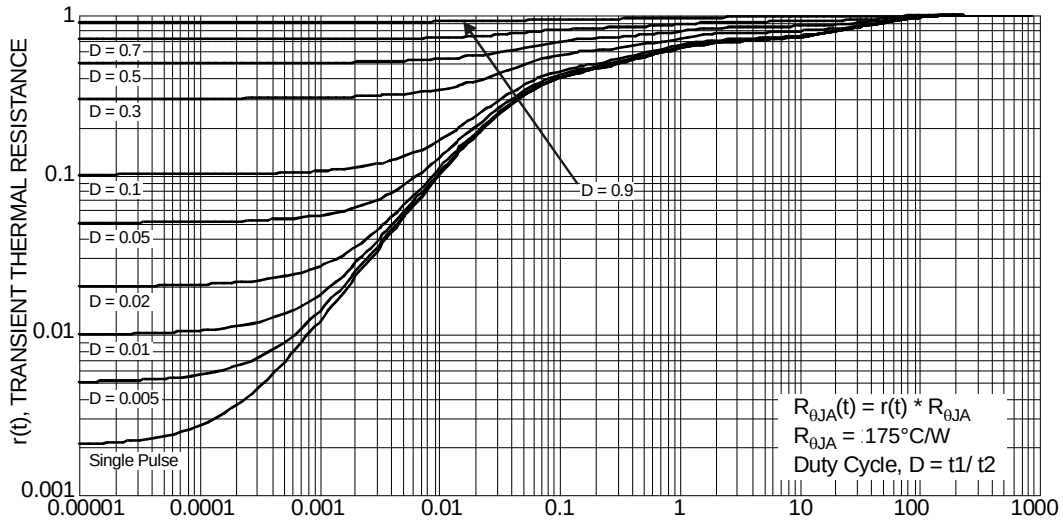


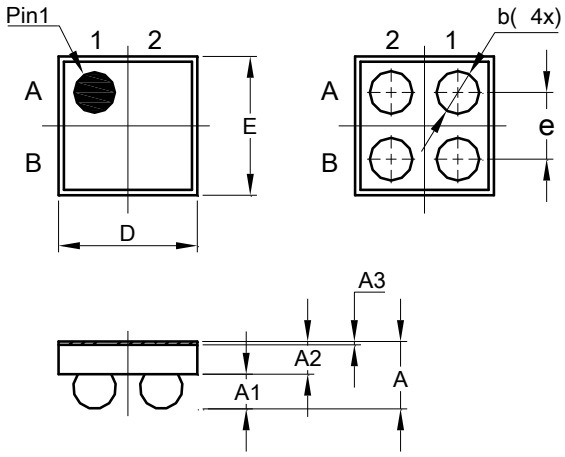
Figure 11 Transient Thermal Resistance

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Package Outline Dimensions

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

U-WLB1010-4 (Type B)

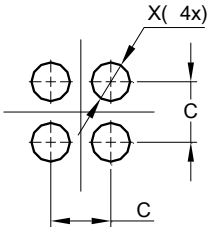


U-WLB1010-4 (Type B)			
Dim	**Min**	**Max**	**Typ**
A	0.4535	0.5565	0.5050
A1	0.2115	0.2585	0.2350
A2	0.2200	0.2700	0.2450
A3	0.0220	0.0280	0.0250
b	0.2880	0.3520	0.3200
D	1.030	1.070	1.050
e	0.500 BSC		
E	1.030	1.070	1.050
All Dimensions in mm			

Suggested Pad Layout

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

U-WLB1010-4 (Type B)



Dimensions	Value (in mm)
C	0.500
X	0.3200

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