

## Product Summary

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

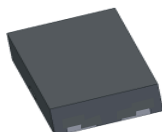
## Description and Applications

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.

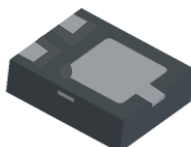
- Backlighting
- Power Management Functions
- DC-DC Converters



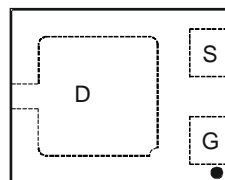
ESD PROTECTED TO 3kV



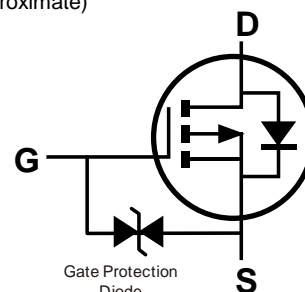
TOP VIEW



BOTTOM VIEW



Internal Schematic  
(Top View)



Equivalent Circuit

## 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**

## Mechanical Data

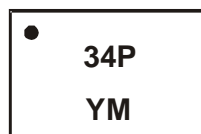
- Case: X2-DFN2015-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (4)
- Terminals Connections: See Diagram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

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMG3415UFY4-7	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](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. 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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	-16	V
Gate-Source Voltage			V <sub>GSS</sub>	±8	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = -4.5V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	-2.5	A
		T <sub>A</sub> = +70°C		-2.2	
Pulsed Drain Current (Note 6)			I <sub>DM</sub>	-12	A

**Thermal Characteristics**

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

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

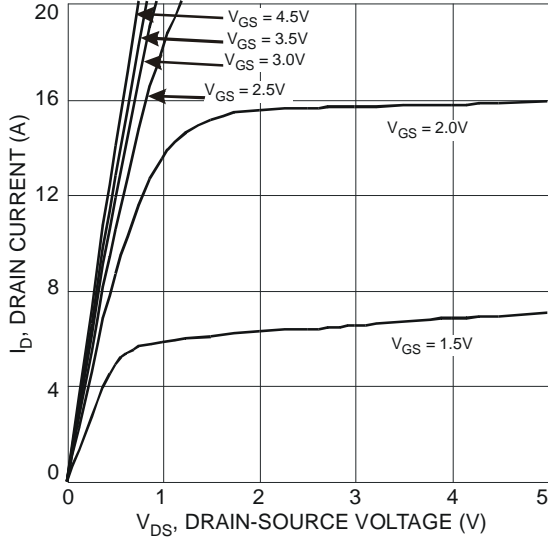


Fig. 1 Typical Output Characteristic

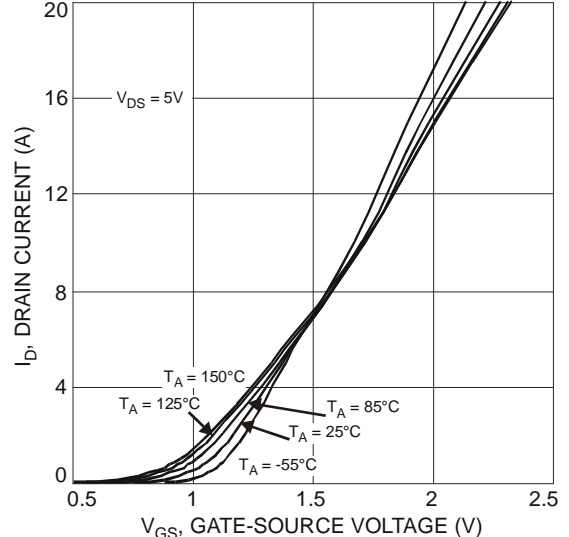


Fig. 2 Typical Transfer Characteristic

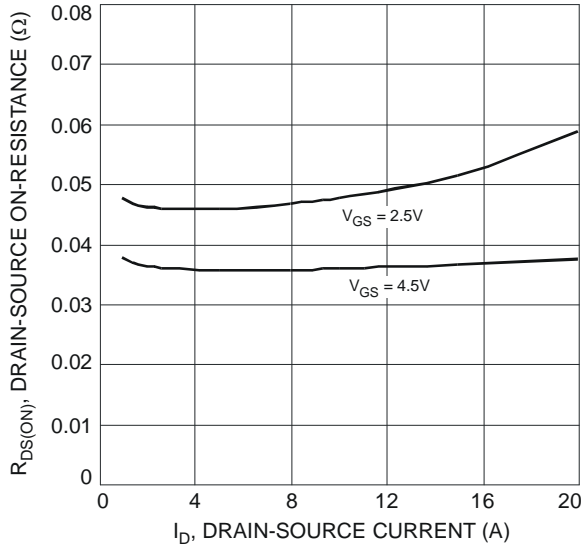


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

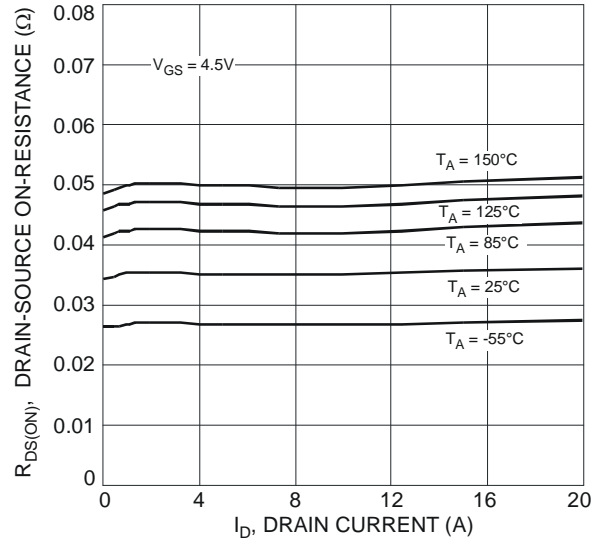


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

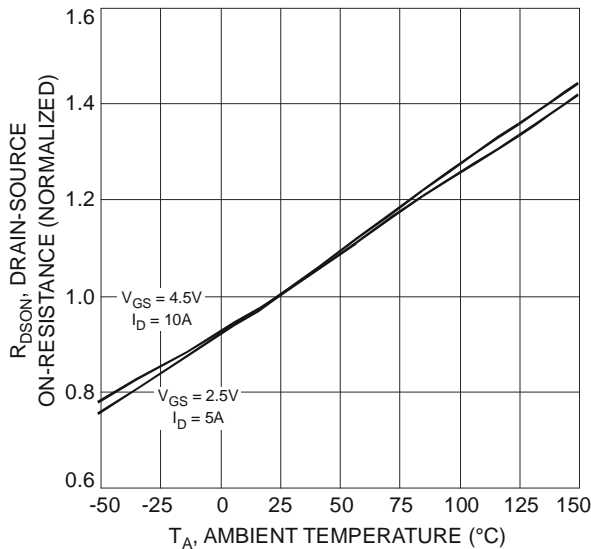


Fig. 5 On-Resistance Variation with Temperature

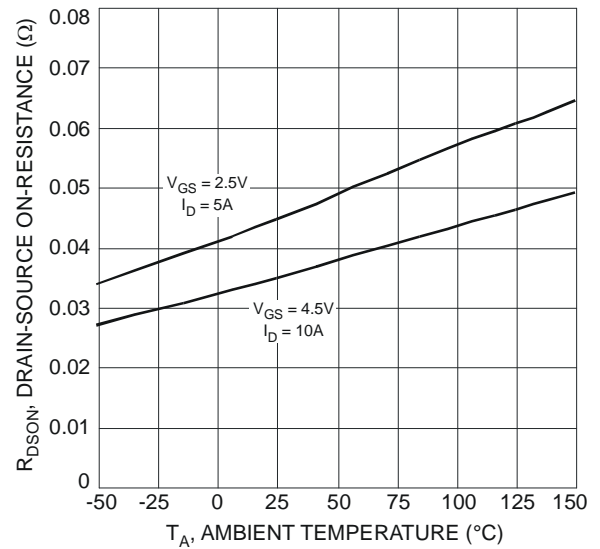


Fig. 6 On-Resistance Variation with Temperature

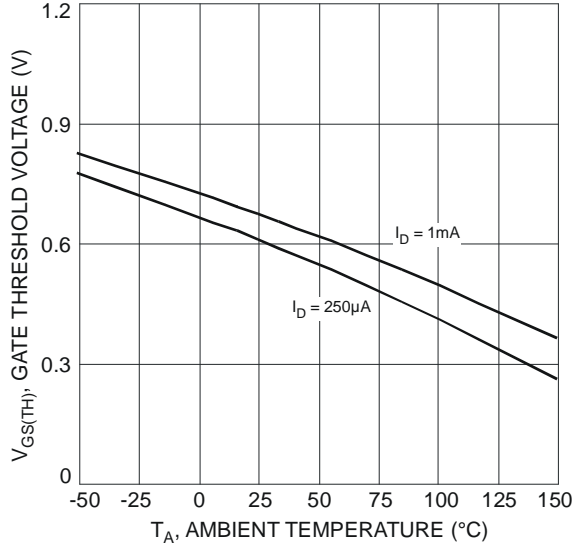


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

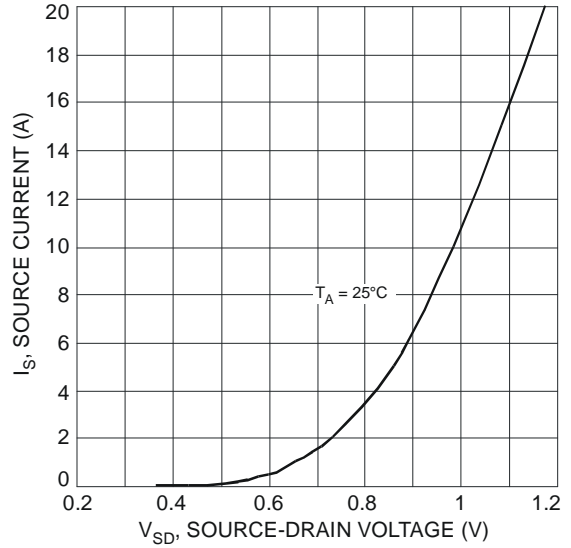


Fig. 8 Diode Forward Voltage vs. Current

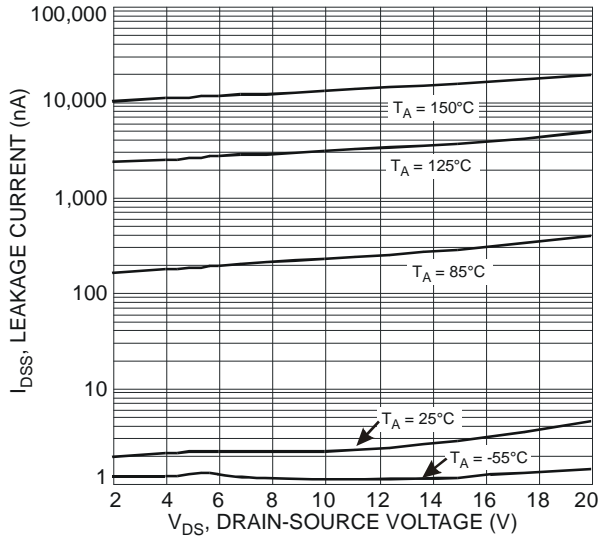


Fig. 9 Typical Leakage Current vs. Drain-Source Voltage

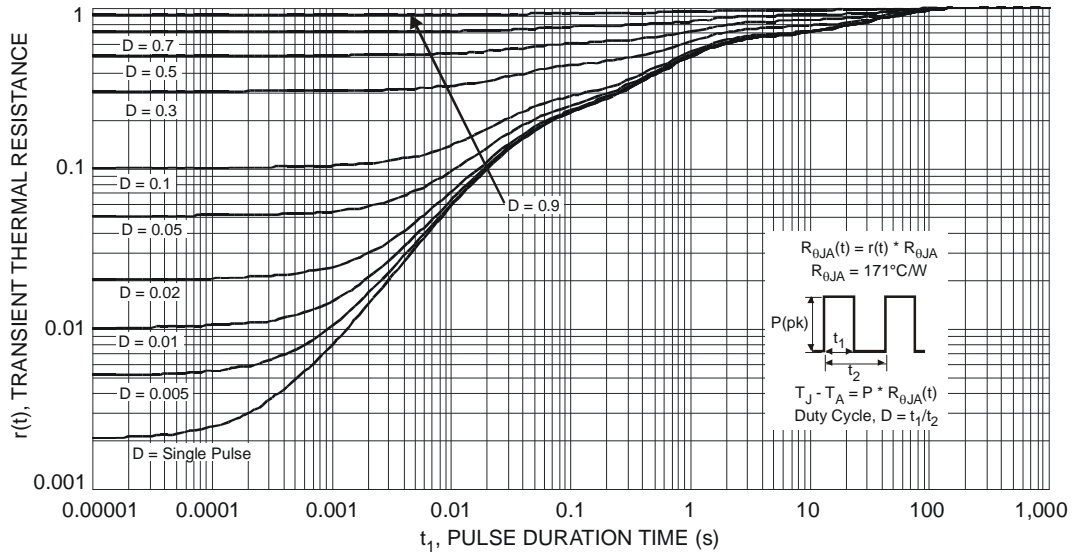
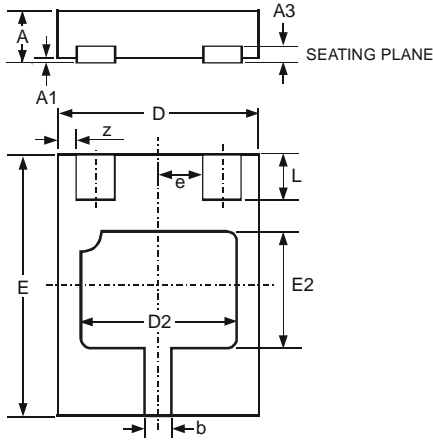


Fig. 10 Transient Thermal Response

**Package Outline Dimensions**

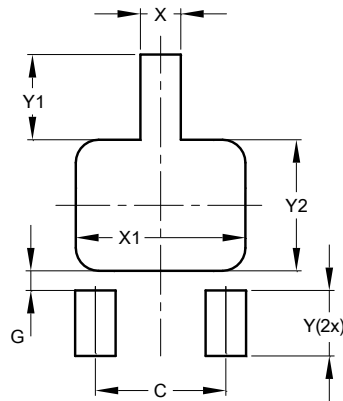
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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/datasheets/ap02001.pdf> for the latest version.



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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