

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) max}$	$I_D$ $T_A = +25^\circ C$
-30V	77mΩ @ $V_{GS} = -10V$	-3.5A
	95mΩ @ $V_{GS} = -4.5V$	-3.0A
	150mΩ @ $V_{GS} = -2.5V$	-2.4A

## 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

## Description and Applications

This MOSFET has been designed to meet the stringent requirements of Automotive applications. It is qualified to AECQ101, supported by a PPAP and is ideal for use in:

- DC-DC Converters
- Power Management Functions
- Analog Switch

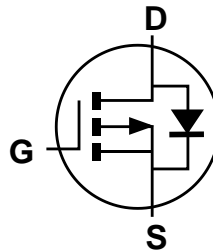
## Mechanical Data

- 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)

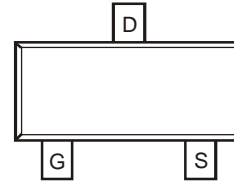
SOT23



Top View



Equivalent Circuit



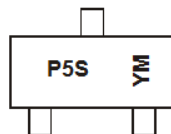
Top View

## Ordering Information (Note 5)

Part Number	Case	Packaging
DMP3130LQ-7	SOT23	3000/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 [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html)
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

## Marking Information



P5S = Product Type Marking Code  
 YM or  $\bar{Y}M$  = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: D = 2016)  
 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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units	
Drain-Source Voltage	V <sub>DSS</sub>	-30	V	
Gate-Source Voltage	V <sub>GSS</sub>	±12	V	
Continuous Drain Current (Note 6) V <sub>GS</sub> = -4.5V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	-3.5 -2.6	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	-4.1 -3.2	A
Maximum Continuous Body Diode Forward Current (Note 6)	I <sub>S</sub>	-1.6	A	
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I <sub>DM</sub>	-20	A	

**Thermal Characteristics**

Characteristic	Symbol	Value	Units	
Total Power Dissipation (Note 6)	P <sub>D</sub>	T <sub>A</sub> = +25°C	0.7	W
		T <sub>A</sub> = +70°C	0.4	
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	Steady State	184	°C/W
		t < 10s	115	
Total Power Dissipation (Note 7)	P <sub>D</sub>	T <sub>A</sub> = +25°C	1.3	W
		T <sub>A</sub> = +70°C	0.8	
Thermal Resistance, Junction to Ambient (Note 7)	R <sub>θJA</sub>	Steady State	94	°C/W
		t < 10s	61	
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	25		
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 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	µA	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.6	—	-1.3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	59	77	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.2A
		—	73	95		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4A
		—	115	150		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -3A
Forward Transconductance	g <sub>fs</sub>	—	8	—	S	V <sub>DS</sub> = -5V, I <sub>D</sub> = -4A
Source-Drain Diode Forward Voltage	V <sub>SD</sub>	—	-0.8	-1.25	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -3.0A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>ISS</sub>	—	432	864	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	87	174	pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	62	124	pF	
Gate Resistance	R <sub>G</sub>	—	4.04	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
<b>SWITCHING CHARACTERISTICS (Note 9)</b>						
Total Gate Charge	Q <sub>G</sub>	—	5.9	11.8	nC	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.0A
		—	12	24		V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.0A
Gate-Source Charge	Q <sub>GS</sub>	—	1.0	2.0		ns
Gate-Drain Charge	Q <sub>GD</sub>	—	3.1	6.2		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	4.6	9.2	ns	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -1A, R <sub>G</sub> = 6.0Ω
Rise Time	t <sub>R</sub>	—	6.5	13.0		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	27.8	55.6		
Fall Time	t <sub>F</sub>	—	15.0	30.0		

- Notes:
6. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  7. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to production testing

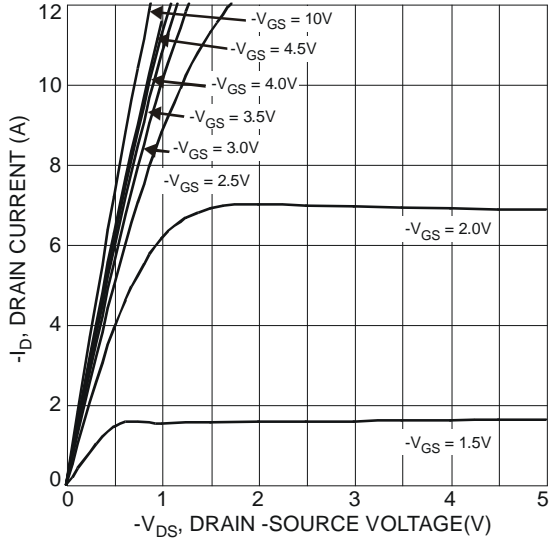


Fig. 1 Typical Output Characteristics

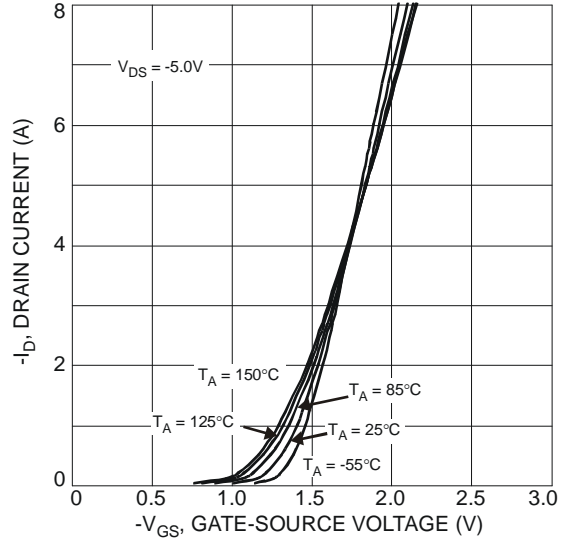


Fig. 2 Typical Transfer Characteristics

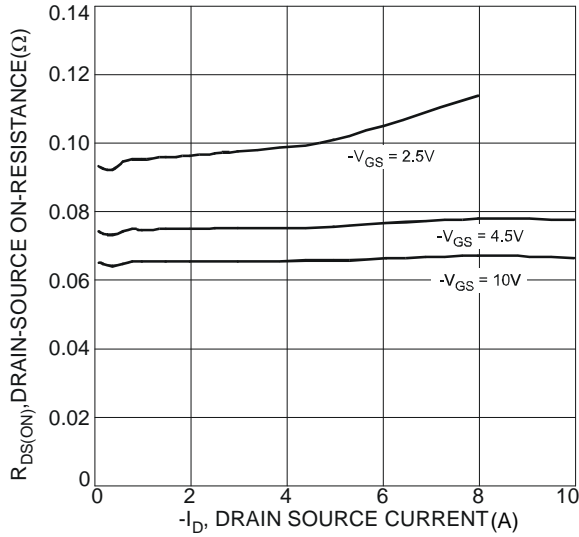


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

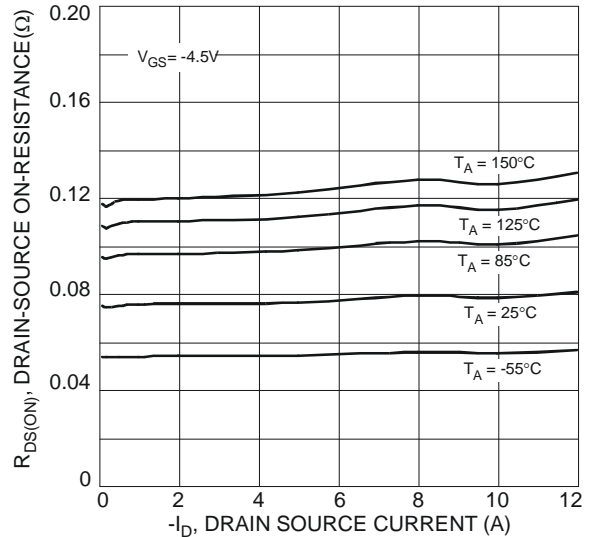


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

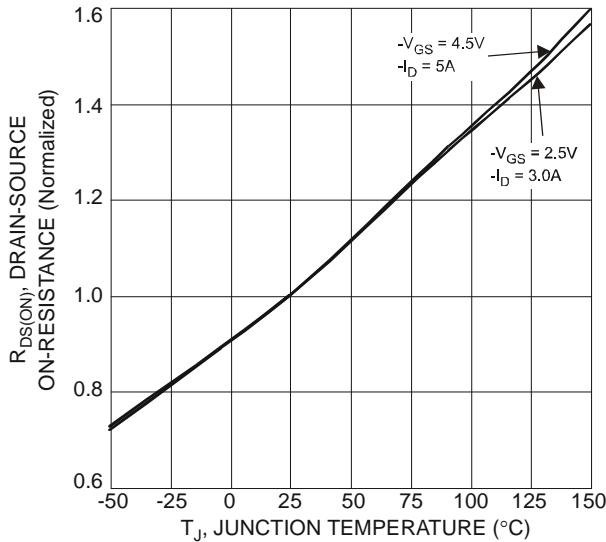


Fig. 5 On-Resistance Variation with Temperature

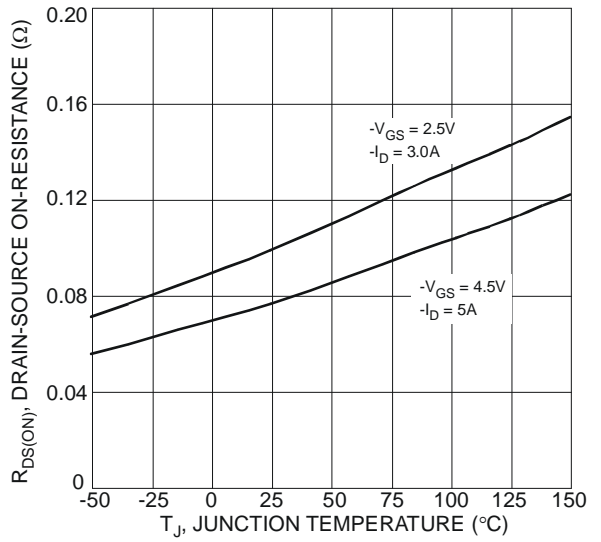


Fig. 6 On-Resistance Variation with Temperature

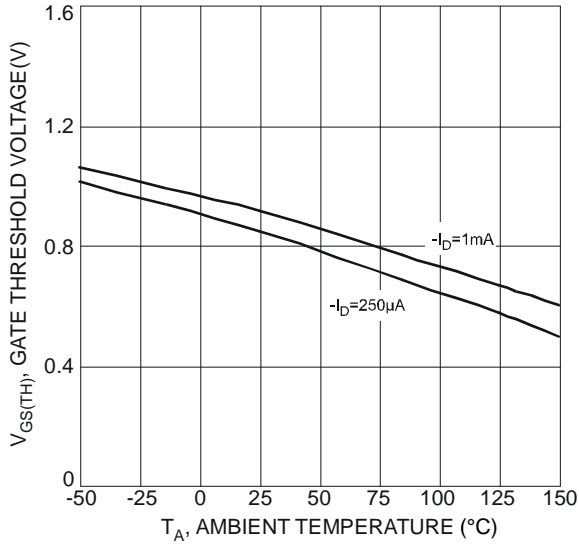


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

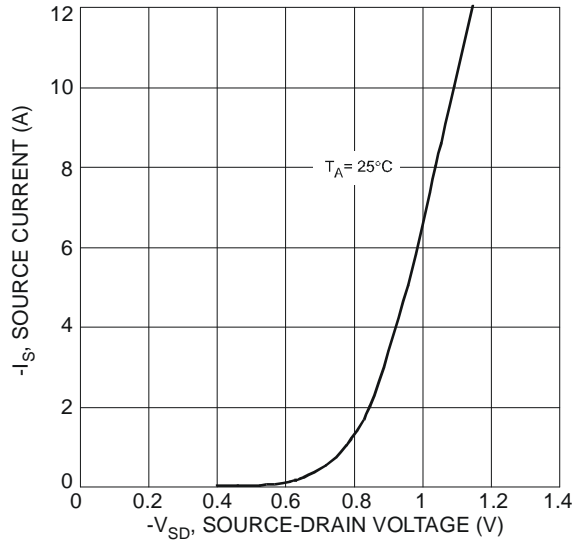


Fig. 8 Diode Forward Voltage vs. Current

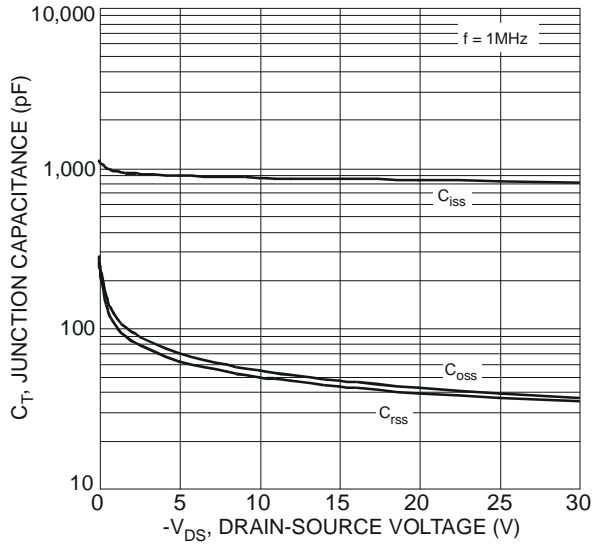


Fig. 9 Typical Junction Capacitance

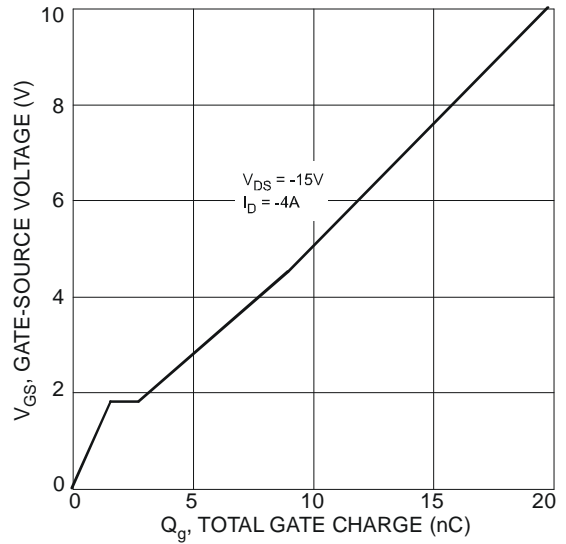


Fig. 10 Gate-Charge Characteristics

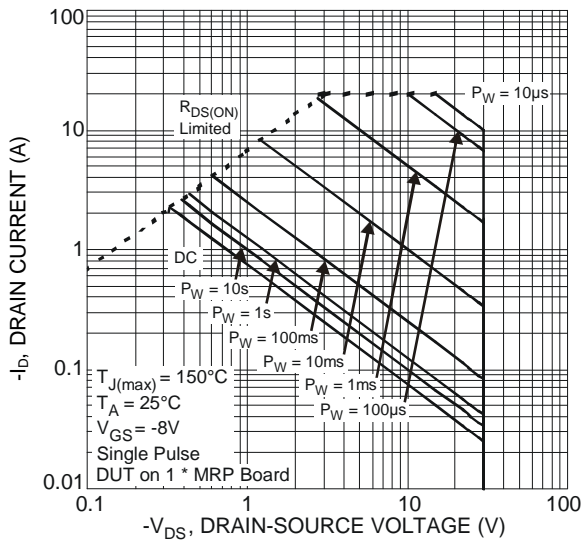
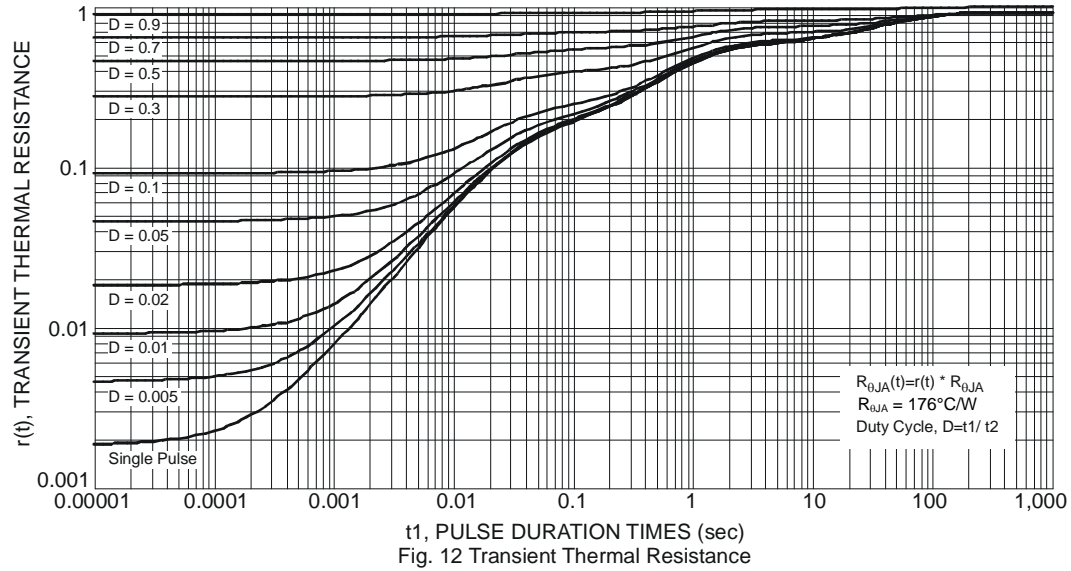


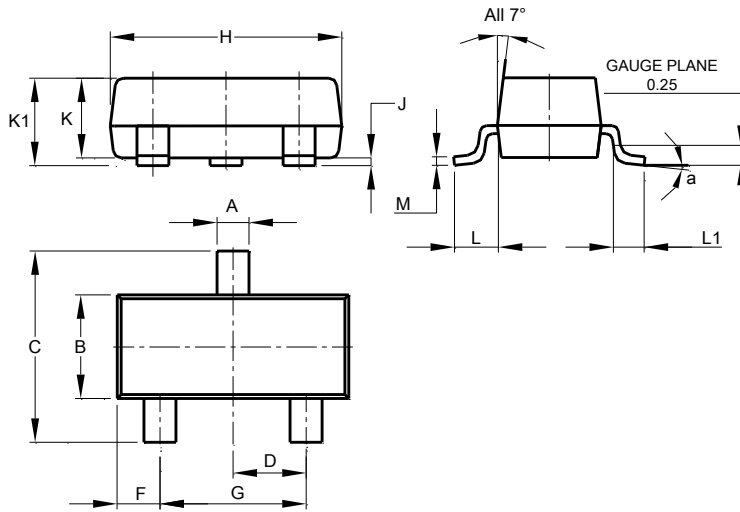
Fig. 11 SOA, Safe Operation Area



**Package Outline Dimensions**

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

**SOT23**



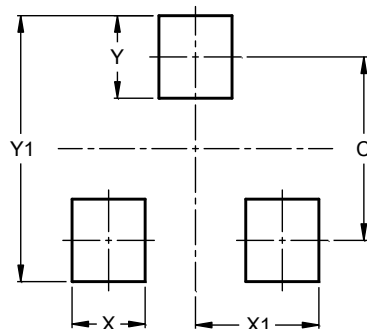
SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--

**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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