Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D Max T_A = +25°C
30V	20mΩ @ V_{GS} = 10V	7.6A
	32mΩ @ V_{GS} = 4.5V	6.0A

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
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

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.

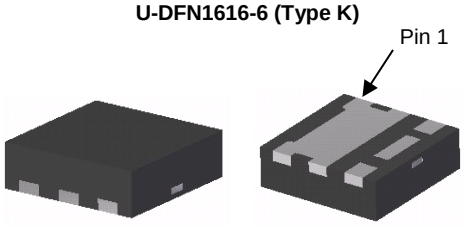
Mechanical Data

- Case: U-DFN1616-6 (Type K)
- 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).
- Terminals: Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.003 grams (Approximate)

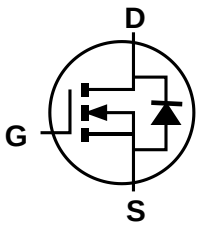
Applications

- Power Management Functions
- Loadswitch

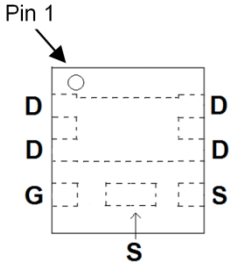
U-DFN1616-6 (Type K)



Top View | Bottom View



Device Symbol



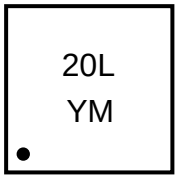
Top View
Pin-Out

Ordering Information (Note 4)

Product	Case	Packaging
DMT3020LFCL-7	U-DFN1616-6	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



20L = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: D = 2016)
M = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021
Code	C	D	E	F	G	H	I

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}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	7.6 6.0	A
Pulsed Drain Current (Note 7)			I_{DM}	40	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	2	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	0.6	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	207	°C/W
Power Dissipation (Note 6)	P_D	1.7	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	73	°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}	30	—	—	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}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	1.6	3.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	15 25	20 32	mΩ	V_{GS} = 10V, I_D = 9A V_{GS} = 4.5V, I_D = 7A
Diode Forward Voltage	V_{SD}	—	0.78	1.0	V	V_{GS} = 0V, I_S = 2A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{ISS}	—	393	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{OSS}	—	173	—	pF	
Reverse Transfer Capacitance	C_{RSS}	—	27	—	pF	
Gate Resistance	R_G	—	1.1	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 10V)	Q_G	—	7.0	—	nC	V_{DS} = 15V, I_D = 9A
Total Gate Charge (V_{GS} = 4.5V)	Q_G	—	3.6	—	nC	
Gate-Source Charge	Q_{GS}	—	0.9	—	nC	
Gate-Drain Charge	Q_{GD}	—	1.5	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	1.8	—	ns	V_{DD} = 15V, V_{GS} = 10V, I_D = 9A, R_G = 6Ω
Turn-On Rise Time	t_R	—	1.9	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	7.5	—	ns	
Turn-Off Fall Time	t_F	—	2.4	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	10	—	ns	I_F = 9A, dI/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q_{RR}	—	2.6	—	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 1-inch 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.
10. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.

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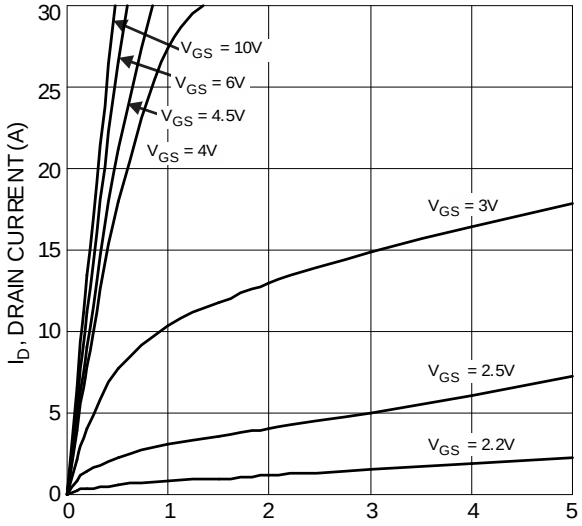


Figure 1 Typical Output Characteristic

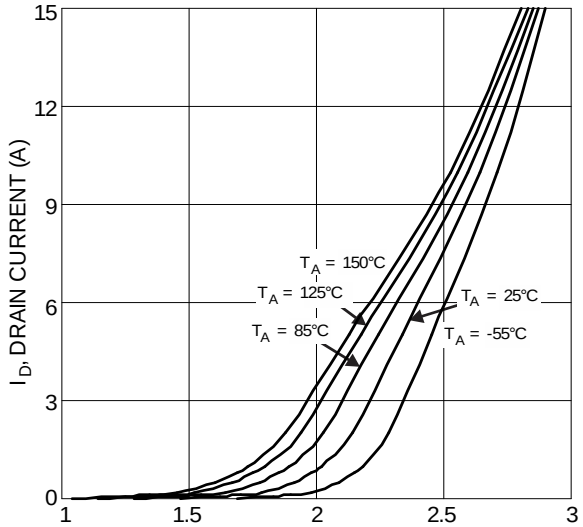


Figure 2 Typical Transfer Characteristics

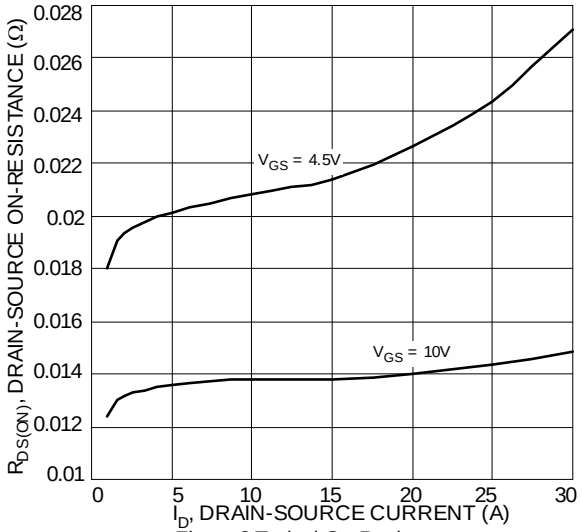


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

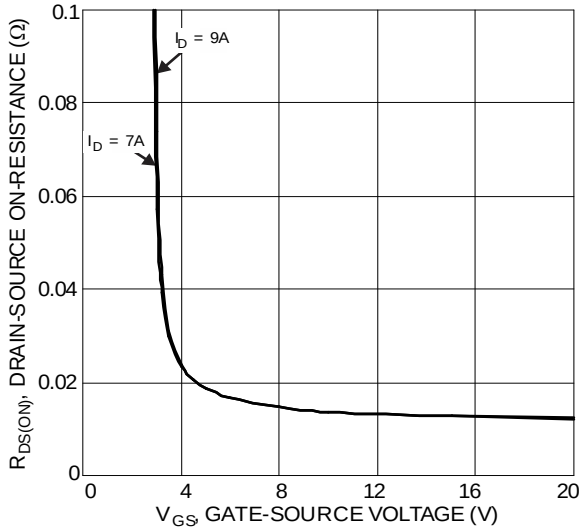


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

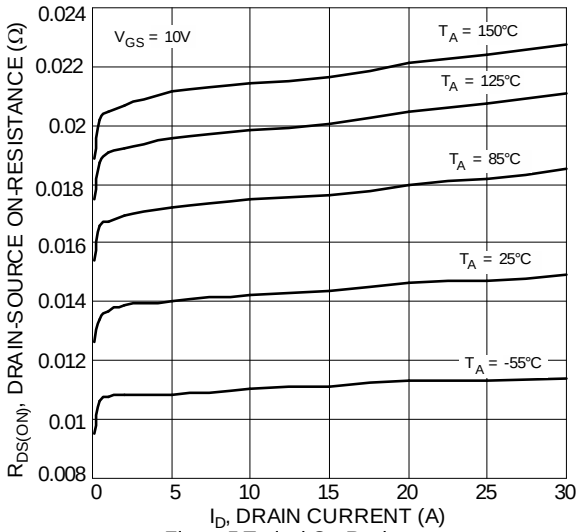


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

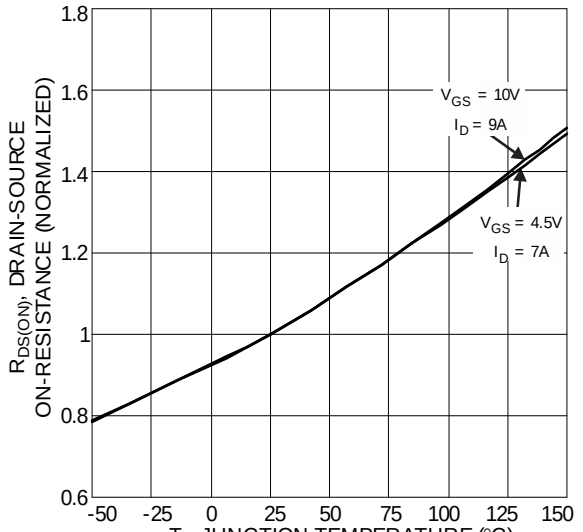


Figure 6 On-Resistance Variation with Temperature

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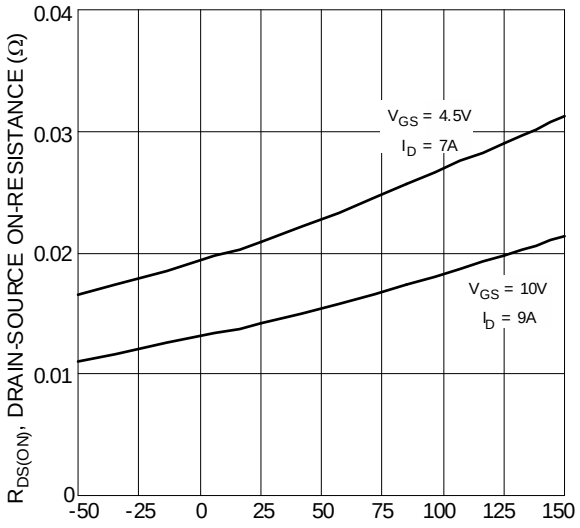


Figure 7 On-Resistance Variation with Temperature

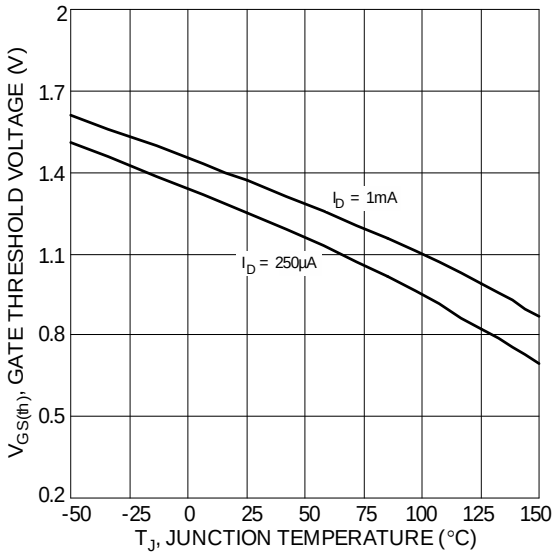


Figure 8 Gate Threshold Variation vs. Ambient Temperature

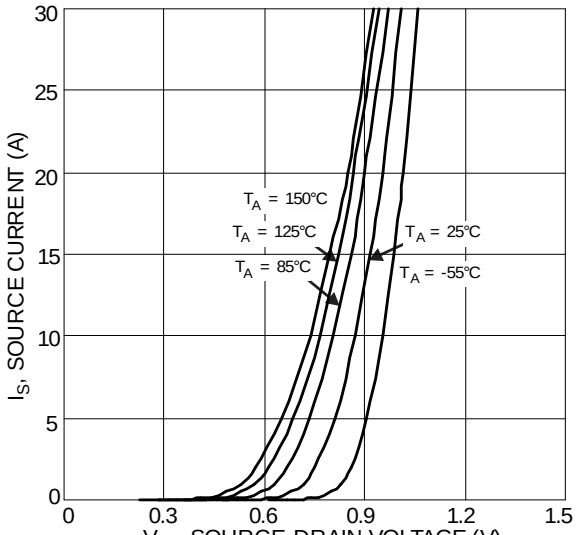


Figure 9 Diode Forward Voltage vs. Current

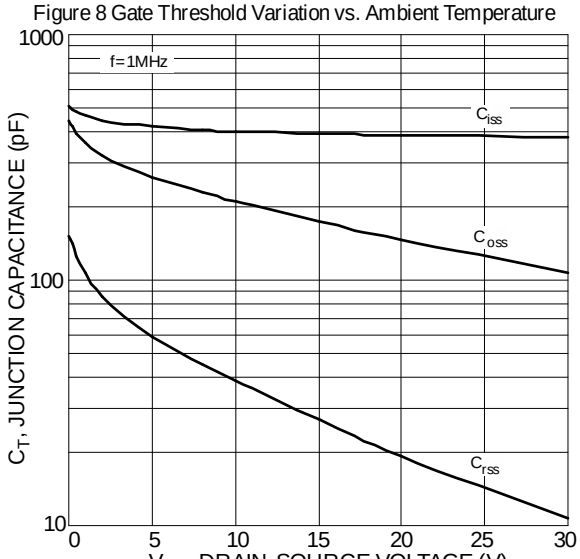


Figure 10 Typical Junction Capacitance

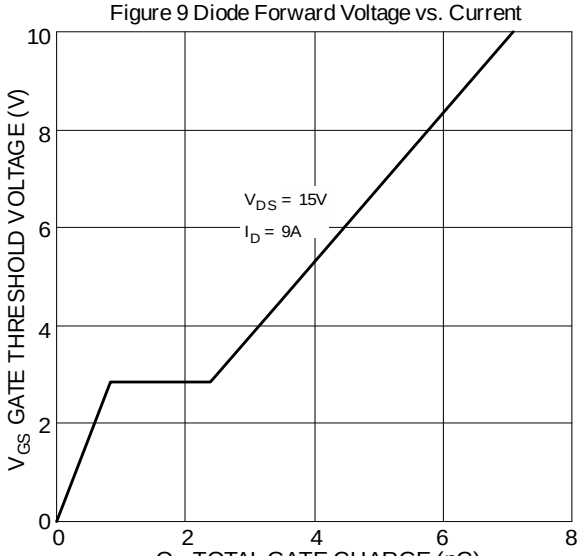


Figure 11 Gate Charge

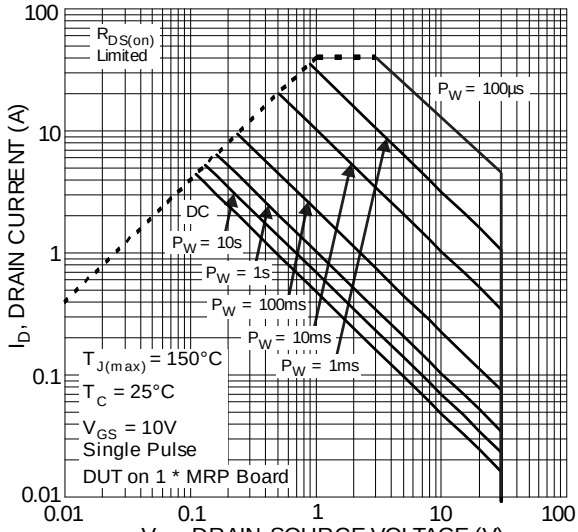


Figure 12 SOA, Safe Operation Area

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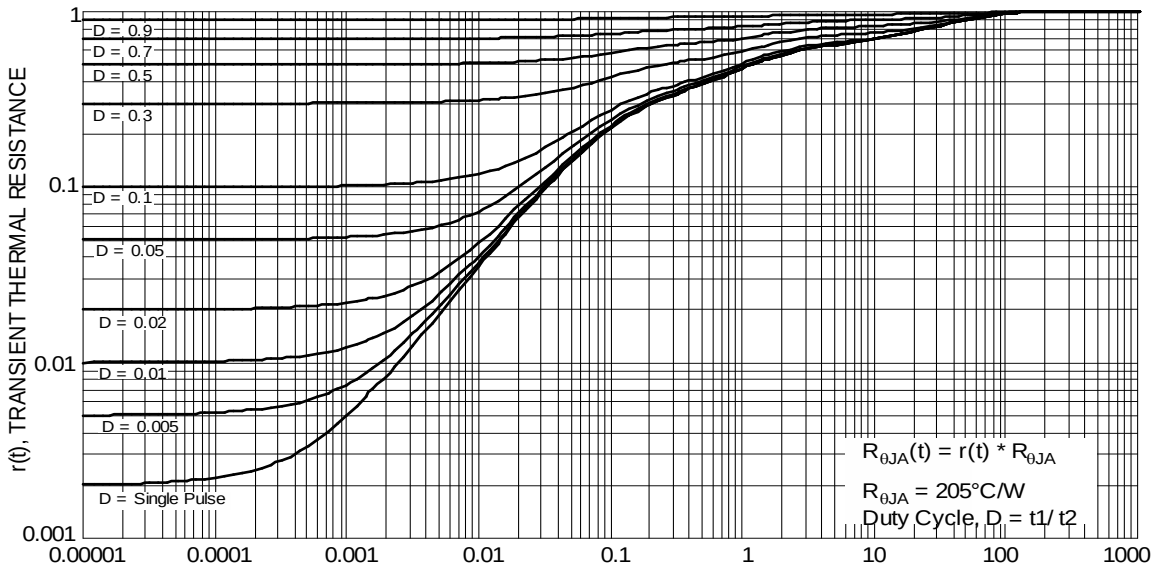


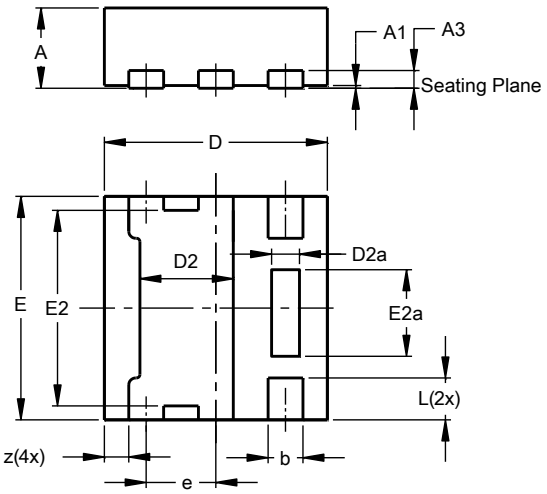
Figure 13 Transient Thermal Resistance

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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)

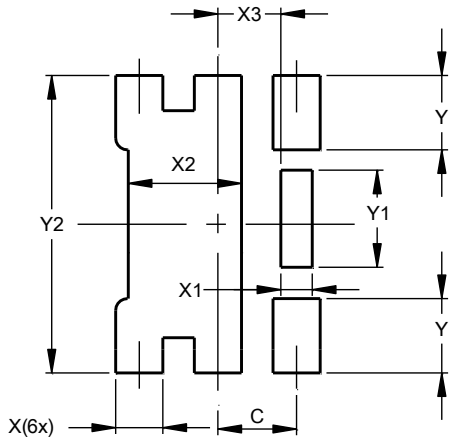


U-DFN1616-6 (Type K)			
Dim	**Min**	**Max**	**Typ**
A	0.55	0.60	0.575
A1	0.00	0.05	0.02
A3	–	–	0.13
b	0.20	0.30	0.25
D	1.55	1.65	1.60
D2	0.57	0.77	0.67
D2a	0.10	0.30	0.20
e	–	–	0.50
E	1.55	1.65	1.60
E2	1.30	1.50	1.40
E2a	0.52	0.72	0.62
L	0.25	0.35	0.30
z	–	–	0.175
All Dimensions in mm			

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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