

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | I_D max $T_A = 25^\circ\text{C}$ |
|---------------|--|---------------------------------------|
| 20V | 18.5m Ω @ $V_{GS} = 10\text{V}$ | 5.4 A |
| | 21m Ω @ $V_{GS} = 4.5\text{V}$ | 5.0 A |
| | 24m Ω @ $V_{GS} = 2.5\text{V}$ | 4.6 A |
| | 31m Ω @ $V_{GS} = 1.8\text{V}$ | 3.5 A |

Description

This new generation MOSFET has been 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.

Applications

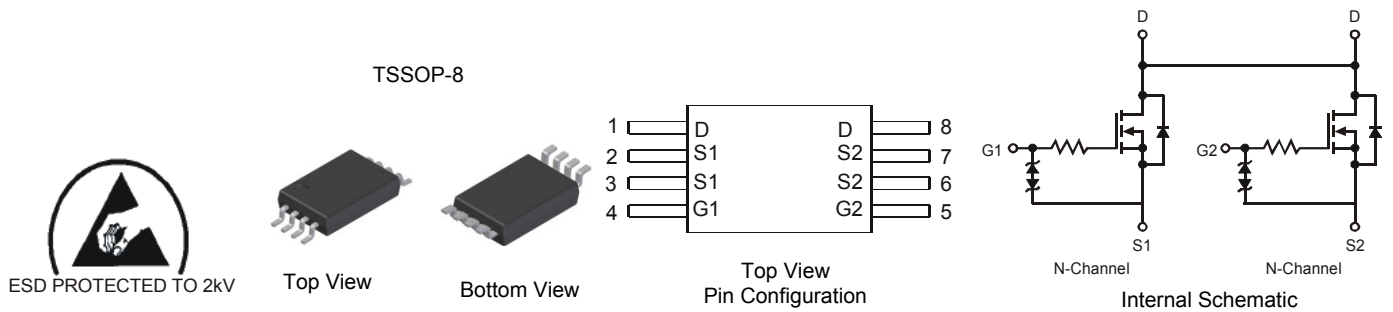
- Power management functions
- Load Switch

Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected up to 2KV**
- **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: TSSOP-8
- Case Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.039 grams (approximate)

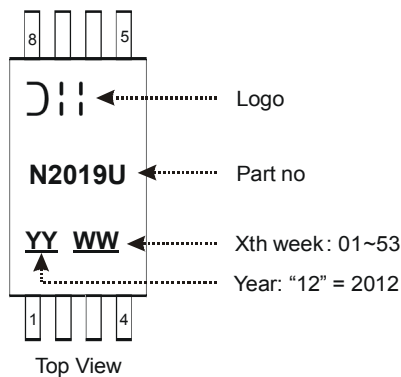


Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|---------|------------------|
| DMN2019UTS-13 | TSSOP-8 | 2500/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> 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 <http://www.diodes.com>.

Marking Information



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

| Characteristic | | | | Symbol | Value | Units |
|---|------------------------|--------------|---------------------------|-----------|----------|-------|
| Drain-Source Voltage | | | | V_{DSS} | 20 | V |
| Gate-Source Voltage | | | | V_{GSS} | ± 12 | V |
| Continuous Drain Current (Note 5) | $V_{GS} = 10\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ | I_D | 5.4 | A |
| | | | $T_A = +70^\circ\text{C}$ | | 4.3 | |
| Continuous Drain Current (Note 5) | $V_{GS} = 2.5\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ | I_D | 4.6 | A |
| | | | $T_A = +70^\circ\text{C}$ | | 3.7 | |
| Continuous Body Diode Forward Current (Note 5) | | | Steady State | I_S | 0.9 | A |
| Pulsed Drain Current (Note 5) 10 μs pulse, duty cycle = 1% | | | | I_{DM} | 30 | A |

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

| Characteristic | Symbol | Value | Units |
|--|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 5) | P_D | 0.78 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 161 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case (Note 5) | $R_{\theta JC}$ | 26 | $^\circ\text{C/W}$ |
| 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 6) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 20 | - | - | V | $V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | - | - | 1.0 | μA | $V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | - | - | 10 | μA | $V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$ |
| Gate-Source Breakdown Voltage | BV_{SGS} | ± 12 | - | - | V | $V_{DS} = 0\text{V}, I_G = \pm 250\mu\text{A}$ |
| ON CHARACTERISTICS (Note 6) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 0.35 | - | 0.95 | V | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | - | 15.5 | 18.5 | m Ω | $V_{GS} = 10\text{V}, I_D = 7\text{A}$ |
| | | - | 16.5 | 21 | | $V_{GS} = 4.5\text{V}, I_D = 7\text{A}$ |
| | | - | 17 | 21.5 | | $V_{GS} = 4.0\text{V}, I_D = 7\text{A}$ |
| | | - | 17.5 | 22.5 | | $V_{GS} = 3.6\text{V}, I_D = 6.5\text{A}$ |
| | | - | 18 | 23 | | $V_{GS} = 3.1\text{V}, I_D = 6.5\text{A}$ |
| | | - | 19 | 24 | | $V_{GS} = 2.5\text{V}, I_D = 5.5\text{A}$ |
| | | - | 24 | 31 | | $V_{GS} = 1.8\text{V}, I_D = 3.5\text{A}$ |
| | | Forward Transfer Admittance | $ Y_{fs} $ | - | | 13 |
| Diode Forward Voltage | V_{SD} | - | 0.7 | 1.0 | V | $V_{GS} = 0\text{V}, I_S = 1\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 7) | | | | | | |
| Input Capacitance | C_{iss} | - | 143 | - | pF | $V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | - | 74 | - | pF | |
| Reverse Transfer Capacitance | C_{rss} | - | 29 | - | pF | |
| Gate Resistance | R_g | - | 202 | - | Ω | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$ |
| Total Gate Charge | Q_g | - | 8.8 | - | nC | $V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}, I_D = 6.5\text{A}$ |
| Gate-Source Charge | Q_{gs} | - | 1.4 | - | nC | |
| Gate-Drain Charge | Q_{gd} | - | 3.0 | - | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | - | 53 | - | ns | $V_{DD} = 10\text{V}, V_{GS} = 4.5\text{V}, R_L = 10\Omega, R_G = 6\Omega$ |
| Turn-On Rise Time | t_r | - | 78 | - | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | - | 562 | - | ns | |
| Turn-Off Fall Time | t_f | - | 234 | - | ns | |

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

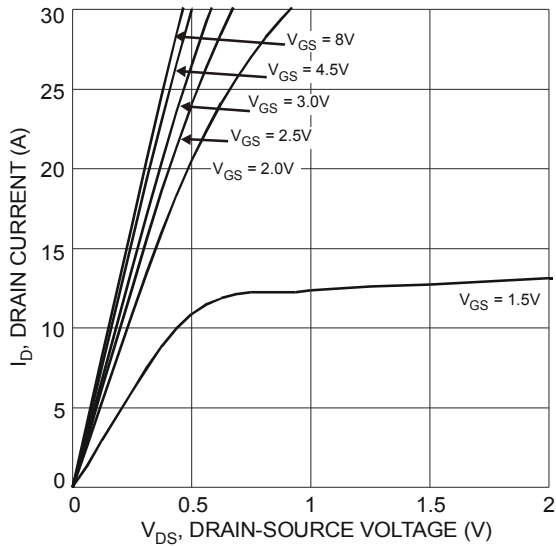


Fig. 1 Typical Output Characteristic

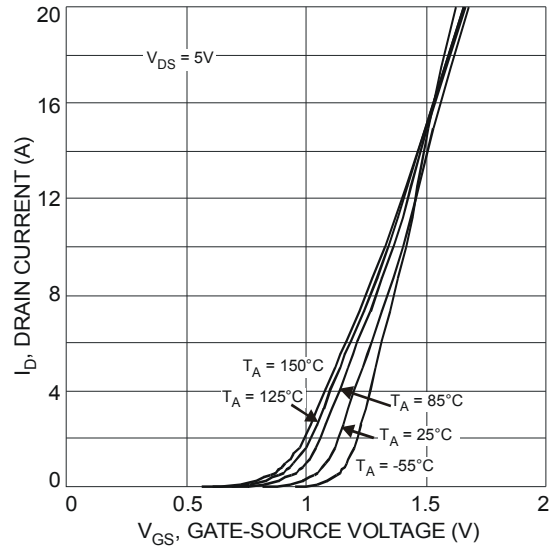


Fig. 2 Typical Transfer Characteristic

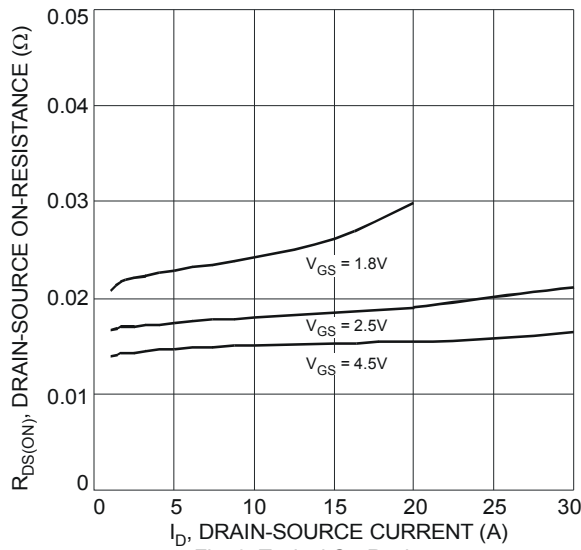


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

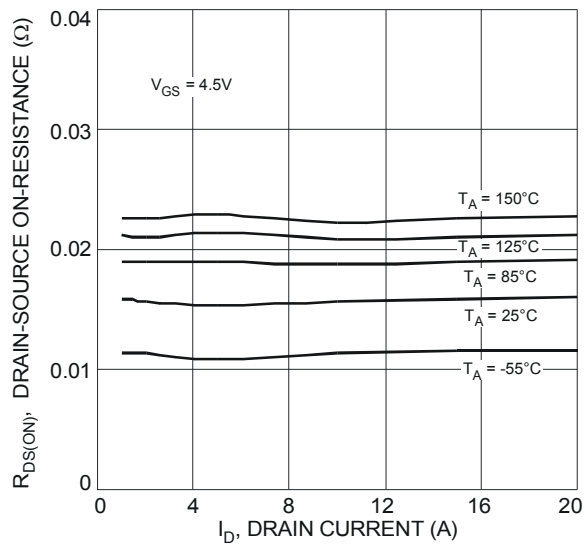


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

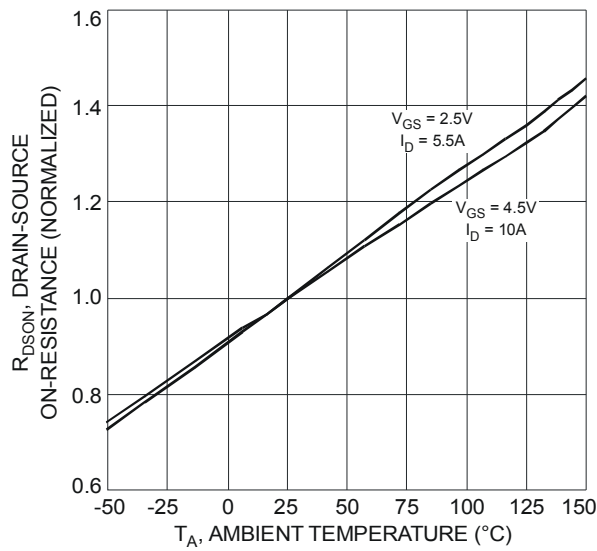


Fig. 5 On-Resistance Variation with Temperature

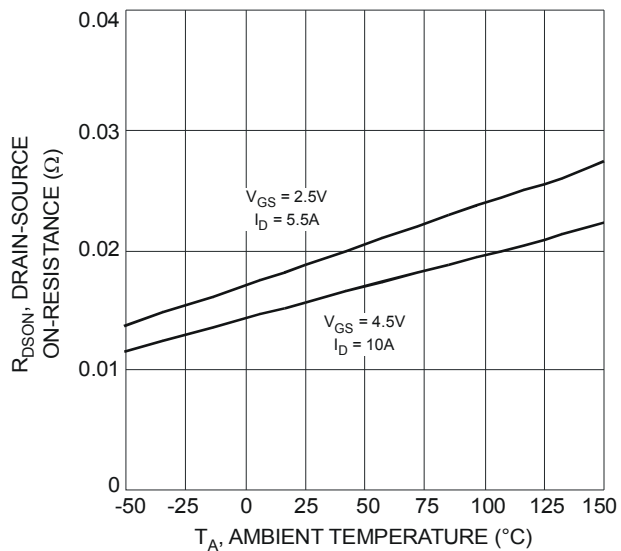


Fig. 6 On-Resistance Variation with Temperature

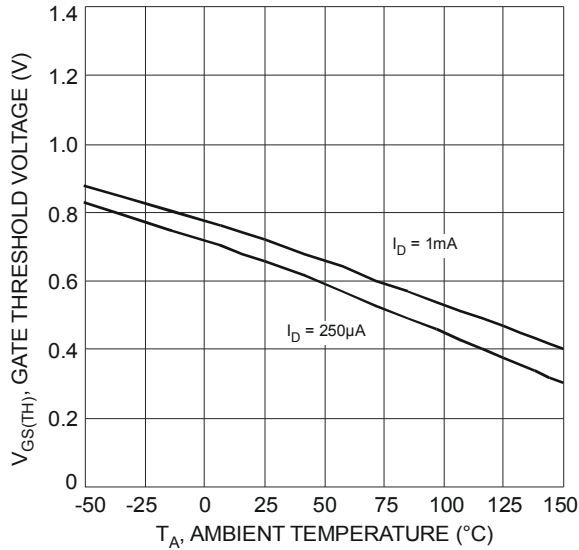


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

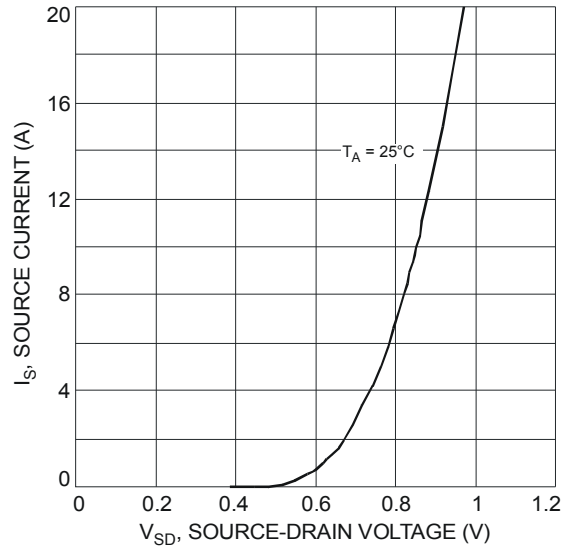


Fig. 8 Diode Forward Voltage vs. Current

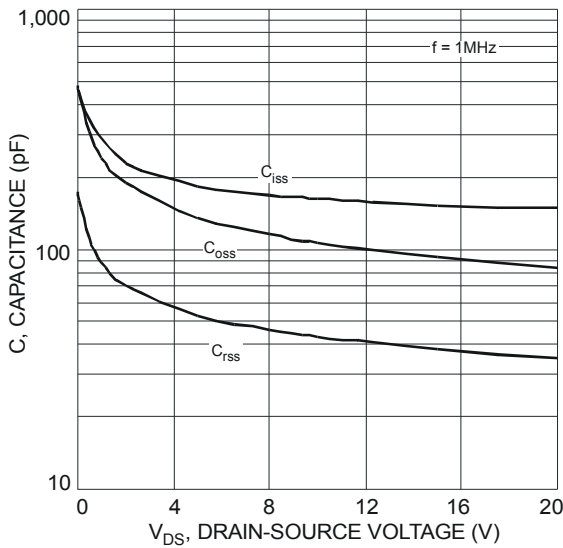


Fig. 9 Typical Total Capacitance

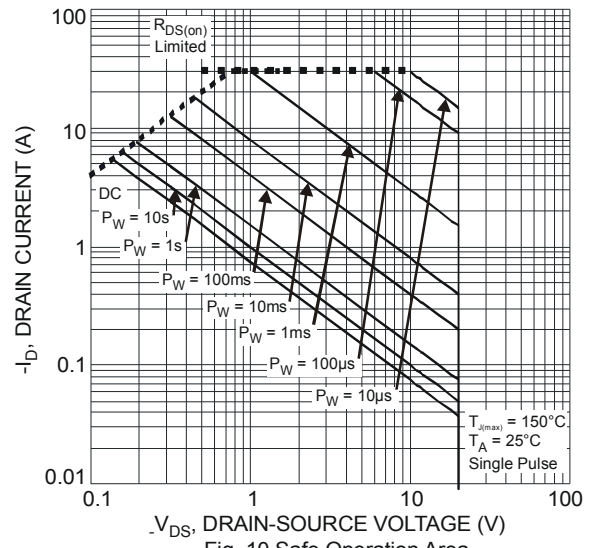


Fig. 10 Safe Operation Area

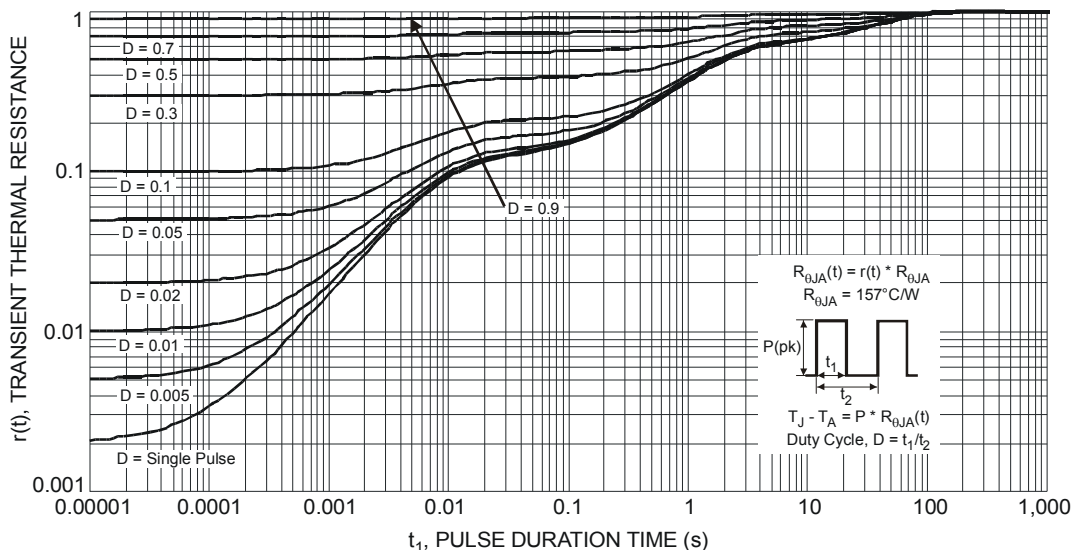
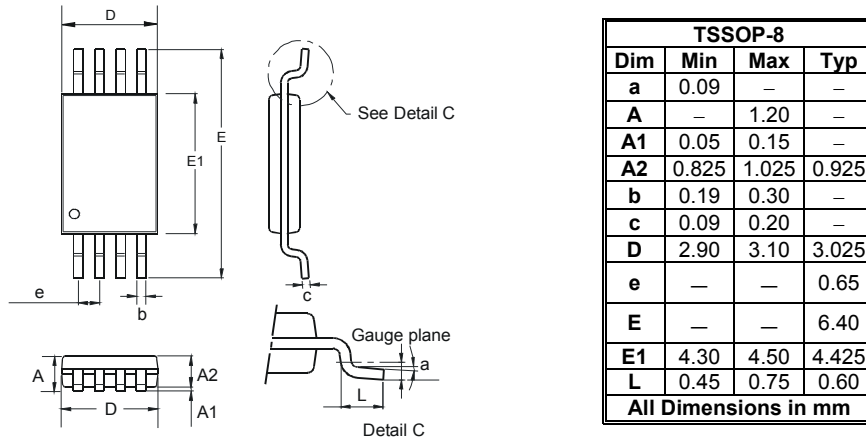


Fig. 11 Transient Thermal Response

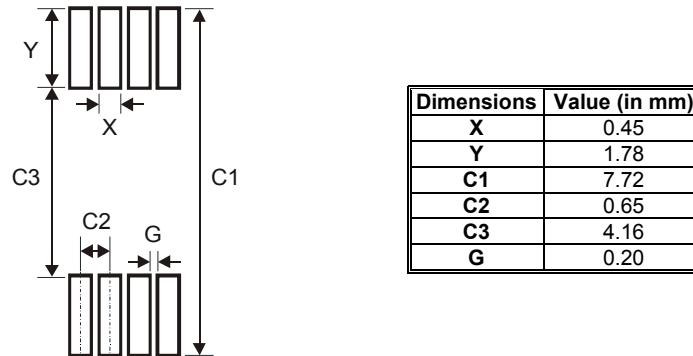
Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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