

N-CHANNEL ENHANCEMENT MODE FIELD MOSFET

Product Summary

V _{SSS}	R _{SS(ON)}	I _S T _A = +25°C
12V	26mΩ @V _{GS} = 4.5V	5.5A

Description

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

Applications

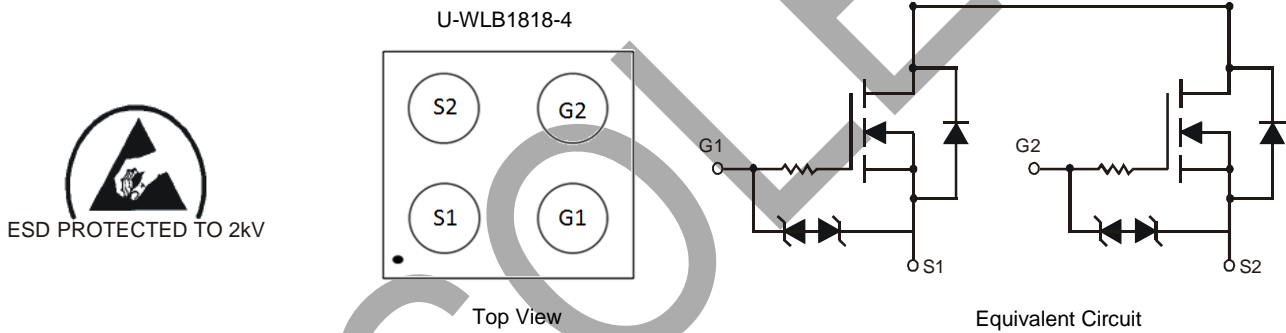
- Battery management
- Load switches
- Battery protections

Features and Benefits

- Built-In G-S Protection Diode Against ESD 2kV HBM.
- **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-Q100/101/104/200, 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-WLB1818-4
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)

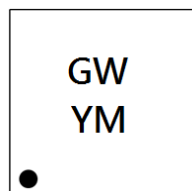


Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN1033UCB4-7	U-WLB1818-4	3,000	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



GW = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: J = 2022)
 M = Month (ex: 9 = September)

Date Code Key

Year	2013	...	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	A	...	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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{SS}	12	V
Gate-Source Voltage			V_{GS}	± 6	V
Continuous Source Current @ $V_{GS} = 4.5V$, $T_A = +25^\circ C$ (Note 5)	Steady State	$T_A = +25^\circ C$	I_S	5.5	A
		$T_A = +70^\circ C$		4.5	
Pulsed Source Current @ $T_A = +25^\circ C$ (Notes 5 & 6)			I_{SM}	20	A

Thermal Characteristics

Characteristic	Symbol	Value	Units
Power Dissipation @ $T_A = +25^\circ C$ (Note 5)	P_D	1.45	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ C$ (Note 5)	$R_{\theta JA}$	88.21	$^\circ C/W$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ C$

Electrical Characteristics (@ $T_A = +25^\circ C$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Source to Source Breakdown Voltage $T_J = +25^\circ C$	$V_{(BR)SS}$	12	—	—	V	$I_S = 1mA, V_{GS} = 0V$
Zero Gate Voltage Source Current $T_J = +25^\circ C$	I_{SSS}	—	—	1.0	μA	$V_{SS} = 12V, V_{GS} = 0V$
Gate-Body Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 6V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	0.35	0.5	0.7	V	$V_{SS} = 10V, I_S = 1.0mA$
Static Source-Source On-Resistance	$R_{SS(ON)}$	—	19.5	26	$m\Omega$	$V_{GS} = 4.5V, I_S = 3.0A$
			20	27		$V_{GS} = 4.0V, I_S = 3.0A$
			20.5	28		$V_{GS} = 3.7V, I_S = 3.0A$
			21	29		$V_{GS} = 3.5V, I_S = 3.0A$
			21.5	30		$V_{GS} = 3.1V, I_S = 3.0A$
			22	31		$V_{GS} = 2.5V, I_S = 3.0A$
			26	33		$V_{GS} = 1.8V, I_S = 3.0A$
35	50	$V_{GS} = 1.5V, I_S = 3.0A$				
Forward Transfer Admittance	$ Y_{fs} $	—	11	—	S	$V_{SS} = 10V, I_S = 3.0A$
Body Diode Forward Voltage	$V_{F(S-S)}$	—	0.7	1.0	V	$I_F = 3.0A, V_{GS} = 0V$
DYNAMIC CHARACTERISTICS (Note 8)						
Total Gate Charge	Q_g	—	37	—	nC	$V_{GS} = 4.5V, V_{SS} = 10V, I_S = 6A$
Turn-On Delay Time	$t_{D(on)}$	—	10	—	ns	$V_{DD} = 6V, R_L = 6.0\Omega, I_S = 3.0A$
Turn-On Rise Time	t_r	—	20	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	83	—	ns	
Turn-Off Fall Time	t_f	—	52	—	ns	

- Notes:
5. Device mounted on FR4 material with 1inch² (6.45cm²), 2oz. (0.071mm thick) Cu.
 6. Repetitive rating, pulse width limited by junction temperature.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to production testing.

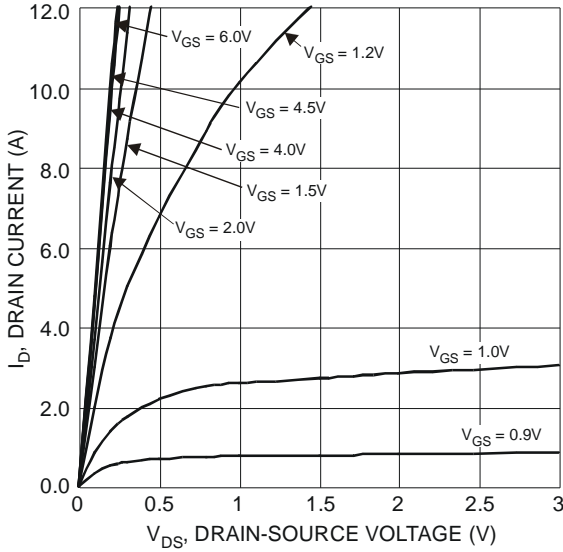


Figure 1 Typical Output Characteristics

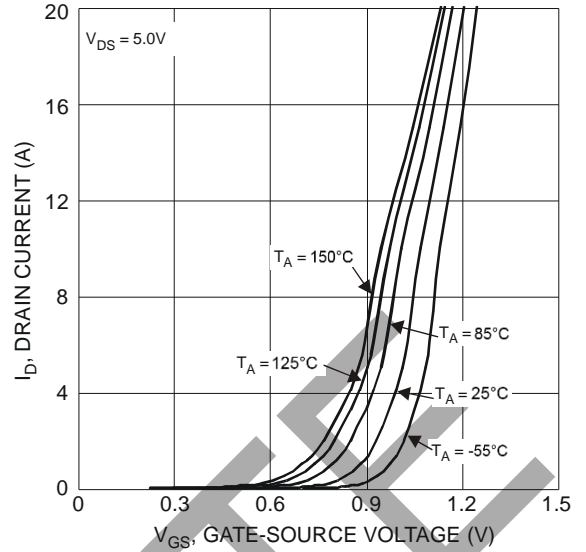


Figure 2 Typical Transfer Characteristics

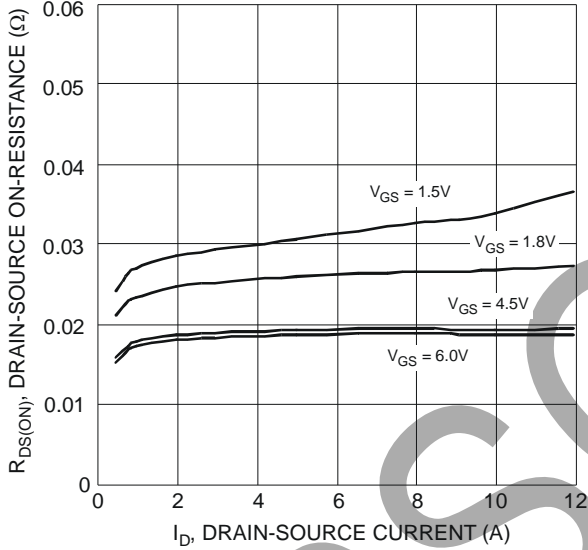


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

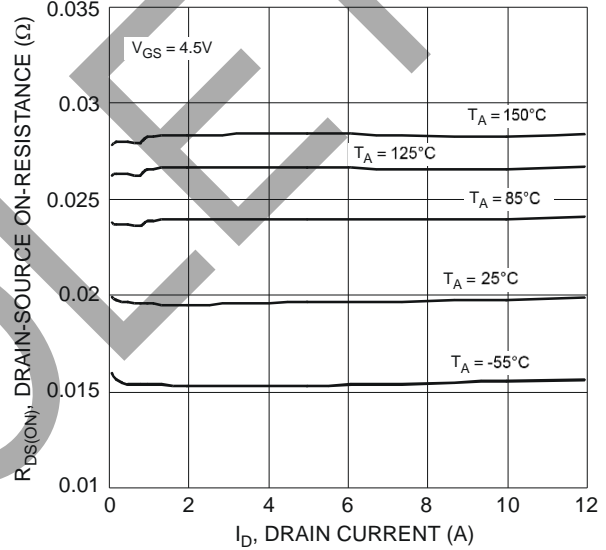


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

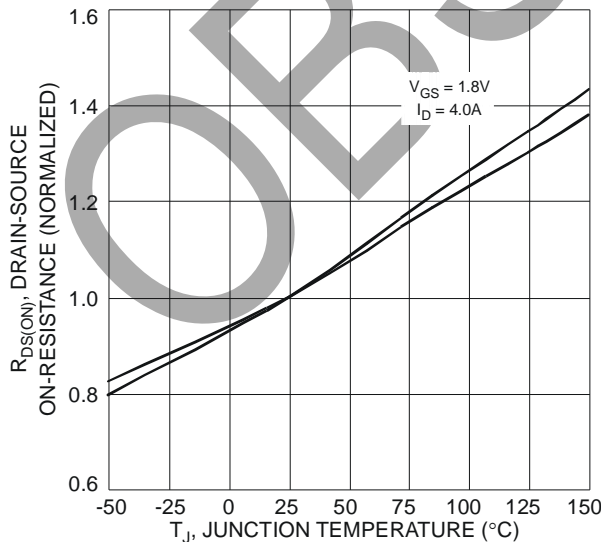


Figure 5 On-Resistance Variation with Temperature

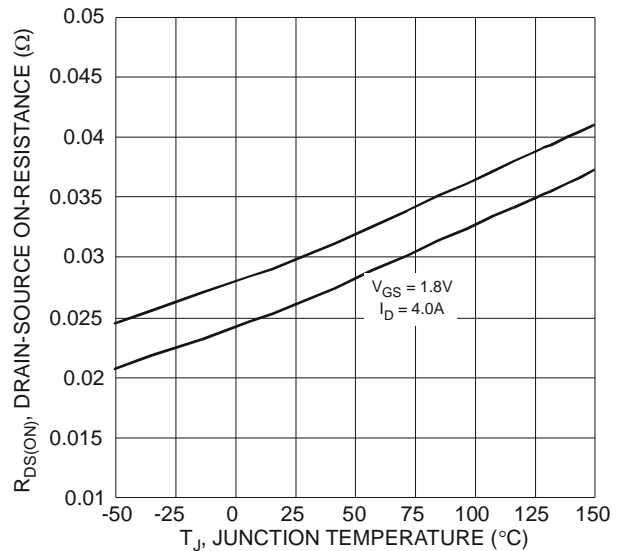


Figure 6 On-Resistance Variation with Temperature

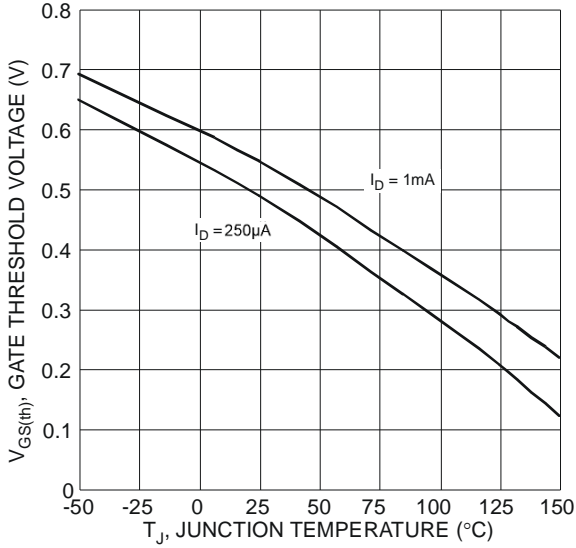


Figure 7 Gate Threshold Variation vs. Junction Temperature

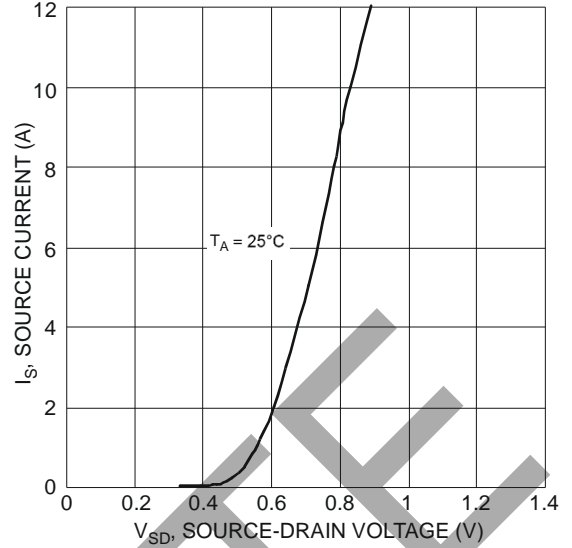


Figure 8 Diode Forward Voltage vs. Current

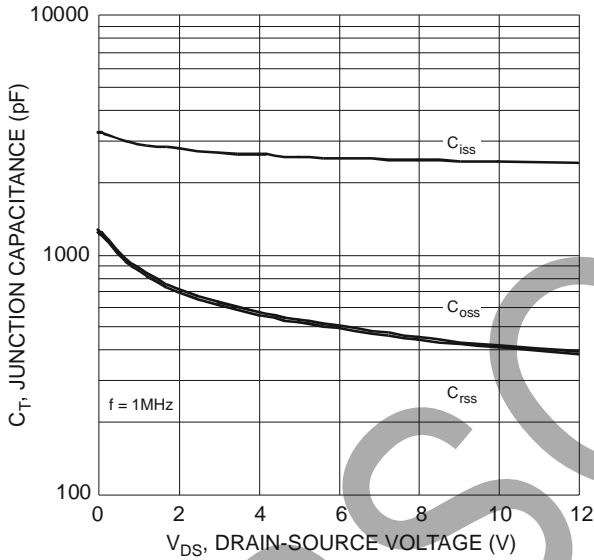


Figure 9 Typical Junction Capacitance

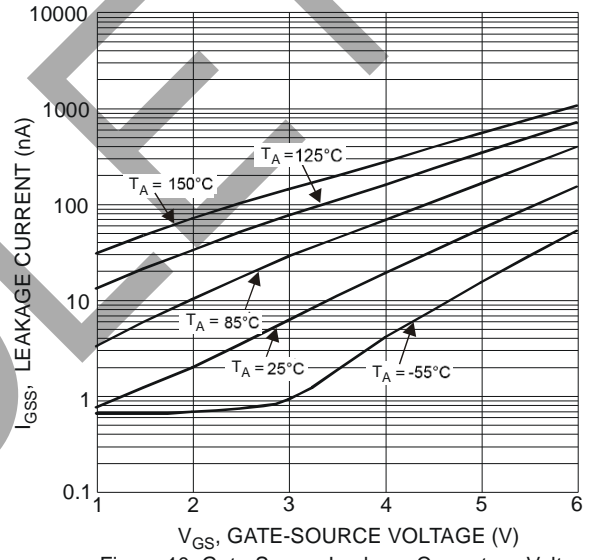


Figure 10 Gate-Source Leakage Current vs. Voltage

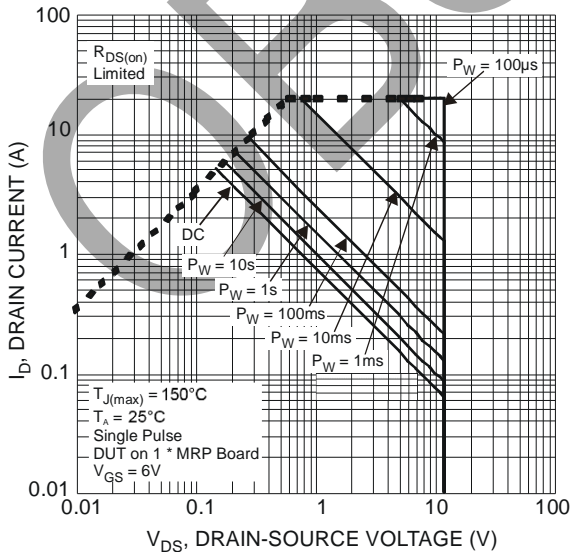
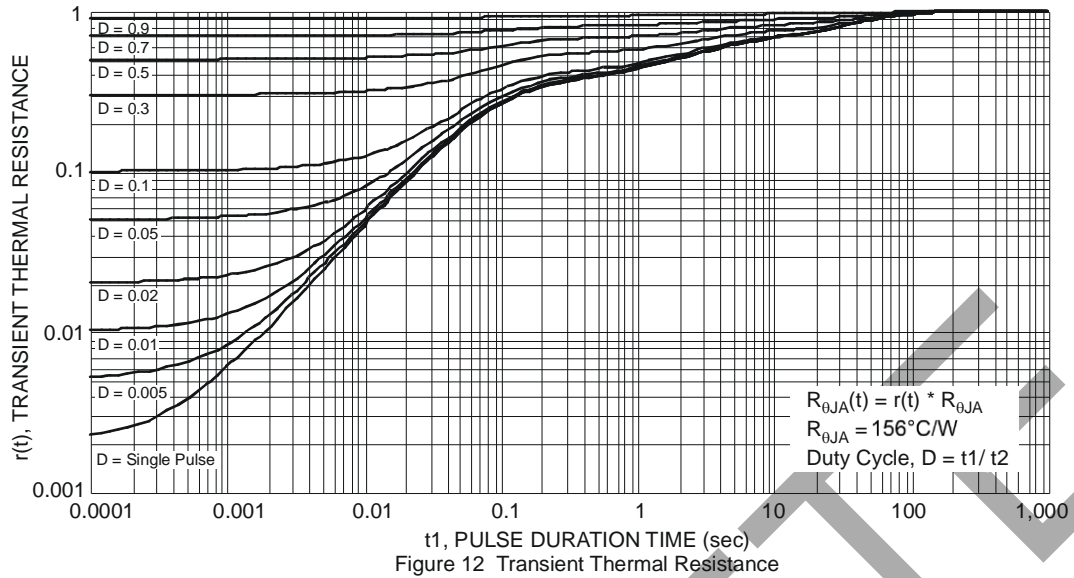


Figure 11 SOA, Safe Operation Area

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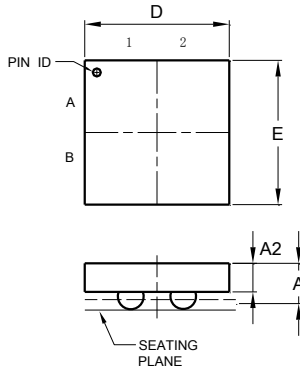


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Package Outline Dimensions

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

U-WLB1818-4

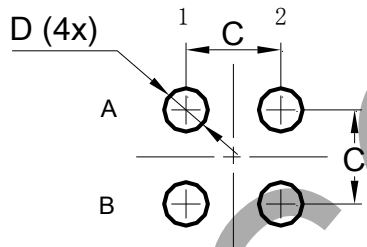


U-WLB1818-4			
Dim	Min	Max	Typ
A	–	0.62	–
A2	–	–	0.36
b	0.25	0.35	0.30
D	1.75	1.80	1.79
E	1.75	1.80	1.79
e	–	–	0.65
All Dimensions in mm			

Suggested Pad Layout

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

U-WLB1818-4



Dimensions	Value (in mm)
C	0.65
D	0.30

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