

Product Summary

BV _{DSS}	R _{DS(on)} Max	Package	I _D Max T _A = +25°C
-20V	52mΩ @V _{GS} = -4.5V	SOT23	-5.0A
	100mΩ @V _{GS} = -2.5V		-3.6A

Description

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

Applications

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

Features

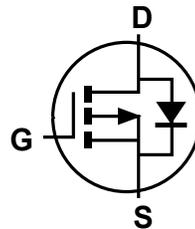
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative.**
<https://www.diodes.com/quality/product-definitions/>
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMG2305UXQ](#))**

Mechanical Data

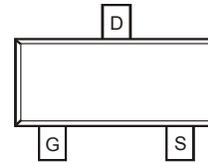
- Case: SOT23 (Standard)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Terminals Connections: See Diagram Below
- Weight: 0.009 grams (Approximate)



Top View



Internal Schematic



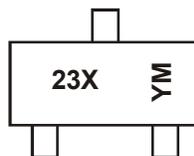
Top View

Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMG2305UX-7	Standard	SOT23 (Standard)	3,000/Tape & Reel
DMG2305UX-13	Standard	SOT23 (Standard)	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



23X = Product Type Marking Code
 YM = Date Code Marking
 Y or Y= Year (ex: 1 = 2021)
 M = Month (ex: 9 = September)

Date Code Key

Year	2009	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	W	I	J	K	L	M	N	O	P	R	S
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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		V_{DSS}	-20	V	
Gate-Source Voltage		V_{GSS}	± 8	V	
Continuous Drain Current (Note 5) $V_{GS} = -4.5\text{V}$	Steady State	I_D	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	-4.2 -3.3	A
	$t < 10\text{s}$		$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	-5.0 -4.0	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%) (Note 6)		I_{DM}	-15	A	

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)		P_D	1.4	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	90	$^\circ\text{C/W}$
	$t < 10\text{s}$		64	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	33	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	μA	$T_J = +25^\circ\text{C}, V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.5	—	-0.9	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	40	52	m Ω	$V_{GS} = -4.5\text{V}, I_D = -4.2\text{A}$
			52	100		$V_{GS} = -2.5\text{V}, I_D = -3.4\text{A}$
			68	200		$V_{GS} = -1.8\text{V}, I_D = -2\text{A}$
Forward Transfer Admittance	$ Y_{FS} $	—	9	—	s	$V_{DS} = -5\text{V}, I_D = -4\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	808	—	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	85	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	77	—	pF	
Gate Resistance	R_g	—	15.2	—	Ω	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1.0\text{MHz}$
SWITCHING CHARACTERISTICS (Note 8)						
Total Gate Charge	Q_g	—	10.2	—	nC	$V_{GS} = -4.5\text{V}, V_{DS} = -4\text{V},$ $I_D = -3.5\text{A}$
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	$V_{DS} = -4\text{V}, V_{GS} = -4.5\text{V},$ $R_g = 6\Omega, I_D = -1\text{A}$
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.

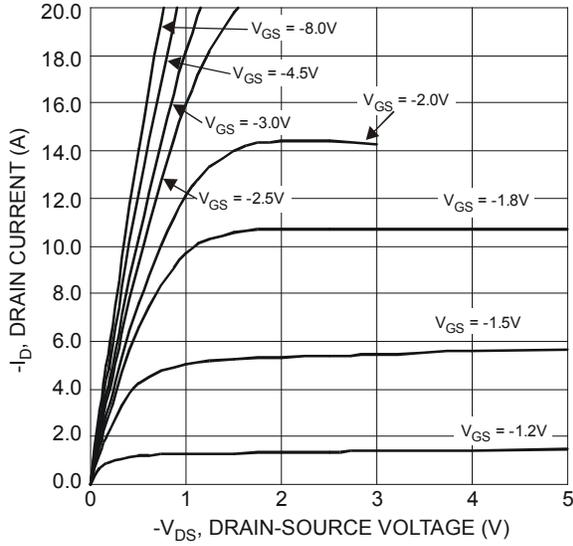


Figure 1 Typical Output Characteristics

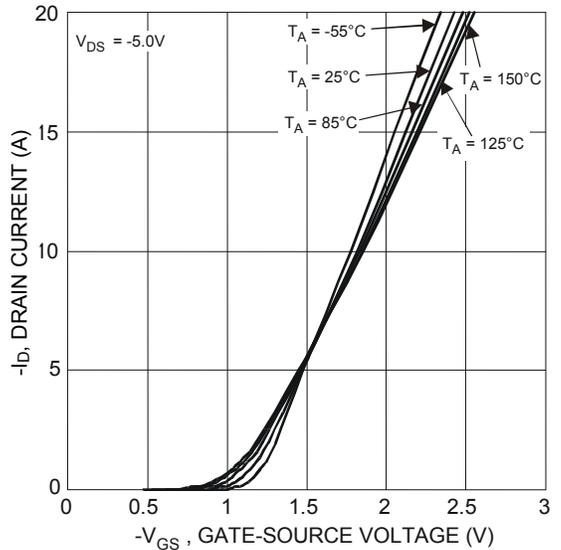


Figure 2 Typical Transfer Characteristics

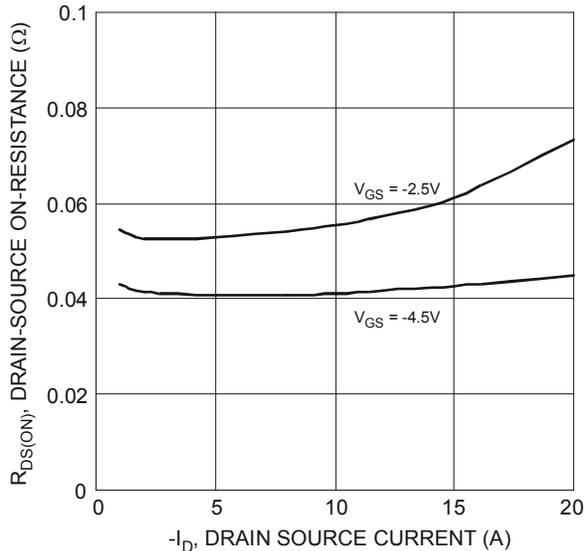


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

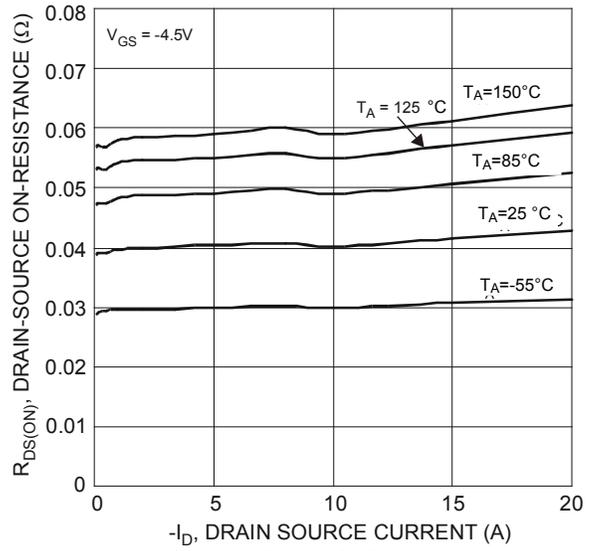


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

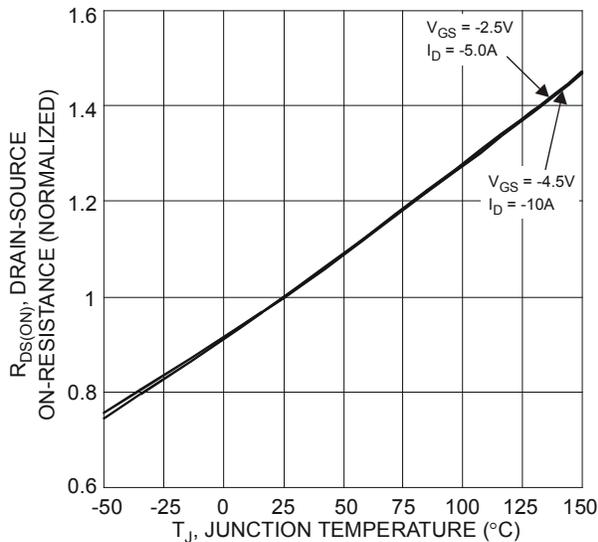


Figure 5 On-Resistance Variation with Temperature

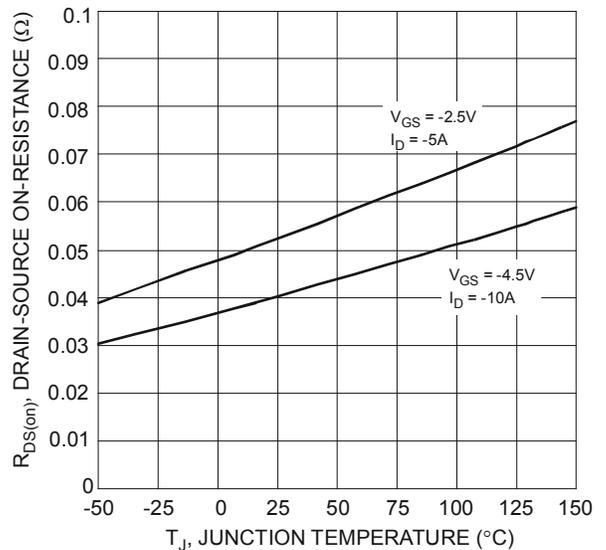


Figure 6 On-Resistance Variation with Temperature

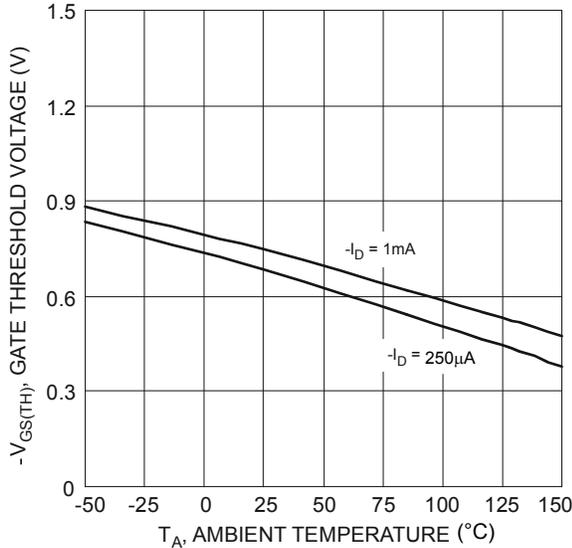


Figure 7 Gate Threshold Variation vs. Ambient Temperature

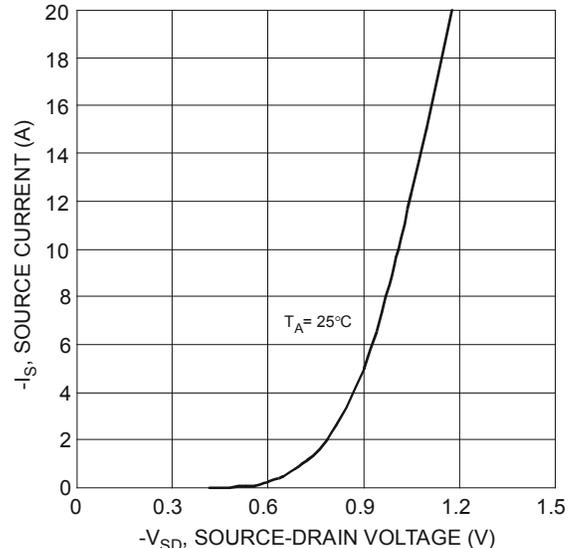


Figure 8 Diode Forward Voltage vs. Current

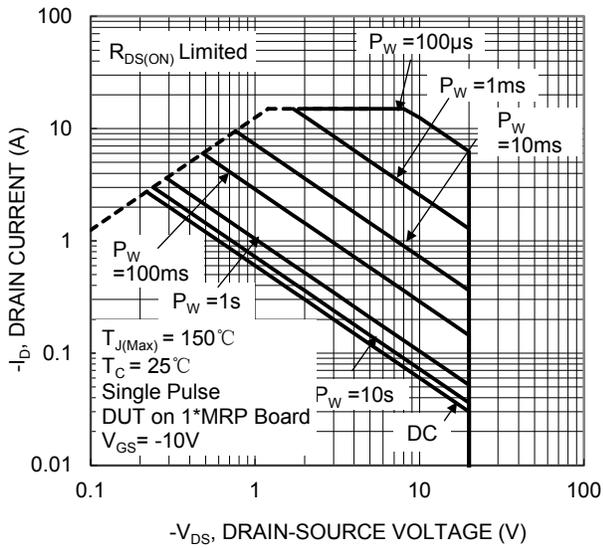
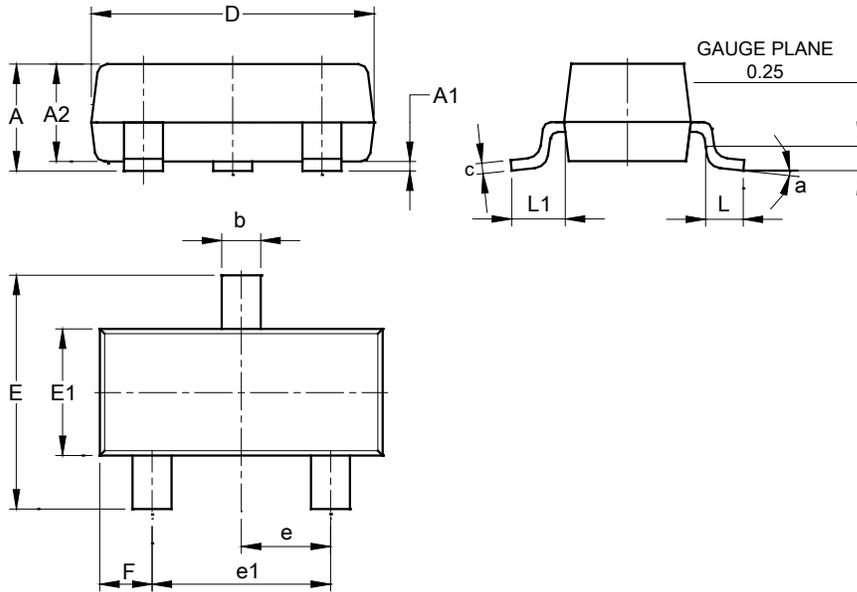


Figure 9. SOA, Safe Operation Area

Package Outline Dimensions

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

SOT23 (Standard)

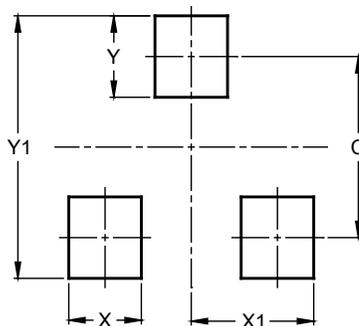


SOT23 (Standard)			
Dim	Min	Max	Typ
A	0.90	1.15	1.025
A1	0.00	0.10	0.05
A2	0.85	1.10	0.975
b	0.30	0.51	0.40
c	0.080	0.202	0.11
D	2.80	3.00	2.90
E	2.25	2.55	2.40
E1	1.20	1.40	1.30
e	0.89	1.03	0.915
e1	1.78	2.05	1.83
F	0.40	0.60	0.535
L1	0.45	0.61	0.55
L	0.25	0.55	0.40
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23 (Standard)



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

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