

## 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)

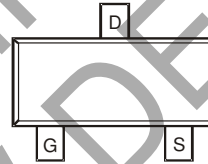


ESD PROTECTED

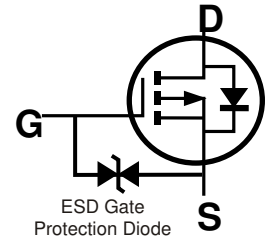
SOT23



Top View



Top View  
Pin Configuration



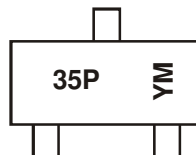
Equivalent Circuit  
(Note 4)

## 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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	$V_{DSS}$	-20	V	
Gate-Source Voltage (Note 6)	$V_{GSS}$	$\pm 10$	V	
Continuous Drain Current (Note 8) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	-4.3	A
		$T_A = +70^\circ\text{C}$	-3.4	A
	$t < 5\text{s}$	$T_A = +25^\circ\text{C}$	-5.5	A
		$T_A = +70^\circ\text{C}$	-4.3	A
Maximum Continuous Body Diodes Forward Current (Note 8)	$I_S$	-2	A	
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	-30	A	
Pulsed Body Diodes Forward Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{SM}$	-30	A	

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 7)	$P_D$	$T_A = +25^\circ\text{C}$	0.8	W
		$T_A = +70^\circ\text{C}$	0.5	
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	Steady State	161	$^\circ\text{C/W}$
		$t < 5\text{s}$	96	
Total Power Dissipation (Note 8)	$P_D$	$T_A = +25^\circ\text{C}$	1.3	W
		$T_A = +70^\circ\text{C}$	0.8	
Thermal Resistance, Junction to Ambient (Note 8)	$R_{\theta JA}$	Steady State	99	$^\circ\text{C/W}$
		$t < 5\text{s}$	60	
Thermal Resistance, Junction to Case (Note 8)	$R_{\theta JC}$	15		
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 9)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-20	—	—	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	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 9)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.3	—	-1.4	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	25	38	m $\Omega$	$V_{GS} = -10\text{V}, I_D = -3.5\text{A}$
		—	29	43		$V_{GS} = -4.5\text{V}, I_D = -3\text{A}$
		—	37	75		$V_{GS} = -2.5\text{V}, I_D = -1\text{A}$
		—	47	—		$V_{GS} = -1.8\text{V}, I_D = -0.5\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	3	—	S	$V_{DS} = -5\text{V}, I_D = -4\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 10)</b>						
Input Capacitance	$C_{iss}$	—	216	—	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	90	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	24	—	pF	
Gate Resistance	$R_g$	—	250	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
<b>SWITCHING CHARACTERISTICS (Note 10)</b>						
Total Gate Charge	$Q_g$	—	9.1	—	nC	$V_{GS} = -4.5\text{V}, V_{DS} = -10\text{V}$ $I_D = -4\text{A}$
Gate-Source Charge	$Q_{gs}$	—	1.6	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	2.0	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	80	—	ns	$V_{DS} = -10\text{V}, V_{GS} = -4.5\text{V},$ $R_D = 2.5\Omega, R_G = 3.0\Omega$
Turn-On Rise Time	$t_R$	—	155	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	688	—	ns	
Turn-Off Fall Time	$t_F$	—	423	—	ns	

- Notes:
- AEC-Q101  $V_{GS}$  maximum is  $\pm 9.6\text{V}$ .
  - 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.

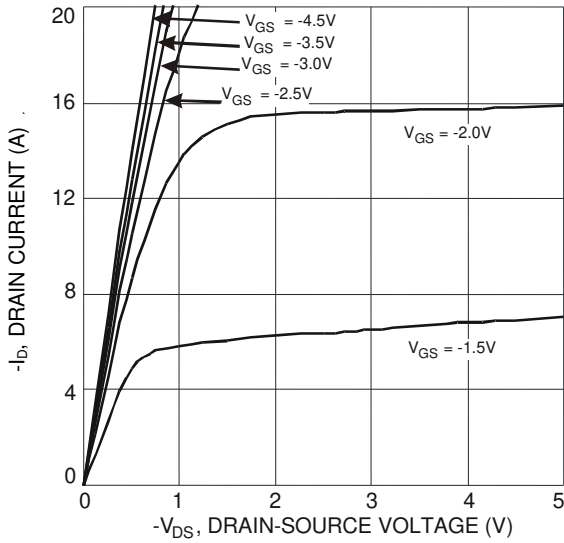


Fig. 1 Typical Output Characteristic

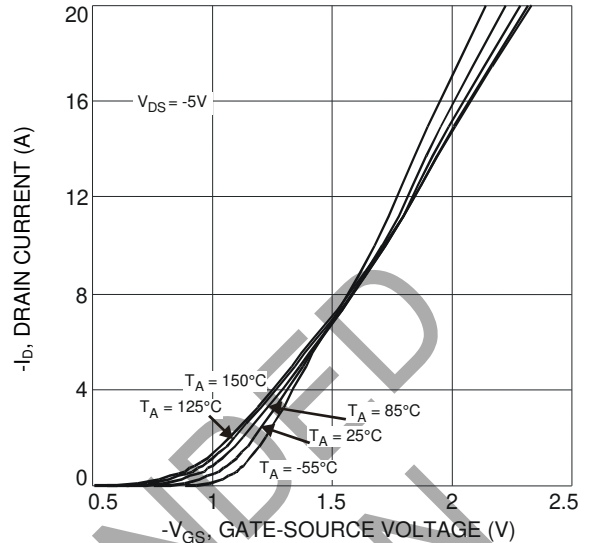


Fig. 2 Typical Transfer Characteristic

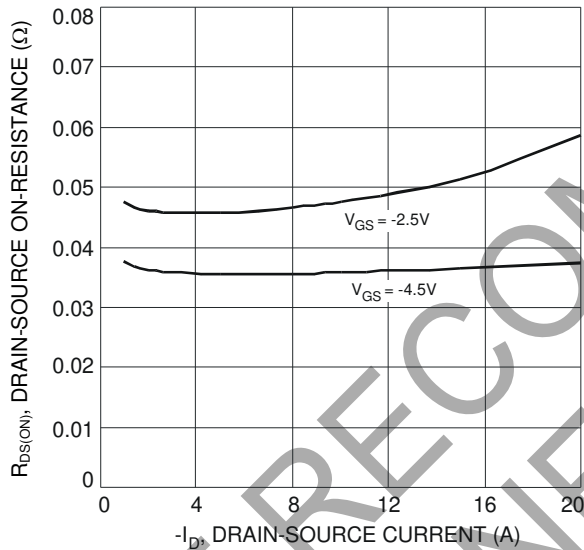


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

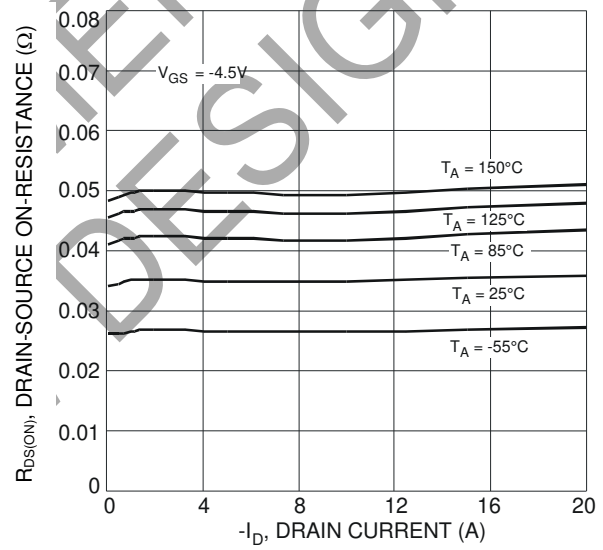


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

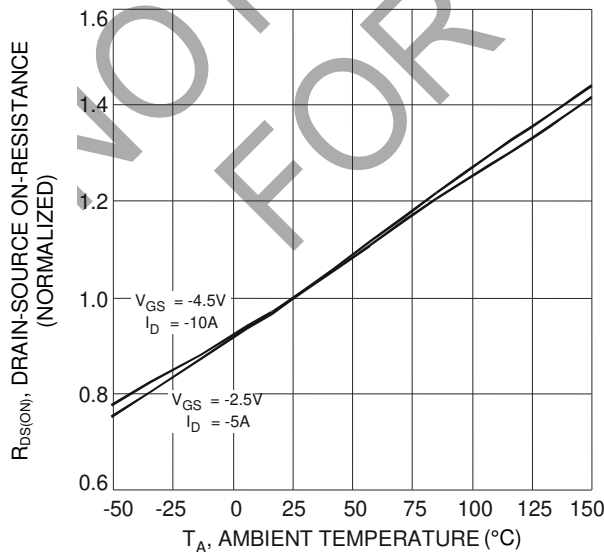


Fig. 5 On-Resistance Variation with Temperature

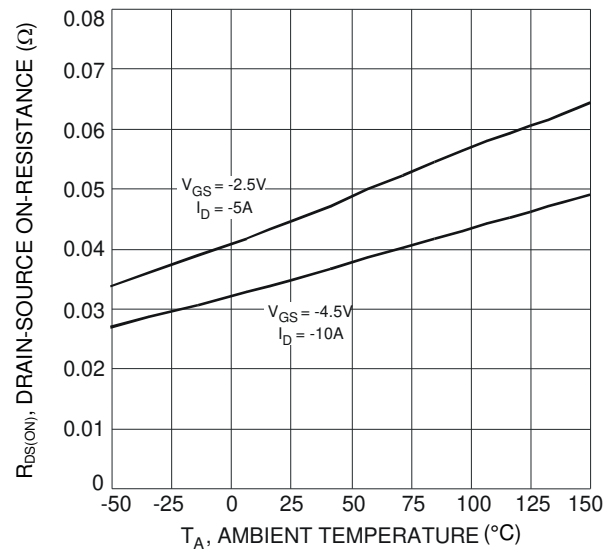


Fig. 6 On-Resistance Variation with Temperature

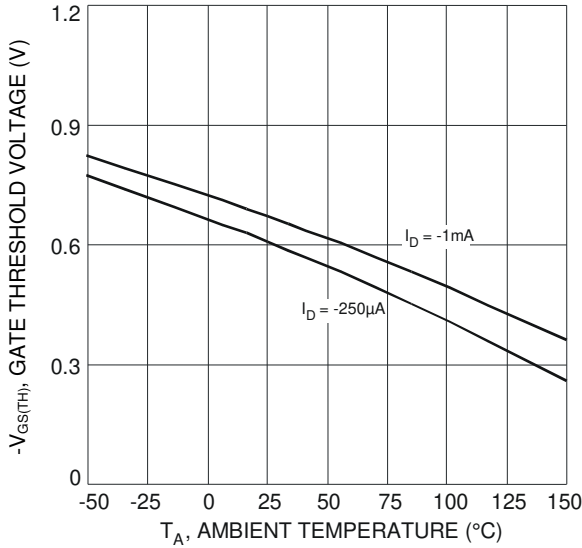


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

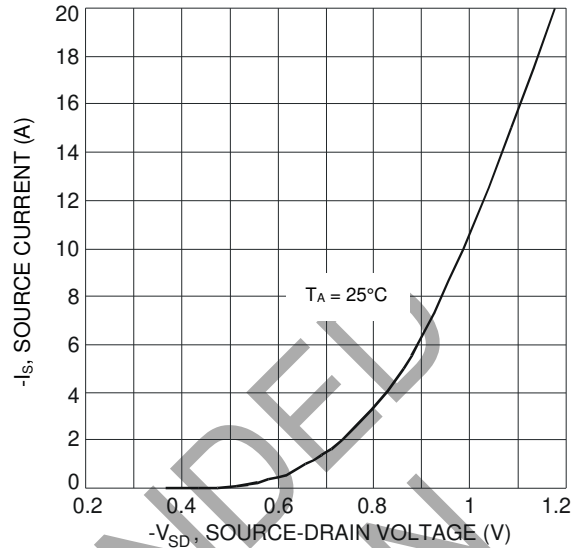


Fig. 8 Diode Forward Voltage vs. Current

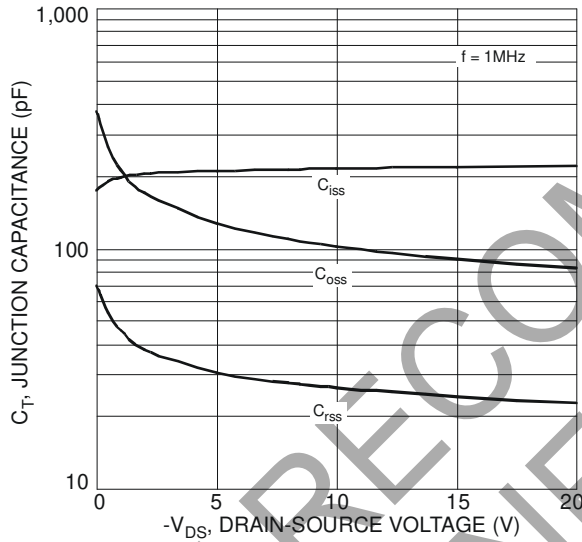


Fig. 9 Typical Junction Capacitance

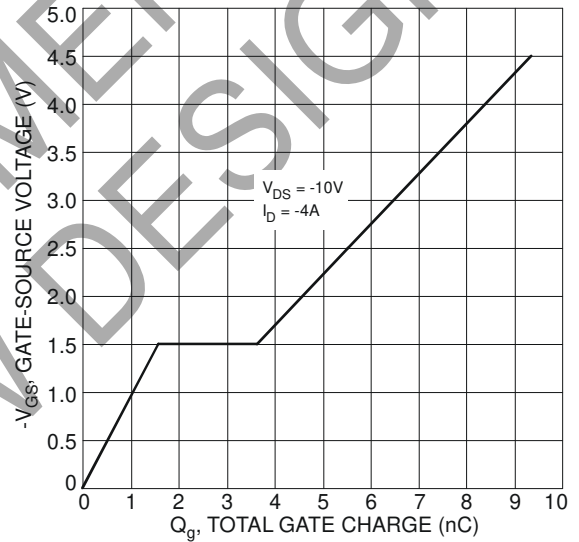


Fig. 10 Gate-Charge Characteristics

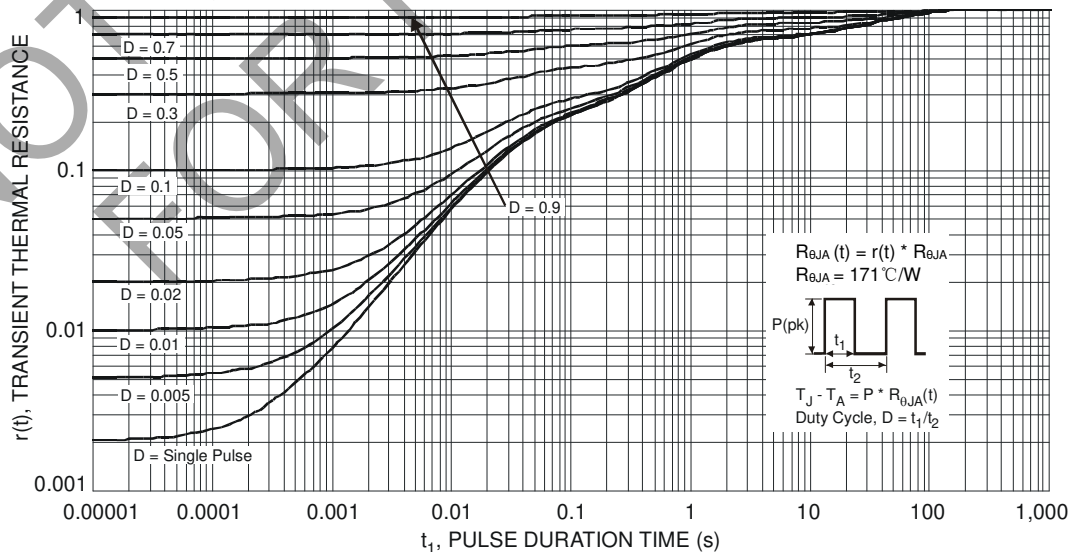
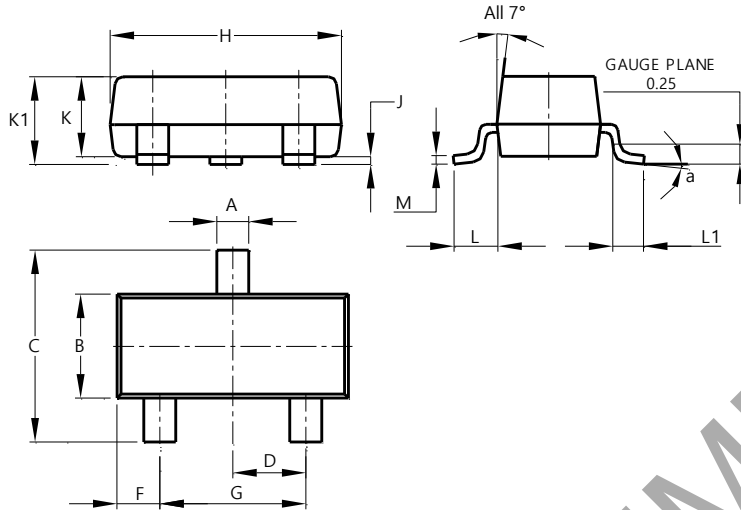


Fig. 11 Transient Thermal Response

**Package Outline Dimensions**

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

**SOT23**

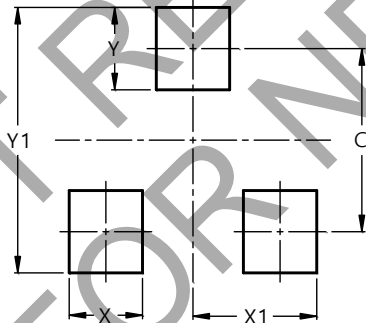


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**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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