

## Product Summary

$BV_{DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = +25^\circ C$
-30V	65m $\Omega$ @ $V_{GS} = -10V$	-3.8A
	99m $\Omega$ @ $V_{GS} = -4.5V$	-3.0A

## 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 in:

- Backlighting
- Power Management Functions
- DC-DC Converters

## Features and Benefits

- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **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)**

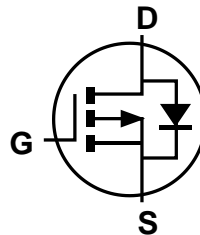
## Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 **e3**
- Terminal Connections: See Diagram
- Weight: 0.009 grams (Approximate)

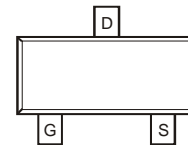
SOT23



Top View



Equivalent Circuit



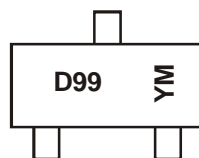
Top View  
Pin Configuration

## Ordering Information (Note 5)

Part Number	Case	Packaging
DMP3099LQ-7	SOT23	3000/Tape & Reel
DMP3099LQ-13	SOT23	10000/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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/product-compliance-definitions/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



D99 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: E = 2017)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2016	2017	2018	2019	2020	2021	2022	2023
Code	D	E	F	G	H	I	J	K

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			$V_{DSS}$	-30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Drain Current (Note 6) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	-3.8	A
		$T_A = +70^\circ\text{C}$		-2.9	
Pulsed Drain Current (Note 7)			$I_{DM}$	-11	A
Avalanche Current, $L = 0.1\text{mH}$			$I_{AS}$	-14.3	A
Avalanche Energy, $L = 0.1\text{mH}$			$E_{AS}$	10.2	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	$P_D$	1.08	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 6)	$R_{\theta JA}$	115	$^\circ\text{C/W}$
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 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-30	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	-800	nA	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.0	—	-2.1	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	65	m $\Omega$	$V_{GS} = -10\text{V}, I_D = -3.8\text{A}$
				99		$V_{GS} = -4.5\text{V}, I_D = -3.0\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	3.6	—	S	$V_{DS} = -5\text{V}, I_D = -2.7\text{A}$
Diode Forward Voltage	$V_{SD}$	—	—	-1.26	V	$V_{GS} = 0\text{V}, I_S = -2.7\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	563	—	pF	$V_{DS} = -25\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	48	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	41	—	pF	
Gate Resistance	$R_G$	—	10.3	—	$\Omega$	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$
<b>SWITCHING CHARACTERISTICS (Note 9)</b>						
Total Gate Charge	$Q_g$	—	5.2	—	nC	$V_{DS} = -15\text{V}, V_{GS} = -4.5\text{V}, I_D = -3.8\text{A}$
		—	11	—		$V_{DS} = -15\text{V}, V_{GS} = -10\text{V}, I_D = -3.8\text{A}$
Gate-Source Charge	$Q_{gs}$	—	1.7	—	ns	$V_{DS} = -15\text{V}, V_{GS} = -10\text{V}, I_D = -3.8\text{A}$
Gate-Drain Charge	$Q_{gd}$	—	1.9	—		
Turn-On Delay Time	$t_{D(ON)}$	—	4.8	—	ns	$V_{DS} = -15\text{V}, V_{GS} = -10\text{V}, I_D = -1\text{A}, R_G = 6.0\Omega$
Rise Time	$t_R$	—	5.0	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	31	—		
Fall Time	$t_F$	—	15	—		

- Notes:
6. Device mounted on FR-4 PCB on 2 oz., 0.5 inch<sup>2</sup> copper pads and  $t \leq 5$  sec.
  7. Pulse width  $\leq 10\mu\text{s}$ , Duty Cycle  $\leq 1\%$ .
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to production testing.

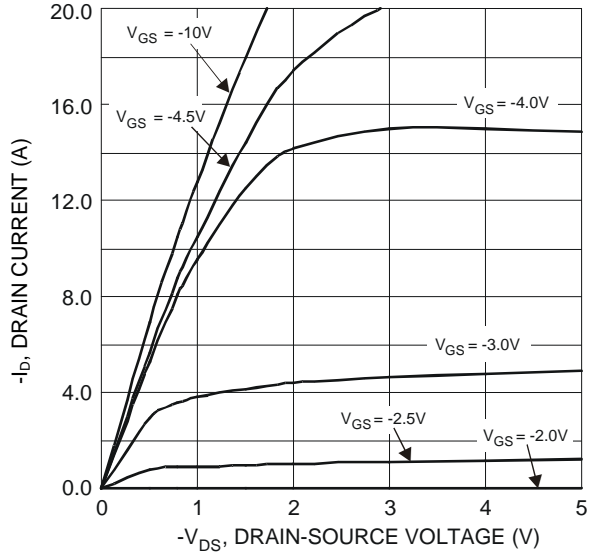


Figure 1 Typical Output Characteristics

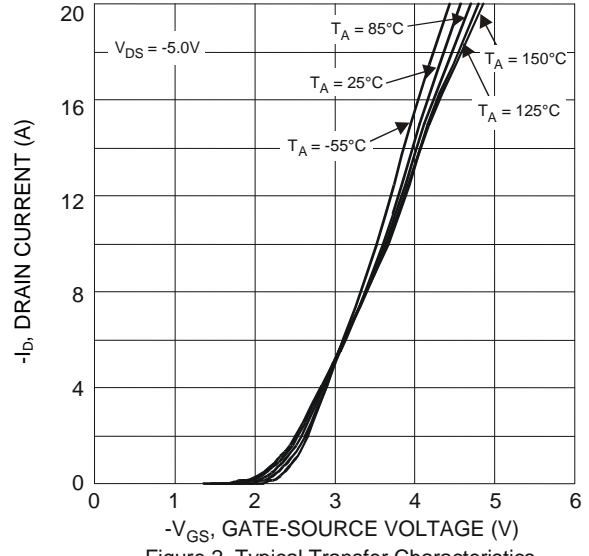


Figure 2 Typical Transfer Characteristics

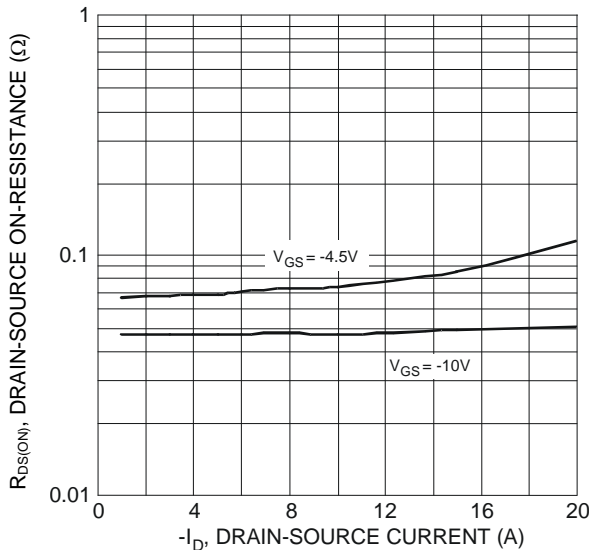


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

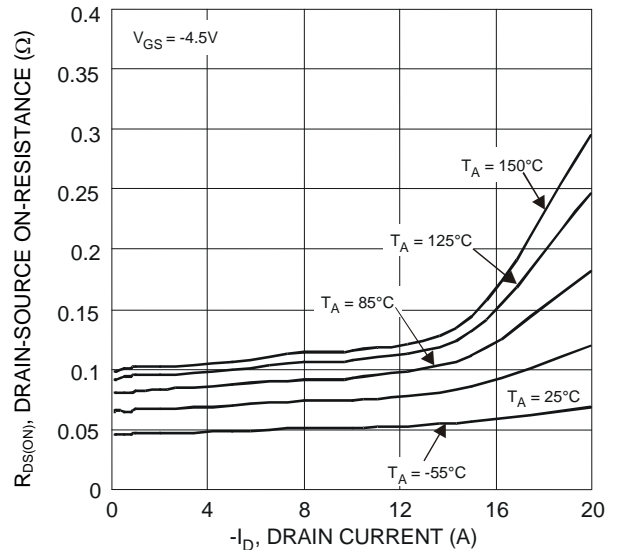


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

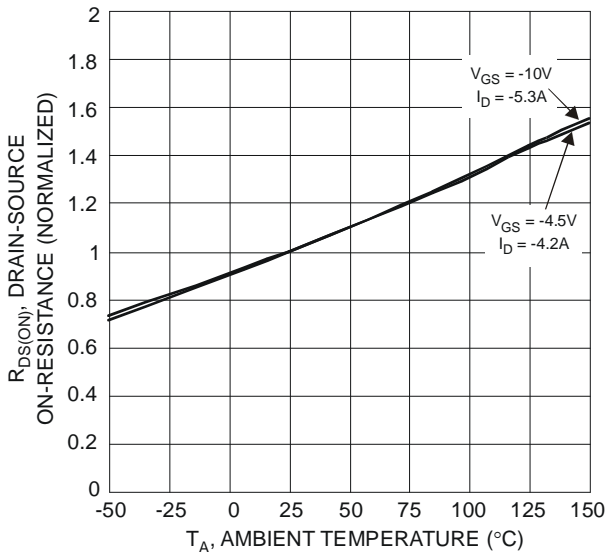


Figure 5 On-Resistance Variation with Temperature

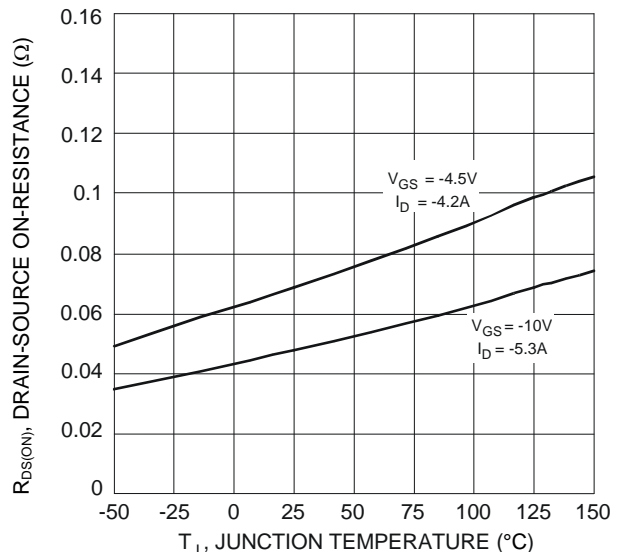


Figure 6 On-Resistance Variation with Temperature

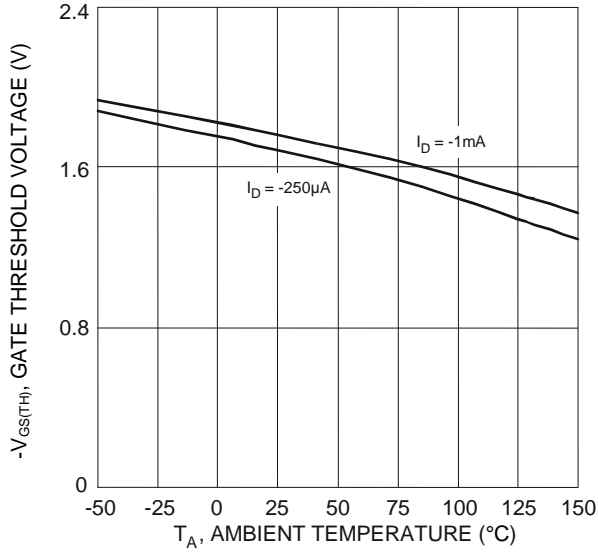


Figure 7 Gate Threshold Variation vs. Ambient Temperature

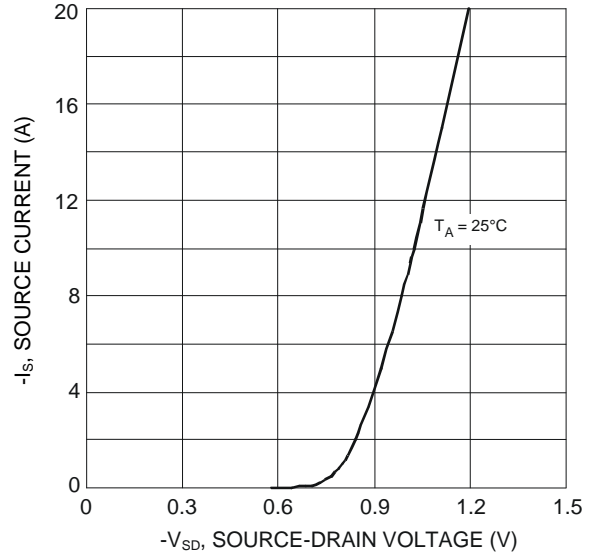


Figure 8 Diode Forward Voltage vs. Current

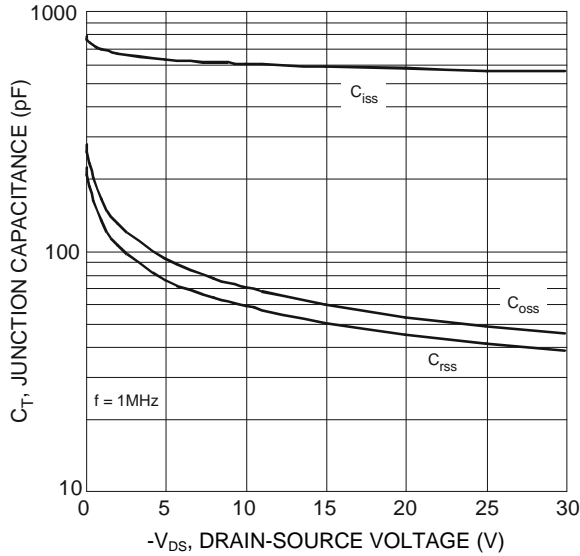


Figure 9 Typical Junction Capacitance

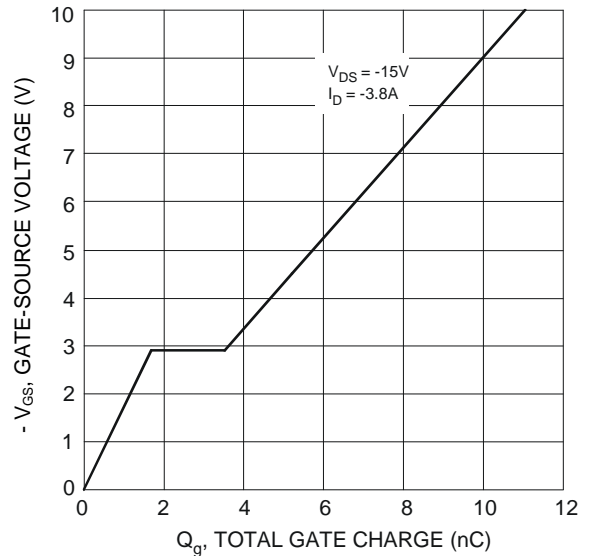
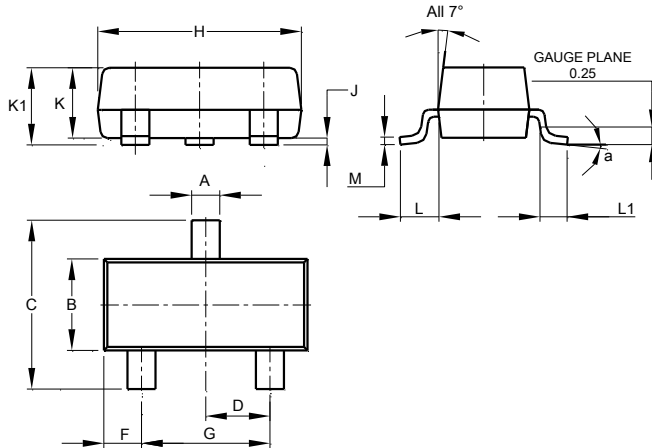


Figure 10 Gate Charge

**Package Outline Dimensions**

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

**SOT23**

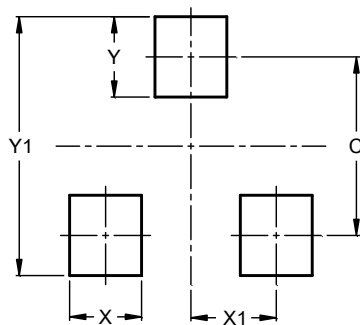


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
<b>All Dimensions in mm</b>			

**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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