

**Features**

- Low Gate Charge
- Low  $R_{DS(ON)}$ :
  - $24m\Omega @ V_{GS} = 4.5V$
  - $28m\Omega @ V_{GS} = 2.5V$
  - $34m\Omega @ V_{GS} = 1.8V$
- Low Input/Output Leakage
- **ESD Protected up to 2kV HBM**
- **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**

**Mechanical Data**

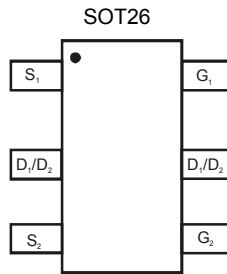
- Case: SOT26
- Case Material - Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin annealed over Copper leadframe Solderable per MIL-STD-202, Method 208 **(e3)**
- Terminal Connections: See Diagram
- Weight: 0.0008 grams (approximate)



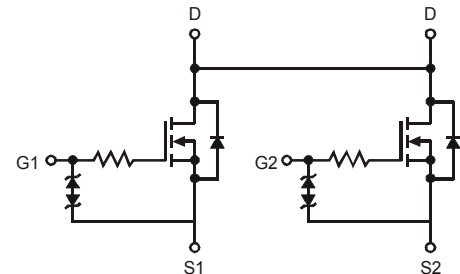
ESD PROTECTED TO 2kV



Top View



Top View  
Pin Configuration



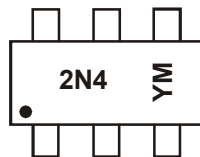
N-Channel  
Equivalent Circuit  
N-Channel

**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMG6968UDM-7	SOT26	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](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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**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	2008	2009	2010	2011	2012	2013	2014	2015
Code	V	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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	20	V
Gate-Source Voltage (Note 5)	$V_{GSS}$	$\pm 12$	V
Drain Current (Note 6) Continuous	$I_D$	$T_A = +25^\circ\text{C}$	6.5
		$T_A = +70^\circ\text{C}$	5.2
Pulsed Drain Current (Note 7)	$I_{DM}$	30	A

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

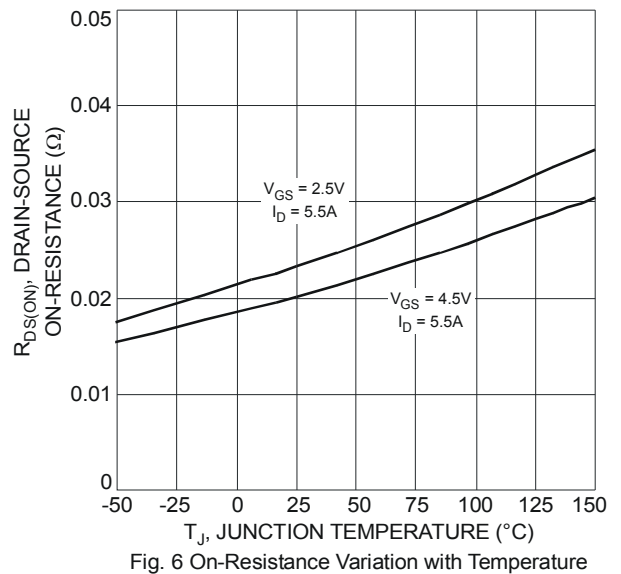
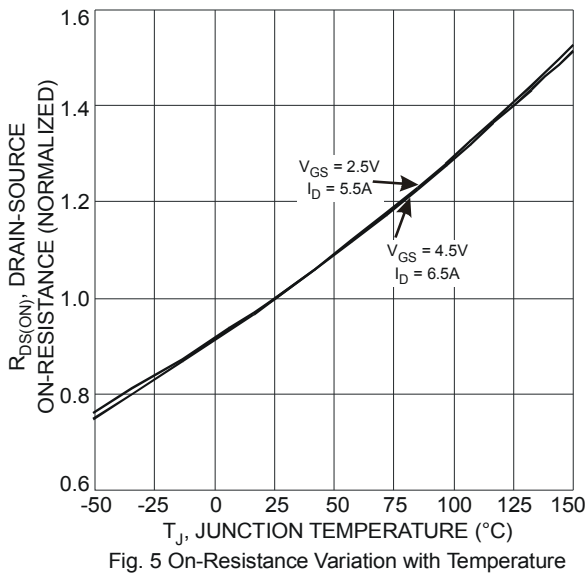
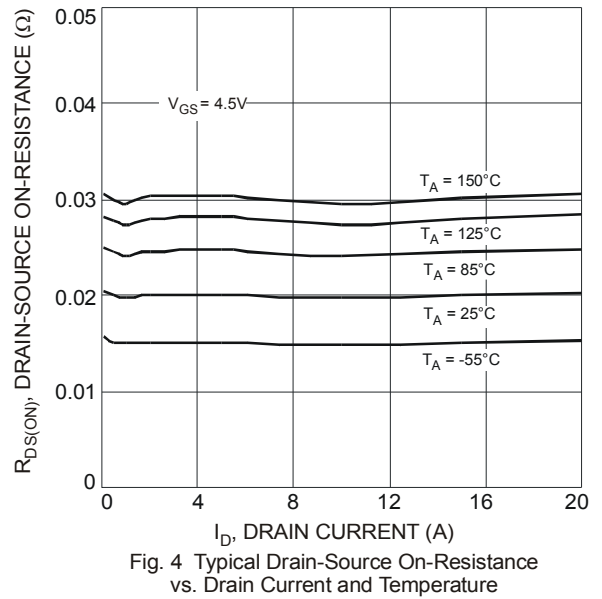
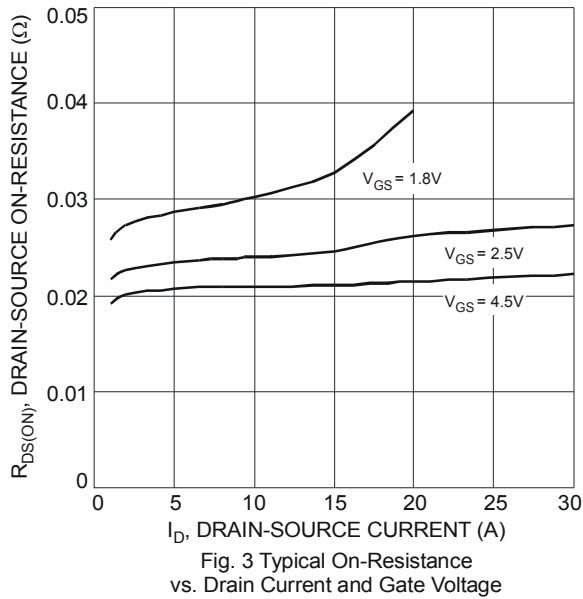
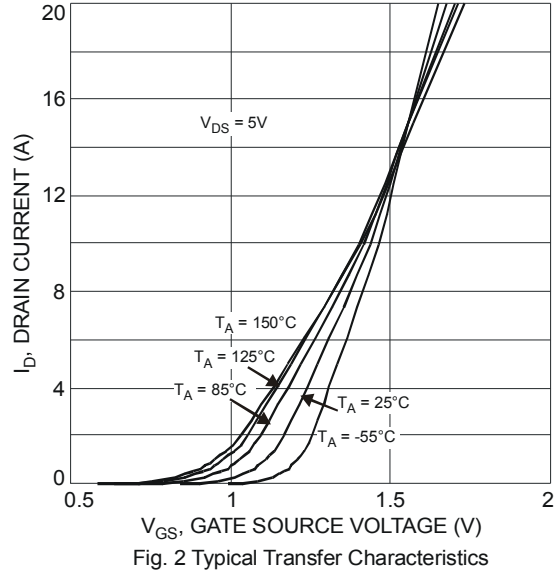
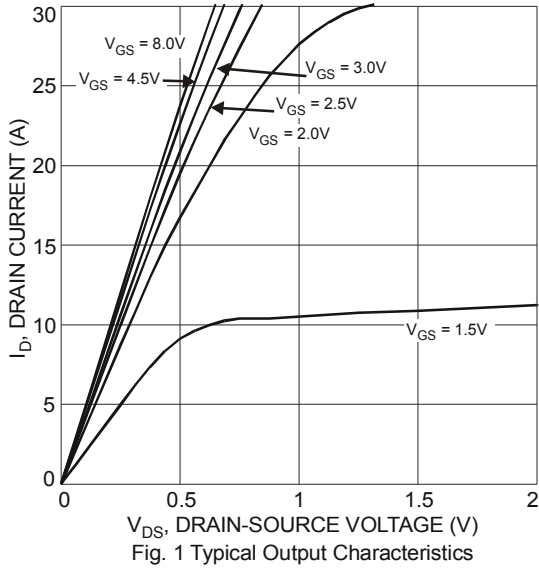
Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	$P_D$	0.85	W
Thermal Resistance, Junction to Ambient (Note 6) $t \leq 10\text{s}$	$R_{\theta JA}$	147	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
- AEC-Q101 VGS maximum is  $\pm 9.6\text{V}$ .
  - Device mounted on 1"x1", FR-4 PC board with 2 oz. Copper and test pulse width  $t \leq 10\text{s}$ .
  - Repetitive Rating, pulse width limited by junction temperature.

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>STATIC CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	—	—	V	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage Current	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{DS} = 0\text{V}, V_{GS} = \pm 10\text{V}$
Gate-Source Breakdown Voltage	$BV_{SGS}$	$\pm 12$	—	—	V	$V_{DS} = 0\text{V}, I_G = \pm 250\mu\text{A}$
Gate Threshold Voltage	$V_{GS(th)}$	0.5	—	0.9	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance (Note 8)	$R_{DS(on)}$	—	17	24	m $\Omega$	$V_{GS} = 4.5\text{V}, I_D = 6.5\text{A}$
			20	28		$V_{GS} = 2.5\text{V}, I_D = 5.5\text{A}$
			26	34		$V_{GS} = 1.8\text{V}, I_D = 3.5\text{A}$
Forward Transfer Admittance	$ Y_{FS} $	—	8	—	S	$V_{DS} = 10\text{V}, I_D = 5\text{A}$
Diode Forward Voltage (Note 8)	$V_{SD}$	—	0.7	1.0	V	$I_S = 2.25\text{A}, V_{GS} = 0\text{V}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	143	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	74	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	29	—	pF	
Gate Resisitance	$R_G$	—	202	—	$\Omega$	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$
<b>SWITCHING CHARACTERISTICS (Note 9)</b>						
Total Gate Charge	$Q_g$	—	8.8	—	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}, I_D = 6.5\text{A}$
Gate-Source Charge	$Q_{gs}$	—	1.4	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	3.0	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	53	—	ns	$V_{DD} = 10\text{V}, V_{GS} = 4.5\text{V},$ $R_L = 10\Omega, R_G = 6\Omega$
Turn-On Rise Time	$t_r$	—	78	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	562	—	ns	
Turn-Off Fall Time	$t_f$	—	234	—	ns	

- Notes:
- Test pulse width  $t = 300\text{ms}$ .
  - Guaranteed by design. Not subject to production testing.



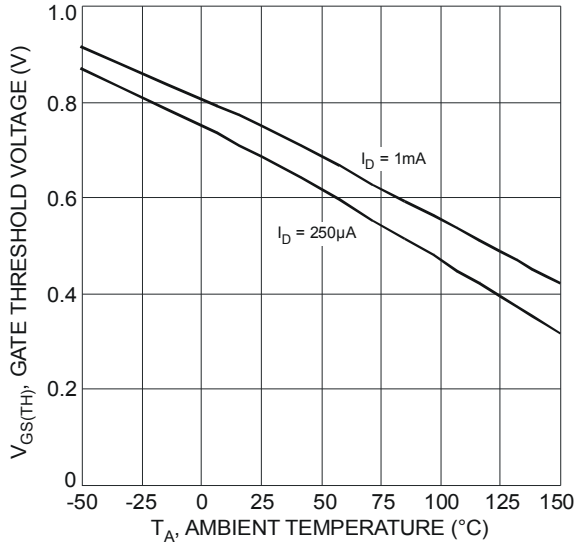


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

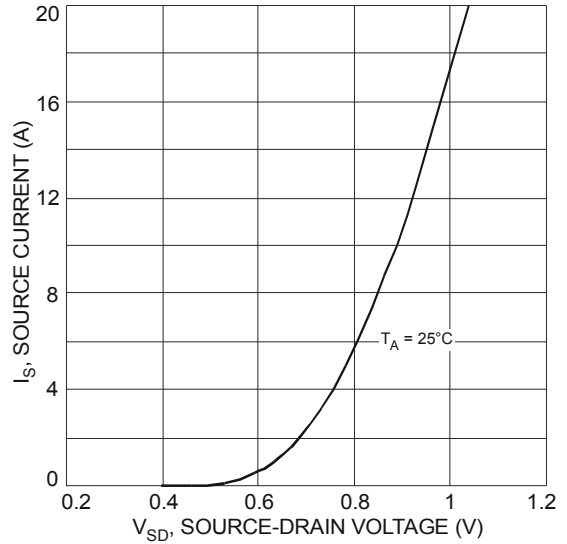


Fig. 8 Diode Forward Voltage vs. Current

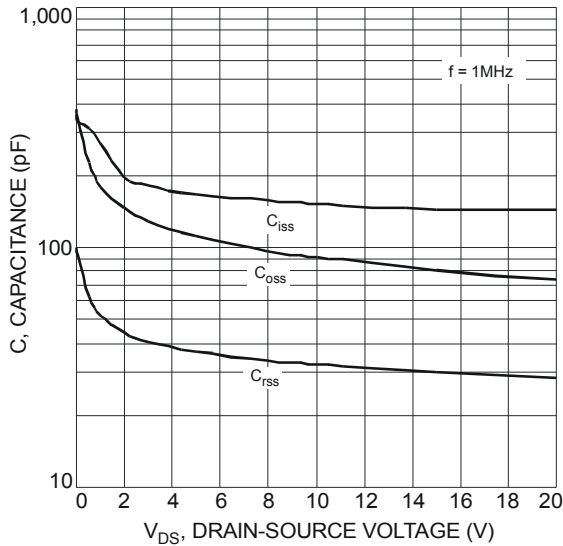


Fig. 9 Typical Capacitance

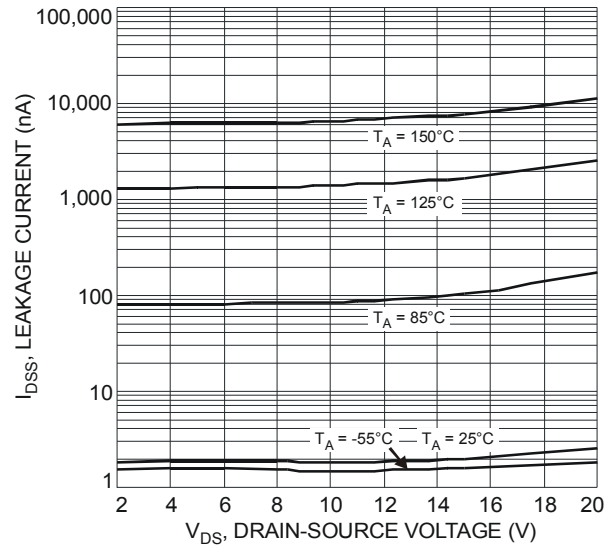


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

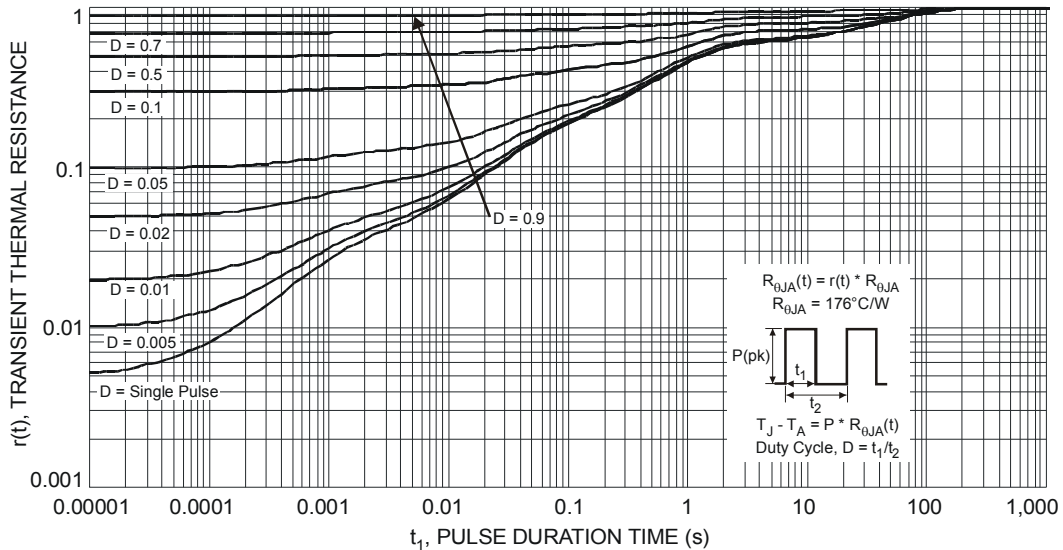
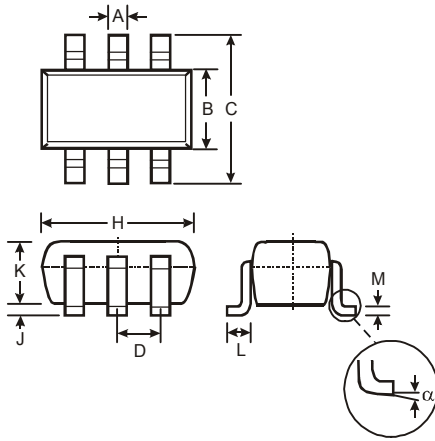


Fig. 11 Transient Thermal Response

**Package Outline Dimensions**

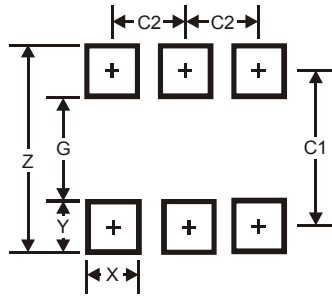
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT26			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
α	0°	8°	—
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

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



Dimensions	Value (in mm)
Z	3.20
G	1.60
X	0.55
Y	0.80
C1	2.40
C2	0.95

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