

MESSRS

S P E C I F I C A T I O N

POLYESTER FILM CAPACITOR

TYPE

A M A

NISSEI ELECTRIC CO., LTD.

SPECIFICATION

POLYESTER FILM CAPACITOR

SPEC No.

P S C 1 2 0 0 0 0

1. SCOPE

This specification defines general requirements for polyester film capacitor AMA type (hereinafter called capacitor).

2. PARTS NUMBER CODE SYSTEM

A	M	A		*	0	1	0	0	K	4	7	3	0	0	0	0	0	0	0	0
①				②	③				④	⑤			⑥				⑦			

① Designation

AMA : Straight lead type

AMAF : Single-formed lead type

AMAV : Automatic vertical insertion type (Formed lead type)

AMAS : Automatic vertical insertion type (Straight lead type)

② Internal use

③ Rated DC voltage

100V.DC

④ Tolerance on capacitance

J : $\pm 5\%$, K : $\pm 10\%$

⑤ Capacitance Code

Capacitance value shall be given by 3-digit figure of which unit used is expressed in pF.

The first 2 digits are significant figures of the capacitance value, the third digit to indicate the number of additional zeros to follow the significant figure.

⑥ Model code (Internal use)

⑦ Lead dimension / Packing mode

AMA : 0000

AMAF : 0050

AMAV : 0200

AMAS : C220

REVISIONS

SIGNATURE

DATE

DESIGNED

M. Sasaki

Apr. 14. 2005

APPROVED

H. Kawagoe

Apr. 14. 2005

SPECIFICATION

POLYESTER FILM CAPACITOR

SPEC No.

P S C 1 2 0 0 0 0

3. RATING

3.1 Operating Temperature Range : Operating temperature range to capacitors shall be $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$.

3.1.1 Maximum Operating Temperature : Maximum value of capacitor's surface temperature (ambient temperature+self heating temperature rise+radiation and conduction heat from other electric supply sources) at which capacitors shall be capable of applying continuously.

3.1.2 Minimum Operating Temperature : Minimum temperature range at which capacitors shall be capable of applying continuously.

3.2 Rated voltage : The rated voltage shall be the voltage which can be continuously applied to a capacitor within the range of the working temperature and shall be 100V.DC.

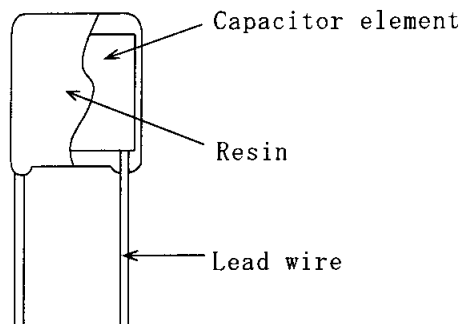
3.3 Capacitance range
0.0010 ~ 0.47 μF E-12

3.4 Tolerance on capacitance
 $\pm 5\%$, $\pm 10\%$

4. CONSTRUCTION

Construction shall satisfy the provision of CQ921 type of JIS C 5101-1:1998. Capacitor shall be with the dielectric of Polyester Film capacitor, and lead wire shall be surely connected to the capacitor element by electric welding.

Exterior coating shall be protected by epoxy resin for moisture proof and insulation treatment.



Material

Item	Material
Capacitor element	Dielectric : Polyester film
	Electrodes : Aluminium-foil
Lead wire	Tinned copper-covered steel wire
Resin	Impregnated resin : Epoxy resin
	Coating resin : Epoxy resin

SPECIFICATION

POLYESTER FILM CAPACITOR

SPEC No.

P S C 1 2 0 0 0 0

5. DIMENSION

Dimension are specified by attached sheet.

6. MARKING

6.1 Marking item

The capacitors shall be marked clearly by an indelible way.

1) Rated capacitance

Shall be marked with 3-digit code. Exp) 333 , 104

2) Tolerance on rated capacitance

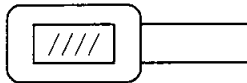
J or K

3) Production date code

Month Year	1	2	3	4	5	6	7	8	9	10	11	12
Odd year	A	B	C	D	E	F	G	H	Φ	Θ	L	Σ
Even year	N	P	Q	R	S	T	U	V	W	X	Y	Z

6.2 Marking position

(Example)



4 7 2 K U

SPECIFICATION

POLYESTER FILM CAPACITOR

SPEC No.

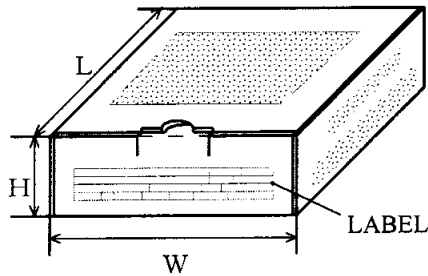
P S C 1 2 0 0 0 0

7. PACKING

1) Straight leads and formed leads type.

The capacitors shall be put in poly-bag and packed in box marked with necessary information.

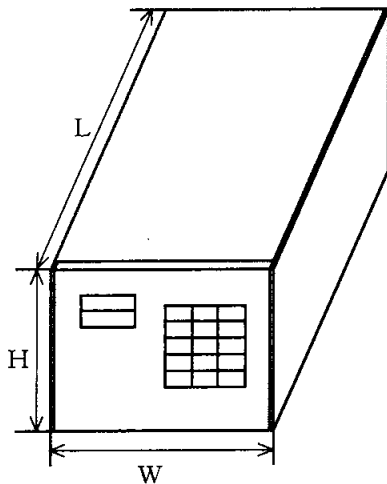
Inside packing case



Dimension (mm)

W	L	H
198	176	74

External packing case



Dimension (mm)

Inside packing case quantity	W	L	H
2	165	210	200
4	210	310	"
6	235	410	"
8	310	410	"
12	410	450	"

Example)

CODE CUSTOMER ①				INSP DATE ②		PKG NO	
PARTS NO ③				MACH NO ④		QTY/PKG	
ORDER NO ⑤			LOT NO ⑥			ROHS ⑦	
TYPE ⑧	WV ⑨	TOL ⑩	CAP ⑪	EDP CODE ⑫		QT (PCS) ⑬	

- ①CODE CUSTOMER ④MACH NO ⑦PRODUCTION COUNTRY ⑩TOL (%)
- ②INSP DATE ⑤ORDER NO ⑧TYPE ⑪CAP
- ③PARTS NO ⑥LOT NO ⑨W V ⑫EDP CODE
- ⑬QT (PCS)

2) Automatic vertical insertion type.

This is specified by the specification of automatic vertical insertion type.

SPECIFICATION	POLYESTER FILM CAPACITOR	SPEC No. P S C 1 2 0 0 0 0
---------------	--------------------------	-------------------------------

8. APPLICABLE STANDARD

Unless otherwise specified, performance and a testing method shall comply with JIS C 5101-1:1998.

9. DISUSE OF O.D.C.

No ozone depleting chemicals are used at any stage of the manufacturing process.

10. DISUSE OF PBBO, PBDPO, PBDPE, PBBs

This products does not contain PBBO, PBDPO, PBDPE, PBBs.

11. CERTAIN HAZARDOUS SUBSTANCES RESTRICTED BY RoHS DIRECTIVE

In the product, materials to which certain hazardous substances restricted by RoHS Directive (2002/95/EC) (cadmium, hexavalent chromium, mercury, lead, PBB and PBDE) are added on purpose aren't used.

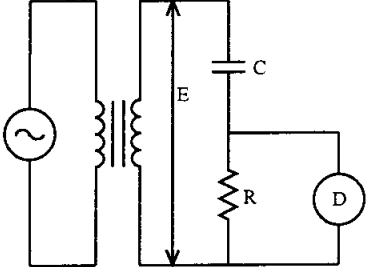
12. PRODUCTION COUNTRY (Manufacturing Plant)

· CHINA (SHANGHAI NISSEI ELECTRIC CO., LTD.)

13. CHARACTERISTICS AND TEST CONDITIONS

13.1 Electrical characteristics test

Item		Characteristics	Test conditions
Dielectric strength	Between terminations	No breakdown.	Capacitors shall withstand 200% of rated DC voltage for 1 minute or 250% of rated DC voltage for 1~5 seconds. (Charge or discharge current : 1A max)
	Between termination and case	No breakdown.	Capacitors shall withstand 200% of rated DC voltage for 1~5 seconds.
Insulation resistance (Between terminations)		30,000M Ω or more	DC voltage specified below shall be applied for 60 \pm 5, after which measurement shall be made. Rated voltage Test voltage 100V.DC 100 \pm 3.0V.DC
Capacitance		Within the nominal tolerance.	Capacitance shall be measured with 1,000Hz \pm 10%, 5Vrms max.
Tangent of loss angle		0.008 or less	

SPECIFICATION		POLYESTER FILM CAPACITOR	SPEC No. P S C 1 2 0 0 0 0
Item	Characteristics	Test conditions	
Connection of element	There shall be no intermittent contacts or open circuiting which would result in any needle deflection on the voltage detector.	<p>As in the diagramed circuit measure the variation of terminal voltage for the series resistor (R) while a weak impact is made on the test capacitor to check the bonding strength of the terminals to the capacitor.</p>  <p>C : Capacitor R : Series resistor R=150 Ω/C (Ω) μF C=Nominal capacitance μF Ⓧ : Detector Internal impedance shall be large enough as compared with c. E : 100mV (peak value) Max at 10k~1MHz</p>	
13.2 Mechanical characteristics test			
Item	Characteristics	Test conditions	
Termination strength	Tensile strength	Test capacitors shall be fixed, and unless otherwise specified, a tensile force of 10N shall be gradually applied to the axial of the leads, and then maintained for 30 \pm 5 seconds.	
	Bending strength	Without mechanical damage, such as break of terminal damage.	<p>The bend test shall consist of hanging a weight of 5N to the end of the leads and then rotating the capacitors 90° in one direction, then to the starting point. This test shall be applied for 2.5 seconds per each time.</p> <p>At the same test speed, the capacitors shall be rotated 90° in alternating direction, then return to the starting point.</p>

SPECIFICATION		POLYESTER FILM CAPACITOR		SPEC No. P S C 1 2 0 0 0 0
Item	Characteristics		Test conditions	
Vibration resistance	No electrical discontinuity such as opening, short-circuit of 0.5ms or more. Also, no abnormality on appearance after test.		Capacitors shall be capable of withstanding without malfunctioning such as short, open circuit or a damage to a vibration test in three directions against perpendicularity at a frequency range from 10Hz to 55Hz. The frequency shall be varied uniformly from 10Hz to 55Hz at 1.5mm amplitude and back to 10Hz in approximately 1 minute intervals. This test shall be applied 2 hours per each direction, total 6 hours.	
Solderability	At least 90% of the circumferential face of termination up to immersed level shall be covered with new solder.		Capacitor's leads shall be immersed into Flux (10% rosin) for 5~10 seconds using sheltering board from radial test, then immersed into soldering bath at $245\pm 5^{\circ}\text{C}$ for 2 ± 0.5 seconds up to the depth of to the depth of 2~2.5mm from the bottom of the body. Immersed and removing speed shall be $25\pm 2.5\text{mm/sec}$. Composition of solder : Lead-free solder (Sn-3.0Ag-0.5Cu)	
Resistance to soldering heat	Appearance	No visible damage.		Using sheltering board from the radial heat, capacitor's leads shall be immersed into soldering bath at $260\pm 5^{\circ}\text{C}$ for 10 ± 1 seconds up to the depth of 1.5~2mm from the bottom of the body. The capacitors shall withstand 150% of rated DC voltage for 1 minute.
	Dielectric strength (Between terminations)	No breakdown.		
	Capacitance change	Within $\pm 3\%$ of the initial value.		
Solvent resistance	Marking	The Marking shall be legible.		The capacitor shall be completely submerged stationarily in the isoprorylalcohol for 30 ± 0.5 seconds, and taken out. After which its appearance and marking shall be visually observed.
	Appearance	No visible damage.		

SPECIFICATION		POLYESTER FILM CAPACITOR		SPEC No. P S C 1 2 0 0 0 0	
13.3 Climatic test					
Item		Characteristics		Test conditions	
Cold		Capacitance change		Within +0, -5% of the initial value.	
Dry heat		Insulation resistance		Measured at $-40 \pm 2^\circ\text{C}$.	
		$C \leq 0.1 \mu\text{F}$ $2,700\text{M}\Omega$ or more <hr/> $0.1 \mu\text{F} < C \leq 0.33 \mu\text{F}$ $600\text{M}\Omega$ or more <hr/> $C > 0.33 \mu\text{F}$ $200\Omega\text{F}$ or more		Measured at $85 \pm 2^\circ\text{C}$.	
		Capacitance change		Within +5, -2% of the initial value.	
Humidity resistance (steady state)		Appearance		No visible damage.	
		Dielectric strength (Between terminations)		No breakdown.	
		Insulation resistance		9,000M Ω or more	
		Tangent of loss angle		0.012 or less	
		Capacitance change		Within +6, -2% of the initial value.	
Endurance test for humidity		Appearance		No visible damage.	
		Dielectric strength (Between terminations)		No breakdown.	
		Insulation resistance		9,000M Ω or more	
		Tangent of loss angle		0.012 or less	
		Capacitance change		Within +6, -2% of the initial value.	
				The capacitor shall be put into the test chamber and left under the condition of relative humidity 90~95% at $40 \pm 2^\circ\text{C}$ for 500^{+2}_{-4} hours.	
				After the test, the capacitor shall be left under the ordinally condition for 1~2 hours.	
				The capacitors shall withstand 200% of rated DC voltage for 1~5 seconds.	
				The rated voltage shall be continuously applied to the capacitor in the test chamber at a relative humidity of 90~95% at $40 \pm 2^\circ\text{C}$ for $1,000^{+4}_{-8}$ hours.	
				After the test, the capacitor shall be left under the ordinally condition for 1~2 hours.	
				The capacitors shall withstand 200% of rated DC voltage for 1~5 seconds.	

SPECIFICATION		POLYESTER FILM CAPACITOR	SPEC No. P S C 1 2 0 0 0 0																		
Item	Characteristics	Test conditions																			
Endurance test for high temperature	Appearance	No visible damage.																			
	Insulation resistance	4,500M Ω or more																			
	Tangent of loss angle	0.011 or less																			
	Capacitance change	Within $\pm 3\%$ of the initial value.																			
Rapid change of temperature	Appearance	No visible damage.																			
	Insulation resistance	15,000M Ω or more																			
	Tangent of loss angle	0.008 or less																			
	Capacitance change	Within $\pm 3\%$ of the initial value.																			
		The capacitors shall be maintained in following temperature the table.1 for 5 cycles. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">Table.1</th> </tr> <tr> <th>Step</th> <th>Temperature</th> <th>Maintaind time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40$\pm$$\frac{3}{3}$$^{\circ}$C</td> <td>30$\pm$3 min</td> </tr> <tr> <td>2</td> <td>room temperature</td> <td>3Min max</td> </tr> <tr> <td>3</td> <td>+85$\pm$$\frac{3}{3}$$^{\circ}$C</td> <td>30$\pm$3 min</td> </tr> <tr> <td>4</td> <td>room temperature</td> <td>3Min max</td> </tr> </tbody> </table>		Table.1			Step	Temperature	Maintaind time	1	-40 \pm $\frac{3}{3}$ $^{\circ}$ C	30 \pm 3 min	2	room temperature	3Min max	3	+85 \pm $\frac{3}{3}$ $^{\circ}$ C	30 \pm 3 min	4	room temperature	3Min max
Table.1																					
Step	Temperature	Maintaind time																			
1	-40 \pm $\frac{3}{3}$ $^{\circ}$ C	30 \pm 3 min																			
2	room temperature	3Min max																			
3	+85 \pm $\frac{3}{3}$ $^{\circ}$ C	30 \pm 3 min																			
4	room temperature	3Min max																			

14. REGULATION IN USAGE

14.1 Voltage derating for frequency

14.1.1 A.C.maximum operating voltage in case of operating with commercial frequency (50 or 60Hz) is as shown in the table below. However, it can not be used for "Across-the-line" application.

Rated voltage	A. C. maximum operating voltage
100V.DC	75Vrms

14.1.2 When containing a portion of D.C.Bias, the crasy value (peak voltage V_{0-P}) waveform shall not exceed the rated voltage.

14.2 Permissible current to frequency

The permissible current shall be regulated by both the root-mean-square (rms) value current and the peak current.

The root-mean-square (rms) value current shall be the permissibe current value to frequency attached and the permissible peak current shall be 200A $_{0-P}$.

SPECIFICATION

POLYESTER FILM CAPACITOR

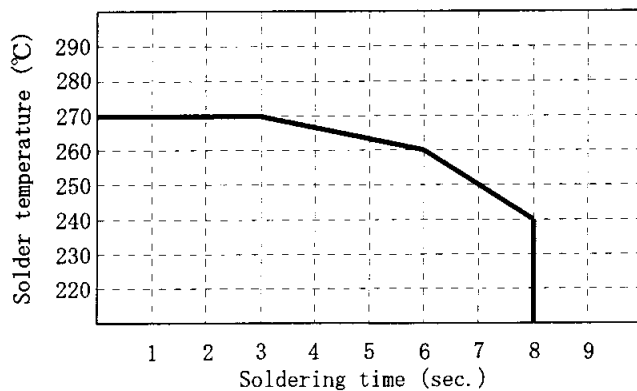
SPEC No.

P S C 1 2 0 0 0 0

14.3 Soldering

When soldering a capacitor, be sure to solder within the following temperature range.

(1) Flow soldering



Preheating condition : 120°C,
for 90 seconds

(2) When using soldering iron

Iron tip temperature less than 350°C

Soldering time (sec.) within 5 seconds

(3) When soldering a capacitor mounted on the board with chip-type components

When applying the curing heat for fixing the chip components, the duration for which a capacitor is exposed to heat shall be within the permissible time, which changes according to the ambient temperature of the capacitor as shown in the annex.

SPECIFICATION

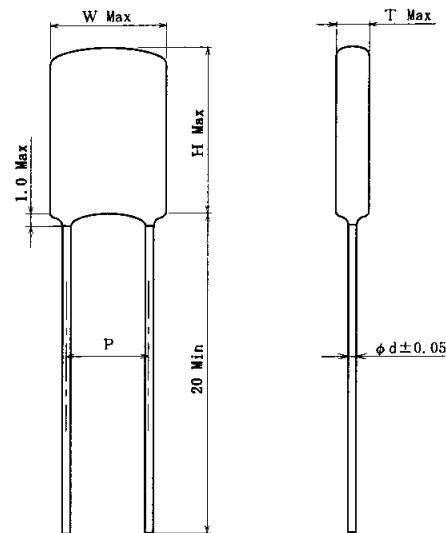
POLYESTER FILM CAPACITOR

SPEC No.

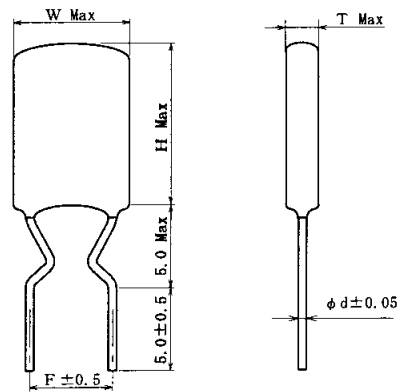
PSC120000

Drawing of dimension

- AMA : Straight lead type



- AMAF : Single-formed lead type



SPECIFICATION

POLYESTER FILM CAPACITOR

SPEC No.

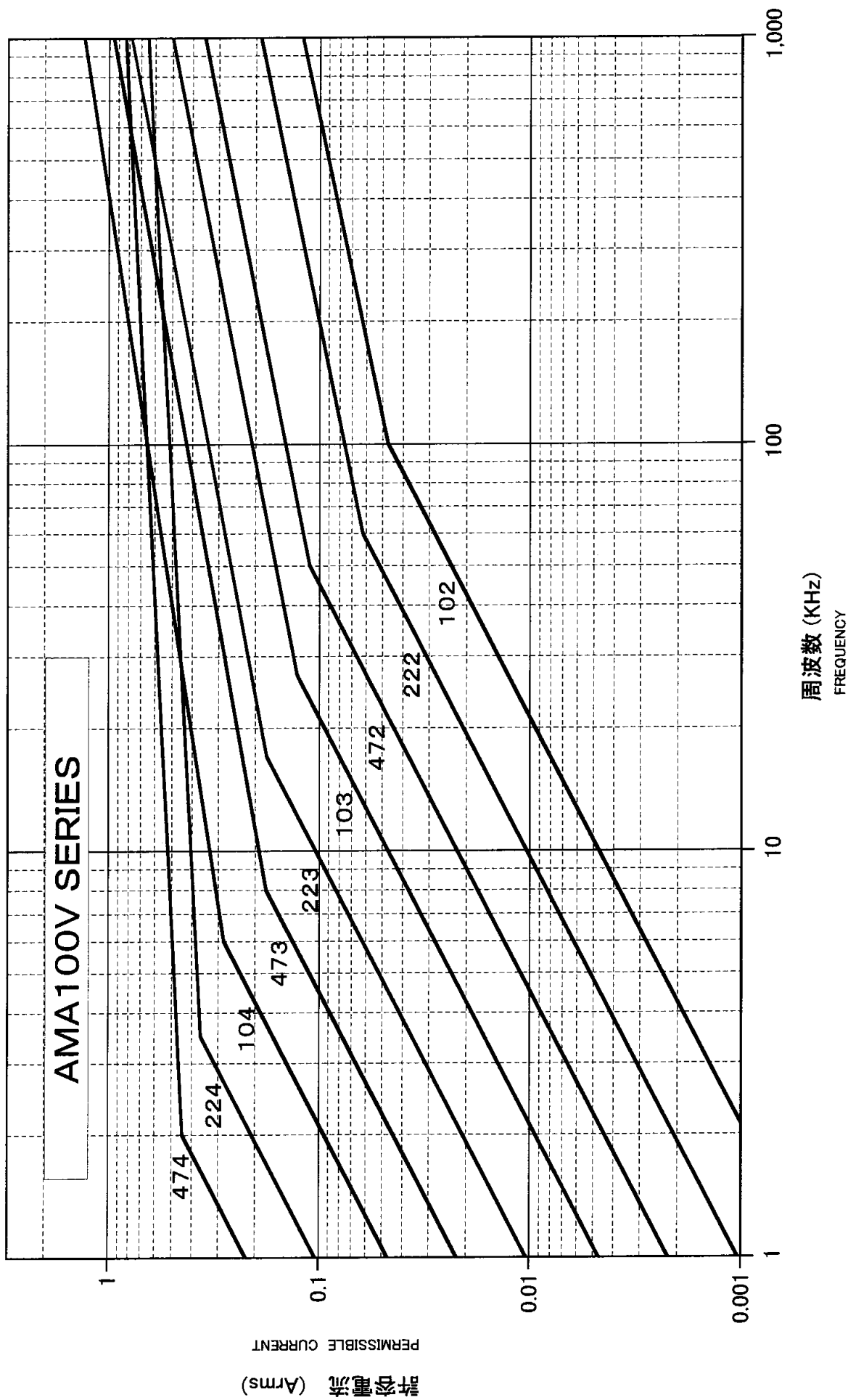
PSC120000

AMA, AMAF-100V. DC

Parts No.	Capacitance (μ F)	Dimensions (mm)					
		W	H	T	P	F	ϕ d
AMA001000102000000000	0.0010	5.0	8.0	3.0	3.5 \pm 0.5	5.0	0.5
AMA001000122000000000	0.0012	"	"	"	"	"	"
AMA001000152000000000	0.0015	"	"	"	"	"	"
AMA001000182000000000	0.0018	"	"	"	"	"	"
AMA001000222000000000	0.0022	"	"	"	"	"	"
AMA001000272000000000	0.0027	"	"	"	"	"	"
AMA001000332000000000	0.0033	"	"	"	"	"	"
AMA001000392000000000	0.0039	"	"	"	"	"	"
AMA001000472000000000	0.0047	"	"	"	"	"	"
AMA001000562000000000	0.0056	"	"	"	"	"	"
AMA001000682000000000	0.0068	6.0	10.0	"	"	"	"
AMA001000822000000000	0.0082	"	"	"	"	"	"
AMA001000103000000000	0.010	"	12.0	"	"	"	"
AMA001000123000000000	0.012	"	"	"	"	"	"
AMA001000153000000000	0.015	"	"	3.5	"	"	"
AMA001000183000000000	0.018	7.0	"	"	"	"	"
AMA001000223000000000	0.022	"	"	4.0	"	"	"
AMA001000273000000000	0.027	7.5	"	"	"	"	"
AMA001000333000000000	0.033	"	"	"	"	"	"
AMA001000393000000000	0.039	8.0	13.0	"	"	"	"
AMA001000473000000000	0.047	"	"	"	5.0 \pm 0.5	"	"
AMA001000563000000000	0.056	"	"	5.0	"	"	"
AMA001000683000000000	0.068	"	"	"	"	"	"
AMA001000823000000000	0.082	9.0	"	6.0	"	"	"
AMA001000104000000000	0.10	"	"	"	"	"	"
AMA001000124000000000	0.12	11.0	"	"	7.5 \pm 0.5	"	"
AMA001000154000000000	0.15	12.5	17.0	6.0	"	"	"
AMA001000184000000000	0.18	13.0	"	7.0	"	"	"
AMA001000224000000000	0.22	13.5	"	"	10.0 \pm 0.5	"	"
AMA001000274000000000	0.27	"	"	"	"	"	"
AMA001000334000000000	0.33	14.5	"	9.0	"	"	0.6
AMA001000394000000000	0.39	15.0	"	10.0	"	"	"
AMA001000474000000000	0.47	16.0	"	"	"	"	"

周波数に対する許容電流特性 (正弦波)

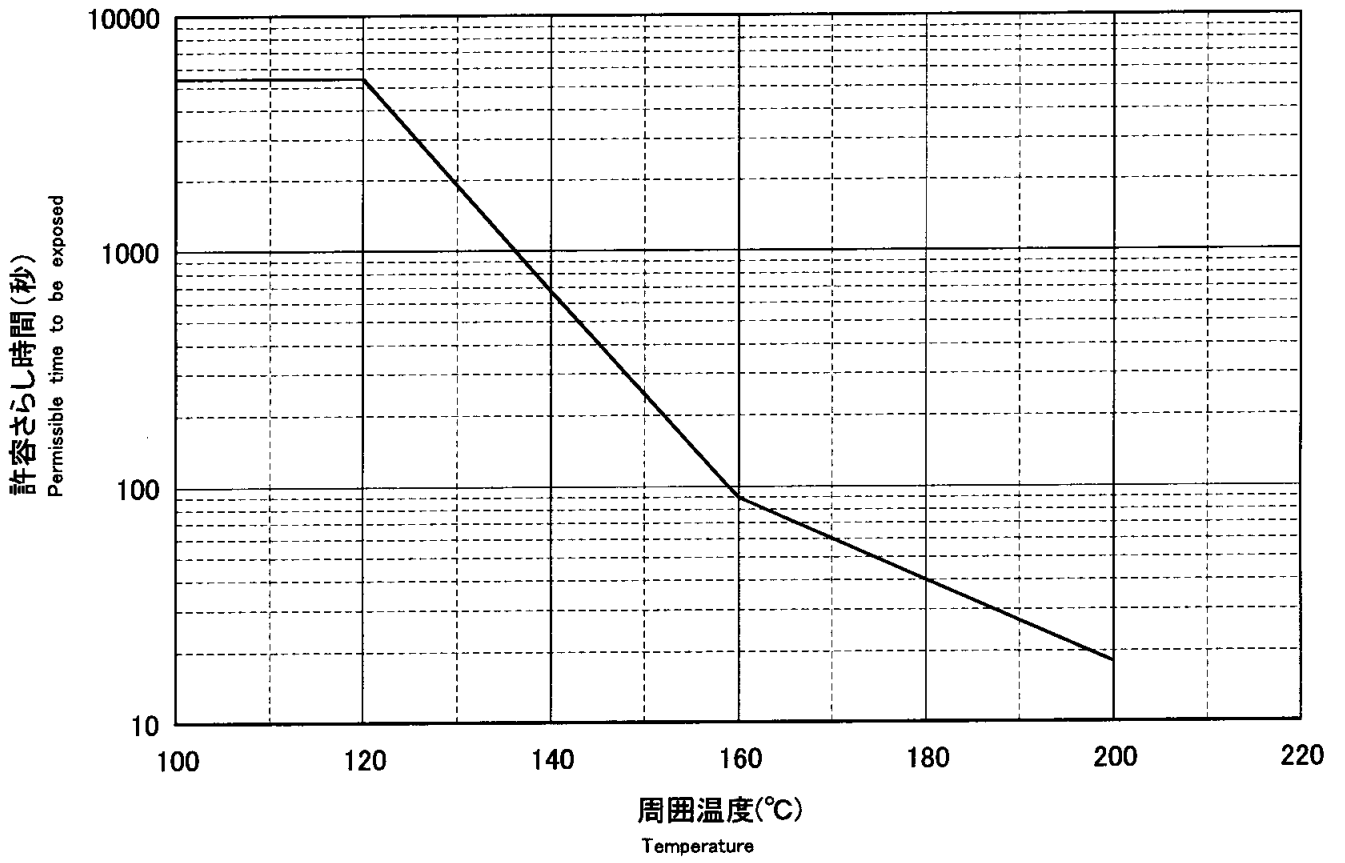
CHARACTERISTICS OF PERMISSIBLE CURRENT TO FREQUENCY (SINUSOIDAL WAVE)



周囲温度による許容さらし時間

Permissible time to be exposed to the ambient temperature

Type:AMA



SPECIFICATION

POLYESTER FILM CAPACITORS

SPEC No.

P S C 1 2 0 0 0

SPECIFICATION OF TAPING FOR AUTOMATIC INSERTION (Type AMAV, AMAS)

1. SCOPE

This specification applies to the taping dimensions and performance required for film capacitors used in the automatic radial insertion system.

Style of packing : Ammo pack

2. TAPING DIMENSIONS

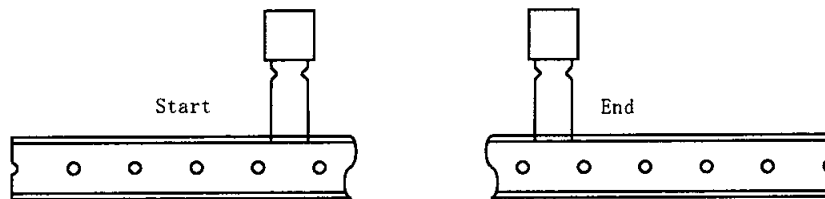
Type	Taping style	STYLE-1
	Rated voltage	
AMAV	100V. DC	102~104
AMAS		

3. TAPING PERFORMANCE (to be satisfied with the following point)

3-1. Appearance : To be no damages or cracks on components and the tape.

3-2. Missing components : A maximum of 3 consecutive components may be missing.

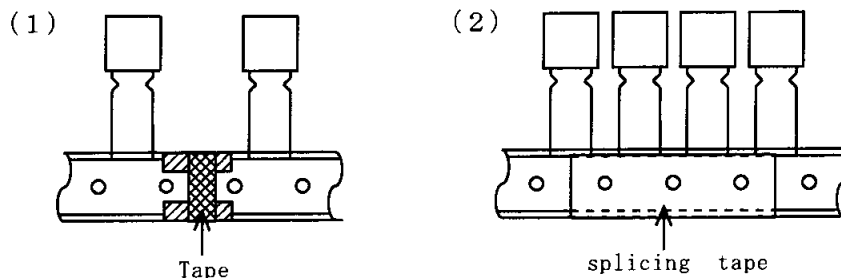
3-3. Tip of the tape : To leave the blank tape more than 4.5 feed hole pitch from the start, and the end of the tape.



3-4. Tape splicing : Tape splicing may be done with (1) or (2).

(1) The carrier tape (include hold-down tape) shall be cut at the center of hole and hole, and spliced with tape.

(2) The carrier tape (include hold down tape) shall be cut at the center of hole, and spliced with splicing tape.



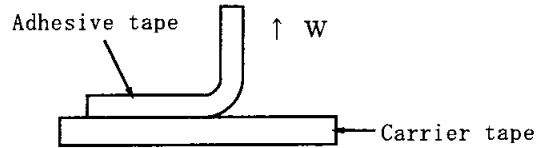
SPECIFICATION

POLYESTER FILM CAPACITOR

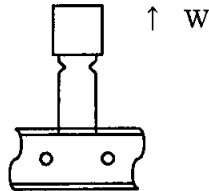
SPEC No.

P S C 1 2 0 0 0

- 3-5. Adhesive strength : When pulling an adhesive tape in W direction (upward) using a push-and-pull scale, adhesive strength shall be 3N or more



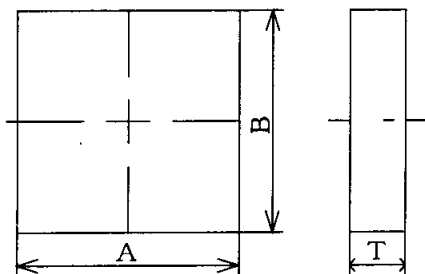
- 3-6. Tensile test : When pulling a test sample by the force 10N, there shall be no gaps or breakdowns.



- 3-7. Moisture resistance : A taped test sample shall be left in a chamber with a temperature of 40°C and RH95% for 96 hours. Then after being left for one hour at room temperature the test sample shall be submitted to a tensile test of item 3.6.

- 3-8. Temperature cycling test : A test sample shall be submitted to 5 cycles of temperature cycling test.
 One cycle consists of : 2 hours at -40°C
 2 hours at +85°C
 Then after being left for one hour at room temperature, the test sample shall be submitted to a tensile test of item 3.6.

4. BOX DIMENSIONS



(Unit : mm)

A	B	T
330±7	330±7	45±5

SPECIFICATION

POLYESTER FILM CAPACITOR

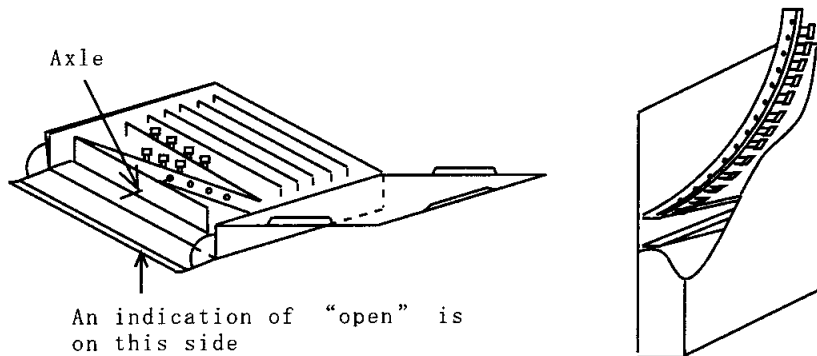
SPEC No.

PSC120000

5. STYLE OF PACKING (Ammo pack)

5-1. Packaging

- * Fold the tape in the cardboard box, with hold-down tepe turning up against an outlet opening.
- * Thread the feed hole with a axle and fix the tape.



5-2. Marking

The following particulars shall be labelled on the surface of a box.

Example)

CODE CUSTOMER				INSP DATE		PKG NO	
①				②			
PARTS NO				MACH NO		QTY/PKG	
③				④			
ORDER NO			LOT NO			ROHS	⑦
⑤			⑥				
TYPE	WV	TOL	CAP	EDP CODE		QT (PCS)	
⑧	⑨	⑩	⑪	⑫		⑬	

- ①CODE CUSTOMER
- ④MACH NO
- ⑦PRODUCTION COUNTRY
- ⑩TOL (%)
- ②INSP DATE
- ⑤ORDER NO
- ⑧TYPE
- ⑪CAP
- ③PARTS NO
- ⑥LOT NO
- ⑨W V
- ⑫EDP CODE
- ⑬QT (PCS)

SPECIFICATION

POLYESTER FILM CAPACITOR

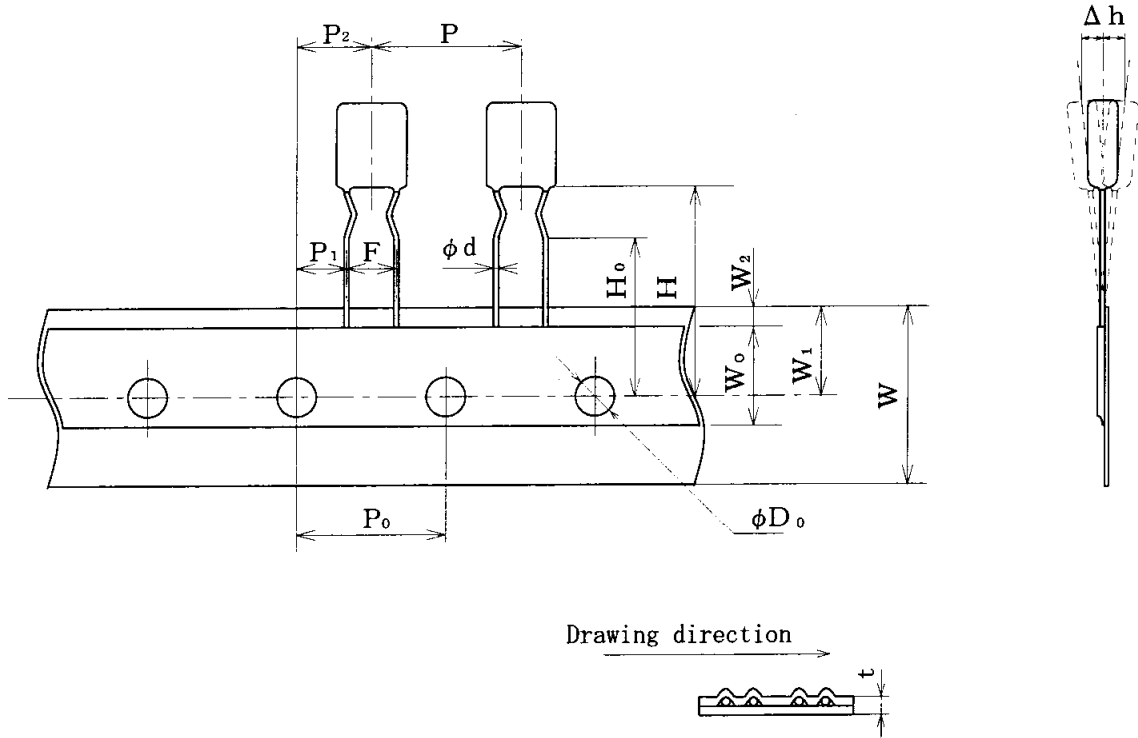
SPEC No.

PSC120000

Type AMAV
STYLE-1
(0200)

102 ~ 104

100V. DC



(Unit : mm)

P	P_0	(1) P_1	P_2	ϕd	(1) F	(2) Δh	W	W_0	W_1	(3) W_2	H	(1) H_0	ϕD_0	t
12.7	12.7	3.85	6.35	0.5	5.0	0	18.0	5.0 以上	9.0	3.0 以下	21.25 以下	16.0	4.0	0.7
± 1.0	± 0.3	± 0.7	± 1.3	± 0.05	± 0.1 ± 0.2	± 2.0	± 1.0 ± 0.5	—	± 0.5	—	—	± 0.5	± 0.2	± 0.2

(1) To be measured under the clinch-position.

(2) To be measured the top of component.

(3) Hold-down tape is not to exceed over the carrier tape.

SPECIFICATION

POLYESTER FILM CAPACITOR

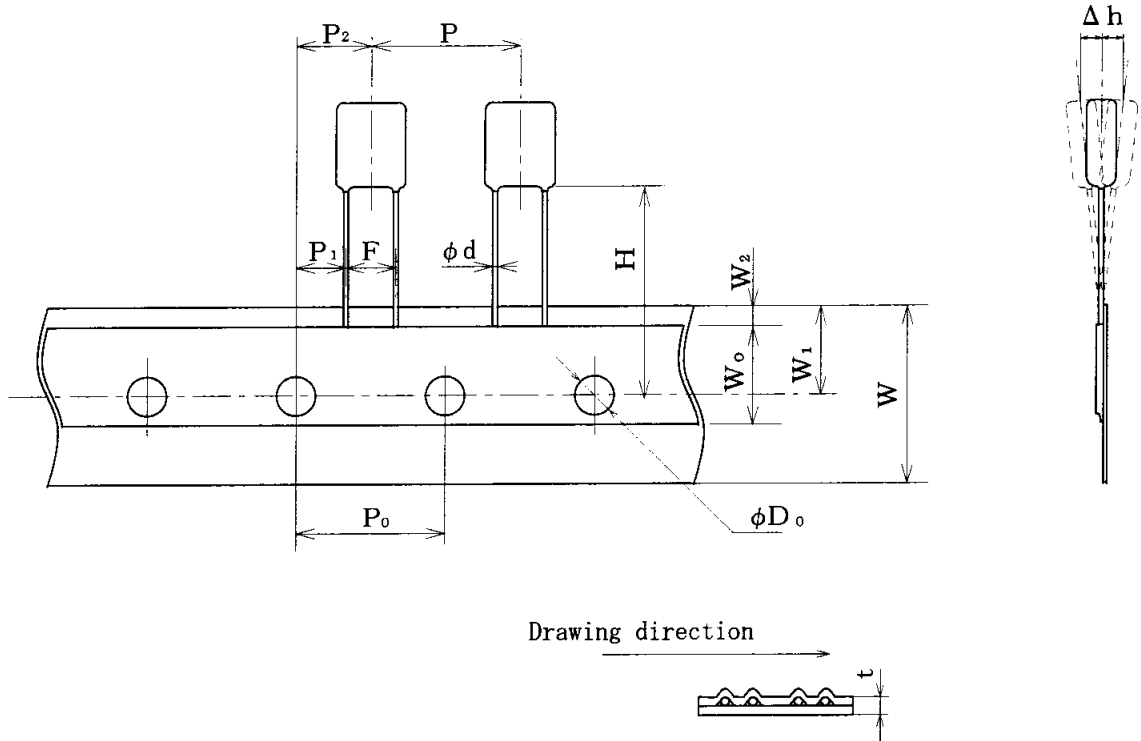
SPEC No.

PSC120000

Type AMAS
STYLE-1
(C220)

102 ~ 104

100V.DC



(Unit : mm)

P	P ₀	(1) P ₁	P ₂	φ d	(1) F	(2) Δ h	W	W ₀	W ₁	(3) W ₂	H	φ D ₀	t
12.7	12.7	(1)	6.35	0.5	(1)	0	18.0	5.0 以上	9.0	3.0 以下	18.5 以下	4.0	0.7
±1.0	±0.3	±0.7	±1.3	±0.05	± 0.2	±2.0	± 1.0	—	±0.5	—	—	±0.2	±0.2

(1) Measuring point shall be the upper side of carrier tape.

The dimensions of P₁ and F shall be as show below.

Cap	P ₁	F
102~363	4.60	3.5
393~104	3.85	5.0

(2) To be measured the top of component.

(3) Hold-down tape is not to exceed over the carrier tape.

SPECIFICATION

POLYESTER FILM CAPACITOR

SPEC No.

P S C 1 2 0 0 0 0

Packing quantity

AMAV, AMAS-100V. DC

(Unit : pcs)

Capacitance (μ F)	STYLE-1	Capacitance (μ F)	STYLE-1	Capacitance (μ F)	STYLE-1
0.0010	3,000	0.010	3,000	0.10	1,000
0.0012	"	0.012	"		
0.0015	"	0.015	2,000		
0.0018	"	0.018	"		
0.0022	"	0.022	"		
0.0027	"	0.027	"		
0.0033	"	0.033	"		
0.0039	"	0.039	"		
0.0047	"	0.047	"		
0.0056	"	0.056	1,000		
0.0068	2,000	0.068	"		
0.0082	"	0.082	"		



Cautions about safety In use of Capacitors

(AMA type)

登録番号

HWC120000

版

01

シート

1/2

When using a capacitor, please use one within the range of the specified values in the specification after checking the environments of using and mounting.

If used beyond the range specified in the specification or the attached cautions, it may lead to short circuit, open, smoking and firing.

Be sure to inquire of us as to the items which are not specified in the specification or are unclear to you.

Also, in case of using capacitors for such equipment or apparatus as may possibly affect human lives like life-support systems, aircraft and automotive control system, etc., please never fail to inquire of us as to further details.

1. Operating temperature and humidity

- (1) In actual use, make sure that the operating temperature is within the range specified in the specification.
- (2) Even if the operating temperature is within the specified range, sudden change in the operating temperature may lead to cracks on the enclosure and result in deterioration of the insulation resistance or the increase in tangent of loss angle by absorbing moisture through cracks on the enclosure.
Please take good care of the operating temperature.
- (3) Please avoid using a capacitor in high humidity which may lead to the condensation as much as possible.
Even if there are no cracks or damage on an enclosure, deterioration of the insulation resistance or the increase in tangent of loss angle, etc. may be caused by absorbing moisture.
Therefore, please be careful when using a capacitor.

2. When using a capacitor in a circuit except a d.c. one

When using a capacitor in a circuit except a d.c. one, a capacitor shall be used below the permissible current to frequency.

When used beyond the specified values, the capacitor surface temperature may rise due to the occurrence of corona charge or self heat generation of a capacitor and it may result in a short life, the destruction of the dielectric or the lowering of the insulation resistance.

At worst smoking or firing may be led.

3. Soldering

When soldering a capacitor, heat in soldering is conducted to the inside of the capacitor through lead wires and an enclosure.

Therefore soldering at high temperature and for hours may cause deterioration of characteristics or breakdown of a capacitor.

Be sure to solder a capacitor within the range specified in the specification when soldering. In case of soldering beyond the range recommended by us, please inquire of us as to the details in advance.

- (1) Avoid soldering over again in a short time.
When dipping again in order to correct, dipping must be applied after the temperature of a capacitor comes down to a room temperature and within twice.
- (2) Avoid any work that puts the stress on lead wires of a capacitor such as correction of the position right after soldering.
- (3) When soldering with a soldering iron, please see to it lest a soldering iron should touch the body of a capacitor directly.



Cautions about safety In use of Capacitors

(AMA type)

登録番号

HWC120000

版

01

シート

2/2

4. Mounting

- (1) When inserting a lead wire into the printed circuit board, the stress put on a lead wire shall be within the following range.
 - ① Bending of lead wire
When bending a lead wire vertically and then restoring straight, bending of a lead wire in the same place shall be less than two cycles. (One cycle -- bending at 90° and restoring straight)
 - ② Twisting of lead wire
Twisting of a lead wire should be carried out within a turn (a 360° turn) in total.
 - ③ Pulling of lead wire
The load in pulling of a lead wire shall be less than 20N.
In case that the above stress is combined together, the value in application should be set less than half of each value.
- (2) When mounting a capacitor by force owing to the difference of the space between lead wires of a capacitor from the space between the holes on the printed circuit board, be careful.
It may cause breakage of a lead wire or cracks on coating resin.
- (3) When mounting a capacitor of large size or a capacitor on the equipment affected by vibrations, fix the body of a capacitor with resin etc. which has no effect on a capacitor.
However, resin used for fixing shall be a flame retardant and minimum.
- (4) Mount a capacitor lest it should touch other parts.
Especially in case of touching a part with self heat generation, a capacitor may deteriorate due to heat and short circuit may be easily caused owing to lowering of dielectric strength or deterioration of the insulation resistance, etc..

5. Cleaning

- (1) When using the solvents for cleaning, use alcohol derivative cleaning solvents (isopropyl alcohol, etc).
- (2) Since a small amount of ingredient contained in flux may lead to corrosion of terminations of the capacitor or chemical change of the capacitor element, be sure to clean a printed circuit board right after soldering.
- (3) The temperature for drying after cleaning shall be less than the maximum operating temperature.
- (4) When cleaning with solvents but alcohol derivatives, please inquire of us in advance.

6. Storing and waste

- (1) Store under the conditions not exceeding -10 °C ~ +40 °C , 75%RH in the room and avoid storing in the place filled with a sudden change in the temperature, the direct sunlight or corrosive gases (hydrogen sulfide, sulfurous acid, chlorine and ammonia, etc.).
- (2) A long-term storage may cause deterioration of characteristics of a capacitor due to absorbing moisture little by little.
Therefore, be sure to use after checking its characteristics and solderability if stored for over one year.
- (3) As capacitors are classified into industrial waste, please ask experts to dispose of them.

7. The others

Please refer to "Guideline of notabilia for fixed plastic film capacitors for use in electronic equipment" published by Electronic Industries Association of Japan (EIAJ RCR-2350) unless specified in the specification.