

Product Summary

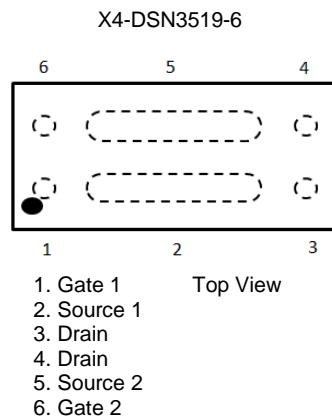
| BV _{SSS} | R _{SS(ON)} Typ | I _S Max T _A = +25°C |
|-------------------|--------------------------------|--|
| 30V | 4.8mΩ @ V _{GS} = 8V | 13.0A |
| | 6.3mΩ @ V _{GS} = 4.5V | 11.5A |

Description

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

Applications

- Battery Management
- Load Switch
- Battery Protection

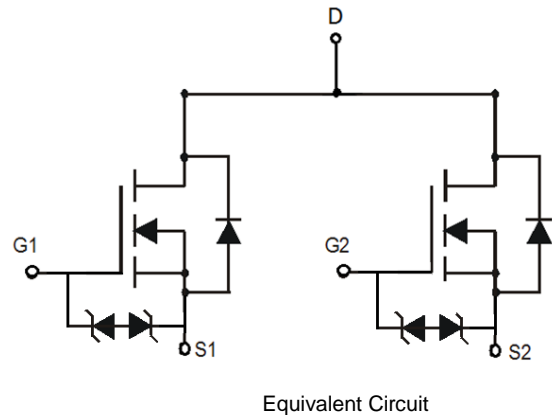


Features

- CSP with Footprint 3.5mm × 1.9mm
- Height = 0.11mm for Low Profile
- ESD Protection of Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen- and Antimony-Free. "Green" Device (Note 3)**

Mechanical Data

- Case: X4-DSN3519-6
- 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)
- Weight: 0.0012 grams (Approximate)

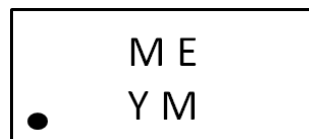


Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|--------------|------------------|
| DMN3006SCA6-7 | X4-DSN3519-6 | 3000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - 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.
 - 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



ME = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: H = 2020)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

| Year | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | | | |
|-------|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| Code | H | I | J | K | L | M | N | O | P | | | |
| 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|--|--------------|---------------------------|-----------|----------|------|
| Source-Source Voltage | | | V_{SSS} | 30 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 20 | V |
| Continuous Source Current (Note 5) $V_{GS} = 8V$ | Steady State | $T_A = +25^\circ\text{C}$ | I_S | 13.0 | A |
| | | $T_A = +70^\circ\text{C}$ | | 10.5 | |
| Continuous Source Current (Note 5) $V_{GS} = 4.5V$ | Steady State | $T_A = +25^\circ\text{C}$ | I_S | 11.5 | A |
| | | $T_A = +70^\circ\text{C}$ | | 9.0 | |
| Pulsed Source Current (Note 6) | | | I_{SM} | 80 | A |

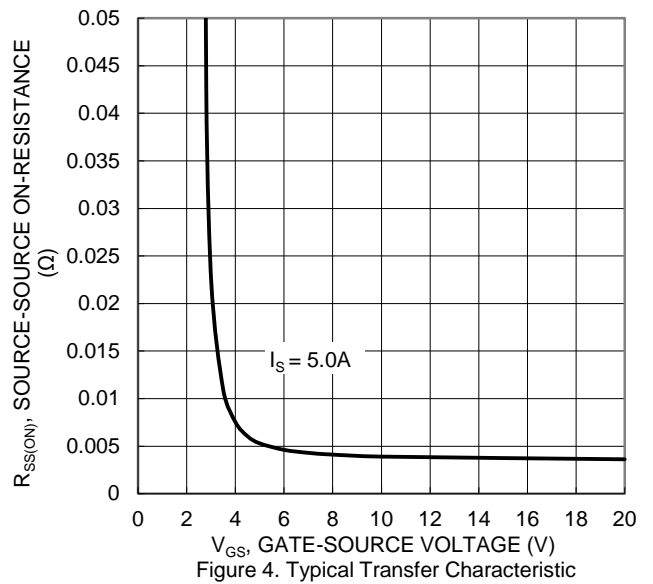
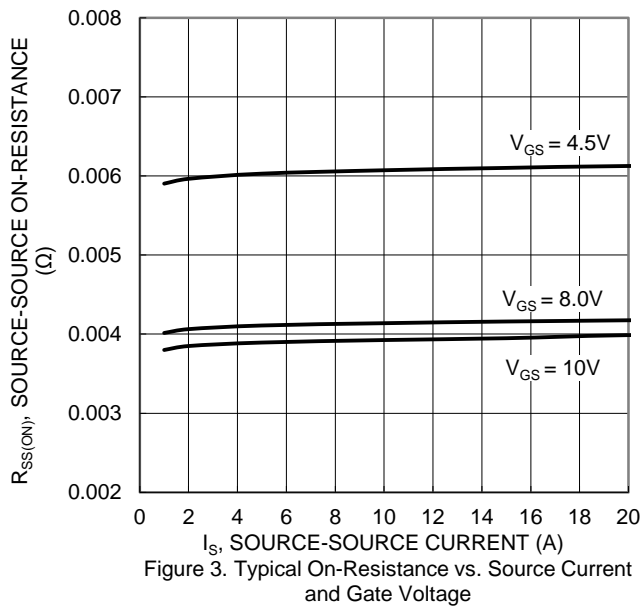
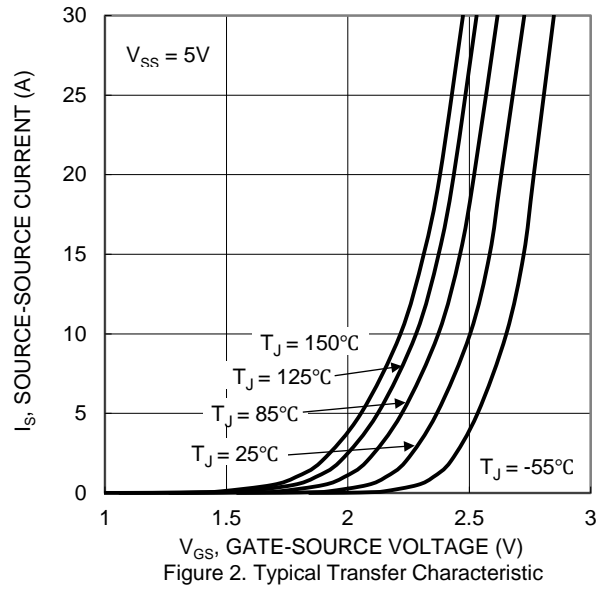
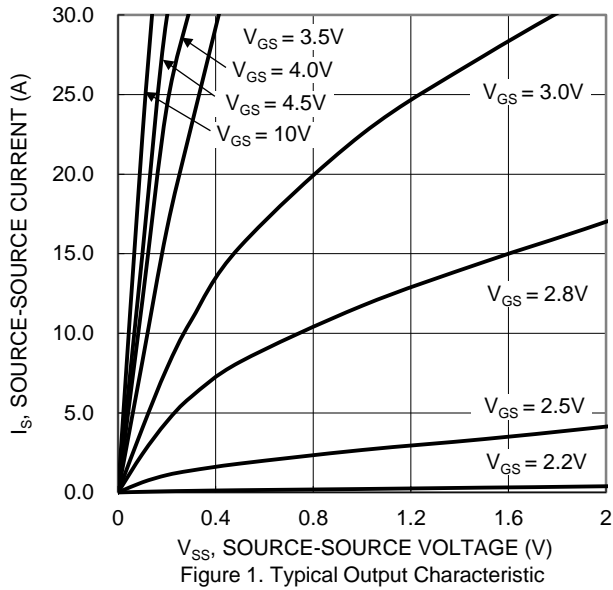
Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|--------------------|
| Power Dissipation (Note 7) | P_D | 0.8 | W |
| Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 7) | $R_{\theta JA}$ | 162 | $^\circ\text{C/W}$ |
| Power Dissipation (Note 5) | P_D | 1.8 | W |
| Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5) | $R_{\theta JA}$ | 68 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|--------------|-----|------|----------|---------------|---|
| OFF CHARACTERISTICS (Note 8) | | | | | | |
| Source-Source Breakdown Voltage | BV_{SSS} | 30 | — | — | V | $V_{GS} = 0V, I_S = 1mA$ |
| Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$ | I_{SSS} | — | — | 1 | μA | $V_{SS} = 24V, V_{GS} = 0V$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 10 | μA | $V_{GS} = \pm 20V, V_{SS} = 0V$ |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 1.3 | — | 2.2 | V | $V_{SS} = 10V, I_S = 1mA$ |
| Static Source-Source On-Resistance | $R_{SS(ON)}$ | 2.5 | 4.6 | 5.5 | m Ω | $V_{GS} = 10V, I_S = 5A$ |
| | | 2.7 | 4.8 | 7.2 | | $V_{GS} = 8V, I_S = 5A$ |
| | | 3.0 | 6.3 | 9.0 | | $V_{GS} = 4.5V, I_S = 5A$ |
| Diode Forward Voltage | V_{SS} | — | 0.95 | 1.2 | V | $V_{GS} = 0V, I_S = 5A$ |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C_{ISS} | — | 2235 | — | pF | $V_{SS} = 15V, V_{GS} = 0V, f = 1.0MHz$ |
| Output Capacitance | C_{OSS} | — | 414 | — | | |
| Reverse Transfer Capacitance | C_{RSS} | — | 274 | — | | |
| Total Gate Charge | Q_g | — | 17.7 | — | nC | $V_{SS} = 15V, V_{GS} = 4.5V, I_S = 5A$ |
| Gate-Source Charge | Q_{gs} | — | 4.9 | — | | |
| Gate-Drain Charge | Q_{gd} | — | 6.1 | — | | |
| Gate Charge at V_{TH} | $Q_{g(TH)}$ | — | 3.0 | — | | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 5.6 | — | ns | $V_{SS} = 15V, V_{GS} = 10V, I_S = 5A$ |
| Turn-On Rise Time | t_R | — | 8.7 | — | | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 41.6 | — | | |
| Turn-Off Fall Time | t_F | — | 20.9 | — | | |

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



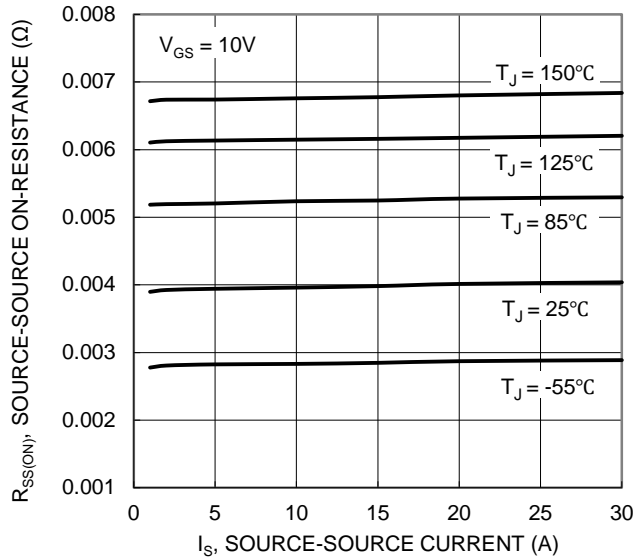


Figure 5. Typical On-Resistance vs. Source Current and Junction Temperature

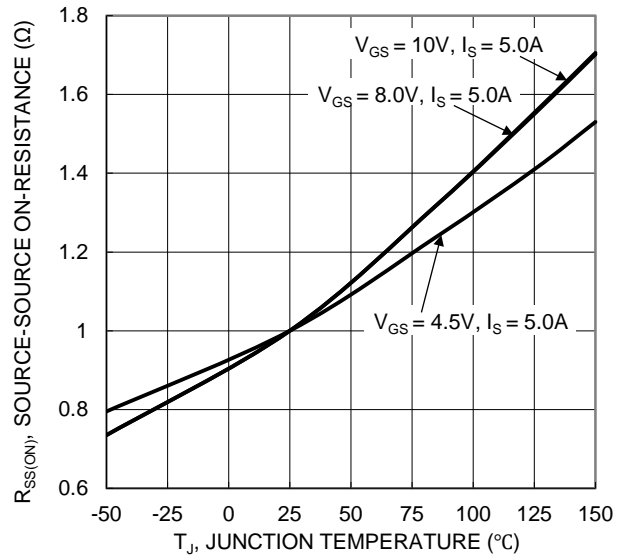


Figure 6. On-Resistance Variation with Junction Temperature

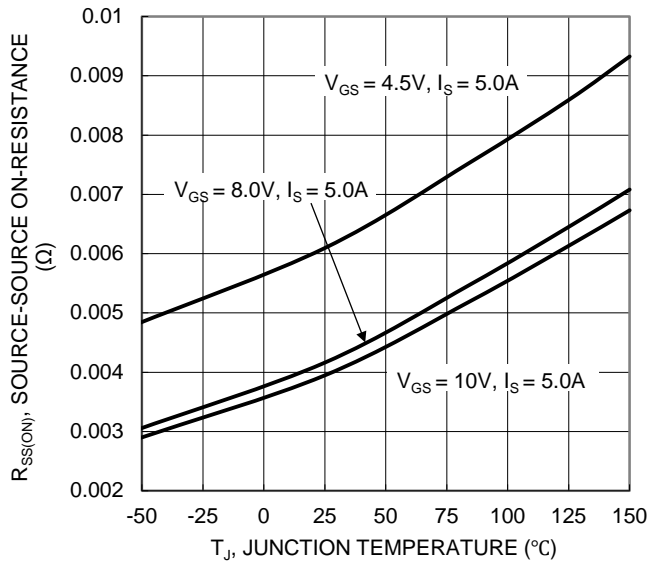


Figure 7. On-Resistance Variation with Junction Temperature

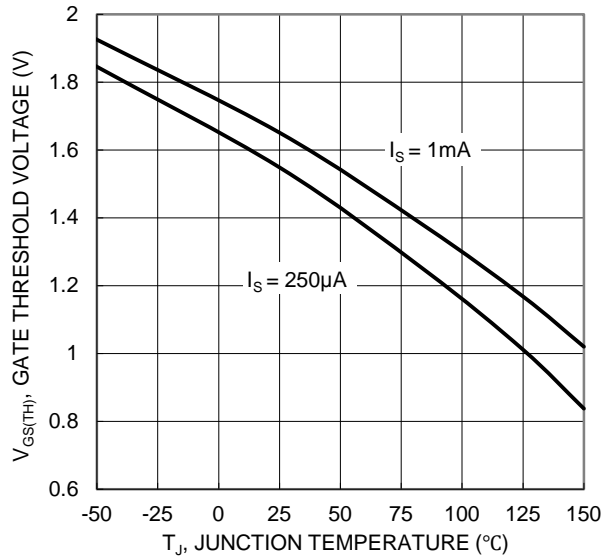


Figure 8. Gate Threshold Variation vs. Junction Temperature

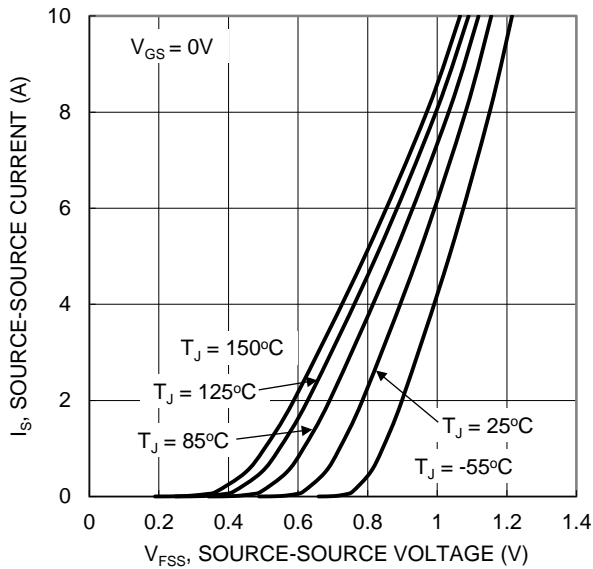


Figure 9. Diode Forward Voltage vs. Current

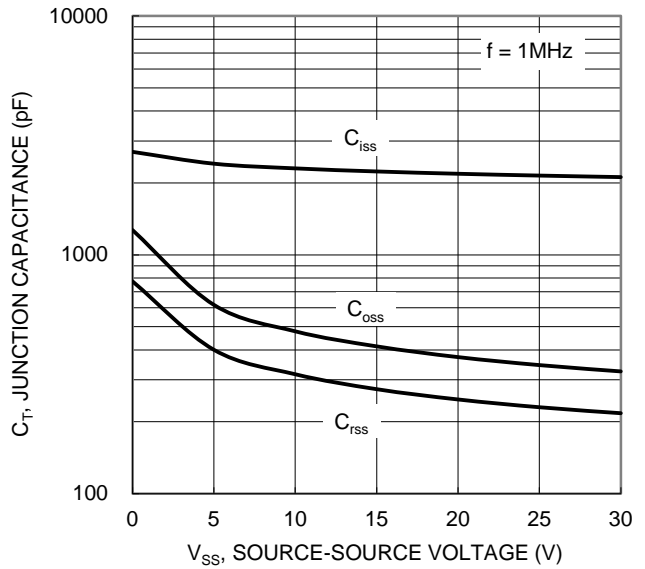


Figure 10. Typical Junction Capacitance

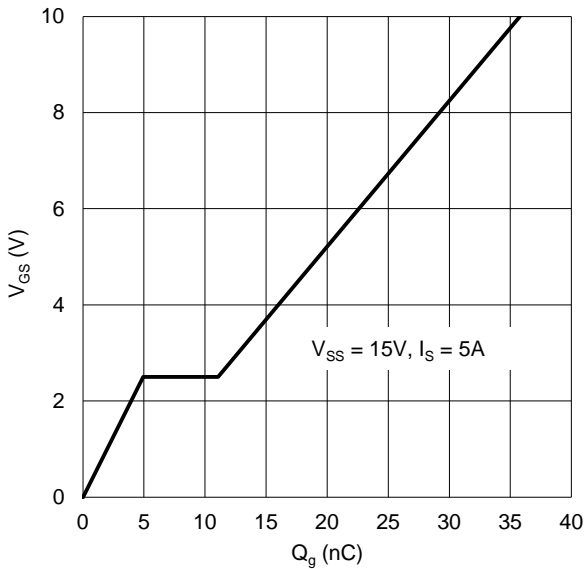


Figure 11. Gate Charge

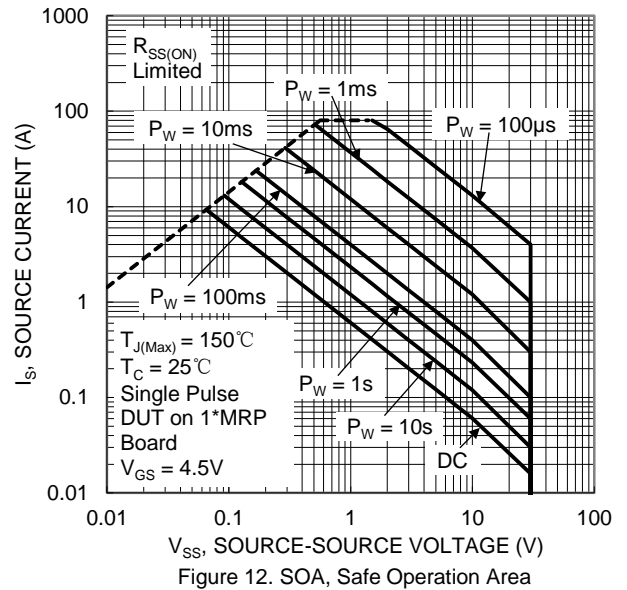


Figure 12. SOA, Safe Operation Area

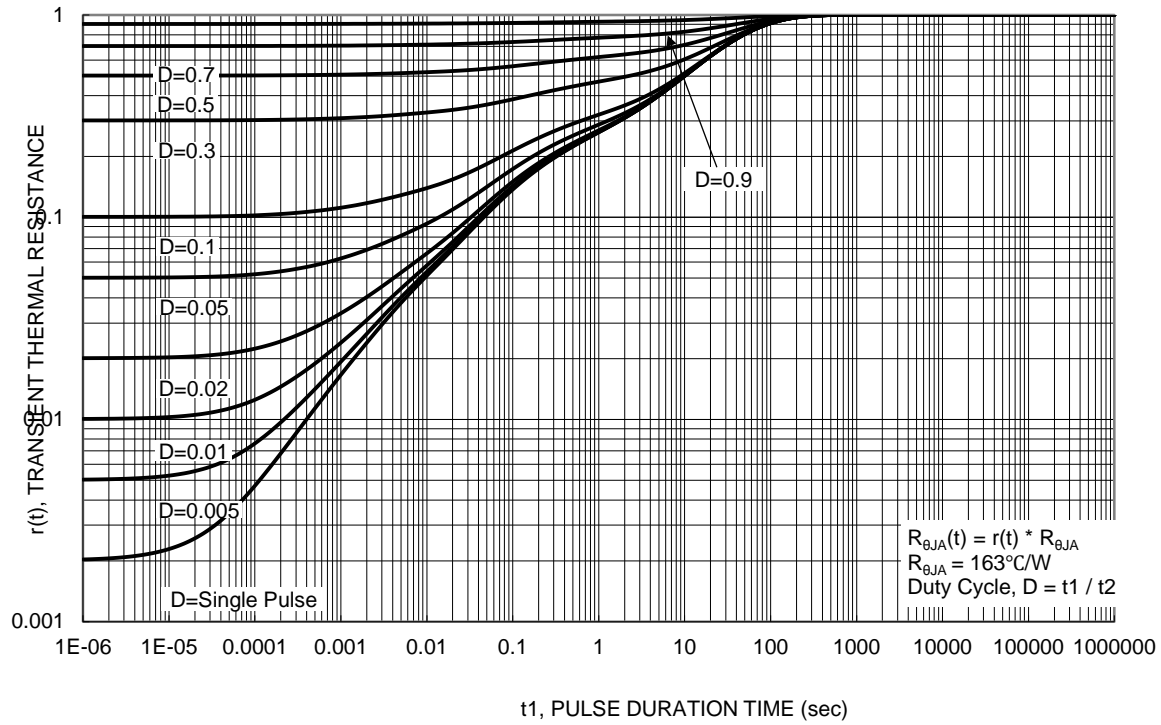
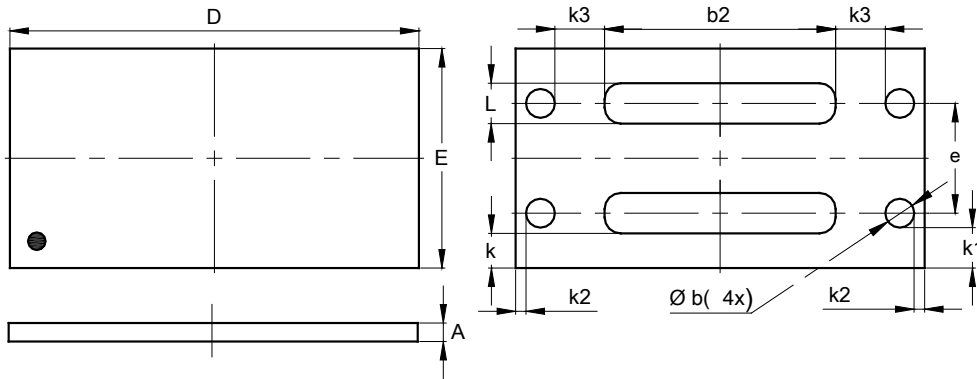


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

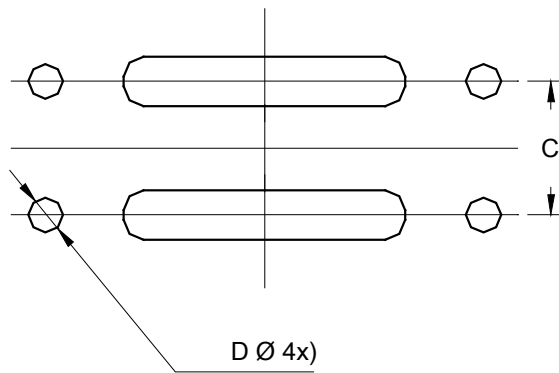
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| X4-DSN3519-6 | | | |
|----------------------|------|------|-------|
| Dim | Min | Max | Typ |
| A | 0.09 | 0.16 | 0.11 |
| b | -- | -- | 0.25 |
| b2 | -- | -- | 2.00 |
| D | 3.45 | 3.55 | 3.50 |
| E | 1.85 | 1.95 | 1.90 |
| e | -- | -- | 0.95 |
| k | -- | -- | 0.30 |
| k1 | -- | -- | 0.35 |
| k2 | -- | -- | 0.085 |
| k3 | -- | -- | 0.415 |
| L | -- | -- | 0.35 |
| All Dimensions in mm | | | |

Suggested Pad Layout

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



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.95 |
| X | 0.25 |

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