

#### Lead-free Green 25V N-CHANNEL ENHANCEMENT MODE MOSFET

#### **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub>	$I_D$ $T_A = +25^{\circ}C$
25V	$4\Omega @ V_{GS} = 4.5V$	0.26A
	$5\Omega @ V_{GS} = 2.7V$	0.23A

#### **Description**

This new generation MOSFET is 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.





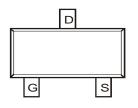
Top View

#### **Features**

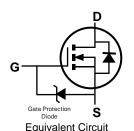
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD Protected Gate (>6kV Human Body Model)
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101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

#### **Mechanical Data**

- Case: SOT23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Solderable per MIL-STD-202, Method 208 (3)
- Lead Free Plating (Matte Tin Finish Annealed over Alloy 42 Leadframe).
- Terminal Connections: See Diagram
- Weight: 0.008 grams (Approximate)



Top View Pin Configuration



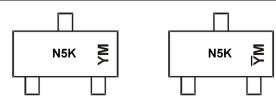
### Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMG301NU-7	Standard	SOT23	3,000/Tape & Reel
DMG301NU-13	Standard	SOT23	10,000/Tape & Reel

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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**



N5K = 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  $\overline{Y}$  = Year (ex: A = 2013)

M = Month (ex: 9 = September)

Date Code Key

Year	201	1	2012		2013	20	14	2015		2016	2	2017
Code	Υ		Z		Α		3	С		D		Е
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 <sub>DSS</sub>	25	V		
Gate-Source Voltage	V <sub>GSS</sub>	8	V		
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I <sub>D</sub>	0.26 0.21	А
Continuous Drain Current (Note 6) V <sub>GS</sub> = 2.7V	Steady State	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I <sub>D</sub>	0.23 0.18	А
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I <sub>DM</sub>	1.5	Α		
Maximum Body Diode Continuous Current (Note 6)	I <sub>S</sub>	0.5	Α		

# **Thermal Characteristics**

Characteristic		Symbol	Value	Units	
Total Power Dissipation	(Note 5)	Ь	0.32	W	
Total Power dissipation	(Note 6)	P <sub>D</sub>	0.4	VV	
Thermal Resistance, Junction to Ambient	(Note 5)	D	369		
mermai Resistance, Junction to Ambient	(Note 6)	$R_{ heta JA}$	296	°C/W	
Thermal Resistance, Junction to Case	(Note 6)	R <sub>0</sub> JC	115		
Operating and Storage Temperature Range		T <sub>J,</sub> T <sub>STG</sub>	-55 to +150	°C	

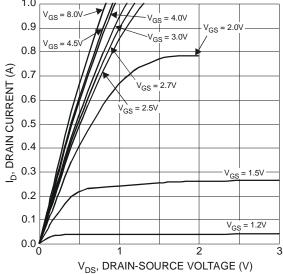
## **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	25	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	_	_	1.0	μΑ	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	$V_{GS(th)}$	0.7	_	1.1	V	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$	
Static Drain-Source On-Resistance	7	_	_	4	Ω	$V_{GS} = 4.5V, I_D = 0.4A$	
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	_	_	5	Ω	$V_{GS} = 2.7V, I_D = 0.2A$	
Forward Transconductance	g <sub>FS</sub>	_	1	_	S	$V_{DS} = 5V, I_D = 0.4A$	
Diode Forward Voltage	V <sub>SD</sub>	_	0.76	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 0.29A	
DYNAMIC CHARACTERISTICS (Note 8)					-		
Input Capacitance	C <sub>iss</sub>	_	27.9	42			
Output Capacitance	Coss	_	6.1	9.2	pF	$V_{DS} = 10V, V_{GS} = 0V,$ f = 1.0MHz	
Reverse Transfer Capacitance	Crss	_	2.0	3.0		1 = 1.0W112	
Gate Resistance	Rg	_	26.4	_	Ω	$V_{DS} = 0V$ , $V_{GS} = 0V$ , $f = 1MHz$	
Total Gate Charge	Qg	_	0.36	_			
Gate-Source Charge	Qgs	_	0.06	_	nC	$V_{GS} = 4.5V, V_{DS} = 5V,$	
Gate-Drain Charge	Q <sub>gd</sub>	_	0.04	_	1	$I_D = 0.2A$	
Turn-On Delay Time	t <sub>D(on)</sub>	_	2.9	_			
Turn-On Rise Time	t <sub>r</sub>	_	1.8	_	0	$V_{GS} = 4.5V, V_{DS} = 6V$	
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	_			

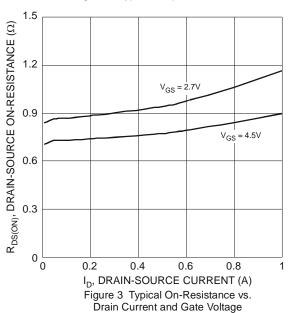
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided. Notes:

Device mounted on FR-4 Fc board, with minimum recommended pad rayout, single sided.
 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.
 Guaranteed by design. Not subject to production testing.





V<sub>DS</sub>, DRAIN-SOURCE VOLTAGE (V) Figure 1 Typical Output Characteristics



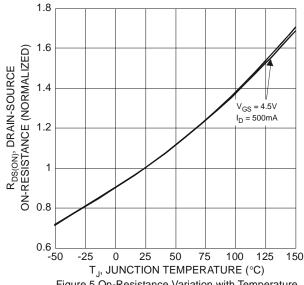
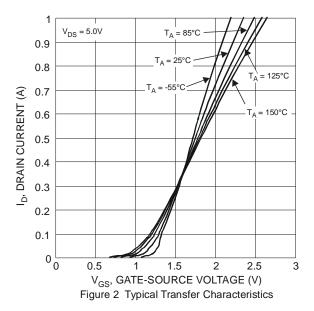
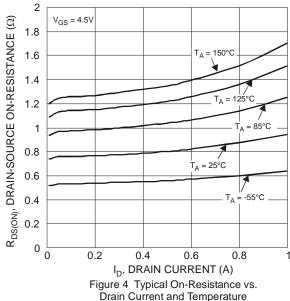


Figure 5 On-Resistance Variation with Temperature





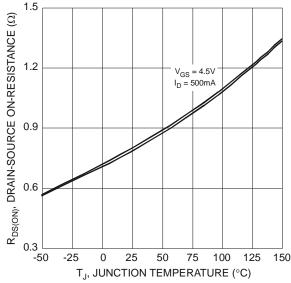


Figure 6 On-Resistance Variation with Temperature



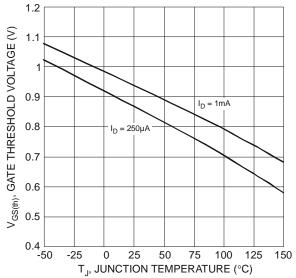
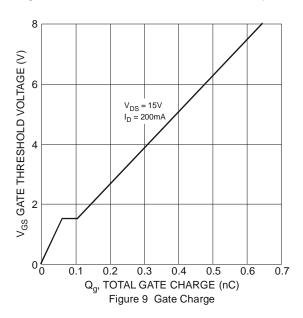
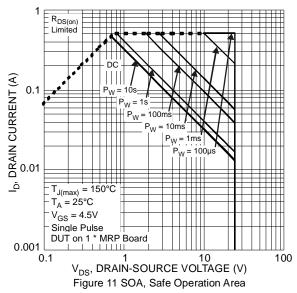
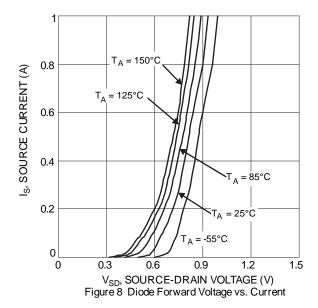
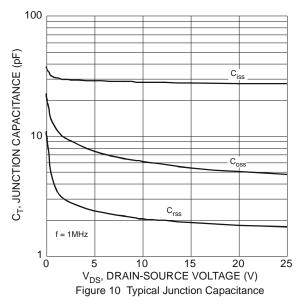


Figure 7 Gate Threshold Variation vs. Ambient Temperature

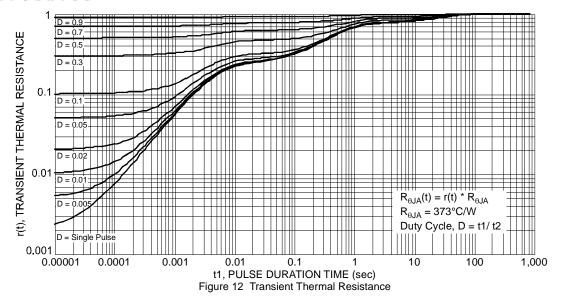






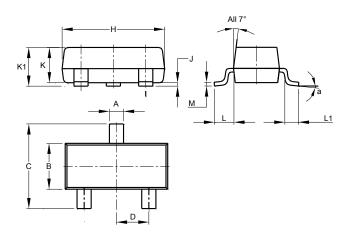






# **Package Outline Dimensions**

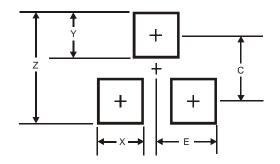
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT23								
Dim	Min	Max	Тур					
Α	0.37	0.51	0.40					
В	1.20	1.40	1.30					
С	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					
Н	2.80	3.00	2.90					
J	0.013	0.10	0.05					
K	0.890	1.00	0.975					
K1	0.903	1.10	1.025					
L	0.45	0.61	0.55					
L1	0.25	0.55	0.40					
M	0.085	0.150	0.110					
а	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	2.9
Х	0.8
Y	0.9
С	2.0
E	1.35



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многоканальный

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