

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _A = +25°C
-20V	80mΩ @ V _{GS} = -4.5V	-2.7A
	110mΩ @ V _{GS} = -2.5V	-2.1A

Description

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.

Applications

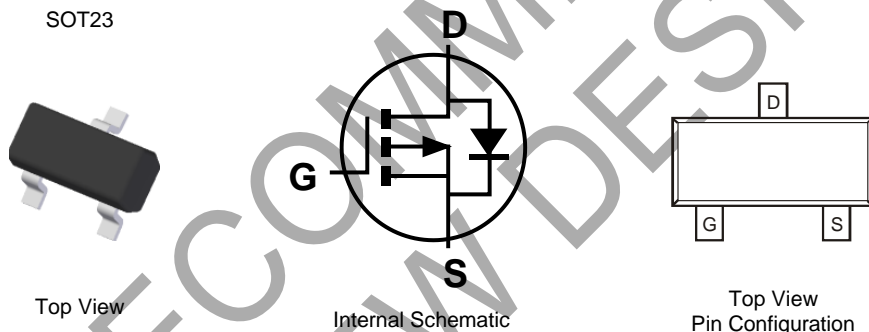
- Backlighting
- Power Management Functions
- DC-DC Converters
- Motor Control

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**

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
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 Ⓔ3
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

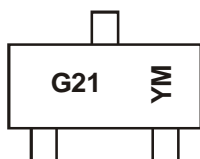


Ordering Information (Note 4)

Part Number	Case	Packaging
DMG2301U-7	SOT23	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 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



G21 = Product Type Marking Code
 YM = Date Code Marking
 Y or Ȳ = Year (ex: E = 2017)
 M = Month (ex: 9 = September)

Date Code Key

Year	2009	2017	2018	2019	2020	2021	2022	2023	2024		
Code	W	E	F	G	H	I	J	K	L		
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	Unit
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 5) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	-2.7	A
		T _A = +70°C		-2.1	
Continuous Drain Current (Note 5) V _{GS} = -2.5V	Steady State	T _A = +25°C	I _D	-2.1	A
		T _A = +70°C		-1.7	
Pulsed Drain Current (Note 6)			I _{DM}	-27	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	0.8	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	R _{θJA}	157	°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 7)						
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} = -16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	-0.45	—	-1.0	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	80	mΩ	V _{GS} = -4.5V, I _D = -2.8A
				110		V _{GS} = -2.5V, I _D = -2.0A
Forward Transfer Admittance	Y _{fs}	—	10	—	S	V _{DS} = -5V, I _D = -2.8A
Diode Forward Voltage	V _{SD}	—	-0.75	-1.0	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	608	—	pF	V _{DS} = -6V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	82	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	72	—	pF	
Gate Resistance	R _G	—	44.9	—	Ω	V _{GS} = 0V, V _{DS} = 0V, f = 1.0MHz
Total Gate Charge	Q _g	—	6.5	—	nC	V _{GS} = -4.5V, V _{DS} = -10V, I _D = -3A
Gate-Source Charge	Q _{gs}	—	0.9	—	nC	
Gate-Drain Charge	Q _{gd}	—	1.5	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	12.5	40	ns	V _{DS} = -10V, V _{GS} = -4.5V, R _L = 10Ω, R _G = 1.0Ω, I _D = -1A
Turn-On Rise Time	t _R	—	10.3	30	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	46.5	140	ns	
Turn-Off Fall Time	t _F	—	22.2	66	ns	

- Notes:
5. Device mounted on FR-4 PCB with minimum recommended pad layout.
 6. Repetitive rating, pulse width limited by junction temperature.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to production testing.

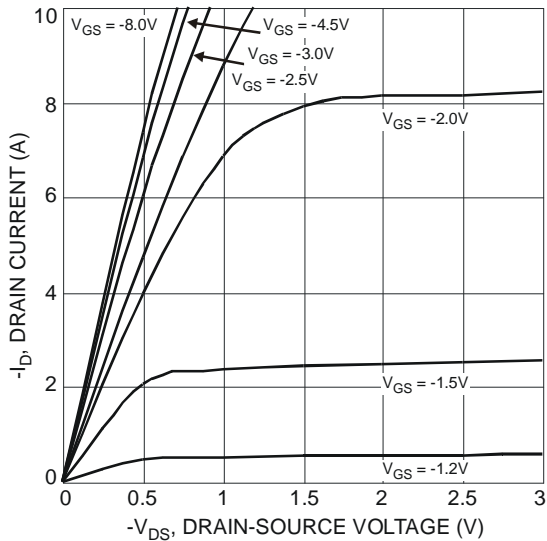


Fig. 1 Typical Output Characteristic

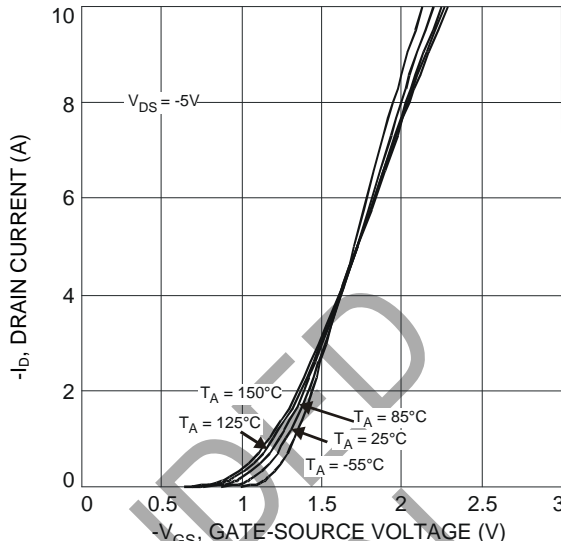


Fig. 2 Typical Transfer Characteristic

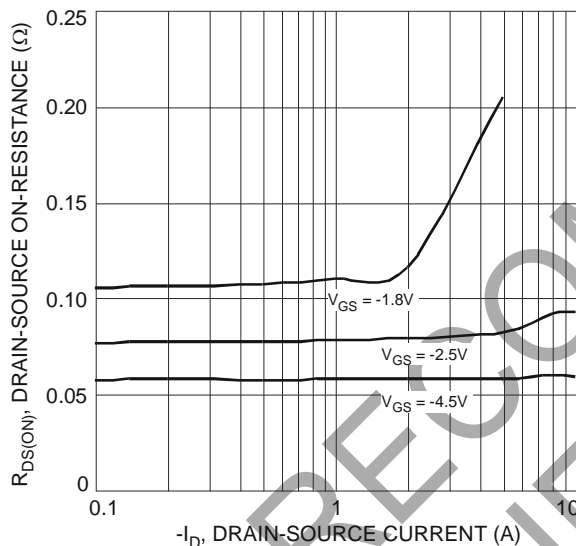


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

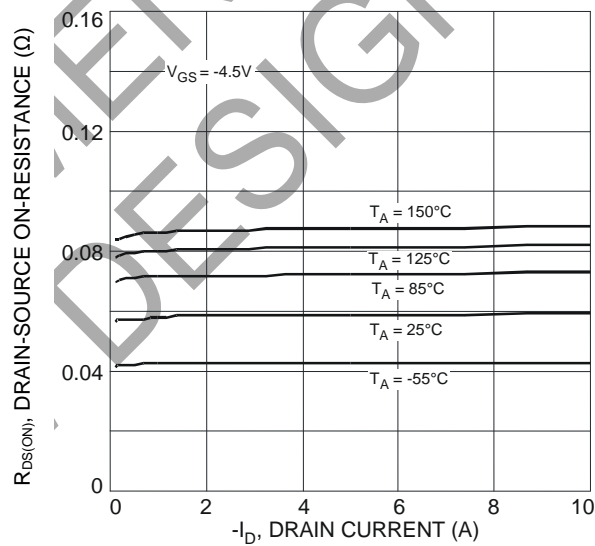


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

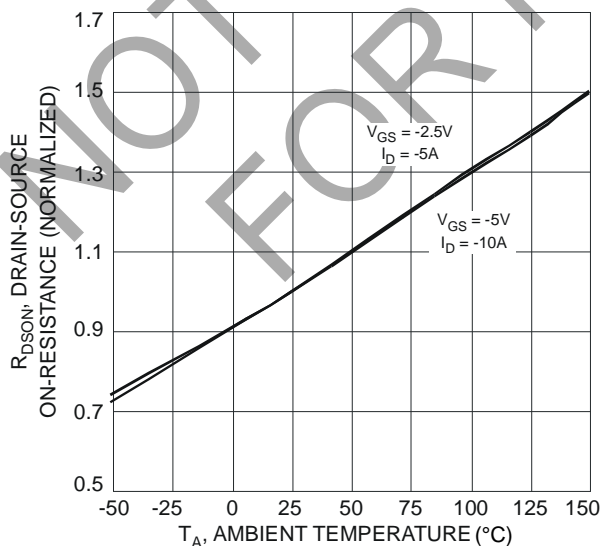


Fig. 5 On-Resistance Variation with Temperature

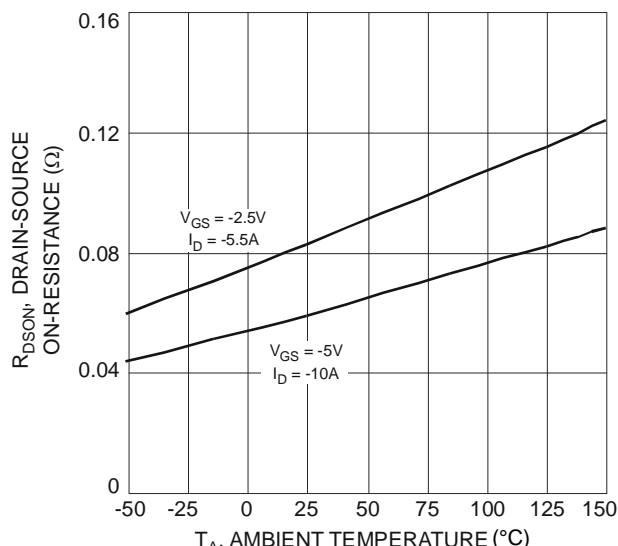


Fig. 6 On-Resistance Variation with Temperature

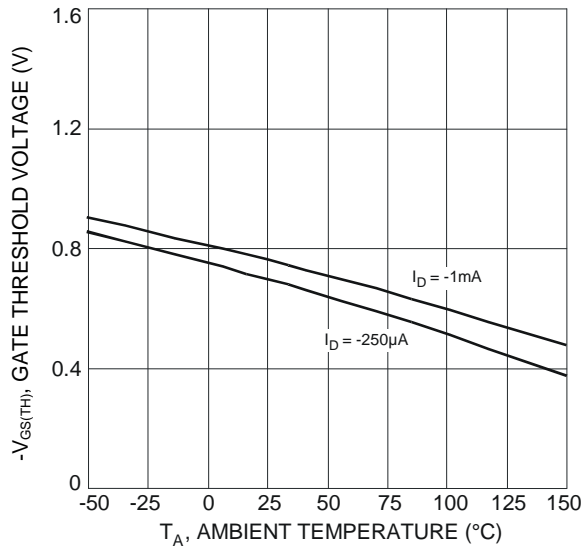


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

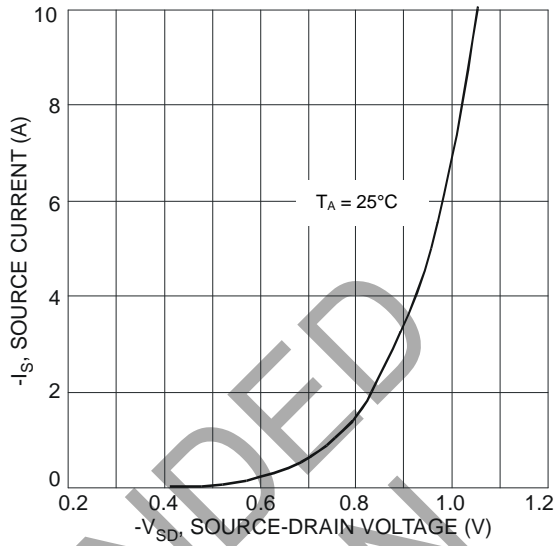


Fig. 8 Diode Forward Voltage vs. Current

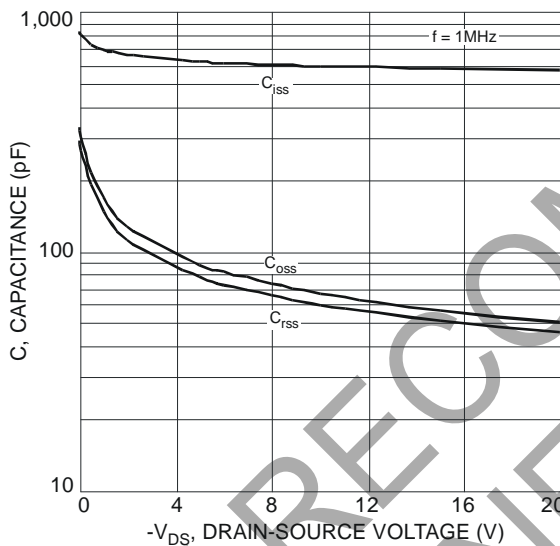


Fig. 9 Typical Total Capacitance

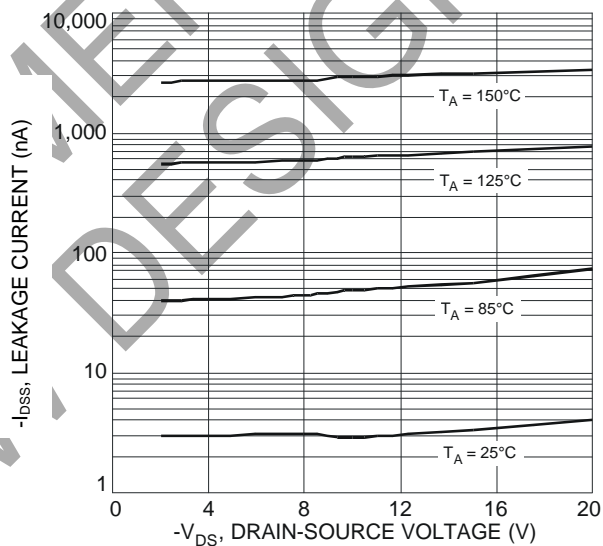


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

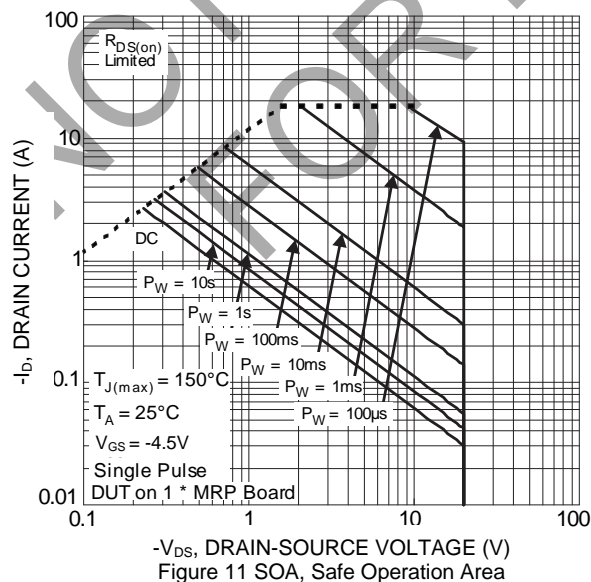


Figure 11 SOA, Safe Operation Area

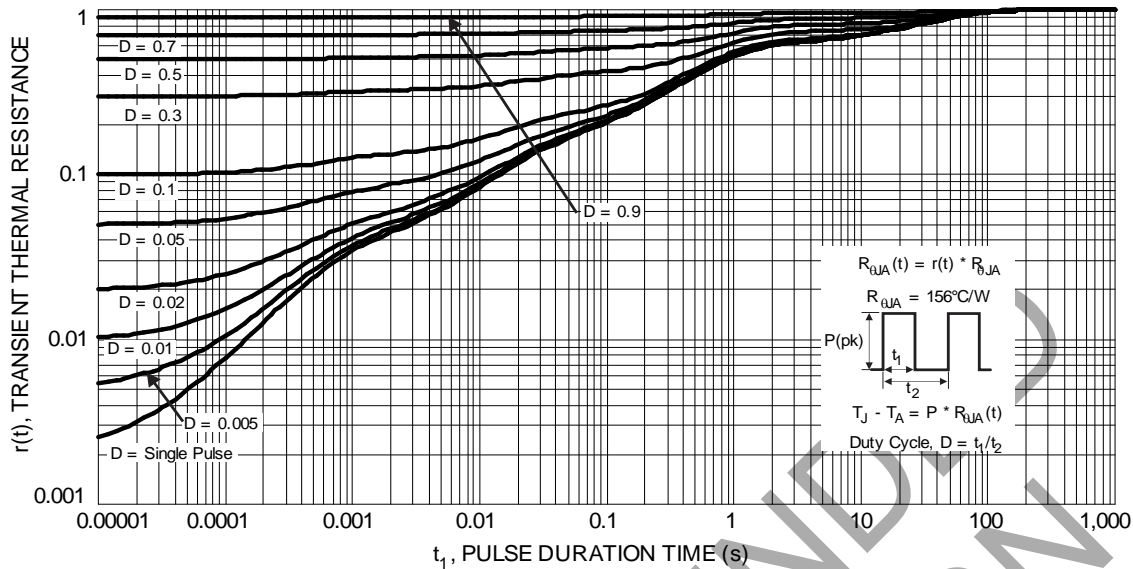


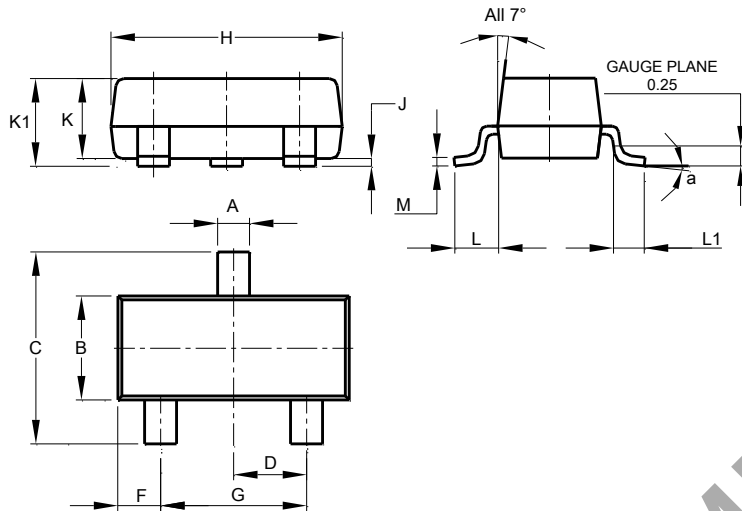
Fig. 12 Transient Thermal Response

NOT RECOMMENDED FOR NEW DESIGN

Package Outline Dimensions

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

SOT23

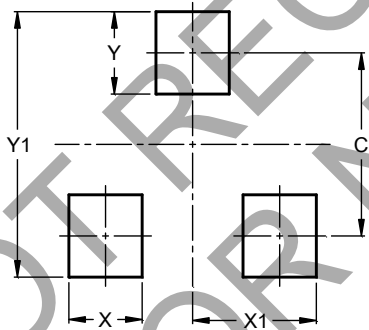


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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