

**DUAL P-CHANNEL ENHANCEMENT MODE MOSFET**
**Summary**

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max
-20V	200mΩ @ V <sub>GS</sub> = -4.5V	-1.7A
	290mΩ @ V <sub>GS</sub> = -2.5V	-1.3A
	390mΩ @ V <sub>GS</sub> = -1.8V	-1.1A
	650mΩ @ V <sub>GS</sub> = -1.5V	-0.5A

**Description**

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

**Applications**

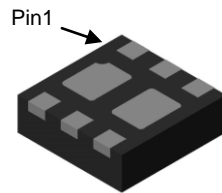
- Battery Disconnect Switch
- Load Switch for Power Management Functions

**Features**

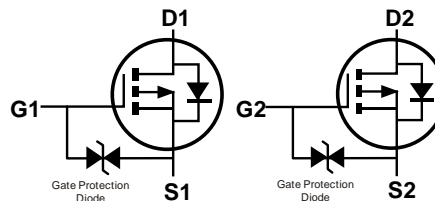
- Typical Off Board Profile of 0.5mm - Ideally Suited for Thin Applications
- Low R<sub>DS(ON)</sub> – Minimizes Conduction Losses
- PCB Footprint of 2.56mm<sup>2</sup>
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. “Green” Device (Note 3)**
- Qualified to AEC-Q101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

**Mechanical Data**

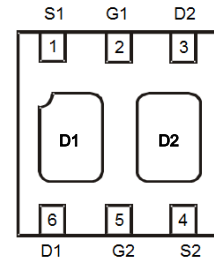
- Case: U-DFN1616-6 (Type F)
- Case Material: Molded Plastic, “Green” Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu. Solderable per MIL-STD-202, Method 208<sup>(4)</sup>
- Weight: 0.04 grams (Approximate)



Bottom View



Device Symbol

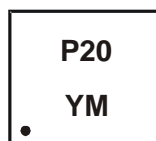


Pin Configuration Bottom View

**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](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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	-20	V
Gate-Source Voltage	V <sub>GSS</sub>	±8	V
Continuous Drain Current (Note 6)	I <sub>D</sub>	@T <sub>A</sub> = +25°C -1.7	A
		@T <sub>A</sub> = +85°C -1.2	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	-8	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation	P <sub>D</sub>	(Note 5) 0.66	W
		(Note 6) 1.58	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5) 193	°C/W
		(Note 6) 80	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	µA	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±10	µA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.4	—	-1.2	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	153	200	mΩ	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.0A V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -1.2A V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -0.24A V <sub>GS</sub> = -1.5V, I <sub>D</sub> = -0.18A
			220	290		
			260	390		
			360	650		
Diode Forward Voltage (Note 7)	V <sub>SD</sub>	—	—	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -0.6A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	184	—	pF	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	25.8	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	18.6	—	pF	
Total Gate Charge	Q <sub>g</sub>	—	2.2	—	nC	V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -10V, I <sub>D</sub> = -1.7A
Gate-Source Charge	Q <sub>gs</sub>	—	0.4	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	0.5	—	nC	
<b>SWITCHING CHARACTERISTICS (Note 8)</b>						
Turn-On Delay Time	t <sub>D(ON)</sub>	—	9.8	—	ns	V <sub>DD</sub> = -10V, I <sub>D</sub> = -1.5A, V <sub>GS</sub> = -4.5V, R <sub>GEN</sub> = 1Ω
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	23	—	ns	
Turn-On Rise Time	t <sub>R</sub>	—	87	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	41	—	ns	
Body Diode Reverse Recovery Time	t <sub>RR</sub>	—	21.5	—	ns	I <sub>F</sub> = -2A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	—	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.

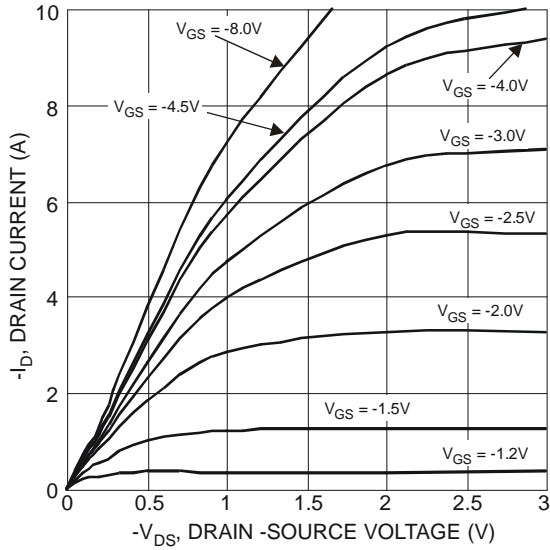


Figure 1 Typical Output Characteristics

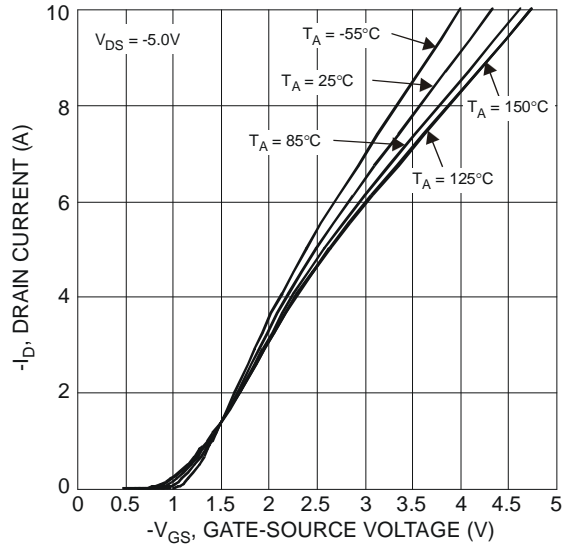


Figure 2 Typical Transfer Characteristics

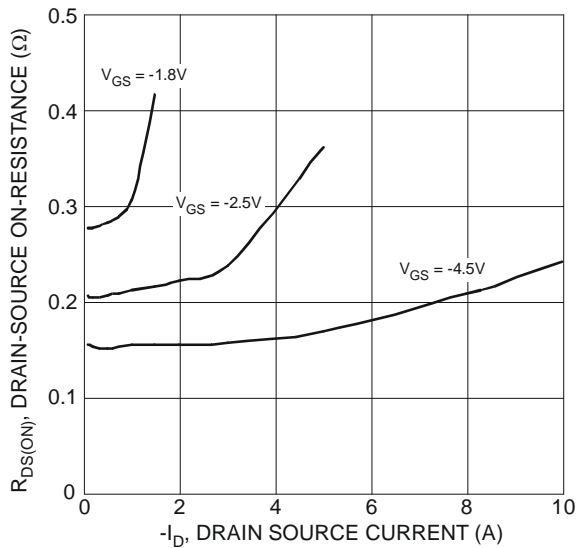


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

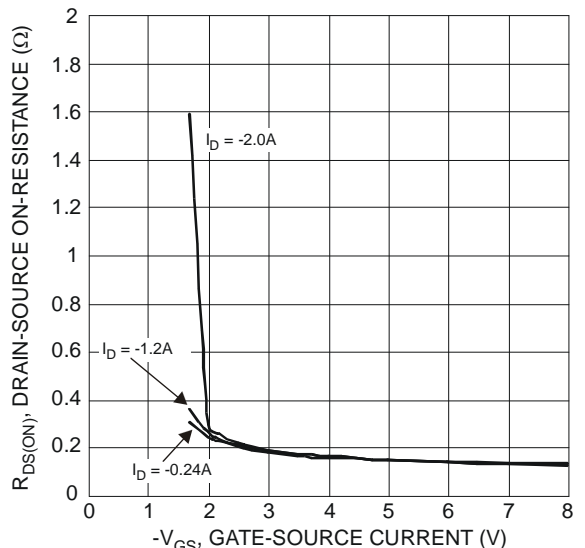


Figure 4 Typical Transfer Characteristics

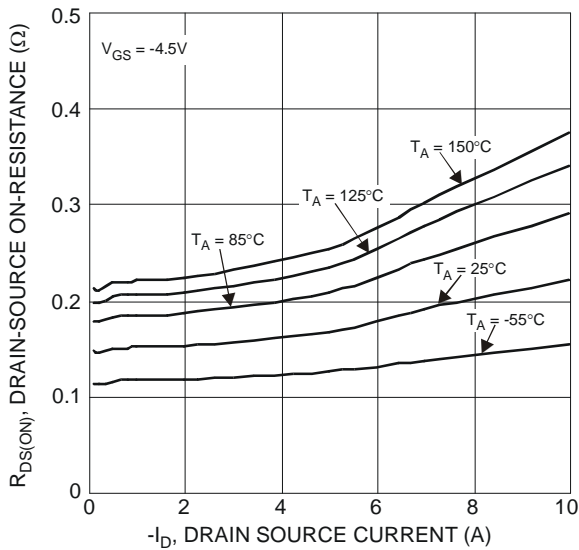


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

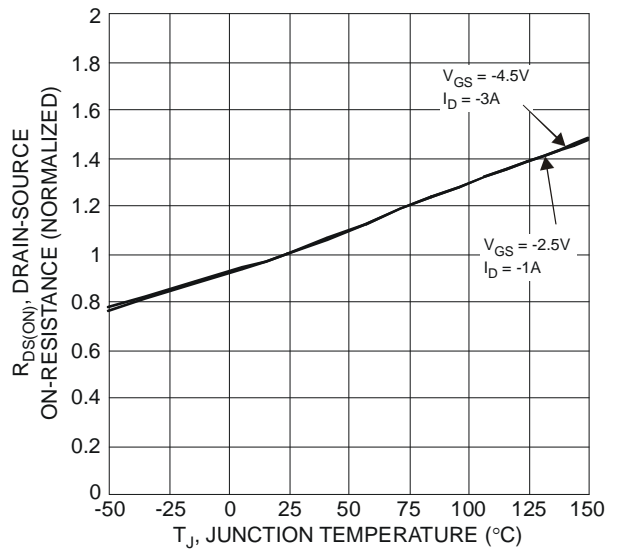


Figure 6 On-Resistance Variation with Temperature

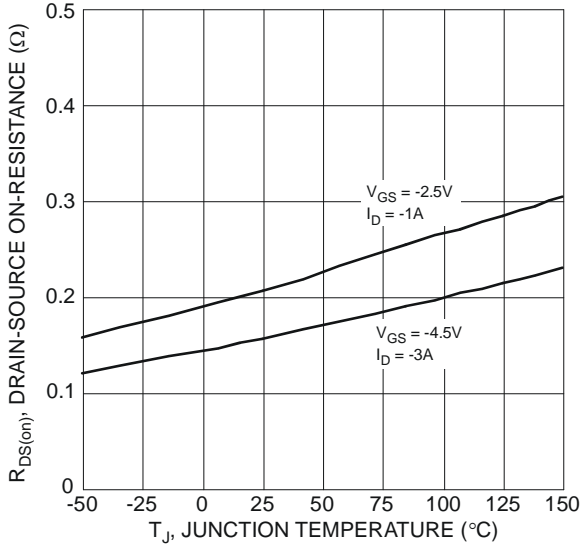


Figure 7 On-Resistance Variation with Temperature

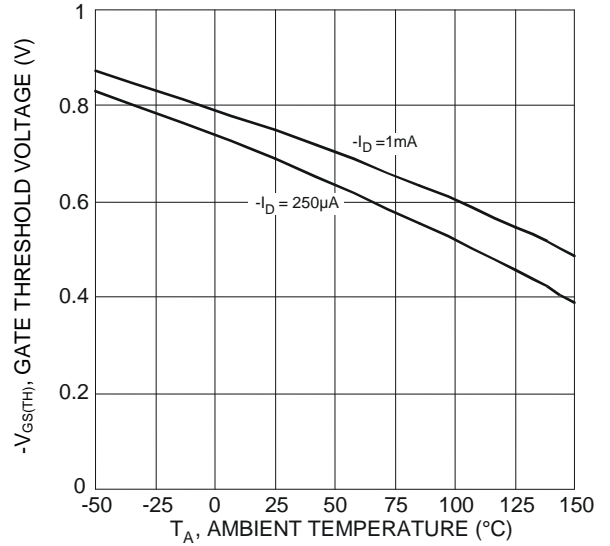


Figure 8 Gate Threshold Variation vs. Ambient Temperature

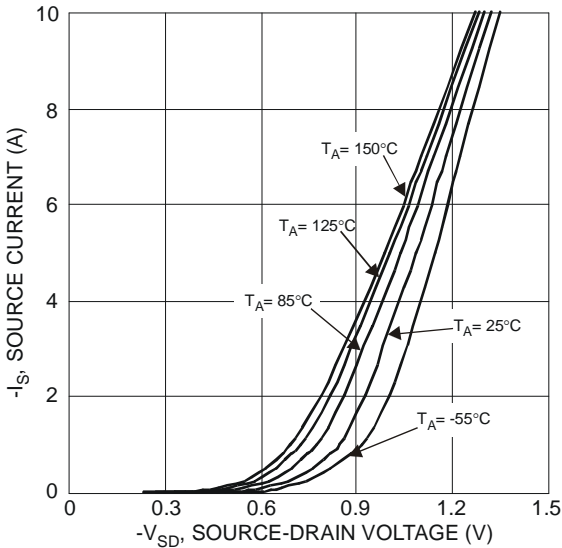


Figure 9 Diode Forward Voltage vs. Current

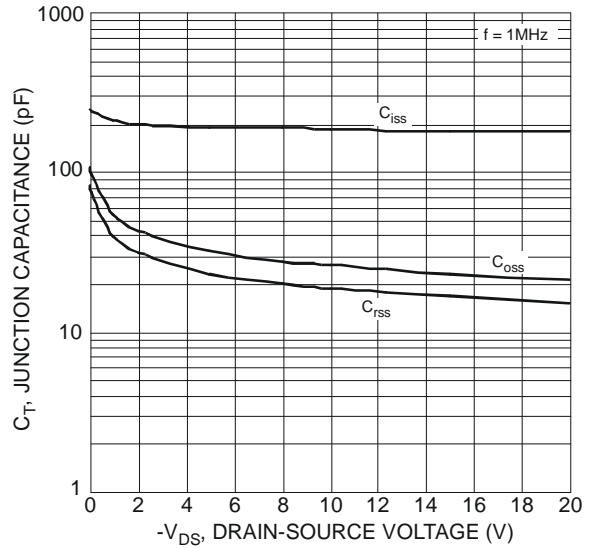


Figure 10 Typical Junction Capacitance

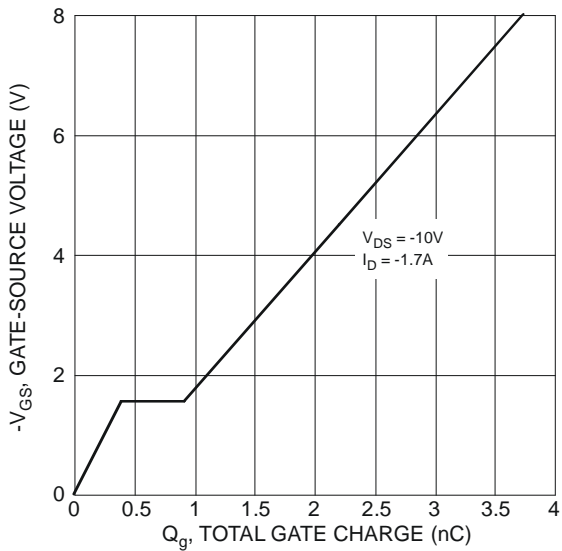


Figure 11 Gate-Charge Characteristics

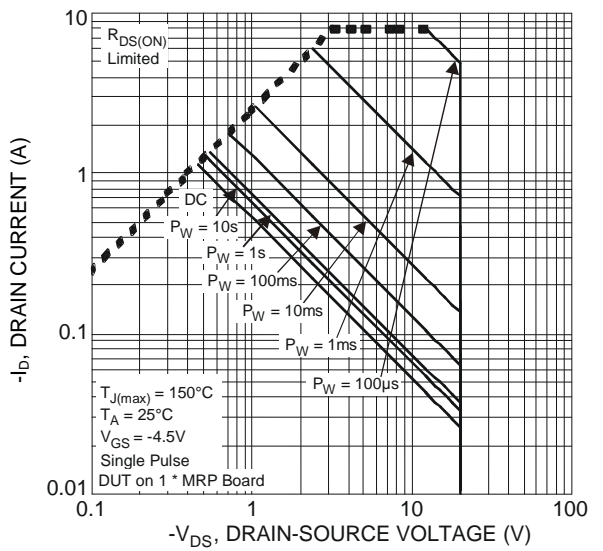


Figure 12 SOA, Safe Operation Area

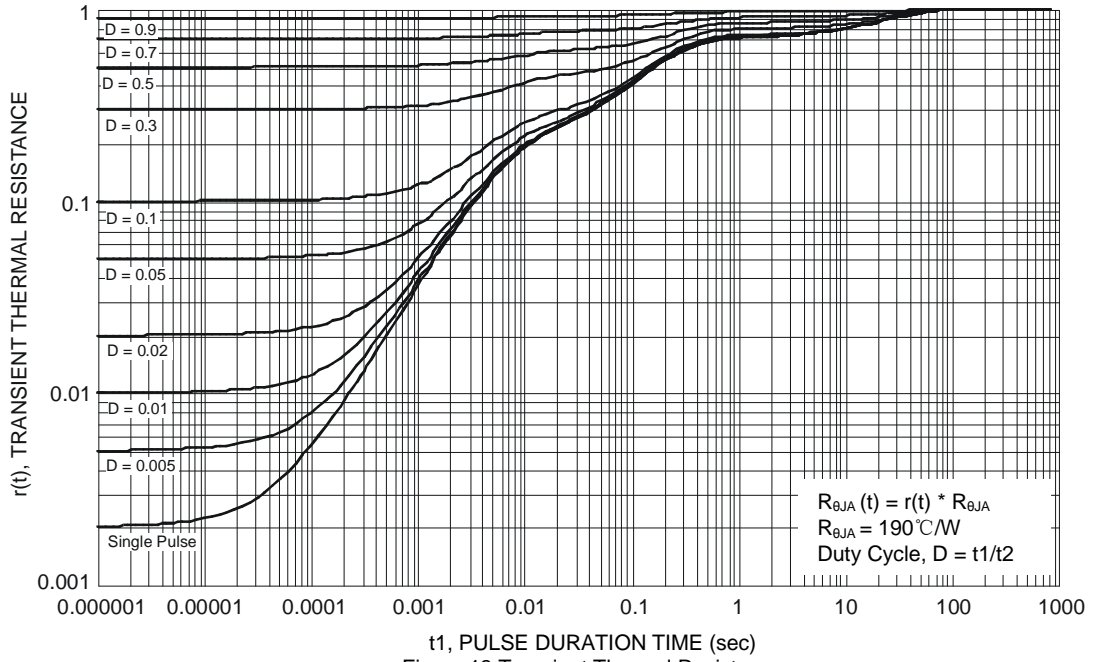
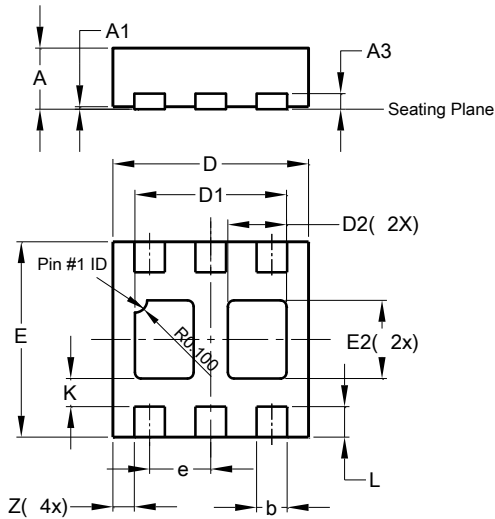


Figure 13 Transient Thermal Resistance

**Package Outline Dimensions**

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

**U-DFN1616-6 (Type F)**

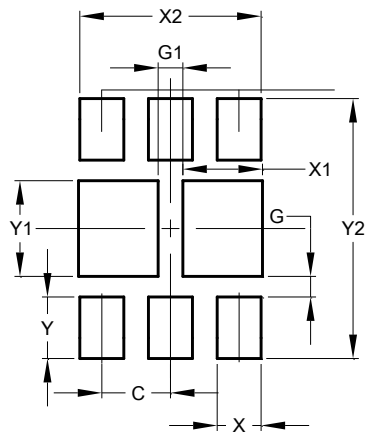


U-DFN1616-6 Type F			
Dim	Min	Max	Typ
A	0.45	0.55	0.50
A1	0	0.05	0.02
A3	—	—	0.127
b	0.20	0.30	0.25
D	1.55	1.65	1.60
D1	1.14	1.34	1.24
D2	0.38	0.58	0.48
E	1.55	1.65	1.60
E2	0.54	0.74	0.64
e	—	—	0.50
K	—	—	0.23
L	0.15	0.35	0.25
Z	—	—	0.175
All Dimensions in mm			

**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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