## Product Summary

| $V_{DSS}$ | $R_{DS(ON)}$ Max | $I_D$ $T_A$ = +25°C |
|---|---|---|
| -12V | 70mΩ @ $V_{GS}$ = -4.5V | -3.6A |
| | 100mΩ @ $V_{GS}$ = -2.5V | -3.0A |

## Features and Benefits

- Low $Q_g$ & $Q_{gd}$
- Small Footprint
- Low Profile 0.22mm Height
- **ESD Protected Gate 4kV HBM**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## 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.

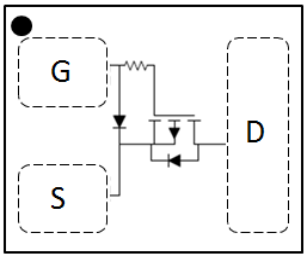
- Battery Management
- Load Switch
- Battery Protection

## Mechanical Data

- Case: X4-DSN0607-3
- Terminal Connections: See Diagram Below
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu or NiAu. Solderable per MIL-STD-202, Method 208 e4

X4-DSN0607-3

ESD PROTECTED




Top View
Equivalent Circuit

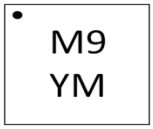
## Ordering Information (Note 4)

| Part Number | Case | Pitch | Packaging | Site |
|---|---|---|---|---|
| DMP1070UCA3-7 | X4-DSN0607-3 | 4mm | 3000/Tape & Reel | A |
| DMP1070UCA3-7A | X4-DSN0607-3 | 2mm | 10000/Tape & Reel | B |

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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

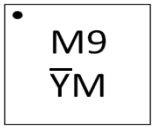
## Marking Information

Site A:




M9 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Site B:




M9 = Product Type Marking Code
$\overline{Y}$M = Date Code Marking
$\overline{Y}$ = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
|---|---|---|---|---|---|---|---|---|---|
| Code | G | H | I | J | K | L | M | N | O |

| 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 | | $V_{DSS}$ | -12 | V |
| Gate-Source Voltage | | $V_{GSS}$ | -6 | V |
| Continuous Drain Current (Note 5) $V_{GS}$ = -4.5V | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | -3.6<br>-2.9 | A |
| Continuous Drain Current (Note 5) $V_{GS}$ = -2.5V | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | -3.0<br>-2.4 | A |
| Pulsed Drain Current (Note 6) | | $I_{DM}$ | -15 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 7) | $P_D$ | 0.71 | W |
| Thermal Resistance, Junction to Ambient @$T_A$ = +25°C (Note 7) | $R_{\theta JA}$ | 179.3 | °C/W |
| Power Dissipation (Note 5) | $P_D$ | 1.36 | W |
| Thermal Resistance, Junction to Ambient @$T_A$ = +25°C (Note 5) | $R_{\theta JA}$ | 92.2 | °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 | $BV_{DSS}$ | -12 | — | — | V | $V_{GS}$ = 0V, $I_D$ = -250µA |
| Zero Gate Voltage Drain Current $T_J$ = +25°C | $I_{DSS}$ | — | — | -50 | nA | $V_{DS}$ = -9.6V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | -25 | nA | $V_{GS}$ = -5V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 8)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | -0.40 | -0.66 | -0.95 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = -250µA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 52 | 70 | mΩ | $V_{GS}$ = -4.5V, $I_D$ = -0.4A |
| | | — | 69 | 100 | | $V_{GS}$ = -2.5V, $I_D$ = -0.4A |
| | | — | 93 | 150 | | $V_{GS}$ = -1.8V, $I_D$ = -0.4A |
| | | — | 120 | 210 | | $V_{GS}$ = -1.5V, $I_D$ = -0.1A |
| Diode Forward Voltage | $V_{SD}$ | — | -0.7 | -1.0 | V | $V_{GS}$ = 0V, $I_S$ = -0.4A |
| **DYNAMIC CHARACTERISTICS (Note 9)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 147 | — | pF | $V_{DS}$ = -6V, $V_{GS}$ = 0V, f = 1MHz |
| Output Capacitance | $C_{oss}$ | — | 79 | — | | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 30 | — | | |
| Series Gate Resistance | $R_G$ | — | 13 | — | Ω | f = 1MHz, $V_{GS}$ = 0V, $V_{DS}$ = 0V |
| Total Gate Charge | $Q_g$ | — | 1.45 | — | nC | $V_{DS}$ = -6V, $V_{GS}$ = -4.5V, $I_D$ = -0.4A |
| Gate-Source Charge | $Q_{gs}$ | — | 0.14 | — | | |
| Gate-Drain Charge | $Q_{gd}$ | — | 0.28 | — | | |
| Gate Charge at $V_{TH}$ | $Q_{g(th)}$ | — | 0.10 | — | | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 3.2 | — | ns | $V_{DS}$ = -6V, $V_{GS}$ = -4.5V, $R_G$ = 0Ω, $I_D$ = -0.4A |
| Turn-On Rise Time | $t_R$ | — | 6.0 | — | | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 8.6 | — | | |
| Turn-Off Fall Time | $t_F$ | — | 5.8 | — | | |

Notes:
5. Device mounted on FR-4 material with 1-inch$^2$ (6.45-cm$^2$), 2-oz. (0.071-mm thick) Cu.
6. Repetitive rating, pulse width limited by junction temperature.
7. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

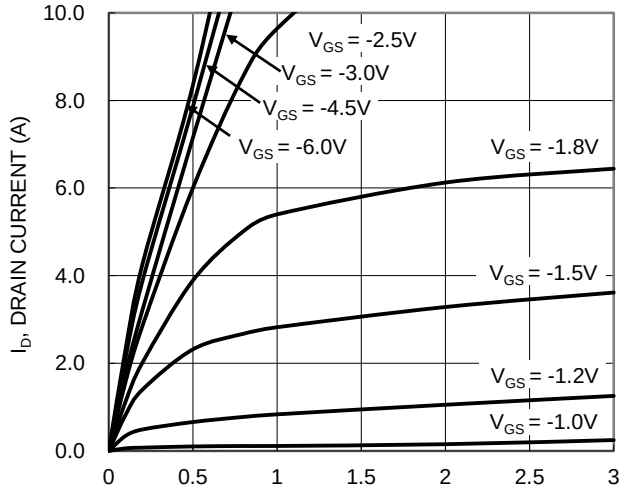



Figure 1. Typical Output Characteristic

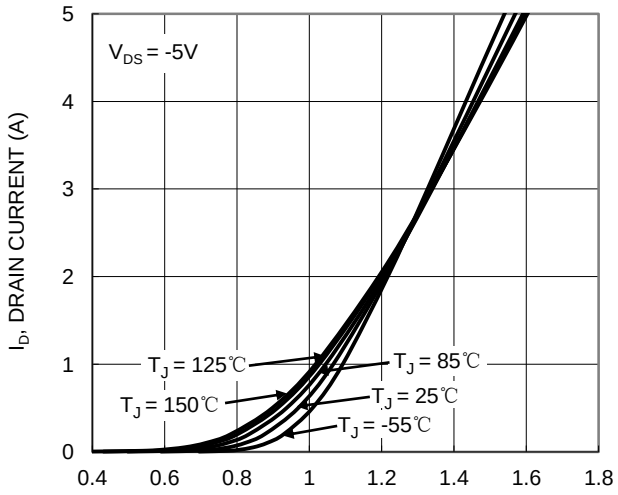



Figure 2. Typical Transfer Characteristic

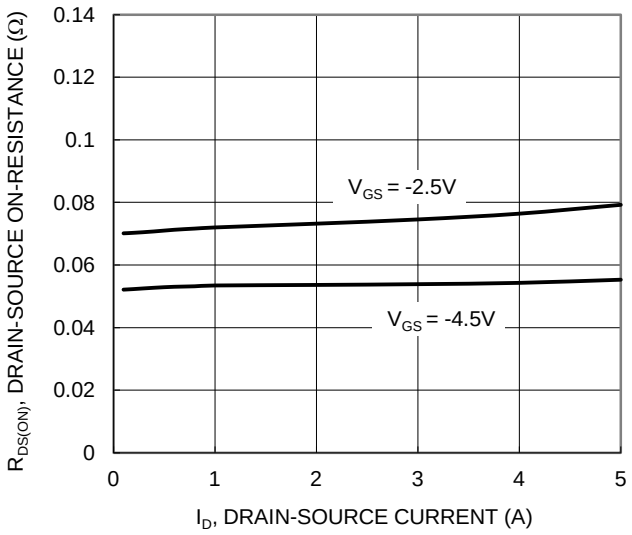



Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

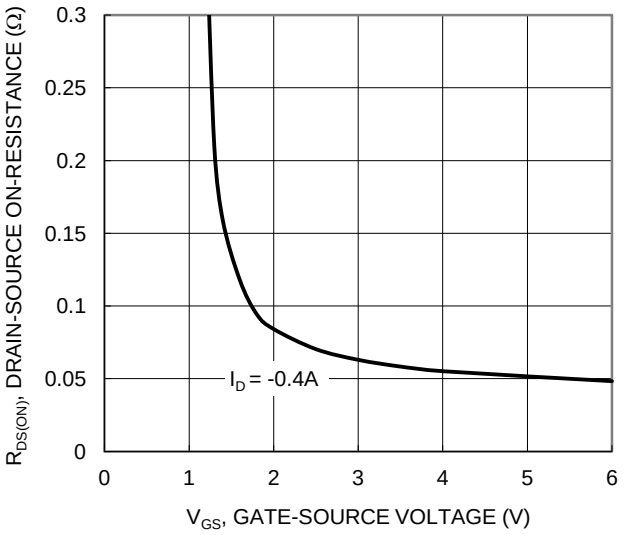



Figure 4. Typical Transfer Characteristic

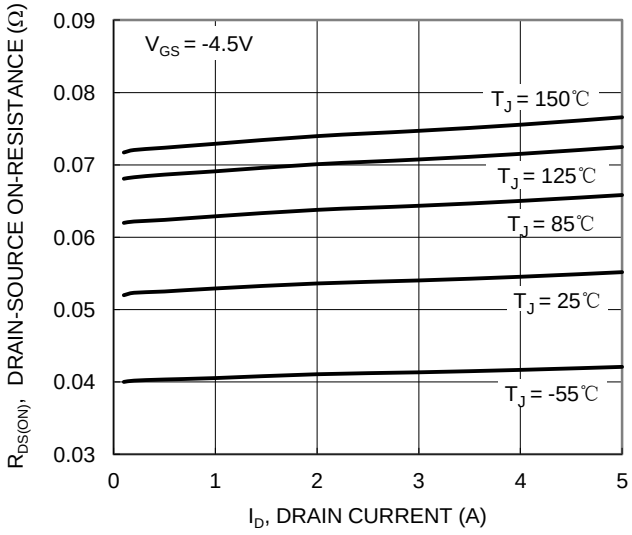



Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

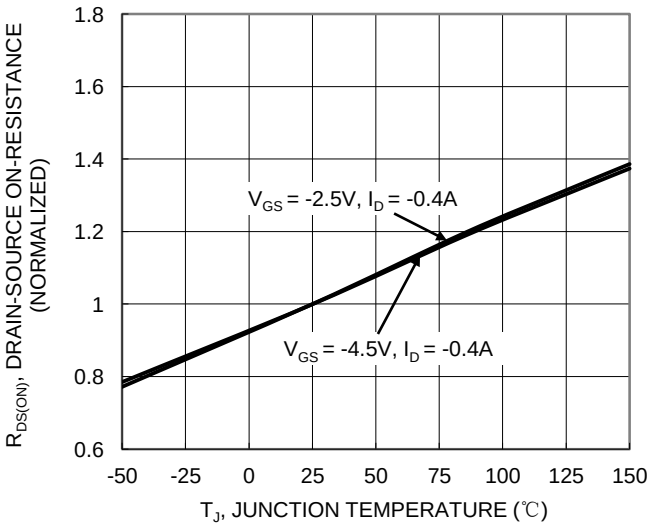



Figure 6. On-Resistance Variation with Junction Temperature

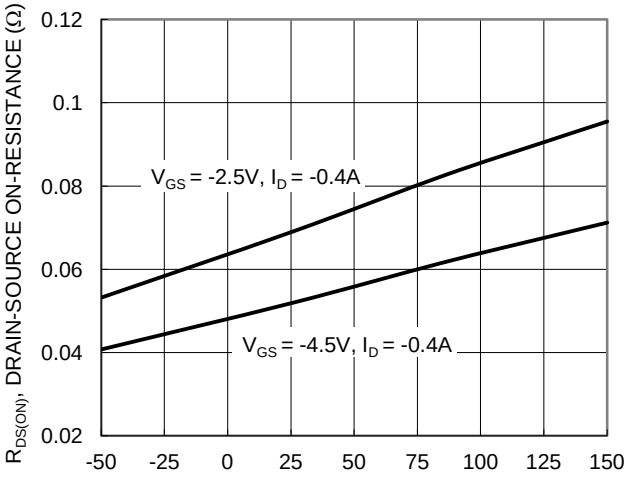



Figure 7. On-Resistance Variation with Junction Temperature

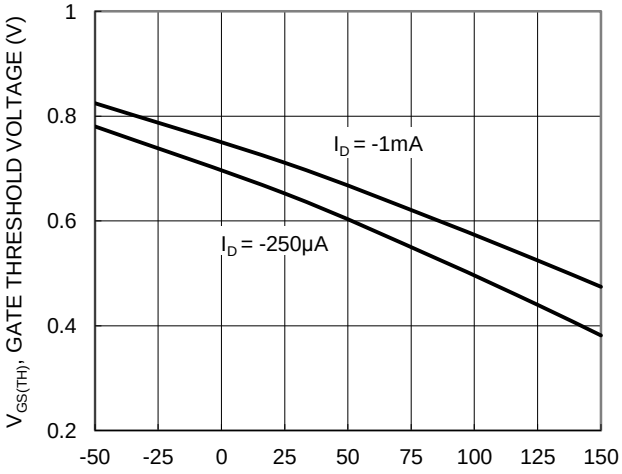



Figure 8. Gate Threshold Variation vs. Junction Temperature

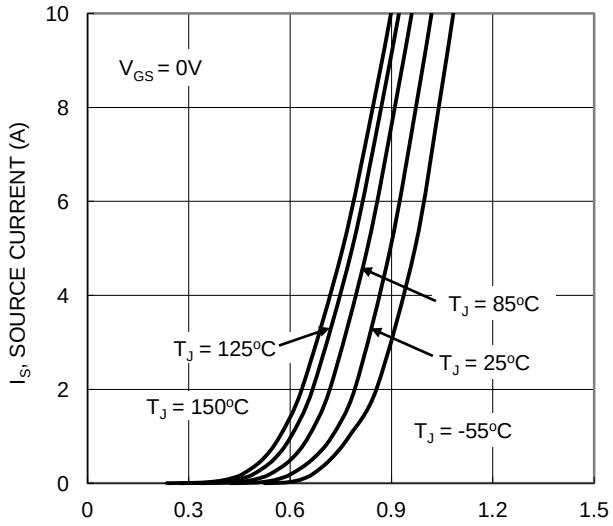



Figure 9. Diode Forward Voltage vs. Current

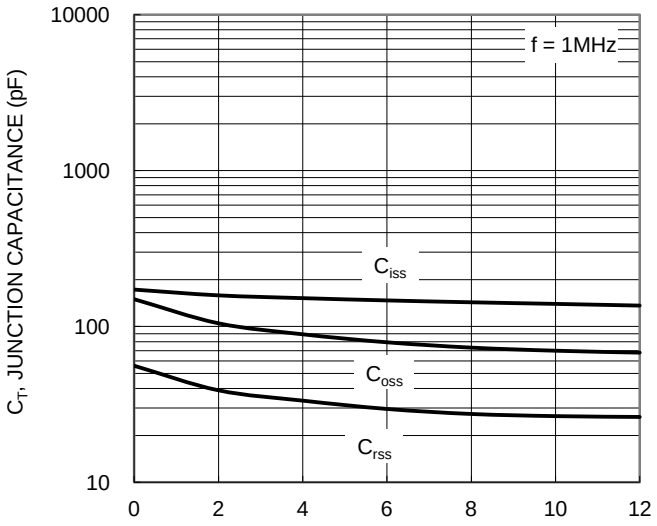



Figure 10. Typical Junction Capacitance

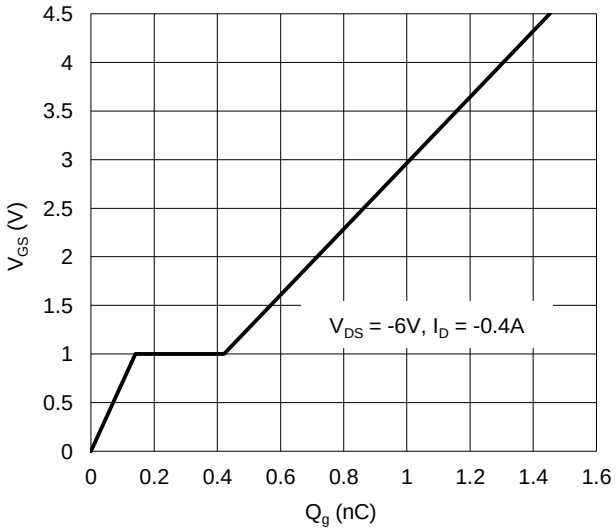



Figure 11. Gate Charge

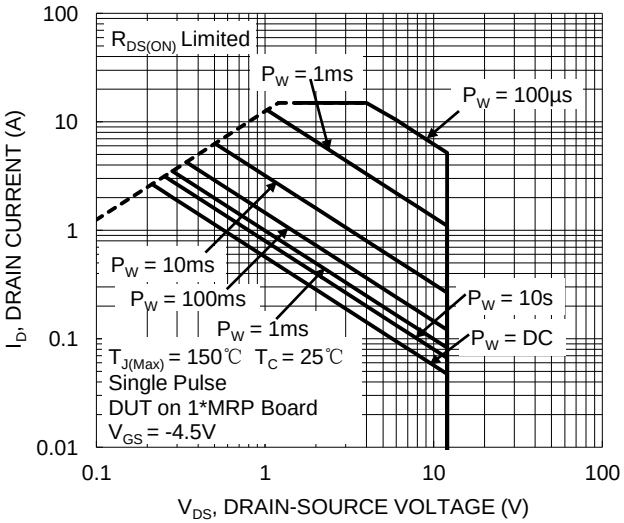



Figure 12. SOA, Safe Operation Area

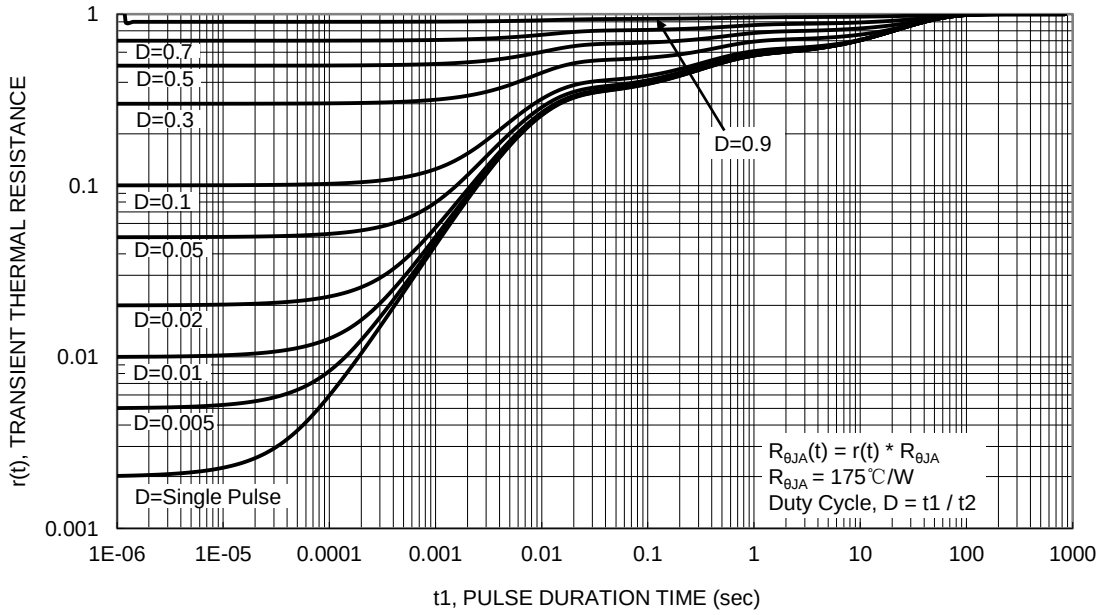
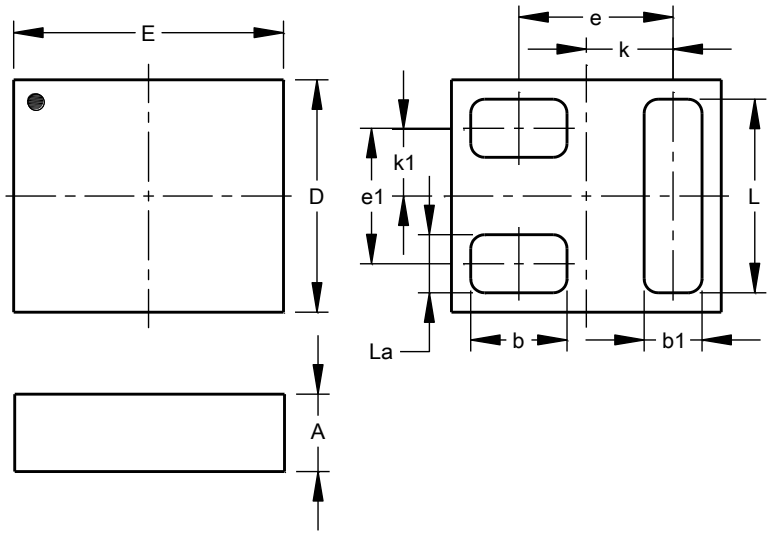



Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

**X4-DSN0607-3**

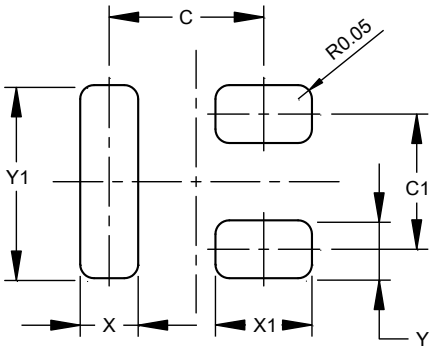



| X4-DSN0607-3 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.18 | 0.22 | 0.20 |
| **b** | 0.24 | 0.26 | 0.25 |
| **b1** | 0.14 | 0.16 | 0.15 |
| **D** | 0.56 | 0.64 | 0.60 |
| **E** | 0.65 | 0.73 | 0.69 |
| **e** | -- | -- | 0.40 |
| **e1** | -- | -- | 0.35 |
| **k** | -- | -- | 0.225 |
| **k1** | -- | -- | 0.175 |
| **L** | 0.49 | 0.51 | 0.50 |
| **La** | 0.14 | 0.16 | 0.15 |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

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

**X4-DSN0607-3**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 0.40 |
| **C1** | 0.35 |
| **X** | 0.15 |
| **X1** | 0.25 |
| **Y** | 0.15 |
| **Y1** | 0.50 |

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