

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
20V	29mΩ @ V _{GS} = 4.5V	5.9A
	50mΩ @ V _{GS} = 2.5V	4.3A

Description and Applications

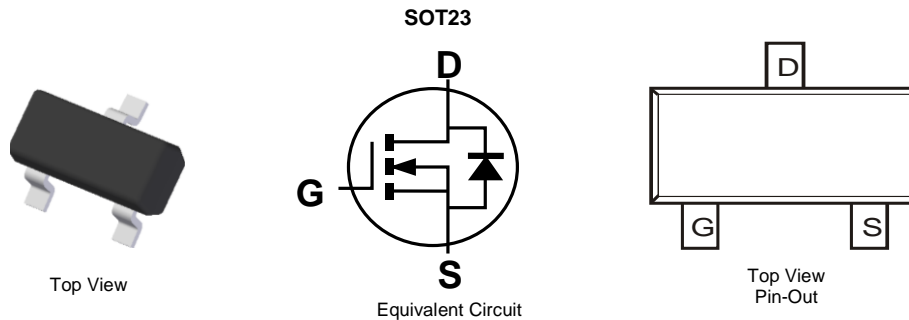
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use.

Features and Benefits

- Low On-Resistance
- 29mΩ @ V_{GS} = 4.5V
- 50mΩ @ V_{GS} = 2.5V
- 100mΩ @ V_{GS} = 2.0V
- Very Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **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**
- **PPAP Capable (Note 4)**

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
- Terminal Connections: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (Approximate)

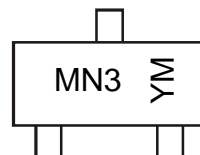


Ordering Information (Note 5)

Part Number	Case	Packaging
DMN2050LQ-7	SOT23	3000/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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



MN3 = Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: G = 2019)
 M = Month (ex: 9 = September)

Date Code Key

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

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	V _{GSS}	±12	V
Drain Current (Note 6)	I _D	5.9	A
Pulsed Drain Current (Note 7)	I _{DM}	21	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	1.4	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	90	°C/W
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 7)						
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}	—	—	±100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	0.45	—	1.4	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	24	29	mΩ	V _{GS} = 4.5V, I _D = 5.0A
			42	50		V _{GS} = 2.5V, I _D = 3.1A
			68	100		V _{GS} = 2.0V, I _D = 1.5A
Forward Transfer Admittance	Y _{fs}	—	8	—	s	V _{DS} = 5V, I _D = 2.1A
Diode Forward Voltage (Note 8)	V _{SD}	—	0.9	1.4	V	V _{GS} = 0V, I _S = 2.0A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	532	—	pF	V _{DS} = 10V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	144	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	117	—	pF	
Gate Resistance	R _g	—	1.3	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
SWITCHING CHARACTERISTICS (Note 9)						
Total Gate Charge	Q _g	—	6.7	—	nC	V _{DS} = 10V, V _{GS} = 4.5V, I _D = 5.0A
Gate-Source Charge	Q _{gs}	—	0.8	—		V _{DS} = 10V, V _{GS} = 4.5V, I _D = 5.0A
Gate-Drain Charge	Q _{gd}	—	3.0	—		V _{DS} = 10V, V _{GS} = 4.5V, I _D = 5.0A

- Notes:
6. Device mounted on FR-4 PCB, on 2oz Copper pad layout with R_{θJA} = 90°C/W.
 7. Repetitive rating, pulse width limited by junction temperature.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to production testing.

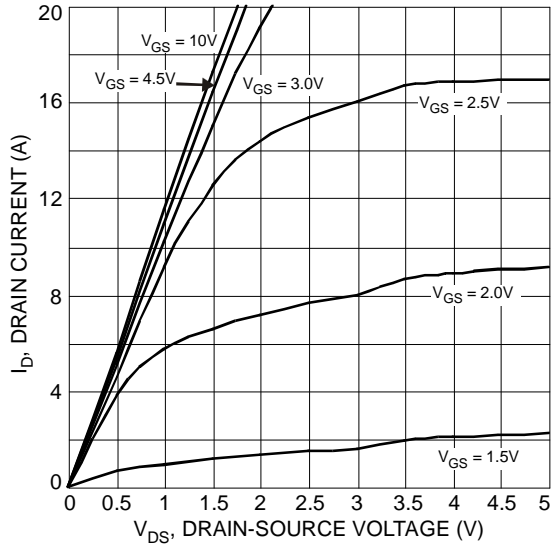


Fig. 1 Typical Output Characteristic

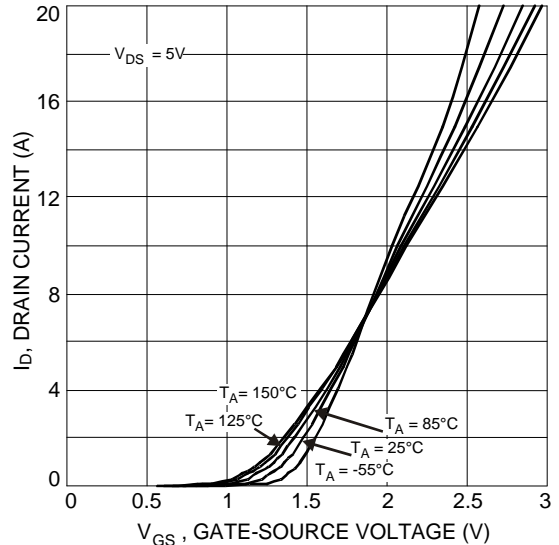


Fig. 2 Typical Transfer Characteristic

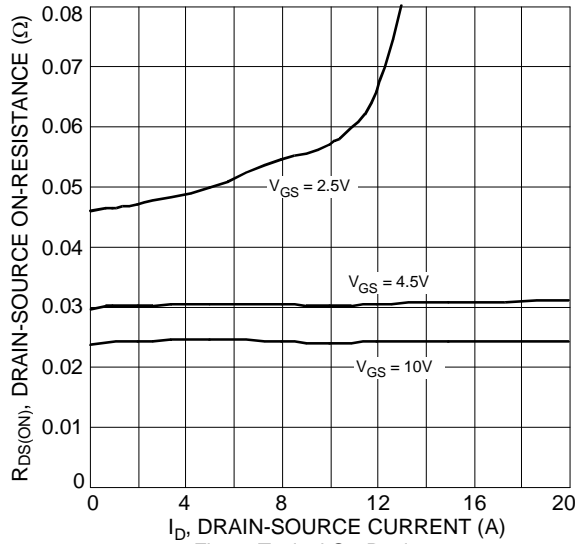


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

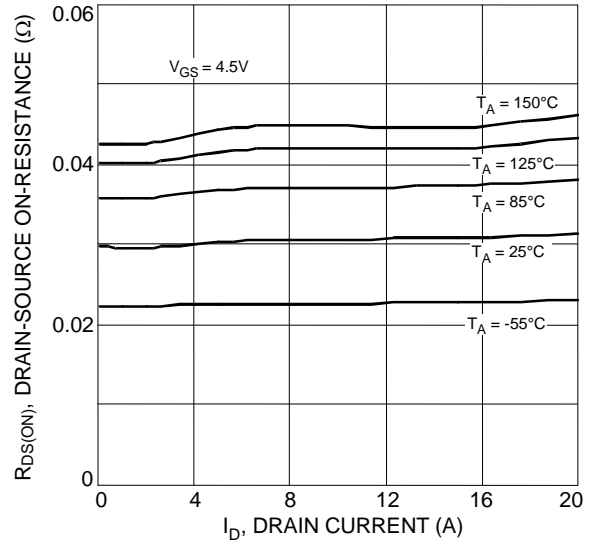


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

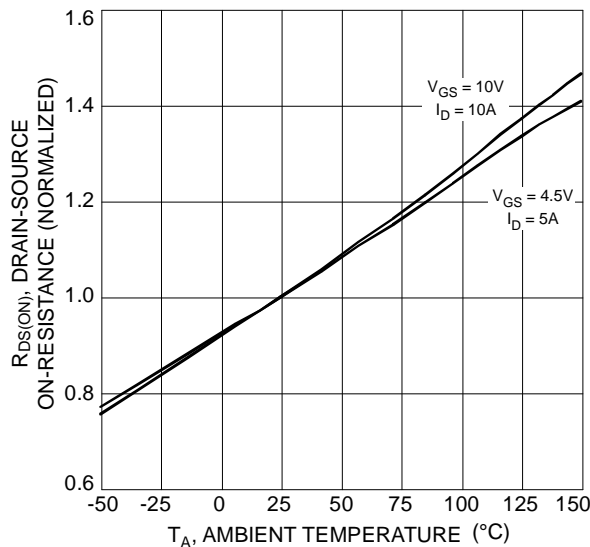


Fig. 5 On-Resistance Variation with Temperature

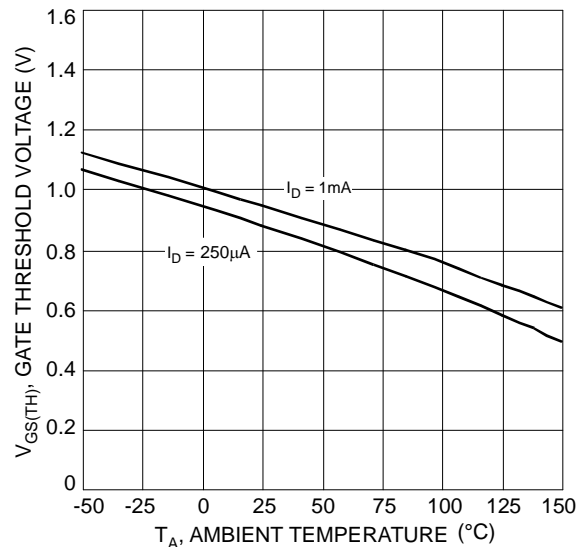


Fig. 6 Gate Threshold Variation vs. Ambient Temperature

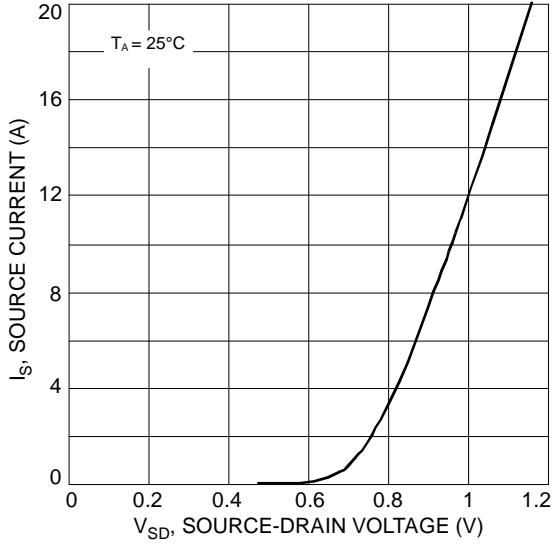


Fig. 7 Diode Forward Voltage vs. Current

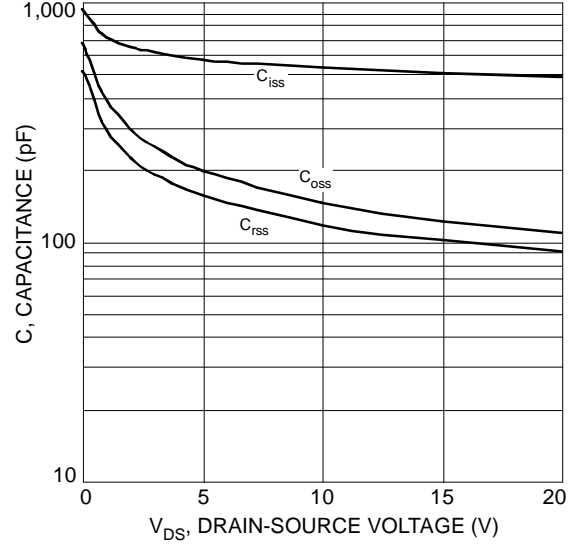


Fig. 8 Typical Total Capacitance

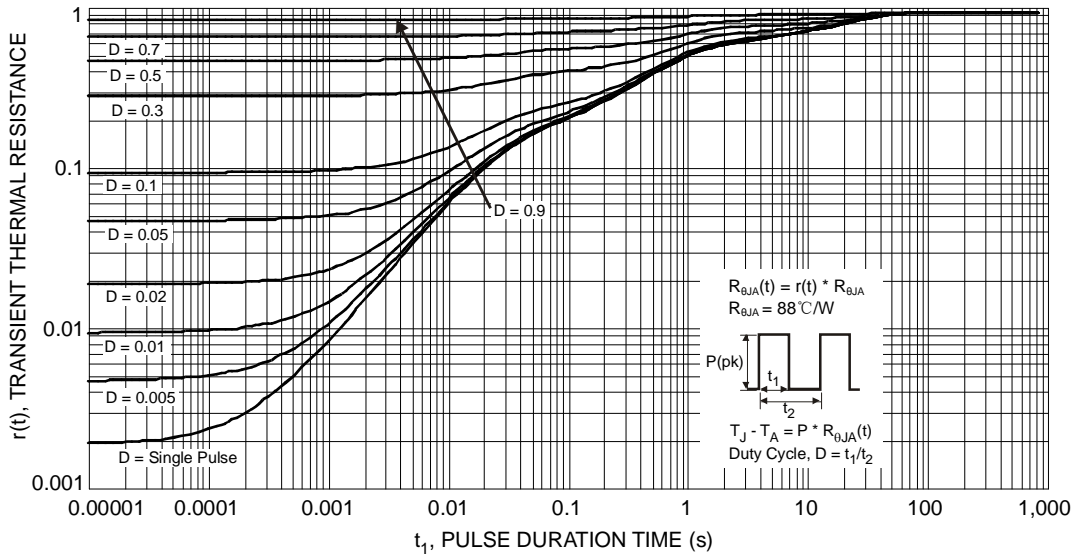
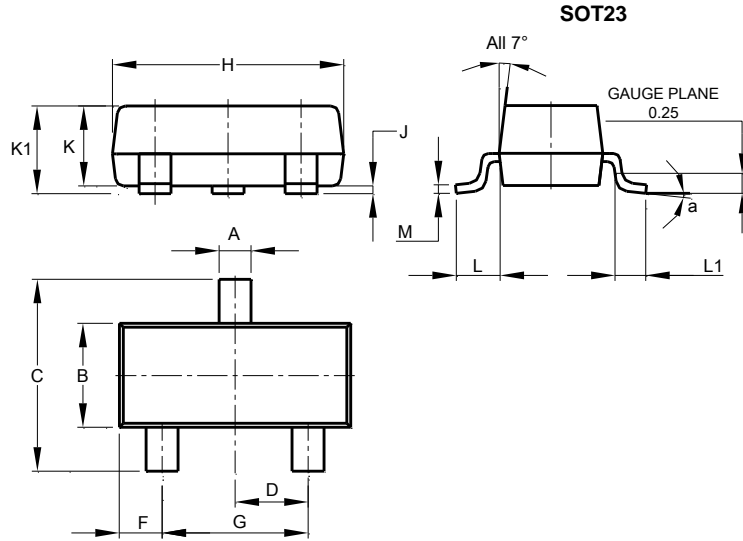


Fig. 9 Transient Thermal Response

Package Outline Dimensions

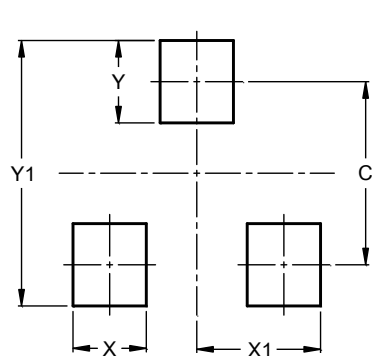
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



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	0.890	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.



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

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