

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	I_D Max $T_A = +25^\circ\text{C}$
30V	20m Ω @ $V_{GS} = 10\text{V}$	7.6A
	32m Ω @ $V_{GS} = 4.5\text{V}$	6.0A

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

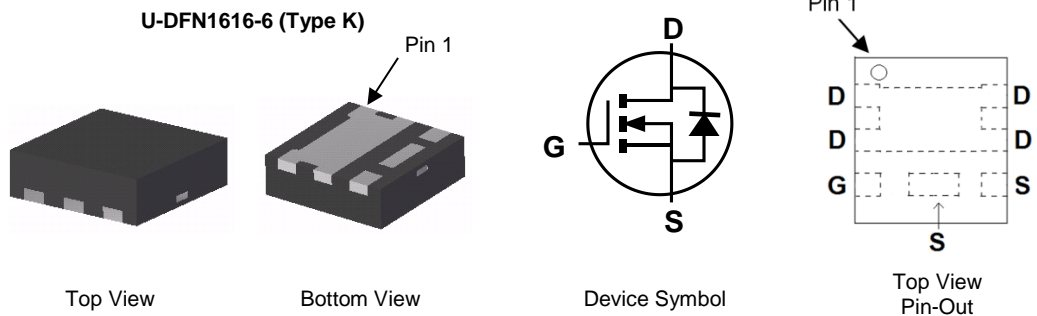
- Power Management Functions
- Loadswitch

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 2.56mm²
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

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)

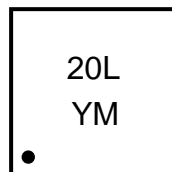


Ordering Information (Note 4)

Product	Case	Packaging
DMT3020LFCL-7	U-DFN1616-6	3,000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - 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 Code	2015	2016	2017	2018	2019	2020	2021
Code	C	D	E	F	G	H	I

Month Code	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 (@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	I _D	Steady State T _A = +25°C	7.6
		T _A = +70°C	6.0
Pulsed Drain Current (Note 7)	I _{DM}	40	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	2	A

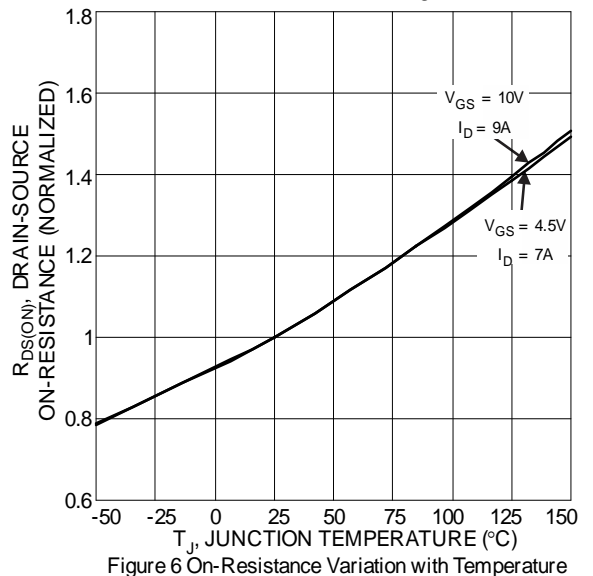
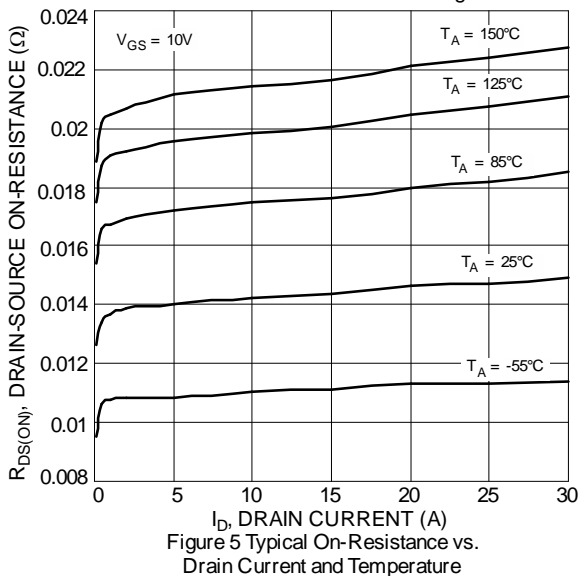
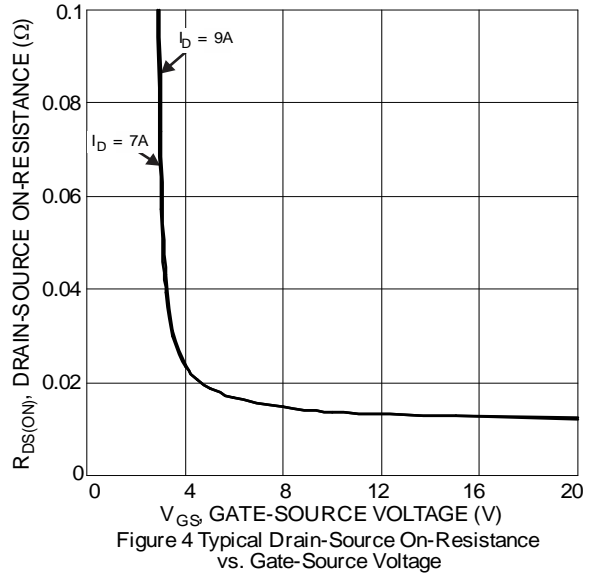
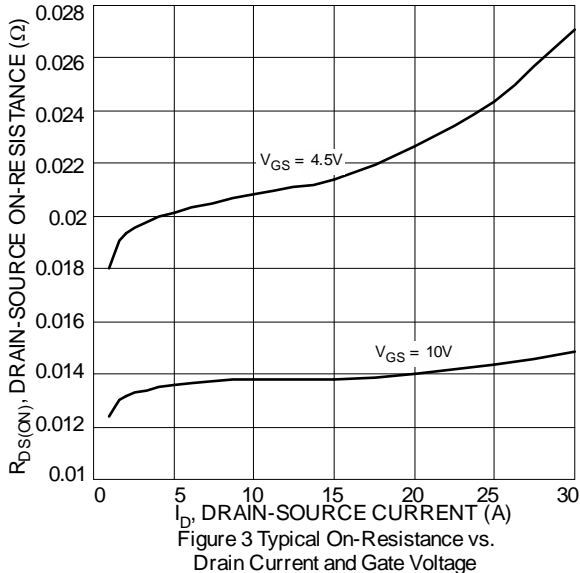
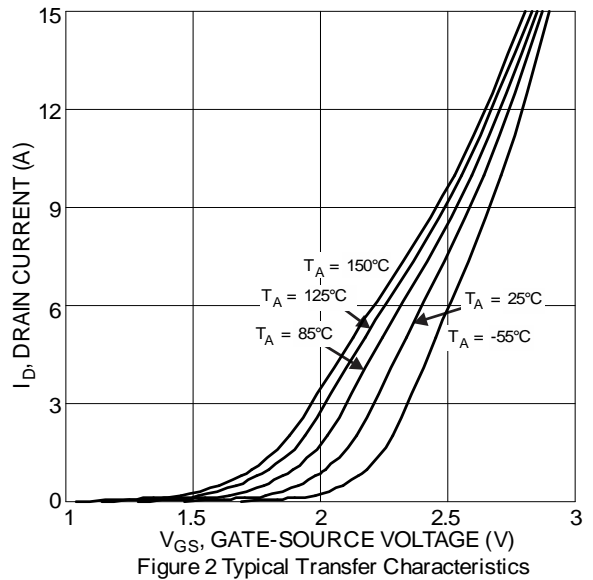
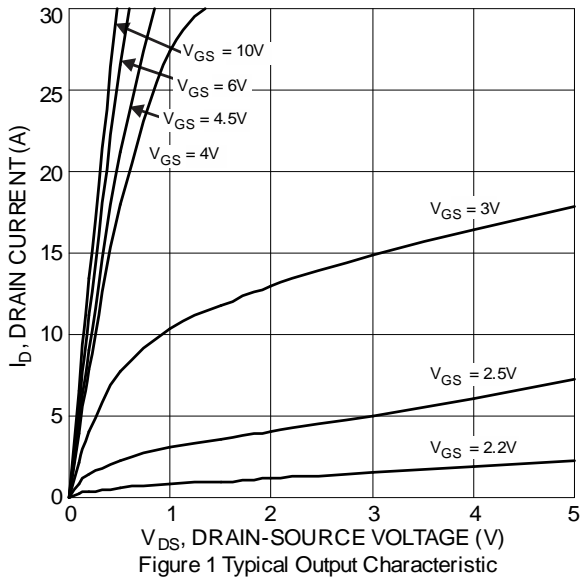
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	0.6	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	207	°C/W
Power Dissipation (Note 6)	P _D	1.7	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	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	20	mΩ	V _{GS} = 10V, I _D = 9A
			25	32		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	
Turn-On Rise Time	t _R	—	1.9	—	ns	V _{DD} = 15V, V _{GS} = 10V, I _D = 9A R _G = 6Ω
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:
- 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 1-inch square copper plate.
 - Repetitive rating, pulse width limited by junction temperature.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.



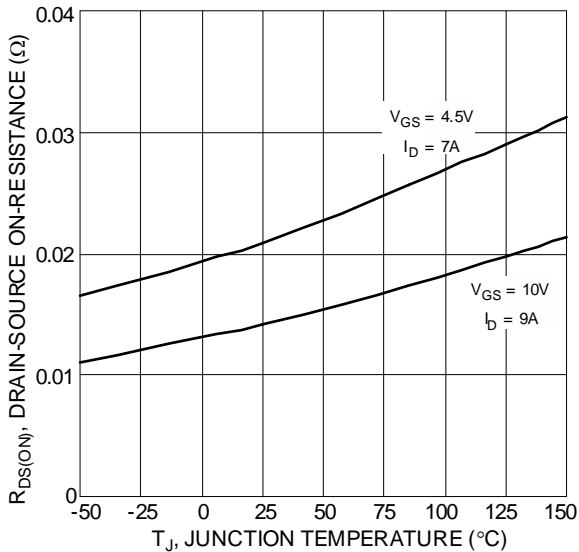


Figure 7 On-Resistance Variation with Temperature

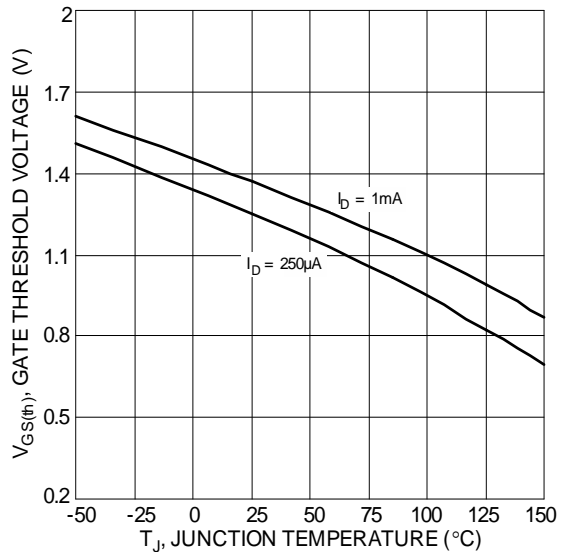


Figure 8 Gate Threshold Variation vs. Ambient Temperature

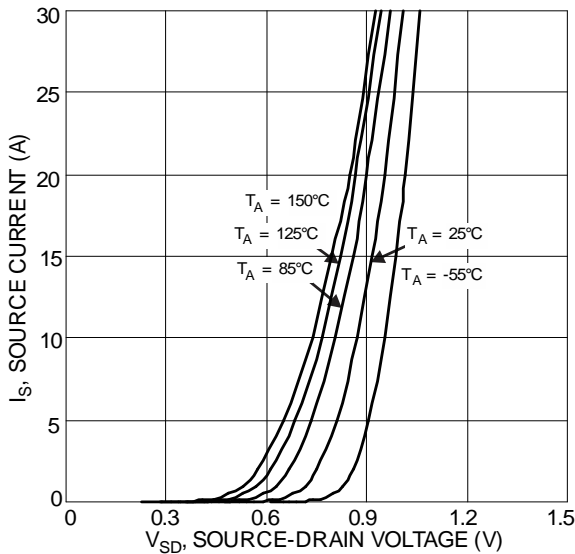


Figure 9 Diode Forward Voltage vs. Current

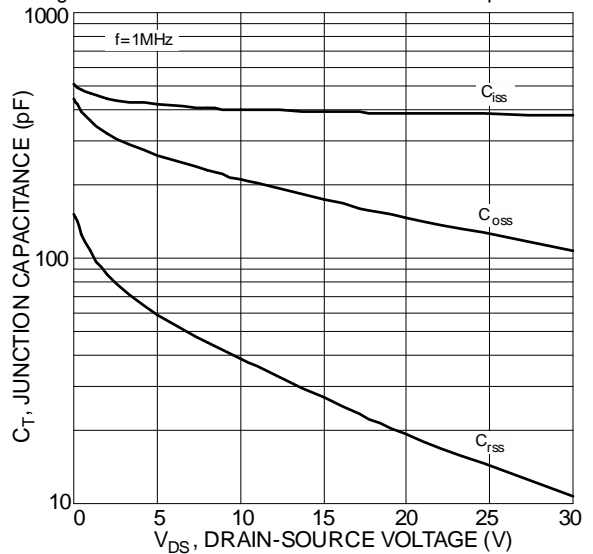


Figure 10 Typical Junction Capacitance

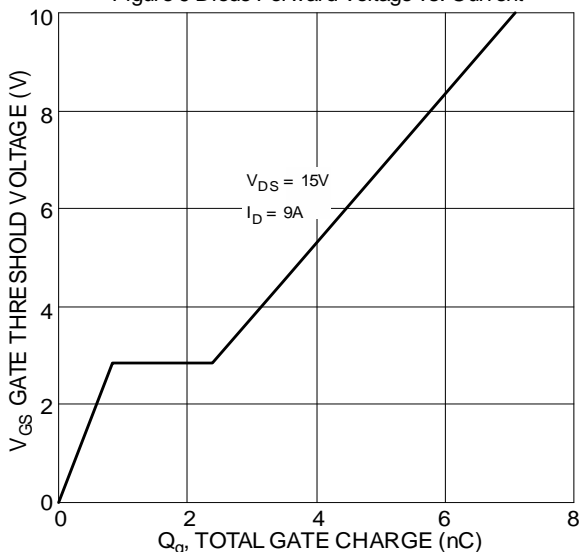


Figure 11 Gate Charge

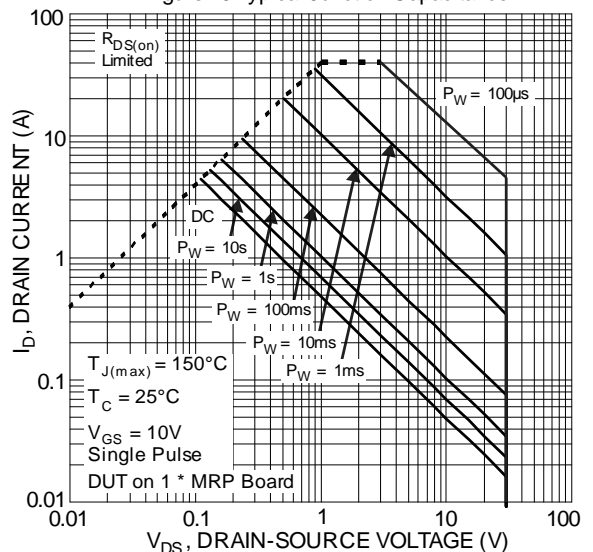


Figure 12 SOA, Safe Operation Area

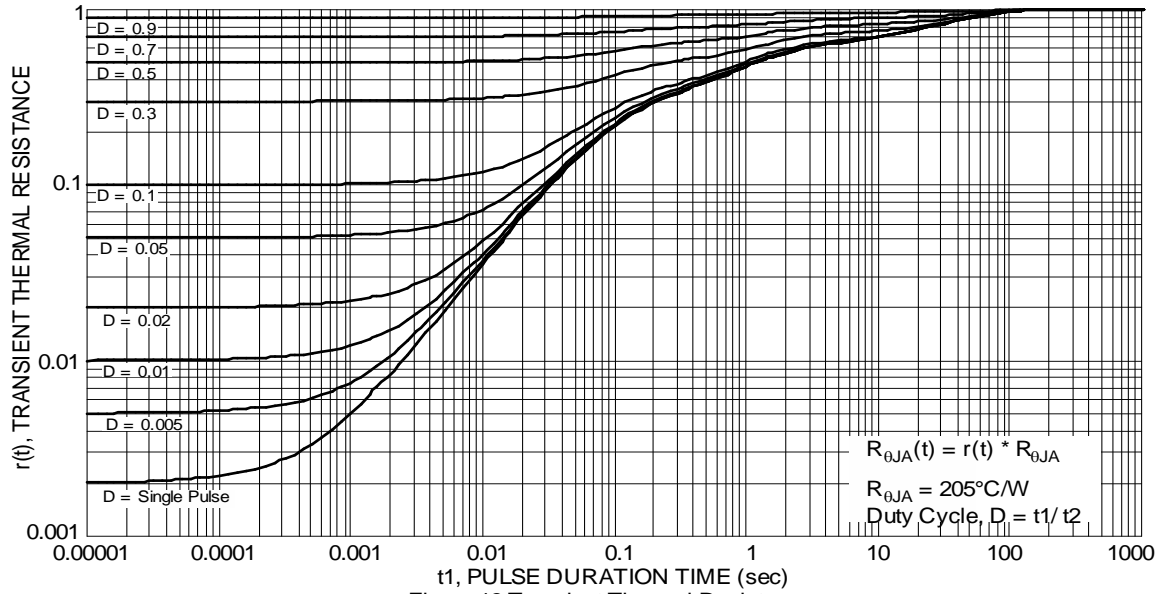
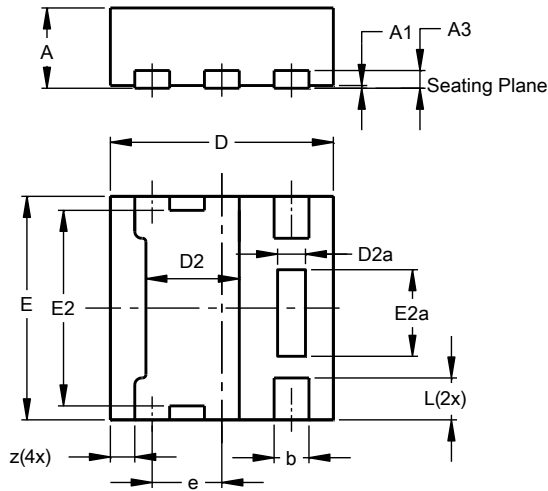


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

U-DFN1616-6 (Type K)

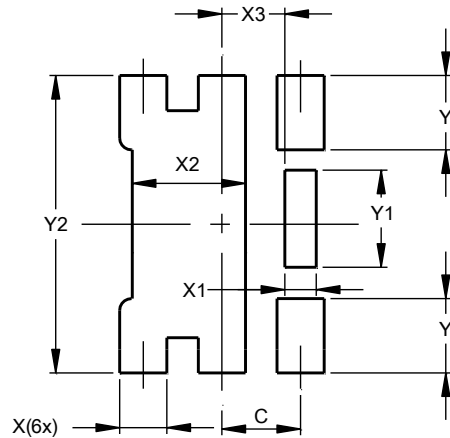


U-DFN1616-6 (Type K)			
Dim	Min	Max	Typ
A	0.55	0.60	0.575
A1	0.00	0.05	0.02
A3	-	-	0.13
b	0.20	0.30	0.25
D	1.55	1.65	1.60
D2	0.57	0.77	0.67
D2a	0.10	0.30	0.20
e	-	-	0.50
E	1.55	1.65	1.60
E2	1.30	1.50	1.40
E2a	0.52	0.72	0.62
L	0.25	0.35	0.30
z	-	-	0.175
All Dimensions in mm			

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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