

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = +25^\circ C$
-25V	10Ω @ $V_{GS} = -4.5V$	-0.17A
	13Ω @ $V_{GS} = -2.7V$	-0.15A

## 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

## Features

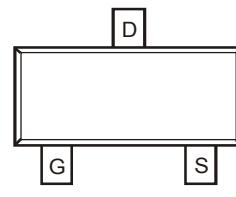
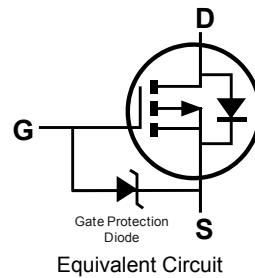
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surfaced Mount Package
- ESD Protected Gate (>6kV Human Body Model)
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 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 
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)



Top View

Top View  
Pin Configuration

Equivalent Circuit

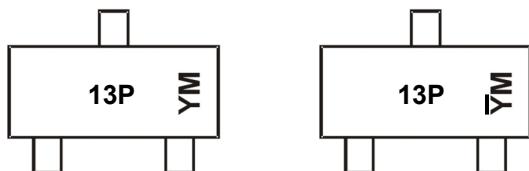
## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMG302PU-7	Standard	SOT23	3,000/Tape & Reel
DMG302PU-13	Standard	SOT23	10,000/Tape & Reel

Notes:

- 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](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.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



13P = 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 YM = Year (ex: A = 2013)

M = Month (ex: 9 = September)

## Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017					
Code	Y	Z	A	B	C	D	E					
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 (Note 6) $V_{GS} = -4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	-0.17 -0.14	A
Continuous Drain Current (Note 6) $V_{GS} = -2.7\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	-0.15 -0.12	A
Pulsed Drain Current $T_P \leq 300\mu\text{s}$ , Duty Cycle = 2%)			$I_{DM}$	-0.5	A

**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation	(Note 5)	$P_D$	0.33	W
	(Note 6)		0.45	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	376	°C/W
	(Note 6)		275	
Thermal Resistance, Junction to Case	(Note 6)	$R_{\theta JC}$	81	
Operating and Storage Temperature Range	$T_J, T_{STG}$		-55 to +150	°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	μA	$V_{DS} = -20\text{V}$ , $V_{GS} = 0\text{V}$
Gate-Source 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	-0.96	-1.5	V	$V_{DS} = V_{GS}$ , $I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	2.5	10	Ω	$V_{GS} = -4.5\text{V}$ , $I_D = -0.2\text{A}$
		—	3	13		$V_{GS} = -2.7\text{V}$ , $I_D = -0.05\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	189	—	ms	$V_{DS} = -5\text{V}$ , $I_D = -0.2\text{A}$
Diode Forward Voltage (Note 7)	$V_{SD}$	—	—	-1.5	V	$V_{GS} = 0\text{V}$ , $I_S = -0.2\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	27.2	—	pF	$V_{DS} = -10\text{V}$ , $V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	6.1	—		
Reverse Transfer Capacitance	$C_{rss}$	—	1.7	—		
Total Gate Charge	$Q_g$	—	0.35	—	nC	$V_{DS} = -5\text{V}$ , $I_D = -0.2\text{A}$ , $V_{GS} = -4.5\text{V}$ ,
Gate-Source Charge	$Q_{gs}$	—	0.08	—		
Gate-Drain Charge	$Q_{gd}$	—	0.06	—		
Turn-On Delay Time	$t_{d(on)}$	—	4.5	—	ns	$V_{GS} = -4.5\text{V}$ , $V_{DD} = -6\text{V}$ $I_D = -0.2\text{A}$ , $R_G = 50\Omega$
Rise Time	$t_r$	—	2.3	—		
Turn-Off Delay Time	$t_{d(off)}$	—	24.1	—		
Fall Time	$t_f$	—	11.0	—		

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.

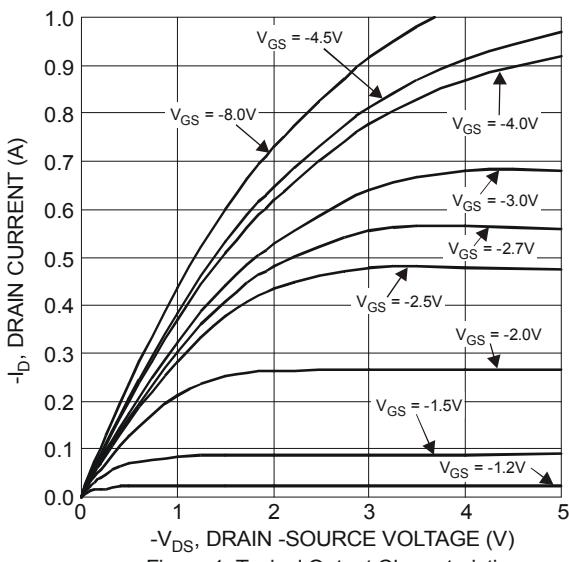


Figure 1 Typical Output Characteristics

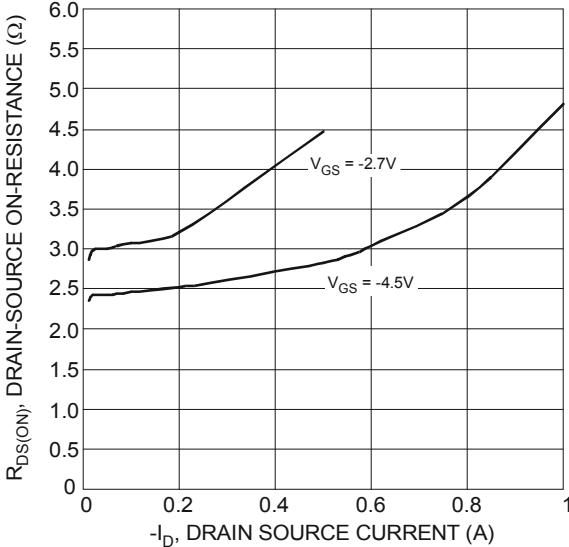
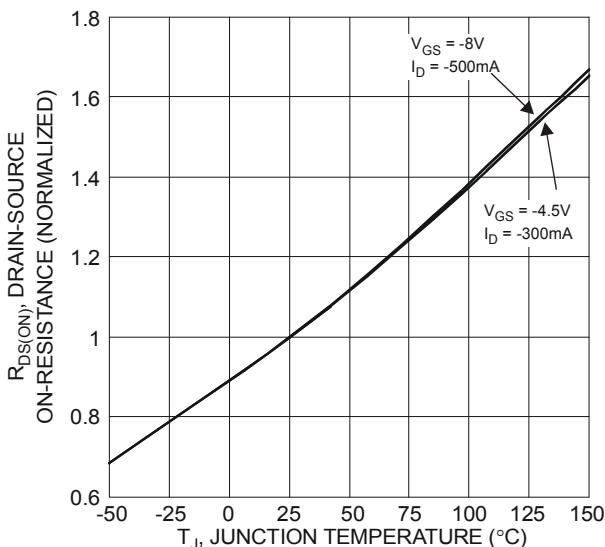
Figure 3 Typical On-Resistance vs.  
Drain Current and Gate Voltage

Figure 5 On-Resistance Variation with Temperature

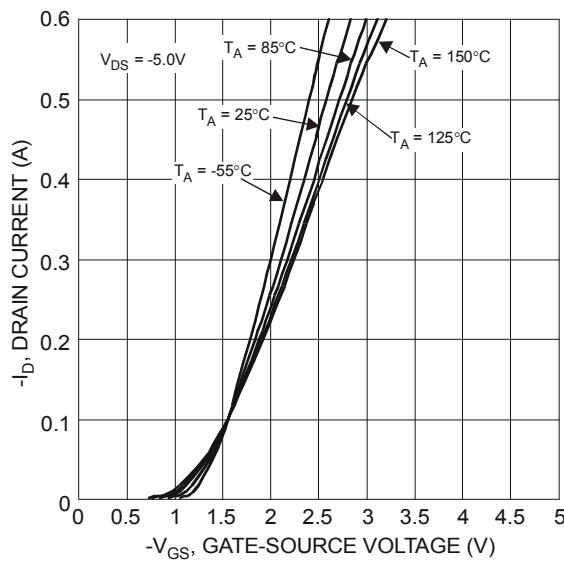


Figure 2 Typical Transfer Characteristics

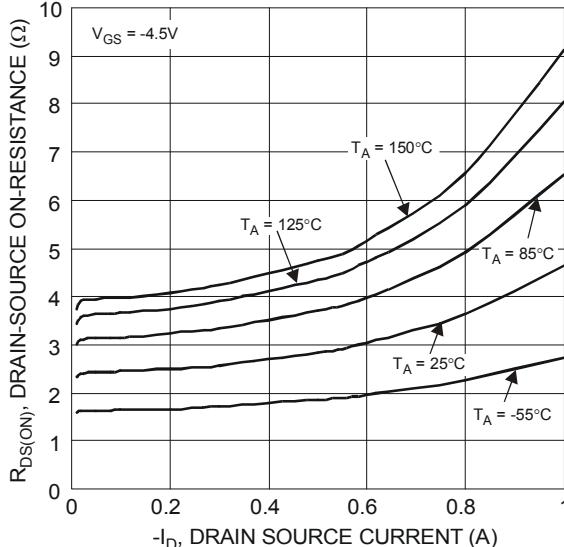
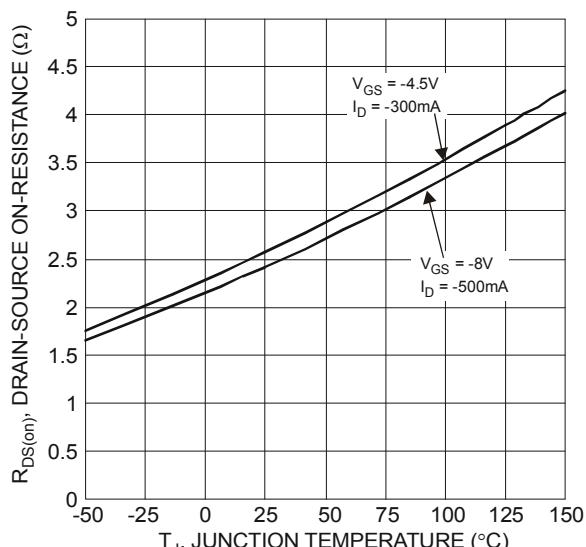
Figure 4 Typical On-Resistance vs.  
Drain Current and Temperature

Figure 6 On-Resistance Variation with Temperature

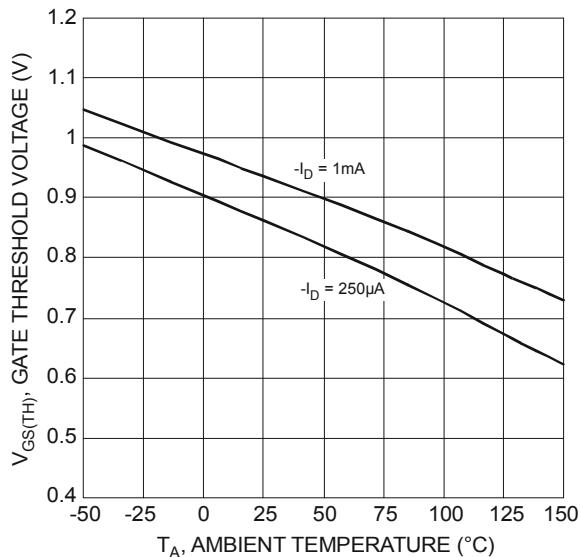


Figure 7 Gate Threshold Variation vs. Ambient Temperature

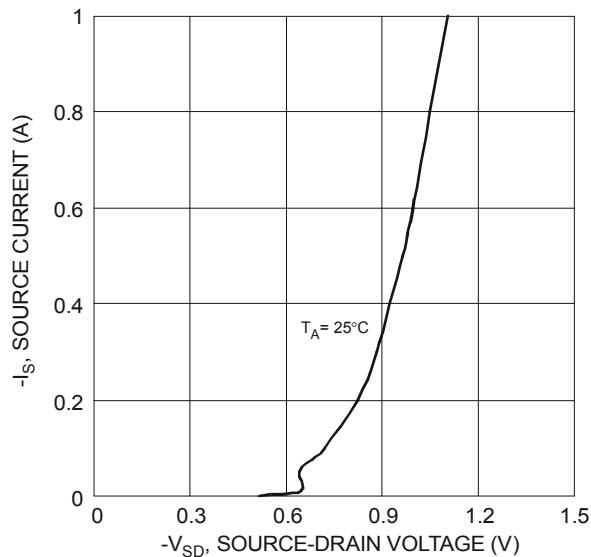


Figure 8 Diode Forward Voltage vs. Current

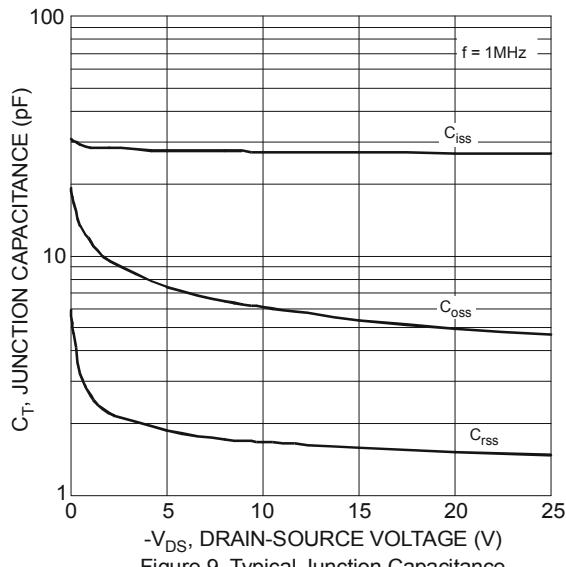


Figure 9 Typical Junction Capacitance

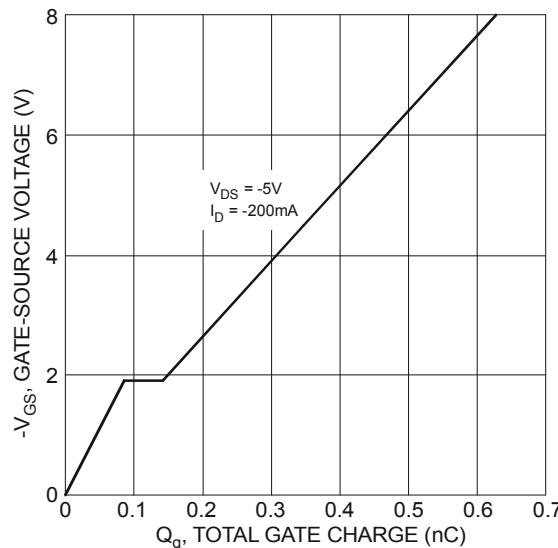


Figure 10 Gate-Charge Characteristics

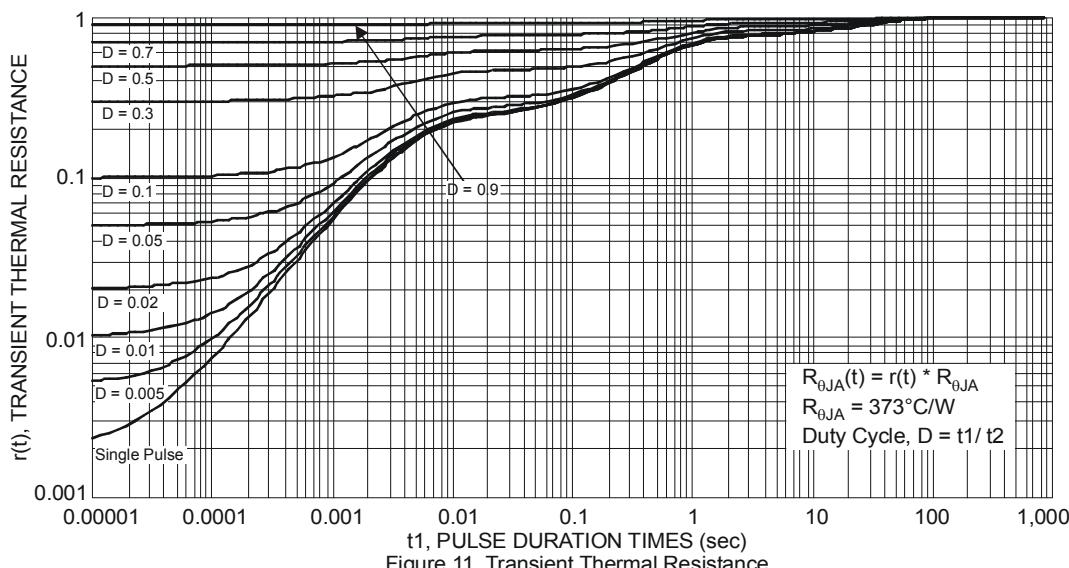
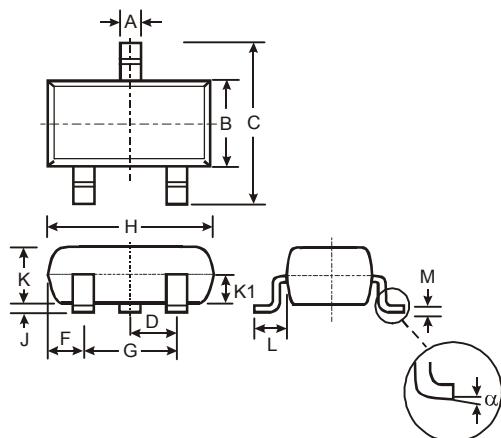


Figure 11 Transient Thermal Resistance

## Package Outline Dimensions

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

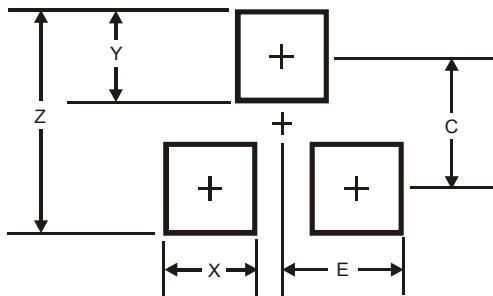


SOT23			
Dim	Min	Max	Typ
<b>A</b>	0.37	0.51	0.40
<b>B</b>	1.20	1.40	1.30
<b>C</b>	2.30	2.50	2.40
<b>D</b>	0.89	1.03	0.915
<b>F</b>	0.45	0.60	0.535
<b>G</b>	1.78	2.05	1.83
<b>H</b>	2.80	3.00	2.90
<b>J</b>	0.013	0.10	0.05
<b>K</b>	0.903	1.10	1.00
<b>K1</b>	-	-	0.400
<b>L</b>	0.45	0.61	0.55
<b>M</b>	0.085	0.18	0.11
$\alpha$	0°	8°	-

All Dimensions in mm

## Suggested Pad Layout

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



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

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**Офис по работе с юридическими лицами:**

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru  
moschip.ru\_4

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