

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
20V	25mΩ @ V _{GS} = 4.5V	6.5A

Features and Benefits

- Low On-Resistance
- Low-Input Capacitance
- Fast Switching Speed
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- The DMG6968UQ is suitable for automotive applications requiring specific change control and is AEC-Q101 qualified, is PPAP capable, and is manufactured in IATF16949:2016 certified facilities.

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:

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

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 
- Terminals Connections: See Diagram Below
- Weight: 0.009 grams (Approximate)

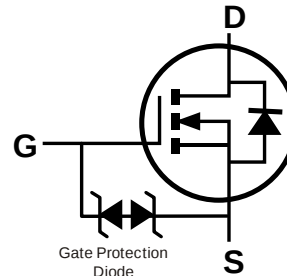


ESD-Protected Gate

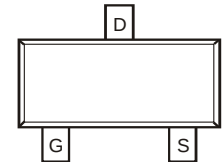
SOT23



Top View



Internal Schematic



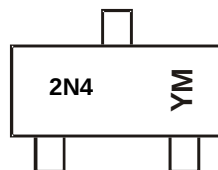
Top View
Pin-out

Ordering Information (Note 4)

Part Number	Case	Packaging
DMG6968UQ-7	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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



2N4 = Product Type Marking Code
YM = Date Code Marking
Y or $\bar{Y}$ = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Date Code Key

Year	2019	2020	2021	2022	2023	2024	2025	2026
Code	G	H	I	J	K	L	M	N

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}	±12	V
Continuous Drain Current (Note 5)	Steady State	T _A = +25°C T _A = +70°C	I _D	6.5 5.2	A
Pulsed Drain Current			I _{DM}	30	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	1.3	W
Thermal Resistance, Junction to Ambient @ T _A = +25°C	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 6)						
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}	—	—	±10	μA	V _{GS} = ±10V, V _{DS} = 0V
Gate-Source Breakdown Voltage	BV _{GSS}	±12	—	—	V	V _{DS} = 0V, I _G = ±250μA
ON CHARACTERISTICS (Note 6)						
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)}	—	21	25	mΩ	V _{GS} = 4.5V, I _D = 6.5A
			23	29		V _{GS} = 2.5V, I _D = 5.5A
			28	36		V _{GS} = 1.8V, I _D = 3.5A
Forward Transfer Admittance	Y _{fs}	—	8	—	S	V _{DS} = 10V, I _D = 5A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C _{iss}	—	151	—	pF	V _{DS} = 10V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	91	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	32	—	pF	
Total Gate Charge	Q _g	—	8.5	—	nC	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 6.5A
Gate-Source Charge	Q _{gs}	—	1.6	—	nC	
Gate-Drain Charge	Q _{gd}	—	2.8	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	54	—	ns	V _{DD} = 10V, V _{GS} = 4.5V, R _L = 10Ω, R _G = 6Ω, I _D = 1A
Turn-On Rise Time	t _R	—	66	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	613	—	ns	
Turn-Off Fall Time	t _F	—	205	—	ns	

- Notes:
5. Device mounted on 1" × 1" FR-4 PCB with high-coverage 2oz copper, single sided.
 6. Short duration pulse test used to minimize self-heating effect.
 7. Guaranteed by design. Not subject to product testing.

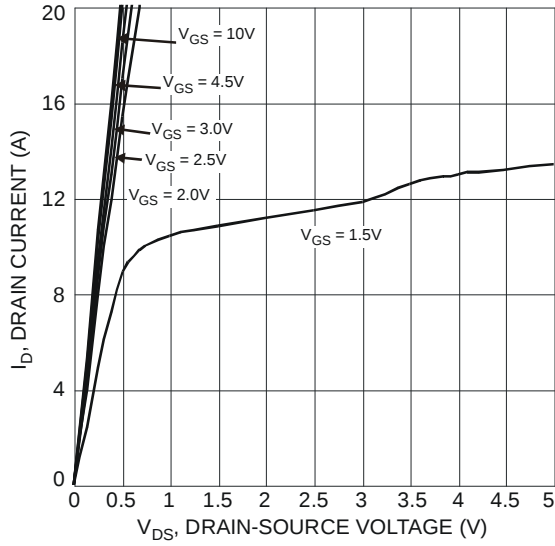


Fig. 1 Typical Output Characteristic

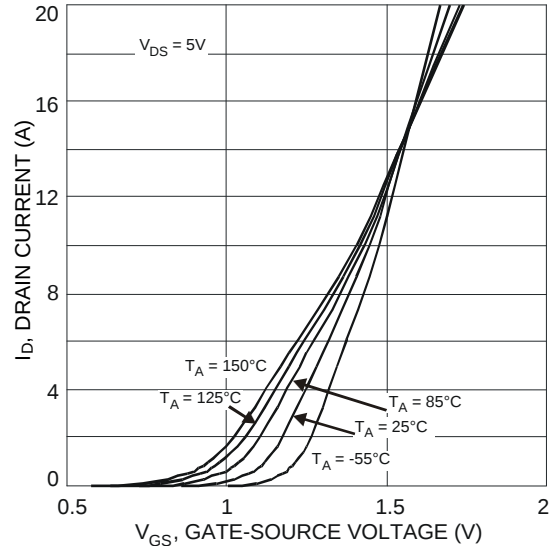


Fig. 2 Typical Transfer Characteristic

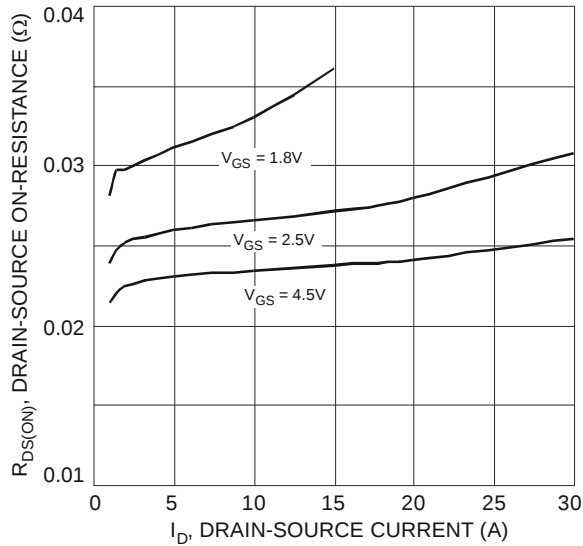


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

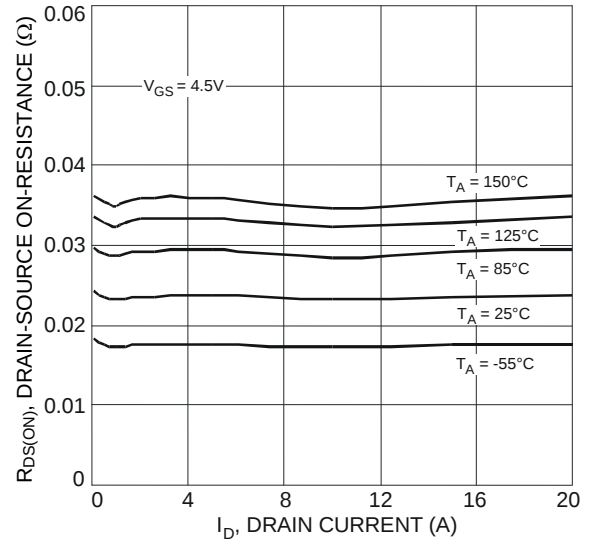


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

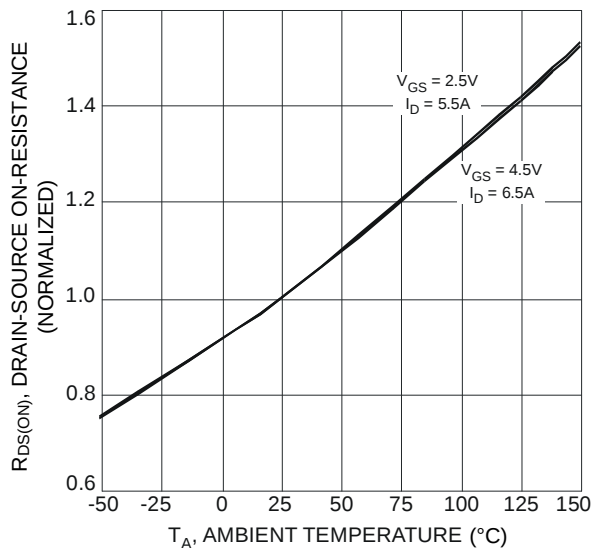


Fig. 5 On-Resistance Variation with Temperature

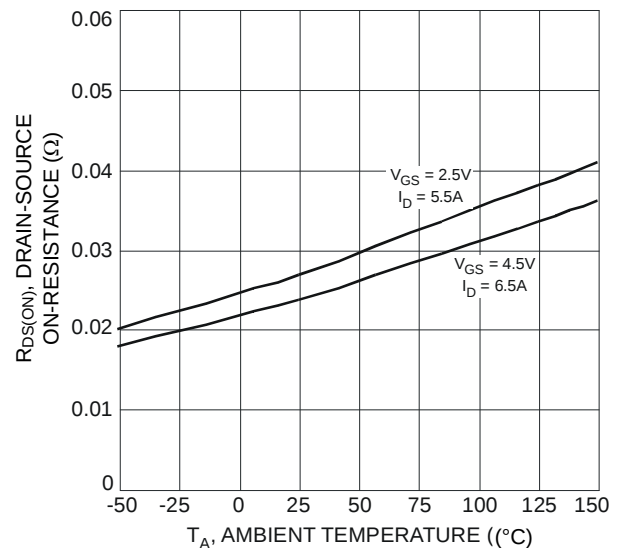


Fig. 6 On-Resistance Variation with Temperature

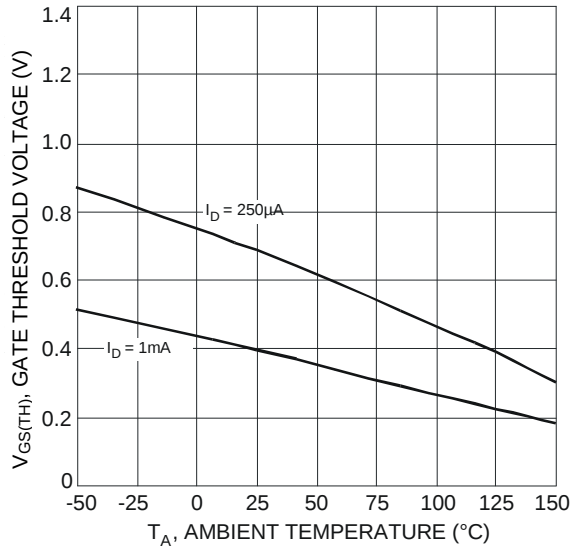


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

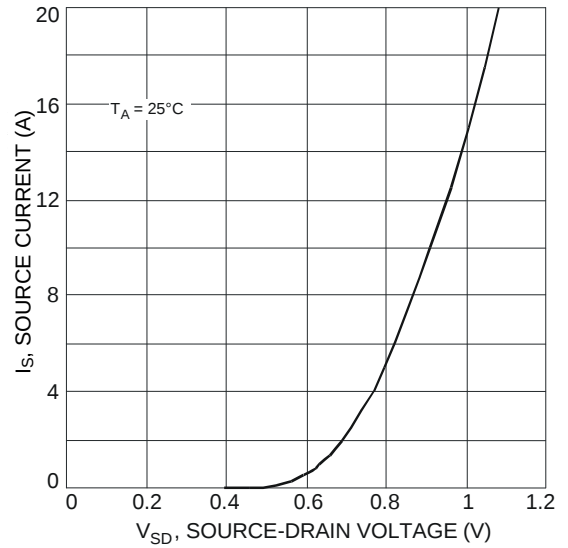


Fig. 8 Diode Forward Voltage vs. Current

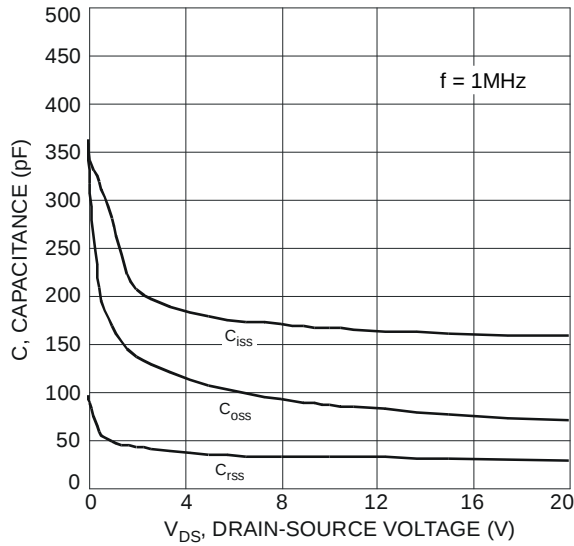


Fig. 9 Typical Total Capacitance

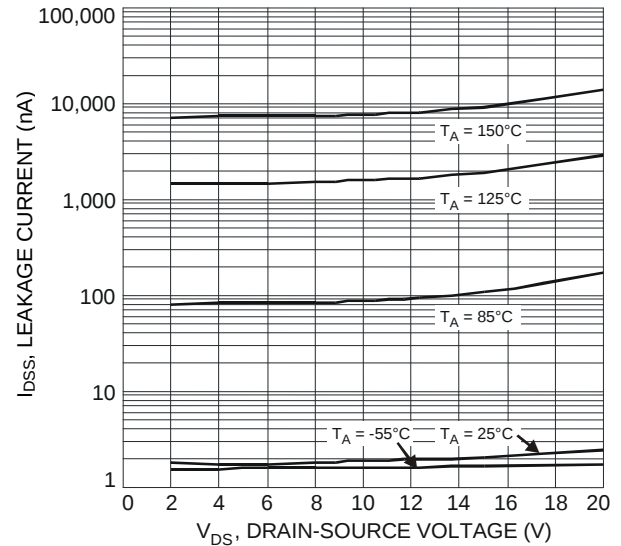


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

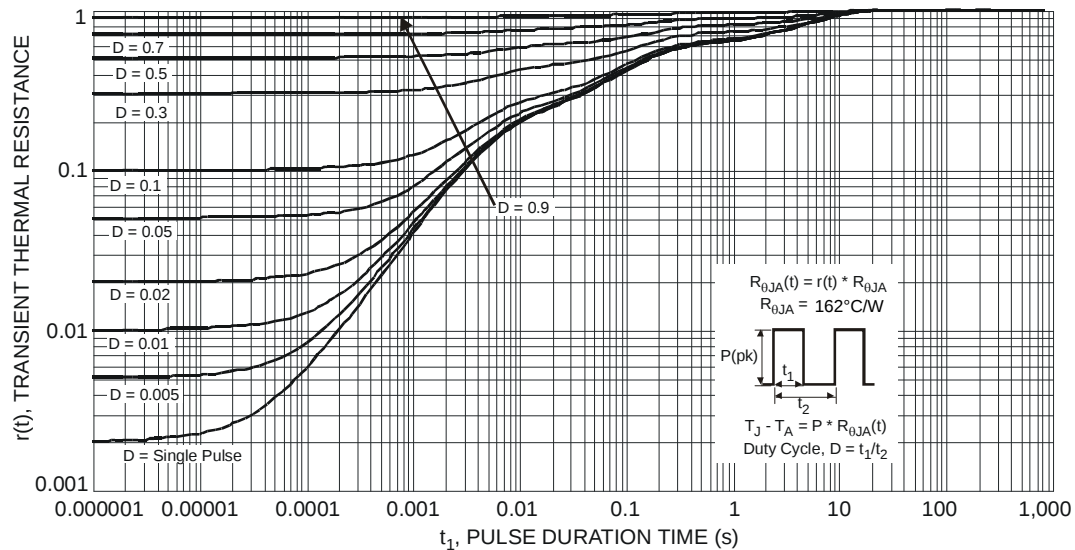
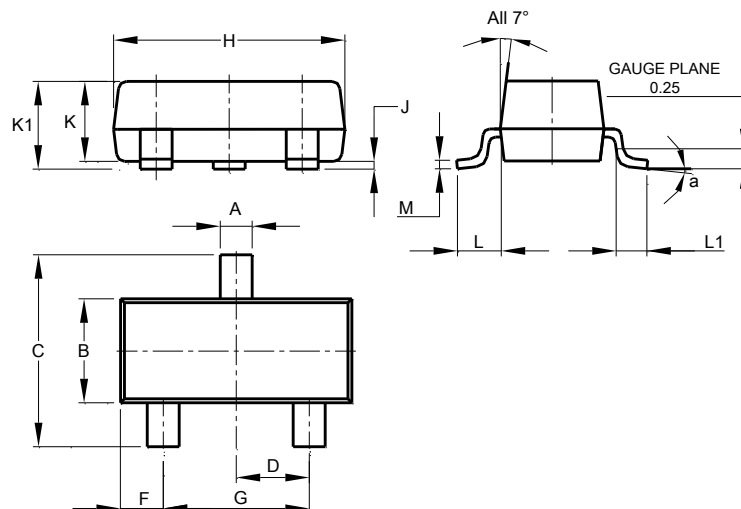


Fig. 11 Transient Thermal Response

Package Outline Dimensions

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

SOT23

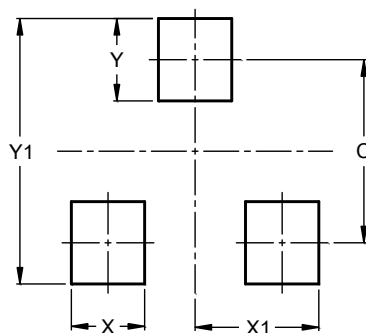


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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