

## 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
- Lead Free By Design/RoHS Compliant (Note 1)**
- ESD Protected Up To 2kV**
- "Green" Device (Note 2)**
- Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

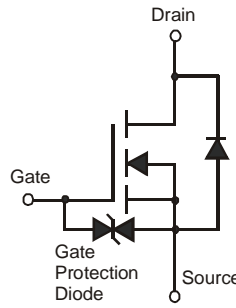
- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Terminals Connections: See Diagram Below
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.008 grams (approximate)



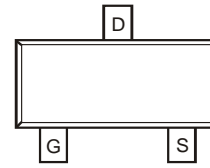
ESD PROTECTED TO 2kV



TOP VIEW



Internal Schematic



TOP VIEW

## Maximum Ratings @ $T_A = 25^\circ C$ unless otherwise specified

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage			$V_{GSS}$	$\pm 12$	V
Continuous Drain Current (Note 3)	Steady State	$T_A = 25^\circ C$	$I_D$	6.5	A
		$T_A = 70^\circ C$		5.2	
Pulsed Drain Current			$I_{DM}$	30	A

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3)	$P_D$	0.81	W
Thermal Resistance, Junction to Ambient @ $T_A = 25^\circ C$	$R_{\theta JA}$	157	$^\circ C/W$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ C$

- Notes:
- No purposefully added lead.
  - Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  - Device mounted on FR-4 PCB with minimum recommended pad layout.

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 4)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1.0	$\mu A$	$V_{DS} = 20V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu A$	$V_{GS} = \pm 10V, V_{DS} = 0V$
Gate-Source Breakdown Voltage	$BV_{SGS}$	$\pm 12$	-	-	V	$V_{DS} = 0V, I_G = \pm 250\mu A$
<b>ON CHARACTERISTICS (Note 4)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	—	0.9	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	21	25	m $\Omega$	$V_{GS} = 4.5V, I_D = 6.5A$
			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	$V_{DS} = 10V, I_D = 5A$
<b>DYNAMIC CHARACTERISTICS</b>						
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	$V_{DD} = 10V, V_{GS} = 4.5V,$ $R_L = 10\Omega, R_G = 6\Omega, I_D = 1A$
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: 4. Short duration pulse test used to minimize self-heating effect.

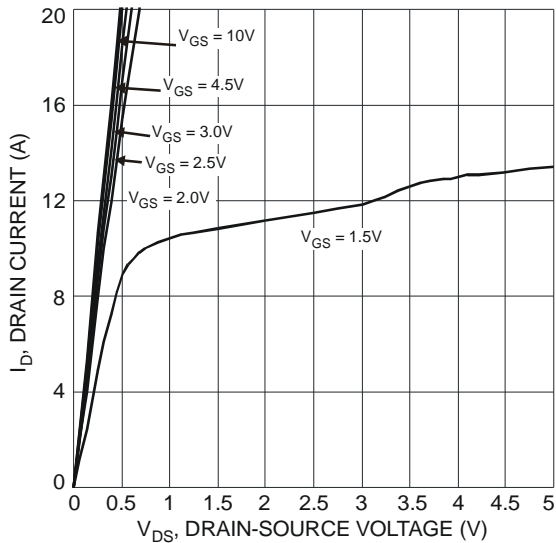


Fig. 1 Typical Output Characteristic

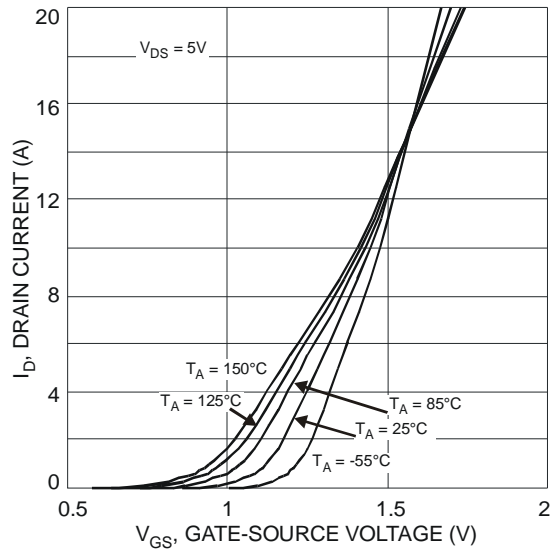


Fig. 2 Typical Transfer Characteristic

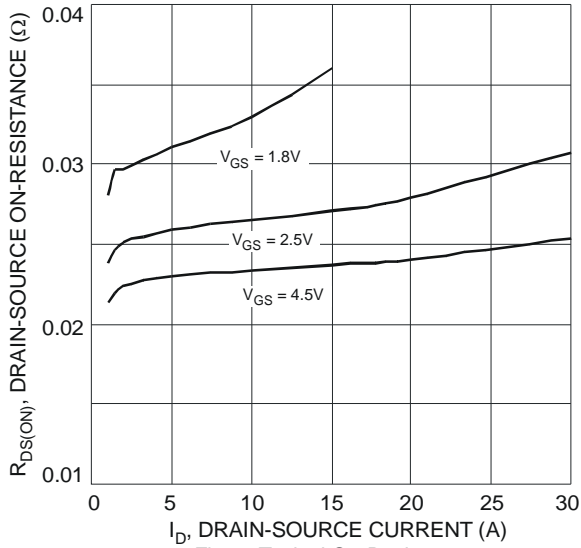


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

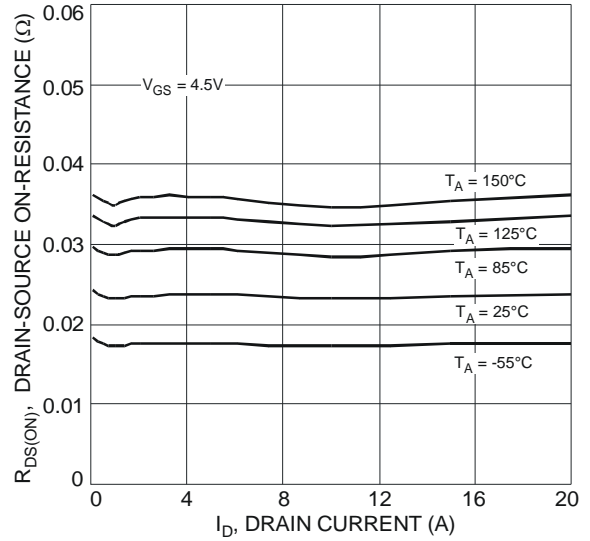


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

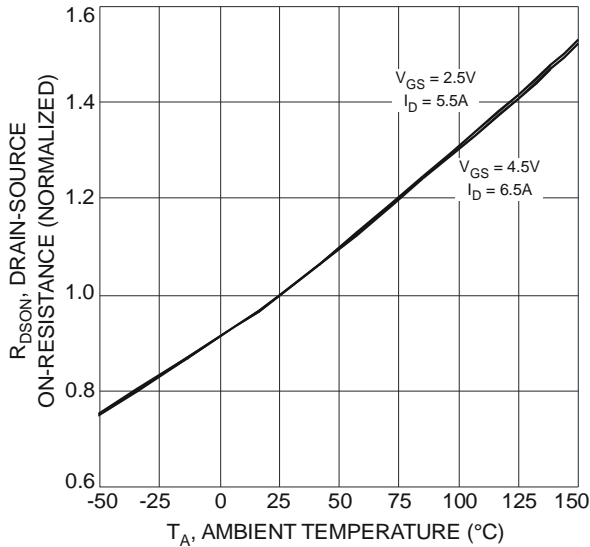


Fig. 5 On-Resistance Variation with Temperature

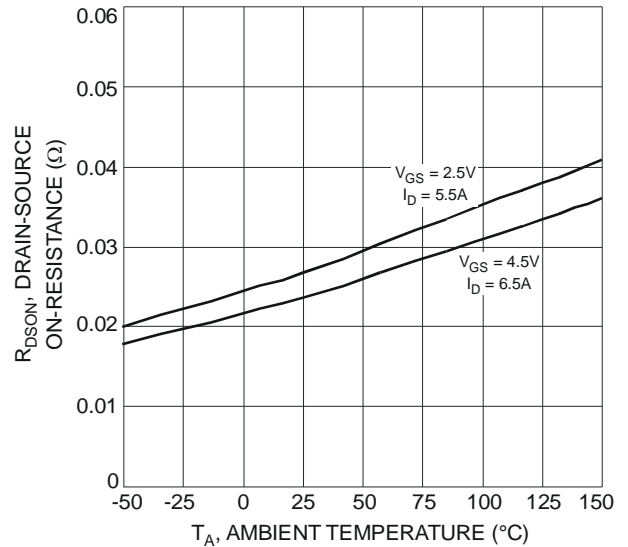


Fig. 6 On-Resistance Variation with Temperature

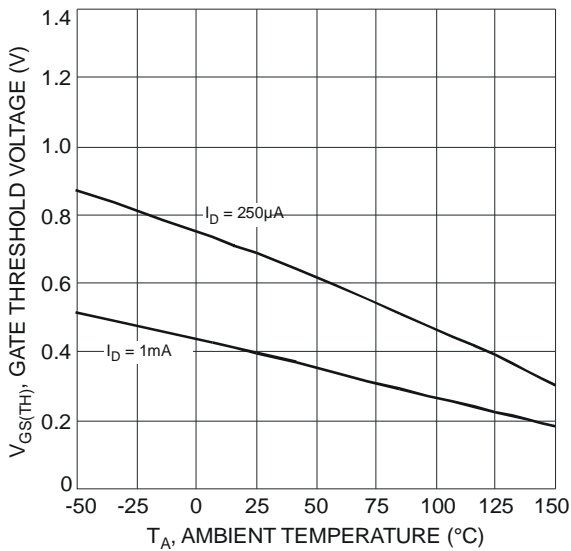


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

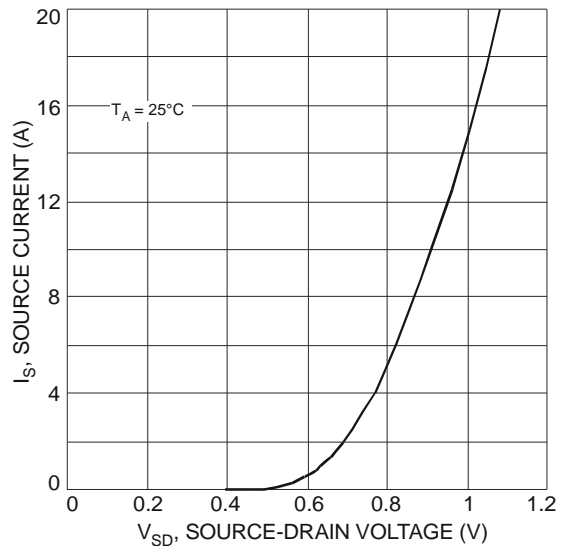


Fig. 8 Diode Forward Voltage vs. Current

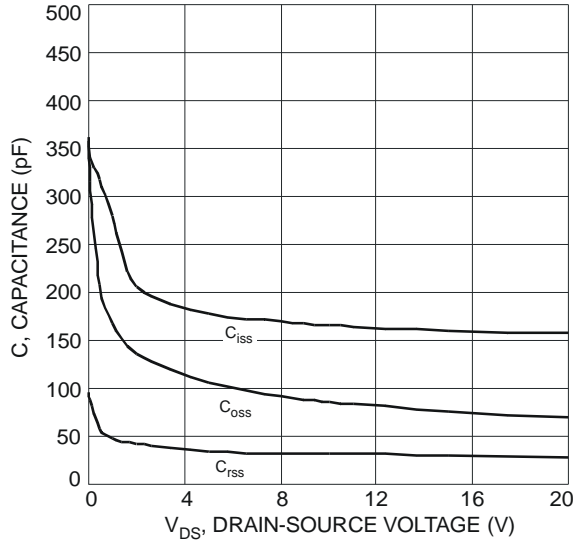


Fig. 9 Typical Total Capacitance

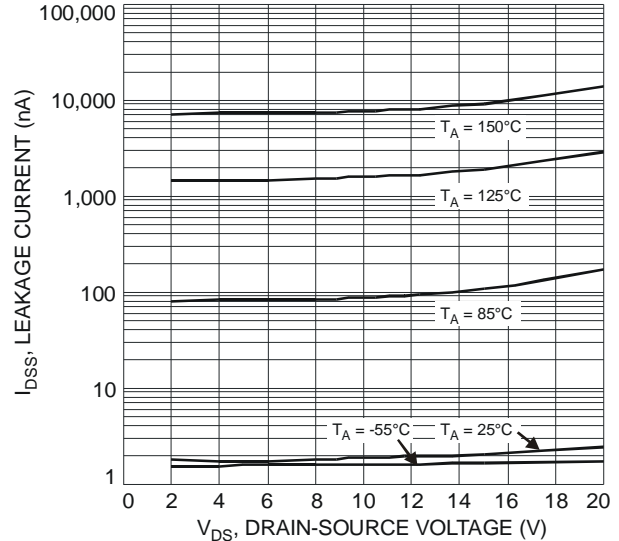


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

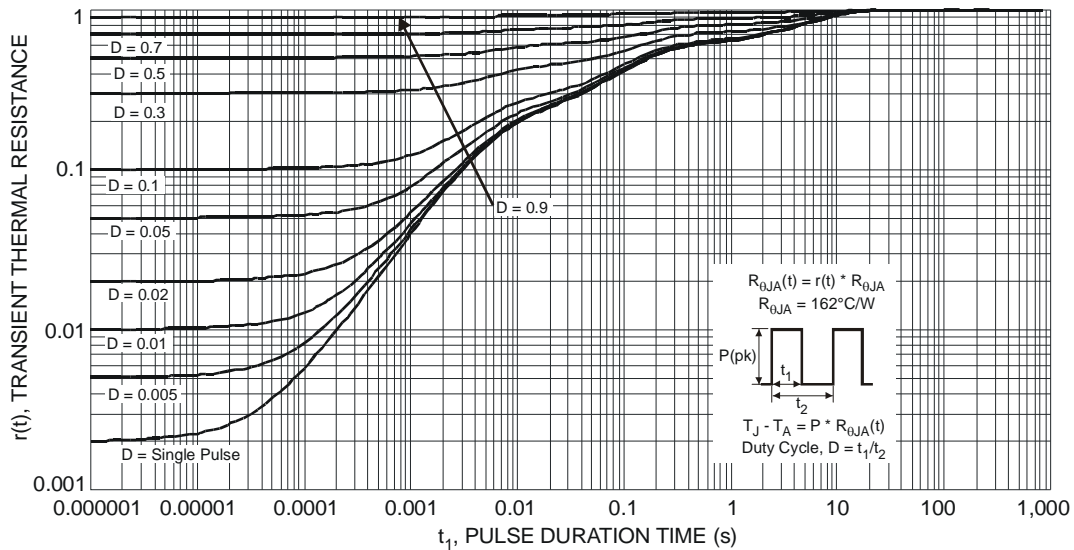


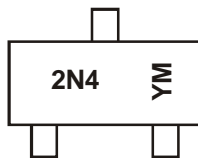
Fig. 11 Transient Thermal Response

**Ordering Information** (Note 5)

Part Number	Case	Packaging
DMG6968U-7	SOT-23	3000/Tape & Reel

Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**

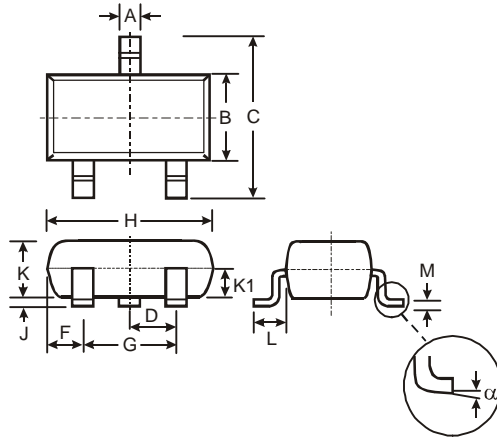


2N4 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: W = 2009)  
 M = Month (ex: 9 = September)

Date Code Key

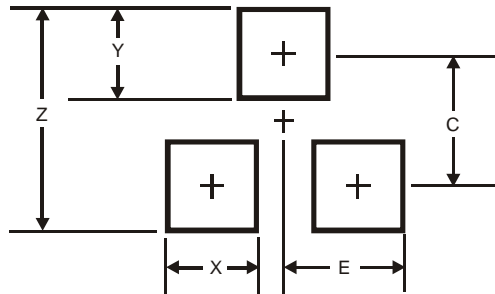
Year	2009	2010	2011	2012	2013	2014	2015					
Code	W	X	Y	Z	A	B	C					
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Package Outline Dimensions**



SOT-23			
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**



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

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