

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = +25^\circ\text{C}$
25V	4Ω @ $V_{GS} = 4.5\text{V}$	0.24A
	5Ω @ $V_{GS} = 2.7\text{V}$	0.22A

## Description

This new generation MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

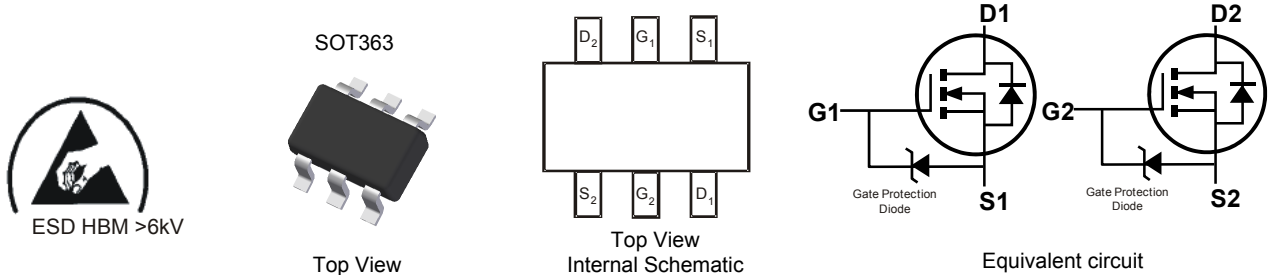
- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc

## Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD Protected Gate (>6kV Human Body Model)
- **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: SOT363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 (E3)
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)

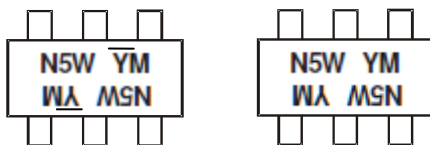


## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMG6301UDW-7	Standard	SOT363	3,000/Tape & Reel
DMG6301UDW-13	Standard	SOT363	10,000/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



N5W= Product Type Marking Code  
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)  
 YM = Date Code Marking for CAT (Chengdu Assembly/ Test site)  
 Y or Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2012	2013	2014	2015	2016	2017	2018
Code	Z	A	B	C	D	E	F

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	Units	
Drain-Source Voltage	$V_{DSS}$	25	V	
Gate-Source Voltage	$V_{GSS}$	8	V	
Continuous Drain Current, $V_{GS} = 4.5\text{V}$ (Note 6)	$I_D$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	0.24 0.19	A
Continuous Drain Current, $V_{GS} = 2.7\text{V}$ (Note 6)		$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	0.22 0.17	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)	$I_{DM}$	1.5	A	

**Thermal Characteristics**

Characteristic	Symbol	Value	Units	
Total Power Dissipation	$P_D$	(Note 5)	0.3	W
		(Note 6)	0.37	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	(Note 5)	409	$^\circ\text{C/W}$
		(Note 6)	334	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	137	$^\circ\text{C}$	
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$	

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	25	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$	—	—	100	nA	$V_{GS} = 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	0.65	0.85	1.5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	3.8	4	$\Omega$	$V_{GS} = 4.5\text{V}, I_D = 0.4\text{A}$
		—	3.1	5	$\Omega$	$V_{GS} = 2.7\text{V}, I_D = 0.2\text{A}$
Forward Transconductance	$ Y_{fs} $	—	1	—	S	$V_{DS} = 5\text{V}, I_D = 0.4\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.76	1.2	V	$V_{DS} = V_{GS}, I_D = 0.25\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	27.9	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	6.1	—		
Reverse Transfer Capacitance	$C_{rss}$	—	2	—		
Total Gate Charge	$Q_g$	—	0.36	—	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 5\text{V}, I_D = 0.2\text{A}$
Gate-Source Charge	$Q_{gs}$	—	0.06	—		
Gate-Drain Charge	$Q_{gd}$	—	0.04	—		
Turn-On Delay Time	$t_{D(on)}$	—	2.9	—	nS	$V_{GS} = 4.5\text{V}, V_{DS} = 6\text{V}, I_D = 0.5\text{A}, R_{\theta} = 50\Omega$
Turn-On Rise Time	$t_r$	—	1.8	—		
Turn-Off Delay Time	$t_{D(off)}$	—	6.6	—		
Turn-Off Fall Time	$t_f$	—	2.3	—		

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

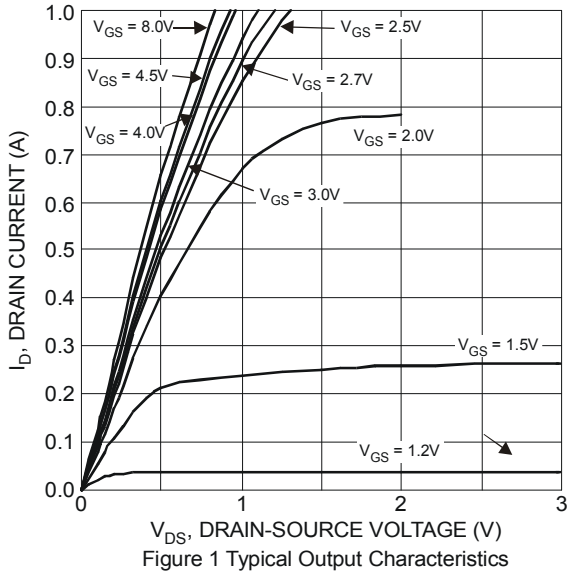


Figure 1 Typical Output Characteristics

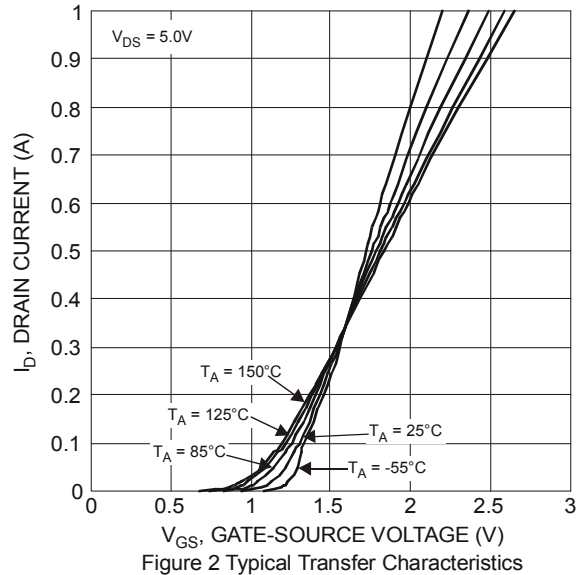


Figure 2 Typical Transfer Characteristics

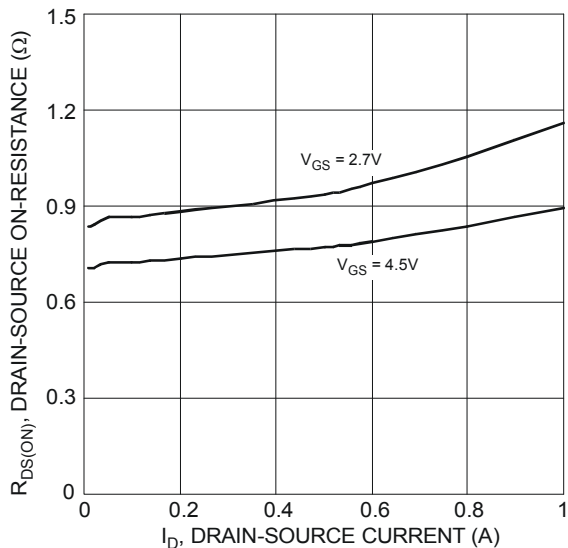


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

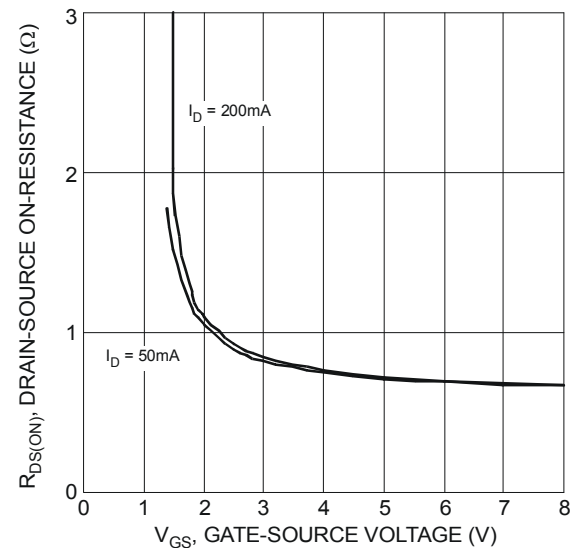


Figure 4 Typical Transfer Characteristics

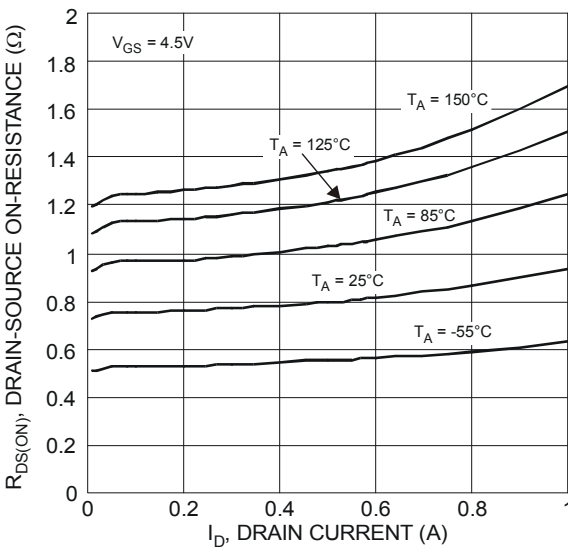


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

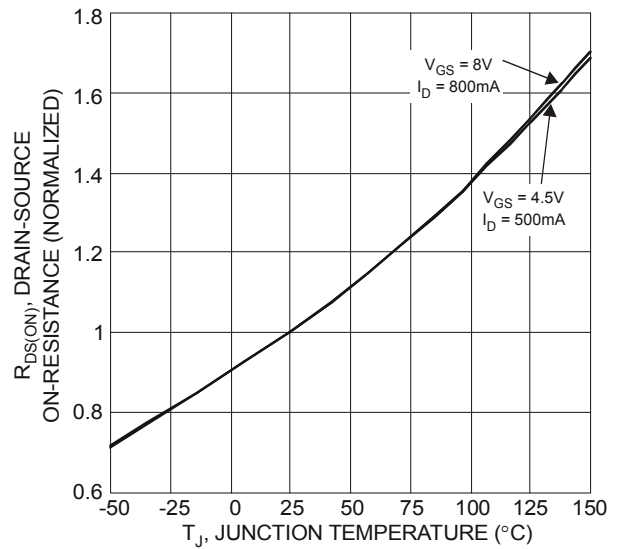


Figure 6 On-Resistance Variation with Temperature

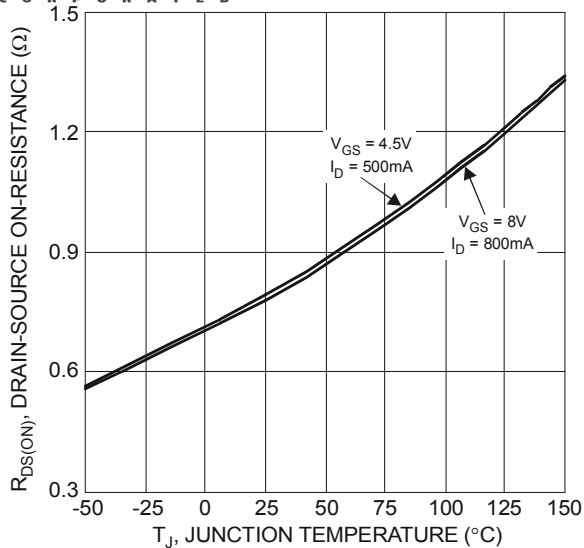


Figure 7 On-Resistance Variation with Temperature

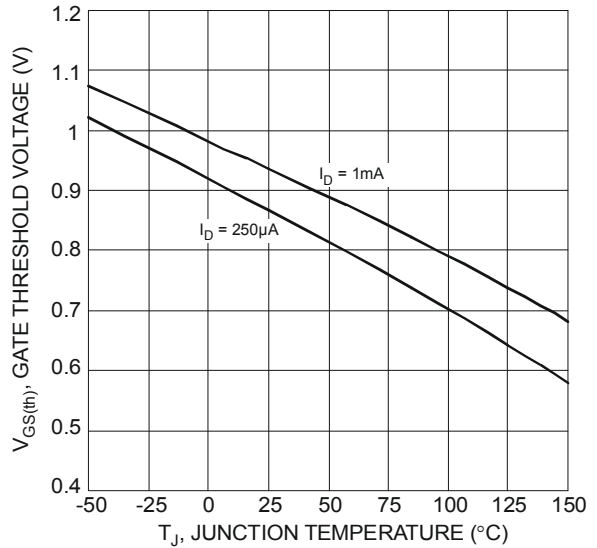


Figure 8 Gate Threshold Variation vs. Ambient Temperature

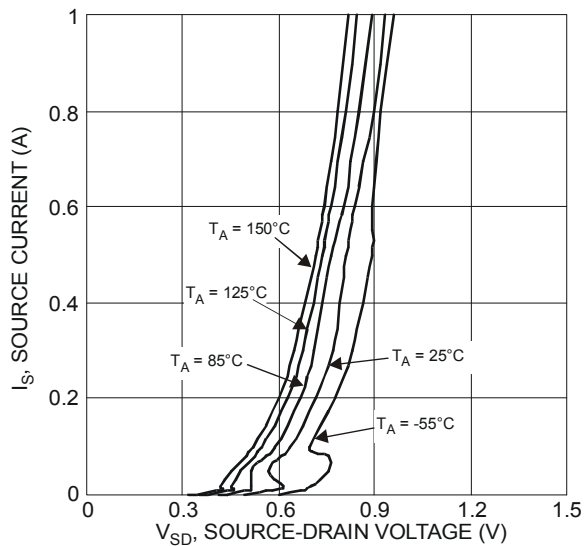


Figure 9 Diode Forward Voltage vs. Current

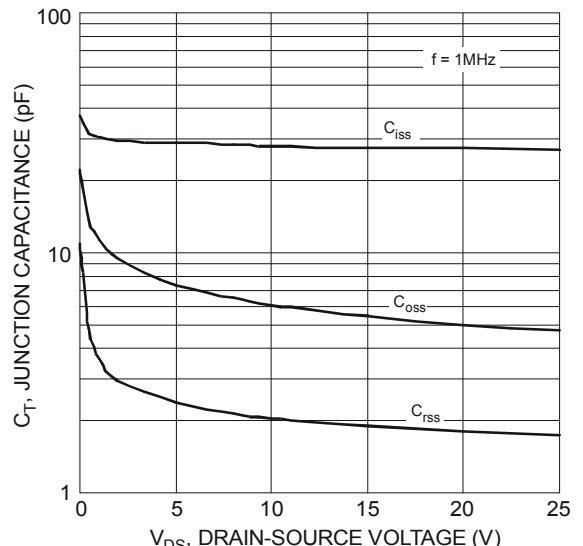


Figure 10 Typical Junction Capacitance

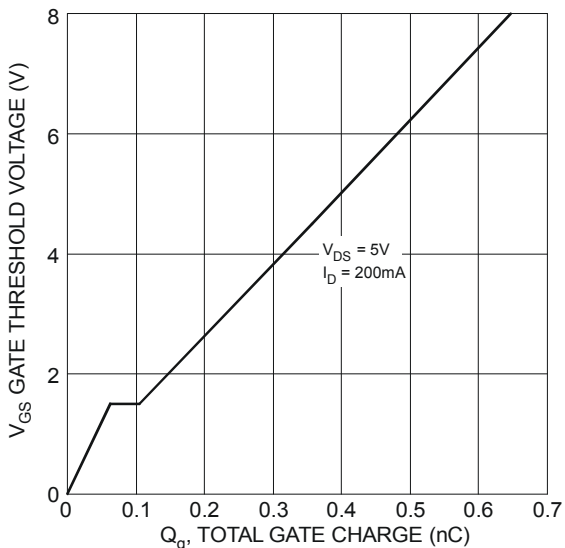
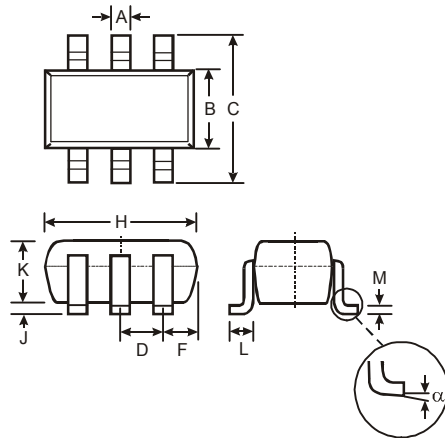


Figure 11 Gate Charge

**Package Outline Dimensions**

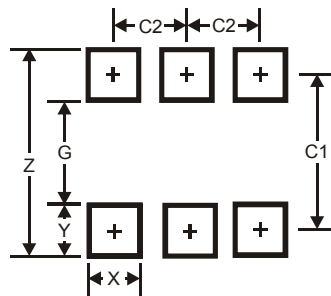
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT363		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Typ	
F	0.40	0.45
H	1.80	2.20
J	0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.22
α	0°	8°
All Dimensions in mm		

**Suggested Pad Layout**

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



Dimensions	Value (in mm)
Z	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

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