

DUAL N-CANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D $T_A = +25^\circ C$
24V	7m Ω @ $V_{GS} = 4.5V$	11.0A
	7.8m Ω @ $V_{GS} = 4.0V$	10.8A
	8.2m Ω @ $V_{GS} = 3.7V$	10.6A
	9.5m Ω @ $V_{GS} = 3.1V$	10.5A
	10.5m Ω @ $V_{GS} = 2.5V$	10.0A

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

- Power management functions
- Battery packs
- Load switches

Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected Gate > 2KV**
- **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 [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

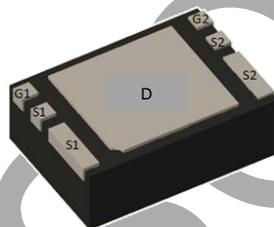
Mechanical Data

- Package: U-DFN2535-6
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.012 grams (Approximate)

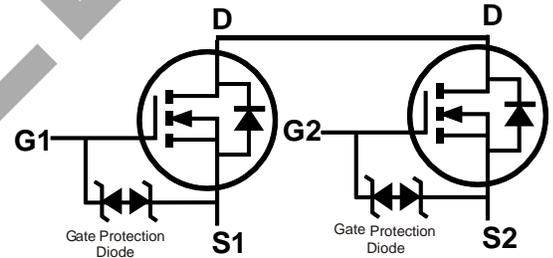
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U-DFN2535-6 (Type B)



Bottom View



Equivalent Circuit

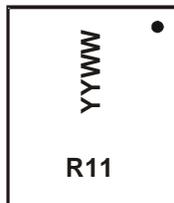
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN2010UDZ-7	U-DFN2535-6 (Type B)	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

U-DFN2535-6 (Type B)



R11 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Digit of Year (ex: 15 for 2015)
 WW = Week Code (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	24	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C	I _D	11	A
		T _A = +70°C		9	
Maximum Continuous Body Diode Forward Current (Note 6)			I _S	2	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I _{DM}	65	A
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	34	A
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	57	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.7	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	184	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.6	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	78	°C/W
Thermal Resistance, Junction to Case		R _{θJC}	16.4	
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}	24	-	-	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	-	-	1.0	µA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±10	µA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.3	-	1.5	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	-	-	7	mΩ	V _{GS} = 4.5V, I _D = 5.5A
			-	7.8		V _{GS} = 4.0V, I _D = 5.5A
			-	8.2		V _{GS} = 3.7V, I _D = 5.5A
			-	9.5		V _{GS} = 3.1V, I _D = 5.5A
			-	10.5		V _{GS} = 2.5V, I _D = 5.5A
Diode Forward Voltage	V _{SD}	-	0.7	1.2	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	-	2,665	-	pF	V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	323	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	311	-	pF	
Gate Resistance	R _g	-	1.1	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	-	33.2	-	nC	V _{DS} = 10V, I _D = 5.5A
Gate-Source Charge	Q _{gs}	-	3.6	-	nC	
Gate-Drain Charge	Q _{gd}	-	5.6	-	nC	
Turn-On Delay Time	t _{d(ON)}	-	7.5	-	ns	V _{DD} = 16V, I _D = 5.5A, V _{GS} = 4.5V, R _G = 6Ω
Turn-On Rise Time	t _r	-	20	-	ns	
Turn-Off Delay Time	t _{d(OFF)}	-	93	-	ns	
Turn-Off Fall Time	t _f	-	49	-	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

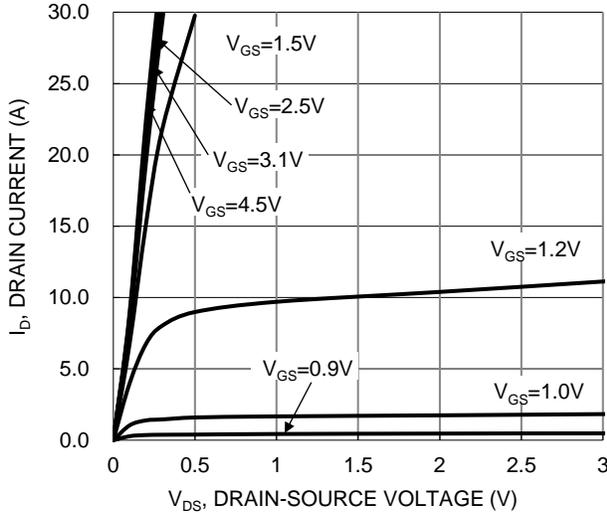


Figure 1. Typical Output Characteristic

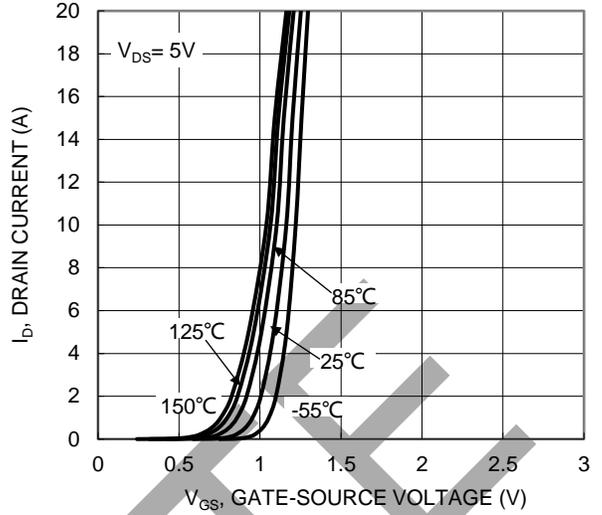


Figure 2. Typical Transfer Characteristic

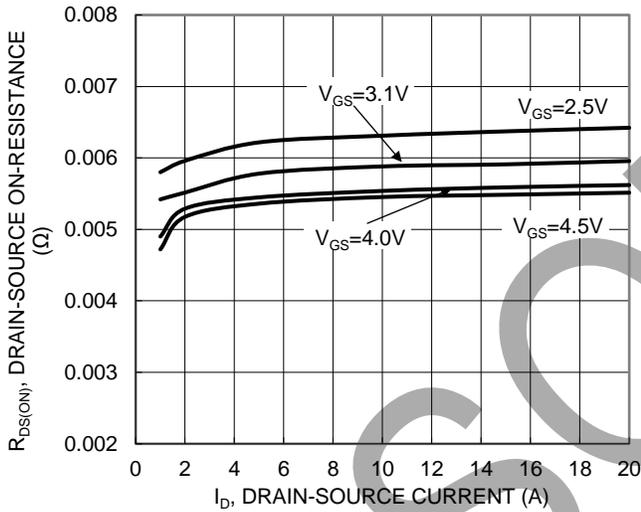


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

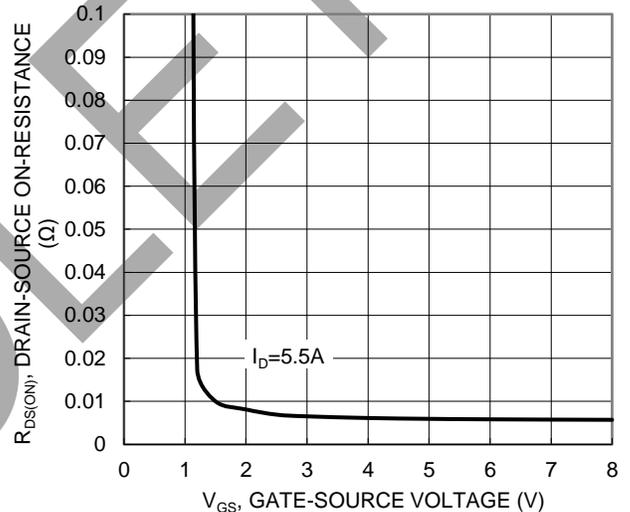


Figure 4. Typical Transfer Characteristic

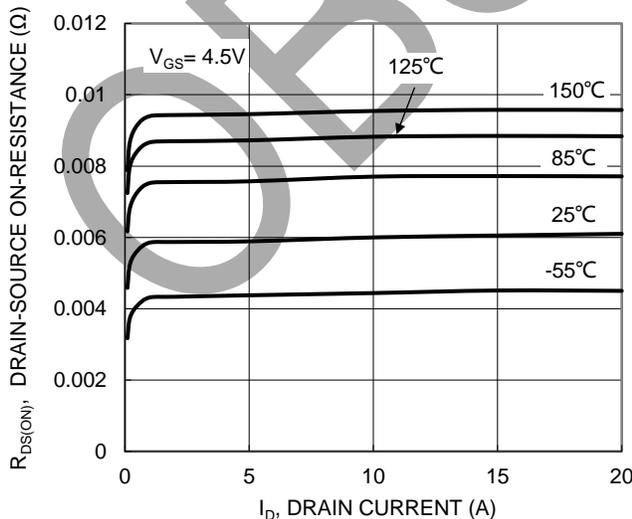


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

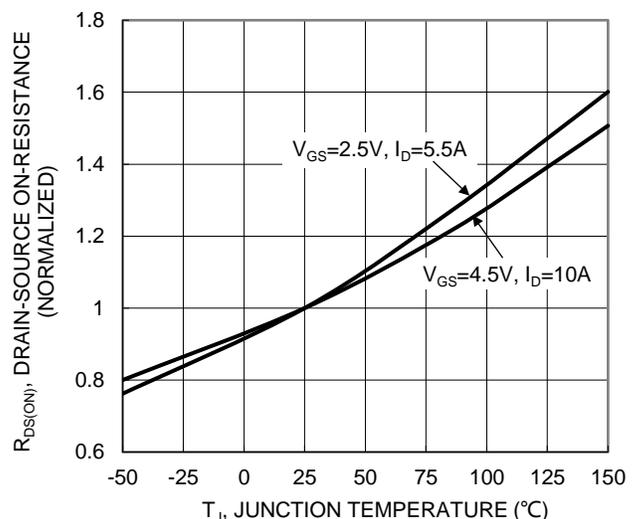


Figure 6. On-Resistance Variation with Temperature

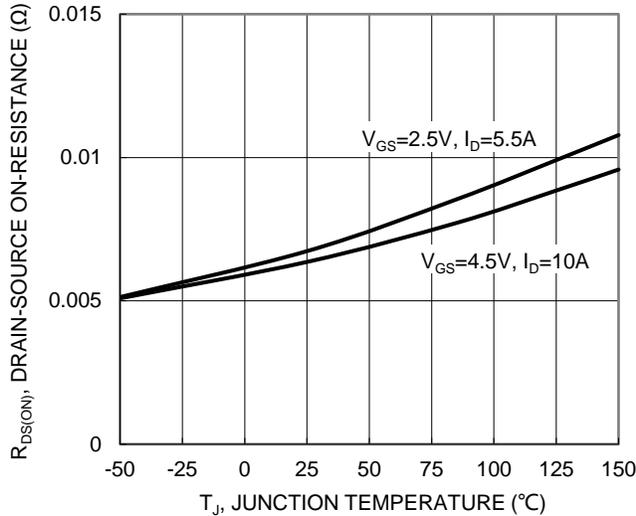


Figure 7. On-Resistance Variation with Temperature

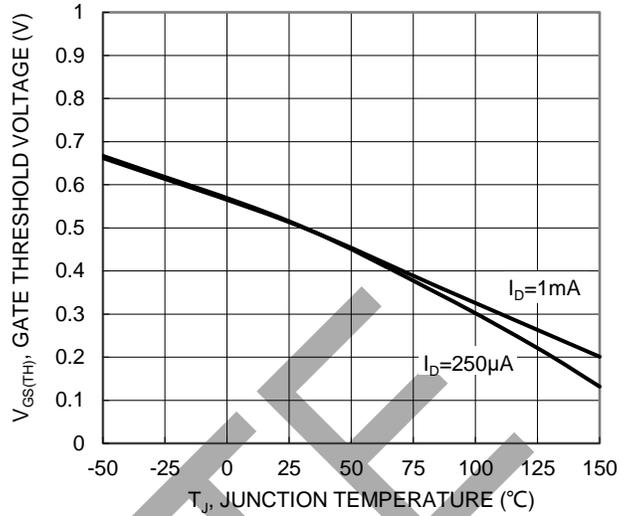


Figure 8. Gate Threshold Variation vs. Temperature

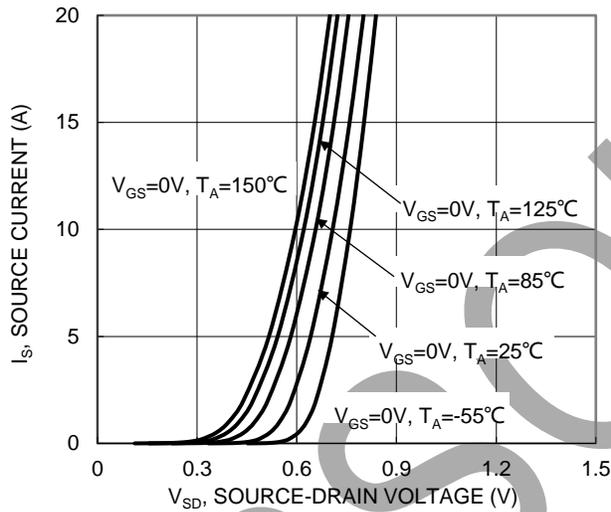


Figure 9. Diode Forward Voltage vs. Current

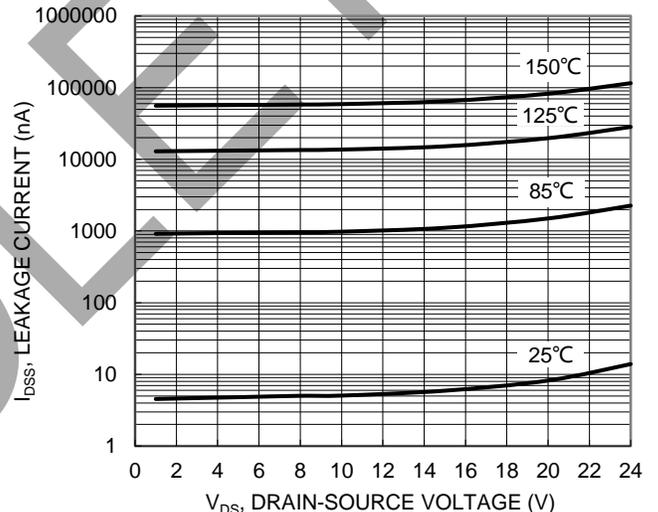


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

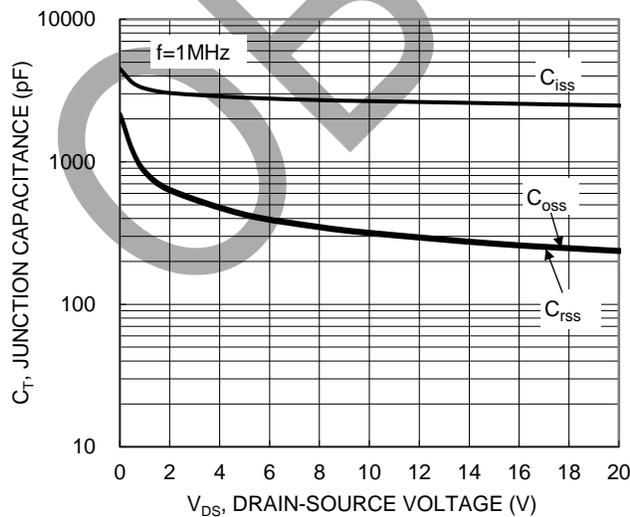


Figure 11. Typical Junction Capacitance

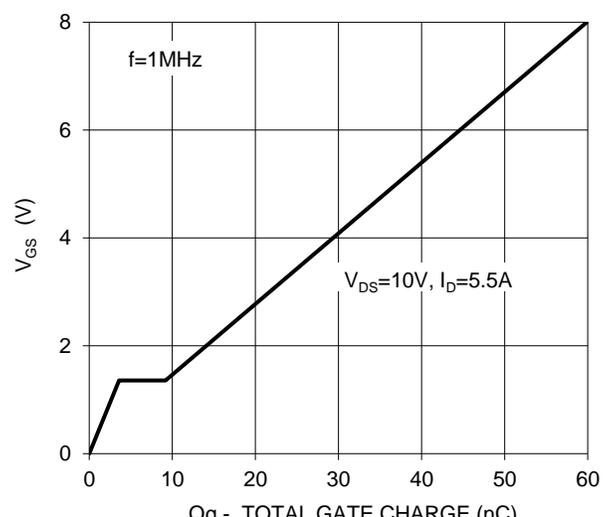
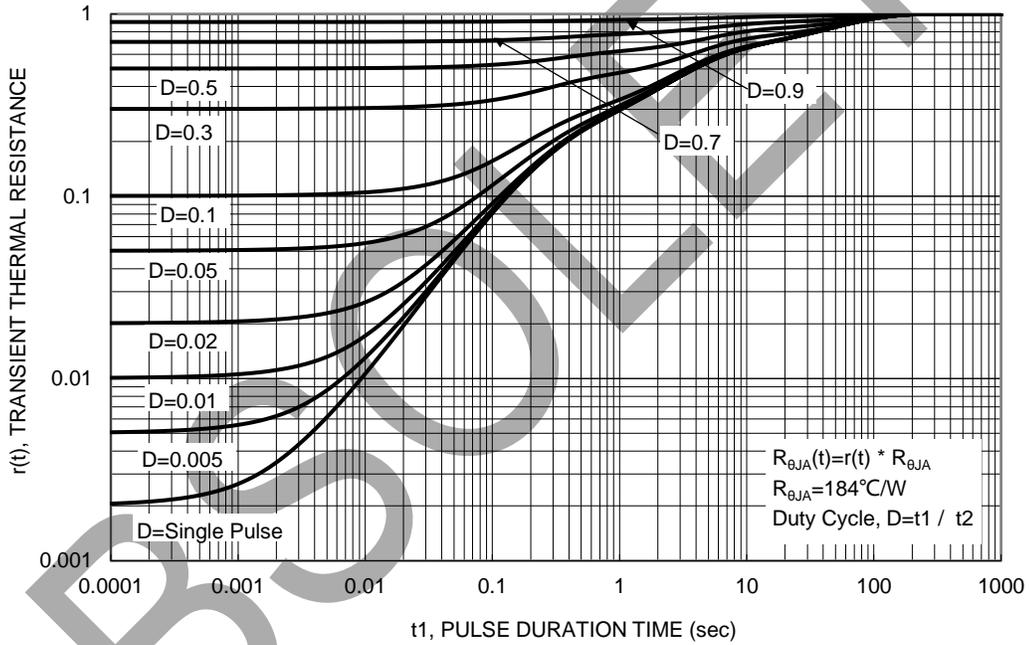
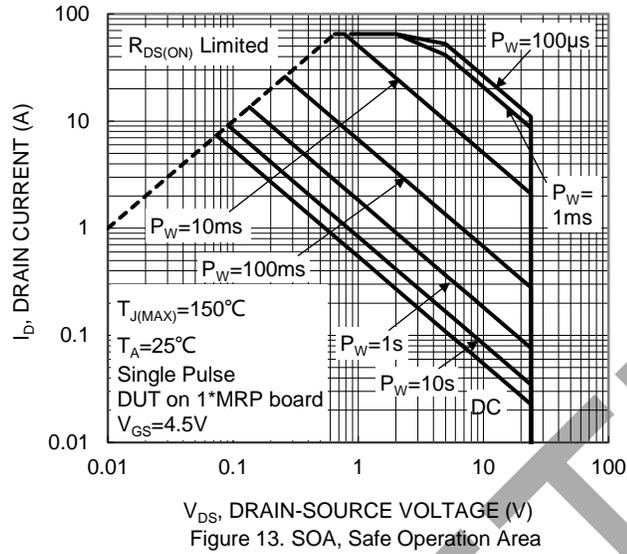


Figure 12. Gate Charge

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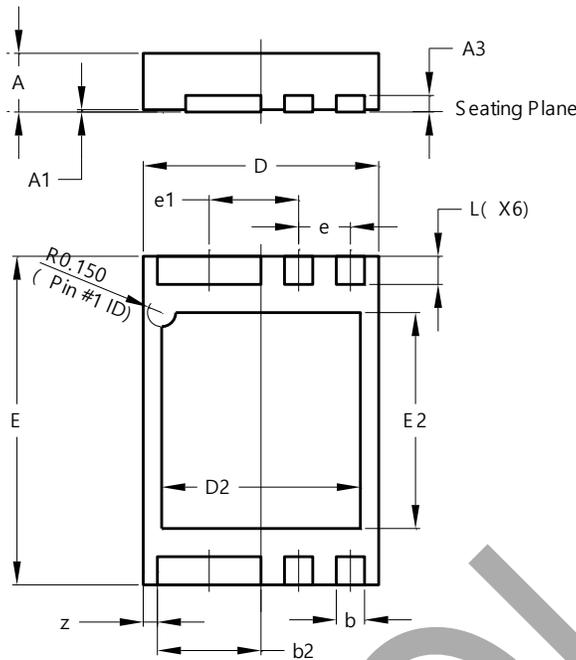


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Package Outline Dimensions

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

U-DFN2535-6 (Type B)

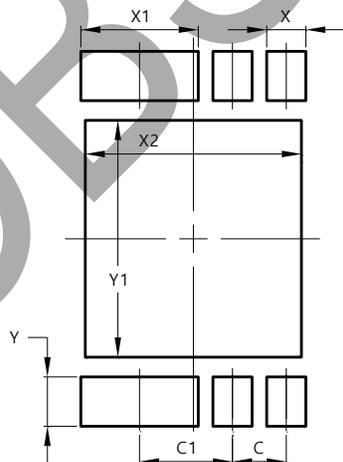


U-DFN2535-6 (Type B)			
Dim	Min	Max	Typ
A	0.50	0.60	-
A1	0.00	0.05	0.02
A3	-	-	0.127
b	0.25	0.35	0.30
b2	1.05	1.15	1.10
D	2.45	2.55	2.50
D2	2.01	2.21	2.11
E	3.45	3.55	3.50
E2	2.20	2.40	2.30
e	-	-	0.55
e1	-	-	0.95
L	0.25	0.35	0.30
z	-	-	0.15
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2535-6 (Type B)



Dimensions	Value (in mm)
C	0.550
C1	0.950
X	0.400
X1	1.200
X2	2.210
Y	0.500
Y1	2.400

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