

Product Summary

BV _{DSS}	R _{DS(ON)} MAX	Package	I _D T _A = +25°C
-20V	38mΩ @ V _{GS} = -10V	SOT23	-4.3A
	43mΩ @ V _{GS} = -4.5V		-4.0A
	75mΩ @ V _{GS} = -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 Switch
- Power Management Functions
- Motor Control

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 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

- Case: SOT23
- Case 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)

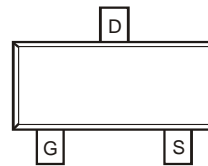


ESD PROTECTED

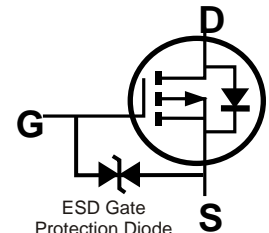
SOT23



Top View



Top View
Pin Configuration



ESD Gate
Protection Diode

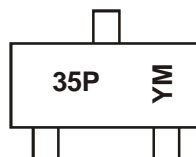
Equivalent Circuit
(Note 4)

Ordering Information (Note 5)

Part Number	Compliance	Case	Packaging
DMP2100UQ-7	Automotive	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_{GSS} 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: G = 2019)
 M = Month (ex: 9 = September)

Date Code Key

Year	2008	~	2017	2018	2019	2020	2021	2022	2023	2024	2025
Code	V	~	E	F	G	H	I	J	K	L	M

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°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V _{DSS}	-20	V	
Gate-Source Voltage (Note 6)	V _{GSS}	±10	V	
Continuous Drain Current (Note 8) V _{GS} = -10V	Steady State	T _A = +25°C	-4.3	A
		T _A = +70°C	-3.4	
	t < 5s	T _A = +25°C	-5.5	A
		T _A = +70°C	-4.3	
Maximum Continuous Body Diodes Forward Current (Note 8)	I _S	-2	A	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	-30	A	
Pulsed Body Diodes Forward Current (10µs Pulse, Duty Cycle = 1%)	I _{SM}	-30	A	

Thermal Characteristics

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 7)	P _D	T _A = +25°C	0.8	W
		T _A = +70°C	0.5	
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	Steady State	161	°C/W
		t < 5s	96	
Total Power Dissipation (Note 8)	P _D	T _A = +25°C	1.3	W
		T _A = +70°C	0.8	
Thermal Resistance, Junction to Ambient (Note 8)	R _{θJA}	Steady State	99	°C/W
		t < 5s	60	
Thermal Resistance, Junction to Case (Note 8)	R _{θJC}	15		
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C	

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	-20	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	µA	V _{DS} = -20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±10	µA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	-0.3	—	-1.4	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	25	38	mΩ	V _{GS} = -10V, I _D = -3.5A
		—	29	43		V _{GS} = -4.5V, I _D = -3A
		—	37	75		V _{GS} = -2.5V, I _D = -1A
		—	47	—		V _{GS} = -1.8V, I _D = -0.5A
Forward Transfer Admittance	Y _{fs}	—	3	—	S	V _{DS} = -5V, I _D = -4A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	216	—	pF	V _{DS} = -15V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{OSS}	—	90	—	pF	
Reverse Transfer Capacitance	C _{rSS}	—	24	—	pF	
Gate Resistance	R _g	—	250	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
SWITCHING CHARACTERISTICS (Note 10)						
Total Gate Charge	Q _g	—	9.1	—	nC	V _{GS} = -4.5V, V _{DS} = -10V I _D = -4A
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} = -10V, V _{GS} = -4.5V, R _D = 2.5Ω, R _G = 3.0Ω
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 ±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.

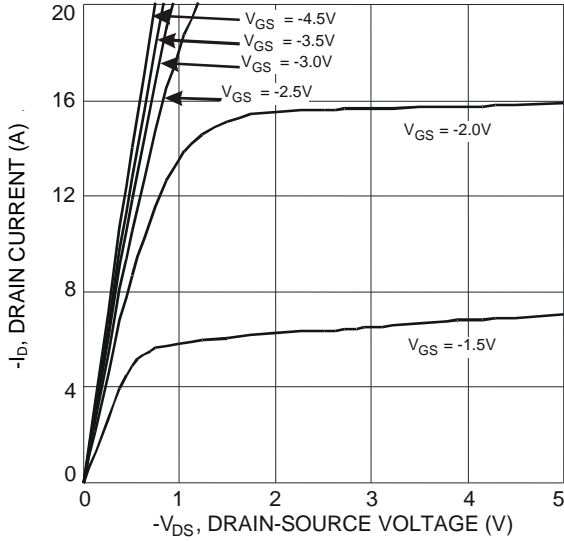


Fig. 1 Typical Output Characteristic

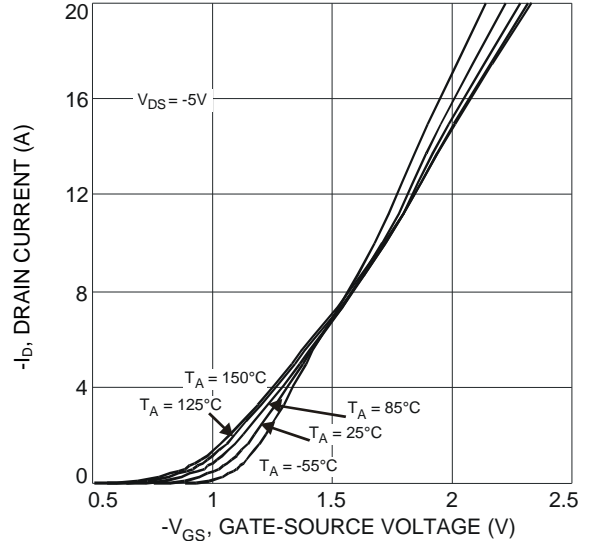


Fig. 2 Typical Transfer Characteristic

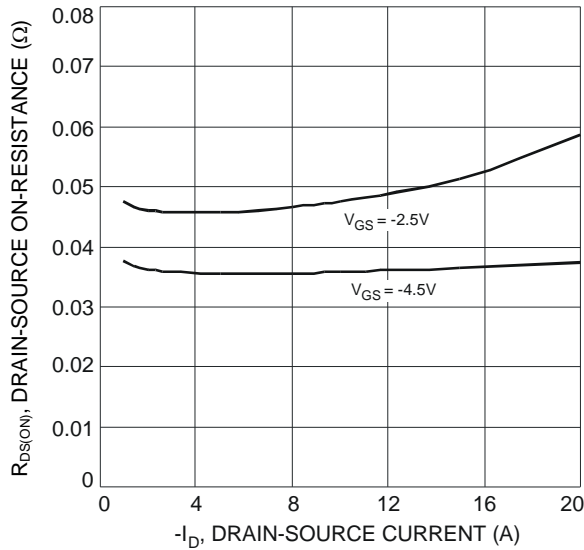


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

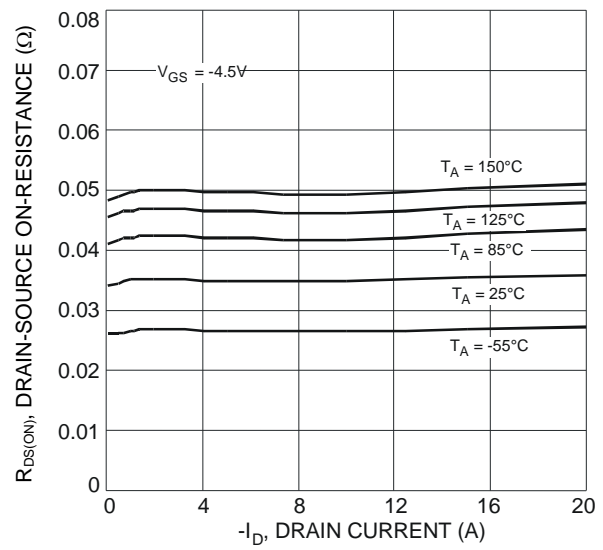


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

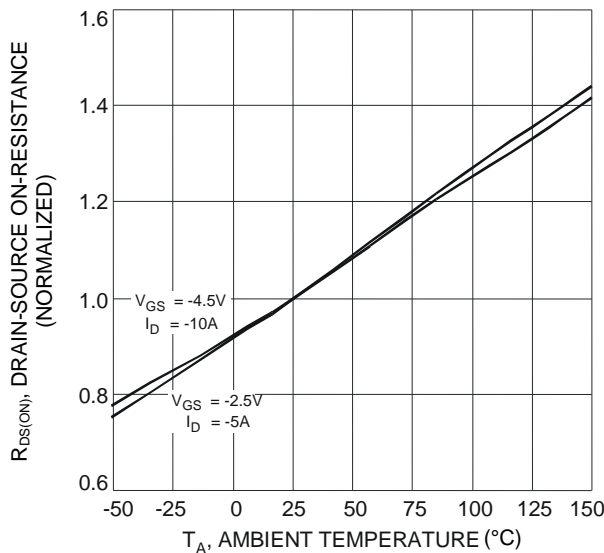


Fig. 5 On-Resistance Variation with Temperature

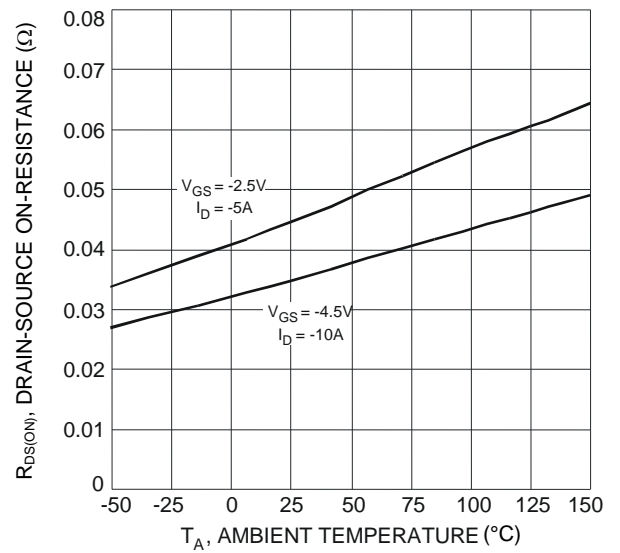


Fig. 6 On-Resistance Variation with Temperature

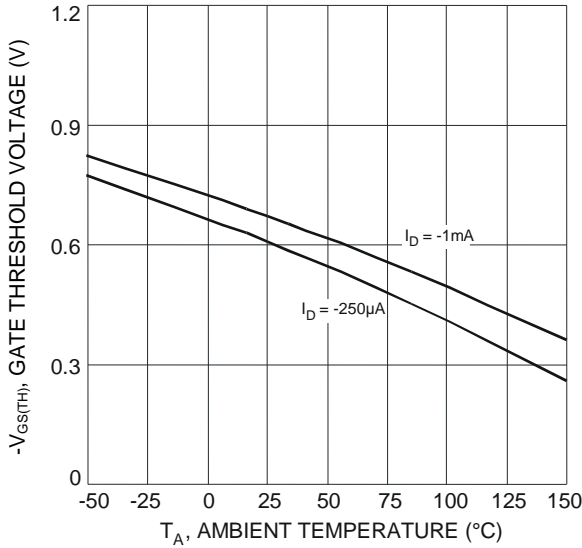


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

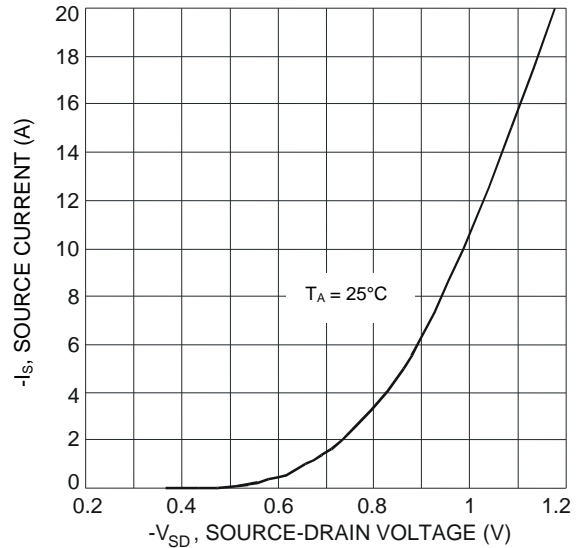


Fig. 8 Diode Forward Voltage vs. Current

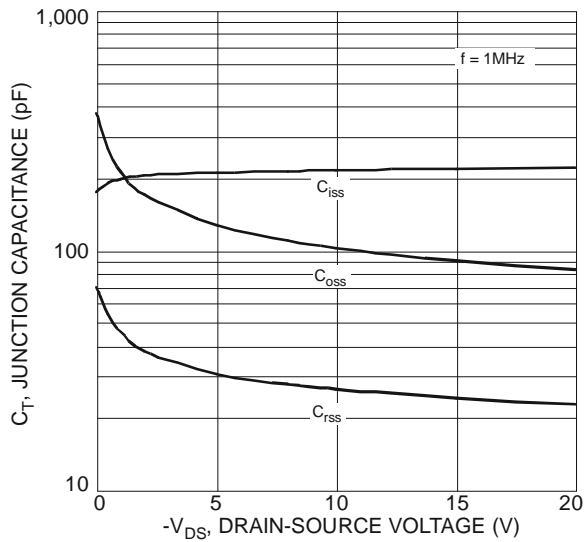


Fig. 9 Typical Junction Capacitance

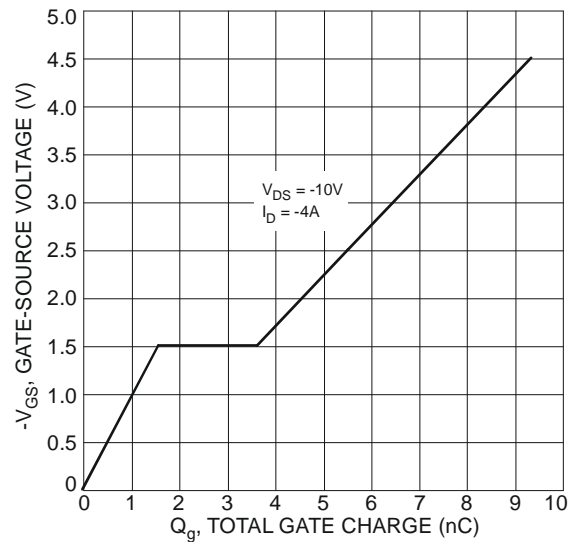


Fig. 10 Gate-Charge Characteristics

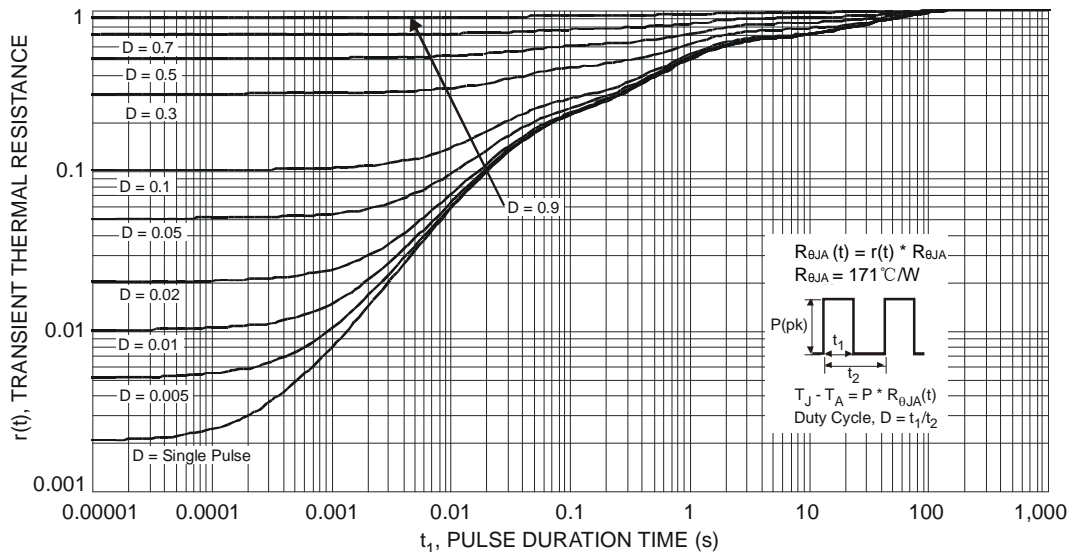
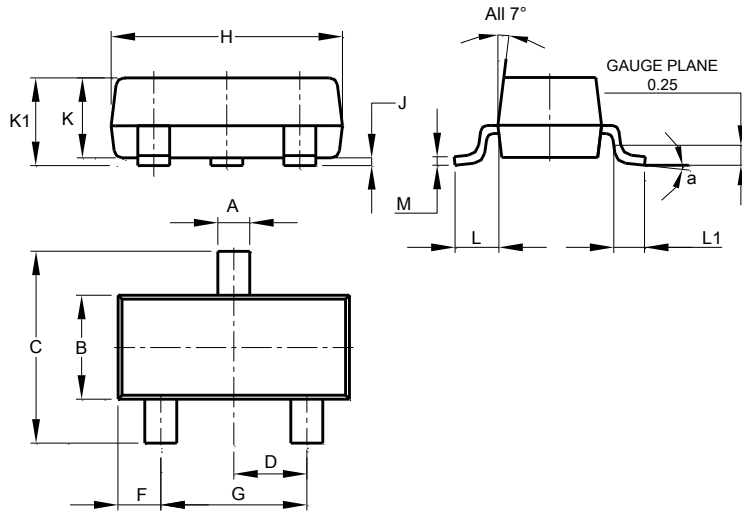


Fig. 11 Transient Thermal Response

Package Outline Dimensions

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

SOT23

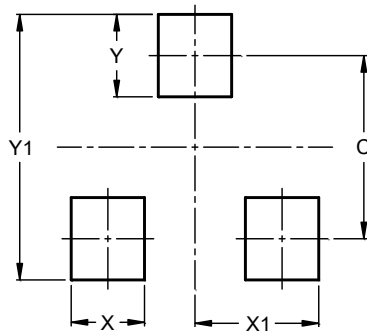


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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