

## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = +25^\circ C$
60V	2Ω @ $V_{GS} = 4V$	400mA
	2.5Ω @ $V_{GS} = 2.5V$	350mA

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected**
- **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**
- **PPAP Capable (Note 4)**

## Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

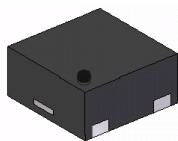
- Backlighting
- Power Management Functions
- DC-DC Converters

## Mechanical Data

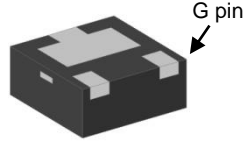
- Case: U-DFN1212-3 (Type C)
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E4)
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)



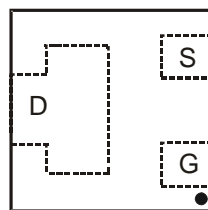
ESD PROTECTED



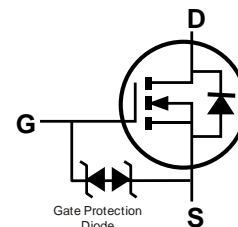
Top View



Bottom View



Pin-Out Top View



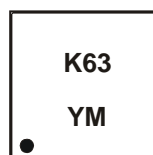
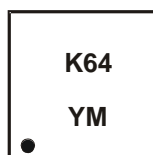
Equivalent Circuit

## Ordering Information (Note 5)

Part Number	Compliance	Case	Packaging
DMN62D1LFDQ-7	Standard	U-DFN1212-3 (Type C)	3000/Tape & Reel
DMN62D1LFDQ-13	Standard	U-DFN1212-3 (Type C)	10,000/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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
  5. For packaging details, see <http://www.diodes.com/products/packages.html>.

## Marking Information



K64 = Product Type Marking Code  
 K63 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: F = 2018)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	A	B	C	D	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>	60	V	
Gate-Source Voltage	V <sub>GSS</sub>	±20	V	
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4V	I <sub>D</sub>	T <sub>A</sub> = +25°C	400	mA
		T <sub>A</sub> = +70°C	310	
Pulsed Drain Current (Note 7)	I <sub>DM</sub>	1	A	

**Thermal Characteristics**

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	0.5	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 6)	R <sub>θJA</sub>	237	°C/W
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 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±5V, V <sub>DS</sub> = 0V
		—	—	±500	nA	V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V
		—	—	±2	μA	V <sub>GS</sub> = ±15V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.6	—	1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	0.8	2	Ω	V <sub>GS</sub> = 4V, I <sub>D</sub> = 100mA
		—	1	2.5		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 50mA
		—	1.4	3		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 50mA
		—	1.8	—		V <sub>GS</sub> = 1.5V, I <sub>D</sub> = 10mA
		—	—	—		—
Forward Transfer Admittance	Y <sub>fs</sub>	—	1.8	—	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 200mA
Diode Forward Voltage	V <sub>SD</sub>	—	0.8	1.3	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 115mA
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	36	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	4.6	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	3.6	—		
Gate Resistance	R <sub>g</sub>	—	59.8	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	0.55	—	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA
Gate-Source Charge	Q <sub>gs</sub>	—	0.08	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	0.12	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	2.1	—	ns	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 30V, R <sub>L</sub> = 150Ω, R <sub>G</sub> = 25Ω, I <sub>D</sub> = 200mA
Turn-On Rise Time	t <sub>R</sub>	—	2.8	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	21	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	13.9	—	ns	

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
  - Repetitive rating, pulse width limited by junction temperature.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

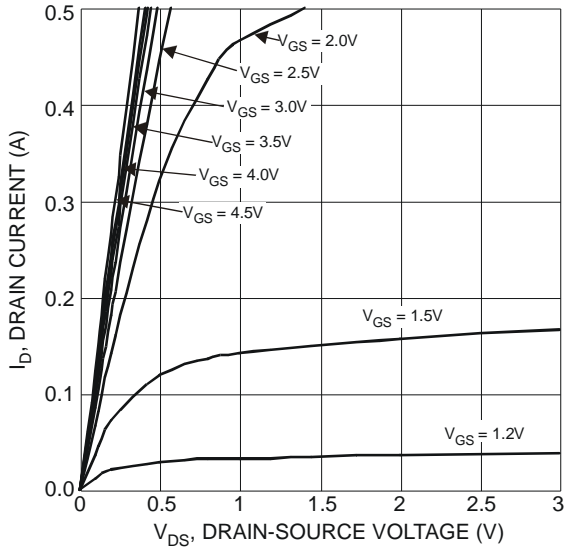


Figure 1 Typical Output Characteristics

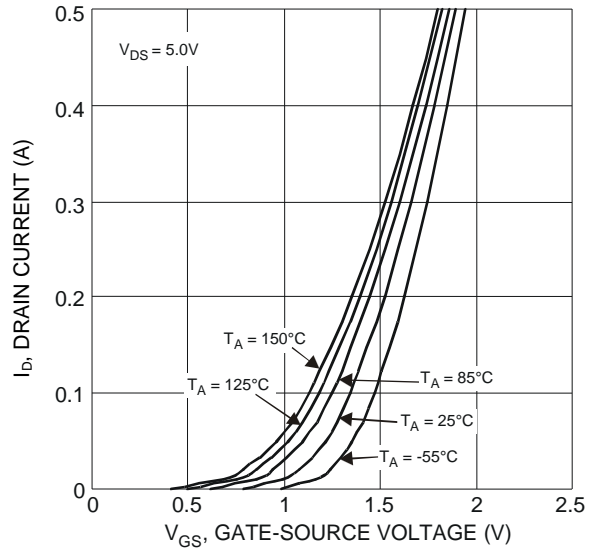


Figure 2 Typical Transfer Characteristics

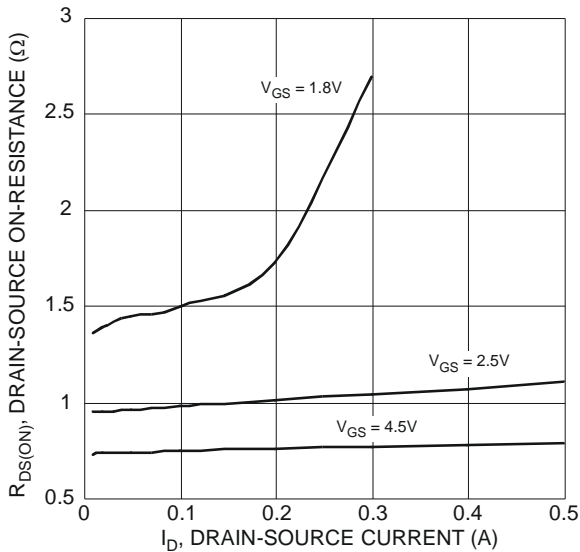


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

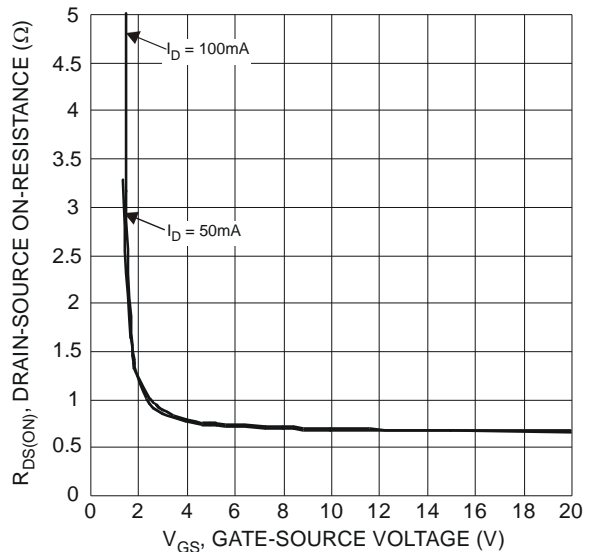


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

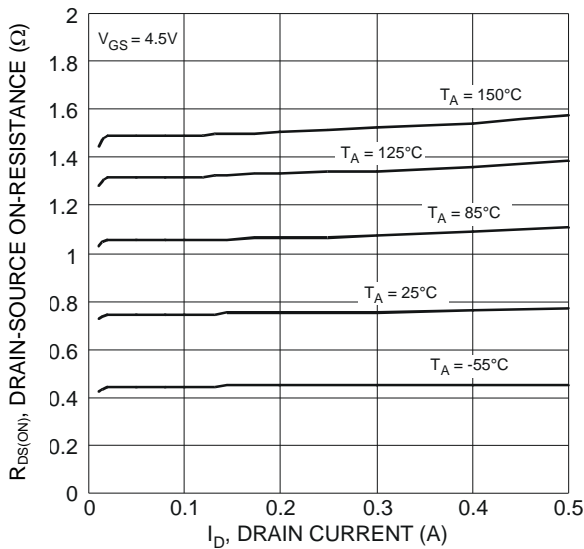


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

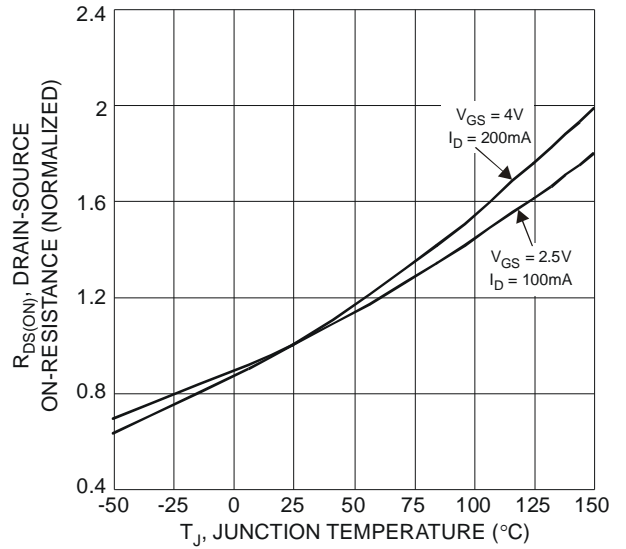


Figure 6 On-Resistance Variation with Temperature

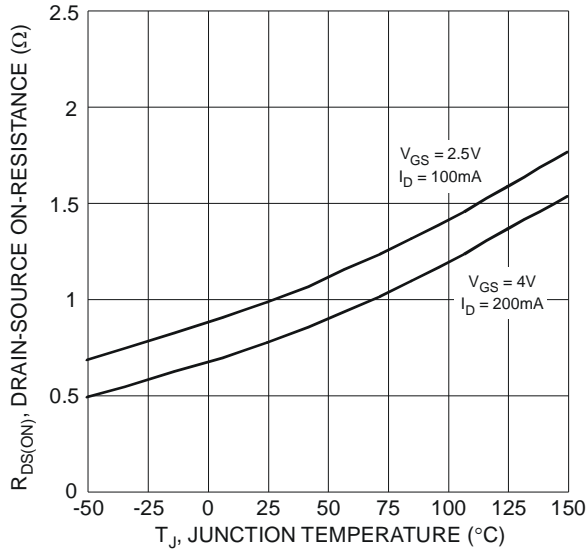


Figure 7 On-Resistance Variation with Temperature

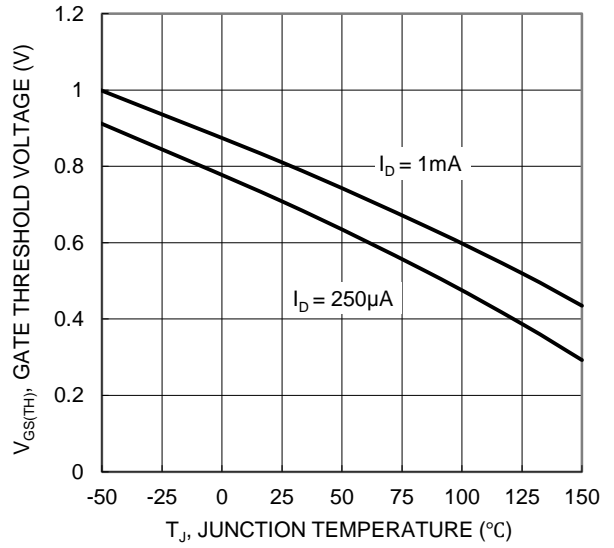


Figure 8 Gate Threshold Variation vs Junction Temperature

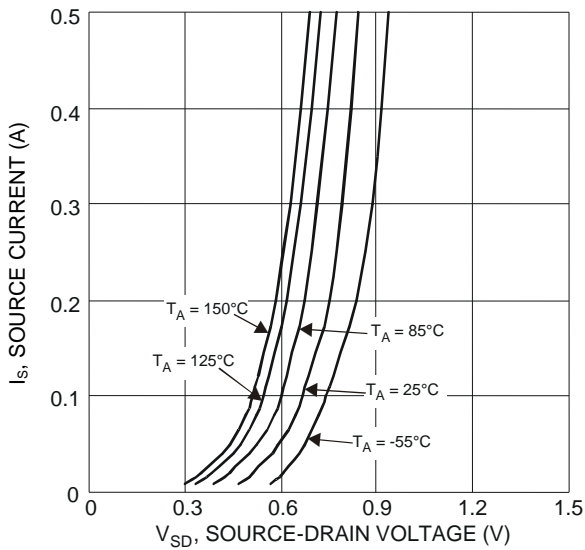


Figure 9 Diode Forward Voltage vs. Current

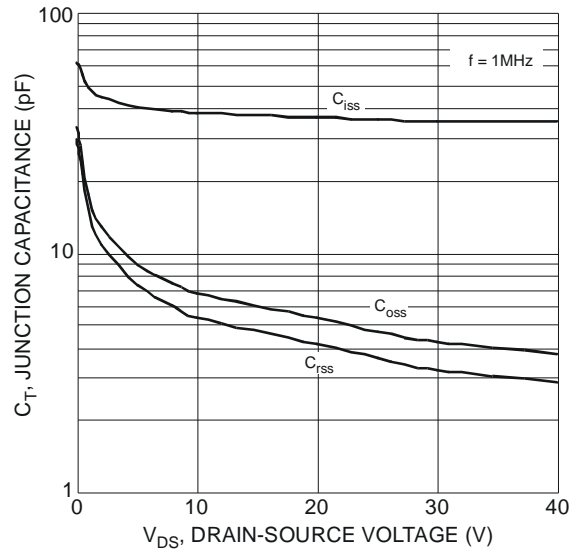


Figure 10 Typical Junction Capacitance

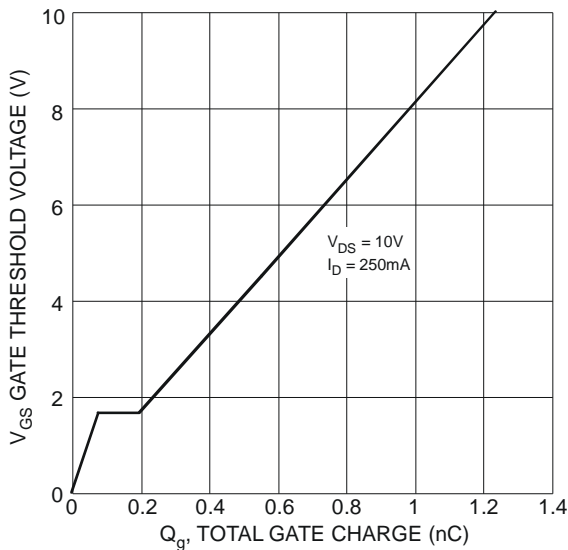


Figure 11 Gate Charge

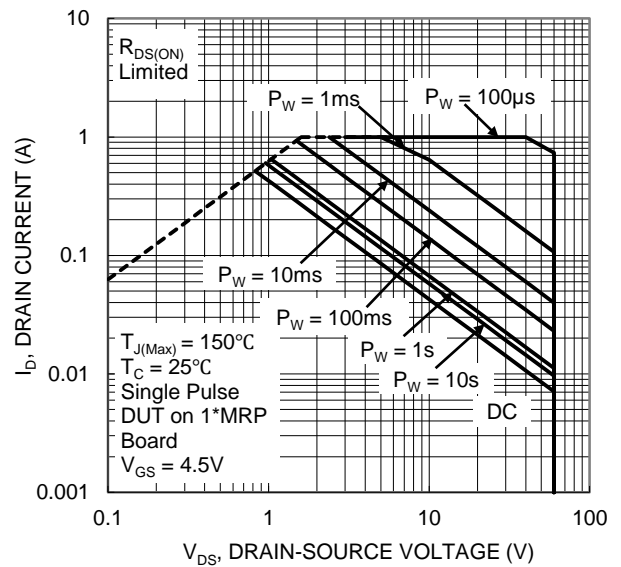


Figure 12 SOA, Safe Operation Area

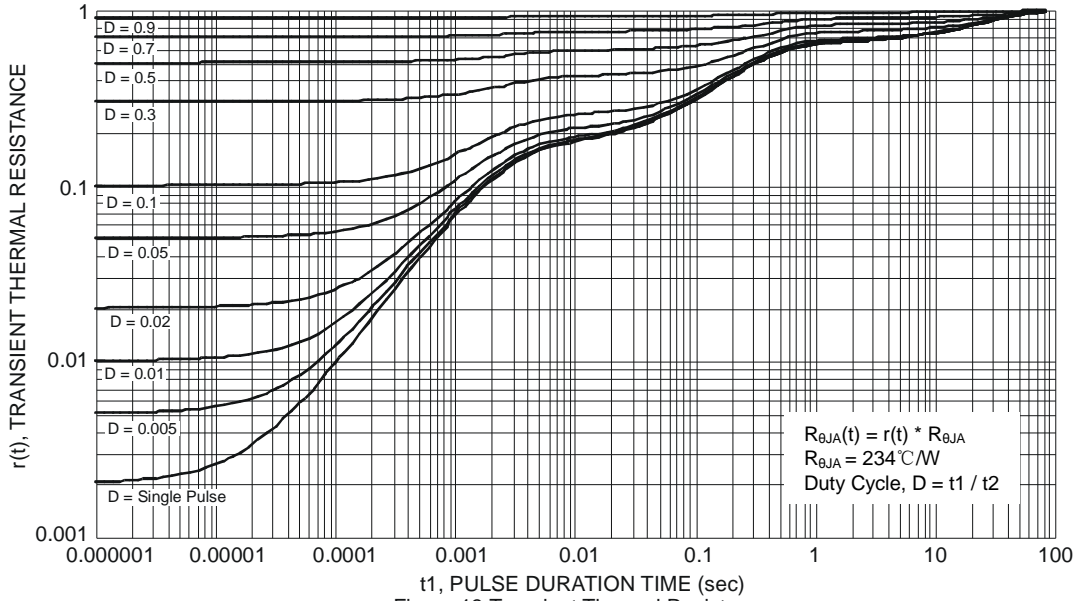
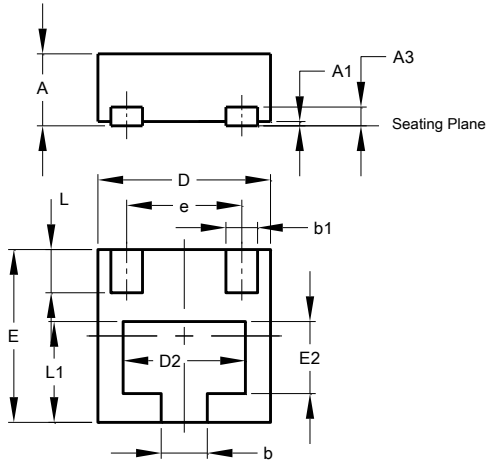


Figure 13 Transient Thermal Resistance

**Package Outline Dimensions**

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

**U-DFN1212-3 (Type C)**

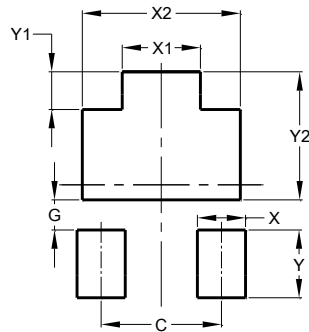


U-DFN1212-3 Type C			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0	0.05	0.02
A3	—	—	0.13
b	0.27	0.37	0.32
b1	0.17	0.27	0.22
D	1.15	1.25	1.20
D2	0.75	0.95	0.85
e	—	—	0.80
E	1.15	1.25	1.20
E2	0.40	0.60	0.50
L	0.25	0.35	0.30
L1	0.65	0.75	0.70
All Dimensions in mm			

**Suggested Pad Layout**

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

**U-DFN1212-3 (Type C)**



Dimensions	Value (in mm)
C	0.800
G	0.200
X	0.320
X1	0.520
X2	1.050
Y	0.450
Y1	0.250
Y2	0.850

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