

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

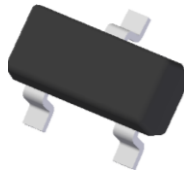
This MOSFET has been designed to meet the stringent requirements of Automotive applications. It is qualified to AECQ101, supported by a PPAP and is ideal for use in:

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

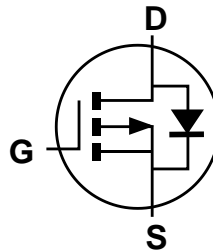
Mechanical Data

- 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)

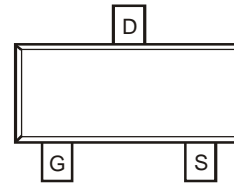
SOT23



Top View



Equivalent Circuit



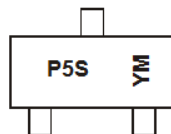
Top View

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 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
 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Units	
Drain-Source Voltage	V_{DSS}	-30	V	
Gate-Source Voltage	V_{GSS}	± 12	V	
Continuous Drain Current (Note 6) $V_{GS} = -4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	-3.5 -2.6	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	-4.1 -3.2	A
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	-1.6	A	
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)	I_{DM}	-20	A	

Thermal Characteristics

Characteristic	Symbol	Value	Units	
Total Power Dissipation (Note 6)	P_D	$T_A = +25^\circ\text{C}$	0.7	W
		$T_A = +70^\circ\text{C}$	0.4	
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	Steady State	184	$^\circ\text{C/W}$
		$t < 10\text{s}$	115	
Total Power Dissipation (Note 7)	P_D	$T_A = +25^\circ\text{C}$	1.3	W
		$T_A = +70^\circ\text{C}$	0.8	
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	Steady State	94	$^\circ\text{C/W}$
		$t < 10\text{s}$	61	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	25	$^\circ\text{C/W}$	
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
OFF CHARACTERISTICS (Note 8)						
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}	—	—	-1	μA	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.6	—	-1.3	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	59	77	m Ω	$V_{GS} = -10\text{V}, I_D = -4.2\text{A}$
		—	73	95		$V_{GS} = -4.5\text{V}, I_D = -4\text{A}$
		—	115	150		$V_{GS} = -2.5\text{V}, I_D = -3\text{A}$
Forward Transconductance	g_{fs}	—	8	—	S	$V_{DS} = -5\text{V}, I_D = -4\text{A}$
Source-Drain Diode Forward Voltage	V_{SD}	—	-0.8	-1.25	V	$V_{GS} = 0\text{V}, I_S = -3.0\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{ISS}	—	432	864	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{OSS}	—	87	174	pF	
Reverse Transfer Capacitance	C_{RSS}	—	62	124	pF	
Gate Resistance	R_G	—	4.04	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
SWITCHING CHARACTERISTICS (Note 9)						
Total Gate Charge	Q_G	—	5.9	11.8	nC	$V_{DS} = -15\text{V}, V_{GS} = -4.5\text{V}, I_D = -4.0\text{A}$
		—	12	24		$V_{DS} = -15\text{V}, V_{GS} = -10\text{V}, I_D = -4.0\text{A}$
Gate-Source Charge	Q_{GS}	—	1.0	2.0	nC	$V_{DS} = -15\text{V}, V_{GS} = -4.5\text{V}, I_D = -4.0\text{A}$
Gate-Drain Charge	Q_{GD}	—	3.1	6.2		
Turn-On Delay Time	$t_{D(ON)}$	—	4.6	9.2	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	—	6.5	13.0		
Turn-Off Delay Time	$t_{D(OFF)}$	—	27.8	55.6		
Fall Time	t_F	—	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

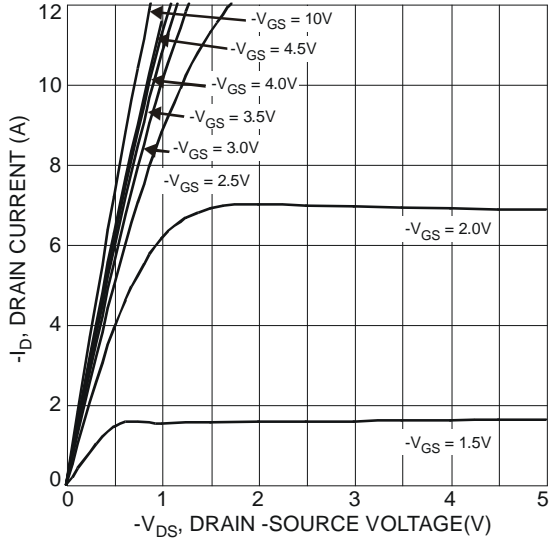


Fig. 1 Typical Output Characteristics

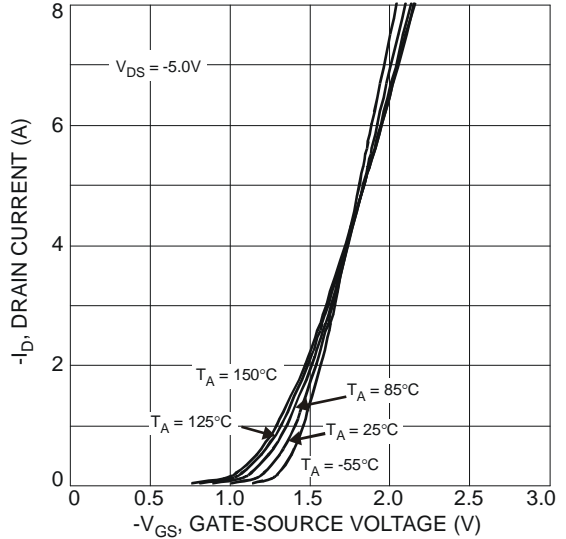


Fig. 2 Typical Transfer Characteristics

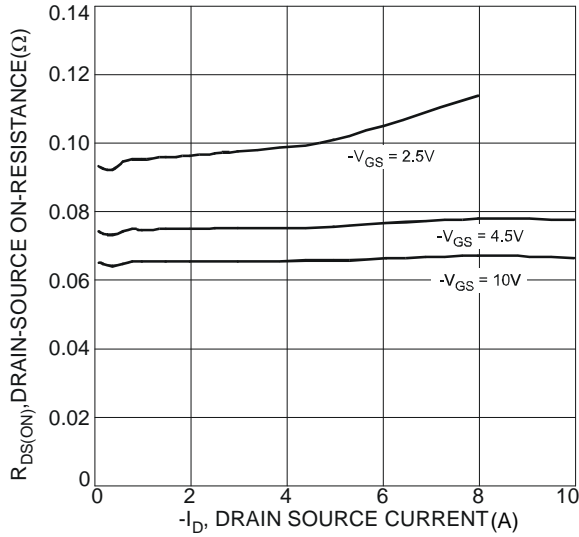


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

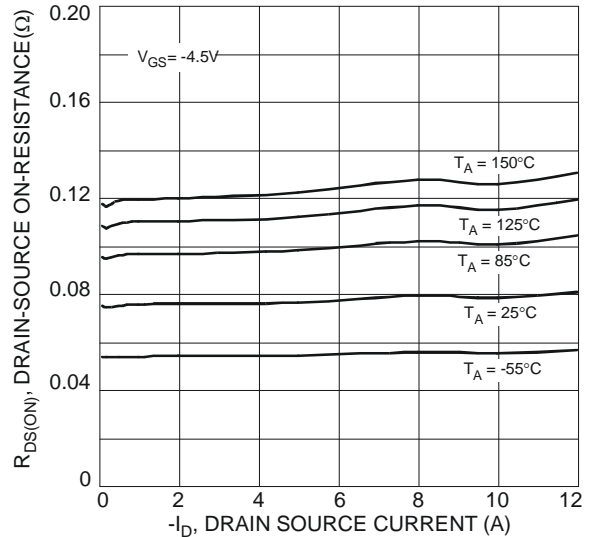


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

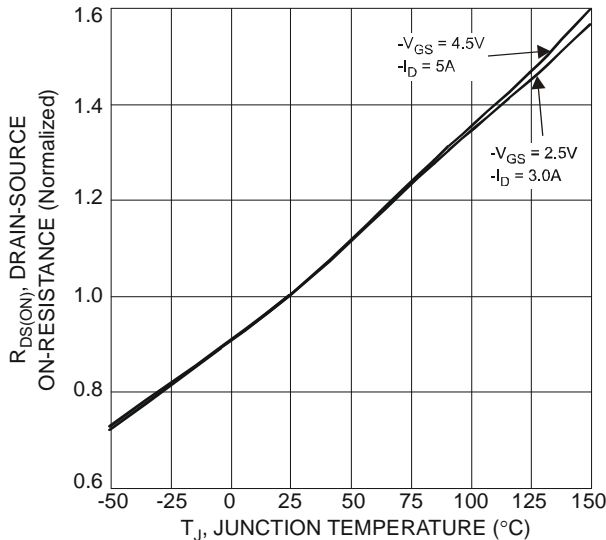


Fig. 5 On-Resistance Variation with Temperature

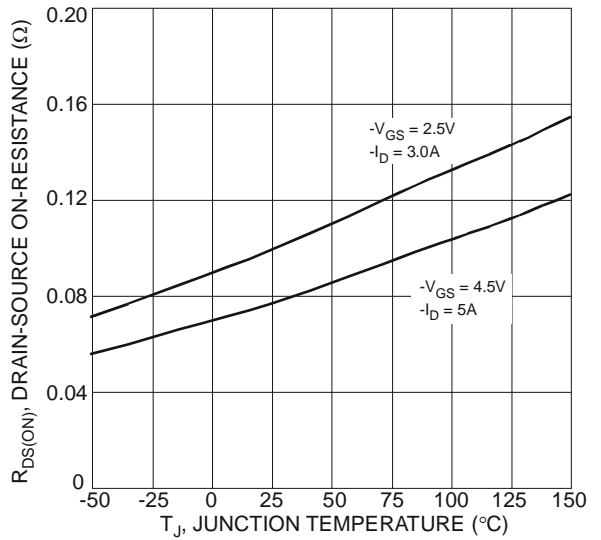


Fig. 6 On-Resistance Variation with Temperature

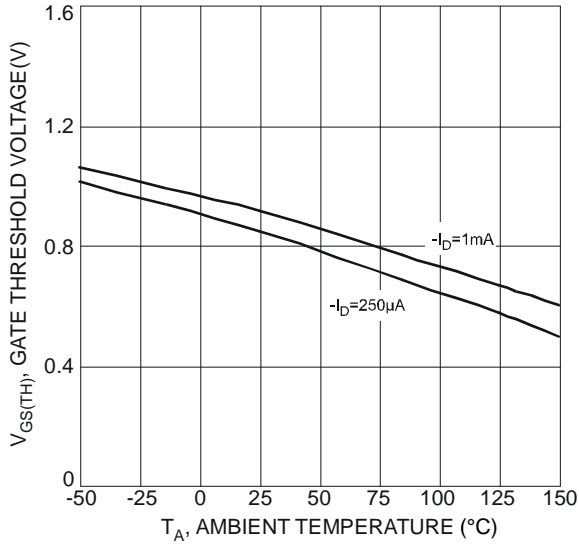


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

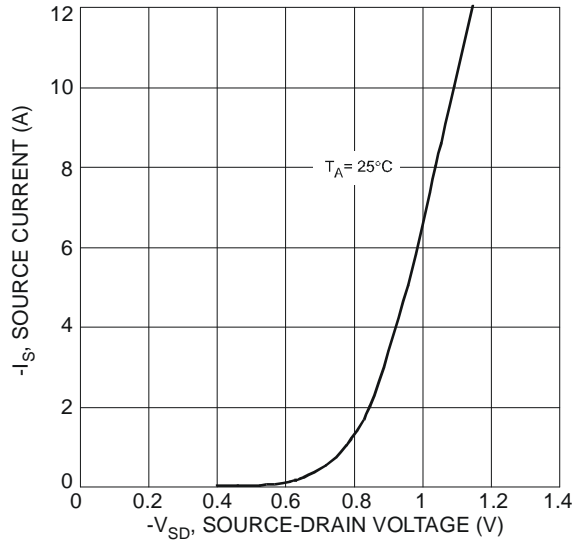


Fig. 8 Diode Forward Voltage vs. Current

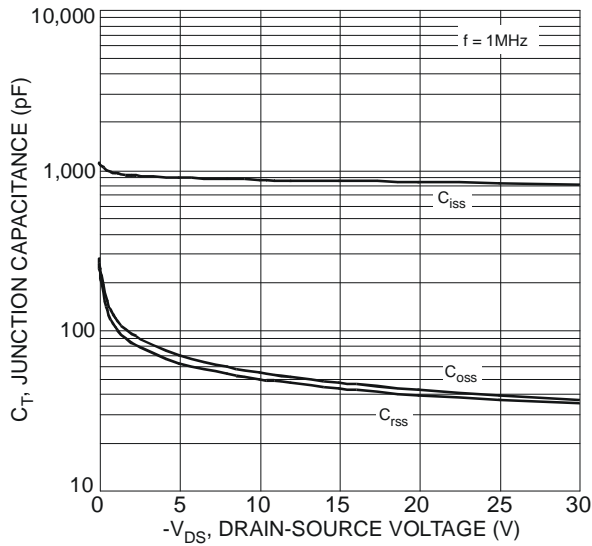


Fig. 9 Typical Junction Capacitance

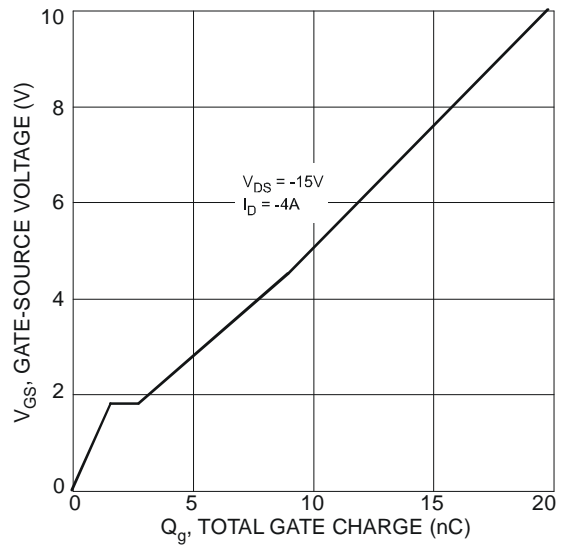


Fig. 10 Gate-Charge Characteristics

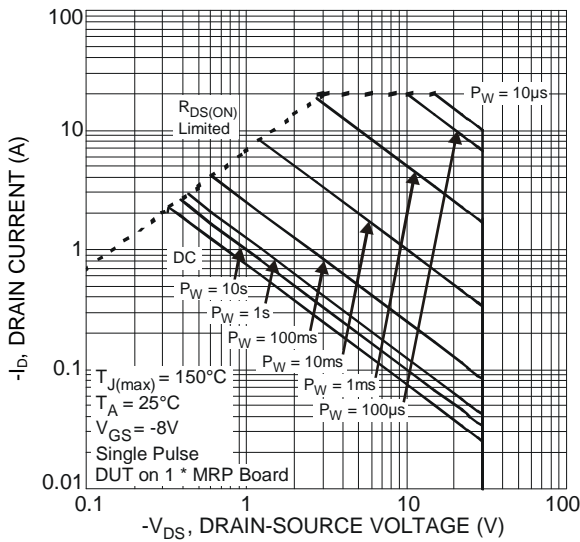
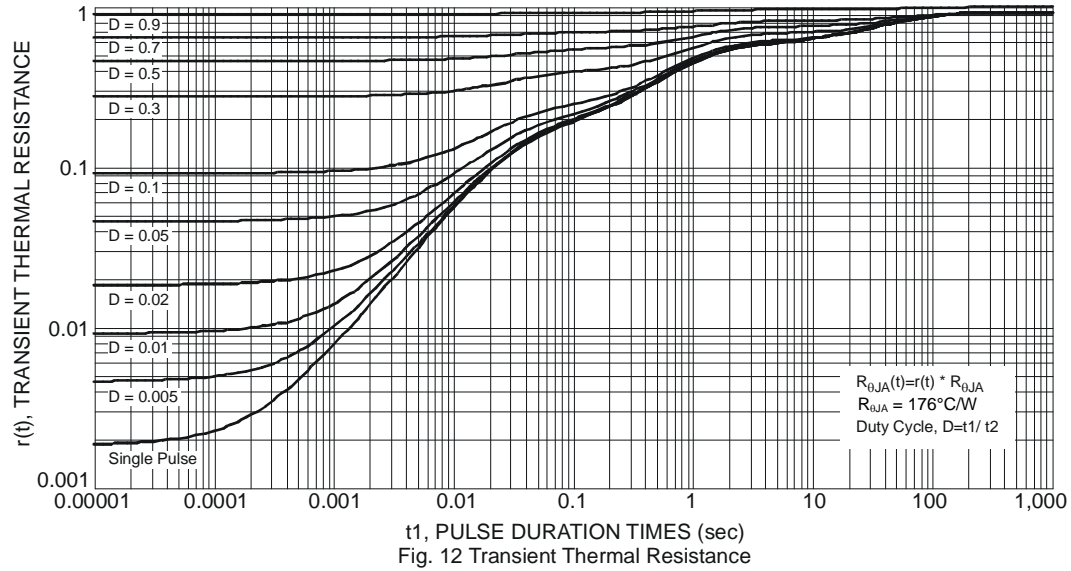


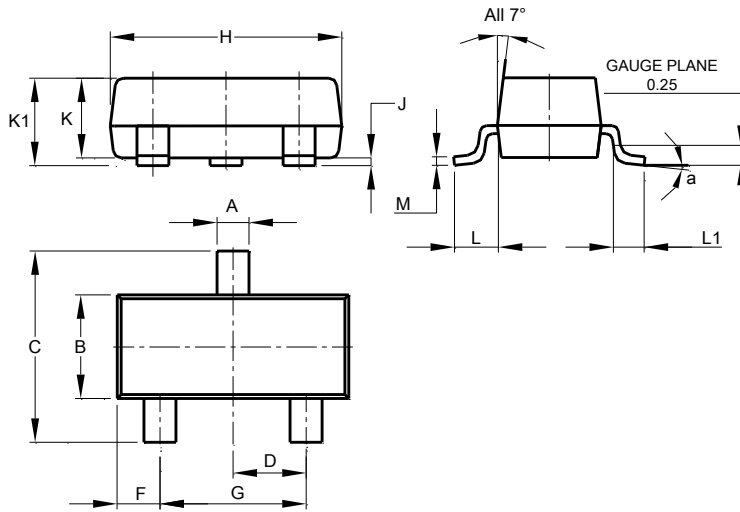
Fig. 11 SOA, Safe Operation Area



Package Outline Dimensions

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

SOT23

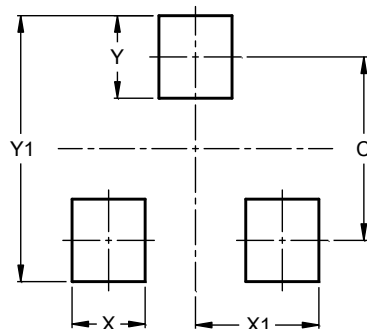


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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