



**THE DATASHEET OF  
DMG302PU-13**



## Product Summary

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

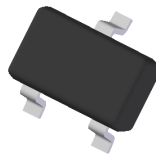
- DC-DC Converters
- Power Management Functions

## Features

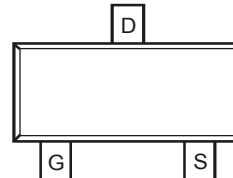
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surfaced Mount Package
- ESD Protected Gate (>6kV Human Body Model)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified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

## Mechanical Data

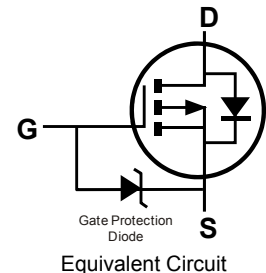
- Case: SOT23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Solderable per MIL-STD-202, Method 208 Ⓜ3
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram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



Top View



Top View  
Pin Configuration

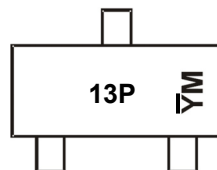
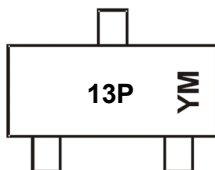


## Ordering Information (Note 4)

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

- Notes:
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



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 Ȳ = 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	$T_A = +25^\circ\text{C}$	$I_D$	-0.17	A
		$T_A = +70^\circ\text{C}$		-0.14	
Continuous Drain Current (Note 6) $V_{GS} = -2.7\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	-0.15	A
		$T_A = +70^\circ\text{C}$		-0.12	
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	$^\circ\text{C/W}$
	(Note 6)		275	
Thermal Resistance, Junction to Case	(Note 6)	$R_{\theta JC}$	81	$^\circ\text{C/W}$
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-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	$\Omega$	$V_{GS} = -4.5\text{V}, I_D = -0.2\text{A}$
		—	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.

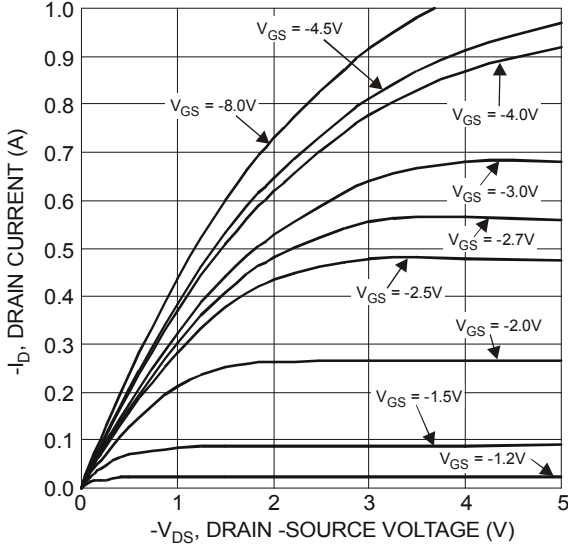


Figure 1 Typical Output Characteristics

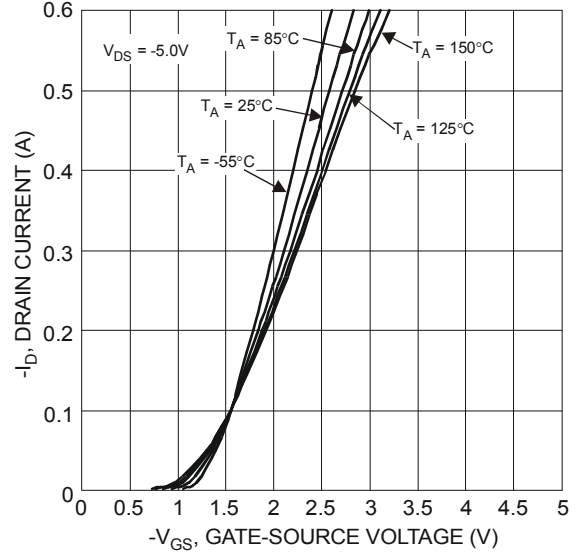


Figure 2 Typical Transfer Characteristics

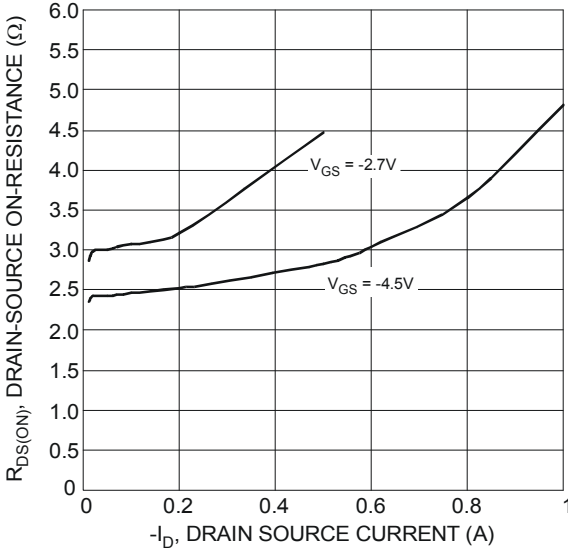


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

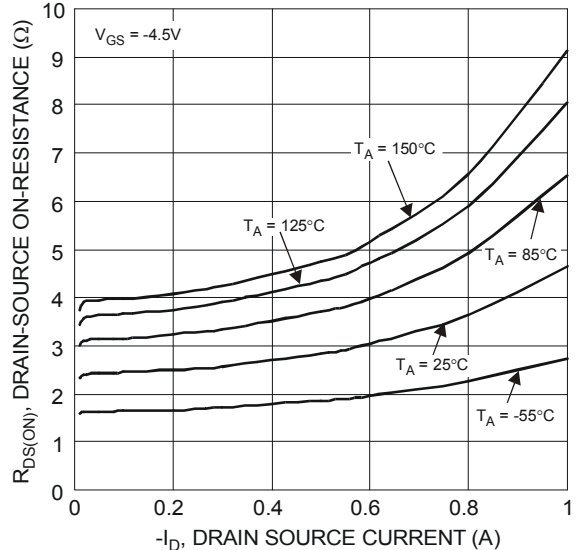


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

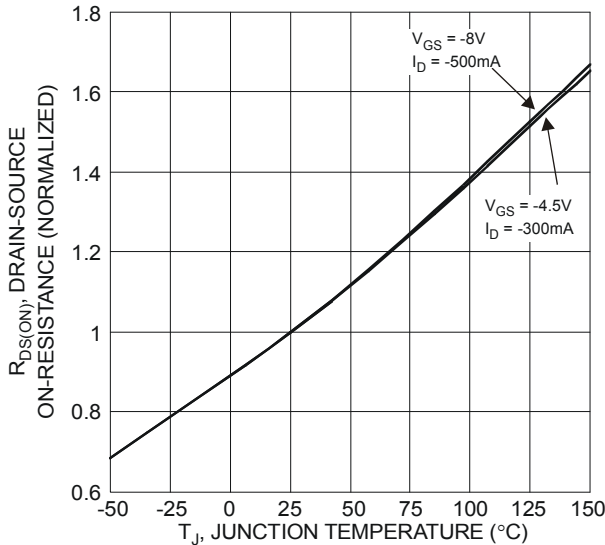


Figure 5 On-Resistance Variation with Temperature

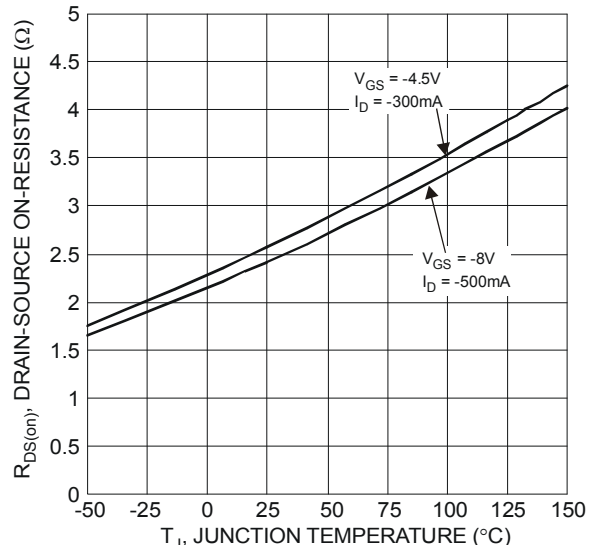


Figure 6 On-Resistance Variation with Temperature

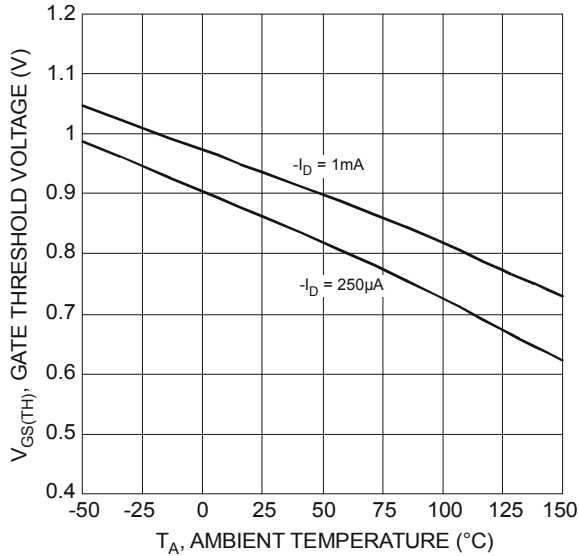


Figure 7 Gate Threshold Variation vs. Ambient Temperature

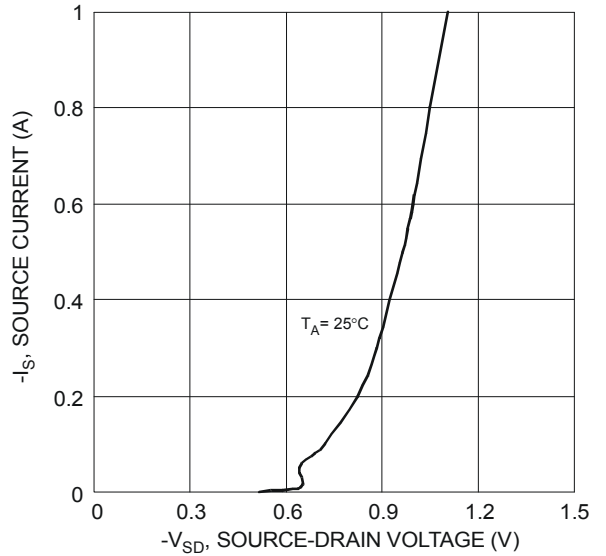


Figure 8 Diode Forward Voltage vs. Current

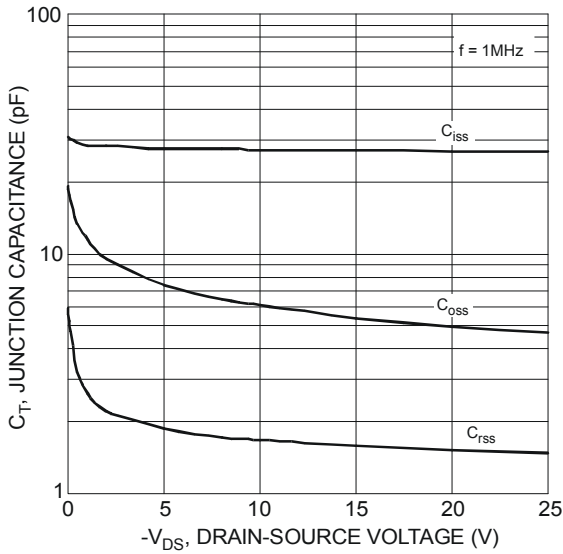


Figure 9 Typical Junction Capacitance

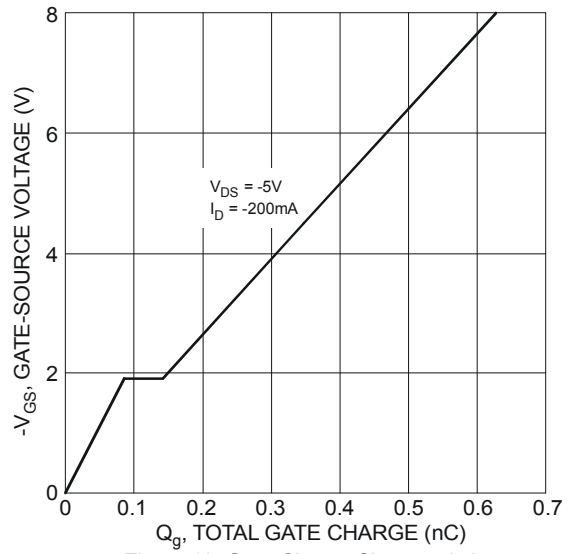


Figure 10 Gate-Charge Characteristics

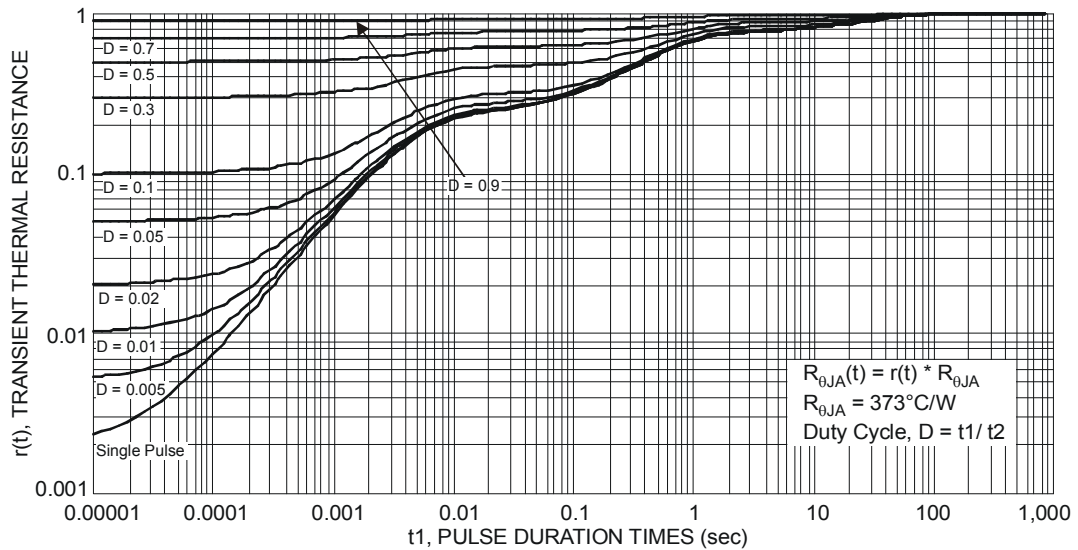
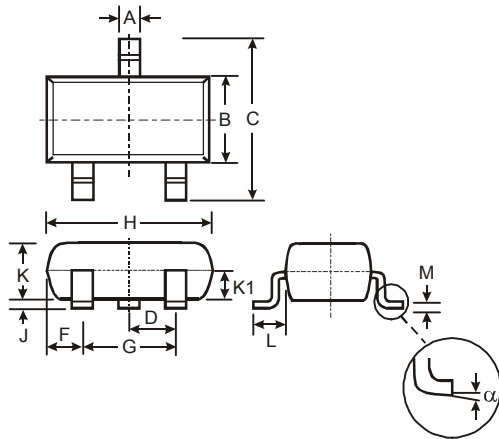


Figure 11 Transient Thermal Resistance

**Package Outline Dimensions**

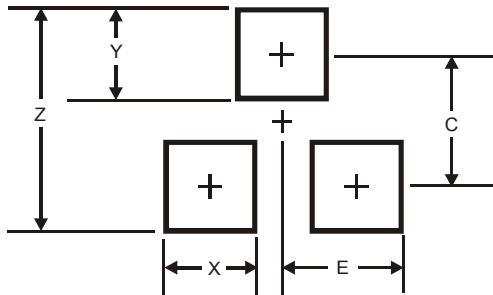
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	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
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
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	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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