

DUAL P-CHANNEL ENHANCEMENT MODE MOSFET
Summary

BV _{DSS}	R _{DS(ON)} max	I _D max
-20V	200mΩ @ V _{GS} = -4.5V	-1.7A
	290mΩ @ V _{GS} = -2.5V	-1.3A
	390mΩ @ V _{GS} = -1.8V	-1.1A
	650mΩ @ V _{GS} = -1.5V	-0.5A

Description

This device provides a high performance, low R_{DS(ON)} P-Channel MOSFET in the thermally and spatially efficient U-DFN1616-6 (Type F) package. The low R_{DS(ON)} of this MOSFET ensures conduction losses are kept making it ideal for use in the following applications.

Applications

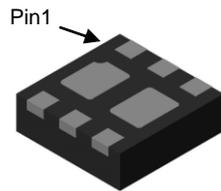
- Battery Disconnect Switch
- Load Switch for Power Management Functions

Features

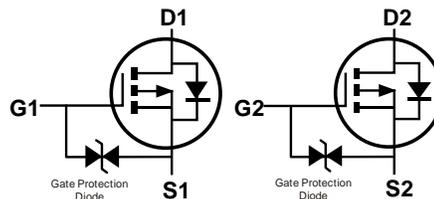
- Typical Off Board Profile of 0.5mm - Ideally Suited for Thin Applications
- Low R_{DS(ON)} – Minimizes Conduction Losses
- PCB Footprint of 2.56mm²
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. “Green” Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**
- ESD Protected Gate**

Mechanical Data

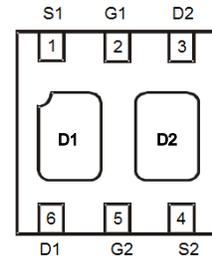
- Case: U-DFN1616-6 (Type F)
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu. Solderable per MIL-STD-202, Method 208^{@4}
- Weight: 0.04 grams (Approximate)



Bottom View



Device Symbol

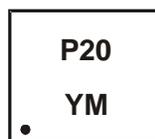


Pin Configuration Bottom View

Ordering Information (Note 4)

Part Number	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DMP2200UFCL-7	7	8	3,000

- 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information


P20 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: E = 2017)
 M = Month (ex: 9 = September)

Date Code Key

Year	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	E	F	G	H	I	J	K	L	M

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

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}	±8	V
Continuous Drain Current (Note 6)	I _D	@ T _A = +25°C -1.7	A
		@ T _A = +85°C -1.2	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	-8	A

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation	P _D	(Note 5) 0.66	W
		(Note 6) 1.58	
Thermal Resistance, Junction to Ambient	R _{θJA}	(Note 5) 193	°C/W
		(Note 6) 80	
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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	-20	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	µA	V _{DS} = -20V, V _{GS} = 0V
Gate-Body Leakage	I _{GSS}	—	—	±10	µA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	-0.4	—	-1.2	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	153	200	mΩ	V _{GS} = -4.5V, I _D = -2.0A V _{GS} = -2.5V, I _D = -1.2A V _{GS} = -1.8V, I _D = -0.24A V _{GS} = -1.5V, I _D = -0.18A
			220	290		
			260	390		
			360	650		
Diode Forward Voltage (Note 7)	V _{SD}	—	—	-1.2	V	V _{GS} = 0V, I _S = -0.6A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	184	—	pF	V _{DS} = -10V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	25.8	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	18.6	—	pF	
Total Gate Charge	Q _g	—	2.2	—	nC	V _{GS} = -4.5V, V _{DS} = -10V, I _D = -1.7A
Gate-Source Charge	Q _{gs}	—	0.4	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.5	—	nC	
SWITCHING CHARACTERISTICS (Note 8)						
Turn-On Delay Time	t _{D(ON)}	—	9.8	—	ns	V _{DD} = -10V, I _D = -1.5A, V _{GS} = -4.5V, R _{GEN} = 1Ω
Turn-Off Delay Time	t _{D(OFF)}	—	23	—	ns	
Turn-On Rise Time	t _R	—	87	—	ns	
Turn-Off Fall Time	t _F	—	41	—	ns	
Body Diode Reverse Recovery Time	t _{RR}	—	21.5	—	ns	I _F = -2A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{RR}	—	4.2	—	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 1inch square copper plate.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

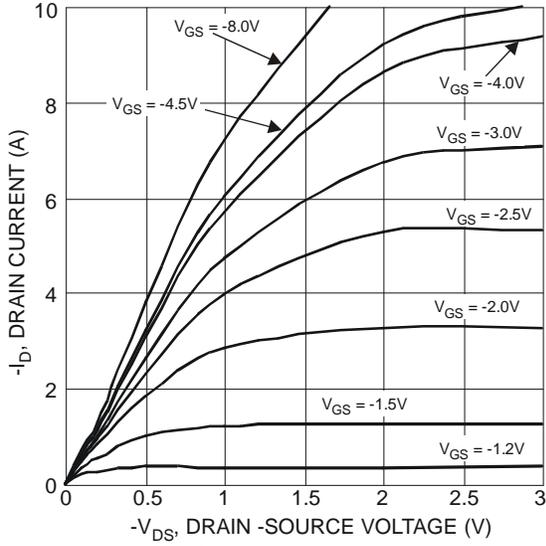


Figure 1 Typical Output Characteristics

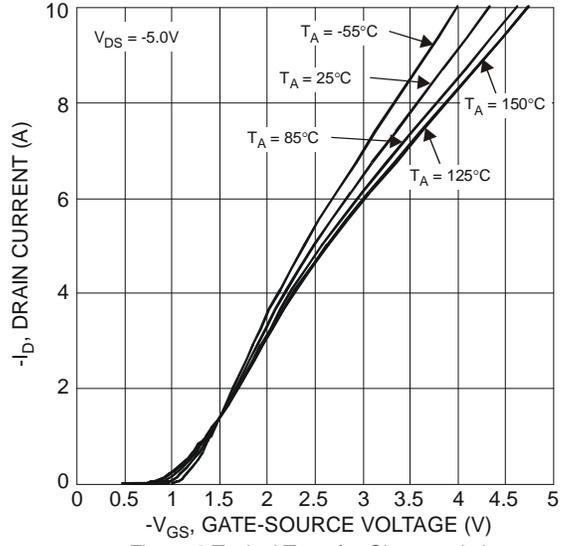


Figure 2 Typical Transfer Characteristics

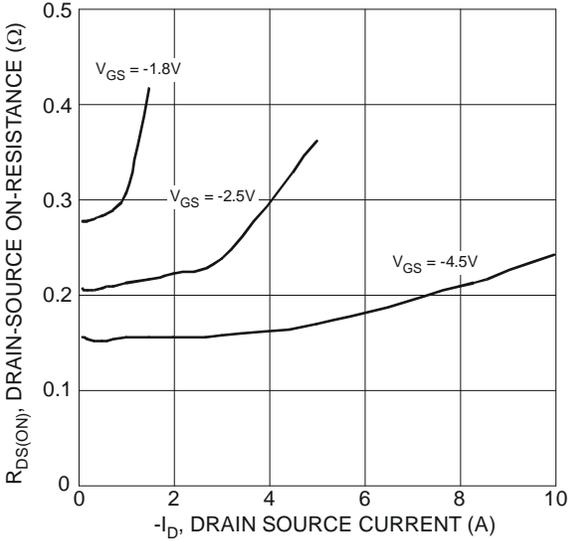


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

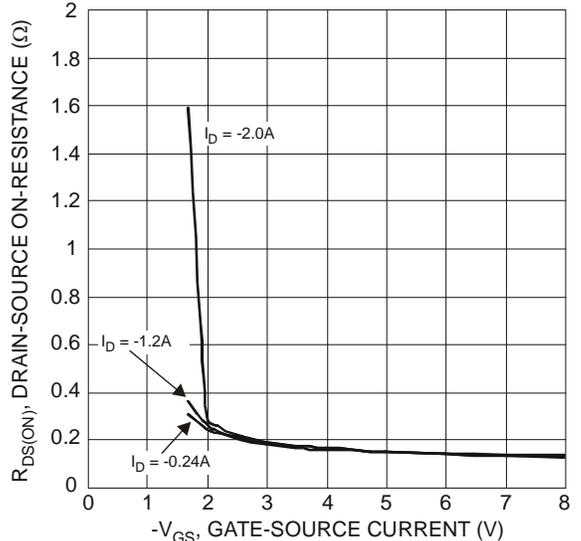


Figure 4 Typical Transfer Characteristics

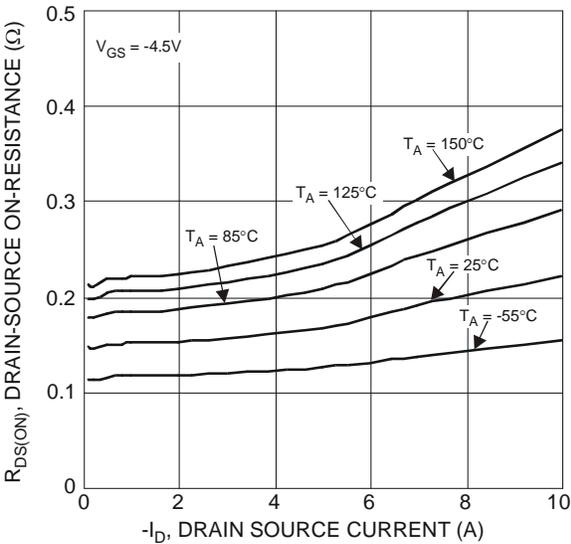


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

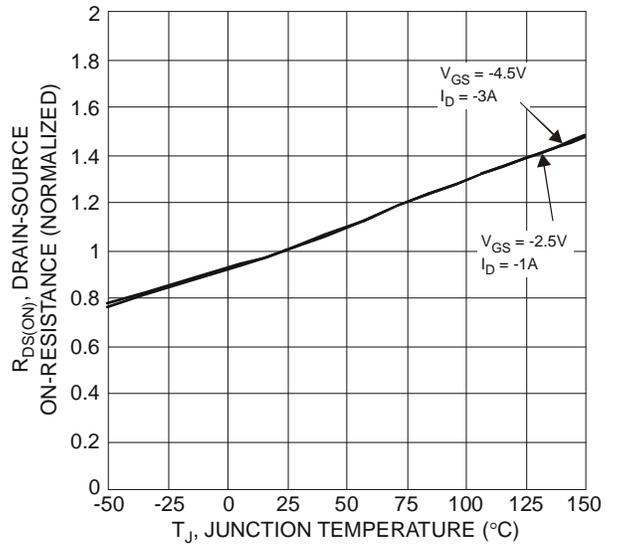


Figure 6 On-Resistance Variation with Temperature

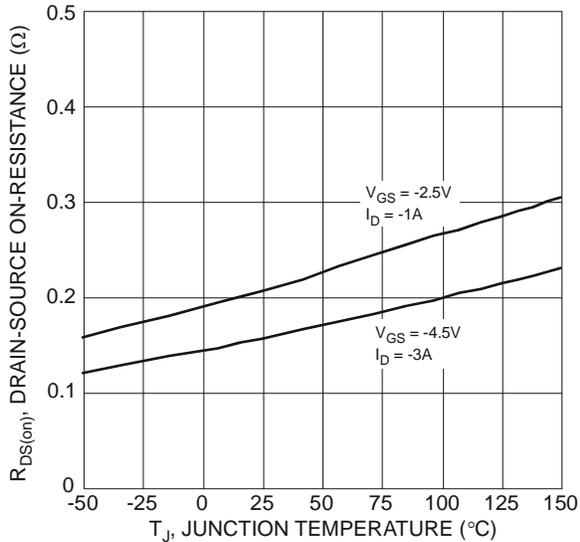


Figure 7 On-Resistance Variation with Temperature

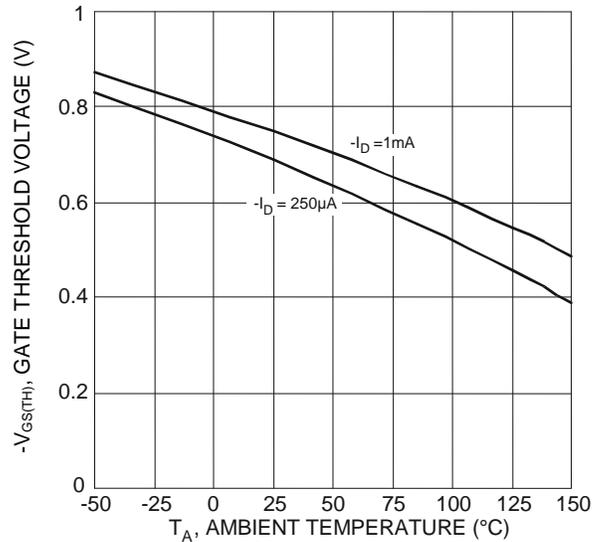


Figure 8 Gate Threshold Variation vs. Ambient Temperature

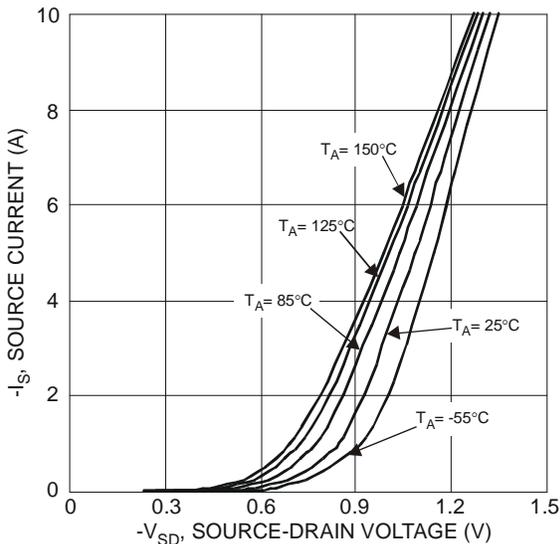


Figure 9 Diode Forward Voltage vs. Current

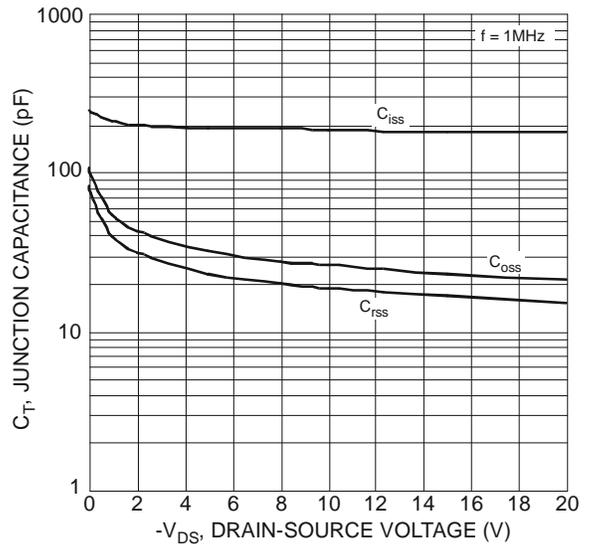


Figure 10 Typical Junction Capacitance

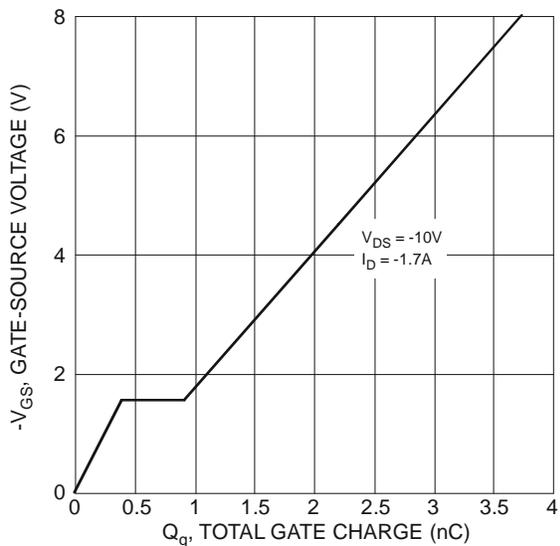


Figure 11 Gate-Charge Characteristics

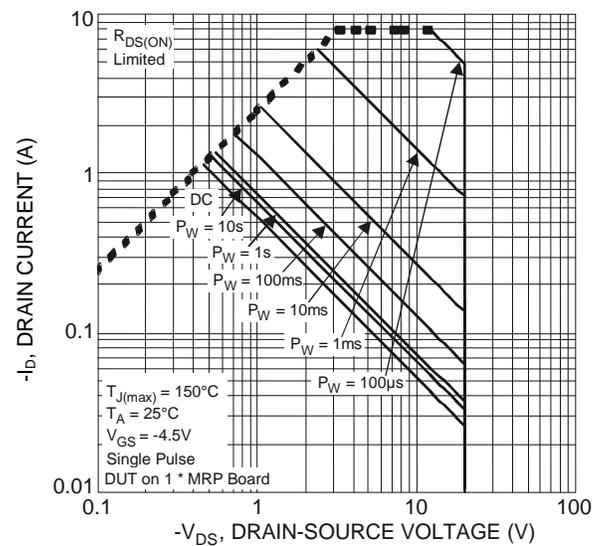


Figure 12 SOA, Safe Operation Area

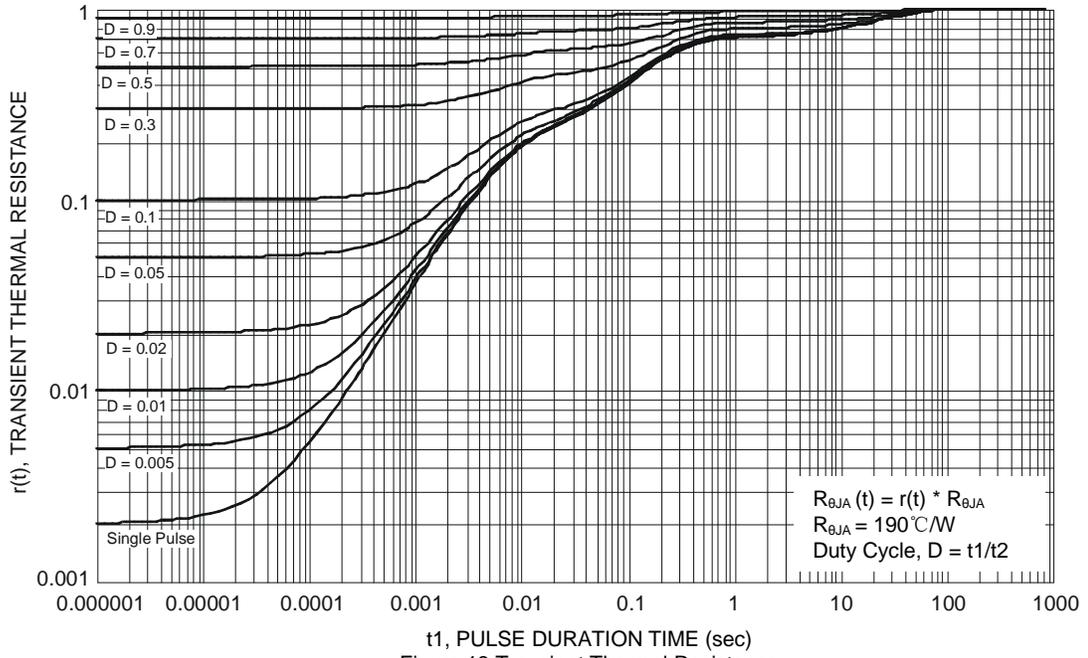
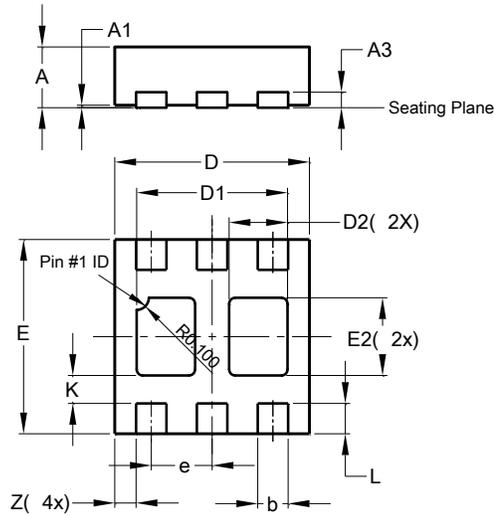


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

U-DFN1616-6 (Type F)

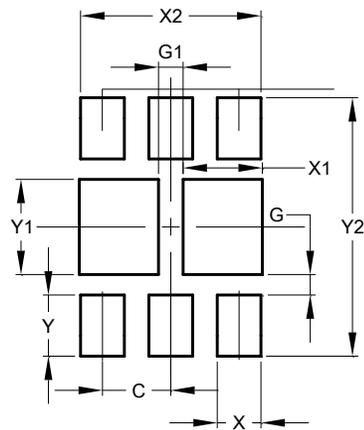


U-DFN1616-6 Type F			
Dim	Min	Max	Typ
A	0.45	0.55	0.50
A1	0	0.05	0.02
A3	—	—	0.127
b	0.20	0.30	0.25
D	1.55	1.65	1.60
D1	1.14	1.34	1.24
D2	0.38	0.58	0.48
E	1.55	1.65	1.60
E2	0.54	0.74	0.64
e	—	—	0.50
K	—	—	0.23
L	0.15	0.35	0.25
Z	—	—	0.175
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN1616-6 (Type F)



Dimensions	Value (in mm)
C	0.500
G	0.150
G1	0.180
X	0.320
X1	0.580
X2	1.320
Y	0.450
Y1	0.700
Y	1.900

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