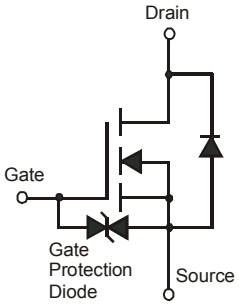
Features

- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

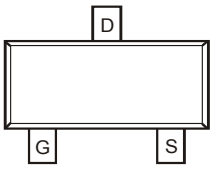
Mechanical Data

- 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)

Top View



Internal Schematic



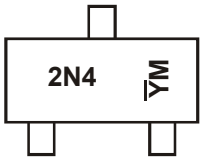
Top View

Ordering Information (Note 5)

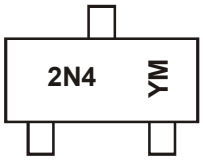
Part Number	Compliance	Case	Packaging
DMG6968U-7	Standard	SOT23	3000/Tape & Reel
DMG6968UQ-7	Automotive	SOT23	3000/Tape & Reel

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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html

Marking Information



Chengdu A/T Site



Shanghai A/T Site

2N4 = Product Type Marking Code
YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)
$\overline{Y}\overline{M}$ = Date Code Marking for CAT (Chengdu Assembly/ Test site)
Y or $\overline{Y}$ = Year (ex: A = 2013)
M = Month (ex: 9 = September)

Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015
Code	W	X	Y	Z	A	B	C

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	Units
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 6)	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 6)	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 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} = 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 7)						
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 8)						
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: 6. Device mounted on FR-4 substrate PC board, 2oz. copper, with thermal vias to bottom layer 1 inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

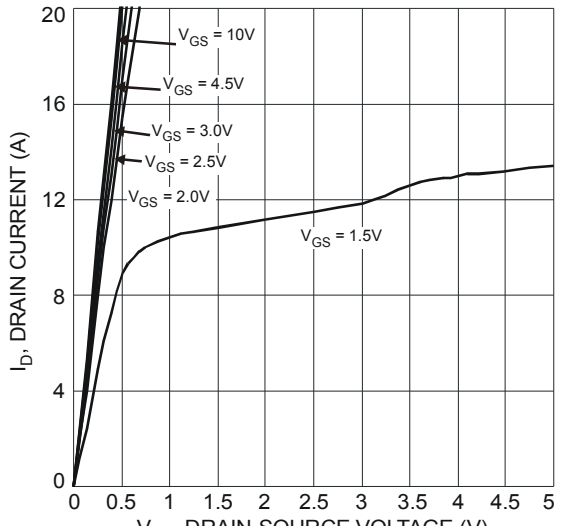


Fig. 1 Typical Output Characteristic

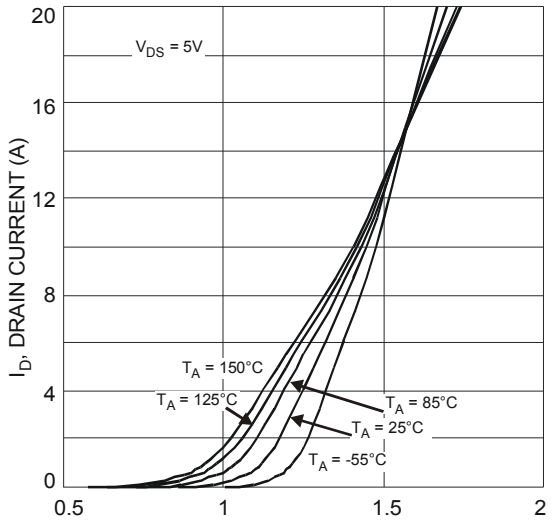


Fig. 2 Typical Transfer Characteristic

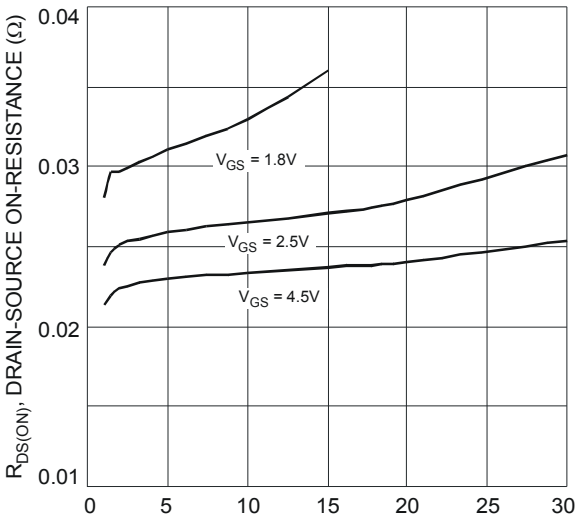


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

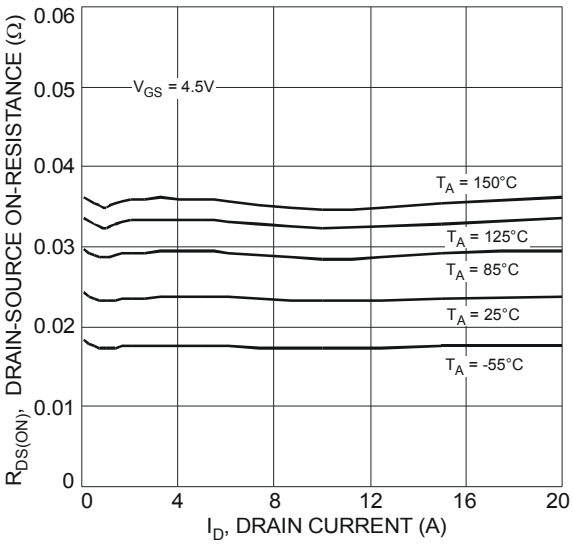


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

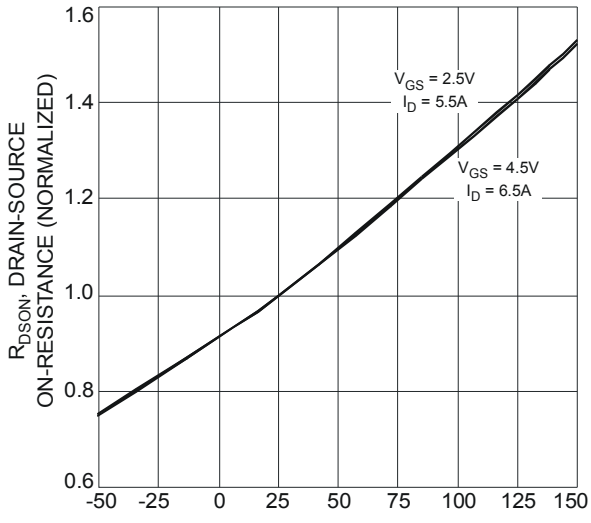


Fig. 5 On-Resistance Variation with Temperature

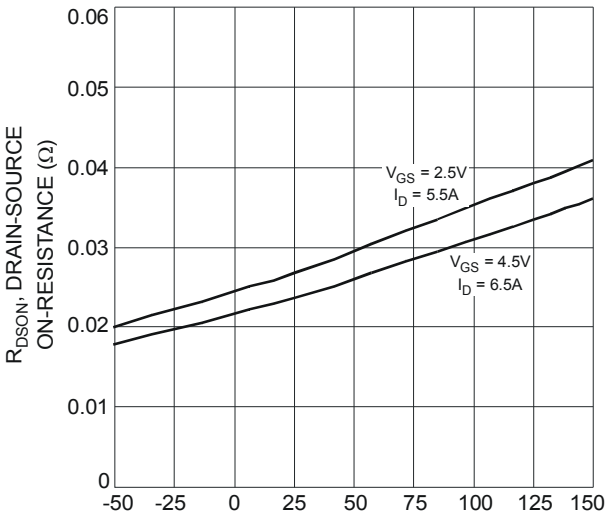


Fig. 6 On-Resistance Variation with Temperature

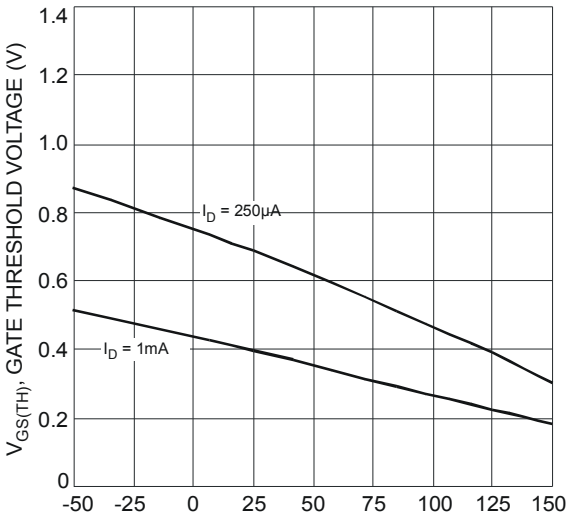


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

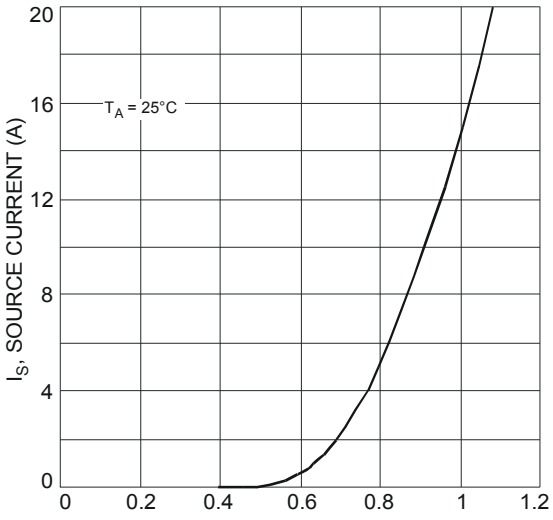


Fig. 8 Diode Forward Voltage vs. Current

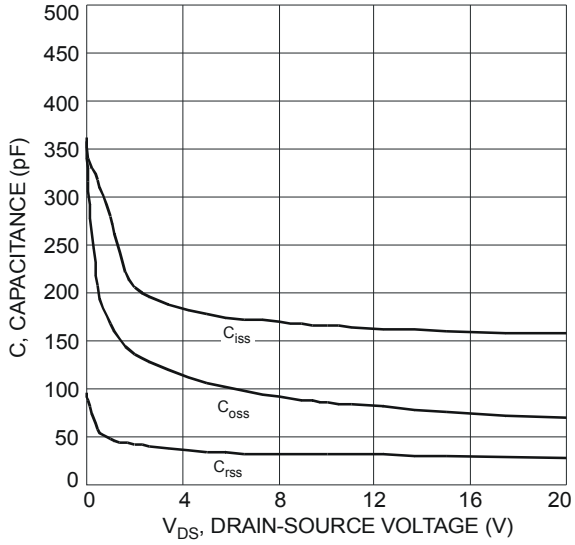


Fig. 9 Typical Total Capacitance

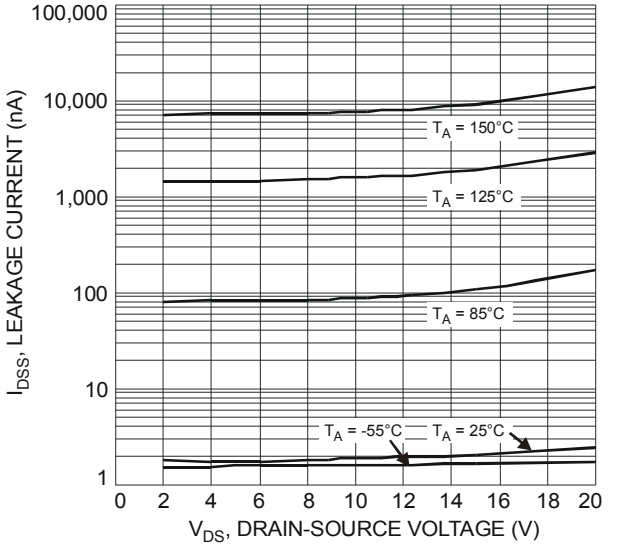


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

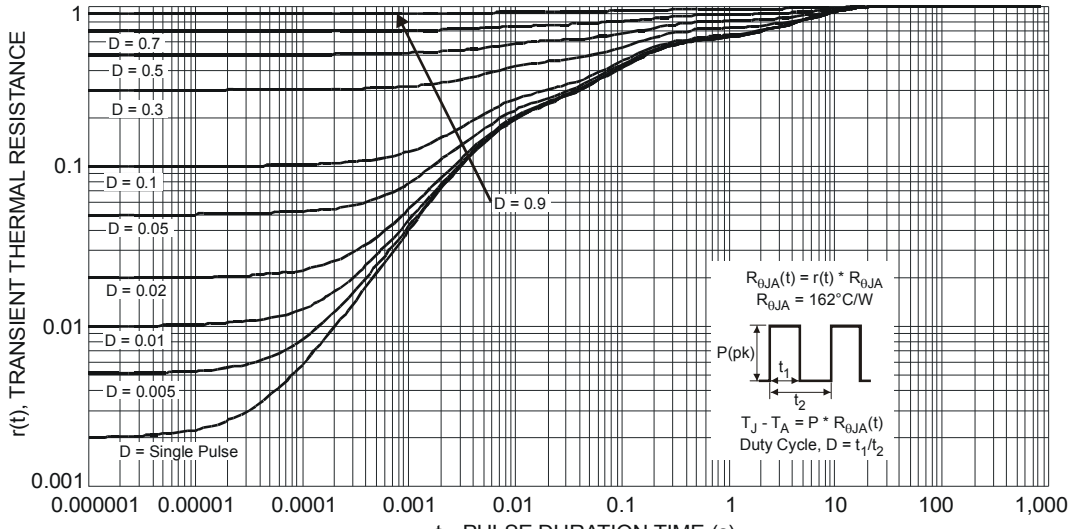
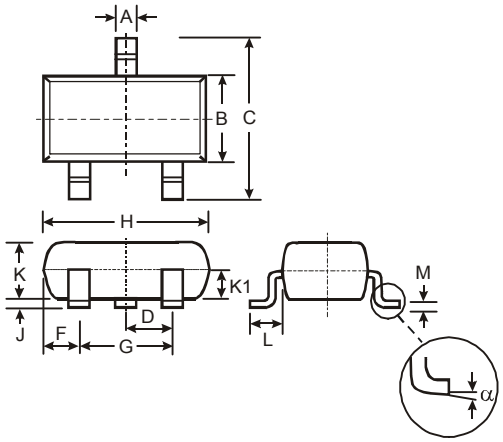


Fig. 11 Transient Thermal Response

Package Outline Dimensions

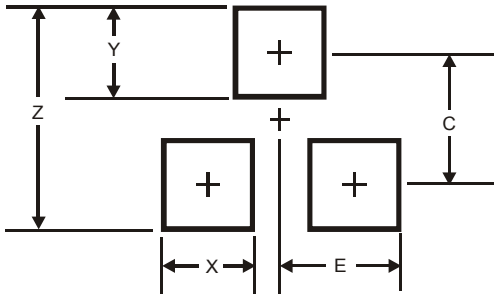
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for latest version.



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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