

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | I_D max $T_A = +25^\circ\text{C}$ |
|---------------|--|--|
| -16V | 39m Ω @ $V_{GS} = -4.5\text{V}$ | -2.5A |
| | 52m Ω @ $V_{GS} = -2.5\text{V}$ | -2.1A |
| | 65m Ω @ $V_{GS} = -1.8\text{V}$ | -1.8A |

Description and Applications

This 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.

- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

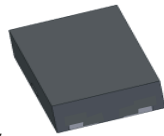
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- ESD Protected Up To 3kV
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

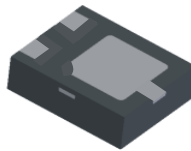
- Case: X2-DFN2015-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 @4
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)



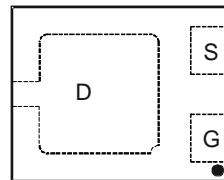
ESD PROTECTED TO 3kV



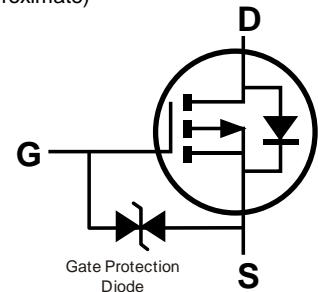
Top View



Bottom View



Internal Schematic
(Top View)



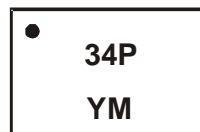
Equivalent Circuit

Ordering Information (Note 5)

| Part Number | Case | Packaging |
|----------------|--------------|-------------------|
| DMG3415UFY4Q-7 | X2-DFN2015-3 | 3,000/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 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



34P = Marking Code
 YM = Date Code Marking
 Y = Year (ex: C = 2015)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2009 | ~ | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|------|------|---|------|------|------|------|------|------|------|
| Code | W | ~ | C | D | E | F | G | H | I |

| 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} | -16 | V |
| Gate-Source Voltage | | | V _{GSS} | ±8 | V |
| Continuous Drain Current (Note 7) V _{GS} = -4.5V | Steady State | T _A = +25°C | I _D | -2.5 | A |
| | | T _A = +70°C | | -2.2 | A |
| Pulsed Drain Current (Note 7) | | | I _{DM} | -12 | A |

Thermal Characteristics

| Characteristic | | | Symbol | Value | Unit |
|--|--|--------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 6) | | | P _D | 0.65 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | | Steady State | R _{θJA} | 197 | °C/W |
| Total Power Dissipation (Note 7) | | | P _D | 1.35 | W |
| Thermal Resistance, Junction to Ambient (Note 7) | | Steady State | R _{θJA} | 95 | °C/W |
| Thermal Resistance, Junction to Case (Note 7) | | | R _{θJC} | 22 | |
| 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} | -16 | — | — | V | V _{GS} = 0V, I _D = -250μA | |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | -1.0 | μA | T _J = +25°C, V _{DS} = -16V, V _{GS} = 0V | |
| Gate-Source Leakage | I _{GSS} | — | — | ±10 | μA | V _{GS} = ±8V, V _{DS} = 0V | |
| | | | | ±500 | nA | | V _{GS} = ±5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | -0.3 | -0.55 | -1.0 | V | V _{DS} = V _{GS} , I _D = -250μA | |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | 31 | 39 | mΩ | V _{GS} = -4.5V, I _D = -4.0A | |
| | | | 40 | 52 | | | V _{GS} = -2.5V, I _D = -3.5A |
| | | | 51 | 65 | | | V _{GS} = -1.8V, I _D = -2.0A |
| Forward Transfer Admittance | Y _{fs} | — | 7.9 | — | S | V _{DS} = -5V, I _D = -2.5A | |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | | |
| Input Capacitance | C _{iss} | — | 282 | — | pF | V _{DS} = -10V, V _{GS} = 0V f = 1.0MHz | |
| Output Capacitance | C _{oss} | — | 152 | — | pF | | |
| Reverse Transfer Capacitance | C _{rss} | — | 38 | — | pF | | |
| Gate Resistance | R _g | — | 250 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz | |
| Total Gate Charge | Q _g | — | 10 | — | nC | V _{GS} = -4.5V, V _{DS} = -10V, I _D = -4A | |
| Gate-Source Charge | Q _{gs} | — | 1.5 | — | nC | | |
| Gate-Drain Charge | Q _{gd} | — | 2.4 | — | nC | | |
| Turn-On Delay Time | t _{D(ON)} | — | 79 | — | ns | V _{DS} = -10V, V _{GS} = -4.5V, R _D = 2.5Ω, R _G = 3.0Ω | |
| Turn-On Rise Time | t _R | — | 175 | — | ns | | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 885 | — | ns | | |
| Turn-Off Fall Time | t _F | — | 568 | — | ns | | |

- Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to product testing.

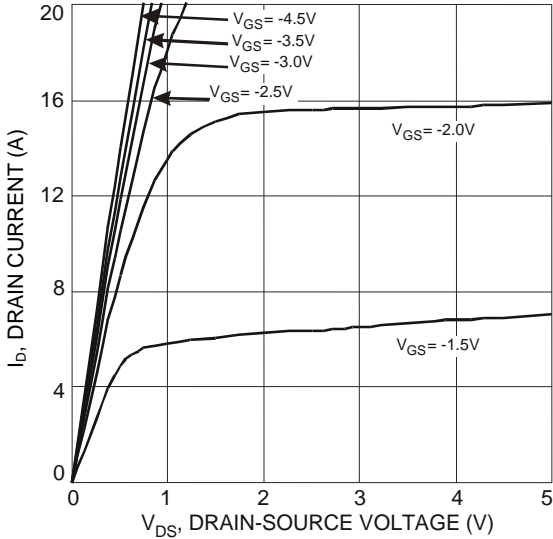


Fig. 1 Typical Output Characteristic

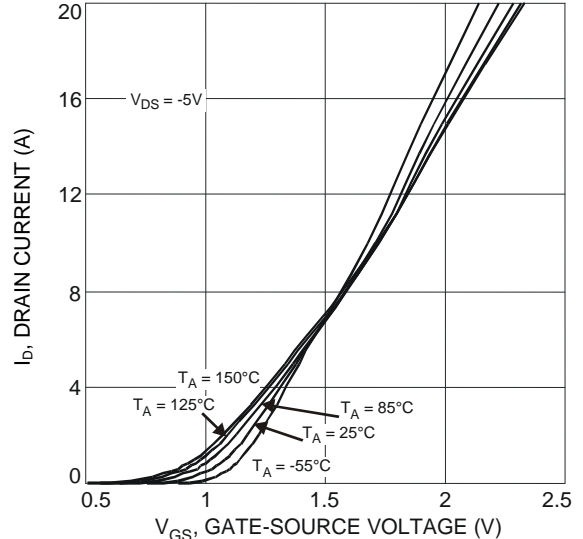


Fig. 2 Typical Transfer Characteristic

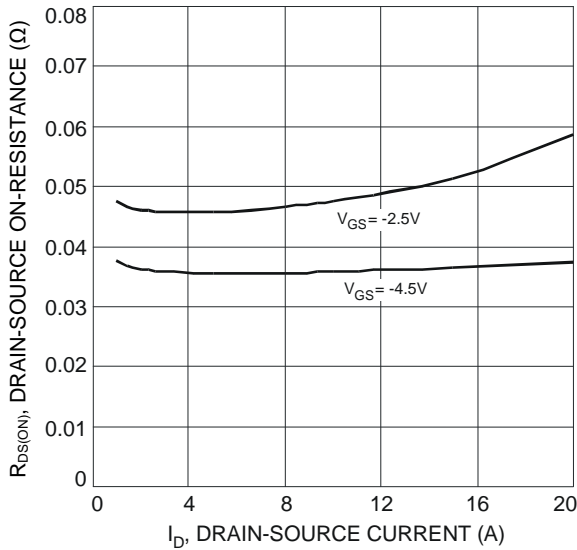


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

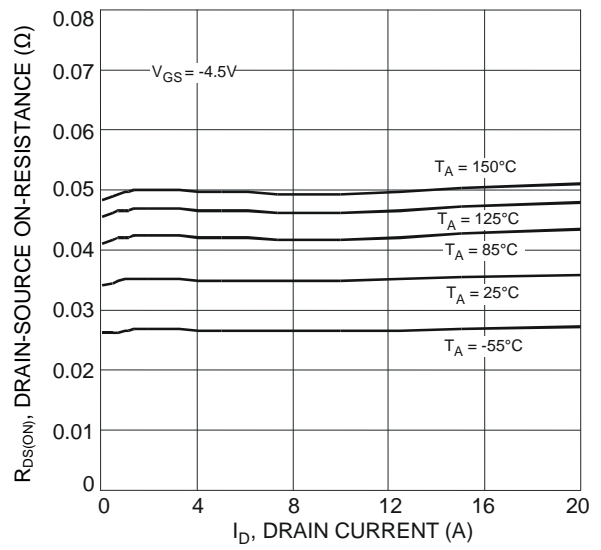


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

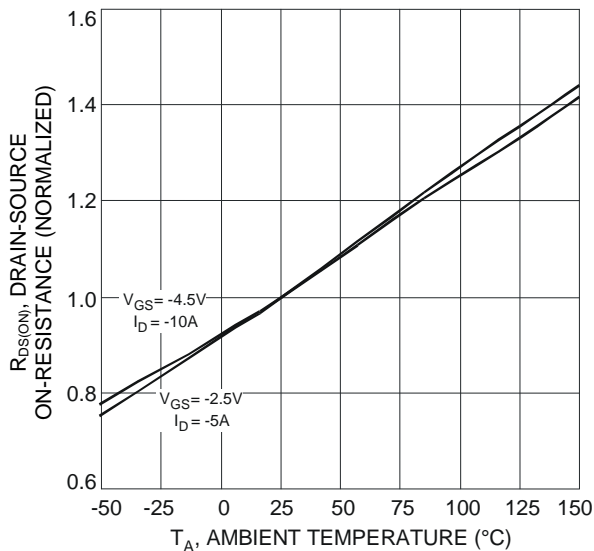


Fig. 5 On-Resistance Variation with Temperature

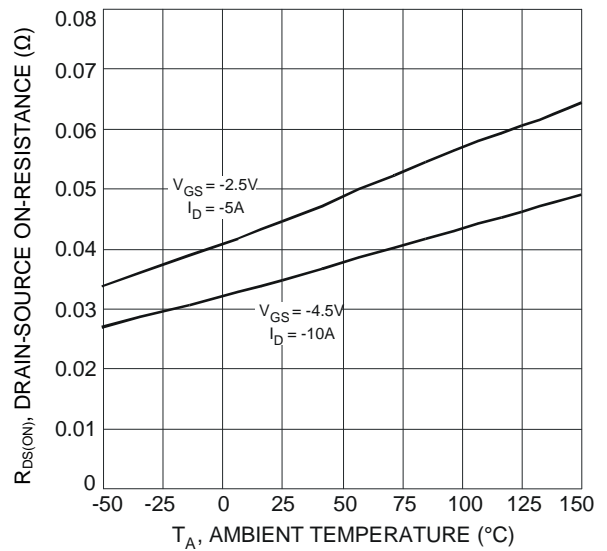


Fig. 6 On-Resistance Variation with Temperature

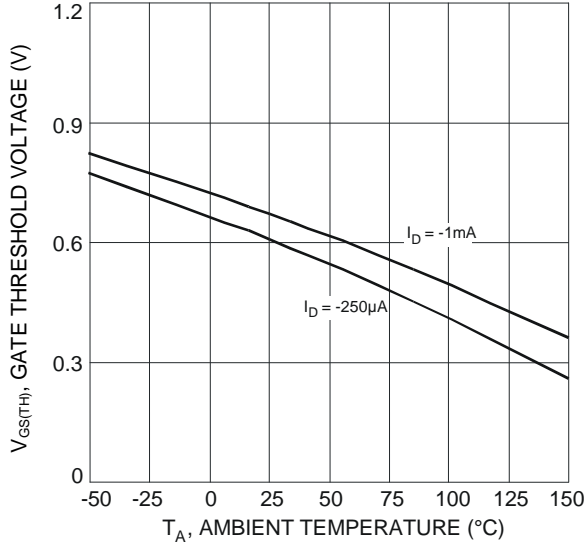


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

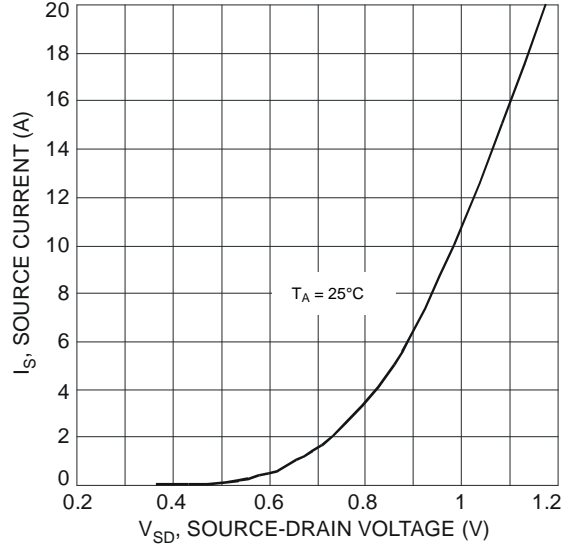


Fig. 8 Diode Forward Voltage vs. Current

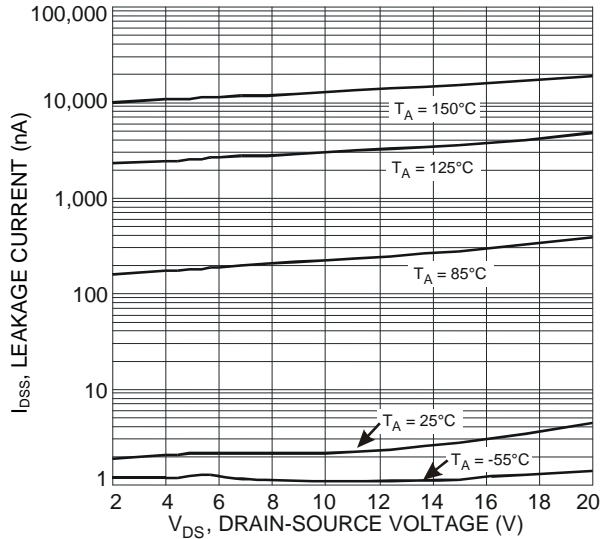


Fig. 9 Typical Leakage Current vs. Drain-Source Voltage

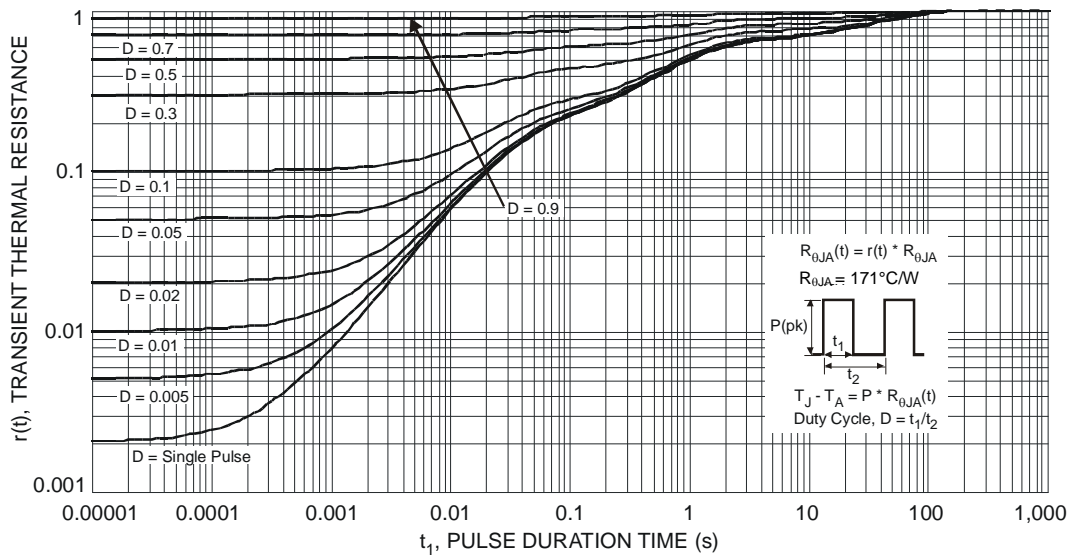
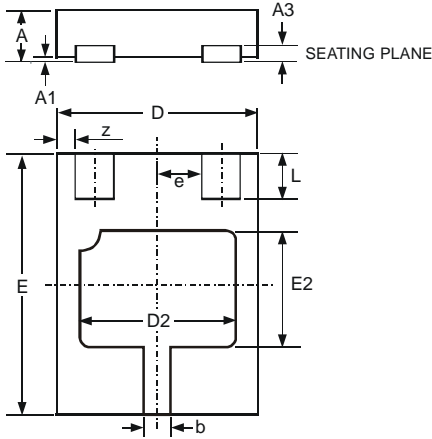


Fig. 10 Transient Thermal Response

Package Outline Dimensions

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

X2-DFN2015-3

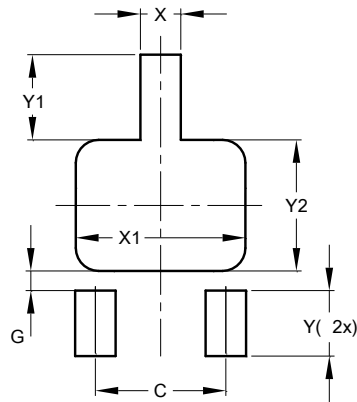


| X2-DFN2015-3 | | | |
|----------------------|------|-------|-------|
| Dim | Min | Max | Typ |
| A | - | 0.40 | - |
| A1 | 0 | 0.05 | 0.02 |
| A3 | - | - | 0.13 |
| b | 0.20 | 0.30 | 0.25 |
| D | 1.45 | 1.575 | 1.5 |
| D2 | 1.00 | 1.20 | 1.10 |
| e | - | - | 0.50 |
| E | 1.95 | 2.075 | 2.00 |
| E2 | 0.70 | 0.90 | 0.80 |
| L | 0.25 | 0.35 | 0.30 |
| z | - | - | 0.125 |
| All Dimensions in mm | | | |

Suggested Pad Layout

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

X2-DFN2015-3



| X2-DFN2015-3 | |
|--------------|---------------|
| Dimensions | Value (in mm) |
| C | 1.000 |
| G | 0.150 |
| X | 0.310 |
| X1 | 1.300 |
| Y | 0.500 |
| Y1 | 0.650 |
| Y2 | 1.000 |

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