Product Summary

BV_{DSS}	$R_{DS(ON)}$ max	I_D max T_A = +25°C
20V	90mΩ @ V_{GS} = 4.5V	4.2A
	120mΩ @ V_{GS} = 2.5V	2.7A

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**
- **PPAP Capable (Note 4)**

Description and Applications

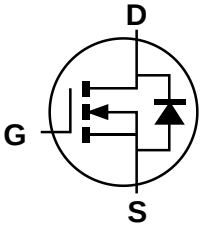
This MOSFET is designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- General Purpose Interfacing Switch
- Power Management Functions
- Boost Application
- Analog Switch

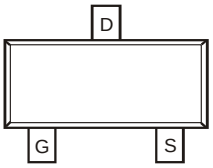
Mechanical Data

- Case: SOT23
- 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
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (Approximate)

Top View



Internal Schematic



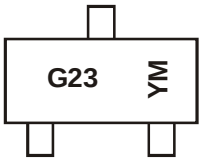
Top View

Ordering Information (Note 5)

Part Number	Case	Packaging
DMG2302UQ-7	SOT-23	3,000/Tape & Reel
DMG2302UQ-13	SOT-23	10,000/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. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



G23 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: C = 2015)
M = Month (ex: 9 = September)

Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Code	W	X	Y	Z	A	B	C	D	E	F	G

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

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Maximum Ratings (@T_A = +25°C unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 6)	Steady State	T_A = +25°C T_A = +70°C	I_D	4.2 3.4	A
Pulsed Drain Current (Note 7)			I_{DM}	27	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 6)	T_A = +25°C T_A = +70°C	P_D	0.8 0.5	W
Thermal Resistance, Junction to Ambient @T_A = +25°C		$R_{\theta JA}$	156	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes: 6. Device mounted on FR-4 PCB, with minimum recommended pad layout.
7. Repetitive rating, pulse width limited by junction temperature.

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}	20	–	–	V	V_{GS} = 0V, I_D = 10μA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	–	–	1.0	μA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	–	–	±100	nA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	0.4	–	1.0	V	V_{DS} = V_{GS}, I_D = 50μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	–	–	90 120	mΩ	V_{GS} = 4.5V, I_D = 3.6A V_{GS} = 2.5V, I_D = 3.1A
Forward Transfer Admittance	$\|Y_{fs}\|$	–	13	–	S	V_{DS} = 5V, I_D = 3.6A
Diode Forward Voltage	V_{SD}	–	0.75	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	–	594.3	–	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	–	64.5	–	pF	
Reverse Transfer Capacitance	C_{rss}	–	57.7	–	pF	
Gate Resistance	R_g	–	1.5	–	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	–	7.0	–	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 3.6A
Gate-Source Charge	Q_{gs}	–	0.9	–	nC	
Gate-Drain Charge	Q_{gd}	–	1.4	–	nC	
Turn-On Delay Time	$t_{D(on)}$	–	7.4	–	ns	V_{DD} = 10V, V_{GS} = 4.5V, R_L = 2.78Ω, R_G = 1.0Ω
Turn-On Rise Time	t_r	–	9.8	–	ns	
Turn-Off Delay Time	$t_{D(off)}$	–	28.1	–	ns	
Turn-Off Fall Time	t_f	–	6.7	–	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

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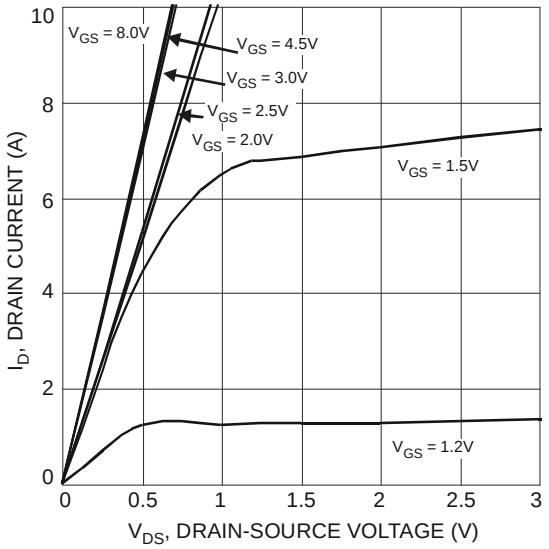

Fig. 1 Typical Output Characteristics

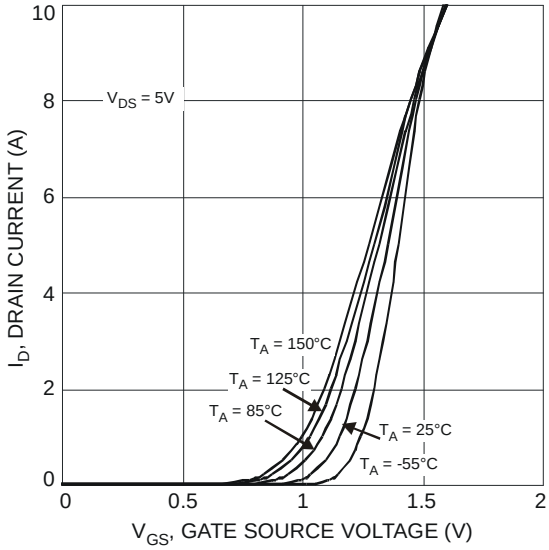

Fig. 2 Typical Transfer Characteristics

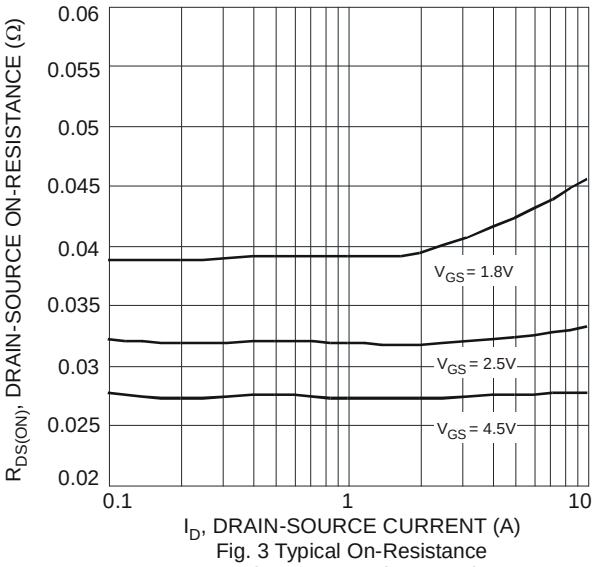

Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

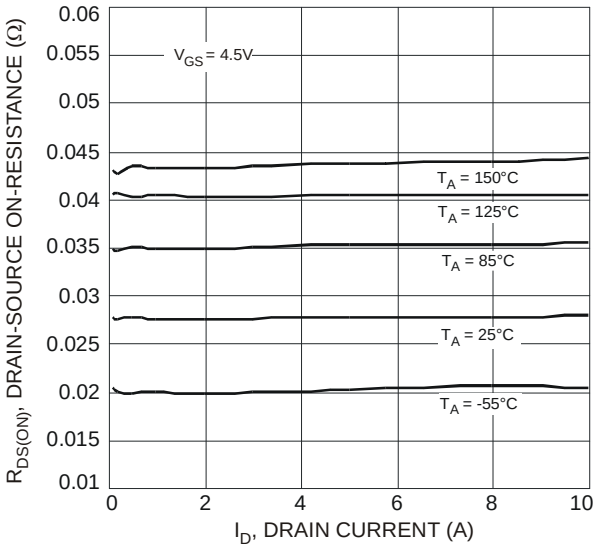

Fig. 4 Typical Drain-Source On-Resistance
vs. Drain Current and Temperature

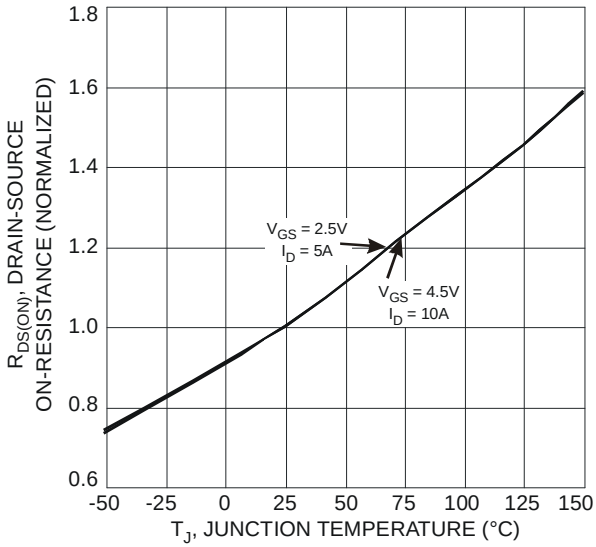

Fig. 5 On-Resistance Variation with Temperature

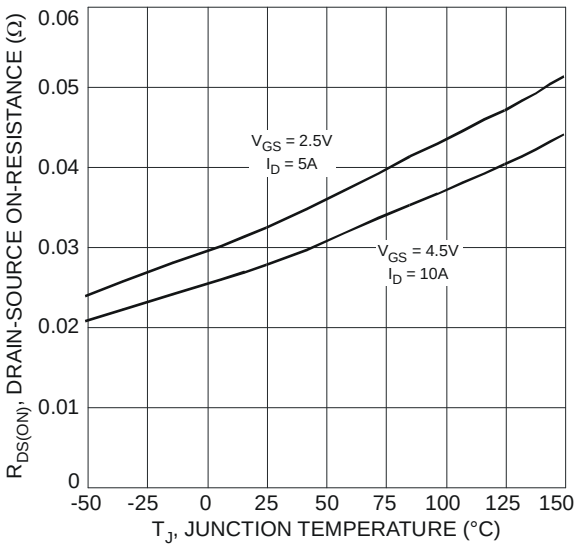

Fig. 6 On-Resistance Variation with Temperature

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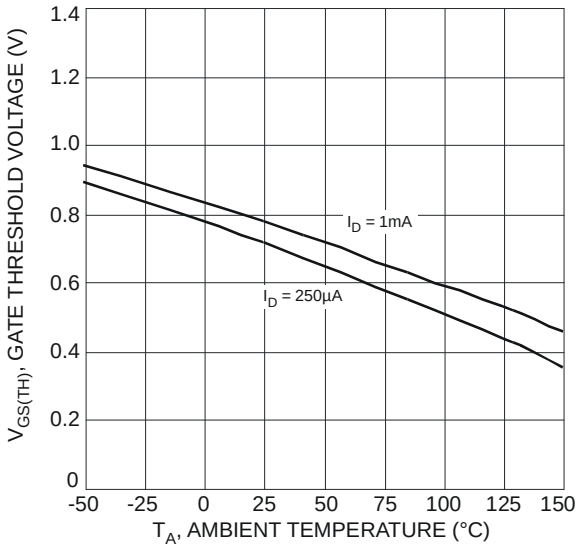

Fig. 7 Gate Threshold Variation vs. Ambient Temperature

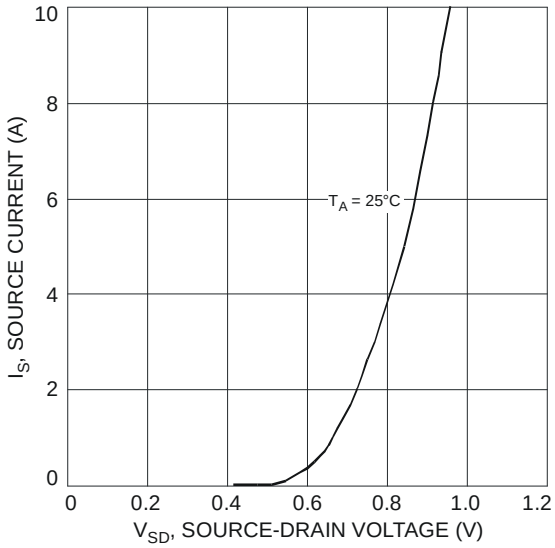

Fig. 8 Diode Forward Voltage vs. Current

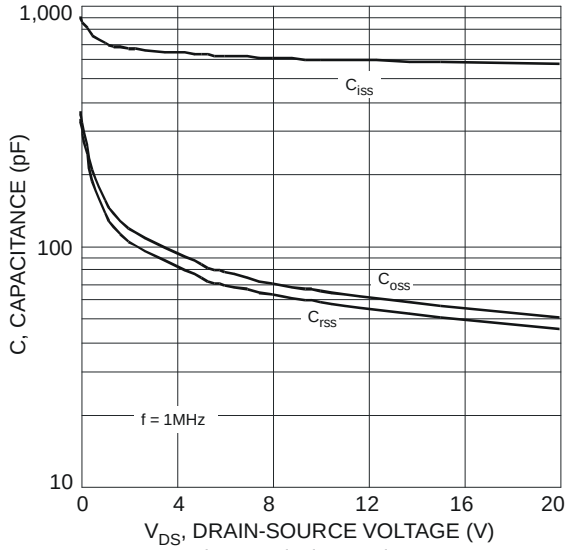

Fig. 9 Typical Capacitance

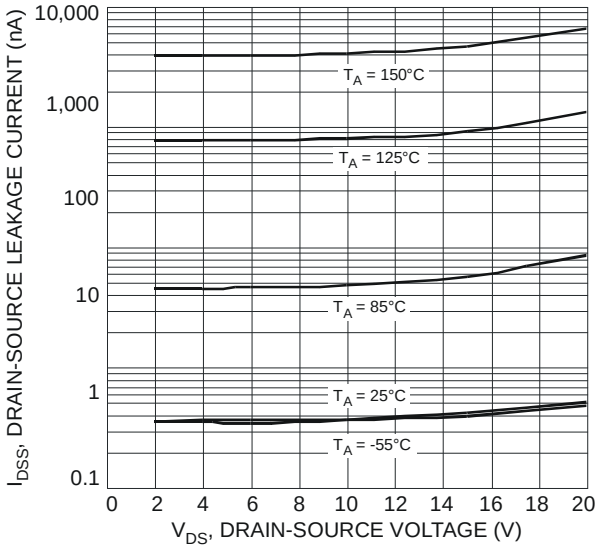

Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

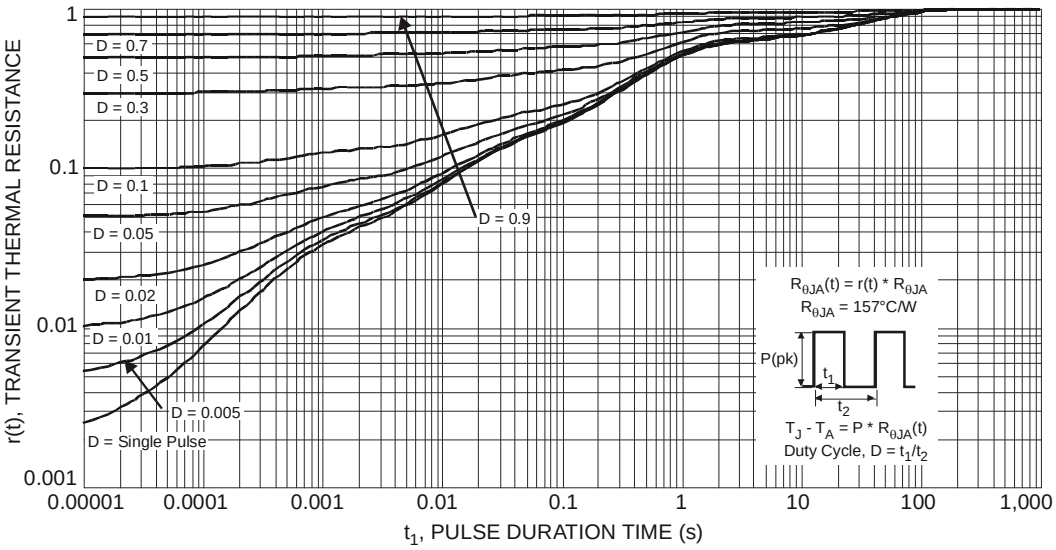

Fig. 11 Transient Thermal Response

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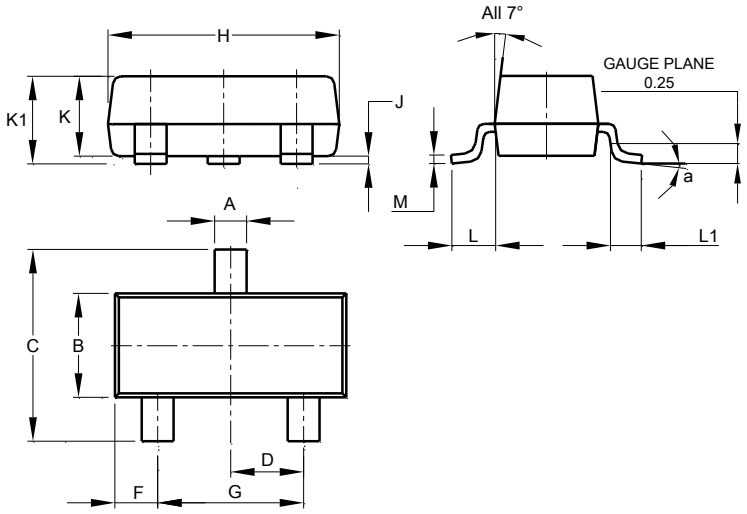
Package Outline Dimensions

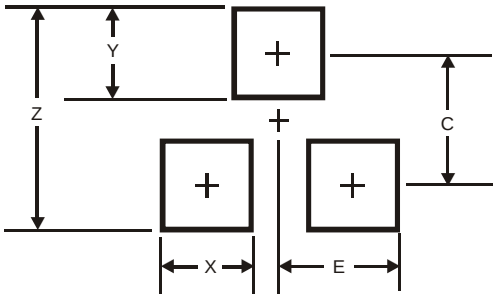
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
α	8°		
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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