

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ max                      | $I_D$<br>$T_A = +25^\circ\text{C}$ |
|---------------|---------------------------------------|------------------------------------|
| -30V          | 16m $\Omega$ @ $V_{GS} = -20\text{V}$ | -7.3A                              |
|               | 20m $\Omega$ @ $V_{GS} = -10\text{V}$ | -6.0A                              |

## 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

- DC-DC Converters
- Power management functions
- Backlighting

## Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **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**

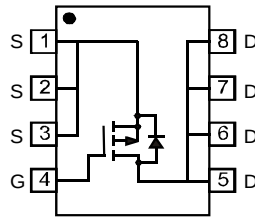
## Mechanical Data

- Case: SO-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: 0.072 grams (approximate)

SO-8



Top View

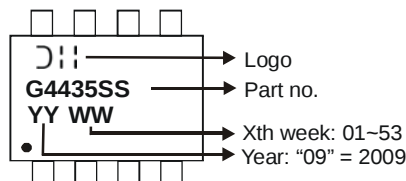

 Top View  
Internal Schematic

## Ordering Information (Note 4)

| Part Number   | Case | Packaging          |
|---------------|------|--------------------|
| DMG4435SSS-13 | SO-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<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                          |              |                                                  | Symbol           | Value        | Unit |
|---------------------------------------------------------|--------------|--------------------------------------------------|------------------|--------------|------|
| Drain-Source Voltage                                    |              |                                                  | V <sub>DSS</sub> | -30          | V    |
| Gate-Source Voltage                                     |              |                                                  | V <sub>GSS</sub> | ±25          | V    |
| Continuous Drain Current (Note 5) V <sub>GS</sub> = -20 | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -7.3<br>-5.7 | A    |
|                                                         | t < 10s      | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | -10<br>-7.5  | A    |
| Pulsed Drain Current (Note 6)                           |              |                                                  | I <sub>DM</sub>  | -80          | A    |

**Thermal Characteristics**

| Characteristic                                                  |                        | Symbol                            | Value       | Unit |
|-----------------------------------------------------------------|------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                                      | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 2.5         | W    |
|                                                                 | T <sub>A</sub> = +70°C |                                   | 1.5         | W    |
| Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C | Steady state           | R <sub>θJA</sub>                  | 96.5        | °C/W |
|                                                                 | t < 10s                |                                   | 55          | °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 7)</b>                    |                     |      |       |      |      |                                                                                                  |
| Drain-Source Breakdown Voltage                         | BV <sub>DSS</sub>   | -30  | -     | -    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -1mA                                                      |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C | I <sub>DSS</sub>    | -    | -     | -1.0 | μA   | V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V                                                     |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | -    | -     | ±100 | nA   | V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V                                                     |
| <b>ON CHARACTERISTICS (Note 7)</b>                     |                     |      |       |      |      |                                                                                                  |
| Gate Threshold Voltage                                 | V <sub>GS(th)</sub> | -1.0 | -1.7  | -2.5 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                      |
| Static Drain-Source On-Resistance                      | R <sub>DS(on)</sub> | -    | 13    | 16   | mΩ   | V <sub>GS</sub> = -20V, I <sub>D</sub> = -11A                                                    |
|                                                        |                     |      | 15    | 20   |      | V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A                                                    |
|                                                        |                     |      | 21    | 29   |      | V <sub>GS</sub> = -5V, I <sub>D</sub> = -5A                                                      |
| Forward Transfer Admittance                            | Y <sub>fs</sub>     | -    | 22    | -    | S    | V <sub>DS</sub> = -5V, I <sub>D</sub> = -10A                                                     |
| Diode Forward Voltage                                  | V <sub>SD</sub>     | -    | -0.74 | -1.0 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A                                                       |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>                |                     |      |       |      |      |                                                                                                  |
| Input Capacitance                                      | C <sub>iss</sub>    | -    | 1614  | -    | pF   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                      |
| Output Capacitance                                     | C <sub>oss</sub>    | -    | 226   | -    | pF   |                                                                                                  |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | -    | 214   | -    | pF   |                                                                                                  |
| Gate Resistance                                        | R <sub>g</sub>      | -    | 6.8   | -    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                             |
| Total Gate Charge at 10V                               | Q <sub>g</sub>      | -    | 35.4  | -    | nC   | V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V, I <sub>D</sub> = -10A                            |
| Total Gate Charge at 5V                                | Q <sub>g</sub>      | -    | 18.9  | -    | nC   |                                                                                                  |
| Gate-Source Charge                                     | Q <sub>gs</sub>     | -    | 4.6   | -    | nC   | V <sub>GS</sub> = -5V, V <sub>DS</sub> = -15V,<br>I <sub>D</sub> = -10A                          |
| Gate-Drain Charge                                      | Q <sub>gd</sub>     | -    | 5.7   | -    | nC   |                                                                                                  |
| Turn-On Delay Time                                     | t <sub>D(on)</sub>  | -    | 8.6   | -    | ns   | V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V,<br>R <sub>L</sub> = 1.5Ω, R <sub>GEN</sub> = 3Ω, |
| Turn-On Rise Time                                      | t <sub>r</sub>      | -    | 12.7  | -    | ns   |                                                                                                  |
| Turn-Off Delay Time                                    | t <sub>D(off)</sub> | -    | 44.9  | -    | ns   |                                                                                                  |
| Turn-Off Fall Time                                     | t <sub>f</sub>      | -    | 22.8  | -    | ns   |                                                                                                  |

- Notes:
5. Device mounted on 1in. x 1in. FR-4 PCB with 2oz. Copper, and the testing is based on the t<10s. The value in any given application depends on the user's specific board design.
  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.

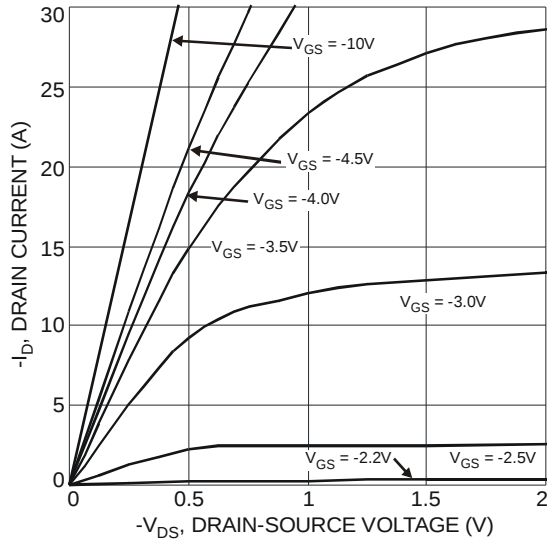


Fig. 1 Typical Output Characteristic

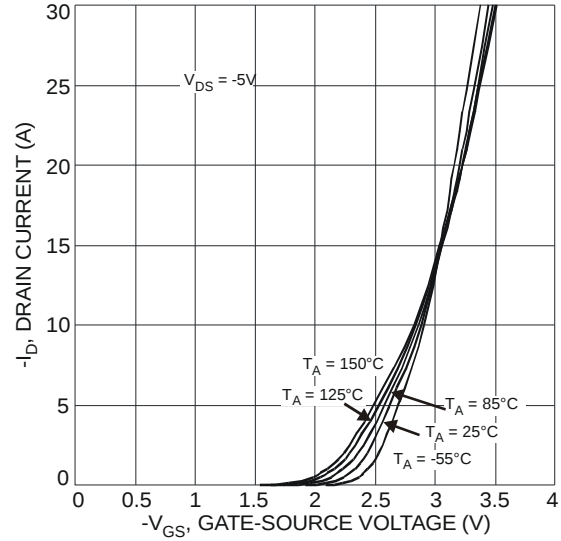


Fig. 2 Typical Transfer Characteristic

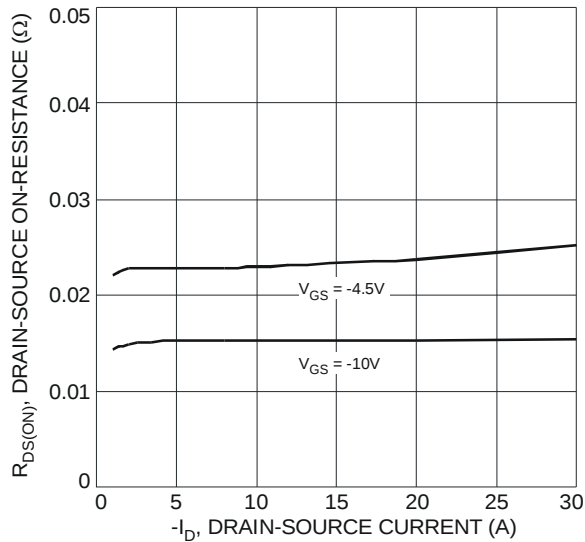


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

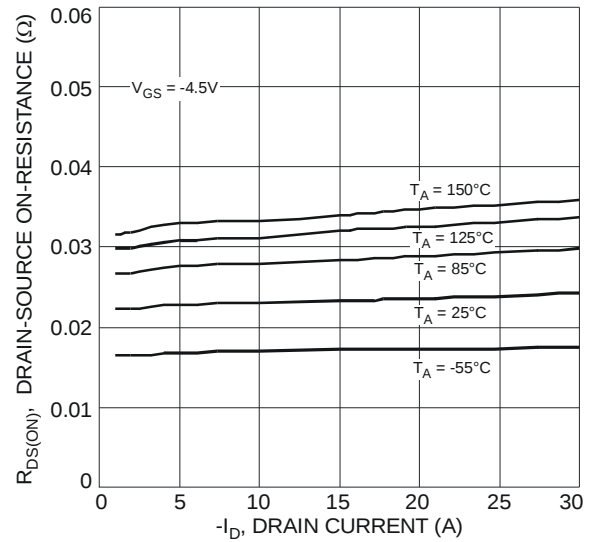


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

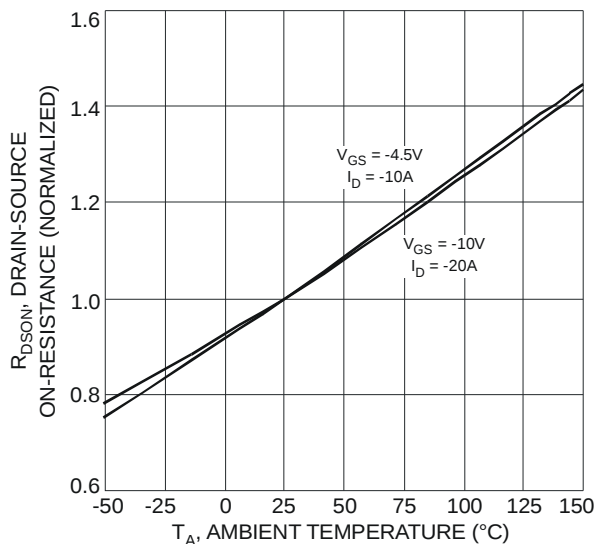


Fig. 5 On-Resistance Variation with Temperature

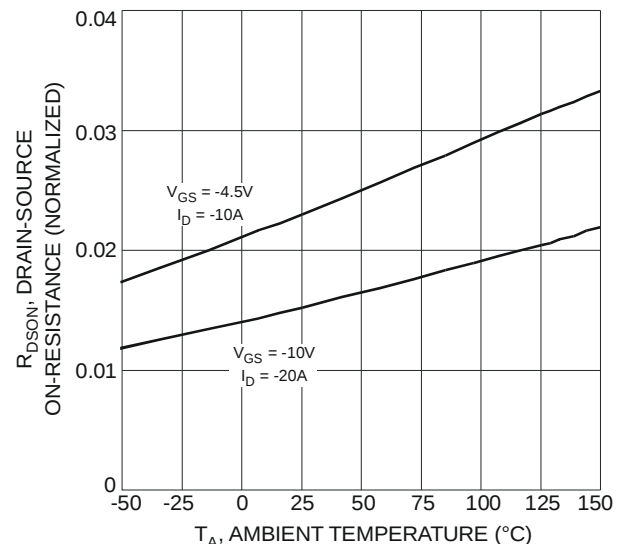


Fig. 6 On-Resistance Variation with Temperature

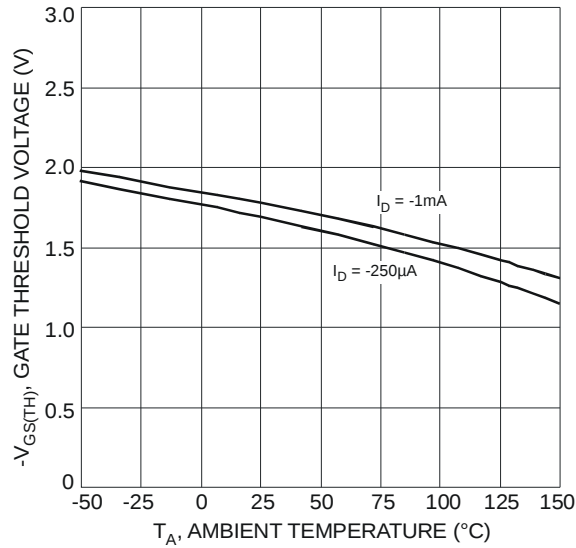


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

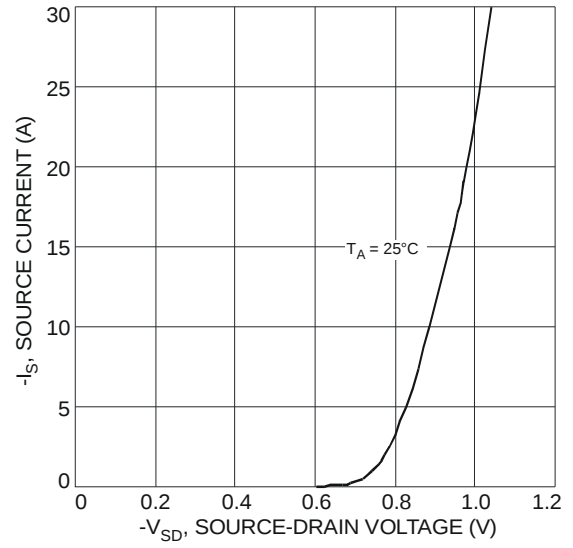


Fig. 8 Diode Forward Voltage vs. Current

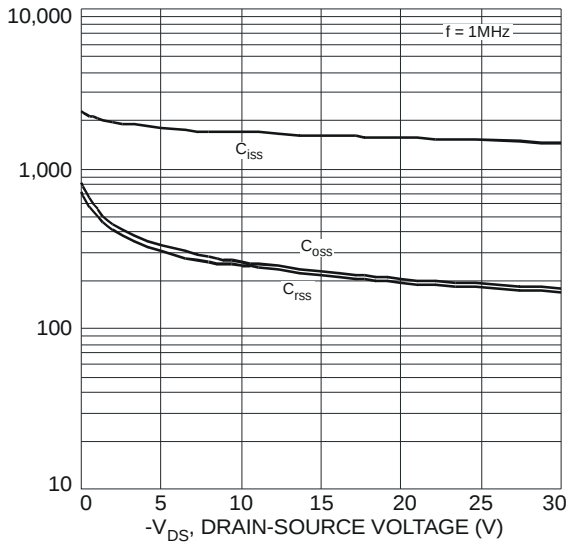


Fig. 9 Typical Total Capacitance

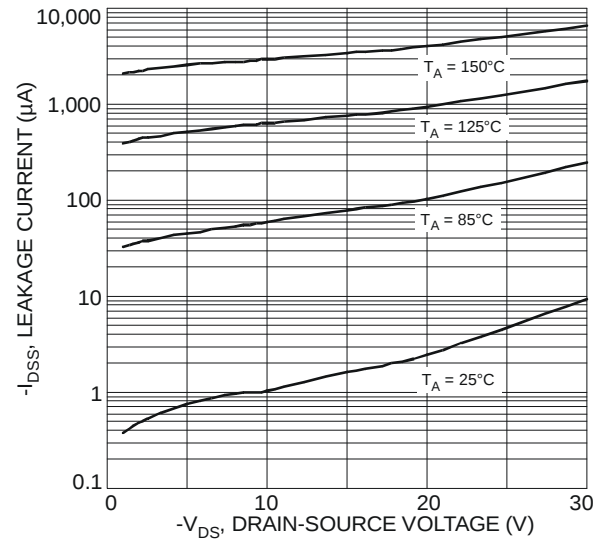


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

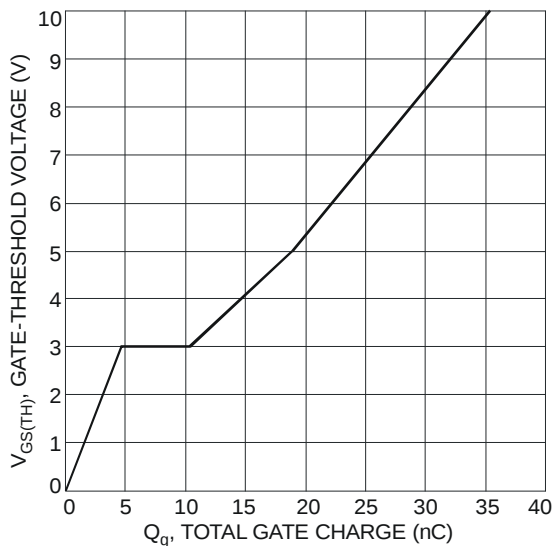


Fig. 11 Gate Threshold Voltage vs. Total Gate Charge

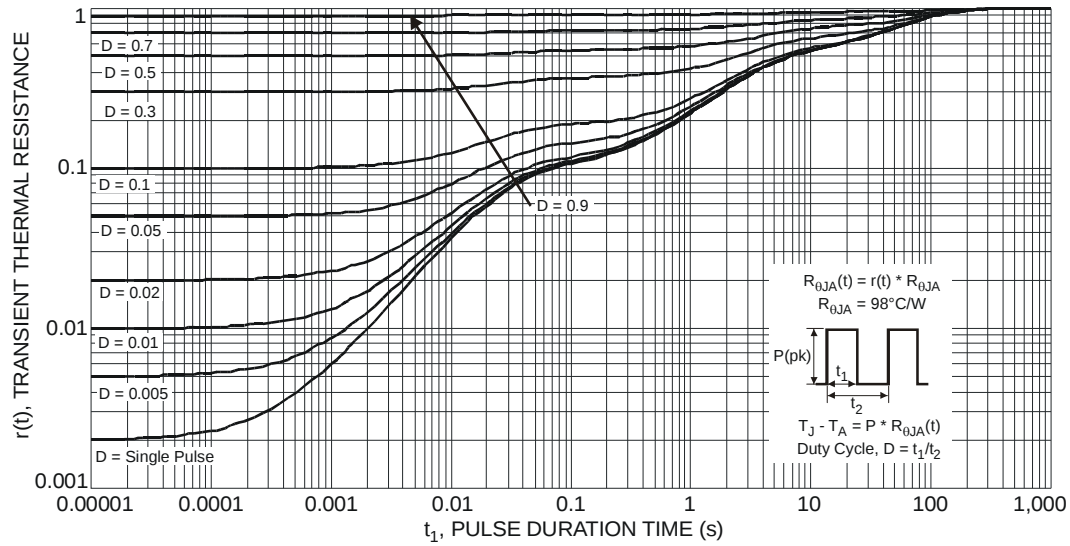
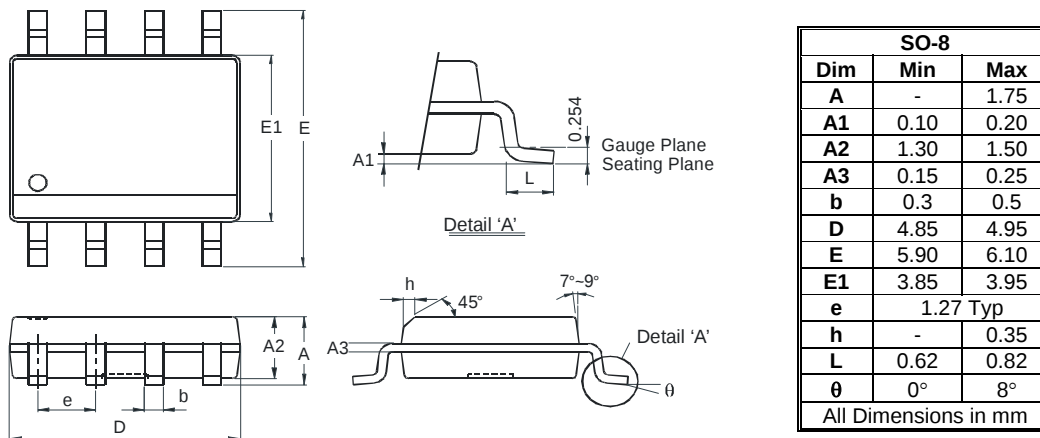


Fig. 12 Transient Thermal Response

## 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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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

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