



**THE DATASHEET OF  
DMP2100UQ-7**



## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> MAX	Package	I <sub>D</sub> T <sub>A</sub> = +25°C
-20V	38mΩ @ V <sub>GS</sub> = -10V	SOT23	-4.3A
	43mΩ @ V <sub>GS</sub> = -4.5V		-4.0A
	75mΩ @ V <sub>GS</sub> = -2.5V		-2.8A

## Description

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Load switches
- Power management functions
- Motor controls

## Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DIODES™ DMP2100UQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

## Mechanical Data

- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

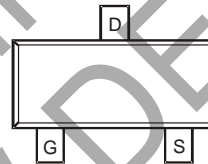


ESD PROTECTED

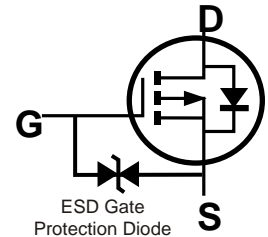
SOT23



Top View



Top View  
Pin Configuration



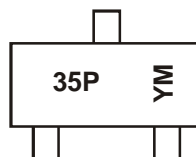
Equivalent Circuit  
(Note 4)

## Ordering Information (Note 5)

Part Number	Package	Packing	
		Qty.	Carrier
DMP2100UQ-7	SOT23	3,000	Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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. The ESD gate protection diode is only designed to protect against ESD events. No gate-source voltage greater than the maximum V<sub>GSS</sub> rating (given on page 2) can be applied.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



35P = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: J = 2022)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2019	...	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	G	...	J	K	L	M	N	O	P	R	S	T

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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	-20	V
Gate-Source Voltage (Note 6)	V <sub>GSS</sub>	±10	V
Continuous Drain Current (Note 8) V <sub>GS</sub> = -10V	I <sub>D</sub>	T <sub>A</sub> = +25°C	-4.3
		T <sub>A</sub> = +70°C	-3.4
	I <sub>D</sub>	T <sub>A</sub> = +25°C	-5.5
		T <sub>A</sub> = +70°C	-4.3
Maximum Continuous Body Diodes Forward Current (Note 8)	I <sub>S</sub>	-2	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	-30	A
Pulsed Body Diodes Forward Current (10µs Pulse, Duty Cycle = 1%)	I <sub>SM</sub>	-30	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 7)	P <sub>D</sub>	T <sub>A</sub> = +25°C	0.8
		T <sub>A</sub> = +70°C	0.5
Thermal Resistance, Junction to Ambient (Note 7)	R <sub>θJA</sub>	Steady State	161
		t < 5s	96
Total Power Dissipation (Note 8)	P <sub>D</sub>	T <sub>A</sub> = +25°C	1.3
		T <sub>A</sub> = +70°C	0.8
Thermal Resistance, Junction to Ambient (Note 8)	R <sub>θJA</sub>	Steady State	99
		t < 5s	60
Thermal Resistance, Junction to Case (Note 8)	R <sub>θJC</sub>	15	°C/W
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	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 9)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	—	—	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-Source Leakage	I <sub>GSS</sub>	—	—	±10	µA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.3	—	-1.4	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	25	38	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -3.5A
		—	29	43		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3A
		—	37	75		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -1A
		—	47	—		V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -0.5A
Forward Transfer Admittance	Y <sub>fs</sub>	—	3	—	S	V <sub>DS</sub> = -5V, I <sub>D</sub> = -4A
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	C <sub>iss</sub>	—	216	—	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	90	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	24	—	pF	
Gate Resistance	R <sub>g</sub>	—	250	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
<b>SWITCHING CHARACTERISTICS (Note 10)</b>						
Total Gate Charge	Q <sub>g</sub>	—	9.1	—	nC	V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -10V I <sub>D</sub> = -4A
Gate-Source Charge	Q <sub>gs</sub>	—	1.6	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	2.0	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	80	—	ns	V <sub>DS</sub> = -10V, V <sub>GS</sub> = -4.5V, R <sub>D</sub> = 2.5Ω, R <sub>G</sub> = 3.0Ω
Turn-On Rise Time	t <sub>R</sub>	—	155	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	688	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	423	—	ns	

- Notes:
- AEC-Q101 V<sub>GS</sub> maximum is ±9.6V.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

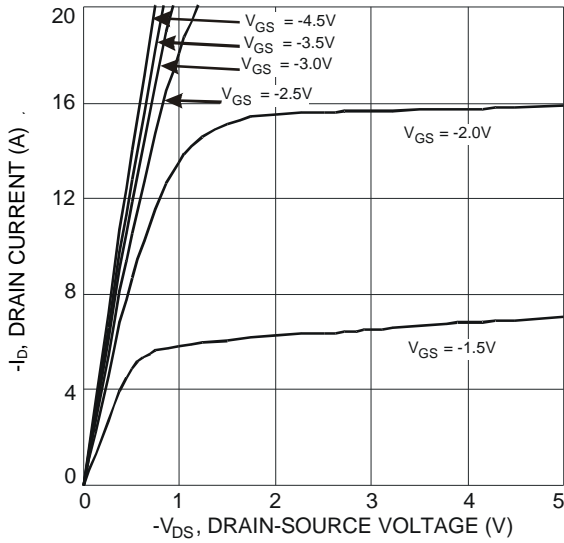


Fig. 1 Typical Output Characteristic

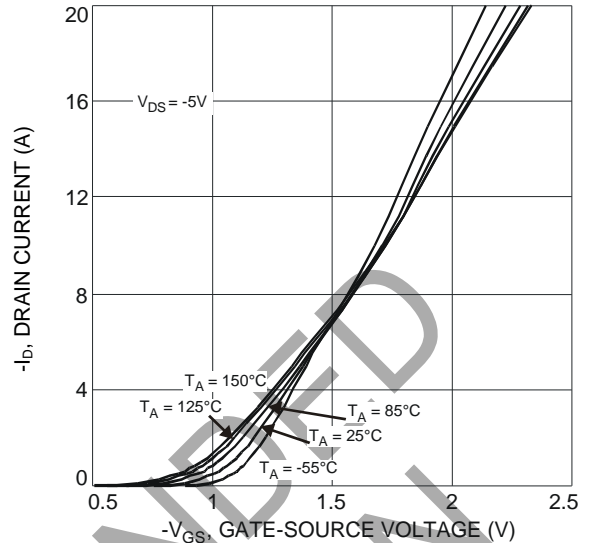


Fig. 2 Typical Transfer Characteristic

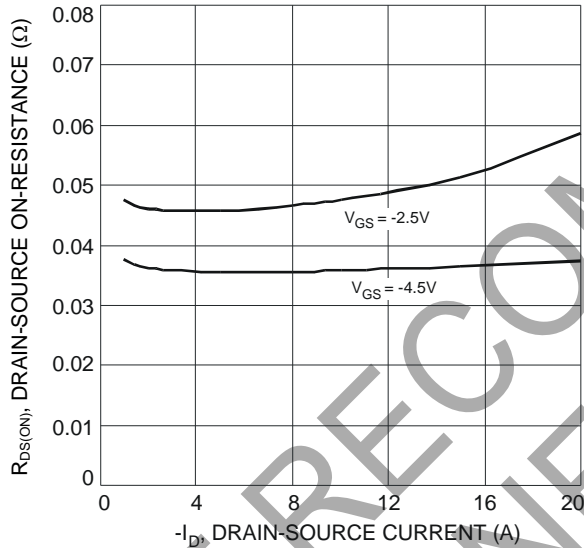


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

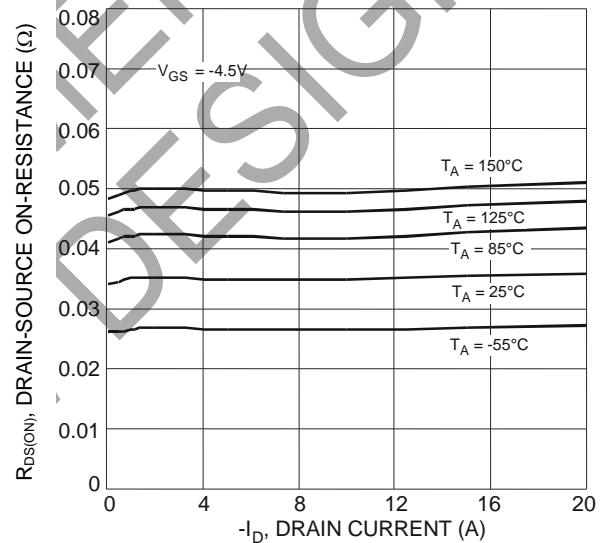


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

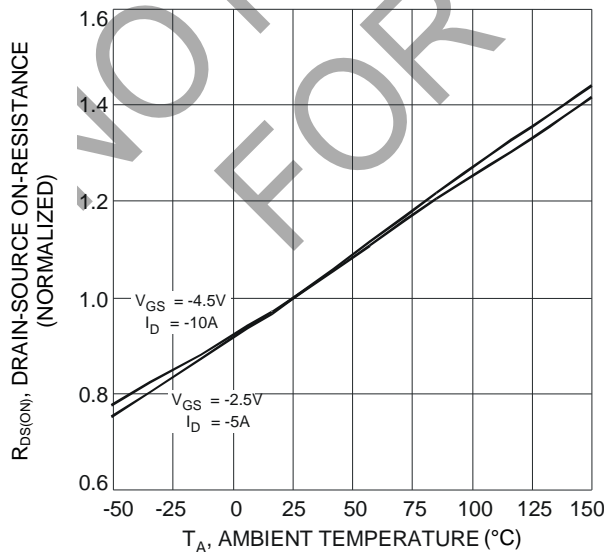


Fig. 5 On-Resistance Variation with Temperature

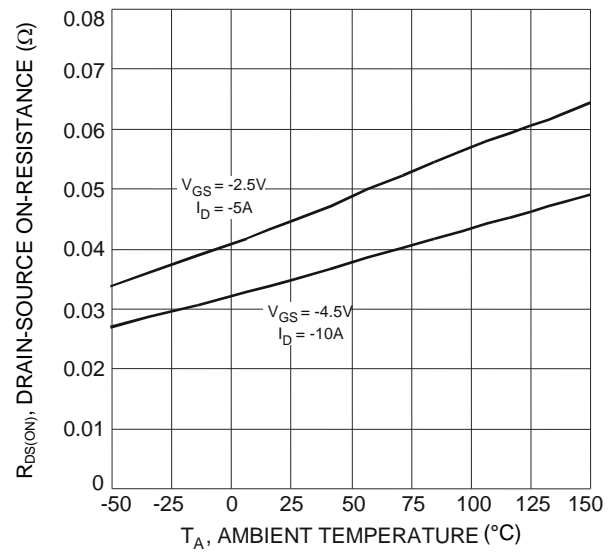


Fig. 6 On-Resistance Variation with Temperature

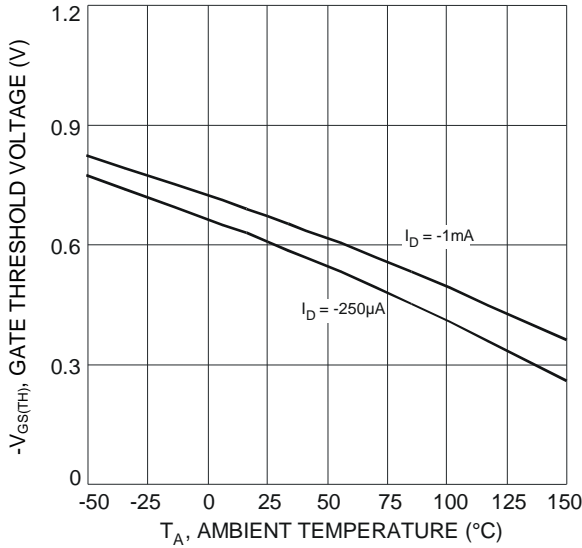


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

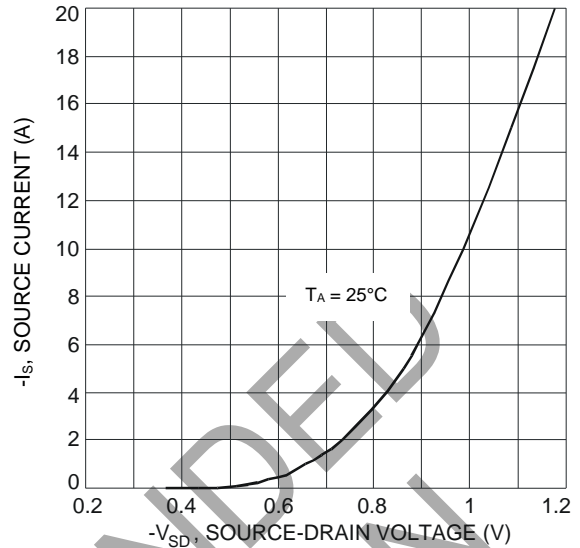


Fig. 8 Diode Forward Voltage vs. Current

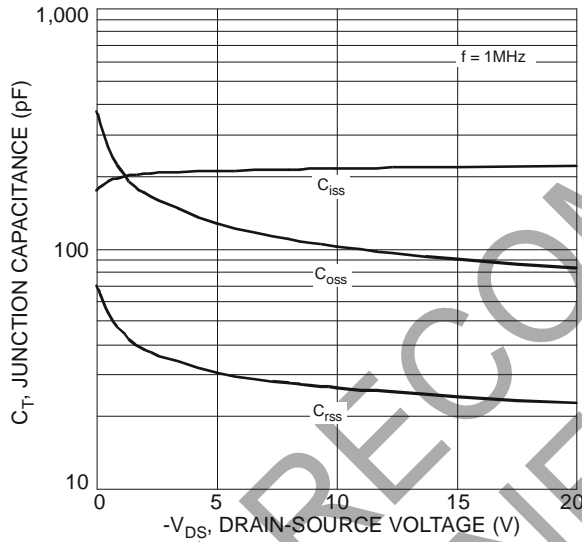


Fig. 9 Typical Junction Capacitance

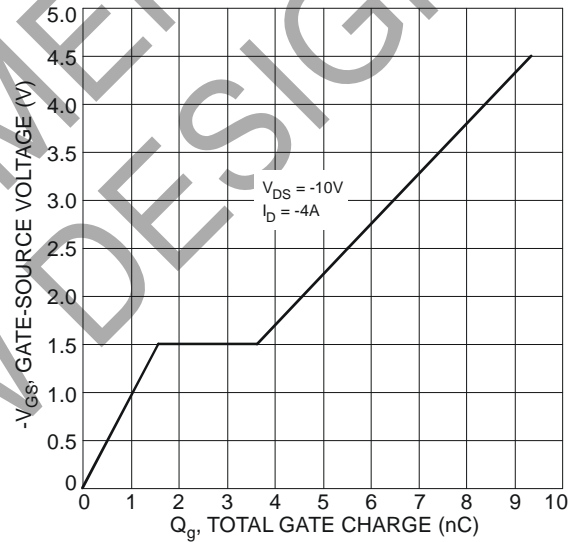


Fig. 10 Gate-Charge Characteristics

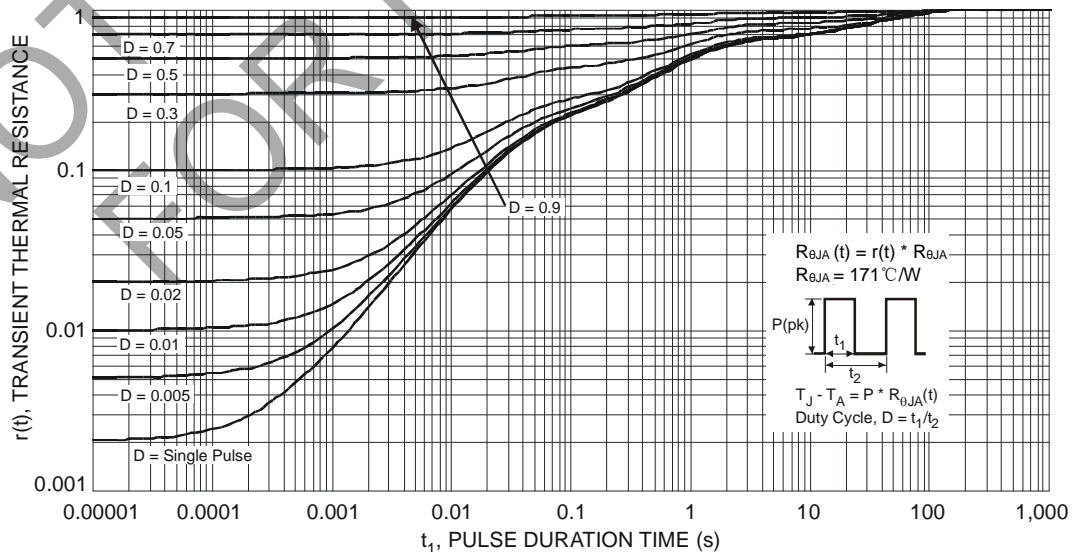
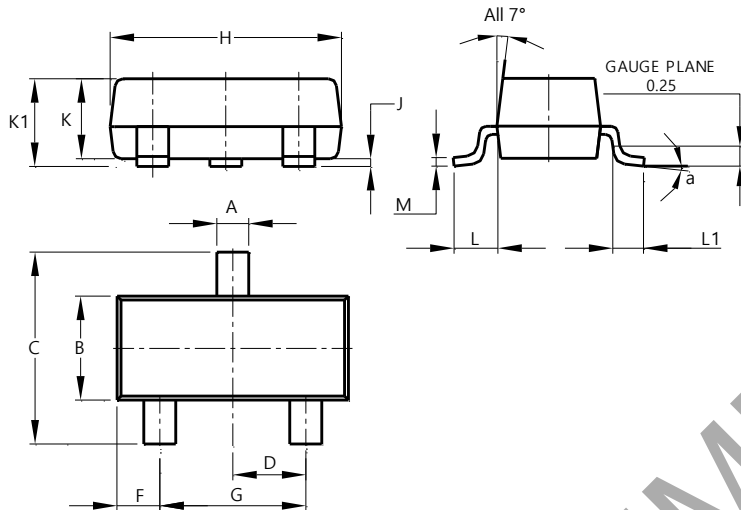


Fig. 11 Transient Thermal Response

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT23**

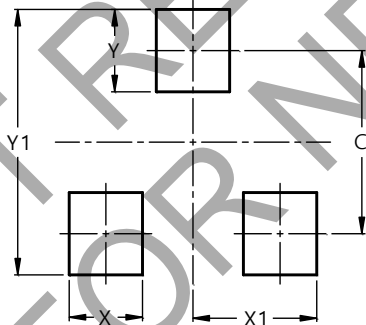


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT23**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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