

N-CHANNEL ENHANCEMENT MODE MOSFET

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

Description and Applications

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

- General-purpose interfacing switches
- Power-management functions
- Boost applications
- Analog switches

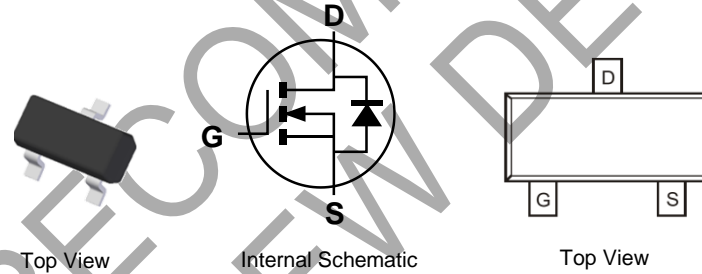
Features

- 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)**
- **The DMG2302UQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Package: SOT23
- Package 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 Ⓢ
- Weight: 0.008 grams (Approximate)

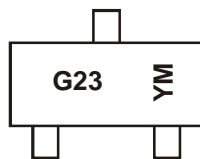


Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMG2302UQ-7	SOT23	3000	Tape & Reel
DMG2302UQ-13	SOT23	10,000	Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



G23 = Product Type Marking Code
 YM or YM = Date Code Marking
 Y or Y = Year (ex: L = 2024)
 M = Month (ex: 9 = September)

Date Code Key

Year	2015	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	C	-	L	M	N	P	R	S	T	U	V	W

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 5)	Steady State	T _A = +25°C	I _D	4.2	A
		T _A = +70°C		3.4	
Pulsed Drain Current (Note 6)			I _{DM}	27	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)	T _A = +25°C	P _D	0.8	W
	T _A = +70°C		0.5	
Thermal Resistance, Junction to Ambient @T _A = +25°C		R _{θJA}	156	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
6. 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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	20	—	—	V	V _{GS} = 0, I _D = 10μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1.0	μA	V _{DS} = 20V, V _{GS} = 0
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±8V, V _{DS} = 0
ON CHARACTERISTICS (Note 7)						
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	mΩ	V _{GS} = 4.5V, I _D = 3.6A
				120		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} = 0, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	594.3	—	pF	V _{DS} = 10V, V _{GS} = 0, 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} = 0, V _{GS} = 0, 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: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

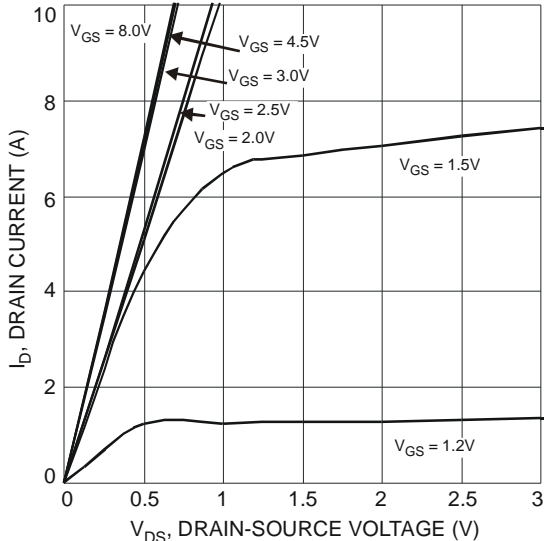


Fig. 1 Typical Output Characteristics

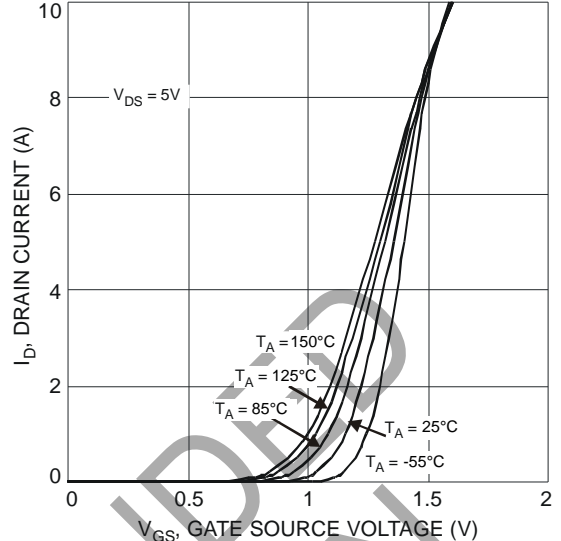


Fig. 2 Typical Transfer Characteristics

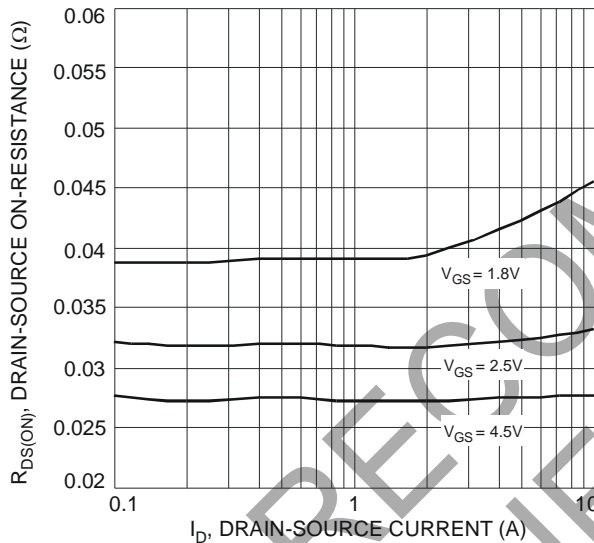


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

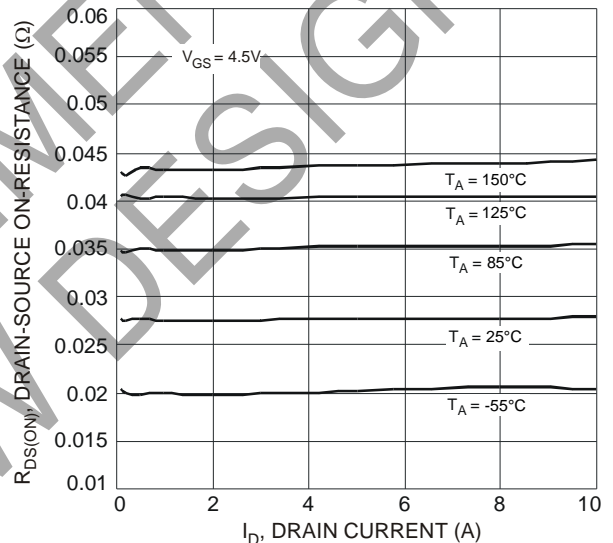


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

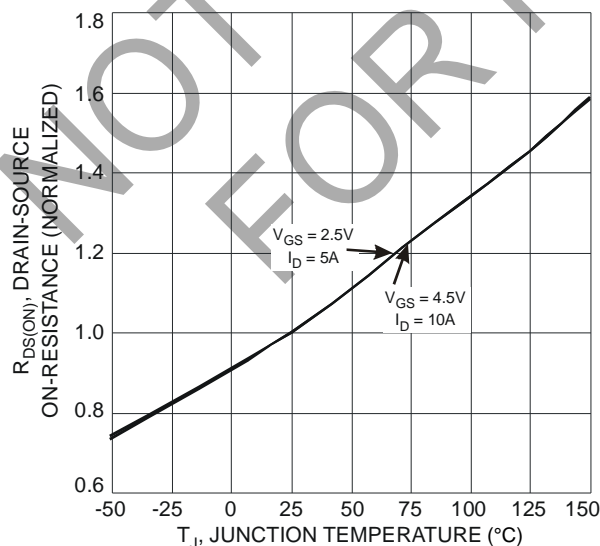


Fig. 5 On-Resistance Variation with Temperature

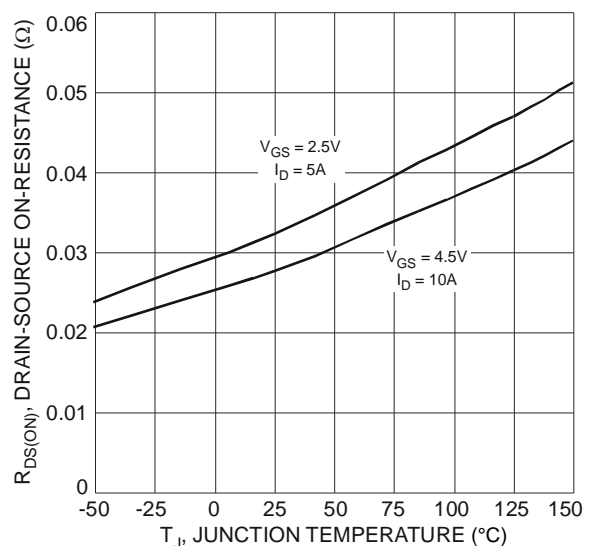


Fig. 6 On-Resistance Variation with Temperature

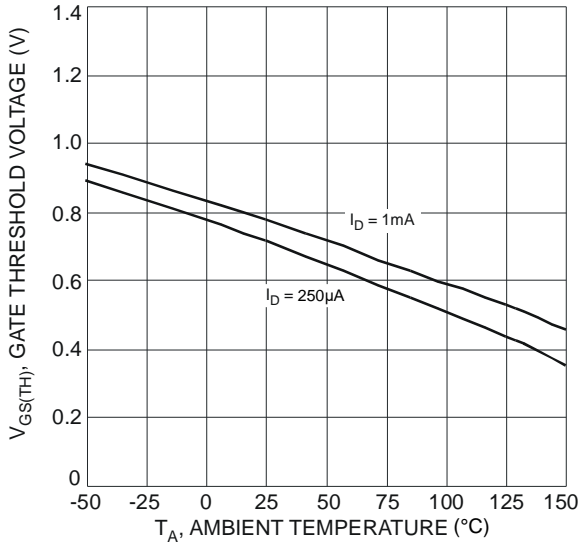


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

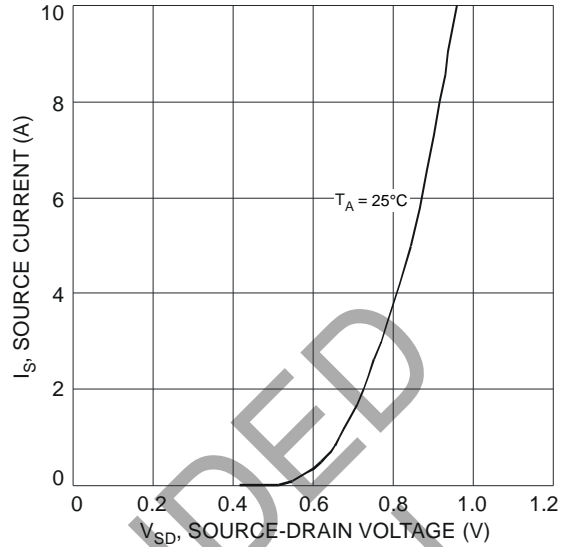


Fig. 8 Diode Forward Voltage vs. Current

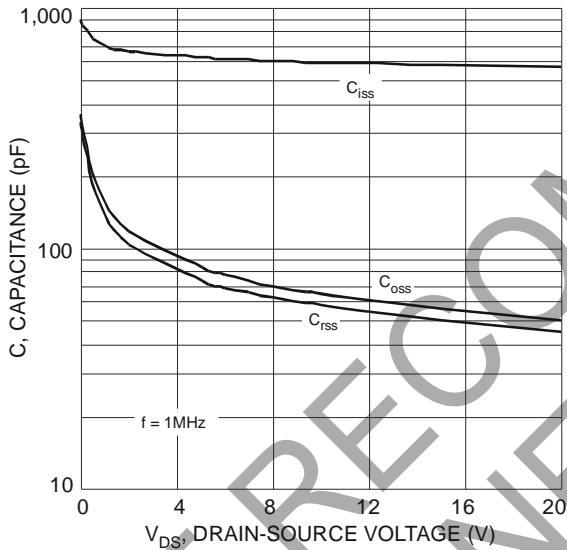


Fig. 9 Typical Capacitance

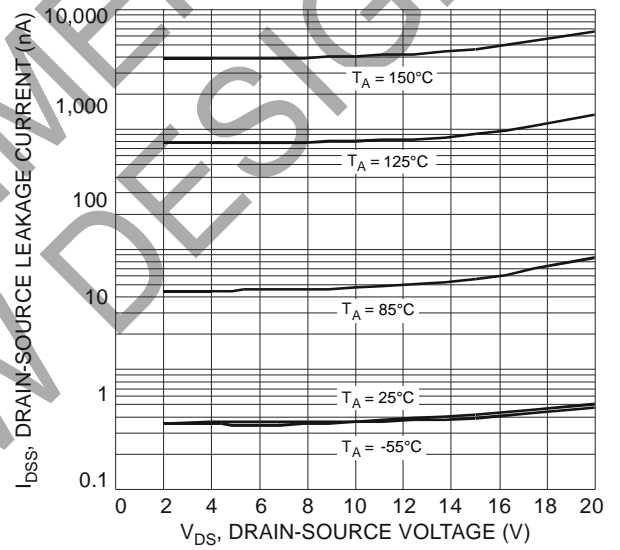


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

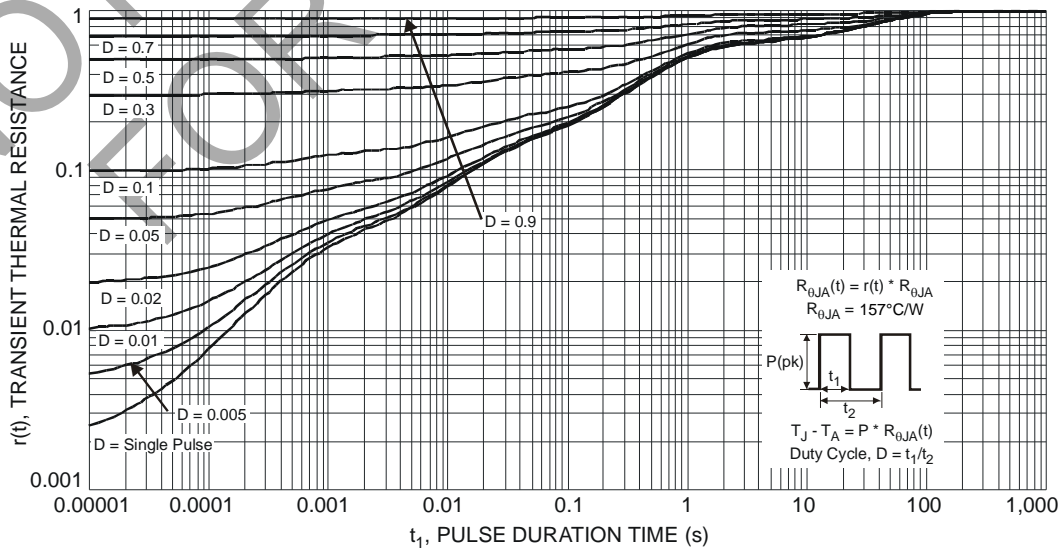
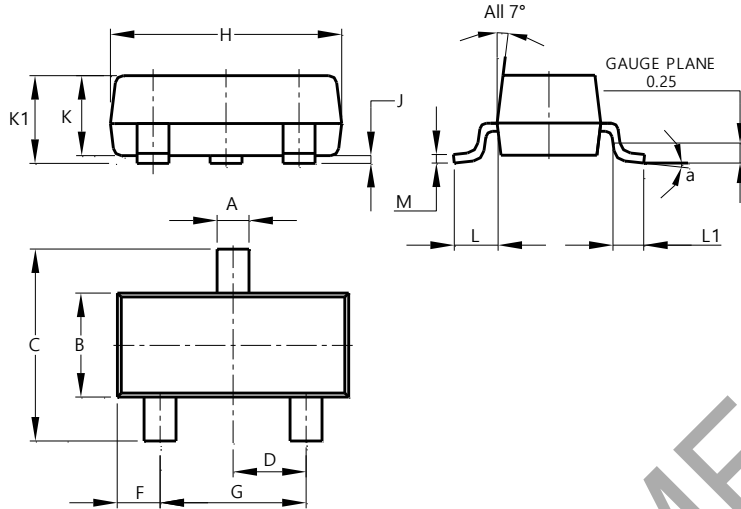


Fig. 11 Transient Thermal Response

Package Outline Dimensions

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

SOT23

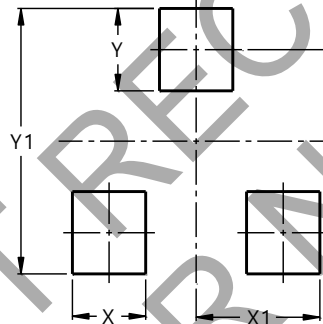


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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