

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>A</sub> = +25°C
20V	29mΩ @ V <sub>GS</sub> = 10V	5.47A
	35mΩ @ V <sub>GS</sub> = 4.5V	5.2A

## Description

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP.

## Applications

- General Purpose Interfacing Switch
- Power Management Functions

## 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)**

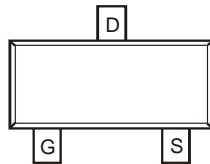
## Mechanical Data

- 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 (e3)
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

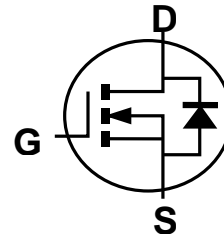
SOT23



Top View



Top View



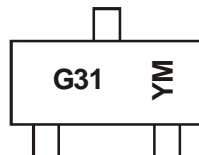
Equivalent Circuit

## Ordering Information (Note 5)

Part Number	Qualification	Case	Packaging
DMG3420UQ-7	Automotive	SOT23	3000/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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



G31 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: G = 2019)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2009	~	2019	2020	2021	2022	2023	2024	2025	2026	2027
Code	W	~	G	H	I	J	K	L	M	N	O

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			$V_{DS}$	20	V
Gate-Source Voltage			$V_{GS}$	$\pm 12$	V
Continuous Drain Current (Note 6)	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	5.47	A
		$T_A = +85^\circ\text{C}$		3.43	
Pulsed Drain Current (Note 7)			$I_{DM}$	20	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	$P_D$	0.74	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 6)	$R_{\theta JA}$	167	$^\circ\text{C/W}$
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
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DS}$	20	—	—	V	$V_{GS} = 0V, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	$I_{DSS}$	—	—	1.0	$\mu\text{A}$	$V_{DS} = 20V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 12V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	0.95	1.2	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	21	29	m $\Omega$	$V_{GS} = 10V, I_D = 6A$
		—	25	35		$V_{GS} = 4.5V, I_D = 5A$
		—	34	48		$V_{GS} = 2.5V, I_D = 4A$
		—	65	91		$V_{GS} = 1.8V, I_D = 2A$
Forward Transfer Admittance	$ Y_{fs} $	—	9	—	s	$V_{DS} = 5V, I_D = 3.8A$
Diode Forward Voltage	$V_{SD}$	—	0.75	1.0	V	$V_{GS} = 0V, I_S = 1A$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{ISS}$	—	434.7	—	pF	$V_{DS} = 10V, V_{GS} = 0V, f = 1.0\text{MHz}$
Output Capacitance	$C_{OSS}$	—	69.1	—	pF	
Reverse Transfer Capacitance	$C_{RSS}$	—	61.2	—	pF	
Gate Resistance	$R_g$	—	1.53	—	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$
Total Gate Charge	$Q_g$	—	5.4	—	nC	$V_{GS} = 4.5V, V_{DS} = 10V, I_D = 6A$
Gate-Source Charge	$Q_{gs}$	—	0.9	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	1.5	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	6.5	—	ns	$V_{DD} = 10V, V_{GS} = 5V, R_L = 1.7\Omega, R_g = 6\Omega$
Turn-On Rise Time	$t_R$	—	8.3	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	21.6	—	ns	
Turn-Off Fall Time	$t_F$	—	5.3	—	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Repetitive rating, pulse width limited by junction temperature.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

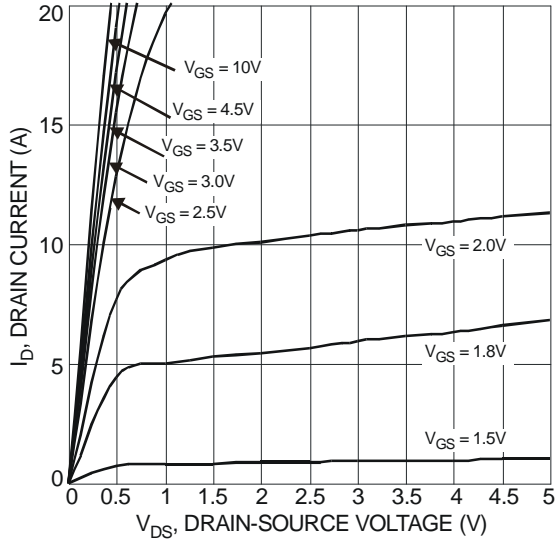


Fig. 1 Typical Output Characteristics

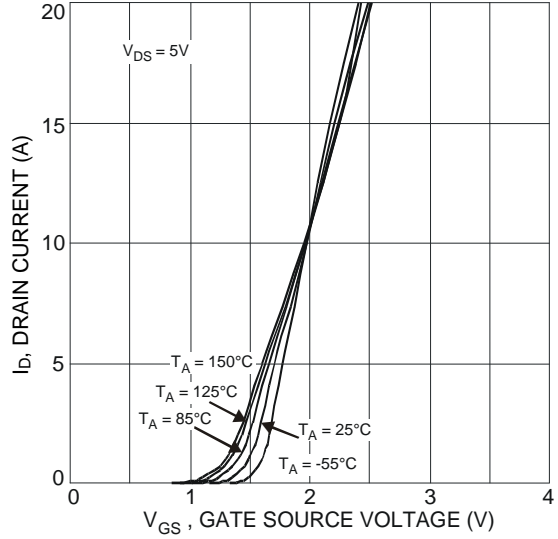


Fig. 2 Typical Transfer Characteristics

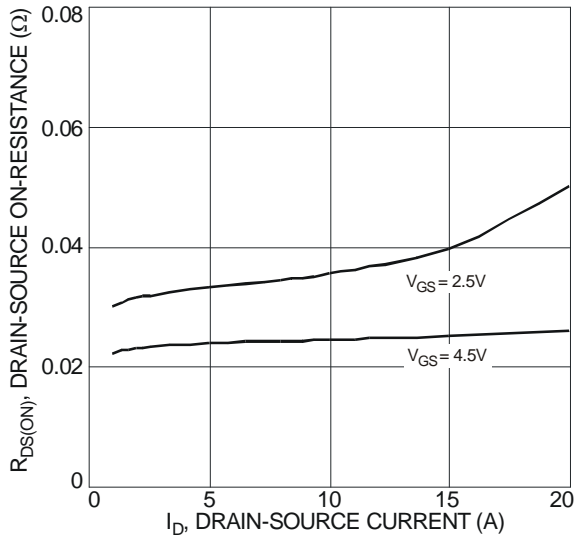


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

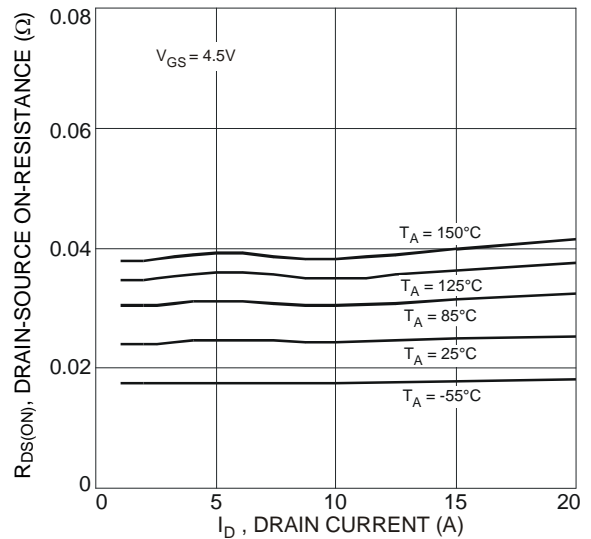


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

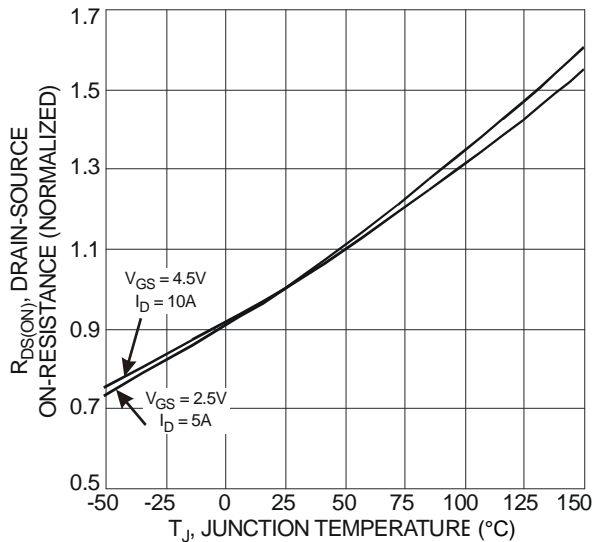


Fig. 5 On-Resistance Variation with Temperature

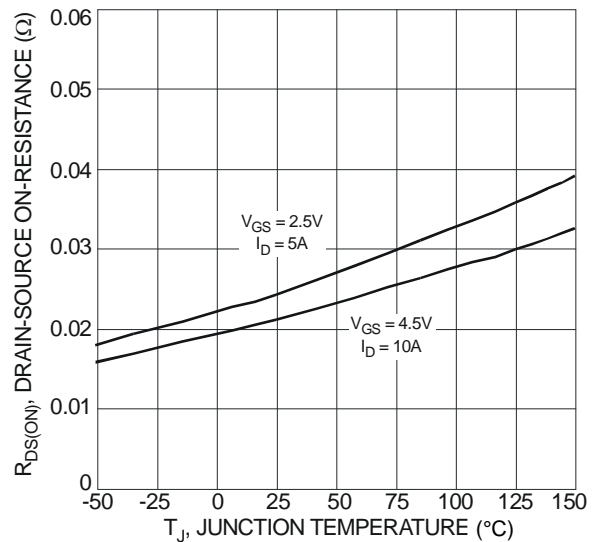


Fig. 6 On-Resistance Variation with Temperature

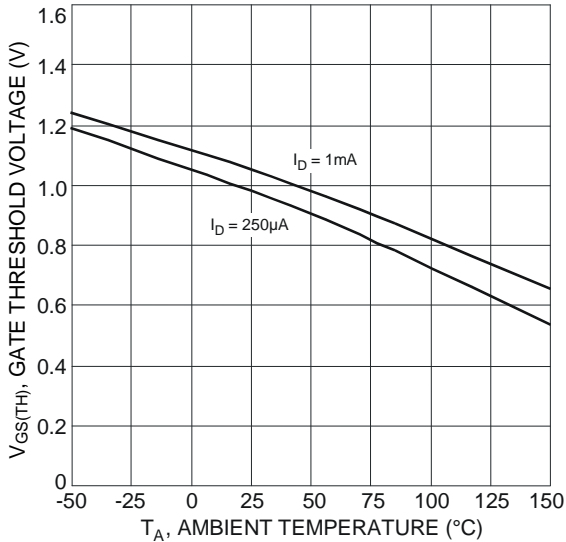


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

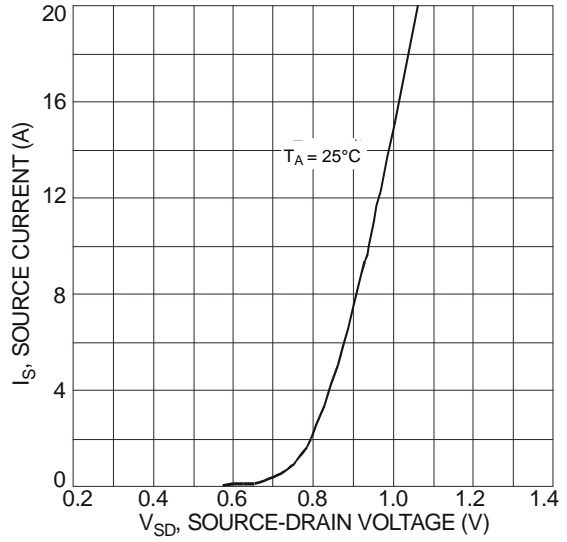


Fig. 8 Diode Forward Voltage vs. Current

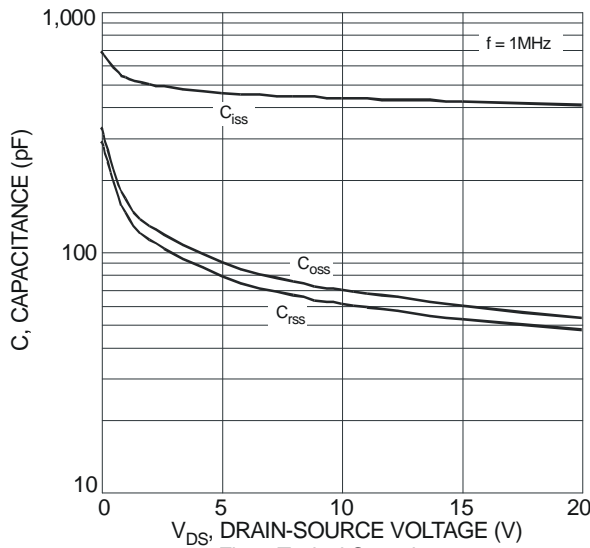


Fig. 9 Typical Capacitance

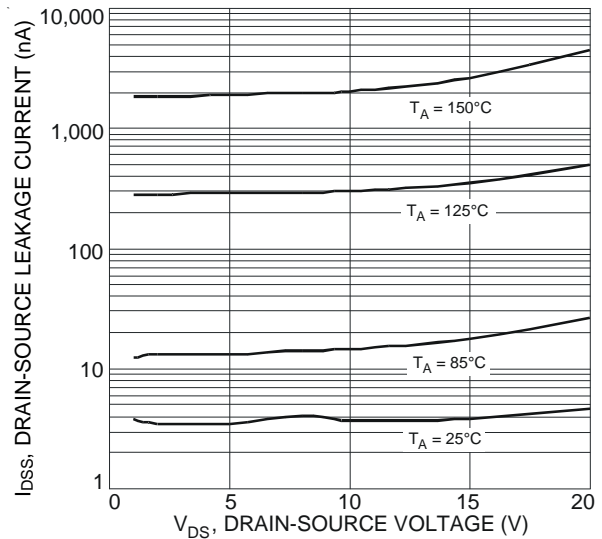


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

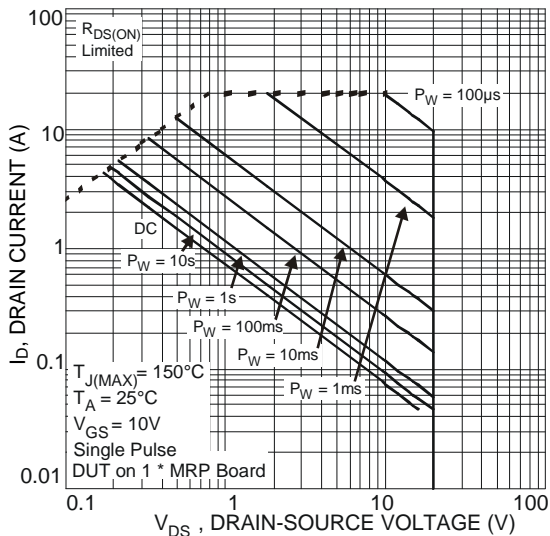


Fig. 11 SOA, Safe Operation Area

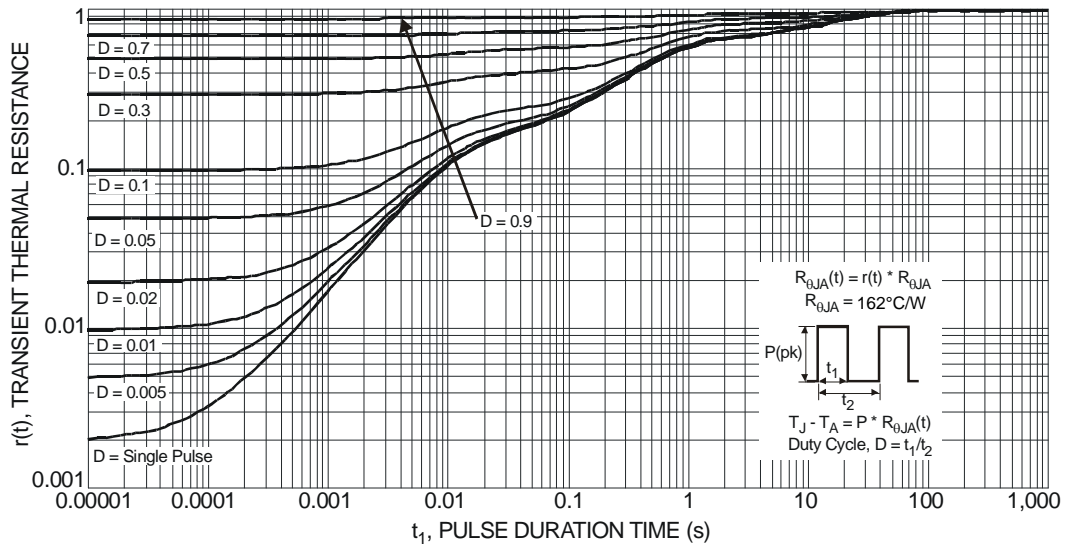
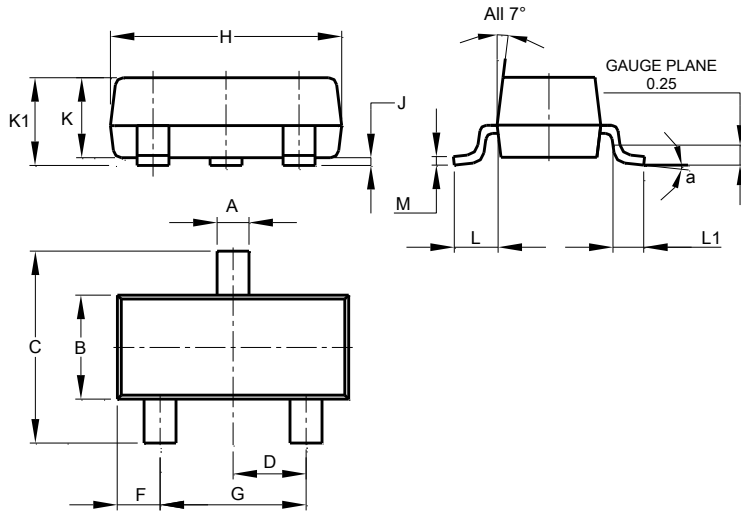


Fig. 12 Transient Thermal Response

**Package Outline Dimensions**

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

**SOT23**

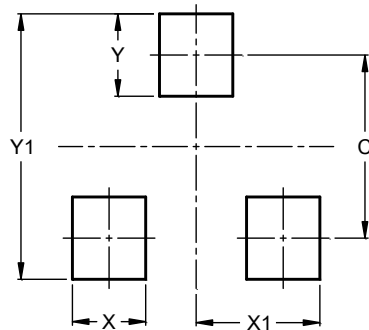


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**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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