SPECIFICATION

Coin type POLYACENE CAPACITOR

PAS414HR-series

TAIYO YUDEN CO.,LTD.

2010.July

1. SCOPE

This document applies to Polyacene Capacitors PAS414HR series submitted by TAIYO YUDEN CO.,LTD.

2. DESIGNATION

The capacitor defined in this document is:
POLYACENE CAPACITOR PAS414HR series
Product Number:

1. PAS414HR-VA5R
2. PAS414HR-VE5R
3. PAS414HR-VG1

3. NOMINAL CHARACTERISTICS

	Characteristics		Nominal Value
1	Usable Temperature Range (ºC)		-20~+60
2	Usable Voltage(V)		3.3
3	Capacity	(μAh)	22
	Capacitance	(F)	0.07
4	Internal Resistance(Ω)		80
5	Dimensions (Bulk Cell)	Diameter(mm)	4.7
		Height(mm)	1.3
6	Weight (Bulk Cell)(g)		0.06
7	Recommended Storage conditions	Temperature (ºC)	+10~+30
		Humidity(%RH)	60 or less

4. SPECIFICATIONS

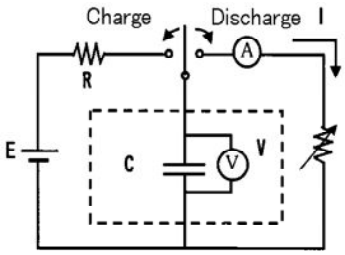
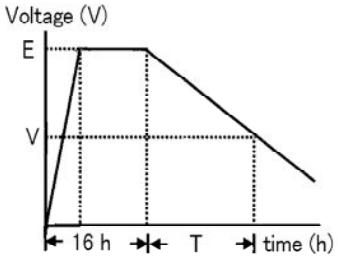
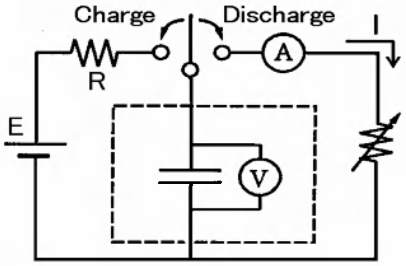
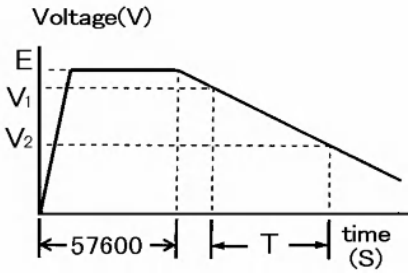
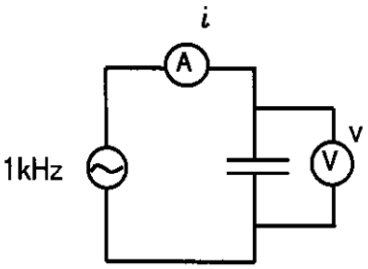
	Items		Specifications	Test Conditions
1	Usable Temperature Range (ºC)		-20~+60	
2	Usable Voltage(V)		3.3	Within the range of usable temperature
3	Initial Capacity (μAh)		Over 10	Test method “5-A”
	Initial Capacitance (F)		0.07±0.04	Test method “5-a”
4	Initial Internal Resistance(Ω)		Under 250	Test method “5-B”
5	Maximum Discharging Current(μA)		20	
6	Resistance to Reflow Soldering Heat	Capacity	Within initial spec.	Conduct reflow soldering under Test Condition “6-A”, and return to normal temperature and humidity. * conduct the reflow in the condition of the voltage of 0.3V or lower.
		Internal Resistance	Within initial spec.	
7	Temperature Characteristics -20ºC	Capacity	Over 50% of initial spec.	
	Temperature Characteristics 60ºC	Capacity	Over 90% of initial spec.	
8	Floating Charge Characteristics	Capacity	Over 70% of initial spec.	Temperature:60±2ºC Apply a voltage of 3.3V to the capacitor for 500 hours, and measure the floating charge characteristics after returning to normal temperature and humidity.
9	Charge/Discharge Cycle characteristics	Capacity	Over 50% of initial spec.	Temperature:25±5ºC Charge/Discharge Cycle:10,000 times Charge: Apply a constant Voltage of 3.3V through resistance 3kΩ for 24min. Discharge: constant resistance of 3KΩ for 6min.
10	Humidity Durability	Capacity	Over 80% of initial spec.	Temperature:40±2ºC, Humidity:90~95%RH Leave the capacitor for 96 hours, and return to normal temperature and humidity.
11	Thermal Durability	Capacity	Over 80% of initial spec.	Leave the capacitor in an atmosphere of +85±2ºC and –30±2ºC consecutively for 96 hours each, and return to normal temperature and humidity.
12	Vibration Resistance		No exterior abnormality observed; initial spec values retained.	Apply a sine wave vibration of 1.5mm amplitude and frequency 10~55Hz, for 2 hours per each direction (X, Y and Z), total 6 hours.
13	Appearance	Initial	No leakage or deformation; soiling; rust; burr in appearance, which is harmful for performance.	Naked eye Boundary samples are prepared as needed.
		After Test	No significant leakage or noticeable abnormality in appearance, which is harmful for performance.	Naked eye Item：6,8,9,10,11 Boundary samples are prepared as needed.
14	Terminal Strength		No coming off from the cell..	Apply 4.9N of tensile strength to the terminal in the direction of pull-out axis.
15	Outer Dimensions		See in drawings.	-

Note:

1.Unless otherwise stated, all tests are conducted under normal temperature (25 ±5ºC) and normal humidity (60±20%RH) conditions.

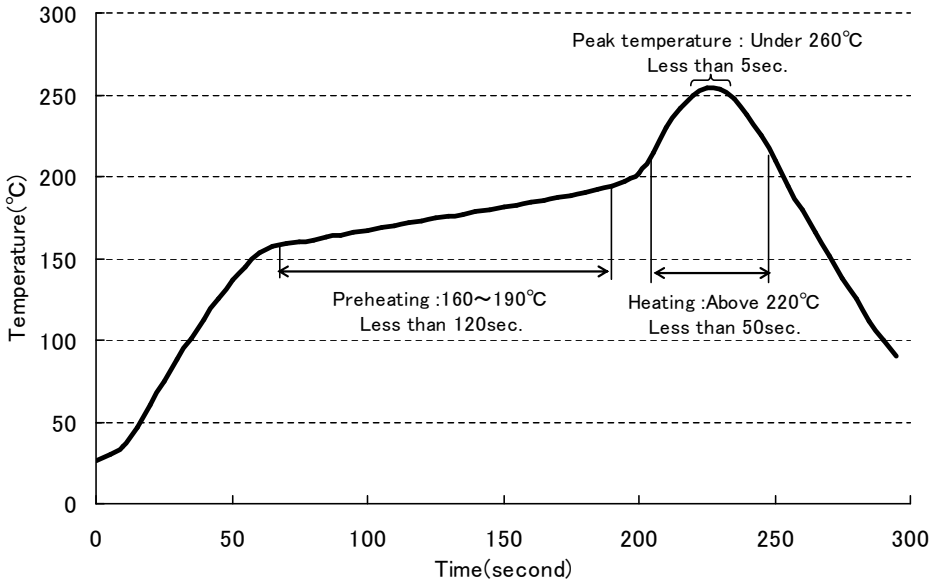
2. The following measuring instruments are used.
DC Voltmeter: JIS (C1102) Class 0.5 or higher, with an impedance of 10MΩ or more.

5. TEST METHOD

		Test Conditions
"A"	Capacity	  E = 3.3V R = 100 Ω I =10 μA V =2.0 V Capacity (μAh) = I (μA) X T (h)
"a"	Capacitance	  E = 3.3V R = 100 Ω I = 10 μA V1 =3.0 V V2 =2.0 V $\text{Capacitance (F)} = \frac{\text{I(A)} \times \text{T(S)}}{\text{V1} - \text{V2}}$
"B"	Internal Resistance	 $i = \sim 1\text{mA(AC)}$ AC internal resistance 0V $\text{Ri} = \frac{v}{i}$ (Ω)

6. REFLOW SOLDERING TEST CONDITION

"A"



* conduct the reflow in the condition of the voltage of 0.3V or lower.
Conducting the above profile two times.

7. SHIPPING INSPECTION

Item	Specification	Test Method	Acceptance Standard
Capacity	Over 10 μAh	Test Method "5-A"	n = 20, k = 2.44 Complies with JIS Z 9003
Internal Resistance	Under 250Ω	Test Method "5-B"	n = 20, k = 2.44 Complies with JIS Z 9003

8. INSCRIPTION

The following inscriptions are imprinted on the cell.

1: Model Code……4 4 H

2: Plus Sign……+

The lot number is imprinted on the cell surface.

[Example]

01☐……Manufactured in 201 0 ,January(1)

12☐……Manufactured in 201 1 , February(2)

20☐……Manufactured in 201 2 , October(10)

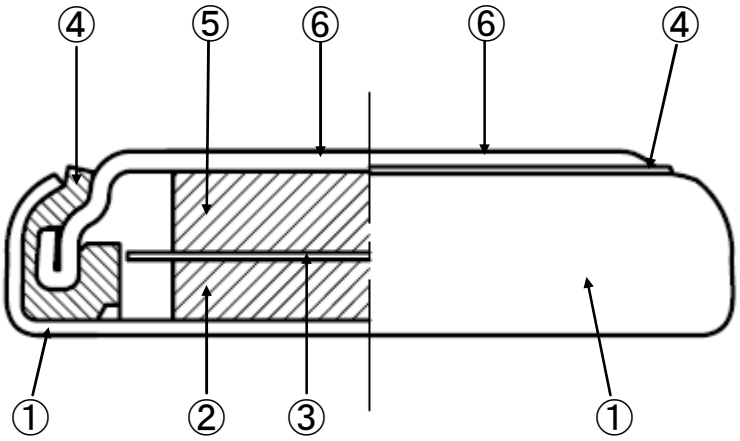
3Y☐……Manufactured in 201 3 , November(Y)

4Z☐……Manufactured in 201 4 , December(Z)

*☐: sub-lot in alphabetical order. (A, B, C…… Z)

and followed by sub-lot in numerical order (1, 2, 3…… 9)

9. Cell COMPONENT



No.	Parts Name	Material	Remark
①	Positive Can	SUS316L	Ni coated outer surface
②	Positive Electrode	PAS and others	
③	Separator	Glass fiber and others	
④	Gasket	Engineering plastics	
⑤	Negative Electrode	PAS and others	
⑥	Negative Top	SUS304	Ni coated outer surface
−	Electrolyte	Organic electrolyte	impregnated electrode and separator

10. PACKING

Packing is entrusted to the manufacturer as long as quality is unimpaired.

11. RoHS compliance

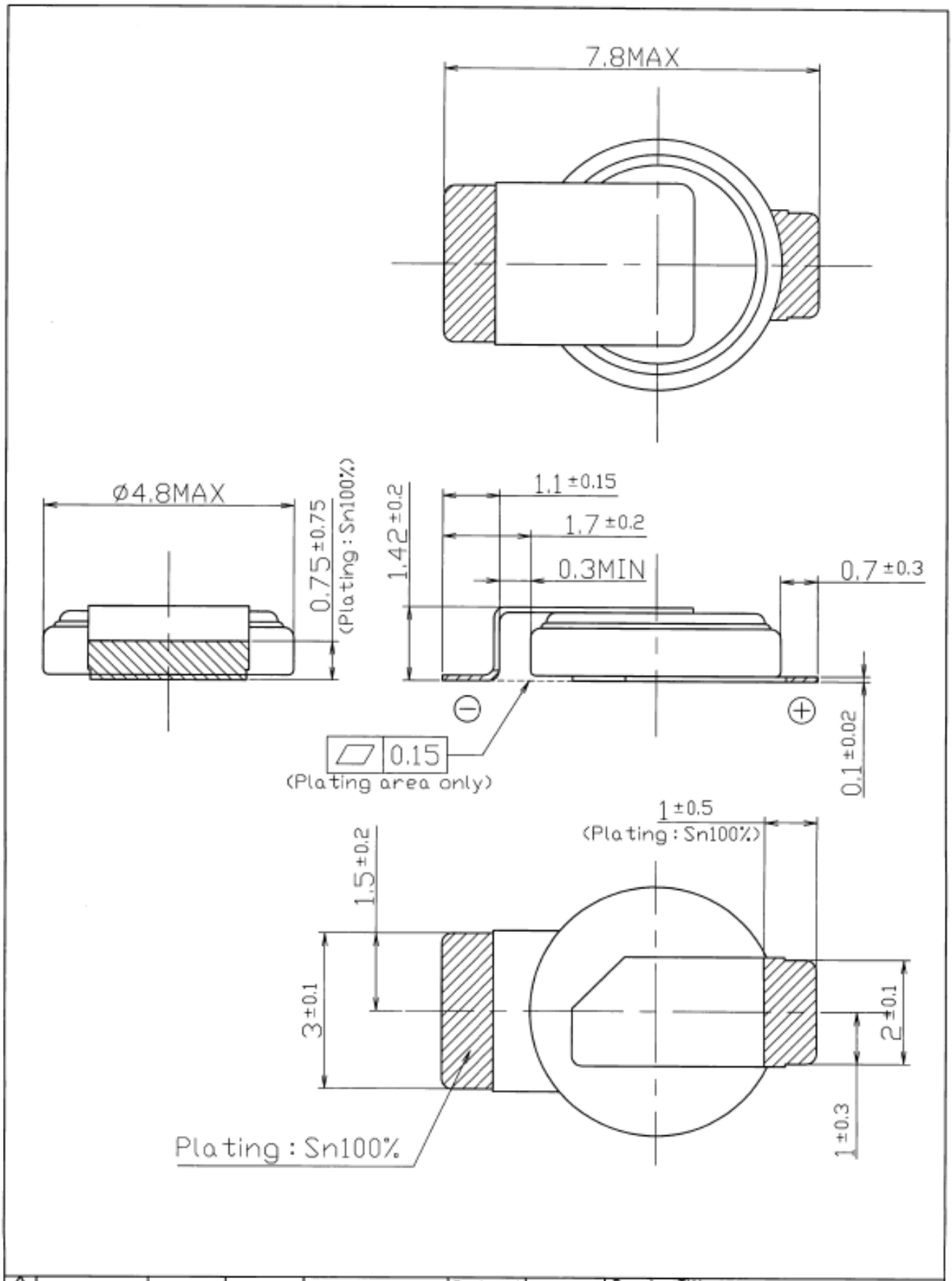
This product conforms to “RoHS compliance”.

12. TREATMENT OF THIS DOCUMENT

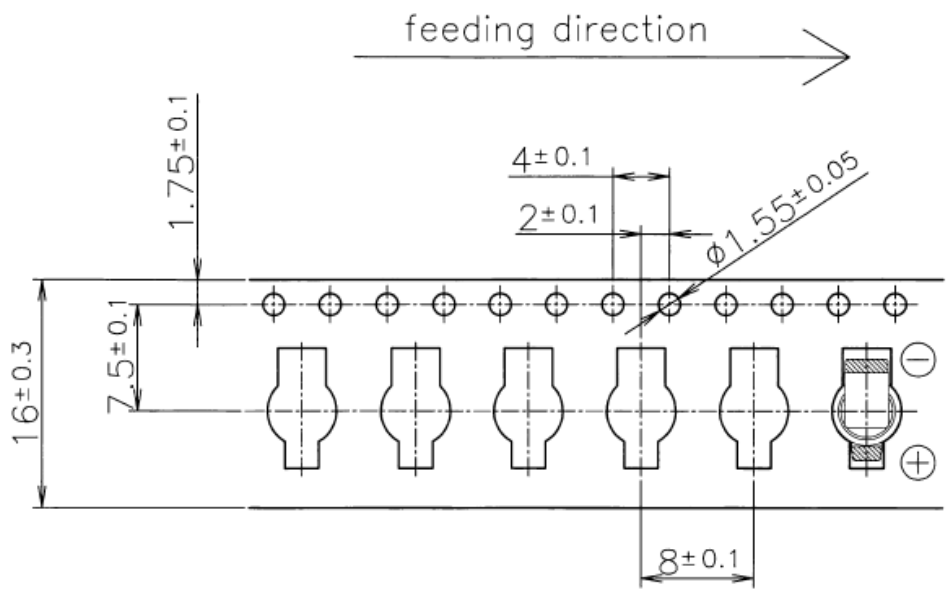
(1) Any amendment or modification requires the agreement of both parties.
(2) If problems occur with anything not stipulated in this document both parties shall discuss and settle matter in good faith.

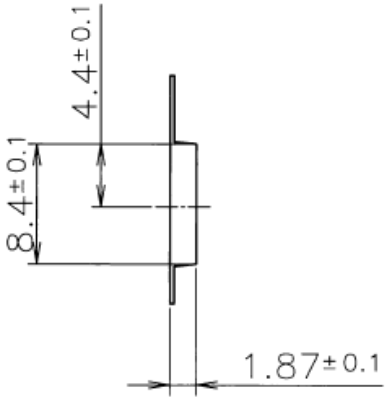
13. GUARANTEE

The operating conditions for the guarantee of this product are as shown in the drawing for specification.
Please note that Taiyo Yuden Co.,Ltd. shall not be responsible for a failure and/or abnormality which is caused by use under conditions other than the aforesaid operating conditions.



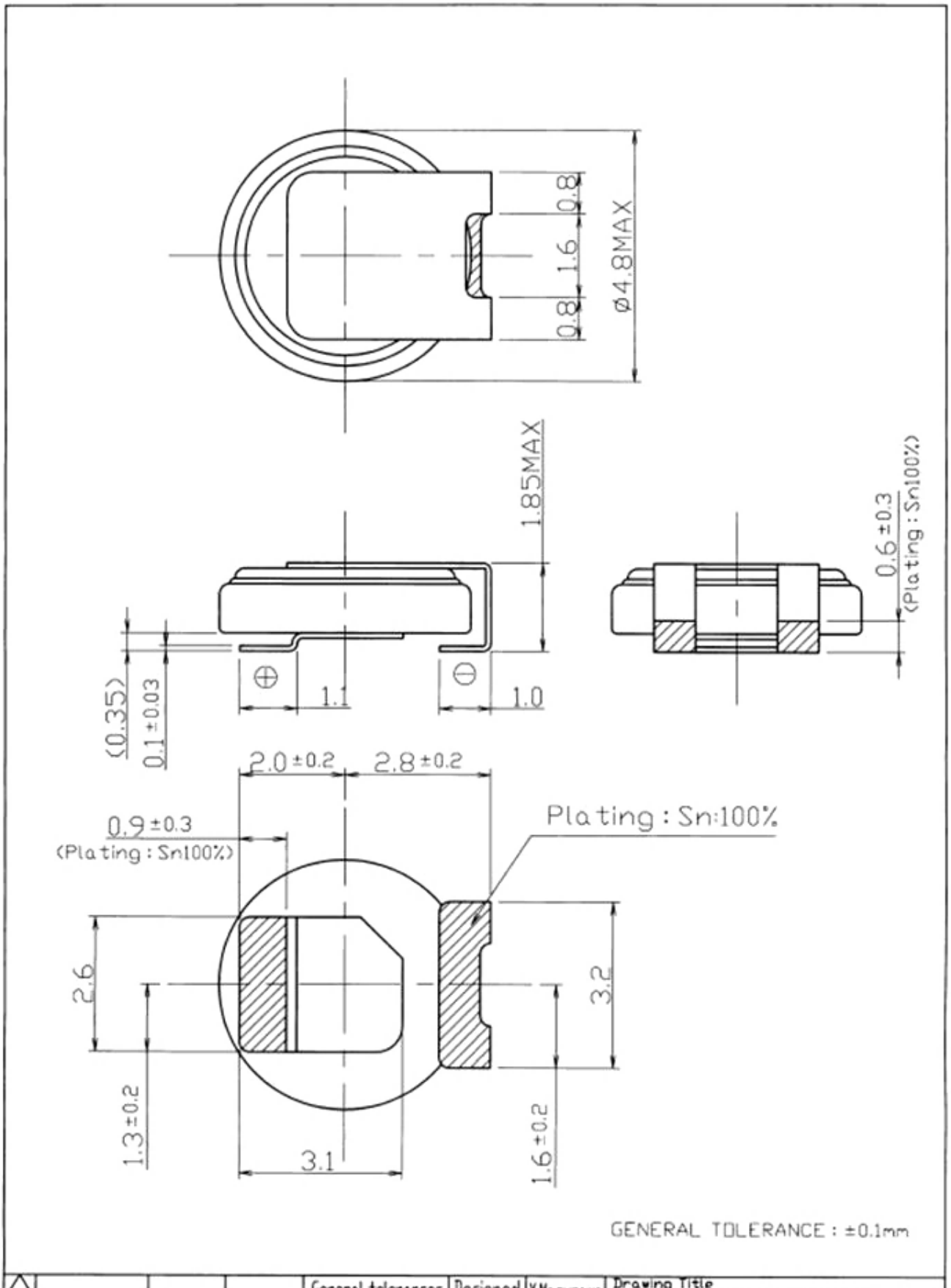
			General tolerances		Designed	Y.Masuzawa	Drawing Title: Polyacene Capacitor PAS414HR-VA5R
			1.5 - 6	±0.1	Checked		
			6 - 30	±0.2	Approved		Drawing No.: CP01-1002-HR0414VA5R
			30 - 120	±0.3	Date	2010.02.01	Ver.: 2.0
			120 - 400	±0.5	Scale	10/1	TAIYO YUDEN Co.,Ltd.
			400 - 1000	±0.8			
Remark	Update	Approved					





1. All Dimensions in mm
2. Material: Insulative PS
3. General Tolerance : ±0.2mm
   Unless Otherwise Specified
4. Corner Without Indication Max Radius 0.5

Remark	Update	Approved	Designed	Y.Masuzawa	Drawing Title		Drawing No.	
			Checked		Carrier Tape PAS414-VA5R		CP01-6057-CTS0414VA5R	Ver. 2.0
			Approved			Scale 2/1	TAIYO YUDEN Co.,Ltd.	
			Date	2010.02.01				



GENERAL TOLERANCE : ±0.1mm

General tolerances	
1.5 - 6	±0.1
6 - 30	±0.2
30 - 120	±0.3
120 - 400	±0.5
400 - 1000	±0.8

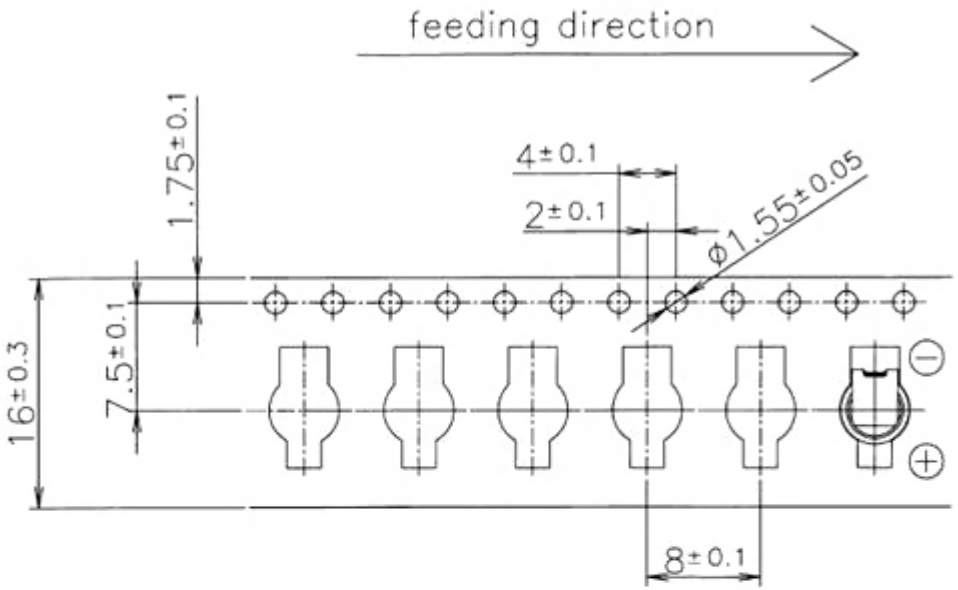
Remark	Update	Approved

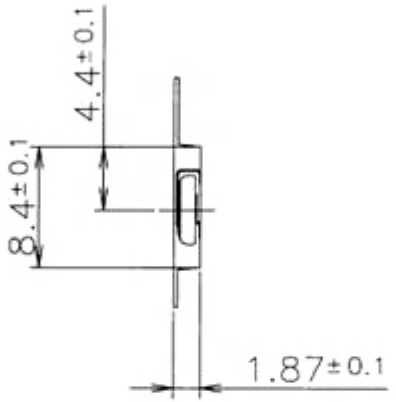
Designed	Y.Masuzawa
Checked	
Approved	
Date	2010.01.26
Scale	10/1

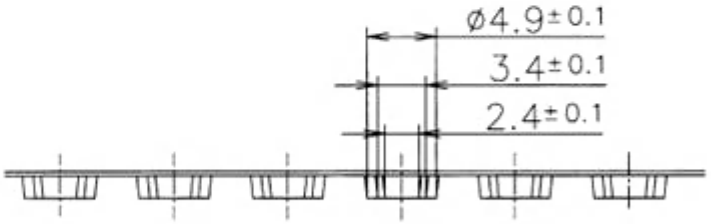
Drawing Title: Polyacene Capacitor PAS414HR-VE5R

Drawing No.	Ver.
CP01-1005-HR0414VE5R	2.0

TAIYO YUDEN Co.,Ltd.

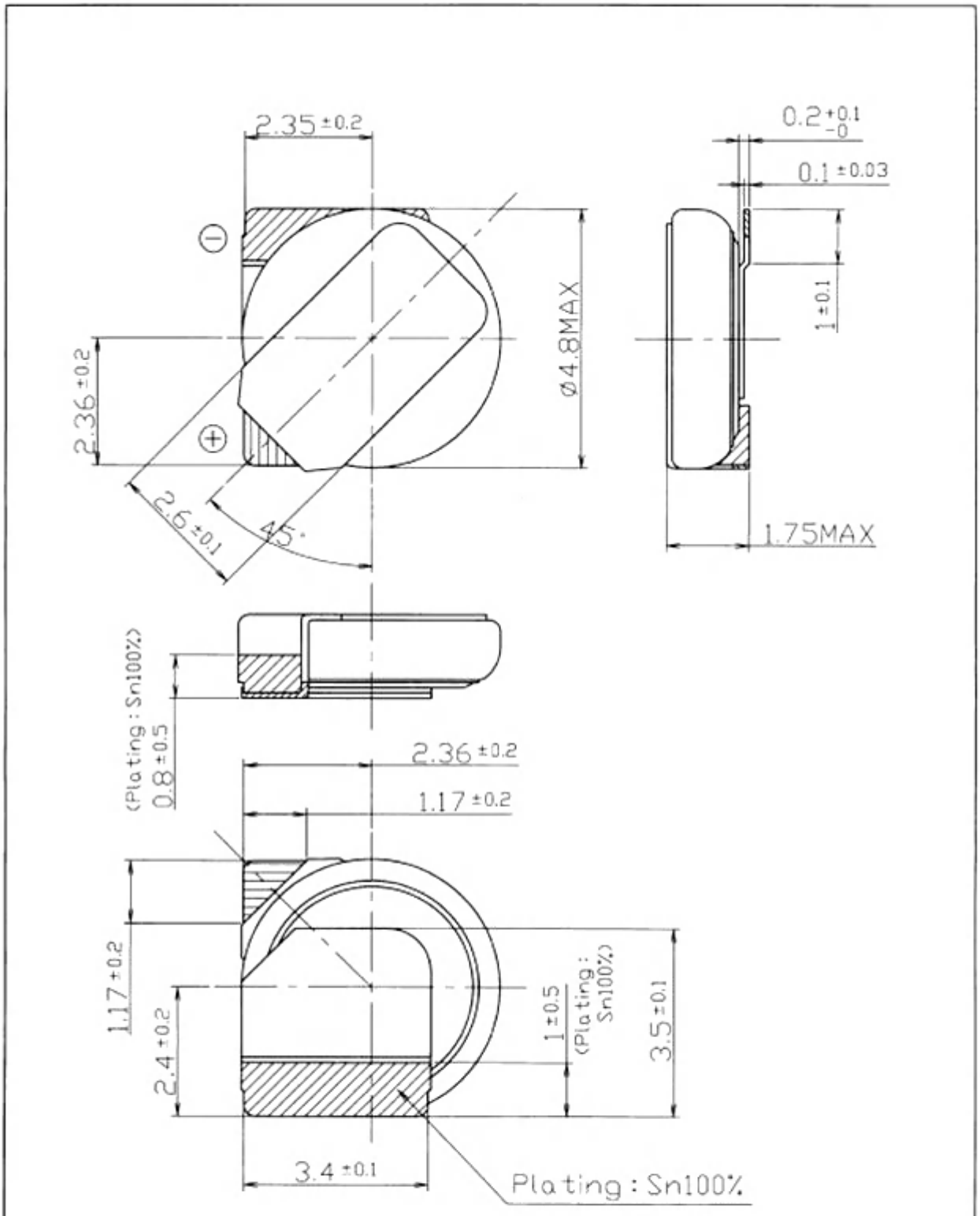




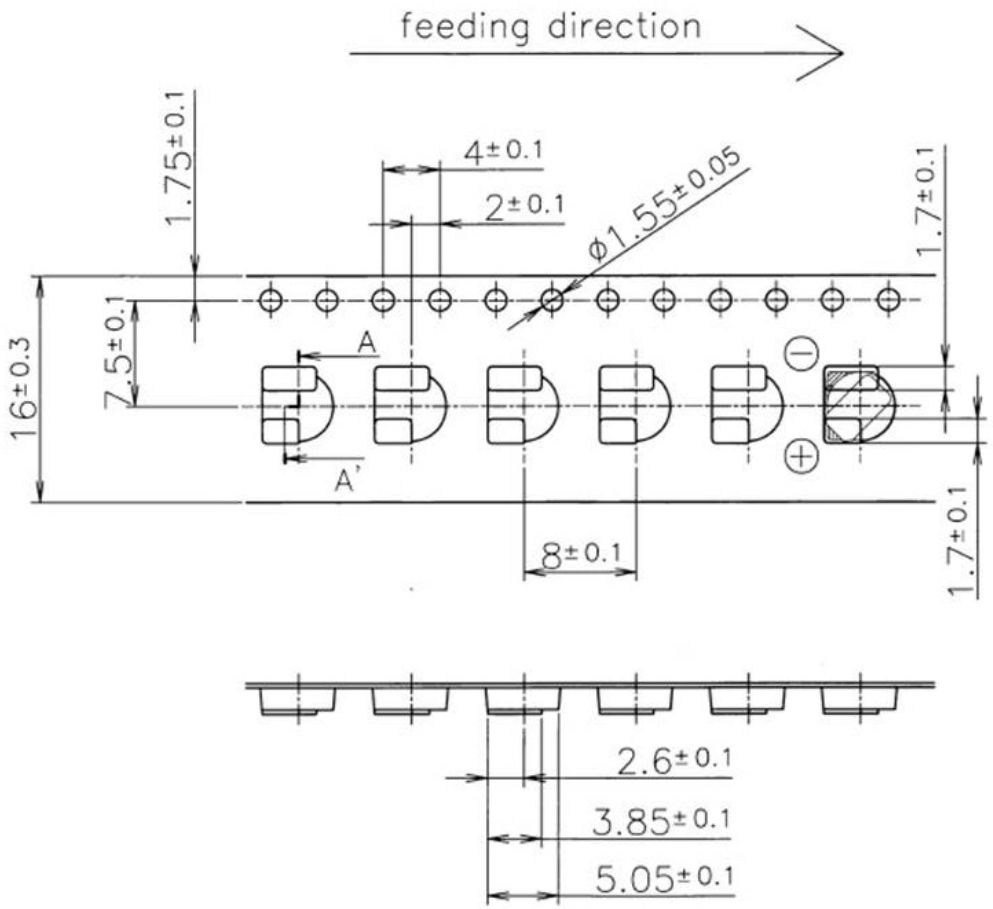


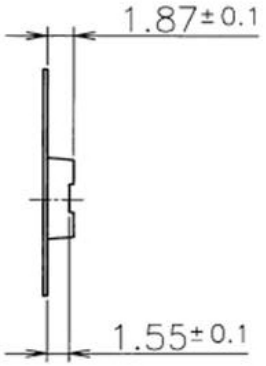
1. All Dimensions in mm
2. Material: Insulative PS
3. General Tolerance : ±0.2mm
   Unless Otherwise Specified
4. Corner Without Indication Max Radius 0.5

			Designed	Y.Masuzawa	Drawing Title		Drawing No.	
			Checked		Carrier Tape PAS414-VE5R		CP01-6059-CTS0414VE5R	Ver. 2.0
			Approved					
Remark	Update	Approved	Date	2010.01.26		Scale 2/1	TAIYO YUDEN Co.,Ltd.	



			General tolerances		Designed	Y.Masuzawa	Drawing Title: Polyacene Capacitor PAS414HR-VG1
			1.5 - 6	±0.1	Checked		
			6 - 30	±0.2	Approved		Drawing No.: CP01-1080-HR0414VG1 Ver.: 2.0
			30 - 120	±0.3	Date	2010.02.01	
			120 - 400	±0.5	Scale	10/1	TAIYO YUDEN Co.,Ltd.
			400 - 1000	±0.8			
Remark	Update	Approved					

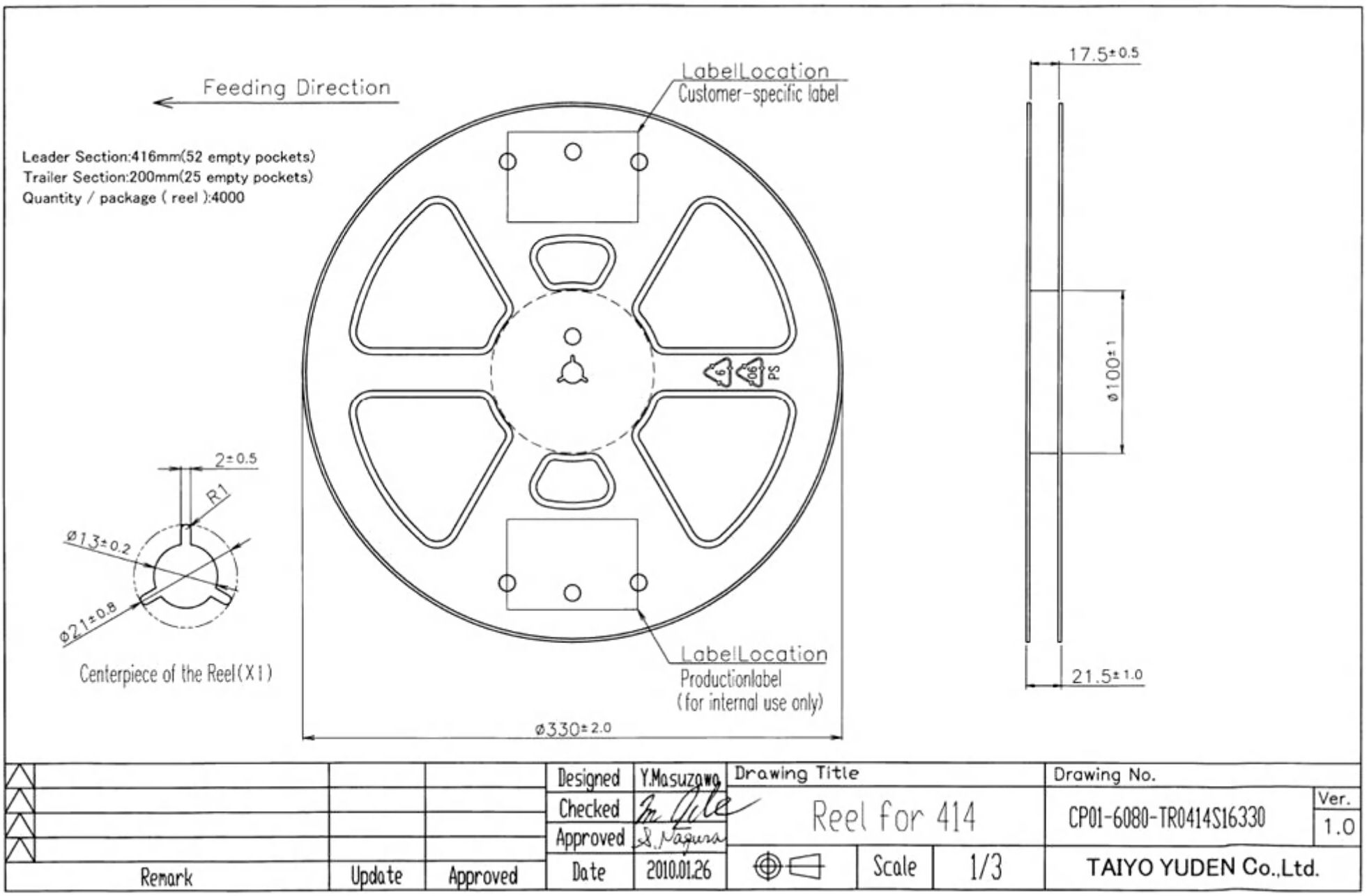




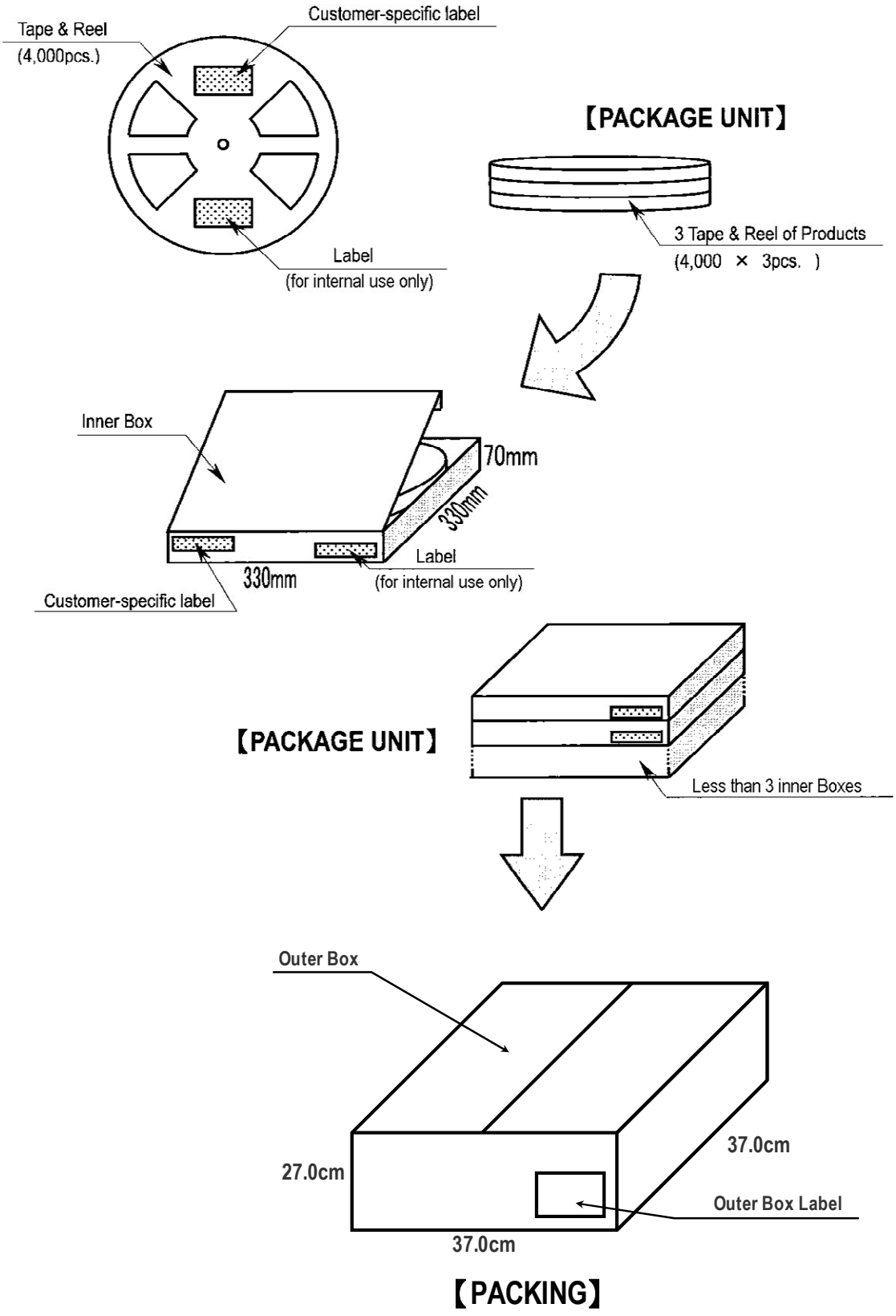
Section A–A'

1. All Dimensions in mm
2. Material: Insulative PS
3. General Tolerance : ±0.2mm
   Unless Otherwise Specified
4. Corner Without Indication Max Radius 0.5

Remark	Update	Approved	Designed	Y.Masuzawa	Drawing Title		Drawing No.	
			Checked		Carrier Tape PAS414-VG1		CP01-6053-CTS0414VG1	Ver. 2.0
			Approved	S. Nagura				
			Date	2010.02.01		Scale 2/1	TAIYO YUDEN Co.,Ltd.	



			Designed	Y.Masuzawa	Drawing Title	Drawing No.	
			Checked		Reel for 414	CP01-6080-TR0414S16330	Ver. 1.0
			Approved	S.Nagura			
Remark	Update	Approved	Date	2010.01.26	Scale 1/3	TAIYO YUDEN Co.,Ltd.	


Tape & Reel
(4,000pcs.)
Customer-specific label
Label
(for internal use only)
【PACKAGE UNIT】
3 Tape & Reel of Products
(4,000 × 3pcs.)
Inner Box
70mm
330mm
330mm
Label
(for internal use only)
Customer-specific label
【PACKAGE UNIT】
Less than 3 inner Boxes
Outer Box
37.0cm
27.0cm
Outer Box Label
37.0cm

【PACKING】

Precautions

1. Use under the maximum usable voltage
If over maximum usable voltage is applied, it might cause abnormal current flow, which shorten lifetime and sometimes damage PAS capacitor

2. Use under maximum operating temperature
Not only shorter life time but also leakage and damage will happen by increasing internal pressure if PAS capacitor use in over max operating temperature.

3. Limited life time
Lifetime of PAS capacitor is greatly affected by surrounding temperature. 10℃ drop in temperature extend its expected lifetime approximately twice as much. Design a circuit under consideration of deterioration of electrical characteristics after long time usage, decreasing in capacitance and increasing in internal resistance.

4. The electrical characteristics of capacitors vary with respect to temperature
The electrical characteristics of PAS capacitors temporarily vary with respect to temperature separately from secular change mentioned above. Design a circuit under consideration of temperature characteristics.

5. PAS capacitor has polarity
PAS capacitor has polarity. Please check the polarity before use. It will be damage if it is reverse charged.

6. Pay sufficient attention to use PAS capacitor in circuit with high ripple current or that requires rapid and very frequent charge / discharge
In circuit with high ripple current or that requires rapid and very frequent charge / discharge, the lifetime of PAS capacitors might be shortened by self-heating. Please consult us in case of using PAS capacitor in such circuit.

7. Mind voltage drop when back-up
When back-up (discharging) starts, voltage drop because of active current and internal resistance. Consult us about if current is over 10μA for 311type, over 20μA for 414/409 and over 50μA for 614.

8. Series connection
In case of using PAS capacitor in series connection, the voltage of each capacitor is not always equal and it may be occurred excessive voltage in a part of capacitor, which may lead to shortening lifetime and breakdown. Take a margin against a rated voltage or add a balancing resister. Consult us about using PAS capacitor in series connection.

9. Do not contact with wiring pattern during installing
If PAS capacitor contact with wiring pattern, it will be short circuit, and if there is wiring pattern underneath of PAS capacitor, short circuit would occur by damage of resist.

10. Environmental of usage
In case PAS capacitor is used in high humidity, alkaline or acid air, it may cause deteriorating of its performance and short circuit by corrosion of outer can or lead terminal. In addition, used in sudden temperature change or high humidity, it may cause deteriorating of its performance and leakage by dew condensation.

11. Do not apply vibration.
If excessive vibration is applied, soldering part might be broken or lead terminal part might be damaged.

12. Precaution of soldering
Don't solder over solder conditions in the spec. sheet.
Don't charge/discharge before reflow
Consult us if other reflow condition is required.

13. Consult us about cleaning condition when cleaning circuit-board after soldering
Cleaning may affect PAS capacitor. Consult us about cleaning conditions beforehand. Some cleaning conditions cause detrimental influence.

14. Storage
Keep following cautions for storage of PAS capacitor
- Don't store in the high temperature and the high humidity condition and a place where receiving direct sunlight. Storing PAS capacitor in the room condition of 5 ºC - 35 ºC temperature and 60% relative humidity is recommended. Sudden temperature change or high humidity may cause deteriorating of its characteristics and Soldering.
- Don't store PAS capacitor near water, salt water or oil, and it the dew condensation, gasified oil or salinity filled place.
- Don't store PAS capacitor in the hazardous gas (hydrogen sulfide, sulfurous, ammonia, bromine, methyl bromine and etc) .
- Don't fumigate by halogen fumigant.
- Don't store PAS capacitor near acid or alkaline solvent.
- Do not store PAS capacitor in a place where exposed to ozone, ultraviolet or x-ray.
- Do not store PAS capacitor in a place where vibration and shock might occur in.

15. Disposal
Dispose PAS capacitor in accordance with local and country rules and regulations.

16. Usage
PAS capacitor is produced for usage of information & communication equipment, home electronics, audio & visual equipment and etc. Consult us about using high reliability and safety required products such as medical equipment, transportation equipment, industrial equipment, flight / space equipment and emergency equipment.

17. Other Notice
Don't heat or throw PAS capacitor into fire.
Don't short.
Don't solder directly to a cell body.
Don't open a body.
Don't apply pressure.

※Please see JEITA RCR-2370C for details.
JEITA RCR-2370C
「Safety application guide of electric double layer capacitor (EDLC)(Directions guideline of electric double layer capacitor)」
〔Corporation Electronic Industries Association of Japan.
Enactment in March 1995 and revision in July 2008〕