






# THE DATASHEET OF ESD0502TL



**SPECIFICATION SHEET**

<b>SPECIFICATION SHEET NO.</b>	N1004- SOT23502TLS52L
<b>DATE</b>	Oct. 04, 2021
<b>REVISION</b>	A0
<b>DESCRIPTION</b>	<p>SMD Plastic-Encapsulate ESD Protection Diodes, SOT-23 series, 3 pads            ESD0502TL Type, Ultra low Capacitance TVS Diodes  <b>Reverse Working Voltage : 5V, Clamping Voltage 10VC Max.@1.0A</b>            Operating Temp. Range -55°C ~+125°C,            Package in Tape/Reel, 3000pcs/Reel            RoHS/RoHS III compliant</p>
<b>CUSTOMER</b>	
<b>CUSTOMER PART NUMBER</b>	
<b>CROSS REF. PART NUMBER</b>	
<b>ORIGINAL PART NUMBER</b>	MDD ESD0502TL
<b>PART CODE</b>	SOT23502TLS52L

<b>VENDOR APPROVE</b>			
Issued/Checked/Approved			
DATE: Oct. 04, 2021			

<b>CUSTOMER APPROVE</b>	
DATE:	

**SMD ESD PROTECTION DIODES SOT-23 SERIES**

**MAIN FEATURE**



- Peak power dissipation 60W (8/20μs)
- IEC61000-4-2 (ESD) ±15kV (air), ±8kV (contact)
- IEC61000-4-4 (EFT) 40A (5/50ns)
- Cable Discharge Event (CDE)
- Protects Two data Line
- Low clamping voltage
- Low leakage current
- Transient protection for high speed data lines
- Low Capacitance 0.2pF Typical (I/O – I/O)

**APPLICATION**

- Serial ATA
- Desktops, Servers and Notebooks
- PCI Express
- MDDI ports
- USB data line protection
- Display ports
- Digital Visual Interfaces (DVI)

**RFQ**

[Request For Quotation](#)

**PART CODE GUIDE**

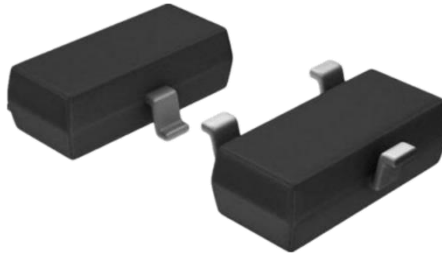
SOT23	502TL	S	52L
1	2	3	4

- 1) **SOT23**: SMD Plastic-Encapsulate ESD Protection Diodes, SOT-23 series, 3 pads
- 2) **502TL**: Type code for original part number ESD0502TL
- 3) **S**: Package code, Package in Tape/Reel, 3000pcs/Reel
- 4) **52L**: Marking code for “52L ” on the case surface, Different Marking for different specification.

**SMD ESD PROTECTION DIODES SOT-23 SERIES**

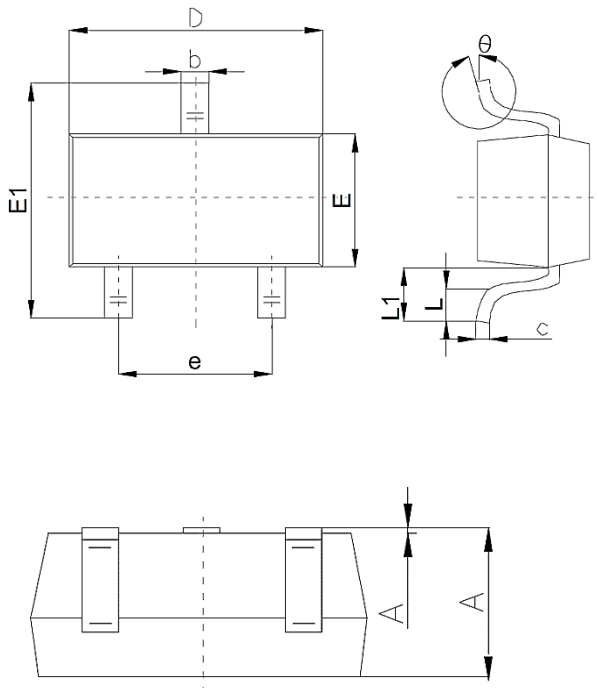
**DIMENSION (Unit: Inch/mm)**

Image for reference



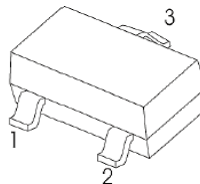
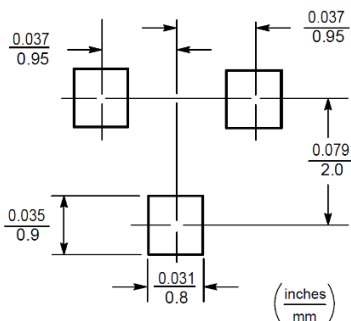
Marking: 52L

SOT-23

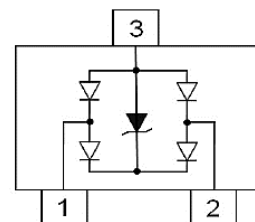


Symbol	Value ( mm )		
	Min.	Typ.	Max.
A	0.89	1.00	1.4
A1	0.01	0.06	0.10
b	0.37	0.44	0.50
c	0.09	0.13	0.20
D	2.80	2.90	3.10
E	1.20	1.30	1.60
E1	2.10	2.40	2.80
e	1.78	1.9	2.04
L	0.10		0.30
L1	0.35	0.54	0.69
θ	0°		10°

**Recommend Pad Layout**



**Circuit Diagram**



**SMD ESD PROTECTION DIODES SOT-23 SERIES**
**MECHANICAL DATA**

Case	Flammability Rating	Terminals	Mounting Position	Weight per piece
JEDEC SOT-323 molded plastic body	UL 94V-0	Matte tin plated	-	-

**ABSOLUTE MAX. RATINGS AT Ta=25 °C (unless otherwise specified)**

Parameter	SYMBOLS	VALUE	UNITS
		LIMIT	
ESD per IEC 61000-4-2 (Air)	V ESD	+/-20	KV
ESD per IEC 61000-4-2 (Contact)	V ESD	+/-20	KV
Peak Pulse Power @8/20µs	P PP	60	W
Operating Temperature Range	T J	-55 ~+ 125	°C
Storage Temperature Range	T STG	-55 ~ +150	°C
Lead Solder Temperature- Max. (10 sec. Duration)	T L	260 /10s	°C

**SMD ESD PROTECTION DIODES SOT-23 SERIES**
**ELECTRICAL CHARACTERISTICS ( Ta=25 °C unless otherwise specified)**

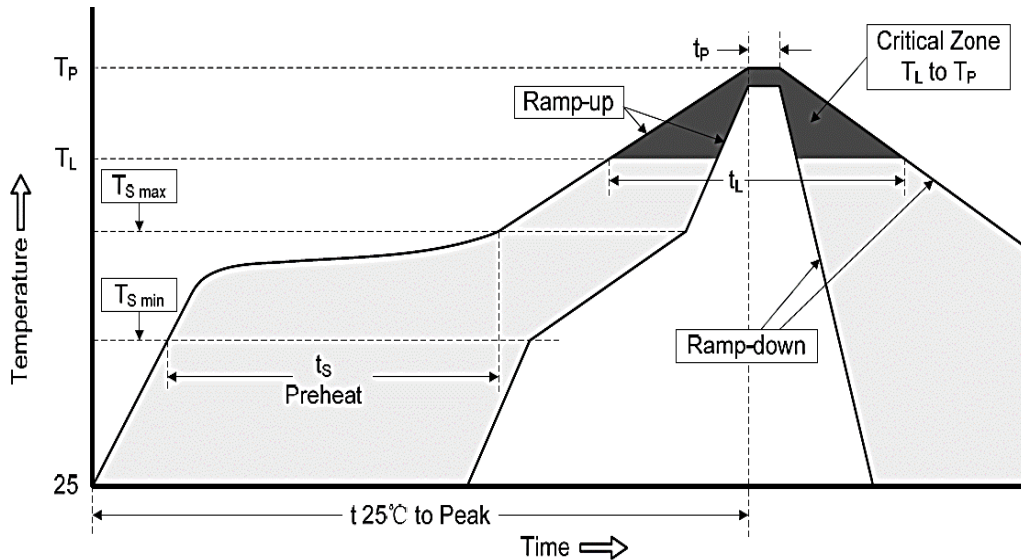
Parameter	SYMBOLS	VALUE			UNITS
		Min.	Typical	Max.	
<b>Reverse Working Voltage @ I/O to GND</b>	V <sub>RWM</sub>			5.0	V
<b>Reverse Breakdown Voltage @ I<sub>T</sub> = 1.0mA Between I/O and GND</b>	V <sub>BR</sub>	6.0			V
<b>Reverse Leakage Current @ V<sub>RWM</sub> = 5V Between I/O and GND</b>	I <sub>R</sub>			100	nA
<b>Clamping Voltage @ I<sub>PP</sub> = 1.0A, t<sub>p</sub> = 8/20μs Between I/O and GND</b>	V <sub>C</sub>			10	V
<b>Clamping Voltage @ I<sub>T</sub> = 4A, t<sub>p</sub> = 8/20μs Between I/O and GND</b>	V <sub>C</sub>			15	V
<b>Forward Voltage @ I<sub>PP</sub> = 10mA, Between I/O and GND</b>	V <sub>F</sub>			1.2	V
<b>Total Capacitance @ V<sub>R</sub> = 0V, f = 1MHz Between I/O and GND</b>	C <sub>T</sub>		0.4		pF
<b>Total Capacitance @ V<sub>R</sub> = 0V, f = 1MHz Between I/O and I/O</b>	C <sub>T</sub>		0.2		pF

**SMD ESD PROTECTION DIODES SOT-23 SERIES**
**RELIABILITY**

Number	Experiment Items	Experiment Method And Conditions	Reference Documents
1	Solder Resistance Test	Test 260°C± 5°C for 10 ± 2 sec. Immerse body into solder 1/16" ± 1/32"	MIL-STD-750D METHOD-2031.2
2	Solderability Test	230°C ±5°C for 5 sec.	MIL-STD-750D METHOD-2026.1 0
3	Pull Test	1 kg in axial lead direction for 10 sec.	MIL-STD-750D METHOD-2036.4
4	Bend Test	0.5Kg Weight Applied To Each Lead, Bending Arcs 90 °C ± 5 °C For 3 Times	MIL-STD-750D METHOD-2036.4
5	High Temperature Reverse Bias Test	TA=100°C for 1000 Hours at VR=80% Rated VR	MIL-STD-750D METHOD-1038.4
6	Forward Operation Life Test	TA=25°C Rated Average Rectified Current	MIL-STD-750D METHOD-1027.3
7	Intermittent Operation Life Test	On state: 5 min with rated IRMS Power Off state: 5 min with Cool Forced Air. On and off for 1000 cycles.	MIL-STD-750D METHOD-1036.3
8	Pressure Cooker Test	15 PSIG, TA=121°C, 4 hours	MIL-S-19500 APPENOIXC
9	Temperature Cycling Test	-55°C~+125°C; 30 Minutes For Dwelled Time 5 minutes for transferred time. Total: 10 cycles.	MIL-STD-750D METHOD-1051.7
10	Thermal Shock Test	0°C for 5 minutes., 100°C for 5minutes, Total: 10 cycles	MIL-STD-750D METHOD-1056.7
11	Forward Surge Test	8.3ms Single Sale Sine-wave One Surge.	MIL-STD-750D METHOD-4066.4
12	Humidity Test	TA=65°C, RH=98% for 1000 hours.	MIL-STD-750D METHOD-1021.3
13	High Temperature Storage life Test	150°C for 1000 Hours	MIL-STD-750D METHOD-1031.5

**SMD ESD PROTECTION DIODES SOT-23 SERIES**

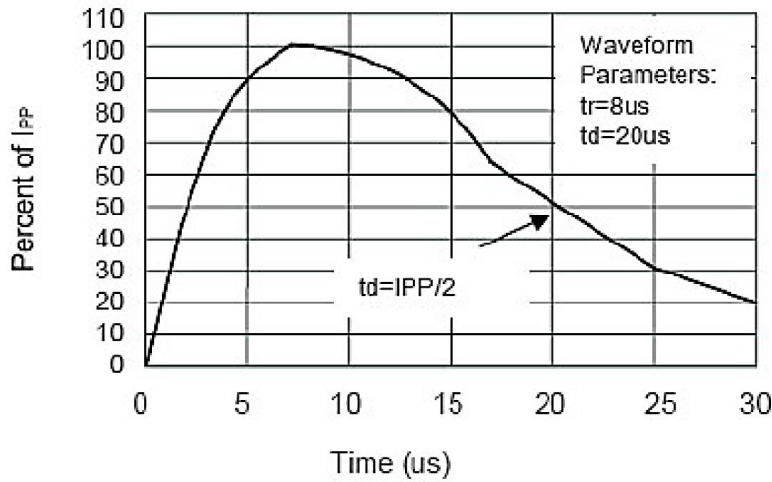
**SUGGESTED REFLOW PROFILE (For Reference Only)**



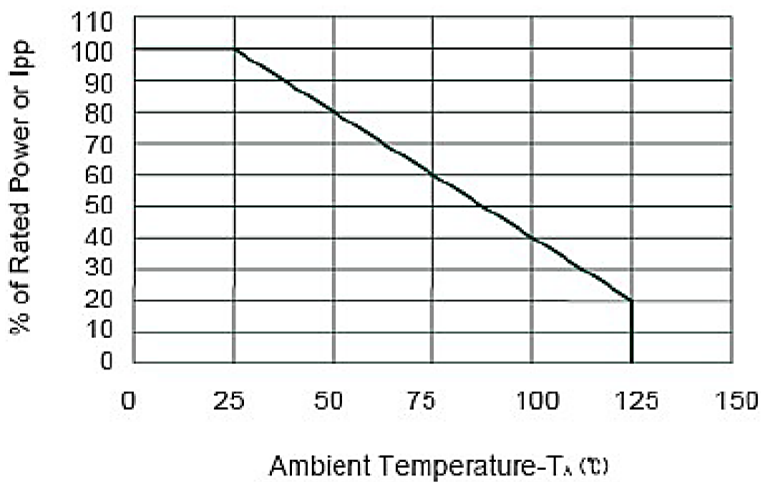
<b>Profile Feature</b>		Pb-Free Assembly
<b>Average Ramp-up Rate (Ts Max to Tp)</b>		3°C/second Max
<b>Preheat</b>	<b>Temperature Min (Ts Min.)</b>	150°C
	<b>Temperature Max (Ts Max.)</b>	200°C
	<b>Time (ts Min. to ts Max.)</b>	60 ~ 180 seconds
<b>Time maintained above</b>	<b>Temperature (Tl)</b>	217°C
	<b>Time (ti)</b>	60 ~ 150 seconds
<b>Peak/Classification Temperature (Tp)</b>		260 °C
<b>Time within 5°C of actual Peak Temperature (tp)</b>		20 ~ 40 seconds
<b>Ramp-down rate</b>		6 °C /Second Max.
<b>Time 25 °C to Peak Temperature</b>		8 minutes Max.
<b>Suggest reflow times</b>		3 Times Max.

**SMD ESD PROTECTION DIODES SOT-23 SERIES**

**RATINGS AND CHARACTERISTIC CURVES (For Reference Only)**



**Pulse Waveform**

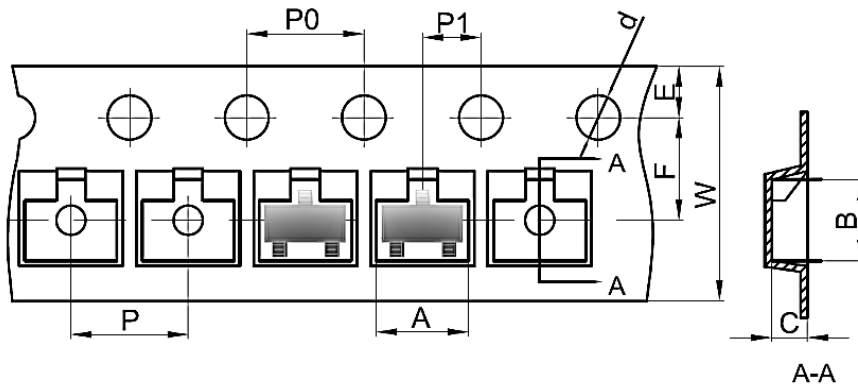


**Power Derating Curve**

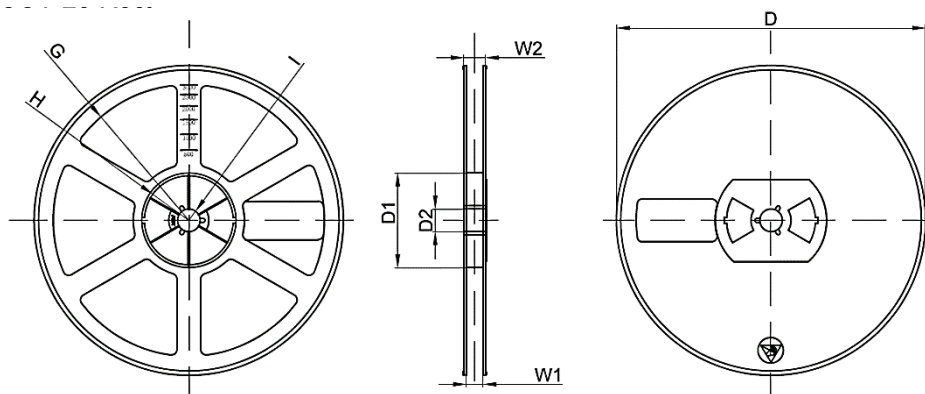
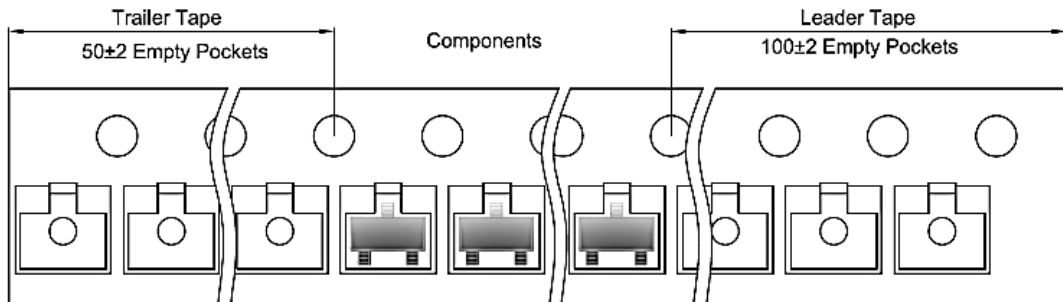
**SMD ESD PROTECTION DIODES SOT-23 SERIES**

**TAPE/REEL (Unit: mm)**

All Devices are packed in accordance with EIA standard RS-481-A and specifications.



Case	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	∅1.5	1.75	3.5	4.0	4.0	2.0	8.0



Reel Size	D	D1	D2	G	H	I	W1	W2
7"	∅178	54.4	13.0	R78.0	R25.6	R6.5	9.5	12.3

**SMD ESD PROTECTION DIODES SOT-23 SERIES**

**SPQ PACKAGE for Reference**

Item	Unit	Value
Case Code		SOT-23
Reel Size	Inch	7
Reel Size	mm	178
Tape Space	mm	/
SPQ /Reel	pcs	3000
Weigh /SPQ	LBS	-
Weigh /SPQ	KGs	-
Qty. Per Box	pcs	6000
Inner Box	Inch	L8.0*W8.0*H1.5

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