

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> T <sub>A</sub> = +25°C
-50V	10Ω @ V <sub>GS</sub> = -5V	-170mA

## Features and Benefits

- Low On-Resistance
- 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)**
- **The DMP512DLQ 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/>

## Description and Applications

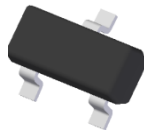
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

- General-purpose interfacing switches
- Power-management functions
- Analog switches

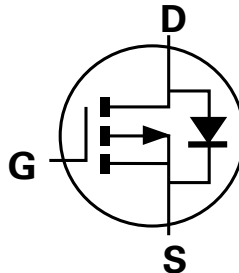
## Mechanical Data

- Package: SOT23
- Package Material: UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish (Lead-Free Plating) Solderable per MIL-STD-202, Method 208 
- Terminal Connections: See Diagram
- Weight: 0.009 grams (Approximate)

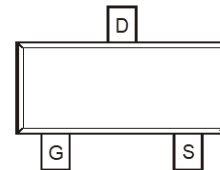
SOT23



Top View



Equivalent Circuit



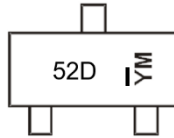
Top View

## Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMP512DLQ-7	SOT23	3000	Tape & Reel
DMP512DLQ-13	SOT23	10000	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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



52D = Product Type Marking Code  
YM = Date Code Marking  
Y = Year (ex: M = 2025)  
M = Month (ex: 9 = September)

Date Code Key

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Code	M	N	P	R	S	T	U	V	W	X	Y	Z

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>	-50	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Drain Current (Note 5)	I <sub>D</sub>	-170	mA
Pulsed Drain Current	I <sub>DM</sub>	-1.2	A

## Thermal Characteristics (@ T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	0.6	mW
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	207	°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 6)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-50	—	—	V	V <sub>GS</sub> = 0, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1 -100	μA nA	V <sub>D</sub> = -50V, V <sub>GS</sub> = 0, T <sub>J</sub> = +25°C V <sub>D</sub> = -25V, V <sub>GS</sub> = 0, T <sub>J</sub> = +25°C
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±10	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.8	—	-2.0	V	V <sub>D</sub> = V <sub>GS</sub> , I <sub>D</sub> = -1mA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	1.8	10	Ω	V <sub>GS</sub> = -5V, I <sub>D</sub> = -0.100A
Forward Transconductance	g <sub>FS</sub>	0.05	—	—	S	V <sub>D</sub> = -25V, I <sub>D</sub> = -0.1A
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	C <sub>iss</sub>	—	42	—	pF	V <sub>D</sub> = -25V, V <sub>GS</sub> = 0, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	6	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	5	—	pF	
Gate Resistance	R <sub>g</sub>	—	290	—	Ω	V <sub>D</sub> = 0, V <sub>GS</sub> = 0, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>g</sub>	—	0.6	—	nC	V <sub>D</sub> = -10V, I <sub>D</sub> = -0.1A
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>	—	1.2	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	0.2	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	0.2	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	3	—	ns	V <sub>DD</sub> = -30V, I <sub>D</sub> = -0.27A
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	53	—	ns	R <sub>GEN</sub> = 50Ω, V <sub>GS</sub> = -10V

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.  
6. Short duration pulse test used to minimize self-heating effect.  
7. Guaranteed by design. Not subject to production testing.

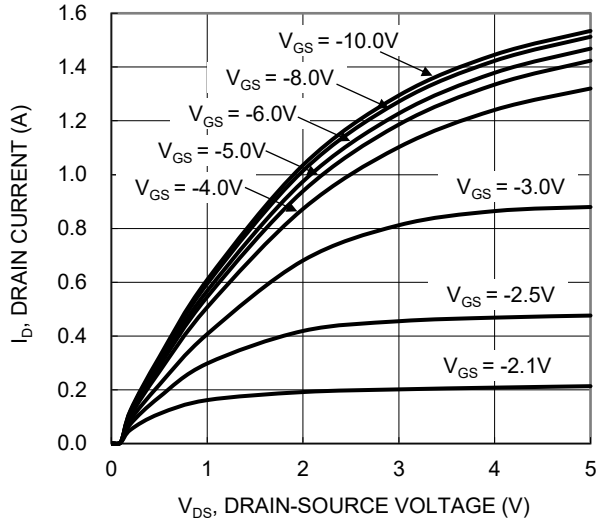


Figure 1. Typical Output Characteristic

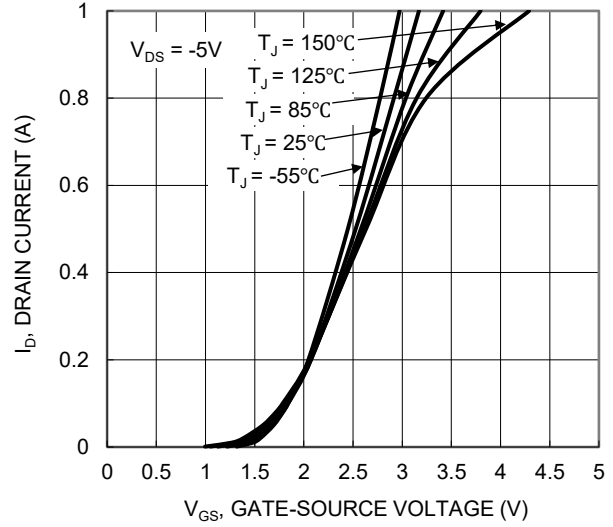


Figure 2. Typical Transfer Characteristic

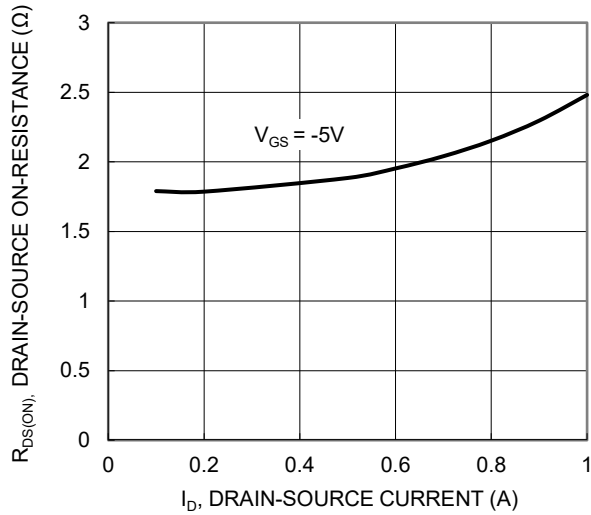


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

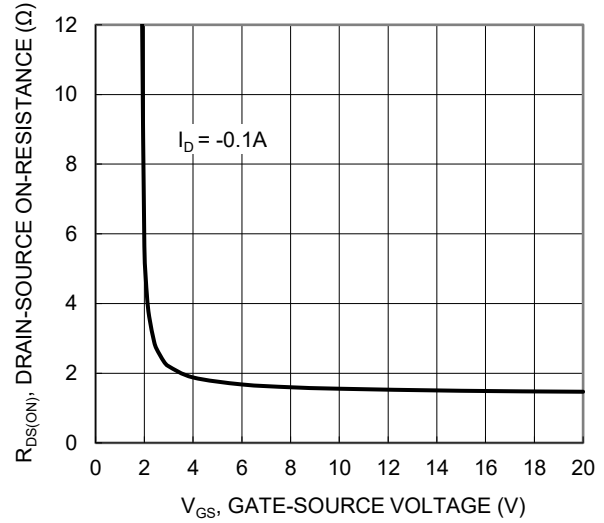


Figure 4. Typical Transfer Characteristic

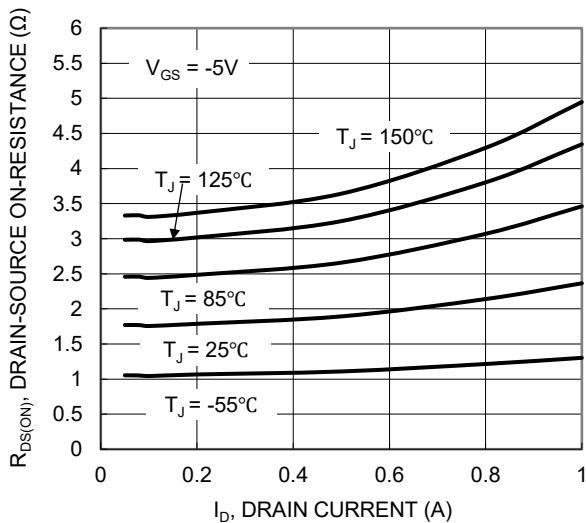


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

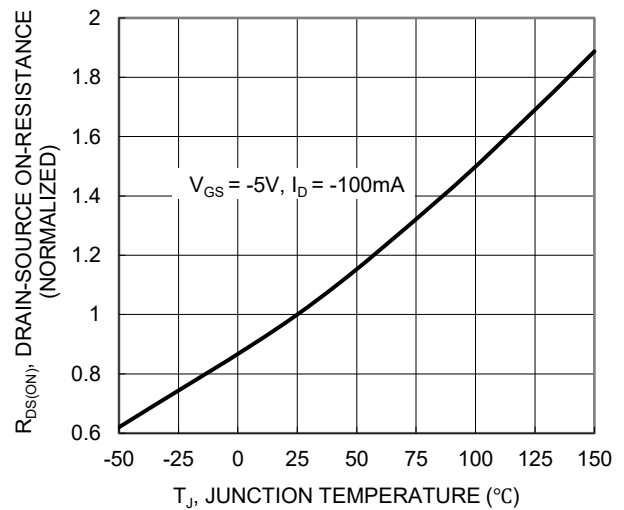


Figure 6. On-Resistance Variation with Junction Temperature

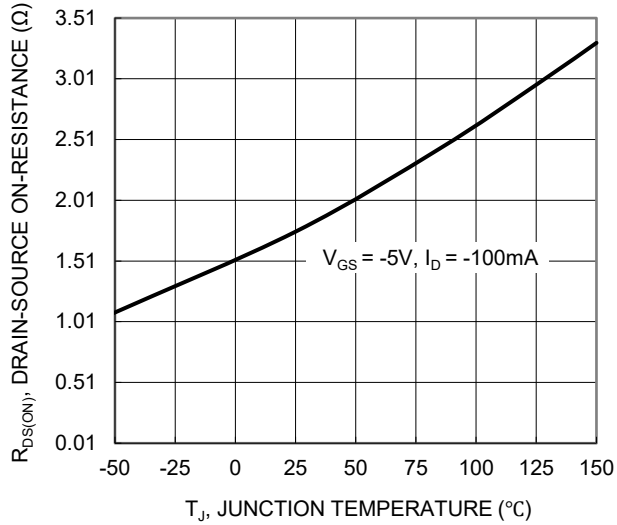


Figure 7. On-Resistance Variation with Junction Temperature

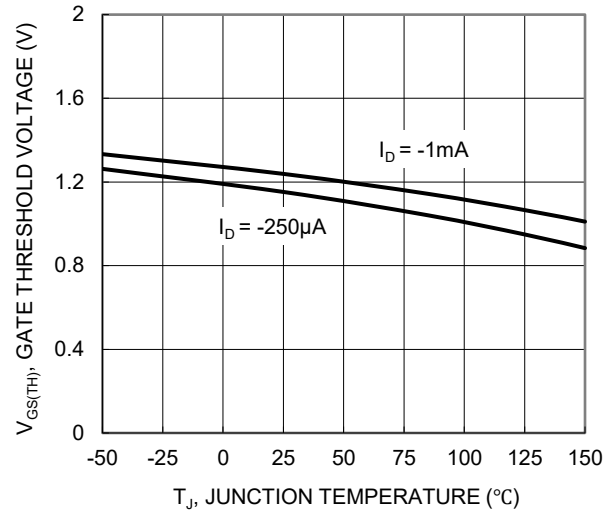


Figure 8. Gate Threshold Variation vs. Junction Temperature

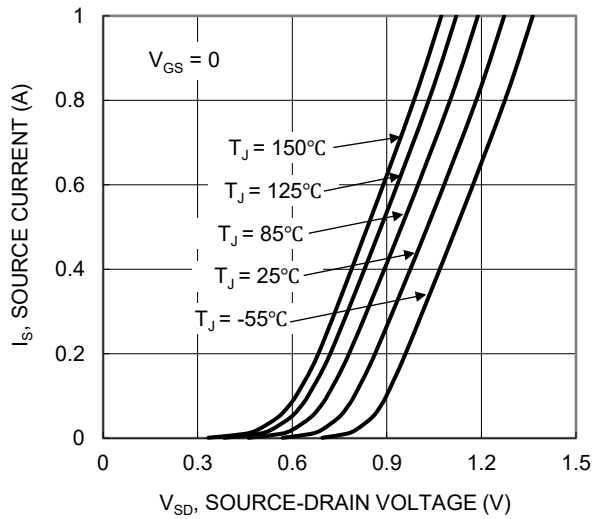


Figure 9. Diode Forward Voltage vs. Current

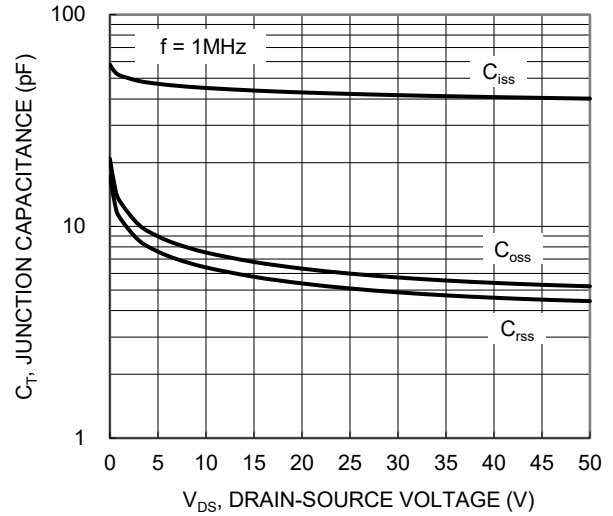


Figure 10. Typical Junction Capacitance

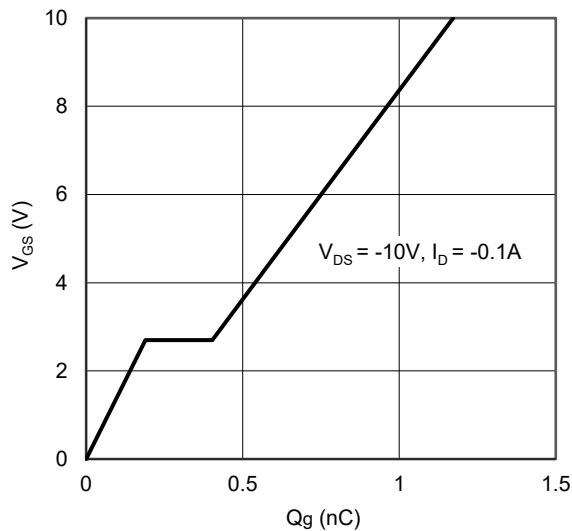


Figure 11. Gate Charge

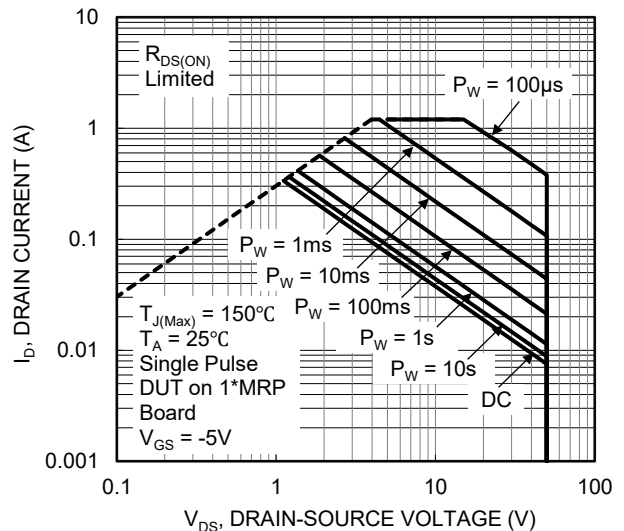


Figure 12. SOA, Safe Operation Area

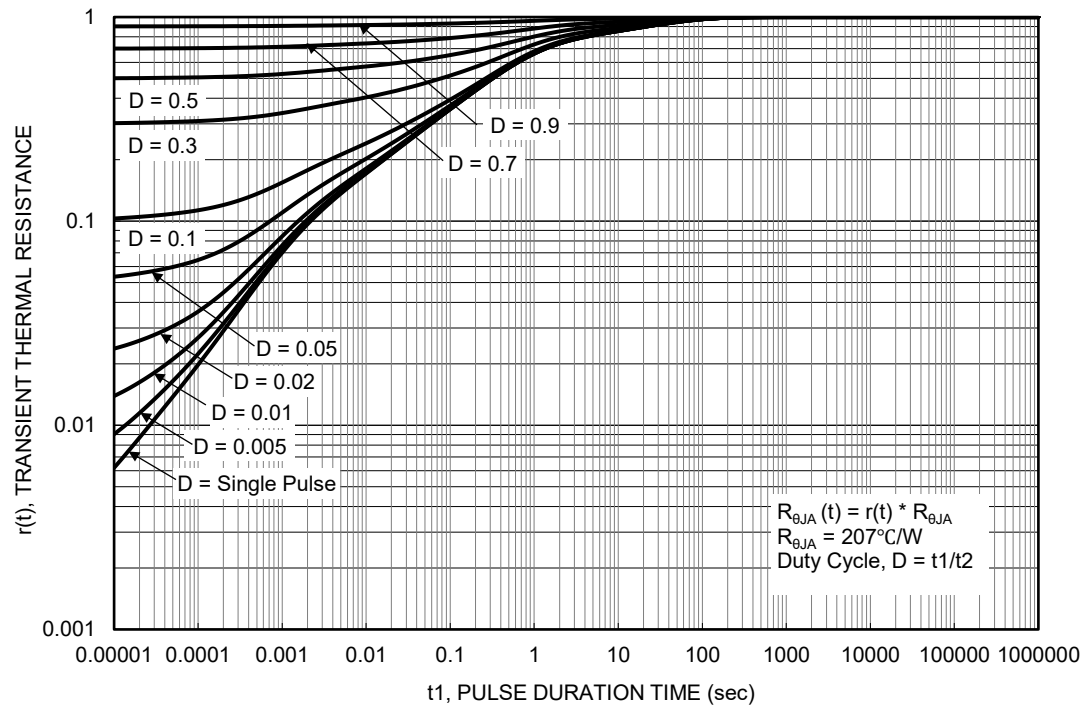
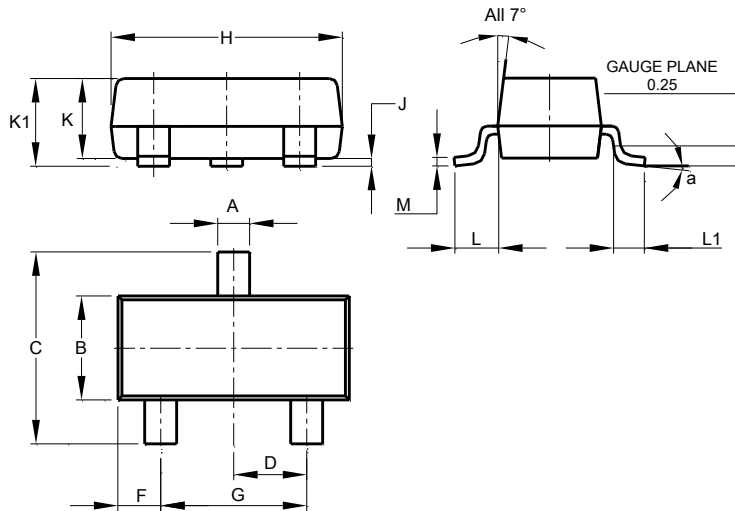


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

**SOT23**

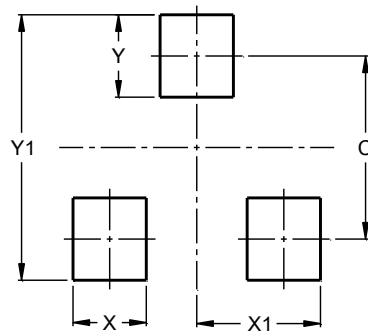


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

## 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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