

**Preliminary**

Messrs. \_\_\_\_\_

## Shock Sensor Specification

Part No. : PMLE480W-R

RoHS Compliant

Halogen-Free Compliant

16.Dec. 2010

Approved by \_\_\_\_\_ Kazuki Shimizu \_\_\_\_\_

Checked by \_\_\_\_\_ Yasuhiro Nakai \_\_\_\_\_

Issued by \_\_\_\_\_ Akira Oikawa \_\_\_\_\_

**KYOCERA CORPORATION**



**1.Scope**

This specification shall cover the characteristics of the shock sensor.

**Preliminary**

**2.Kyocera's Type Name**

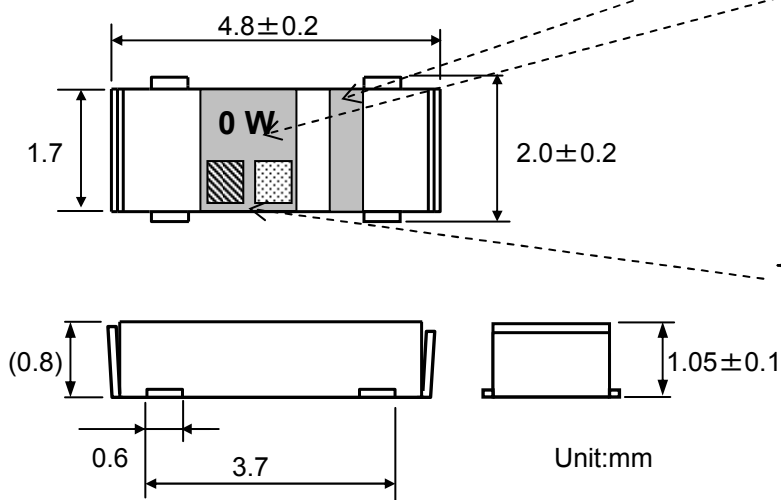
**PMLE480W-R**

**3.Customer's Type Name****4.Electrical Characteristics**

Items	Specifications
4-1 Primary Axis Inclined Angle	$0 \pm 3$ degree
4-2 Capacitance	$890\text{pF} \pm 30\%$ , at $1\text{V}_{\text{rms}}$ , $1\text{kHz}$
4-3 Charge Sensitivity	$0.608 \text{ pC/G} \pm 15\%$ under vibration at $200\text{Hz}$ , $2\text{G}$
4-4 Insulation Resistance	$0.5\text{Gohm}$ minimum, at $10\text{VDC}$ after $1\text{min.}$
4-5 Resonant Frequency	$19.5 \pm 3.5\text{kHz}$
4-6 Non-linearity	$5\%$ maximum, under vibration at $25\text{G}$
4-7 Charge Sensitivity Temperature Drift	$T_a : 70^\circ\text{C} \quad 7.7 \pm 3.0\%$ $T_a : 0^\circ\text{C} \quad -4.2 \pm 2.0\%$ under vibration at $200\text{Hz}$ , $2\text{G}$

<Measurement Condition>

The reference temperature shall be  $25^\circ\text{C} \pm 5^\circ\text{C}$ .

**5.Dimensions and Marking**

**Fig.1**

**Marking of Polarity****Characteristic Spec**

0: Initial of Primary Axis Inclined Angle.

W: Specification

Manufacturing Day Code :

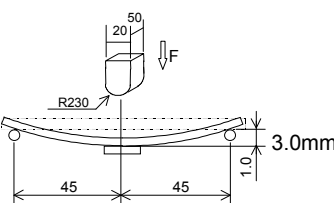
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Code	A	B	C	D	E	F	G	H	J	K	
Day	11	12	13	14	15	16	17	18	19	20	
Code	L	M	N	P	Q	R	S	T	U	V	
Day	21	22	23	24	25	26	27	28	29	30	31
Code	W	X	Y	Z	a	b	c	d	e	f	g

Manufacturing Month Code :

2010 Jan. ~ Dec. : N ~ Z except "O"  
2011 Jan. ~ Dec. : a ~ m except "i"  
2012 Jan. ~ Dec. : n ~ z except "o"  
2013 Jan. ~ Dec. : A ~ M except "I"

Note: These alphabets should be repeated after Jan.2014.

**6.Environmental Characteristics****Preliminary**

Items	Conditions
6-1.High Temperature Storage Test	Keep in a chamber at $85 \pm 2^{\circ}\text{C}$ for 1000 +12/-0 hours, and then keep at room temperature for 1 hour. The characteristics of shock sensor shall meet the specifications.
6-2.Low Temperature Storage Test	Keep in a chamber at $-40 \pm 2^{\circ}\text{C}$ for 1000 +12/-0 hours, and then keep at room temperature for 1 hour. The characteristics of shock sensor shall meet the specifications.
6-3.Moisture Resistance Test	Keep in a chamber at 90 to 95 % R.H. and $60 \pm 2^{\circ}\text{C}$ for 500 +12/-0 hours, and then keep at room temperature for 1 hour. The characteristics of shock sensor shall meet the specifications.
6-4.Temperature Cycling Test	Apply 100 thermal cycles with the following temperatures: <ul style="list-style-type: none"> <li>- upper temperature <math>85^{\circ}\text{C}</math> for 20 minutes and transfer time 10 minutes</li> <li>- lower temperature <math>-40^{\circ}\text{C}</math> for 20 minutes and transfer time 10 minutes</li> <li>- total cycle time is 1hour</li> </ul> and then left at room temperature for 1 hour. The characteristics of shock sensor shall meet the specifications.
6-5.Mechanical Shock Test	After applying the acceleration at $29430\text{m}/\text{sec}^2$ {3000G} in each of X, Y and Z axis (each 3 times). The characteristics of shock sensor shall meet the specifications.
6-6.Solderability Test	At first, being soaked in the Methanol solution containing Rosin for 5 seconds and then being dipped in a bath of Pb/Sn solder at $250 \pm 5^{\circ}\text{C}$ for $4 \pm 0.5$ seconds. The surface of the electrode terminal shall be soldered more than 95%.
6-7.Resistance to Soldering Heat Test	Pre-heat temperature is 150 to $180^{\circ}\text{C}$ for 1 minute. High temperature is $250 \pm 5^{\circ}\text{C}$ , over $200^{\circ}\text{C}$ for 20 seconds max.(2times). Then keep at room temperature for 1 hour. The characteristics of shock sensor shall meet the specifications.
6-8.Board Flex Test	After soldered on the circuit board specified as below, then the load which cause 3 mm bend to the board is applied. The characteristics of shock sensor shall meet the specifications. The shock sensor cause no defect in the appearance. (Circuit Board: FR4, 100 x 40 x 1.6 ) 

**<Measurement Condition>**The reference temperature shall be  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ .

## 7. Recommended Land pattern

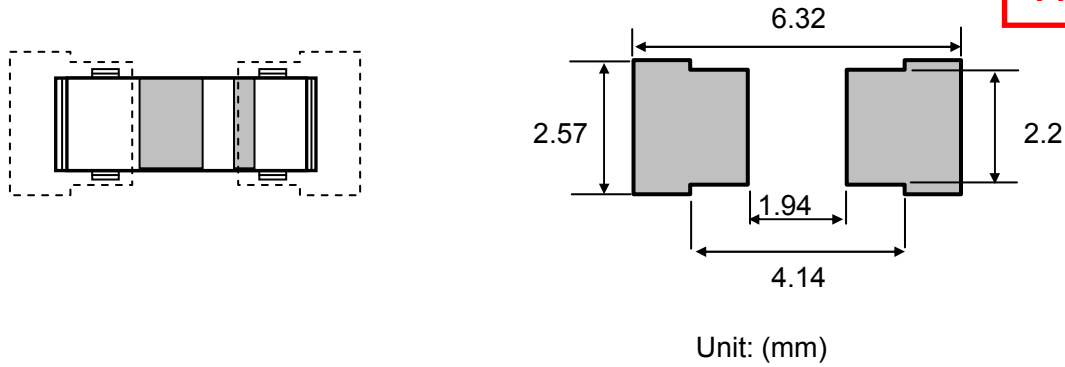


Fig.2 Recommended Land pattern

## 8. Recommended Convection Reflow profile

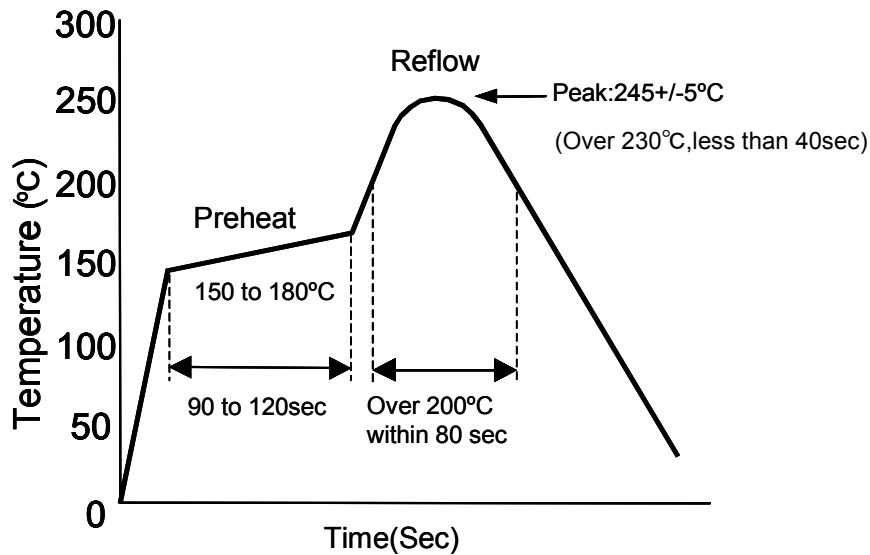
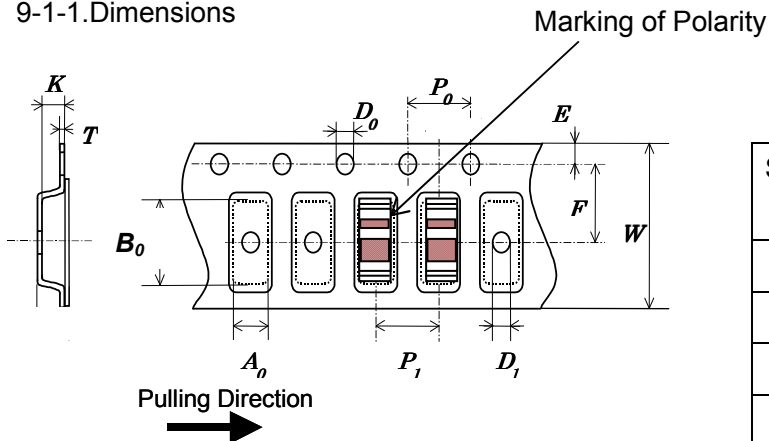


Fig.3 Recommended Convection Reflow profile

## 9. Taping Specifications

### 9-1. Carrier Tape

#### 9-1-1. Dimensions



Unit: (mm)

Sym bol	Dimensions	Sym bol	Dimensions
$A_0$	$2.25 \pm 0.1$	$P_0$	$4.0 \pm 0.1$
$B_0$	$4.4 \pm 0.1$	$P_1$	$4.0 \pm 0.1$
$W$	$12.0 +0.3/-0.1$	$D_0$	$1.5 +0.1/-0$
$E$	$1.75 \pm 0.1$	$K$	$1.25 \pm 0.1$
$F$	$5.5 \pm 0.05$	$T$	$0.3 \pm 0.05$

Fig.4 Emboss Carrier Tape Dimensions

## 9-2. Taping

**Preliminary**

## 9-2-1. Taping Quantity

One reel of the carrier tape shall pack 3500 pcs. Shock sensor shall be contained in pocket continuously.

## 9-2-2. Dimensions

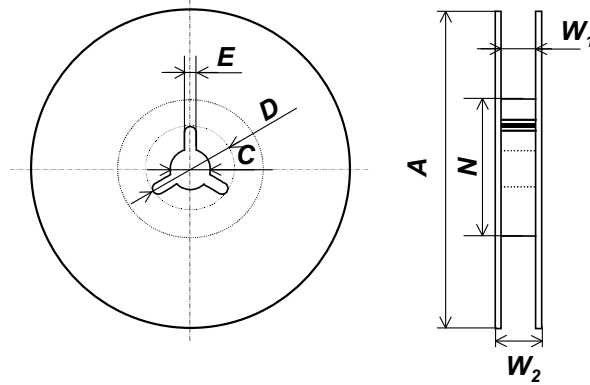


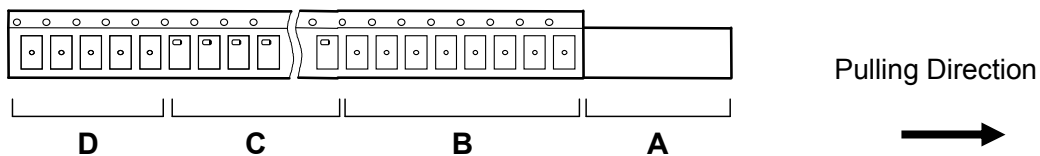
Fig.5 Reel

Unit: (mm)

Symbol	<b>A</b>	<b>N</b>	<b>W<sub>1</sub></b>	<b>W<sub>2</sub></b>
Dimensions	180±5.0	60min.	12.5 +2.0/-0.0	20.5 max.
Symbol	<b>C</b>	<b>D</b>	<b>E</b>	
Dimensions	13.0±0.2	21.0±0.8	2.0±0.5	

## 9-2-3. Leader and Blank Pocket

Package shall consist of leader, blank pocket and loaded pocket as follows. (fig.6)



A) Leader

B) Blank Pocket (160mm Min.)

A+B: 400mm to 560mm

C) Load Pocket

D) Blank Pocket (40 to 190mm )

Fig.6 Packing Method

Peeling load of top tape shall be 0.1N {10gf} to 0.7N {70gf} from Carrier Tape.

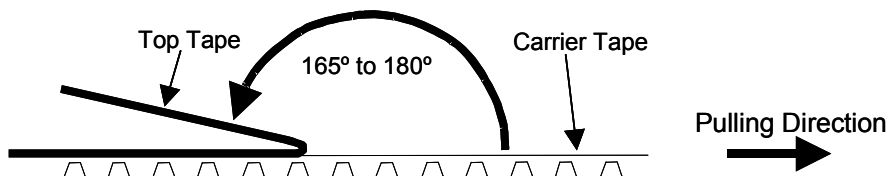


Fig.7 Peeling Strength

**9-2-4. Reel label**

A reel label shall be contained as below: (Based on EIAJ C-3 format)

**Preliminary**

- A) Customer P/N
- B) Lot No.
- C) Quantity
- D) Shipping date
- E) Vender Name

**9-2-5. Exterior Package label**

Shock sensor shall be packed properly to avoid defect in transportation and the marking of exterior package shall be contained as below:

- A) Name of Customer
- B) P/O No.
- C) Customer P/N
- D) Lot No.
- E) Quantity
- F) Shipping Date
- G) Vender Name

**10. The agreement of this specifications**

Should any part of the content of this specification become questionable, it shall be settled by mutual deliberations.

**11. Remarks on Usage**

- A) This part can use only reflow soldering.
- B) Not washable
- C) Maximum temperature is 280 degree.

**12. RoHS Compliant**

- A) Sensor Case: LCP(liquid crystal polymer)
- B) Terminal: Bronze with phosphate (thickness 100 um)  
Plating: Cu(1-2um), Ag(1-3 um)
- C) Element: Piezo Ceramic, contains lead-oxide, however, piezo-electronic devices are exempted from RoHS compliant requirement of article 4(1).  
(Refer to Annex, Section 7)

**All materials meet to RoHS Compliant.**

**13. Halogen-Free Compliant**

- A) Bromine (Br) < 900ppm (0.09%)
- B) Chlorine (Cl) < 900ppm (0.09%)
- C) Total concentration of Chlorine (Cl) + Bromine (Br) < 1500ppm (0.15%)
- D) Antimony Trioxide (Sb<sub>2</sub>O<sub>3</sub>) < 1000ppm (0.1%)
- E) Red Phosphorus < 1000ppm (0.1%)

**All materials meet to Halogen-Free Compliant.**