

## Product Summary

| $BV_{DS}$ | $R_{DS(ON)}$                | $I_D$<br>$T_A = +25^\circ C$ |
|-----------|-----------------------------|------------------------------|
| 60V       | $2\Omega @ V_{GS} = 4V$     | 400mA                        |
|           | $2.5\Omega @ V_{GS} = 2.5V$ | 350mA                        |

## Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.

## Features and Benefits

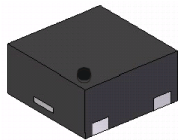
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

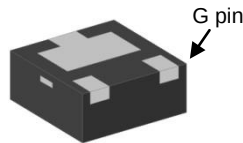
- Case: U-DFN1212-3 (Type C)
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 <sup>(e4)</sup>
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)



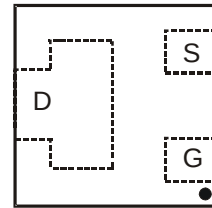
ESD PROTECTED



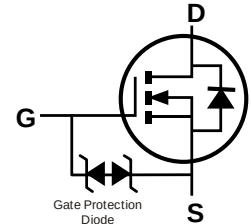
Top View



Bottom View



Pin-Out Top View



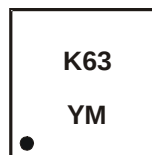
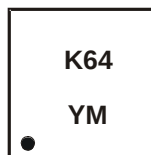
Equivalent Circuit

## Ordering Information (Note 4)

| Part Number   | Compliance | Case                 | Packaging          |
|---------------|------------|----------------------|--------------------|
| DMN62D1LFD-7  | Standard   | U-DFN1212-3 (Type C) | 3,000/Tape & Reel  |
| DMN62D1LFD-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) compliant.
  2. 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.
  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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



K64 = Product Type Marking Code  
 K63 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: E = 2017)  
 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 5) V <sub>GS</sub> = 4V | I <sub>D</sub>   | 400<br>310 | mA   |
| Pulsed Drain Current (Note 6)                          | I <sub>DM</sub>  | 1          | A    |

**Thermal Characteristics**

| Characteristic                                                           | Symbol                            | Max         | Unit |
|--------------------------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                                               | P <sub>D</sub>                    | 0.5         | W    |
| Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 5) | 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                                                                                                          |
|--------------------------------------------------------|---------------------|-----|------|------|------|-------------------------------------------------------------------------------------------------------------------------|
| OFF CHARACTERISTICS (Note 7)                           |                     |     |      |      |      |                                                                                                                         |
| 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                                                                            |
| ON CHARACTERISTICS (Note 7)                            |                     |     |      |      |      |                                                                                                                         |
| 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                                                                            |
| DYNAMIC CHARACTERISTICS (Note 8)                       |                     |     |      |      |      |                                                                                                                         |
| Input Capacitance                                      | C <sub>iss</sub>    | —   | 36   | —    | pF   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V,<br>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,<br>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,<br>R <sub>L</sub> = 150Ω, R <sub>G</sub> = 25Ω,<br>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:
5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
  6. Repetitive rating, pulse width limited by junction temperature.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to production testing.

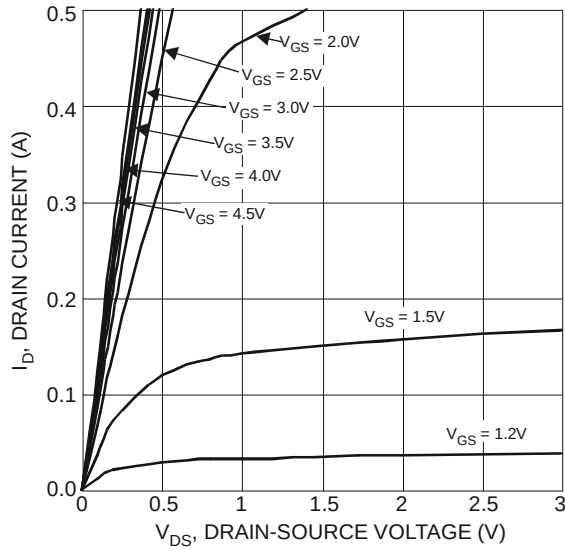


Figure 1 Typical Output Characteristics

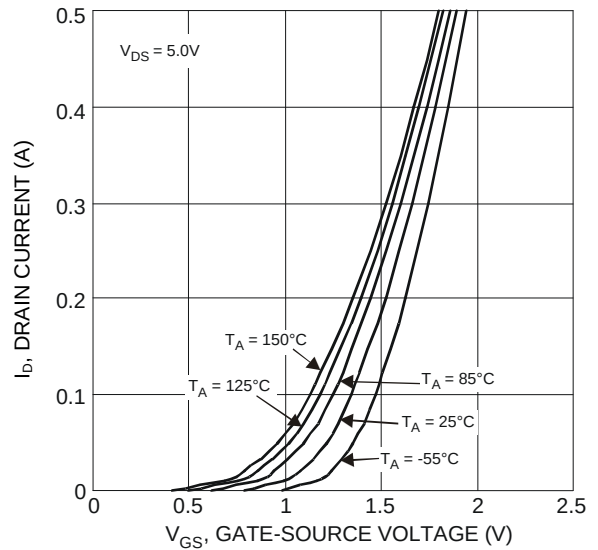


Figure 2 Typical Transfer Characteristics

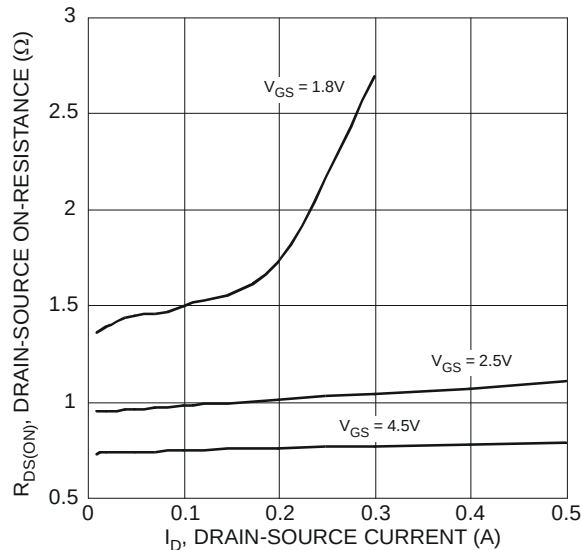


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

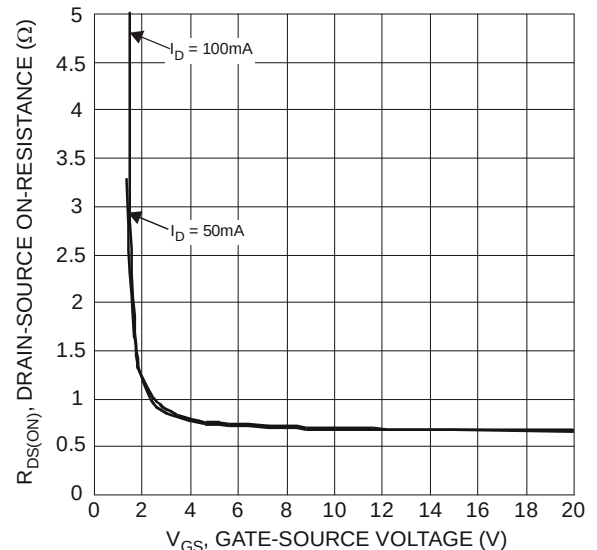


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

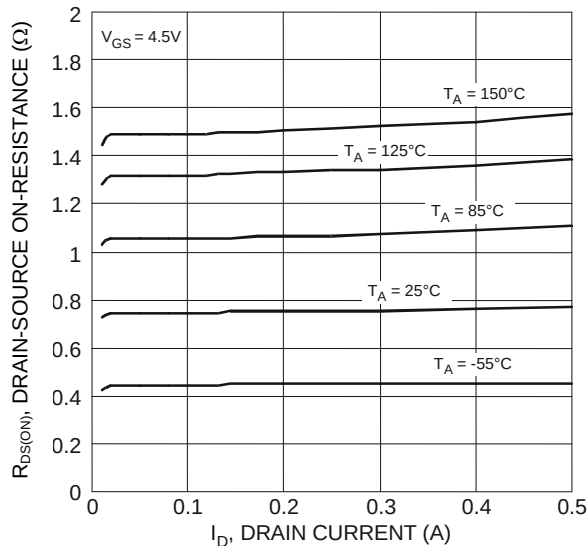


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

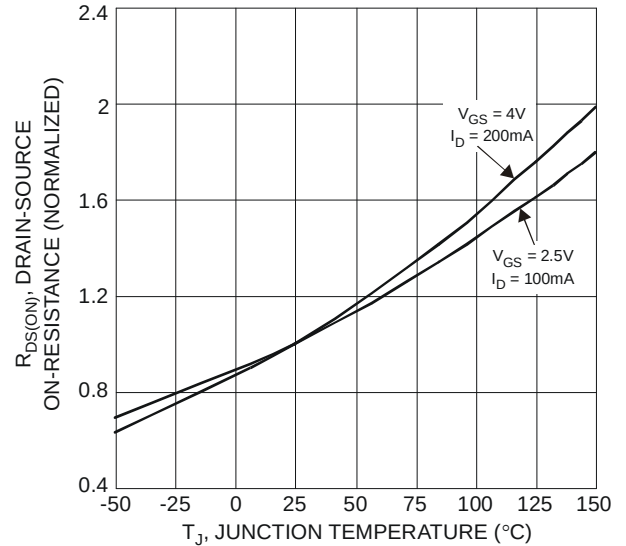
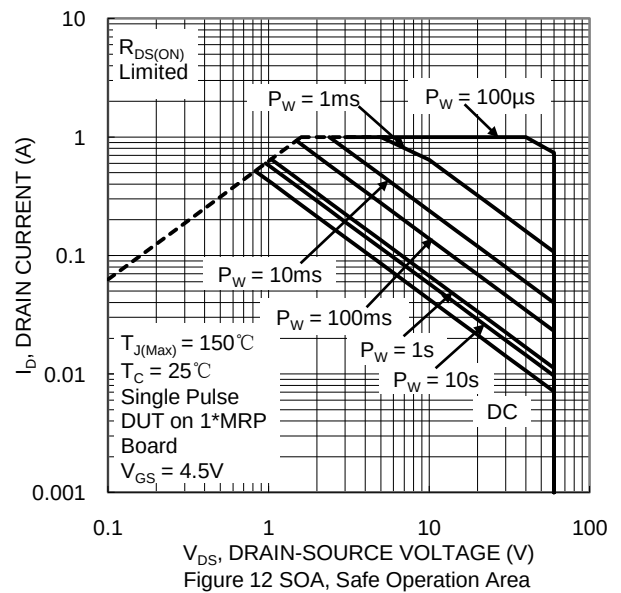
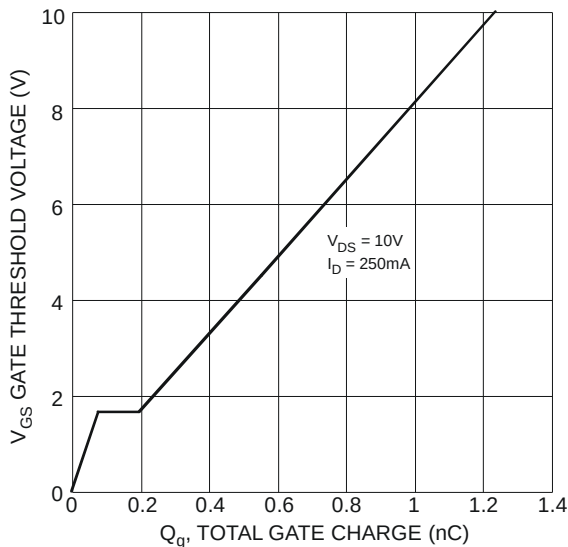
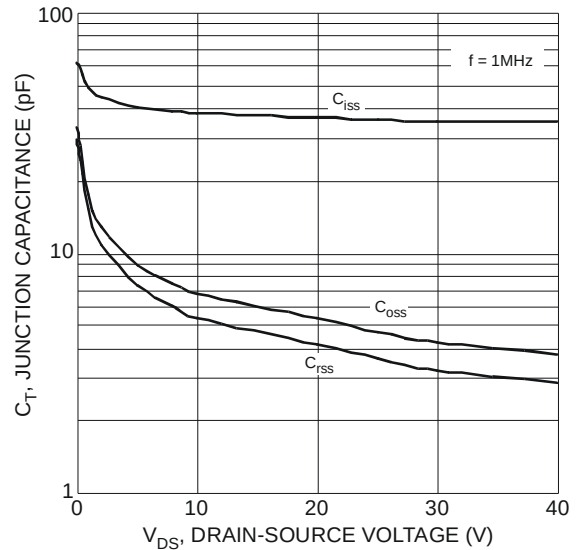
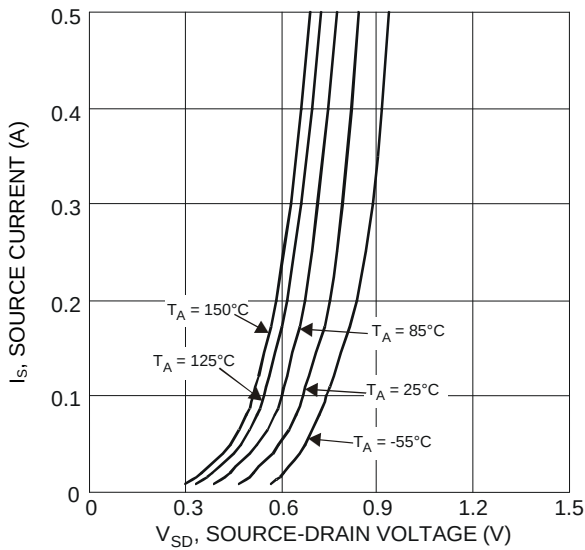
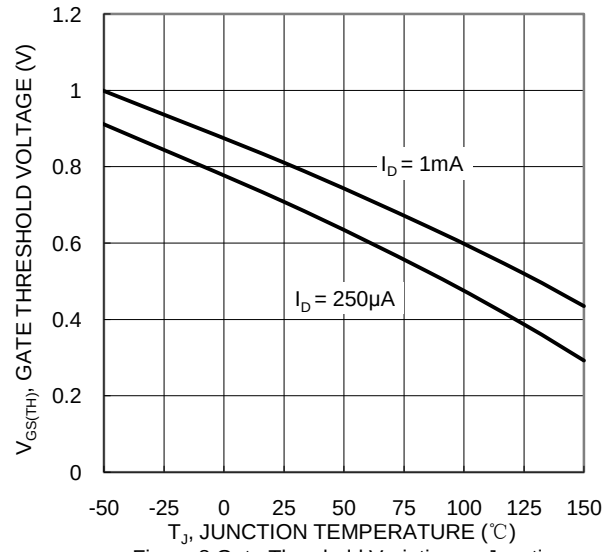
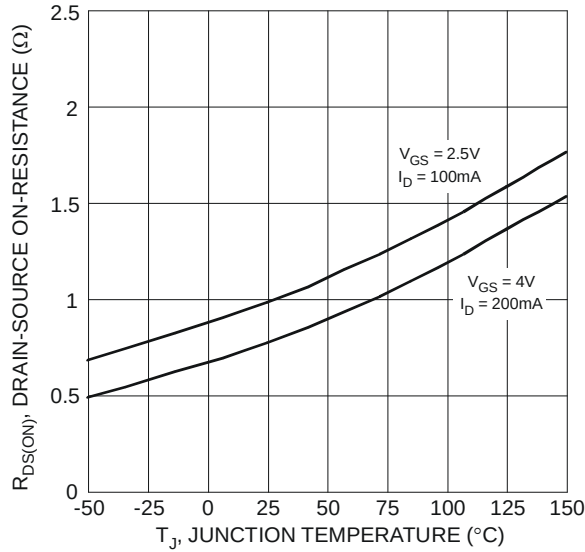


Figure 6 On-Resistance Variation with Temperature



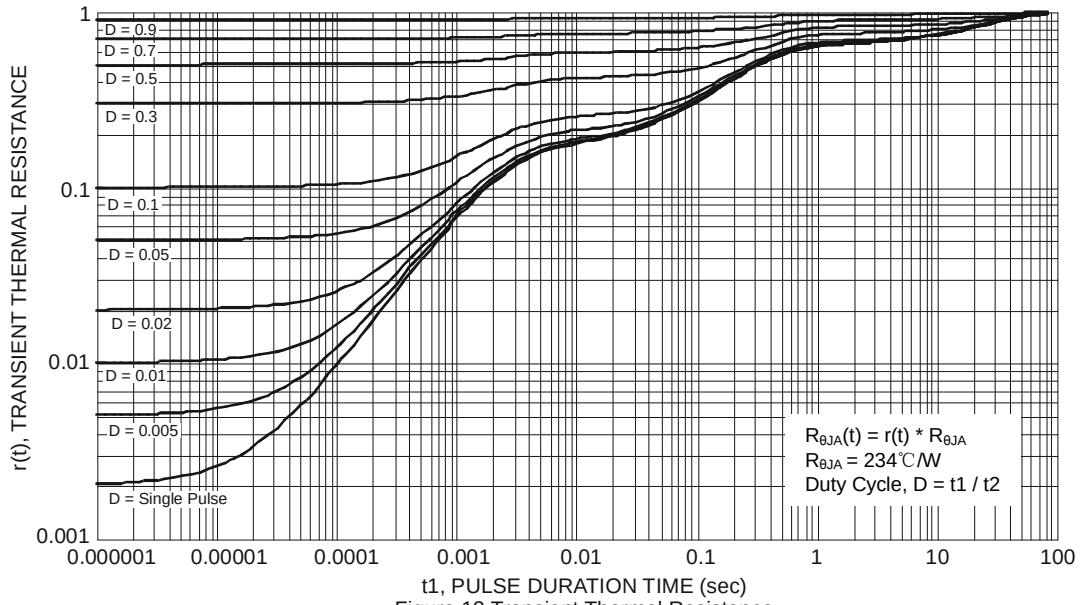
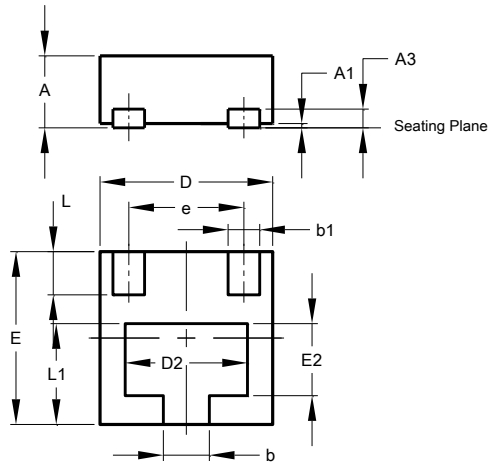


Figure 13 Transient Thermal Resistance

## Package Outline Dimensions

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

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

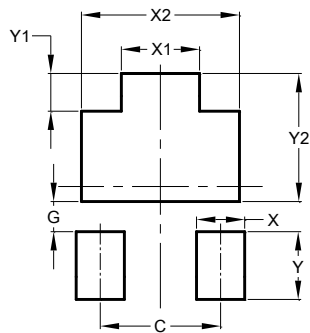


| U-DFN1212-3<br>Type C |      |      |      |
|-----------------------|------|------|------|
| Dim                   | Min  | Max  | Typ  |
| A                     | 0.47 | 0.53 | 0.50 |
| A1                    | 0    | 0.05 | 0.02 |
| A3                    | -    | -    | 0.13 |
| b                     | 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<br>(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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