muRata

Product Specification for Reference Only

Issued Date: Nov 7 ,2002

Rev. : 1

Part Description: SHOCK SENSOR

MURATA Part No.: PKGS-90LD-R

The product specification in this sheet is for reference only.
The contents of this specification is subject to change.

You are requested to receive the latest specification and to return one copy of the specification to us with your receipt signature before going into mass production.

Product engineering section
Sensor module department
Circuit module products division
Murata MFG. Co.,Ltd.

Approved by	Checked by	Issued by	Issued Date	Drawing No.
Y.Atsuta	M.Ogiura	T.Kojouma	Nov 7, 2002	reference only

SPECIFICATION for TRANSDUCER

Part Number : PKGS-90LD-R

1. Scope

This product specification is applied to surface mountable acceleration sensors used for hard disk drive in a personal computer. Please contact us before using any of the products in the applications not described above.

2. Part Number

2-1 Murata Part Number :PKGS-90LD-R
2-2 Customer Part Number :
2-3 Customer Drawing Number :

3. Outline Drawing and Dimensions

3-1 Dimensions : See Figure 2.
3-2 Construction : A piezo ceramic element is sticked between two ceramic substrate.

4. Characteristics

(* Temperature 25±3°C, unless otherwise noted)

	Parameter	Test Condition		Min.	Typ.	Max.	Units	Note
4-1	Electric Charge Sensitivity	1kHz, 98.1m/s^2(10G) applied in the direction of D axis at Fig.1		-15%	85.7 {0.840}	+15%	fC/(m/s^2) {pC/G}	1,2, 5
4-2	Insulation Resistance	10V DC, after 1 min.		500	10000		MΩ	
4-3	Non-Linearity	% of the Full-Scale output at 490 m/s^2(50G). Range : ±50G			1%	5%		
4-4	Resonance Frequency			17	20		kHz	3
4-5	Inclined Angle of Sensitivity Axis			87	90	93	Degree	
4-6	Electric Charge Sensitivity Temperature Drift	Maximum deviation from initial value at +25°C 100Hz,10G	Ta:70°C	0%	+4%	+10%		
			Ta:0°C	-5%	-2.5%	0%		
4-7	Capacitance	1Vrms,1kHz		-30%	770	+30%	pF	
Ref.	<reference Only> Voltage Sensitivity	1kHz, 98.1m/s^2(10G) applied in the direction of D axis at Fig.1			{1.10}		{mV/G}	1,2,4

Note:

1. As measured with an applied acceleration in the direction of D at figure 1. In this case, positive voltage and electrical charge are generated at electrode B.
2. 1[G] = 9.80665 [m/s^2]
3. Resonance frequency of inner bimorph element.
4. Input impedance of measurement circuit is 10 MΩ(Zi), and amplified gain is 0 dB.
5. f (femto)= 10^{-15}

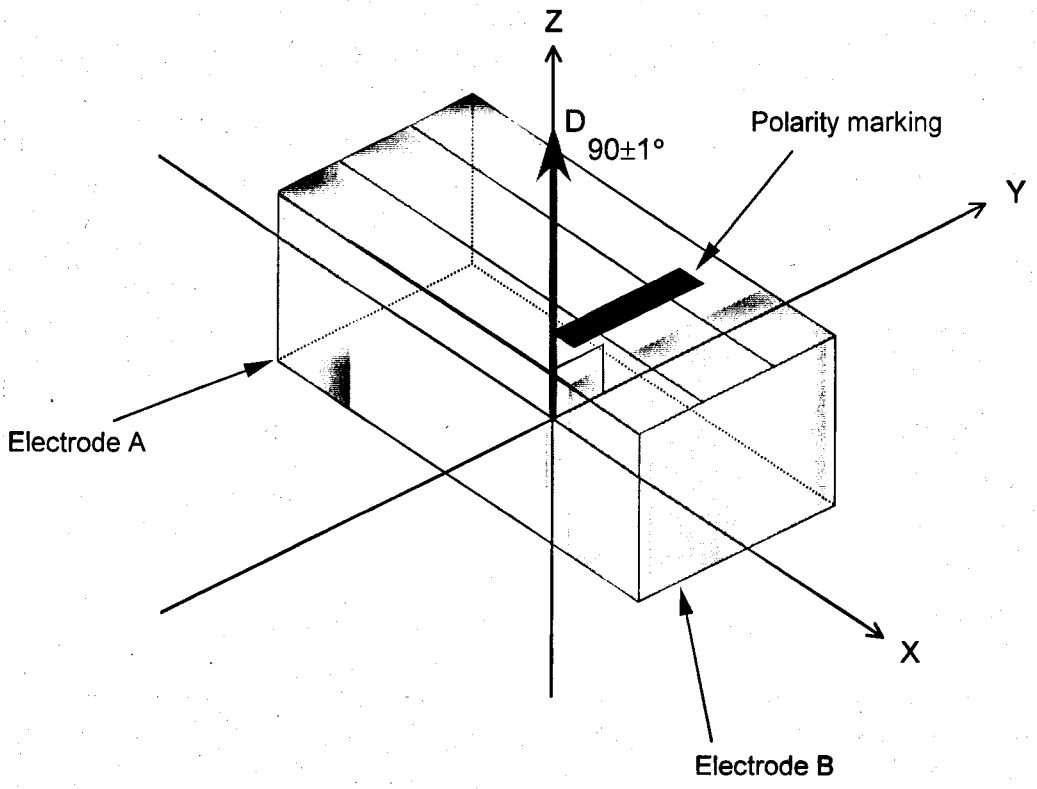


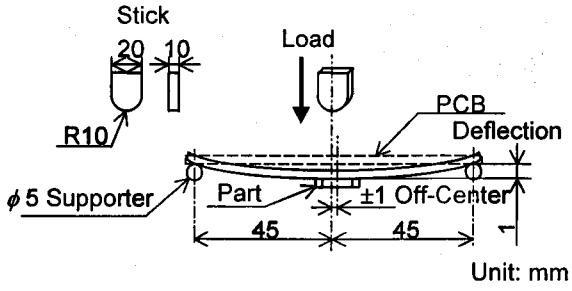
Figure 1.

Axis D : This axis is an acceleration applied direction, when electric charge sensitivity is checked.

5. Absolute Rating

Apply voltage between electrode A and B	: 10 Vp-p within 60 sec. max.
Storage temperature range	: -40 to 85 °C
Operating temperature range	: -40 to 85 °C

6. Physical Characteristics

	Test Item	Condition of Test	Performance Requirements
6-1	Mechanical Shock	The transducer shall be measured after being applied three impacts in plus and minus directions of three mutually perpendicular planes. The shock is specified as 14700m/s^2(1500G) half sine pulse of 0.5 ms duration.	No visible damage and the measured values shall meet Table 1.
6-2	Vibration	The transducer shall be measured after being applied vibration of amplitude of 1.5 mm with 10 to 55 Hz band of vibration frequency to each of 3 perpendicular directions for 2 hours. (5 minutes × 24 cycles)	No visible damage and the measured values shall meet Table 1.
6-3	Bend Strength PCB	The transducer is soldered onto the center of PCB (1.6 mm thickness) which is laid on the 2 small supporters spaced 90 mm. PCB is deflected to 1 mm below from horizontal level by the pressing force with 20 × 10. R10 stick. The force is supplied for 1 second, 5 times repeatably.  	No visible damage and the measured values shall meet Table 1.
6-4	Resistance to Reflow Soldering	The transducer shall be mounted on PCB, then measured after being applied following reflow conditions. <Test flow> Pre-heating : 60 to 150 sec. at 150 to 180 °C Heating : Within 60 sec. at 200 °C (or more) Within 30 sec. at 250 °C (or more) Peak Temperature: Within 10 sec. at 260 °C Shock sensor should be tested 2 times of this test flow. PCB size : 115 × 80 × 0.8 mm After being placed at ambient conditions for 8 hours, the transducer shall be measured.	No visible damage and the measured values shall meet Table 1.
6-5	Solderability	End terminals are immersed in rosin for 5 seconds then immersed in soldering bath of +230±5°C for 3±0.5 seconds.	75% min. end terminals shall be wet with solder.
6-6	Washability	See Table 2.	No visible damage and the measured values shall meet Table 1.

7. Environmental Characteristics

	Test Item	Condition of Test	Performance Requirements
7-1	High Temperature	After being placed in a thermal chamber with at +85±2°C for 1000 hours and then being placed at ambient conditions for 8 hours, the transducer shall be measured.	The measured values shall meet Table 1.
7-2	Low Temperature	After being placed in a thermal chamber with at -40±2°C for 1000 hours and then being placed at ambient conditions for 8 hours, the transducer shall be measured.	The measured values shall meet Table 1.
7-3	Humidity	After being placed in a humidity chamber with 90 to 95% R.H. at +60±2°C for 500 hours and the being placed at ambient conditions for 8 hours, the transducer shall be measured.	The measured values shall meet Table 1.
7-4	Heat Shock	After being kept at room temperature, the transducer shall be placed in a thermal chamber at temperature of -40°C. After 30 minutes at this temperature, the transducer shall be immediately placed in a chamber at temperature of +85°C. After 30 minutes at this temperature, the transducer shall be returned to -40°C again. After 10 of the above cycles, the transducer shall be returned to ambient conditions where it shall remain for 8 hours prior to being measured.	The measured values shall meet Table 1.

Table 1.

Electric Charge Sensitivity	±10% (from initial value)

Table 2. Wash

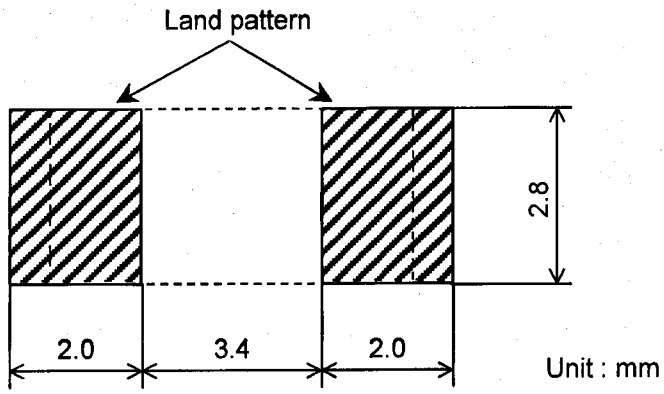
Item \ Cleaning Solvent		Alcohol (Iso-propanol)	Water (Tap water, Demineralized water)	Cleaning Water Solution (Cleanthrough 750H, Pine alpha 100S)	Silicon (Techno care FRW)
Temperature Difference: ΔT *1 [ΔT = Component - Solvent]		ΔT<100°C			
Condition					
(1)	Ultrasonic Wash	1 minute max. in above solvent at 60°C max. (Frequency : 28 kHz, Output : 20 W/L)			
(2)	Immersion Wash	5 minutes max. in above solvent at 60°C max.			
(3)	Shower or Rinse Wash	5 minutes max. in above solvent at 60°C max.			
(4)	Drying	1 to 5 minutes. by air blow at 80°C max.			

*1 ex. In case the component at 90°C immerses into cleaning solvent at 60°C, then ΔT = 30°C.

Note(Wash)

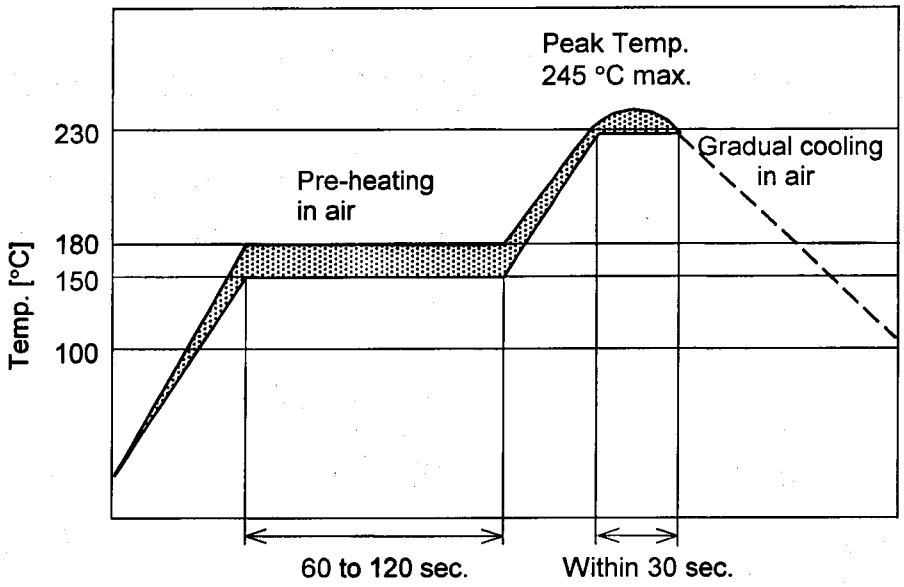
1. Please insure the component is thoroughly evaluated in your application circuit.
2. The component may be damaged if it is washed with alkali cleaning solvent.
3. Flux should be washed out before use.

8. Standard land pattern



9. Soldering Conditions

9-1 Reflow Soldering



9-2 Soldering Iron

Use iron (3mm diameter or less, 45W max.) and iron temp should be 300°C max. within 3 sec. at only one point. Please take care to avoid soldering iron from touching the product directly.

10. Taping Method

10-1 The tape for transducer shall be would clockwise. The feeding holes shall be to the right side as the tape is pulled toward the user.

10-2 A reel shall contain 1,500 pcs of transducers and be clearly marked with part number, quantity, inspection number.

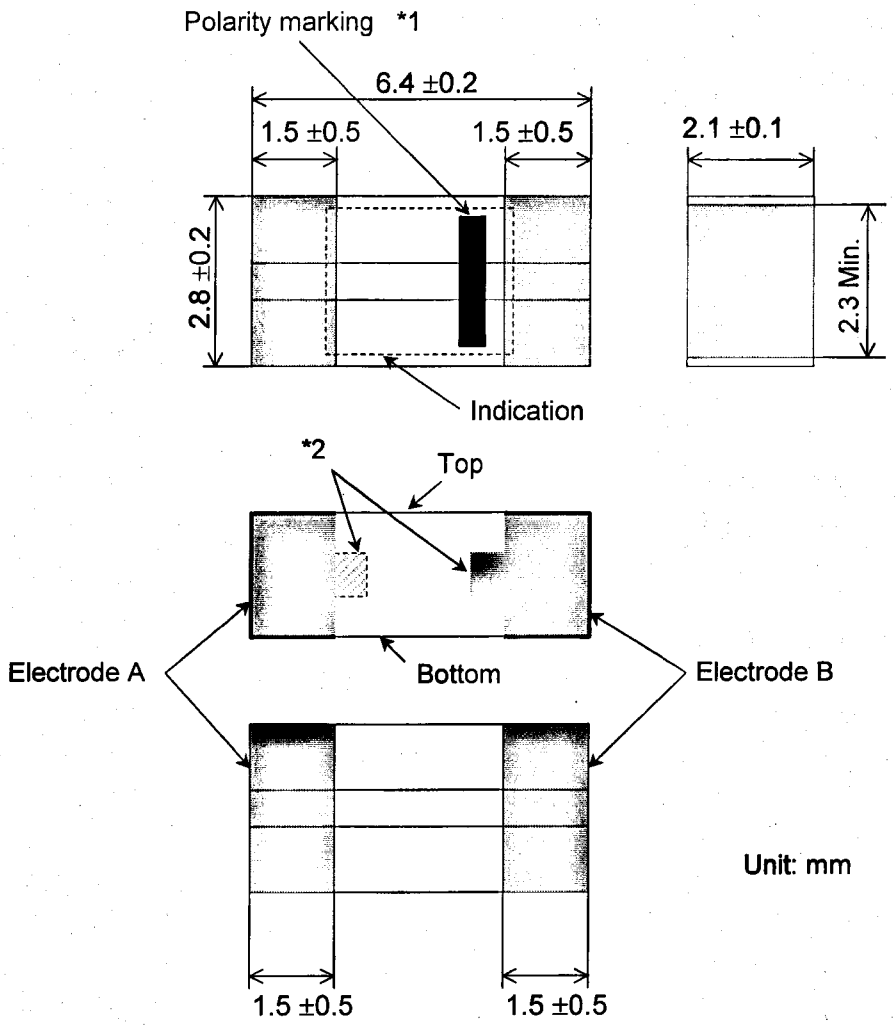


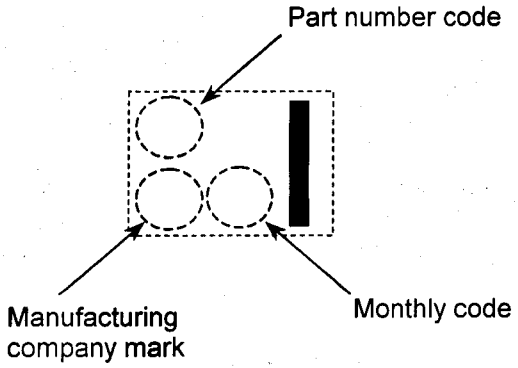
Figure 2. Dimensions

Indication contents

Part number code····· D

Manufacturing company mark····· Ⓜ

Monthly code·····Monthly code based on EIAJ-0901



*1 There is a case that polarity marking overlap electrode B. However electrical characteristics meet the specification.

*2 This mark appear either electrode A or B, however electrical characteristics meet the specification in both case.

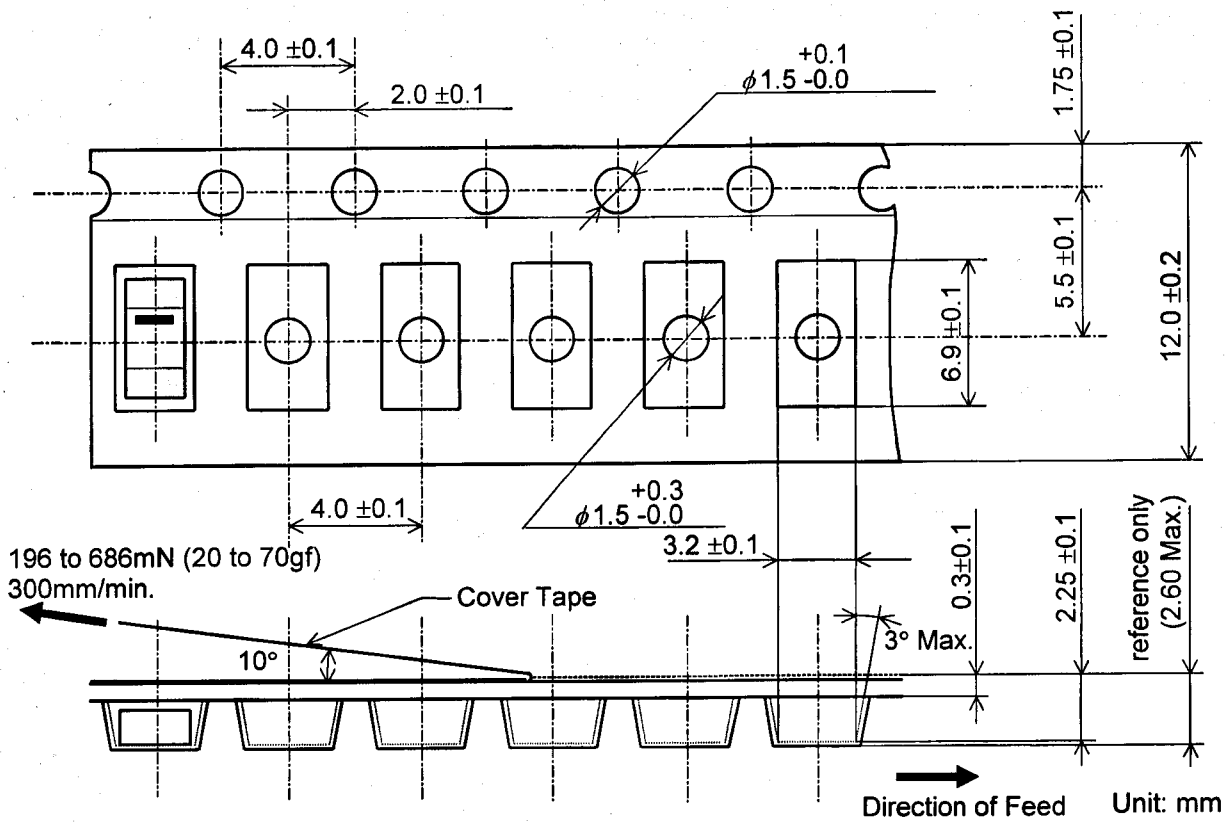


Figure.3 Dimension of Plastic Tape

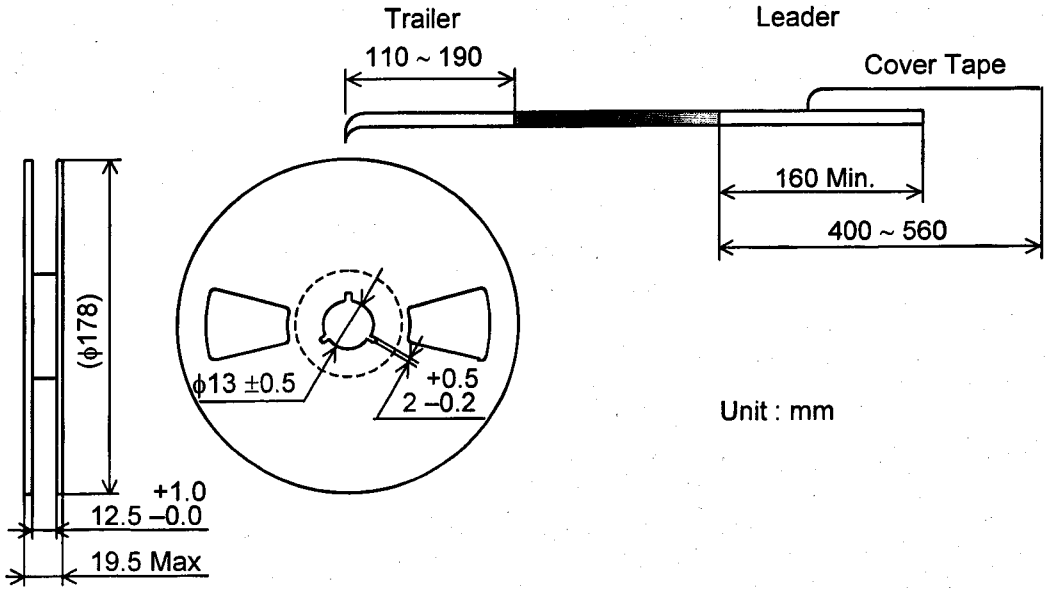


Figure.4 Dimension of Plastic Reel

11. ⚠Caution

11-1 Avoid directly applying a direct voltage to the component.

11-2 Limitation of Applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property.

(1)Aircraft equipment
(2)Aerospace equipment
(3)Undersea equipment
(4)Power plant control equipment
(5)Medical equipment
(6)Transportation equipment (vehicles, trains, ships, etc.)
(7)Traffic signal equipment
(8)Disaster prevention / crime prevention equipment
(9)Data-processing equipment
(10)Applications of similar complexity and/or reliability requirements to the applications listed in the above.

11-3 Fail-safe

Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure of our product.

12. ⚠Note

1) Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
2) All the items and parameters in this product specification have been prescribed on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us. You are requested not to use our product deviating from this product specification.
3) We consider it not appropriate to include any terms and conditions with regard to the business transaction in the product specifications, drawings or other technical documents. Therefore, if your technical documents as above include such terms and conditions such as warranty clause, product liability clause, or intellectual property infringement liability clause, they will be deemed to be invalid.