

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ Max	Package	I_D $T_A = +25^\circ C$
-20V	52m Ω @ $V_{GS} = -4.5V$	SOT23	-5.0A
	100m Ω @ $V_{GS} = -2.5V$		-3.6A

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

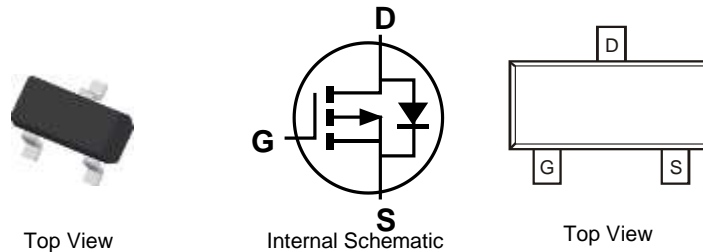
- Backlighting
- Power Management Functions
- DC-DC Converters
- Motor Control

Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **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: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Terminals Connections: See Diagram Below
- Weight: 0.009 grams (Approximate)

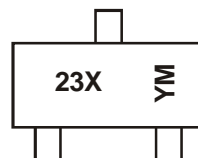


Ordering Information (Note 5)

Part Number	Compliance	Case	Packaging
DMG2305UXQ-7	Automotive	SOT23	3,000/Tape & Reel
DMG2305UXQ-13	Automotive	SOT23	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. 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



23X = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: W = 2009)
 M = Month (ex: 9 = September)

Date Code Key

Year	2009	~	2016	2017	2018	2019	2020
Code	W	~	D	E	F	G	H

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	Units
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	-4.2	A
		T _A = +70°C		-3.3	
Pulsed Drain Current (Note 7)	t < 10s	T _A = +25°C	I _D	-5.0	A
		T _A = +70°C		-4.0	
Pulsed Drain Current (Note 7)			I _{DM}	-10	A

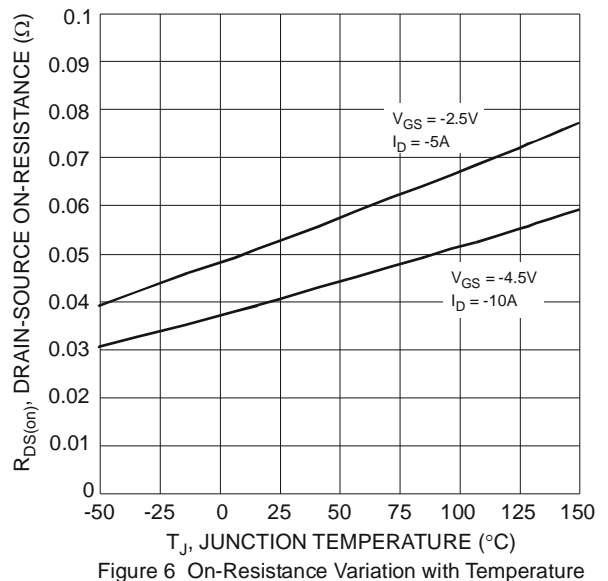
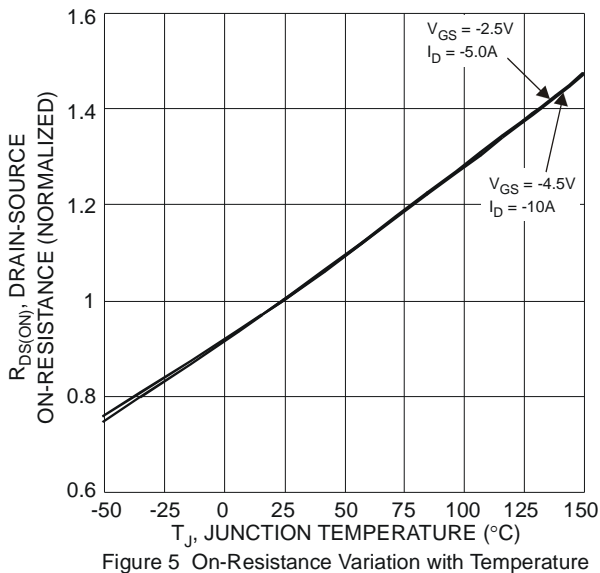
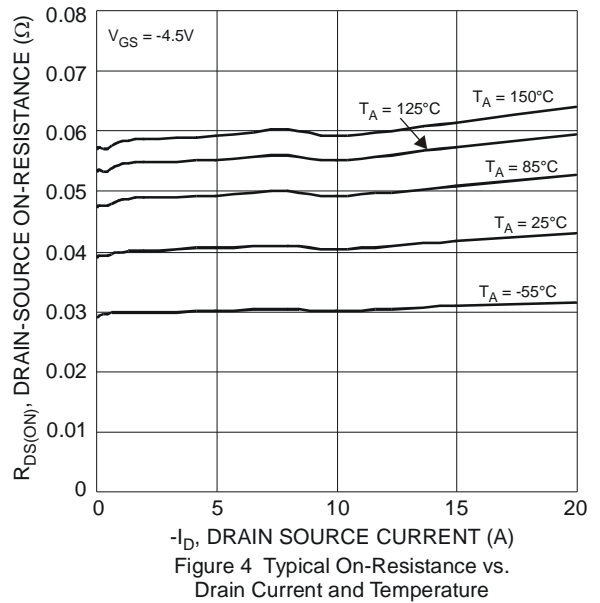
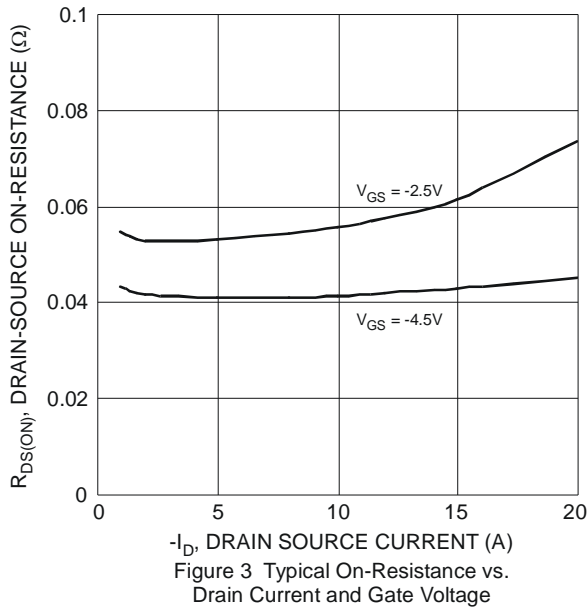
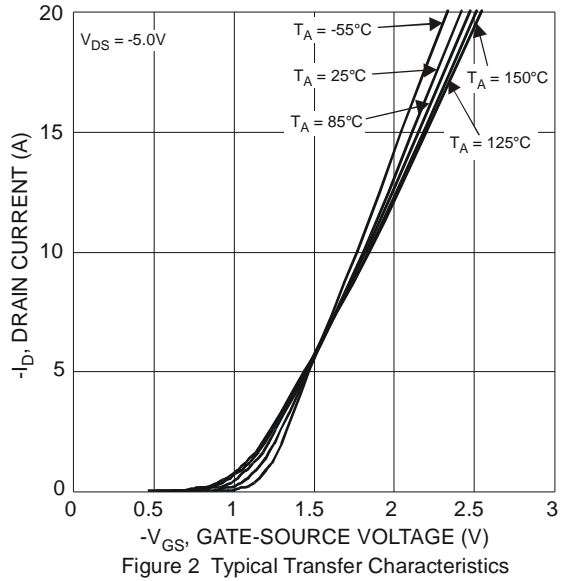
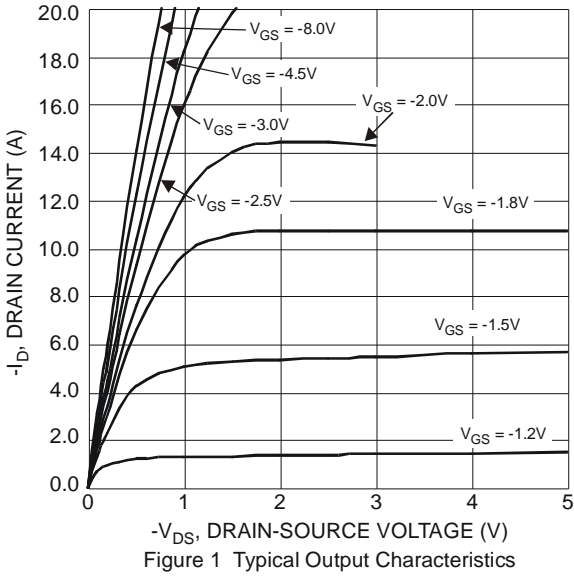
Thermal Characteristics

Characteristic			Symbol	Value	Unit
Power Dissipation (Note 6)			P _D	1.4	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R _{θJA}	90	°C/W
	t < 10s			64	
Thermal Resistance, Junction to Case (Note 8)			R _{θJC}	33	°C/W
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}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA
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)}	-0.5	—	-0.9	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	40	52	mΩ	V _{GS} = -4.5V, I _D = -4.2A
			52	100		V _{GS} = -2.5V, I _D = -3.4A
			68	200		V _{GS} = -1.8V, I _D = -2A
Forward Transfer Admittance	Y _{FS}	—	9	—	S	V _{DS} = -5V, I _D = -4A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{ISS}	—	808	—	pF	V _{DS} = -15V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{OSS}	—	85	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	77	—	pF	
Gate Resistance	R _G	—	15.2	—	Ω	V _{GS} = 0V, V _{DS} = 0V, f = 1.0MHz
SWITCHING CHARACTERISTICS (Note 9)						
Total Gate Charge	Q _G	—	10.2	—	nC	V _{GS} = -4.5V, V _{DS} = -4V, I _D = -3.5A
Gate-Source Charge	Q _{GS}	—	1.3	—	nC	
Gate-Drain Charge	Q _{GD}	—	2.2	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	10.8	—	ns	V _{DS} = -4V, V _{GS} = -4.5V, R _G = 6Ω, I _D = -1A
Turn-On Rise Time	t _R	—	13.7	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	79.3	—	ns	
Turn-Off Fall Time	t _F	—	34.7	—	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.
 - Repetitive rating, pulse width limited by junction temperature.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing



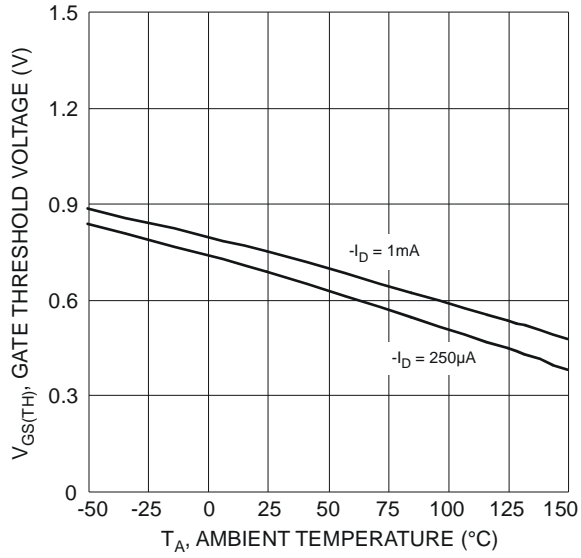


Figure 7 Gate Threshold Variation vs. Ambient Temperature

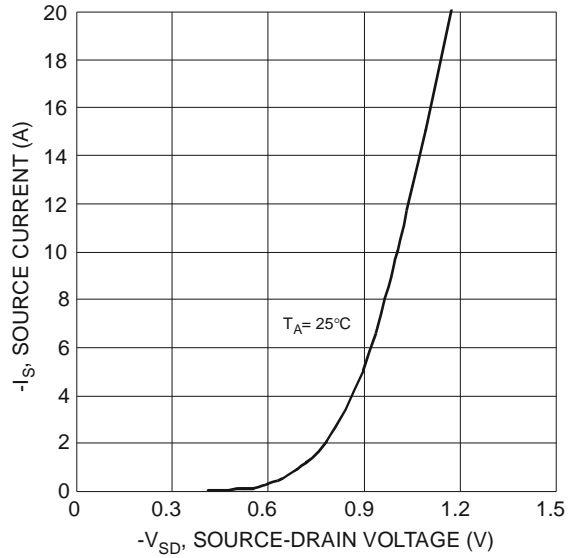
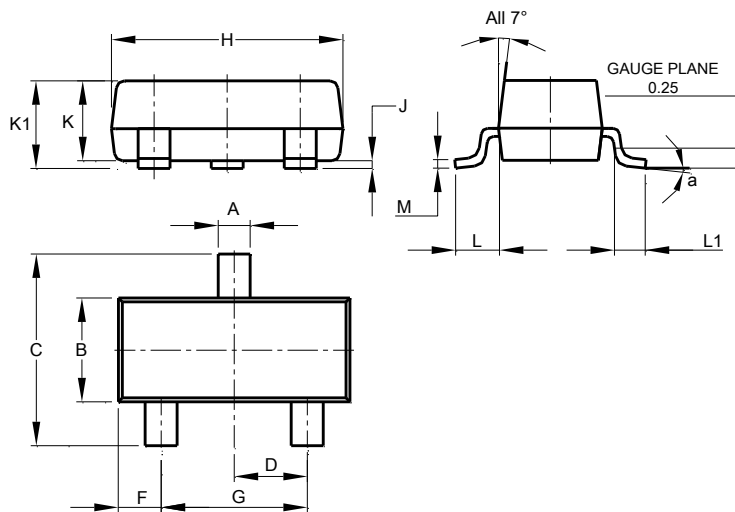


Figure 8 Diode Forward Voltage vs. Current

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT23

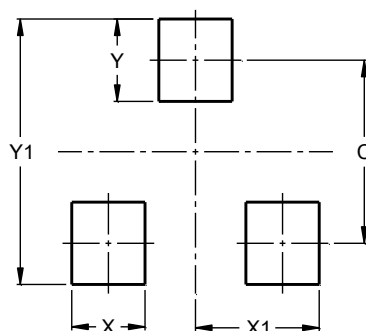


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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