Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_A = +25°C
20V	100mΩ @ V_{GS} = 4.5V	1.8A
	140mΩ @ V_{GS} = 2.5V	1.5A

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
- Load Switch

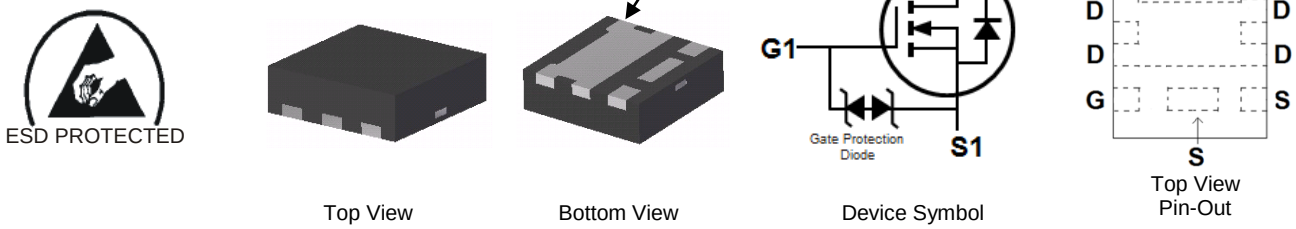
Features and Benefits

- Typical Off Board Profile of 0.6mm - Ideally Suited for Thin Applications
- Low $R_{DS(ON)}$ – Minimizes Conduction Losses
- PCB Footprint of 2.56mm^2
- ESD Protected Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: U-DFN1616-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Lead Free Plating (NiPdAu Finish over Copper Leadframe).e4
- Terminals: Solderable per MIL-STD-202, Method 208
- Weight: 0.003 grams (Approximate)

U-DFN1616-6 (Type K)



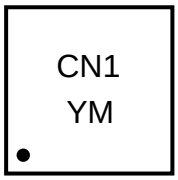
Top View | Bottom View | Device Symbol | Top View Pin-Out

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2120UFCL-7	U-DFN1616-6 (Type K)	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



CN1 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Date Code Key

Year	2019	2020	2021	2022	2023	2024	2025	2026
Code	G	H	I	J	K	L	M	N

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 6) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	1.8 1.4	A
Pulsed Drain Current (380µs Pulse, 1% Duty Cycle) (Note 7)			I_{DM}	10	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	0.7	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	0.45	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	270	°C/W
Power Dissipation (Note 6)	P_D	1.16	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6)	$R_{\theta JA}$	108	°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}	20	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1.0	µA	V_{DS} = 16V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.3	—	1.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	57	100	mΩ	V_{GS} = 4.5V, I_D = 3.6A
		—	69	140		V_{GS} = 2.5V, I_D = 3.1A
		—	74	200		V_{GS} = 1.8V, I_D = 1A
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 1.6A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	130	—	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	26	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	18	—	pF	
Gate Resistance	R_g	—	2.7	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	1.4	—	nC	V_{DS} = 10V, I_D = 3.6A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	2.8	—	nC	
Gate-Source Charge	Q_{gs}	—	0.1	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.5	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	0.6	—	ns	V_{DD} = 10V, V_{GS} = 4.5V, I_D = 1A, R_G = 6Ω, R_L = 10Ω
Turn-On Rise Time	t_R	—	2.7	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	4.2	—	ns	
Turn-Off Fall Time	t_F	—	1.7	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	10	—	ns	I_F = 4A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	1.0	—	nC	

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. Repetitive rating, pulse width limited by junction temperature.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

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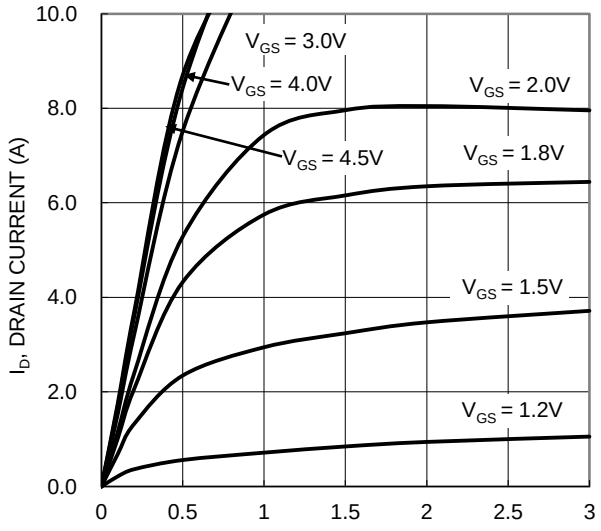


Figure 1. Typical Output Characteristic

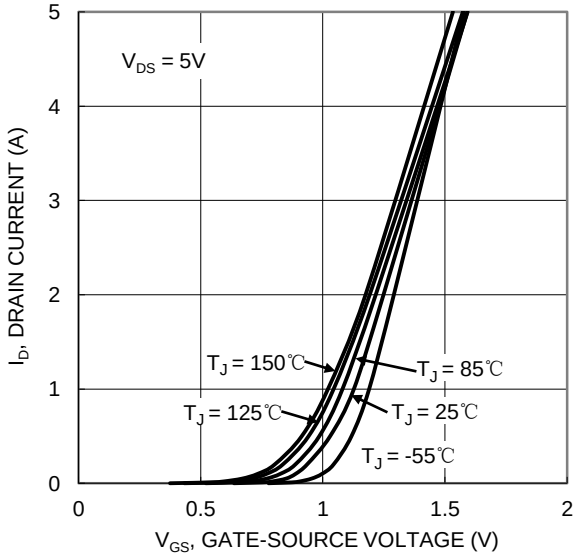


Figure 2. Typical Transfer Characteristic

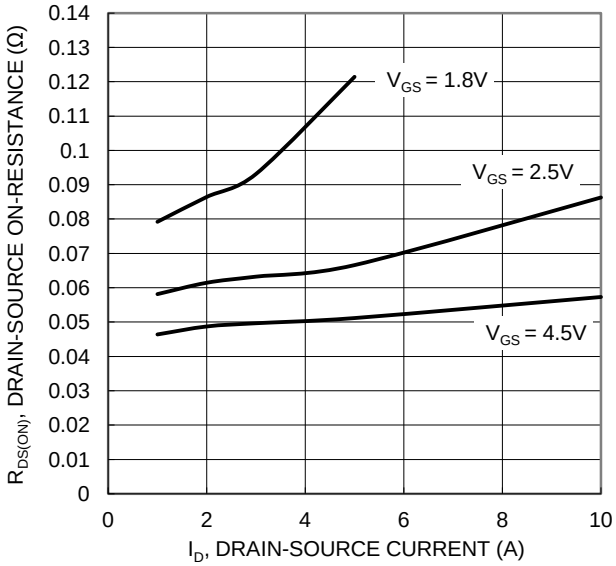


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

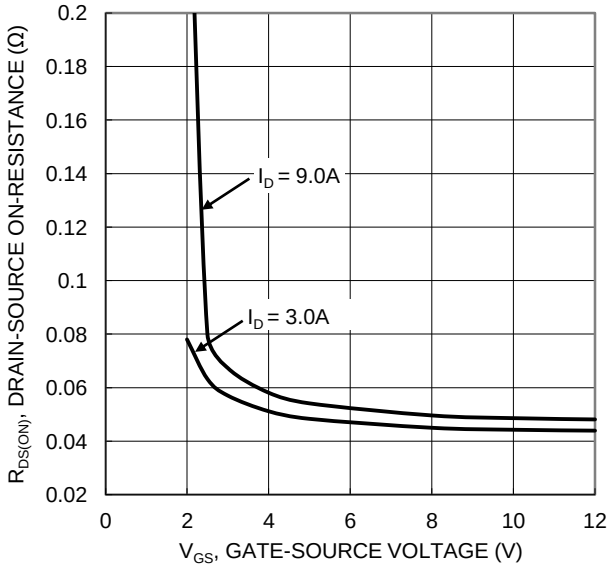


Figure 4. Typical Transfer Characteristic

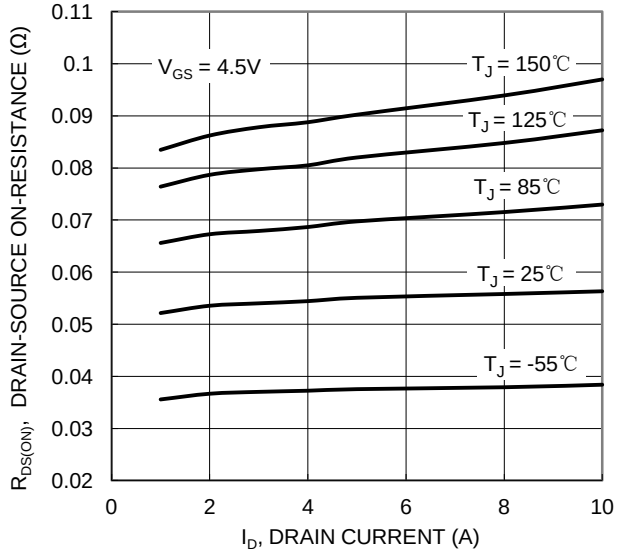


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

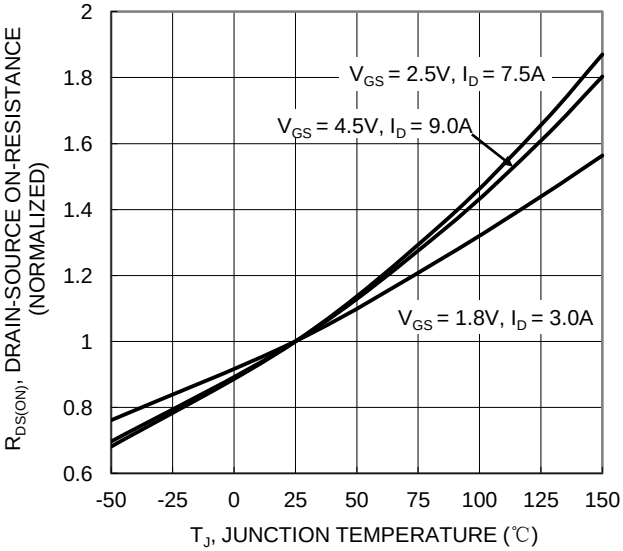


Figure 6. On-Resistance Variation with Temperature

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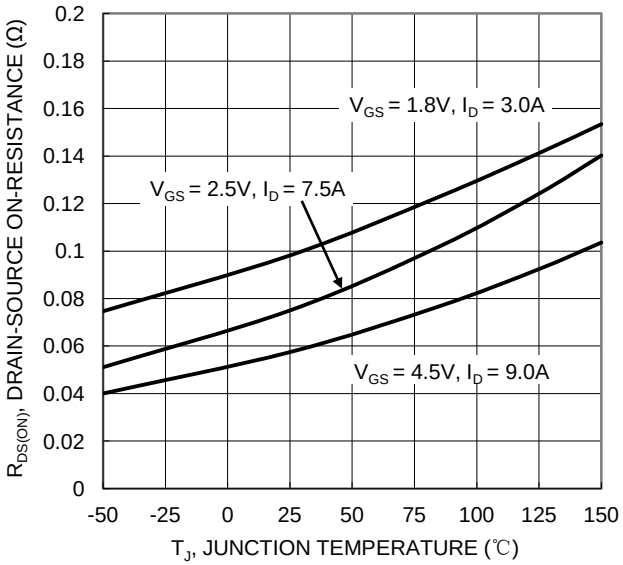


Figure 7. On-Resistance Variation with Temperature

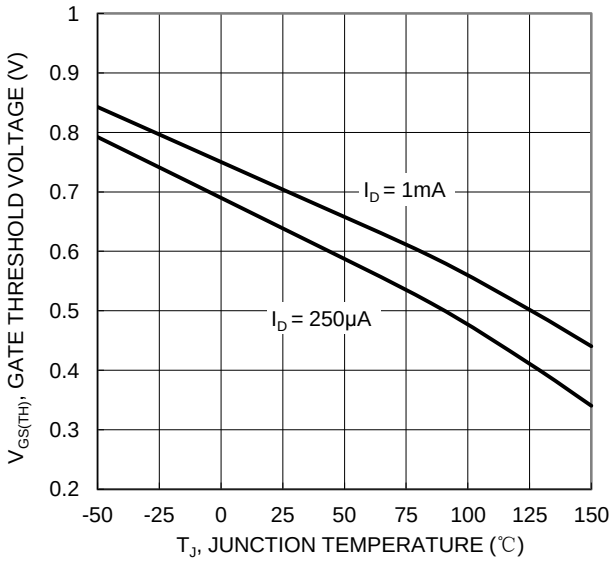


Figure 8. Gate Threshold Variation vs. Junction Temperature

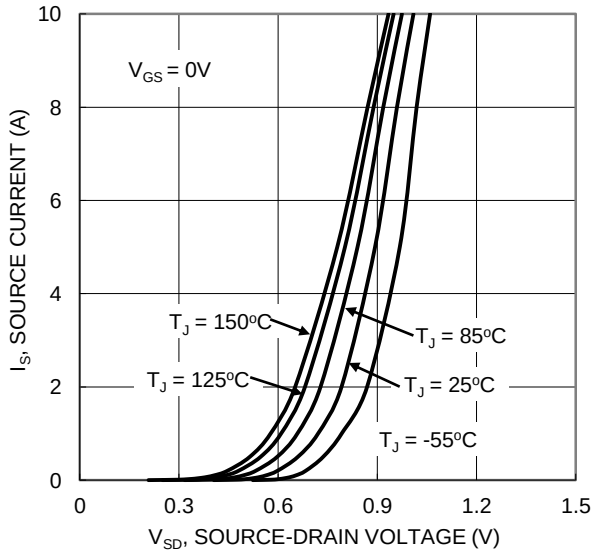


Figure 9. Diode Forward Voltage vs. Current

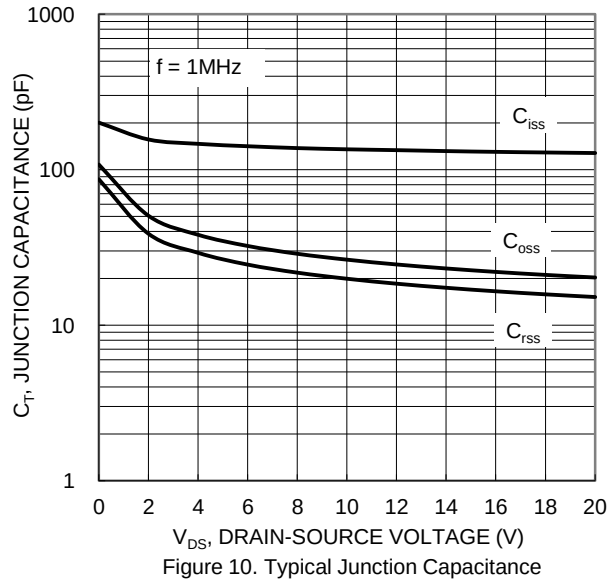


Figure 10. Typical Junction Capacitance

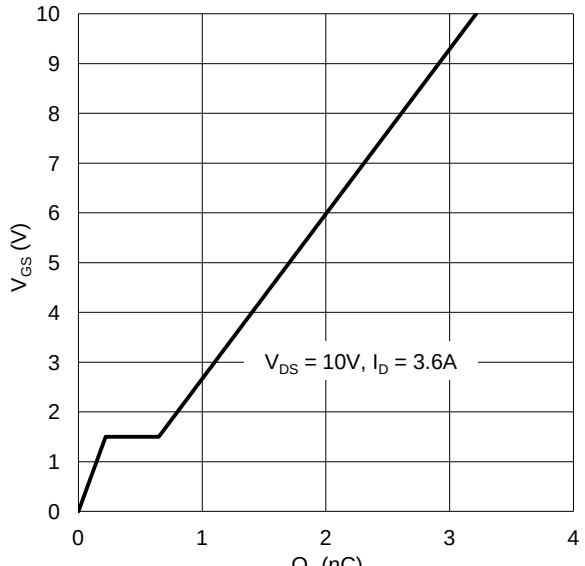


Figure 11. Gate Charge

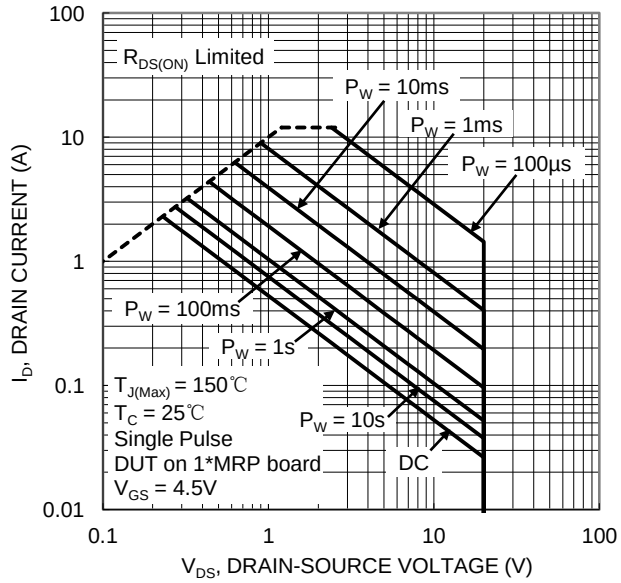


Figure 12. SOA, Safe Operation Area

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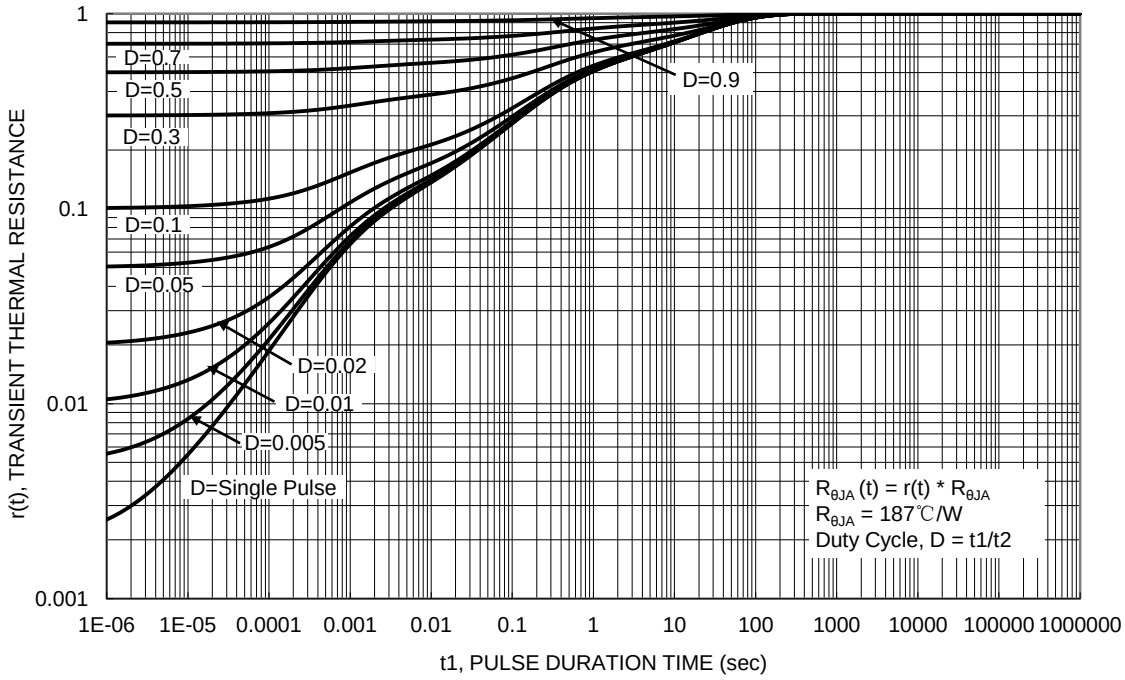


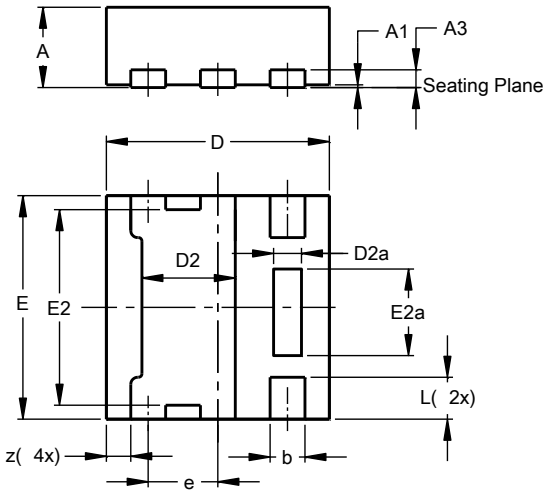
Figure 13. Transient Thermal Resistance

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Package Outline Dimensions

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

U-DFN1616-6 (Type K)

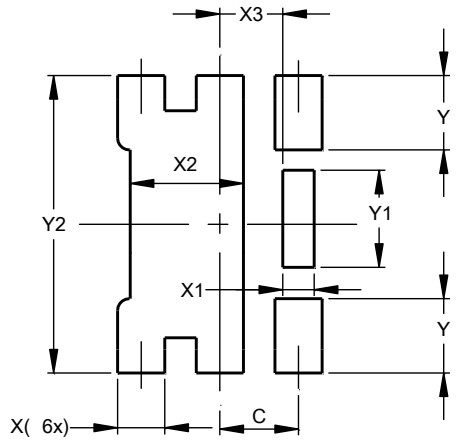


U-DFN1616-6 (Type K)			
Dim	**Min**	**Max**	**Typ**
A	0.55	0.60	0.575
A1	0.00	0.05	0.02
A3	--	--	0.13
b	0.20	0.30	0.25
D	1.55	1.65	1.60
D2	0.57	0.77	0.67
D2a	0.10	0.30	0.20
e	--	--	0.50
E	1.55	1.65	1.60
E2	1.30	1.50	1.40
E2a	0.52	0.72	0.62
L	0.25	0.35	0.30
z	--	--	0.175
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN1616-6 (Type K)



Dimensions	Value (in mm)
C	0.500
X	0.300
X1	0.200
X2	0.720
X3	0.400
Y	0.475
Y1	0.620
Y2	1.900

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