



#### 25V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

## **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
25V	$4\Omega$ @ $V_{GS} = 4.5V$	0.24A
257	$5\Omega$ @ $V_{GS} = 2.7V$	0.22A

## **Description**

This new generation MOSFET has been designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) 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**

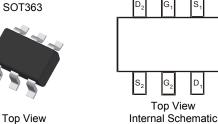
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD Protected Gate (>6kV Human Body Model)
- Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

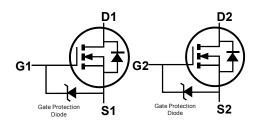
#### **Mechanical Data**

- 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 (3)
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)









Equivalent circuit

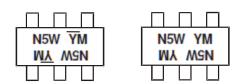
#### Ordering Information (Note 4)

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 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	201	2	2013		2014	20	15	2016		2017	2	2018
Code	Z		Α		В	(	0	D		Е		F
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D



# Maximum Ratings (@T<sub>A</sub> = +25°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 <sub>GS</sub> = 4.5V (Note 6)	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	Ι <sub>D</sub>	0.24 0.19	А
Continuous Drain Current, V <sub>GS</sub> = 2.7V (Note 6)	I <sub>D</sub>	0.22 0.17	А	
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I <sub>DM</sub>	1.5	А	

## **Thermal Characteristics**

Characteristic	Symbol	Value	Units		
Total Power Dissipation	(Note 5)	Б	0.3	W	
Total Fower Dissipation	(Note 6)	$P_D$	0.37		
Thermal Resistance, Junction to Ambient	(Note 5)	В	409		
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\ThetaJA}$	334	°C/W	
Thermal Resistance, Junction to Case	(Note 6)	Rejc	137		
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C	

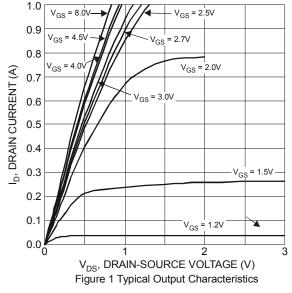
# Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

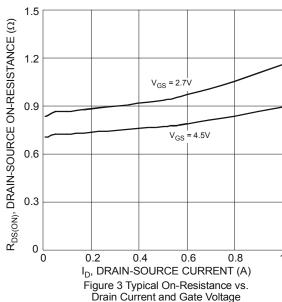
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition		
OFF CHARACTERISTICS (Note 7)								
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	25	_	_	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA		
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	_	_	1	μA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V		
Gate-Body Leakage	I <sub>GSS</sub>	_	_	100	nA	$V_{GS}$ = 8V, $V_{DS}$ = 0V		
ON CHARACTERISTICS (Note 7)								
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.65	0.85	1.5	>	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$		
Static Drain-Source On-Resistance	0		3.8	4	Ω	$V_{GS} = 4.5V, I_D = 0.4A$		
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	_	3.1	5	Ω	V <sub>GS</sub> = 2.7V, I <sub>D</sub> = 0.2A		
Forward Transconductance	Y <sub>fs</sub>	_	1	_	S	V <sub>DS</sub> = 5V, I <sub>D</sub> =0.4A		
Diode Forward Voltage	$V_{SD}$	_	0.76	1.2	V	$V_{DS} = V_{GS}, I_{D} = 0.25A$		
DYNAMIC CHARACTERISTICS (Note 8)								
Input Capacitance	C <sub>iss</sub>	_	27.9	_				
Output Capacitance	Coss	_	6.1	_	pF	$V_{DS} = 10V, V_{GS} = 0V,$ f = 1MHz		
Reverse Transfer Capacitance	Crss	_	2	_		1 - 1101112		
Total Gate Charge	Qg	_	0.36	_				
Gate-Source Charge	Q <sub>gs</sub>	_	0.06	_	nC	$V_{GS} = 4.5V, V_{DS} = 5V,$		
Gate-Drain Charge	Q <sub>gd</sub>	_	0.04	_		$I_D = 0.2A$		
Turn-On Delay Time	t <sub>D(on)</sub>		2.9					
Turn-On Rise Time	t <sub>r</sub>	_	1.8	_	~0	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 6V		
Turn-Off Delay Time	t <sub>D(off)</sub>	_	6.6	_	nS	$I_D = 0.5A, R_G = 50\Omega$		
Turn-Off Fall Time	t <sub>f</sub>	_	2.3	_				

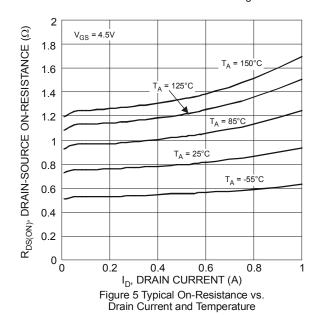
Notes:

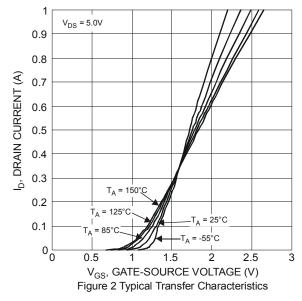
- 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout 7. Short duration pulse test used to minimize self-heating effect.
- 8. Guaranteed by design. Not subject to production testing.

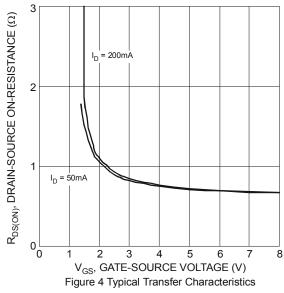


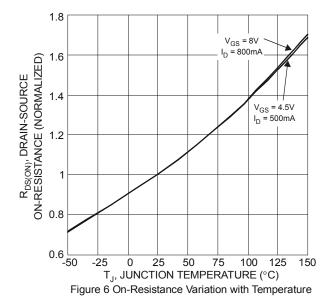




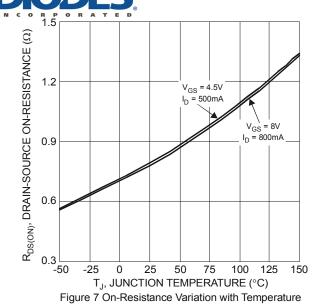


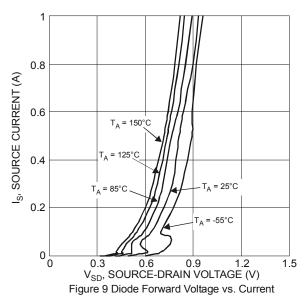


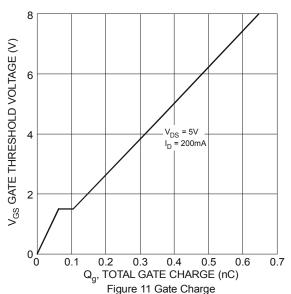




# **DMG6301UDW**







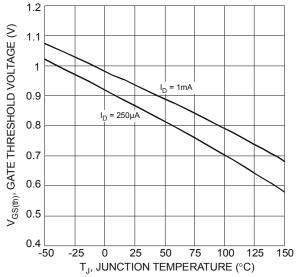
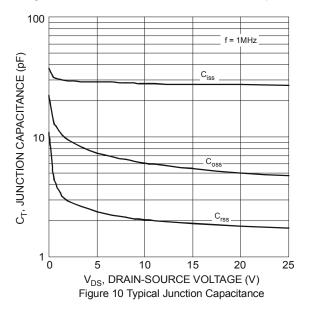


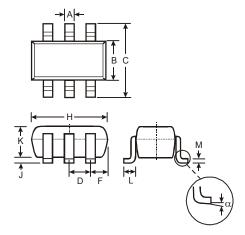
Figure 8 Gate Threshold Variation vs. Ambient Temperature





# **Package Outline Dimensions**

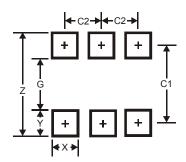
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT363						
Dim	Min	Max				
Α	0.10	0.30				
В	1.15	1.35				
С	2.00	2.20				
D	0.65	Тур				
F	0.40	0.45				
Н	1.80 2.20					
J	0 0.10					
K	0.90 1.00					
L	0.25 0.40					
M	0.10 0.22					
α	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
Х	0.42
Υ	0.6
C1	1.9
C2	0.65



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