Features

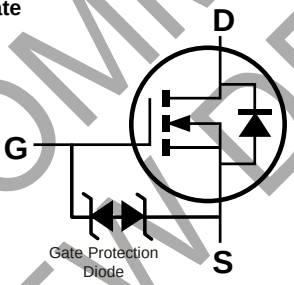
- Low On-Resistance
  - 25mΩ @ V_{GS} = 4.5V
  - 29mΩ @ V_{GS} = 2.5V
  - 36mΩ @ V_{GS} = 1.8V
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected Up To 2kV**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (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 refer to the related automotive grade (Q-suffix) part. A listing can be found at https://www.diodes.com/products/automotive/automotive-products/.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (DMG6968UQ)**

Mechanical Data

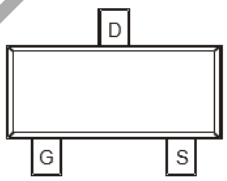
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)


ESD PROTECTED TO 2kV


Top View



Internal Schematic



Top View

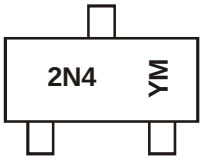
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Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMG6968U-7	Standard	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 $\overline{Y}$ = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Date Code Key

Year	2009	…	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Code	W	…	G	H	I	J	K	L	M	N	O	P

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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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	$R_{\theta JA}$	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_{SGS}	±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 FR-4 substrate PC board, 2oz. copper, with thermal vias to bottom layer 1 inch square copper plate.
6 Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.

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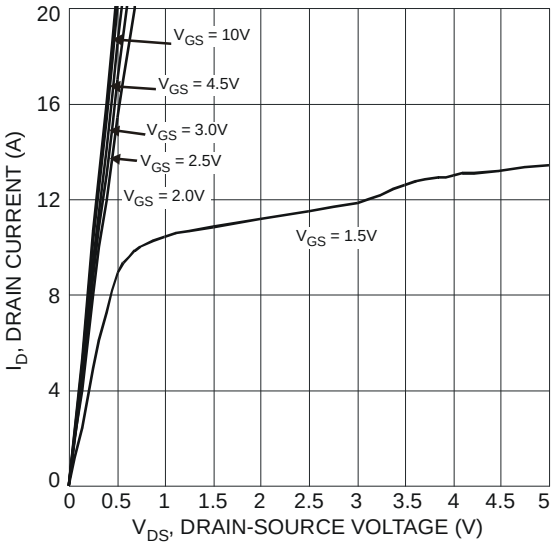


Fig. 1 Typical Output Characteristic

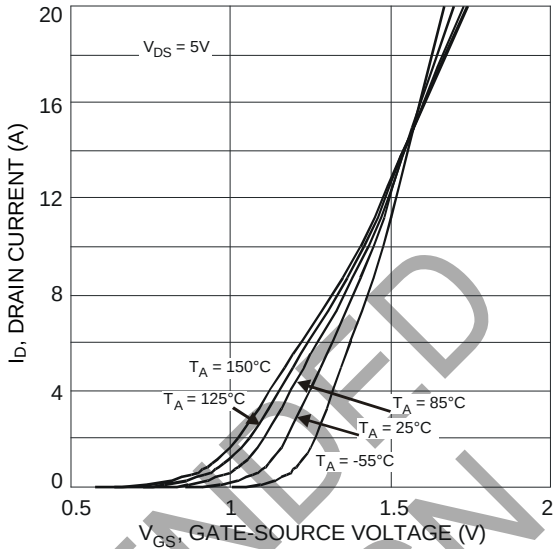


Fig. 2 Typical Transfer Characteristic

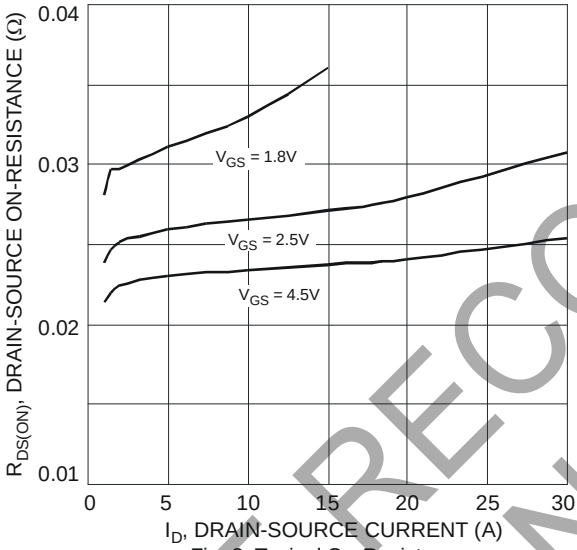


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

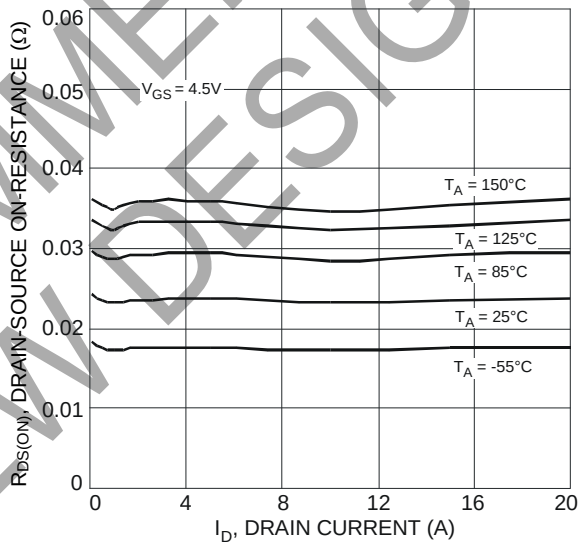


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

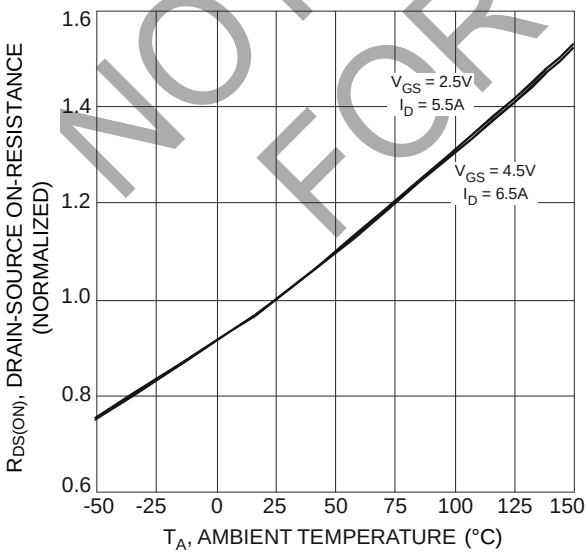


Fig. 5 On-Resistance Variation with Temperature

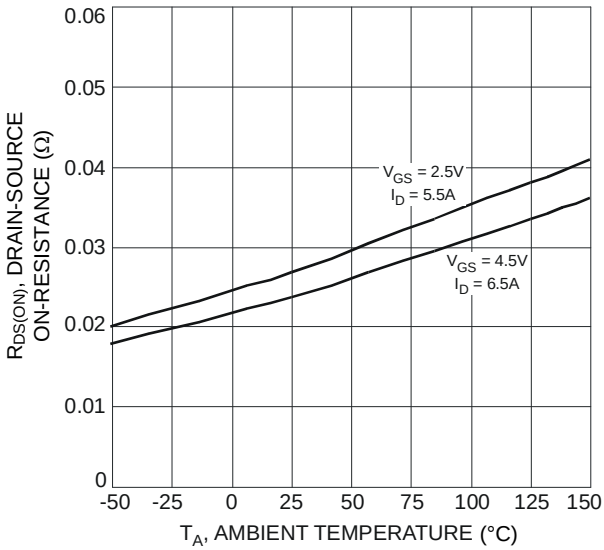


Fig. 6 On-Resistance Variation with Temperature

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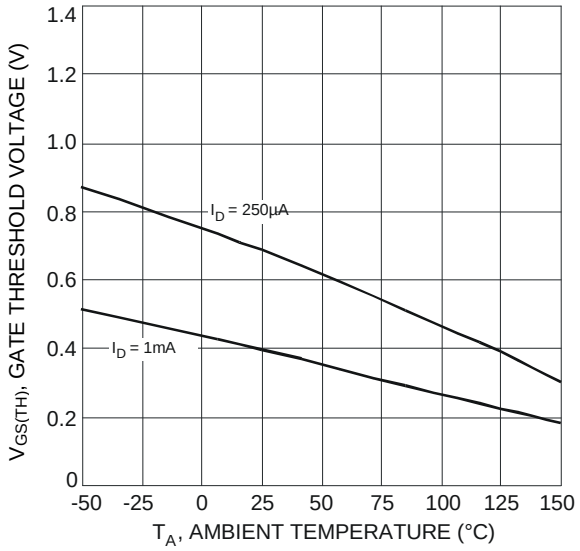


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

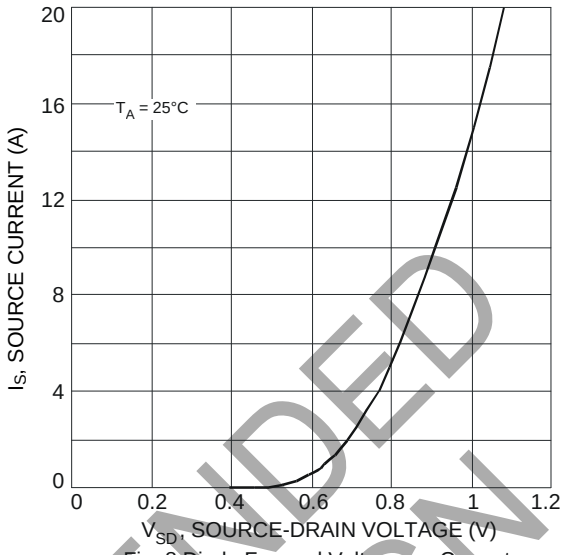


Fig. 8 Diode Forward Voltage vs. Current

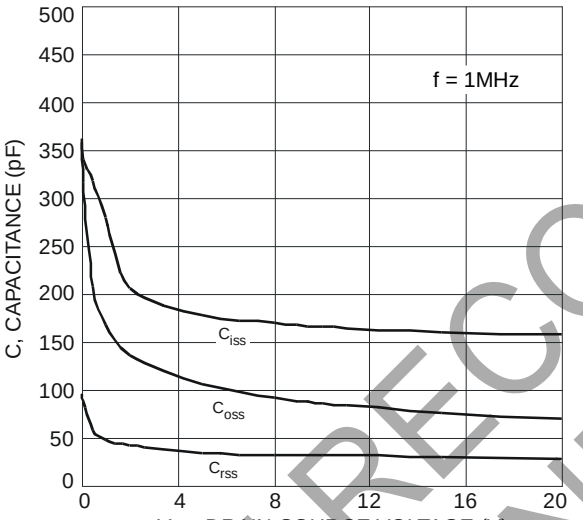


Fig. 9 Typical Total Capacitance

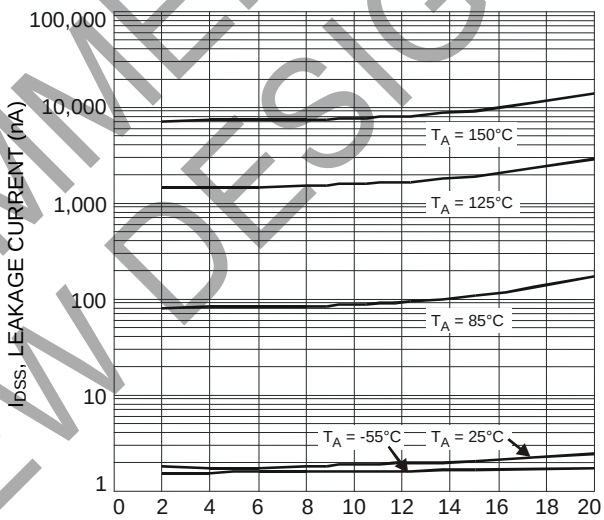


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

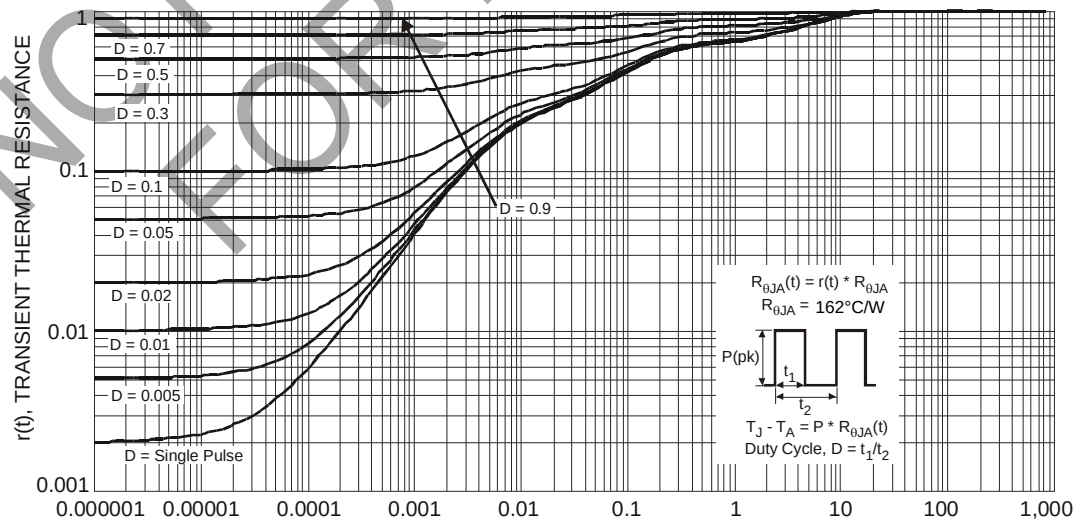


Fig. 11 Transient Thermal Response

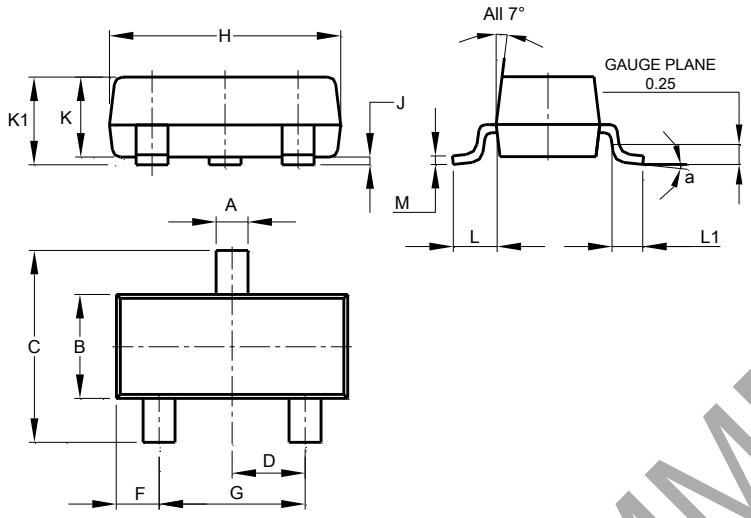
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Package Outline Dimensions

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SOT23



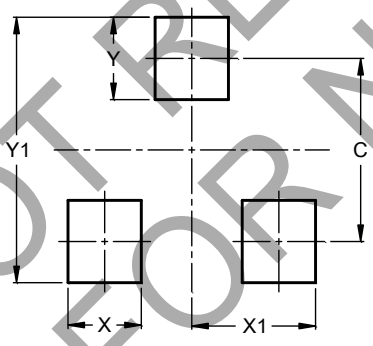
SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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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