DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

NEW PRODUCT

Product Summary

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

Description

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.

Applications

- Power Management Functions
- Battery Pack
- Load Switch

Features

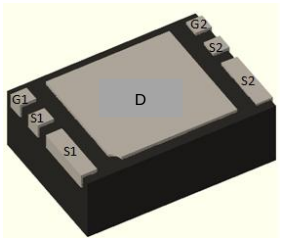
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected Gate > 2KV**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

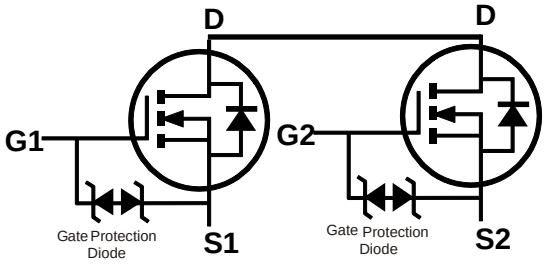
- Case: U-DFN2535-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.012 grams (Approximate)

ESD PROTECTED

U-DFN2535-6



Bottom View



Equivalent Circuit

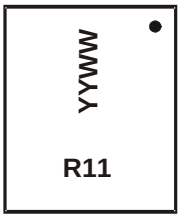
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2010UDZ-7	U-DFN2535-6	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-DFN2535-6



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

NEW PRODUCT

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 T_A = +70°C	I_D	11 9	A
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	$R_{\theta JA}$	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	$R_{\theta JA}$	78	°C/W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	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: 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. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

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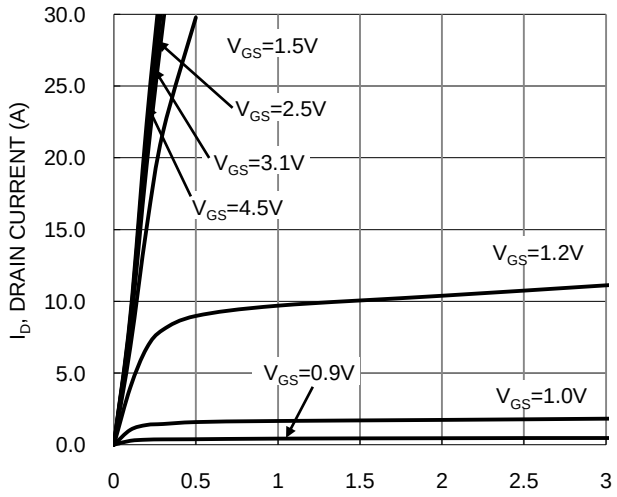

Figure 1. Typical Output Characteristic

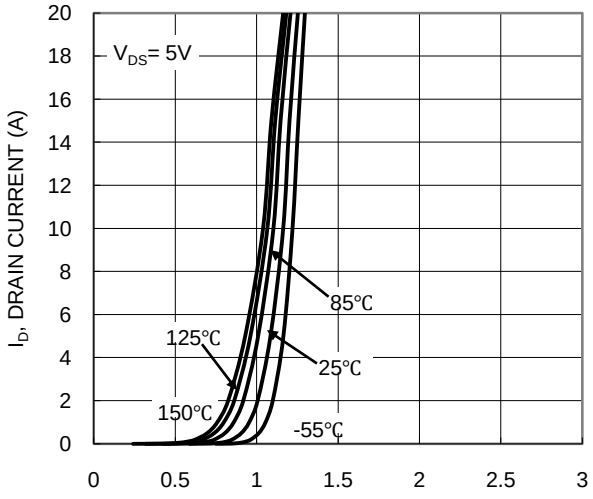

Figure 2. Typical Transfer Characteristic

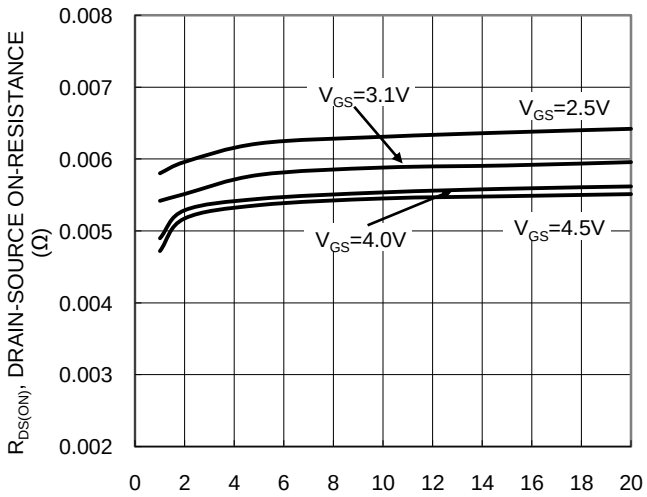

Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

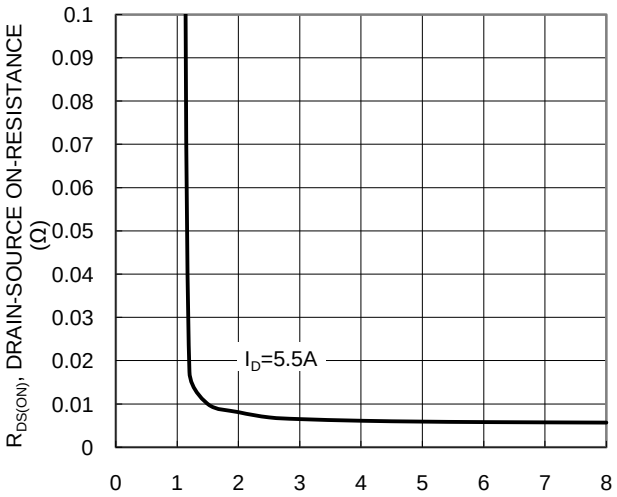

Figure 4. Typical Transfer Characteristic

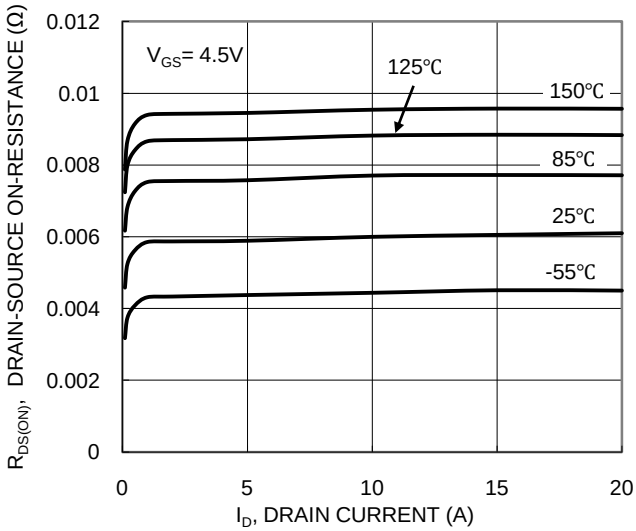

Figure 5. Typical On-Resistance vs. Drain Current and Temperature

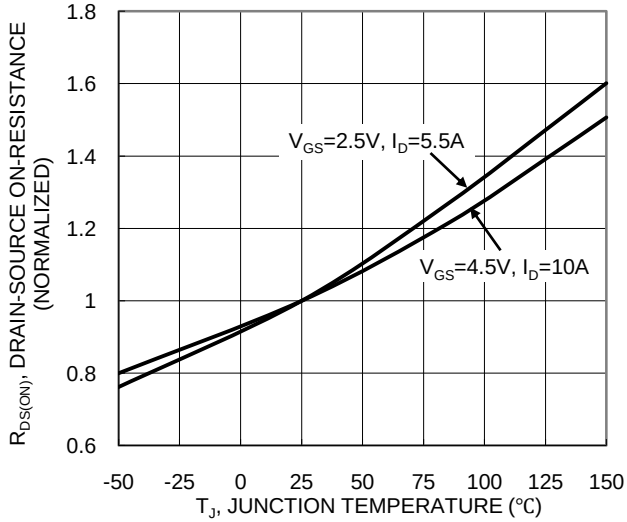

Figure 6. On-Resistance Variation with Temperature

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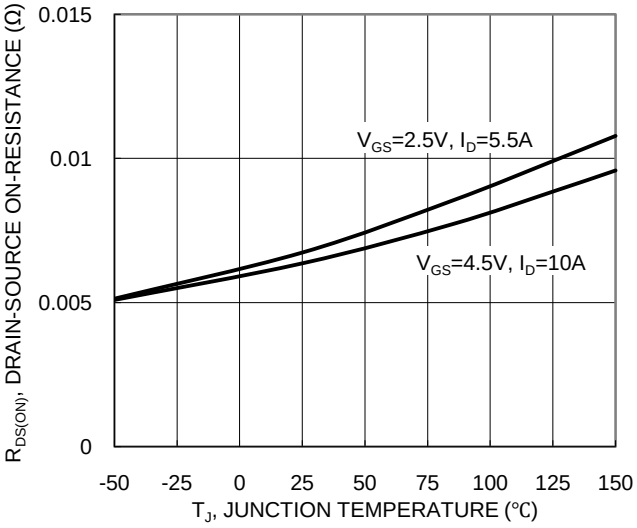

Figure 7. On-Resistance Variation with Temperature

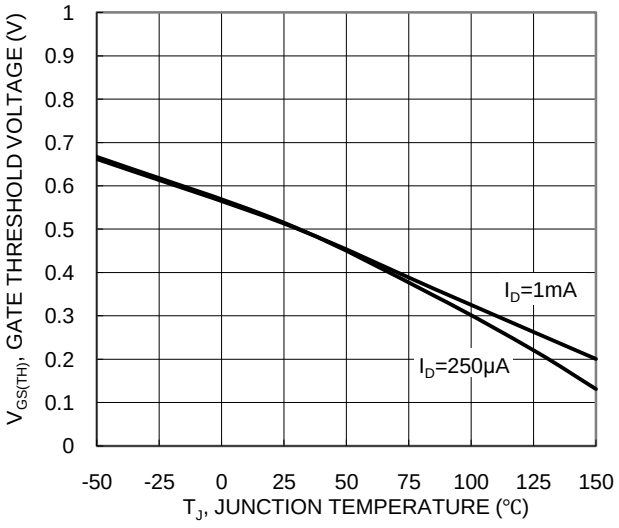

Figure 8. Gate Threshold Variation vs. Temperature

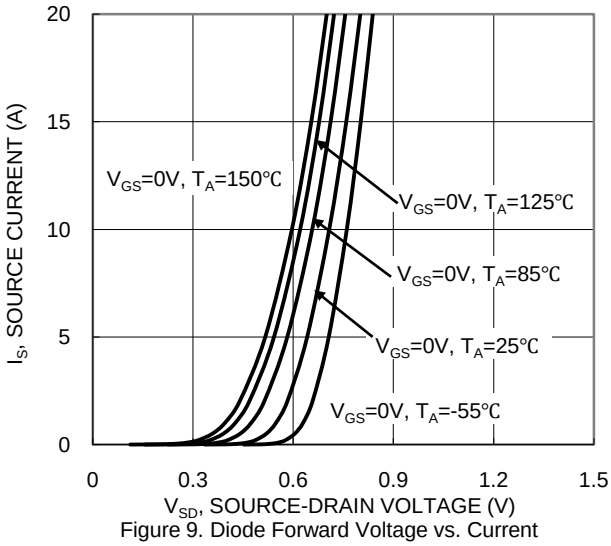

Figure 9. Diode Forward Voltage vs. Current

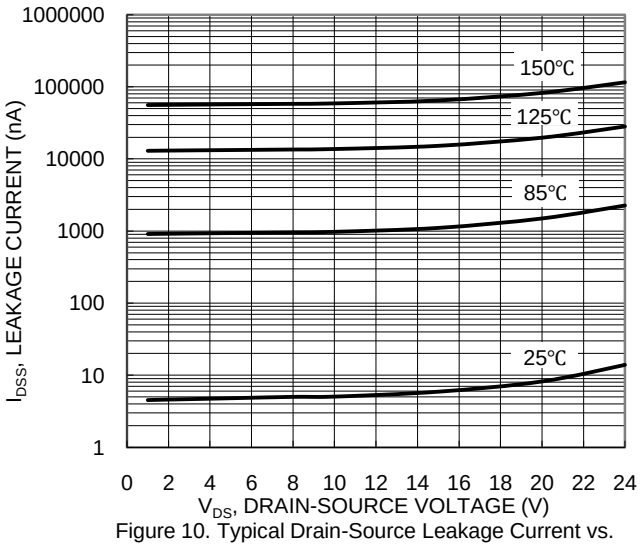

Figure 10. Typical Drain-Source Leakage Current vs. Voltage

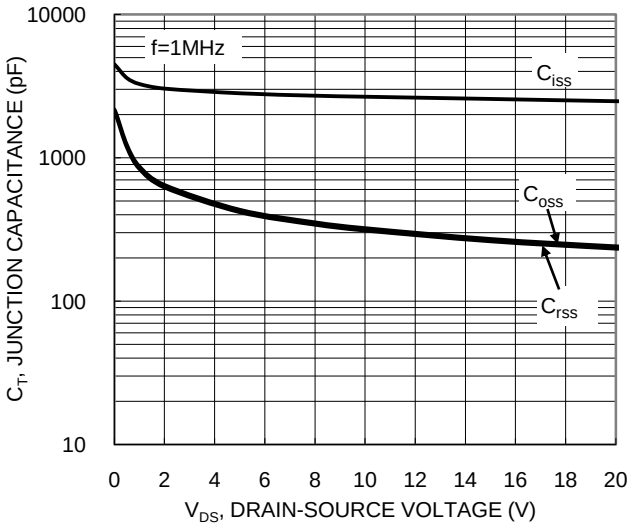

Figure 11. Typical Junction Capacitance

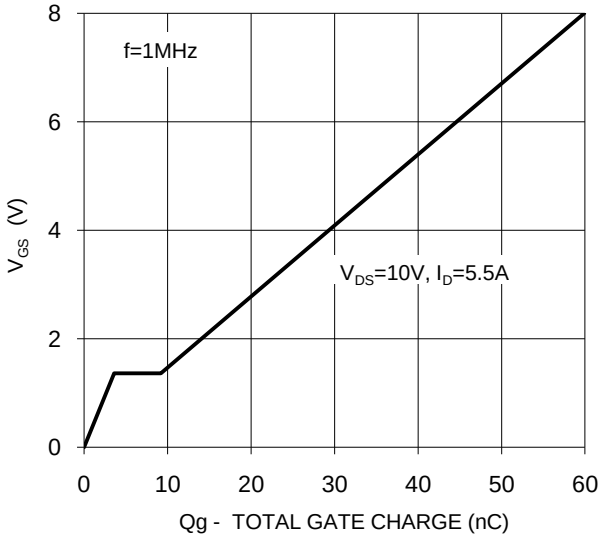

Figure 12. Gate Charge

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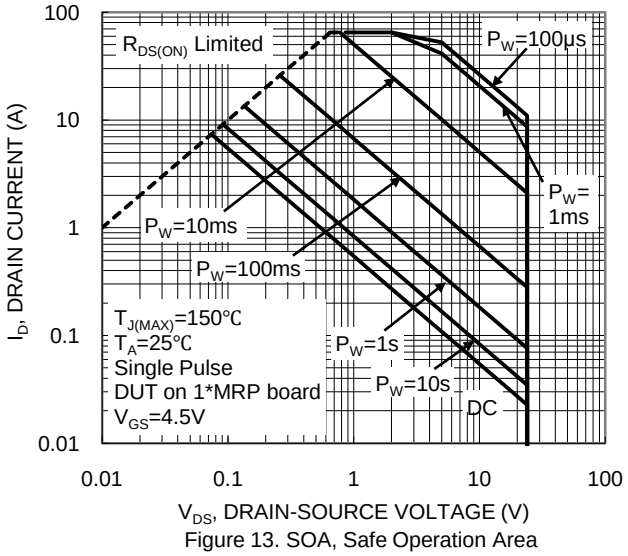

Figure 13. SOA, Safe Operation Area

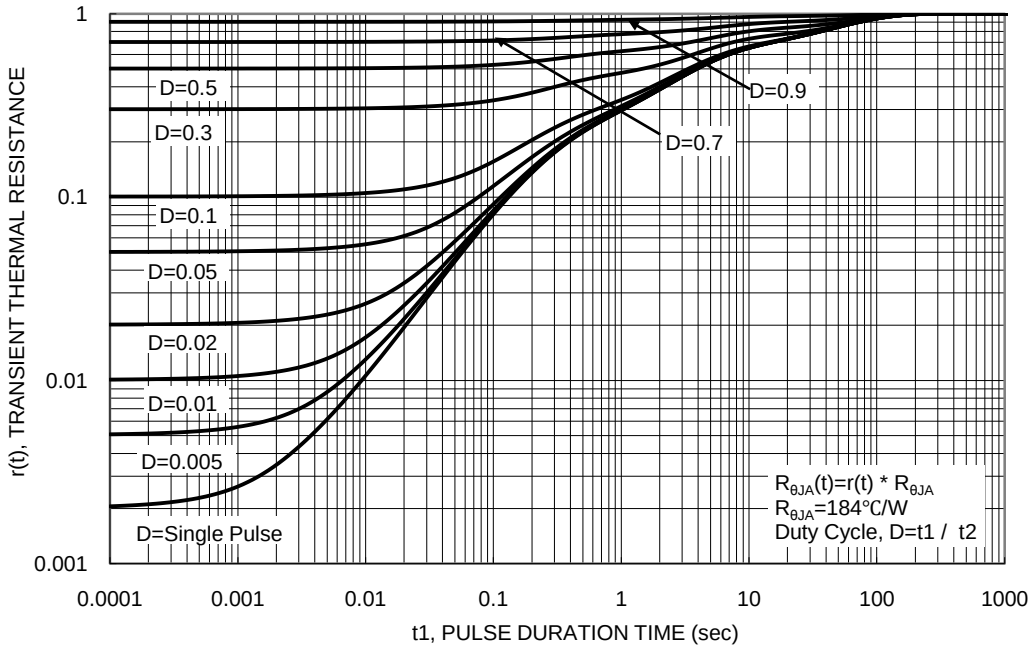

Figure 14. Transient Thermal Resistance

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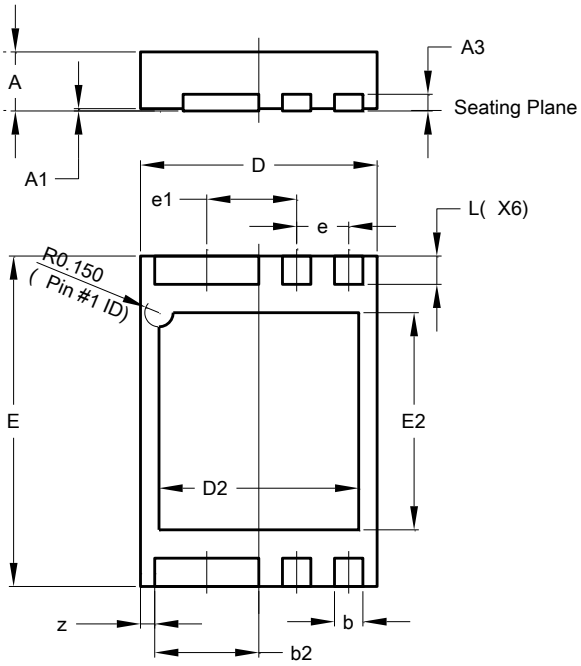
Package Outline Dimensions

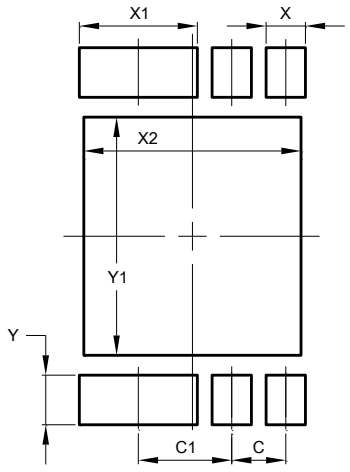
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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 AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



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

NEW PRODUCT

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