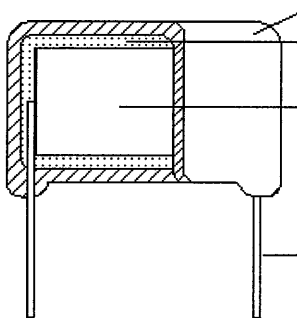


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1. SCOPE	This specification covers the requirement for metallized polypropylene dielectric fixed capacitor for use in electronic equipments.	
2. PRODUCT NAME	Metallized polypropylene film capacitor, Type ECWH (V).	
3. PRODUCT RANGE	Operating temperature range	− 40 to 85°C (105°C) ;Including temperature rise on unit surface. (Refer to Fig.1 and Fig.2 when the temperature exceeds 85°C.)
	Rated voltage	Refer to the individual drawing. (Refer to Fig.1 when the temperature exceeds 85°C.)
	Capacitance range	Refer to the individual drawing.
	Capacitance tolerance	Refer to the individual drawing.
4. APPEARANCE	1. Marking shall be legible in the right place. 2. Lead wire shall be covered perfectly by plating without rust. 3. There shall be no problem (any crack, rent, pinhole etc. of coating) to use.	
5. CONSTRUCTION	The capacitor has a non-inductive construction, wound with metallized polyester and polypropylene film dielectric. The capacitor is enclosed in noncombustible epoxy resin and has two leads.  Noncombustible epoxy resin (Flammability: UL94 V-0) Epoxy resin Element (Metallized polyester, Polypropylene) Lead wire	
6. DIMENSIONS	As specified in the individual drawing.	
7. STANDARD TEST CONDITION	The test shall be conducted at a temperature from 15°C to 35°C, a humidity from 45% to 75%. However the test shall be conducted at a temperature of 20±2°C, a humidity of 65±5%, when doubt is entertained about judgement.	
8. MARKING	Marking shall not be erased easily and describes the following items as a rule. 1. Capacitance 2. Capacitance tolerance code 3. Rated voltage 4. Date code 5. Manufacture's trade mark 6. Type name (WHV)	

Date 1996.11.18	Established	Date 2006. 4. 1	Revision H	QA Dept. Approved by	Approved by	Controlled by
Date 2003.10. 1	Revision E	Date 2006. 12. 4	Revision I			M. Kashio
Date 2004.10. 1	Revision F	Date 2008. 4. 1	Revision J			
Date 2005. 4. 1	Revision G	Date 2008. 7.30	Revision K			

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9.CHARACTER

No	Item	Performance	Testing method				
1.	Withstand voltage	[between terminals]: Nothing abnormal shall be found, when applied the voltage of 150% of the rated voltage for 60 seconds. [terminals and enclosure]: Nothing abnormal shall be found, when applied the voltage of AC1500V for 60 seconds. (The capacitor shall be applied the voltage through a resistor of 2kΩ or more when charge and discharge.)	JISC5101-16-1999 (IEC 60384-16)				
2.	Insulation resistance	[between terminals] 30000MΩ or more Measured after applying the voltage of DC 500±15V for 60 ±5 seconds, at 20°C.	JISC5101-16-1999 (IEC 60384-16)				
3.	Capacitance	Within a range of specified value. (Measured at a frequency of 1±0.2kHz ,at 20°C and a voltage of 5V or less.)	JISC5101-16-1999 (IEC 60384-16)				
4.	Dissipation factor	0.10% or less at 1kHz 0.20% or less at 10kHz (Measured at a frequency of 1±0.2kHz or 10±0.2kHz, at 20°C and a voltage of 5V or less)	JISC5101-16-1999 (IEC 60384-16)				
5.	Connection	The connection of the element shall not open even Instantaneously.	JISC5101-16-1999 (IEC 60384-16)				
6.	Termination strength	[tensile strength] The load specified below shall be applied to the terminal in its draw-out direction gradually up to the specified value and held thus for 10±1 seconds. After the test, the breaking or loosening of the terminal shall not be found. <table border="1"><tr><td>Lead wire diameter [mm]</td><td>Tensile force [N]</td></tr><tr><td>over 0.5 to 0.8</td><td>10.0±1.0</td></tr></table>	Lead wire diameter [mm]	Tensile force [N]	over 0.5 to 0.8	10.0±1.0	JISC5101-16-1999 (IEC 60384-16)
		Lead wire diameter [mm]	Tensile force [N]				
over 0.5 to 0.8	10.0±1.0						
[bending strength] While applying the load specified below to the lead wire, the Body of the capacitor shall be bend 90° and returned to the original position. This operation shall be conducted in a few seconds. Then the body shall be bent 90°,at the same speed in the opposite direction and returned to the original position. After the test, the breaking or loosening of the terminal shall not be found. <table border="1"><tr><td>Lead wire diameter [mm]</td><td>Bending force [N]</td></tr><tr><td>over 0.5 to 0.8</td><td>5.0±0.5</td></tr></table>	Lead wire diameter [mm]	Bending force [N]	over 0.5 to 0.8	5.0±0.5	JISC5101-16-1999 (IEC 60384-16)		
Lead wire diameter [mm]	Bending force [N]						
over 0.5 to 0.8	5.0±0.5						

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9.CHARACTER

No	Item	Performance	Testing method
7.	Vibration	The following vibration shall be applied to the capacitor. Range of vibration frequency 10 to 55 Hz total amplitude 1.5mm, rate of frequency vibration to be such as to vary from 10 to 55 Hz and return to 10 Hz in about 1 minute and thus repeated. Thus shall be conducted for 2.0 hours each (total 6.0 hours) in 3 mutually perpendicular directions. The connection shall not get short-circuit or open when examined the connection of the element in compliance with the previous item (connection of element) during the last 30 minutes of the test.	JISC5101-16-1999 (IEC 60384-16)
8.	Soldering property	The lead wire shall be immersed in methanol solution of resin (about 10%) and its depth of dipping shall be up to 1.5+0.5/-0mm from the root of the terminal in the solder bath at a temperature of $235 \pm 5^{\circ}\text{C}$ for 2 ± 0.5 seconds, by using a heat shielding plate. After test immersion, the solder shall be stucked to more than 90% in the circumferential direction of the lead wire.	JISC5101-16-1999 (IEC 60384-16)
9.	Soldering heat resistance	[1]The lead wire shall be immersed in methanol solution of resin (about 10%) and its depth of dipping shall be up to 1.5+0.5/-0mm from the root of the terminal in the solder bath at a temperature of $350 \pm 10^{\circ}\text{C}$ for 3.5 ± 0.5 seconds by using a heat shielding plate. After the immersion is finished, the capacitor shall be let alone at ordinary temperature and humidity for 1 to 2 hours. After this, the capacitor shall be satisfied with the following performance. Appearance : No remarkable change Withstand voltage : [between terminals] Nothing abnormal shall be found, when applied a voltage of 150% of rated voltage for 60 seconds. Insulation resistance : [between terminals] 10000MΩ or more Change rate of capacitance : Within $\pm 3\%$ of the value before the test.	JISC5101-16-1999 (IEC 60384-16)
10.	Component solvent resistance	The capacitor shall be completely immersed into the reagent of Isopropyl alcohol for 5 ± 0.5 min at $23 \pm 5^{\circ}\text{C}$. After this, the capacitor shall be satisfied with the following performance. Appearance : No remarkable change. Marking : To be legible	JISC5101-16-1999 (IEC 60384-16)

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9.CHARACTER

No	Item	Performance	Testing method
11.	Characteristic s depending on temperature Low category temperature	Change rate of capacitance at $-40\pm 3^{\circ}\text{C}$ after 2+1/-0 hours: Within +3/-0% of the value before the test.	JISC5101-16-1999 (IEC 60384-16)
12.	Characteristic s depending on temperature upper category temperature	Insulation resistance at $+85\pm 2^{\circ}\text{C}$ after 2+1/-0 hours: [between terminals] 3000M Ω or more Change rate of capacitance at $+85\pm 2^{\circ}\text{C}$ after 2+1/-0 hours: Within +0/-5% of the value before the test.	JISC5101-16-1999 (IEC 60384-16)
13.	Rapid change of temperature	The capacitor under the test shall be stored in the testing oven and kept at condition of the temperature of $-40\pm 3^{\circ}\text{C}$ for 30 ± 3 minutes. After this, the capacitor shall be let alone at the ordinary temperature for 3 minutes or less. After this, the capacitor under the test shall be stored in the testing oven and kept at condition of the temperature of $+85\pm 2^{\circ}\text{C}$ for 30 ± 3 minutes. Then the capacitor shall be let alone at the ordinary temperature for 3 minutes or less. This operation shall be counted as 1 cycle, and it shall be repeated for 5 cycles successively. After the test, the capacitor shall be let alone at the ordinary condition for 1.5 ± 0.5 hours, and shall be satisfied with the following performance. Appearance : No remarkable change. Insulation resistance : [between terminals] 15000M Ω or more Change rate of capacitance : Within $\pm 5\%$ of the value before the test. Dissipation factor : 0.12% or less (at 1kHz)	JISC5101-16-1999 (IEC 60384-16)
14.	Damp heat	The capacitor under test shall be put in the testing oven and kept at condition of the temperature $+40\pm 2^{\circ}\text{C}$ and the humidity at 90 to 95% for 500+24/-0 hours and then shall be let alone at ordinary condition for 1.5 ± 0.5 hours. After the test, the capacitor shall be satisfied with the following performance. Appearance : No remarkable change. Withstand voltage : [between terminals] Nothing abnormal shall be found, when applied a voltage of 150% of the rated voltage for 60 seconds. Insulation resistance : [between terminals] 10000M Ω or more Change rate of capacitance : Within $\pm 5\%$ of the value before the test.	JISC5101-16-1999 (IEC 60384-16)

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	Dissipation factor : 0.12% or less (at 1kHz)	
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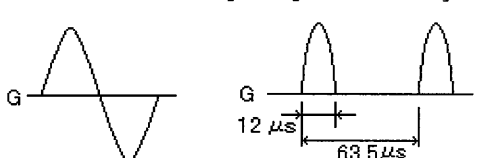
9.CHARACTER

No	Item	Performance	Testing method
15.	Damp heat loading	The capacitor under test shall be applied the rated voltage continuously for 500+24/-0 hours in the testing oven and kept at condition of the temperature $+40\pm 2^{\circ}\text{C}$ and the humidity at 90 to 95% and then shall be let alone at ordinary condition for 1.5 ± 0.5 hours. After the test, the capacitor shall be satisfied with the following performance. Appearance : No remarkable change. Withstand voltage : [between terminals] Nothing abnormal shall be found, when applied a voltage of 150% of the rated voltage for 60 seconds. Insulation resistance : [between terminals] 10000MΩ or more Change rate of capacitance : Within $\pm 5\%$ of the value before the test. Dissipation factor : 0.12% or less (at 1kHz)	JISC5101-16-1999 (IEC 60384-16)
16.	Endurance	The capacitor under the test shall be applied the voltage of 125% of rated voltage(DC) continuously through a resistance of 20 to 1000Ω per one volt for 1000 +48/-0 hours in the testing oven and kept at condition of the temperature at $85\pm 2^{\circ}\text{C}$ and then shall be let alone at ordinary condition for 1.5 ± 0.5 hours. After the test, the capacitor shall be satisfied with the following performance. Appearance : No remarkable change. Insulation resistance : [between terminals] 15000MΩ or more Change rate of capacitance : Within $\pm 5\%$ of the value before the test. Dissipation factor : 0.11% or less (at 1kHz)	JISC5101-16-1999 (IEC 60384-16)

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9.CHARACTER

No	Item	Performance	Testing method												
17.	High frequency loading	The capacitor under test shall be applied the voltage of 120% of the below voltage(V) , for 1000 +48/-0 hours in the testing oven kept at 85±2℃. (In case of the wave-form 2, it shall be applied the below table's voltage) After this, the capacitor shall be let alone at ordinary temperature for 1.5±0.5 hours. After the test, the capacitor shall be satisfied with the following performance. [wave form1 : sine curve] [wave form2]  Voltage of wave form 1 $V = \frac{I}{2 \pi fC}$ I : Permissible Current f : Frequency C : Capacitor π : 3.14 Voltage of wave form 2 <table border="1"><thead><tr><th>Rated voltage(DC)</th><th>Rated voltage(AC)</th></tr></thead><tbody><tr><td>800VDC</td><td>——</td></tr><tr><td>1000VDC</td><td>——</td></tr><tr><td>1250VDC</td><td>1000Vpp</td></tr><tr><td>1600VDC</td><td>1200Vpp</td></tr><tr><td>2000VDC</td><td>1500Vpp</td></tr></tbody></table> Appearance : No remarkable change. Insulation resistance : [between terminals] 15000MΩ or more Change rate of capacitance : Within ±5% of the value before the test. Dissipation factor : 0.11% or less (at 1kHz)	Rated voltage(DC)	Rated voltage(AC)	800VDC	——	1000VDC	——	1250VDC	1000Vpp	1600VDC	1200Vpp	2000VDC	1500Vpp	
Rated voltage(DC)	Rated voltage(AC)														
800VDC	——														
1000VDC	——														
1250VDC	1000Vpp														
1600VDC	1200Vpp														
2000VDC	1500Vpp														
18.	Temperature rise	The capacitor shall be applied permissible current and shall be measured temperature of capacitor surface by thermocouple.(refer to page.10) The temperature rise of capacitor shall be 20℃ or less.													

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Fig.1 VOLTAGE DERATING vs. TEMPERATURE

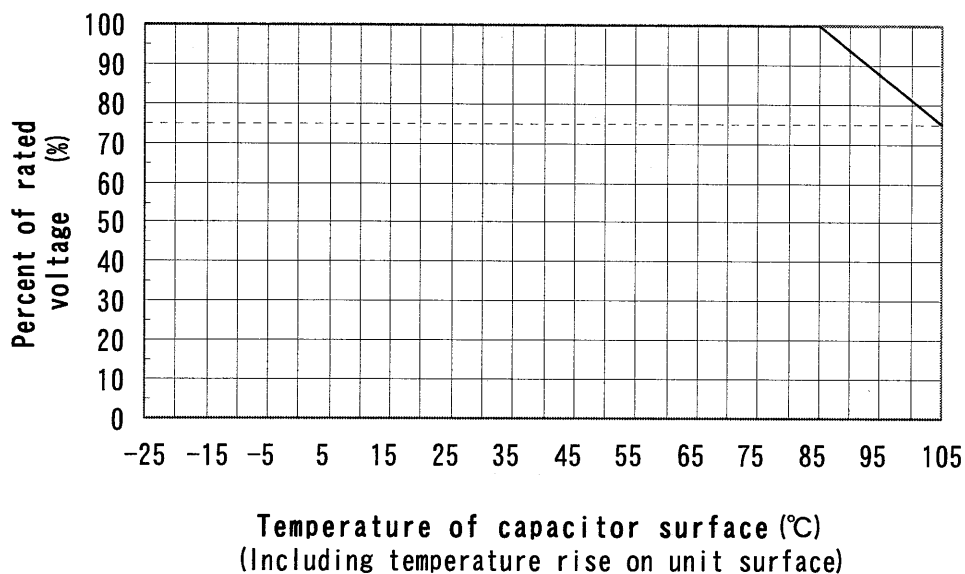
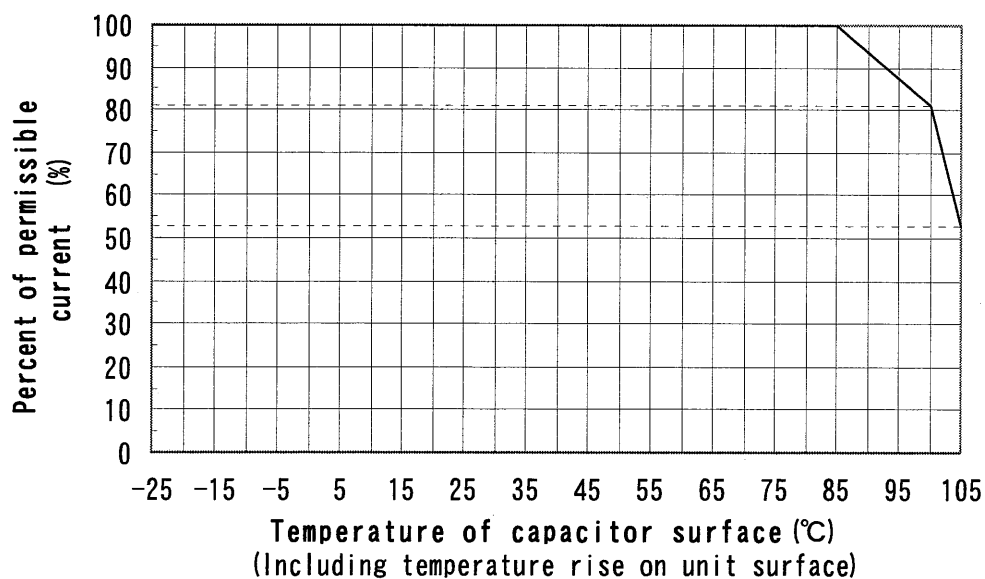


Fig.2 PERMISSIBLE CURRENT DERATING vs. TEMPERATURE



- (Note) 1 The temperature of capacitor’s surface that include the own temperature rise should not exceed the prescribed value.
2. Please confirm that temperature rise of capacitor except other components' influence is not more than 20 degrees.

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10. Cautions about safety in use

(1) Permissible conditions

Use components within the specified limits listed below (① to ③). Over rated conditions might cause deterioration, damage, smoke and fire. Don't use over rate.

① Permissible voltage

- Use the peak value (V_{0-p}) of the voltage which applied to both terminal of the capacitor within the rated voltage

② Permissible current

It refers Permissible current to PERMISSIBLE CURRENT vs. FREQUENCY of 11~23page

③ Operating temperature range

- Please notice that the category temperature range is the surface temperature of the capacitor, not the ambient temperature of the capacitor.
- Please control the self heating temperature rise within 20°C or less in 85°C or less of category temperature.
- Please make sure the sum of the ambient temperature + capacitor's self heating temperature rise value (Within specified value), and the capacitor surface temperature is within the rated operating temperature range shown in page 1/23.
- If there is cooling plate of other part or any resistance near the capacitor, the capacitor may be locally heated by the radiation heat, and then it's temperature exceeding the category temperature range, and smoking or firing may be caused. Check the capacitor surface temperature at the heat source side.

(2) Please provide the protective means for safety if the pulse or rms current is exceed the permissible values, by the abnormal action of in the circuit.

(3) Sudden charging or discharging may cause deterioration of capacitor such as shorting and opening by the charging or discharging current.

When charging or discharging, pass through a resistance of 2kΩ or more.

(4) Don't give a shock or damage to the capacitor.

And the lead wire should no be given force over the value specified in 9.6 Termination strength test (re-processing of lead wire, etc.)

(5) Storage and use keeping of the product

① Storage product

- Please keep the capacitor within 3years after shipment as a rule, in temperature of 35°C or less and humidity of 85%RH or less.

If capacitor was kept for long period, soldering property is fall by oxidation of lead wire surface.

Therefore we recommend the keeping period within 6month.

② Keeping or using in high humidity.

Please ask to us when used or stored in high humidity for a long period, because characteristic deterioration as low insulation resistance and oxidized electrode may occur due to the humidity absorbed through the enclosure of the components.

③ Cautions on gas atmosphere

- When using in an oxidizing gas such as hydrogen chloride, hydrogen sulfide and sulfurous acid, the evaporated film or metallized contact may be oxidized and may result in smoke or fire.

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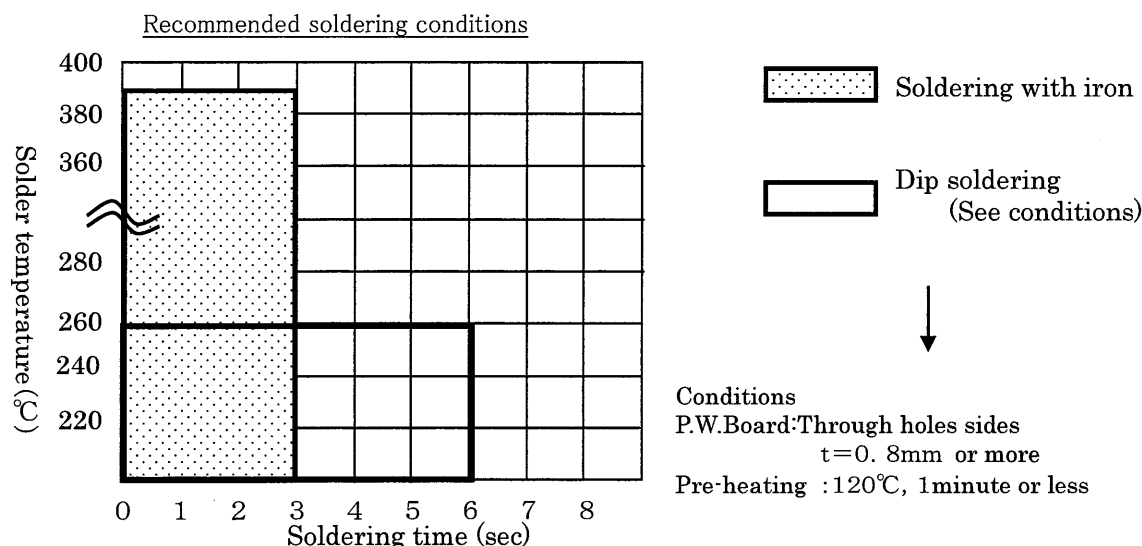
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④When using by resin coating

- Please ask to us when use the resin coating or resin embedding for the purpose of improvement of humidity resistance or gas resistance, or fixing of parts.
- The solvent which contained in the resin permeate into the capacitor, and it may deteriorate the characteristic.
- When hardening the resin, chemical reaction heat(curing heat generation) happen and it may occurs the infection to the capacitor.
- The lead wire might be cut down and the soldering crack might be happen by expansion or contraction of resin hardening. Therefore, please try to technical check before using.

(6) Cautions for soldering

- Soldering conditions refer to the blow figure page 9/23.
Please ask to us when exceeding the recommended soldering conditions. Soldering time should be the total time of 1st bath and 2nd bath in 2 bath soldering equipment.
- Recommended soldering condition is for the guideline for ensuring the basic characteristics of the components, not for the stable soldering conditions. Conditions for proper soldering should be set up according to individual conditions.
- Avoid passing through an adhesive curing oven in order to cure the resin for fixing the chip parts, in combination with chip parts. (Or an excessive heat over the mounting heat resisting temperature may be applied, leading to breakage of coating resin or deterioration of capacitor characteristic.)
When combining with chip parts, after curing the adhesive, insert capacitor, and solder.
- Avoid reflow soldering by combining with chip parts. (Or an excessive heat over the mounting heat resisting temperature may be applied, leading to breakage of coating resin or deterioration of capacitor characteristic.)
- If re-working or dipping twice in necessary, it should be done after the capacitor returned to the normal temperature.(for 30minutes in room temperature)
Please ask to us when three times dipping is necessary.
- Please ask to us about the using of many layer board.



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(7) Washing

- We recommend the ethanol or isopropyl alcohol for capacitor washing.
(Please ask to us about the other solvents)
- Washing in short duration is recommended in case detergent percolate capacitor affects its performances.

(8) Withstand voltage test

When many capacitors are parallel-connected for a withstand voltage test, following method is recommended.

DC withstand voltage : A resistor of a resistance value of (20~1000) Ω/V or more is series-connected to each capacitor.

AC withstand voltage : A barrister is parallel-connected to each capacitor for a prevention of excessive voltage.

(9) Hum(Buzz)

- Hum produced by capacitors due to mechanical vibration of the film are caused by the Coulomb force which exists between electrodes of opposite polarity.
- A louder hum is produced when applied voltage waveform has distortion, and higher frequency component, etc. Although hum does not spoil characteristics of capacitors.

Method of measuring own temperature rise

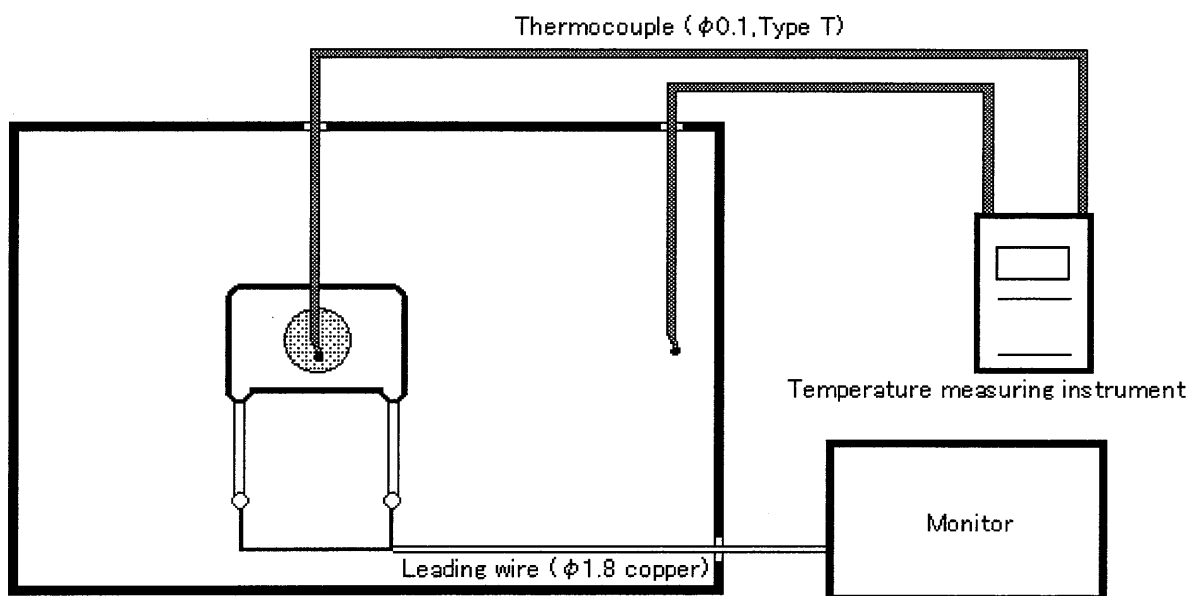
As shown below, attach a thermocouple to the capacitor with adhesive or the like, and measure the capacitor temperature with care not to be affected by radiation heat from other parts.

Own temperature rise is temperature which subtracted atmospheric temperature surrounding capacitor from temperature of capacitor surface. (They shall be measured in normal temperature.)

In case of being influenced by heat of surrounding components, to avoid effects of convection or heat, put the capacitor into box or the like, and measure in wind-free condition.

They shall be measured at the center of body.

(Use thermocouple with $\phi 0.1$, T type)



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PERMISSIBLE CURRENT vs. FREQUENCY

Rated voltage : 800VDC

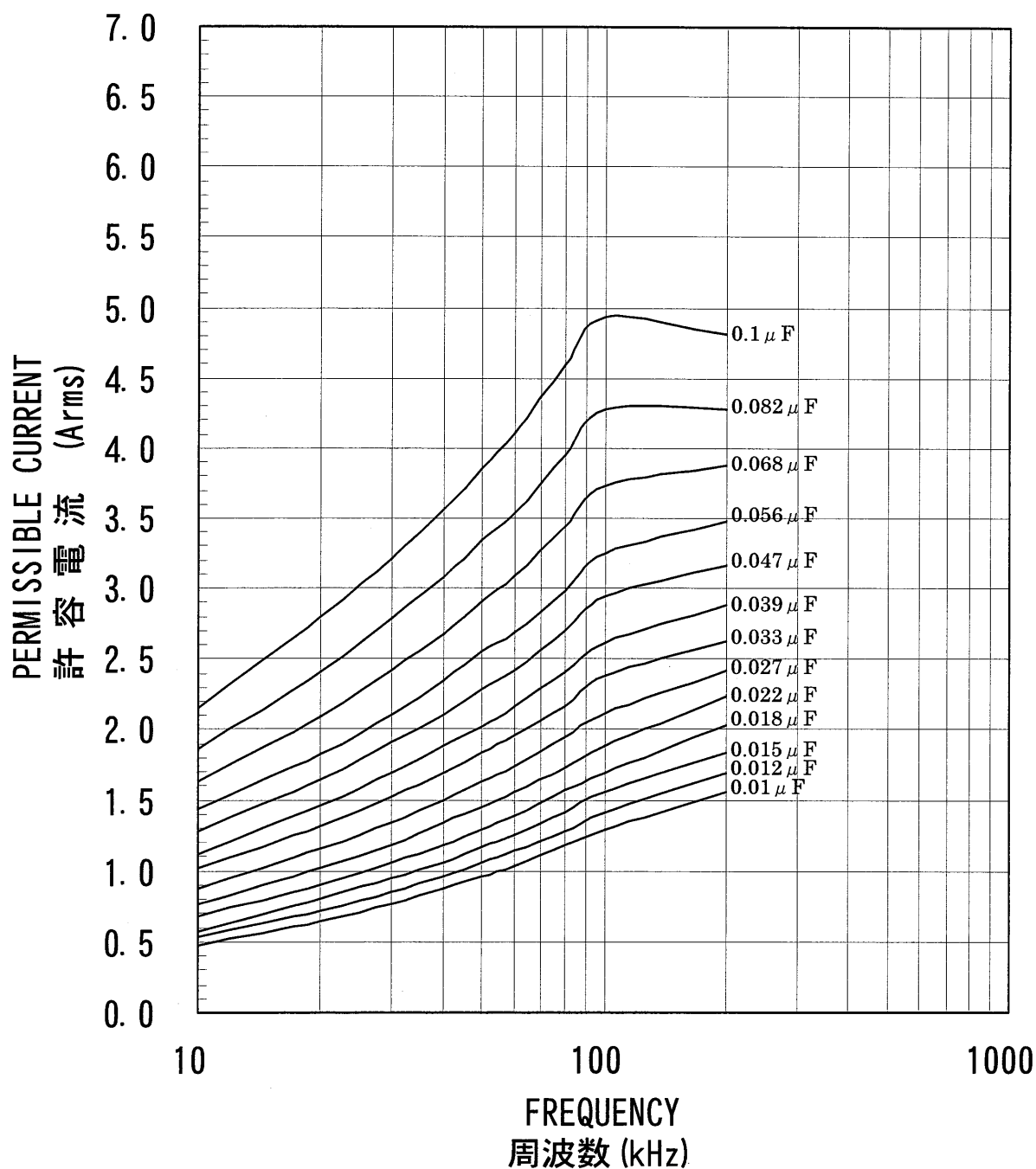
Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.
(Refer to Fig.2 when the temperature exceeds 85°C)

[About the value of under 0.01 μ F]

0.0010~0.0033 μ F : the same value as the 1600VDC

0.0039~0.0068 μ F : the same value as the 1250VDC

0.0082 μ F : the same value as the 1000VDC



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PERMISSIBLE CURRENT vs. FREQUENCY

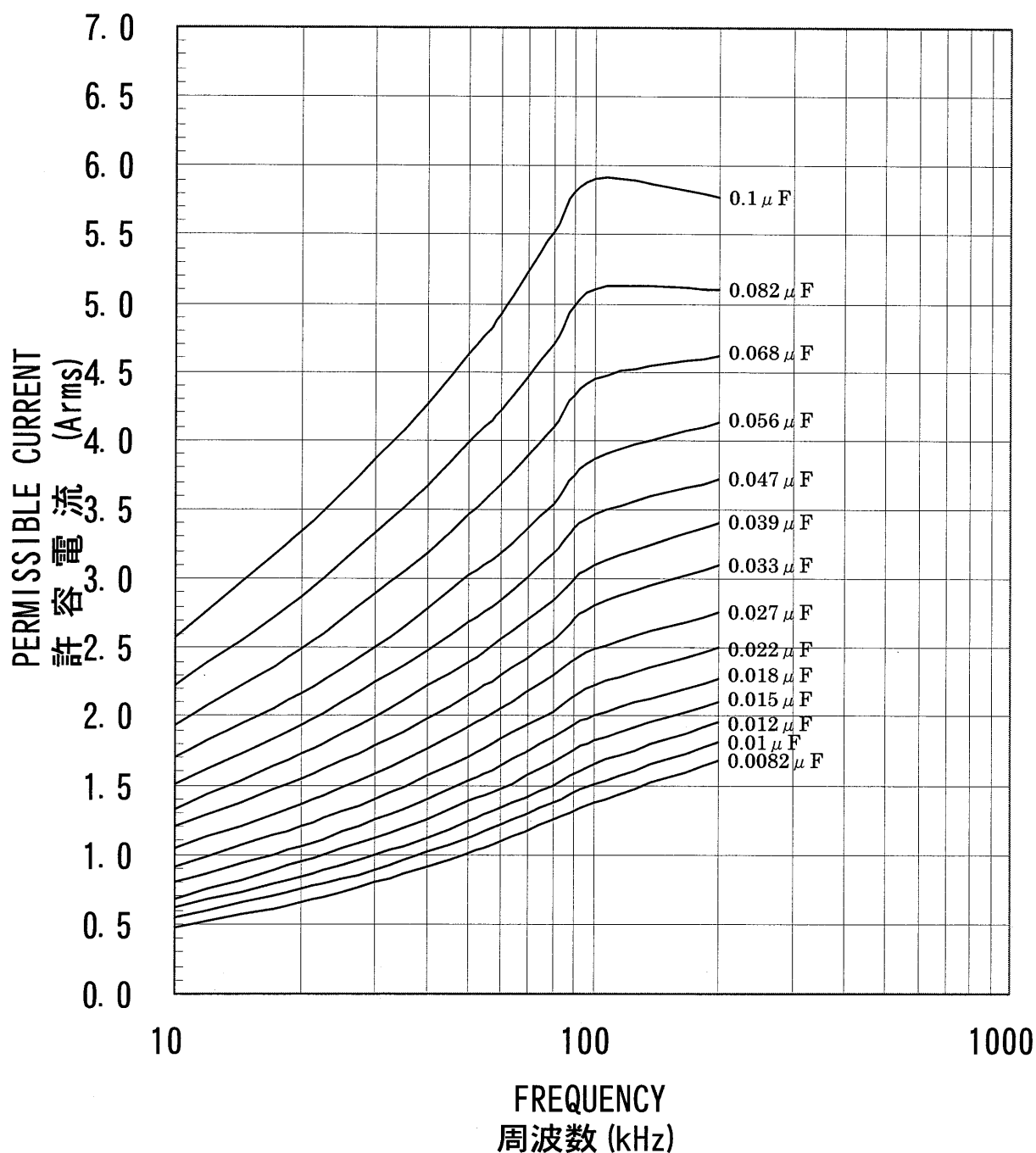
Rated voltage : 1000VDC

Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.
(Refer to Fig.2 when the temperature exceeds 85°C)

[About the value of under 0.0082 μ F]

0.0010~0.0033 μ F : the same value as the 1600VDC

0.0039~0.0068 μ F : the same value as the 1250VDC



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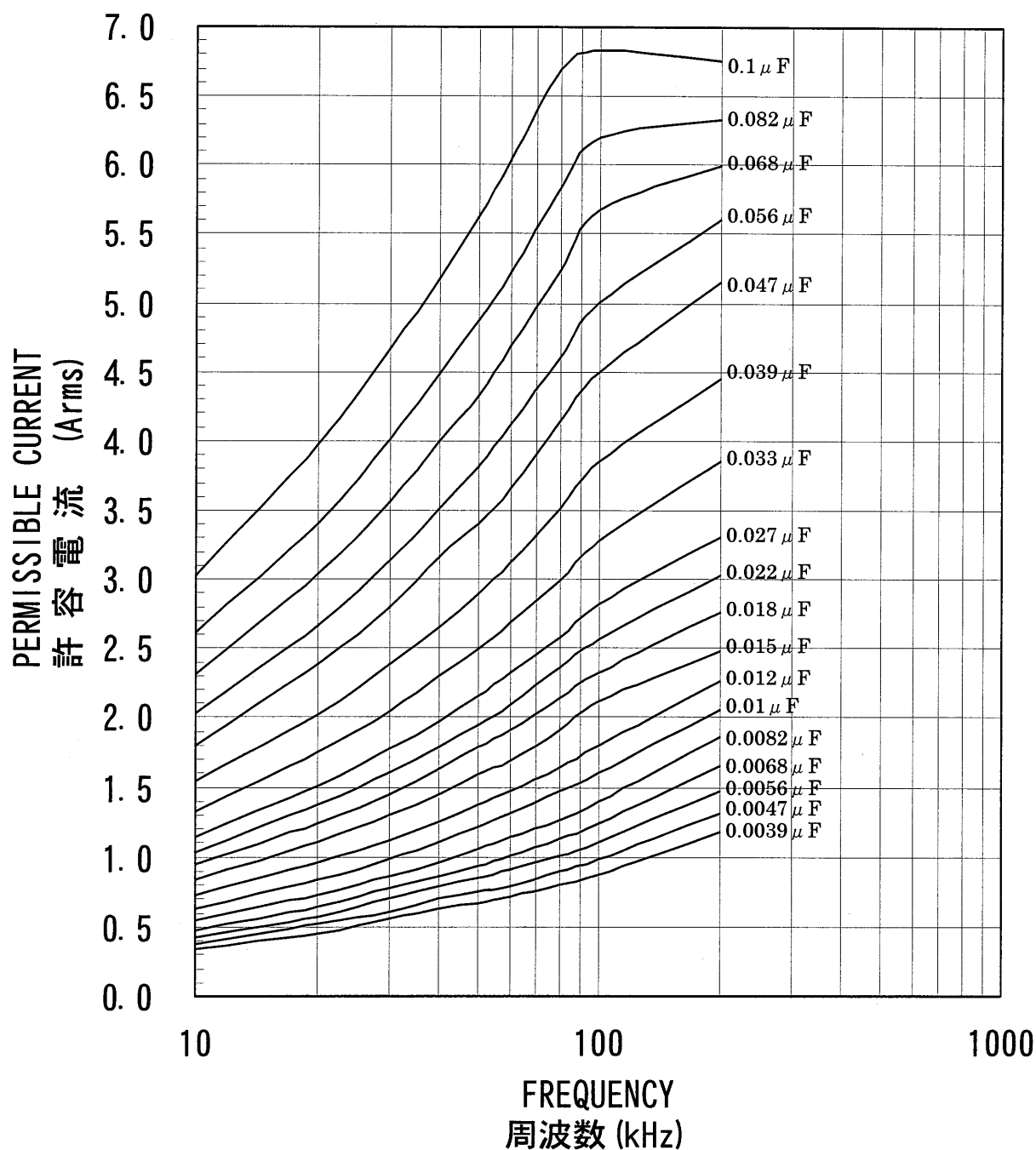
PERMISSIBLE CURRENT vs. FREQUENCY

Rated voltage : 1250VDC

Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.
(Refer to Fig.1 when the temperature exceeds 85°C)

[About the value of under 0.0039 μ F]

0.0010~0.0033 μ F : the same value as the 1600VDC



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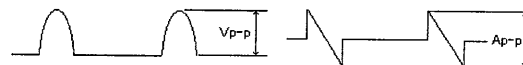
PERMISSIBLE CURRENT vs. FREQUENCY (Pulse wave)

Rated voltage : 1250VDC (1000V_{P-P})

Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.
(Refer to Fig.2 when the temperature exceeds 85°C)

[About the value of under 0.0039 μF]

0.0010~0.0033 μF : the same value as the 1600VDC



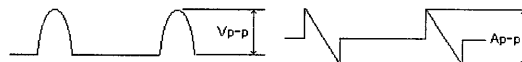
Frequency Duty Capacitance	Permissible current(A _{P-P})									
	15.75kHz					25kHz				
	10%	15%	20%	25%	30%	10%	15%	20%	25%	30%
0.0039 μF	7.2	5.9	4.8	3.8	3.2	8.1	7.2	5.7	4.8	4.1
0.0047 μF	7.7	6.3	5.2	4.2	3.5	8.9	7.7	6.3	5.2	4.5
0.0056 μF	8.7	7.3	6.0	4.9	4.2	9.9	8.6	7.0	5.9	5.0
0.0068 μF	9.8	8.2	6.7	5.3	4.6	11.0	9.9	8.0	6.6	5.6
0.0082 μF	11.2	9.3	7.6	6.0	5.2	12.6	11.3	9.0	7.4	6.4
0.010 μF	12.8	10.4	8.7	6.9	6.0	14.3	12.8	10.4	8.4	7.3
0.012 μF	14.2	11.9	9.8	7.7	6.7	15.9	14.3	11.5	9.5	8.1
0.015 μF	16.6	14.0	11.3	8.8	7.8	18.4	16.7	13.6	10.9	9.5
0.018 μF	18.5	15.4	12.6	10.1	8.8	20.3	18.5	14.8	12.2	10.5
0.022 μF	20.2	17.0	13.7	10.9	9.5	22.5	20.5	16.7	13.4	11.5
0.027 μF	22.1	18.6	15.1	12.2	10.8	24.5	22.3	18.1	15.0	12.9
0.033 μF	25.7	21.6	17.6	14.3	12.5	28.6	25.9	20.9	17.2	14.8
0.039 μF	30.1	25.4	20.7	16.5	14.6	33.4	30.4	24.5	20.3	17.5
0.047 μF	34.4	29.0	23.8	19.2	16.8	39.1	35.0	28.0	23.2	19.7
0.056 μF	39.7	33.2	27.2	21.6	19.0	43.5	40.1	32.3	26.6	22.8
0.068 μF	45.8	37.7	30.7	24.6	21.6	47.7	46.2	36.7	30.1	25.9
0.082 μF	50.8	42.3	34.6	27.7	24.4	51.3	51.2	41.4	33.6	29.0
0.10 μF	56.0	48.3	39.8	32.1	28.1	55.9	56.4	47.2	38.8	33.2

Frequency Duty Capacitance	Permissible current(A _{P-P})							
	35kHz					45kHz		
	10%	15%	20%	25%	30%	20%	25%	30%
0.0039 μF	9.1	7.9	6.6	5.5	4.6	7.3	6.0	5.2
0.0047 μF	10.1	8.7	7.3	5.9	5.0	8.1	6.4	5.6
0.0056 μF	11.3	9.6	8.0	6.6	5.6	9.0	7.3	6.2
0.0068 μF	12.6	10.8	9.1	7.4	6.4	9.9	8.3	7.1
0.0082 μF	14.3	12.4	10.5	8.5	7.3	11.5	9.4	8.1
0.010 μF	16.1	13.9	11.9	9.7	8.3	13.0	10.8	9.2
0.012 μF	17.7	15.6	13.3	10.9	9.2	14.4	11.9	10.2
0.015 μF	20.2	18.2	15.5	12.6	10.9	16.8	13.7	11.9
0.018 μF	22.1	20.0	17.1	14.0	12.0	18.6	15.4	13.3
0.022 μF	24.2	22.1	19.0	15.7	13.3	20.6	17.2	14.8
0.027 μF	26.4	24.1	20.6	16.9	14.6	22.4	18.8	16.0
0.033 μF	30.6	28.1	24.1	19.7	16.8	26.2	21.7	18.6
0.039 μF	35.6	33.0	28.1	23.2	19.9	30.7	25.5	21.8
0.047 μF	41.4	38.7	32.5	26.3	22.5	36.0	29.3	24.8
0.056 μF	45.2	43.3	37.2	30.5	26.2	40.2	33.5	28.8
0.068 μF	48.7	47.8	42.6	34.9	29.7	44.5	38.2	33.2
0.082 μF	51.8	51.7	46.6	39.3	33.3	48.3	41.9	37.0
0.10 μF	55.9	56.3	51.4	43.8	38.2	52.5	46.2	40.9

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参考
Reference

PERMISSIBLE CURRENT vs. FREQUENCY (Pulse wave)



Rated voltage : 1250VDC (1000V_{P-P})

Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.

(Refer to Fig.2 when the temperature exceeds 85°C)

[About the value of under 0.0039 μ F]

0.0010~0.0033 μ F : the same value as the 1600VDC

Frequency Duty Capacitance	Permissible current(A_{P-P})								
	65kHz			80kHz			95kHz		
	20%	25%	30%	20%	25%	30%	20%	25%	30%
0.0039 μ F	8.4	6.7	5.9	9.0	7.4	6.4	9.5	7.8	6.9
0.0047 μ F	9.4	7.7	6.6	10.1	8.4	7.1	10.8	8.8	7.6
0.0056 μ F	10.4	8.4	7.3	11.2	9.2	7.8	12.0	9.8	8.5
0.0068 μ F	11.5	9.4	8.1	12.5	10.2	8.7	13.3	11.1	9.4
0.0082 μ F	13.2	10.8	9.2	14.1	11.6	9.9	15.0	12.5	10.6
0.010 μ F	14.8	12.2	10.5	15.7	13.2	11.3	16.7	13.9	12.0
0.012 μ F	16.4	13.6	11.6	17.5	14.6	12.5	18.3	15.3	13.4
0.015 μ F	18.8	15.3	13.6	19.5	16.4	14.3	20.3	17.2	15.1
0.018 μ F	20.4	17.2	15.1	21.3	18.2	16.0	22.1	18.9	16.7
0.022 μ F	22.5	19.0	16.7	23.4	20.0	17.6	23.9	20.7	18.3
0.027 μ F	24.6	20.9	18.2	25.5	22.0	19.2	26.3	22.5	20.0
0.033 μ F	28.6	24.2	21.3	29.5	25.5	22.4	30.1	26.2	23.4
0.039 μ F	33.3	28.4	24.8	34.4	29.8	26.2	35.0	30.5	27.2
0.047 μ F	38.6	33.2	29.3	39.5	34.6	30.5	40.2	35.3	31.5
0.056 μ F	42.6	36.8	32.6	43.1	37.8	33.9	43.5	38.4	34.6
0.068 μ F	45.9	40.5	36.3	46.1	40.9	37.0	46.3	41.3	37.4
0.082 μ F	48.9	43.4	39.3	48.9	43.7	39.8	48.7	43.7	39.9
0.10 μ F	52.6	47.2	42.8	52.6	47.2	42.8	52.4	47.2	43.1

Frequency Duty Capacitance	Permissible current(A_{P-P})					
	110kHz			130kHz		
	20%	25%	30%	20%	25%	30%
0.0039 μ F	9.9	8.3	7.1	10.6	8.7	7.6
0.0047 μ F	11.3	9.4	8.1	12.0	9.9	8.5
0.0056 μ F	12.6	10.4	9.1	13.3	10.9	9.5
0.0068 μ F	13.9	11.5	9.9	14.7	12.2	10.6
0.0082 μ F	15.5	13.0	11.3	16.5	13.6	11.9
0.010 μ F	17.2	14.4	12.6	18.1	15.3	13.3
0.012 μ F	19.0	16.0	14.0	19.7	16.8	14.7
0.015 μ F	20.9	17.6	15.8	21.6	18.5	16.2
0.018 μ F	22.5	19.5	17.2	23.1	20.0	17.8
0.022 μ F	24.4	21.1	18.9	24.9	21.6	19.3
0.027 μ F	26.9	23.2	20.6	27.4	23.8	21.3
0.033 μ F	30.5	26.7	23.9	31.1	27.2	24.5
0.039 μ F	35.4	31.1	27.9	35.8	31.6	28.6
0.047 μ F	40.5	35.7	32.2	40.7	36.1	32.6
0.056 μ F	43.5	38.6	35.0	43.8	39.1	35.4
0.068 μ F	46.3	41.4	37.7	46.2	41.4	37.8
0.082 μ F	48.6	43.7	39.9	48.3	43.4	39.9
0.10 μ F	52.1	46.9	43.0	51.7	46.6	42.8

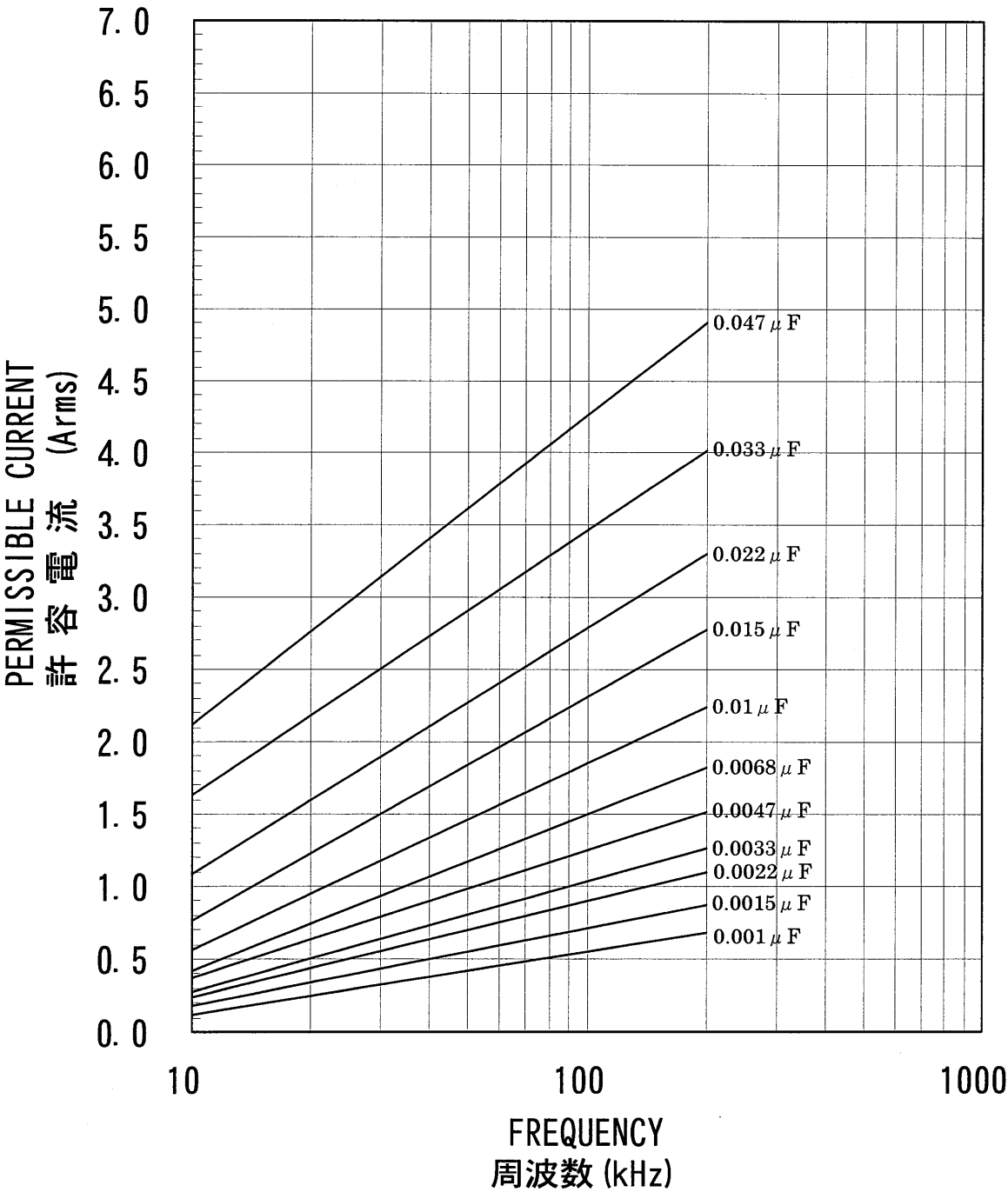
Standard Doc.	METALLIZED POLYPROPYLENE CAPACITOR TYPE ECWH(V)	Clsf.	28-07
Product Specifications		No.	1-14
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参考

Reference

PERMISSIBLE CURRENT vs. FREQUENCY

Rated voltage : 1600VDC
 Operating temperature range : -25 to 85℃ (105℃) Including temperature rise on unit surface.
 (Refer to Fig.2 when the temperature exceeds 85℃)



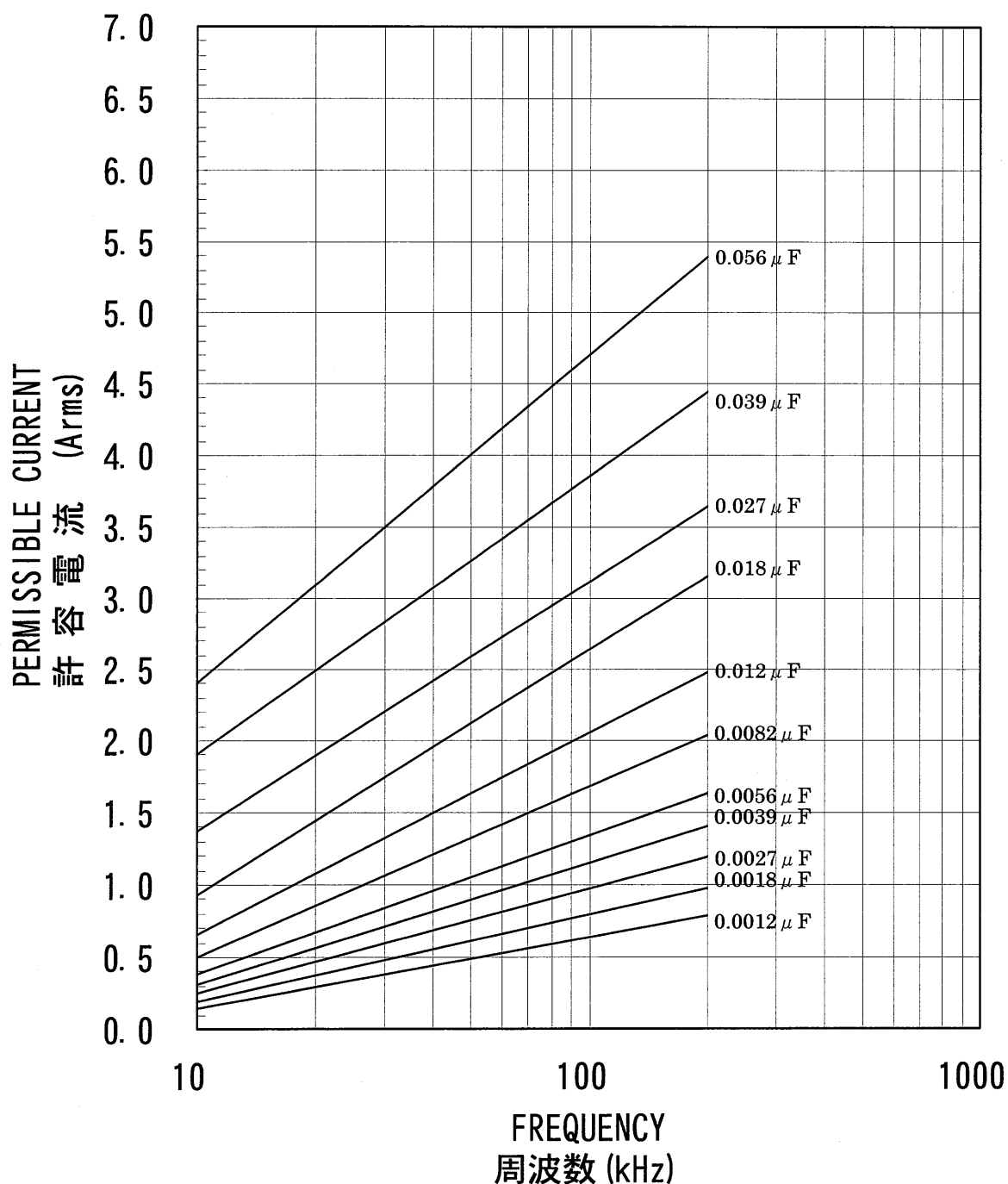
Standard Doc.	METALLIZED POLYPROPYLENE CAPACITOR TYPE ECWH(V)	Clasf.	28-07
Product Specifications		No.	1-14
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参考
Reference

PERMISSIBLE CURRENT vs. FREQUENCY

Rated voltage : 1600VDC

Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.
(Refer to Fig.2 when the temperature exceeds 85°C)



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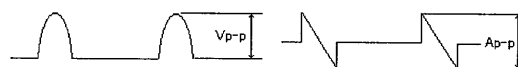
参考
Reference

PERMISSIBLE CURRENT vs. FREQUENCY (Pulse wave)

Rated voltage : 1600VDC (1200V_{P-P})

Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.

(Refer to Fig.2 when the temperature exceeds 85°C)



Frequency Duty Capacitance	Permissible current(A _{P-P})									
	15.75kHz					25kHz				
	10%	15%	20%	25%	30%	10%	15%	20%	25%	30%
0.0010 μF	5.1	4.2	3.4	2.7	2.2	5.8	5.1	4.1	3.4	2.9
0.0012 μF	5.6	4.7	3.6	2.9	2.5	6.5	5.7	4.5	3.6	3.2
0.0015 μF	6.4	5.3	4.2	3.4	2.9	7.2	6.5	5.2	4.2	3.6
0.0018 μF	7.0	5.9	4.8	3.6	3.2	8.1	7.3	5.7	4.8	4.1
0.0022 μF	7.8	6.5	5.2	4.2	3.5	8.8	8.0	6.3	5.0	4.5
0.0027 μF	8.6	7.3	5.7	4.6	3.9	9.9	8.8	7.0	5.7	5.0
0.0033 μF	9.6	8.1	6.4	5.2	4.5	10.8	9.7	8.0	6.4	5.7
0.0039 μF	10.7	9.2	7.4	5.7	5.2	12.0	10.9	8.8	7.1	6.4
0.0047 μF	11.7	10.0	8.0	6.3	5.6	13.2	11.9	9.5	7.7	6.9
0.0056 μF	12.9	10.9	8.8	7.0	6.0	14.4	13.1	10.5	8.5	7.6
0.0068 μF	15.4	12.2	9.7	7.7	6.7	16.1	14.6	11.6	9.5	8.4
0.0082 μF	15.8	13.5	10.9	8.7	7.6	17.9	16.3	13.0	10.6	9.4
0.010 μF	17.9	15.5	12.3	9.8	8.5	19.7	18.2	14.8	12.2	10.8
0.012 μF	19.9	17.1	13.7	11.1	9.5	22.1	20.3	16.4	13.4	11.9
0.015 μF	22.3	19.2	15.4	12.3	10.8	24.8	22.8	18.5	15.0	13.3
0.018 μF	25.5	21.9	17.4	14.0	12.2	27.7	25.9	21.1	17.1	15.3
0.022 μF	27.8	23.9	19.3	15.7	13.6	30.6	28.4	23.0	18.8	16.7
0.027 μF	31.4	26.7	21.4	17.4	15.0	34.4	32.0	25.8	21.0	18.6
0.033 μF	35.1	30.1	24.2	19.6	16.8	38.7	35.9	29.0	23.5	21.0
0.039 μF	39.4	33.6	27.0	21.7	18.8	43.3	40.1	32.3	26.5	23.4
0.047 μF	44.9	37.8	30.1	24.2	20.7	48.6	45.9	36.8	29.8	26.2
0.056 μF	50.6	42.9	34.2	27.2	23.2	54.6	51.6	41.6	33.7	29.8

Frequency Duty Capacitance	Permissible current(A _{P-P})							
	35kHz					45kHz		
	10%	15%	20%	25%	30%	20%	25%	30%
0.0010 μF	6.7	5.7	4.8	4.2	3.4	5.3	4.3	3.6
0.0012 μF	7.7	6.2	5.3	4.5	3.6	5.9	4.8	4.1
0.0015 μF	8.4	7.2	6.0	4.9	4.1	6.6	5.5	4.6
0.0018 μF	9.1	7.9	6.7	5.2	4.6	7.3	6.0	5.2
0.0022 μF	10.1	8.7	7.3	5.6	5.0	8.0	6.6	5.6
0.0027 μF	11.1	9.6	8.1	6.1	5.6	9.0	7.3	6.2
0.0033 μF	12.3	10.7	9.0	6.7	6.3	9.9	8.1	7.0
0.0039 μF	13.5	11.8	9.9	7.3	7.0	10.9	9.0	7.8
0.0047 μF	14.8	12.9	11.1	7.8	7.7	12.0	9.8	8.5
0.0056 μF	16.3	15.2	12.0	8.4	8.5	13.2	10.8	9.4
0.0068 μF	18.1	15.9	13.4	9.2	9.4	14.6	12.0	10.5
0.0082 μF	19.8	17.6	15.0	10.2	10.5	16.2	13.3	11.6
0.010 μF	21.9	19.5	16.8	11.3	11.9	18.2	15.1	13.2
0.012 μF	24.3	21.7	18.6	12.3	13.2	20.2	16.8	14.4
0.015 μF	27.2	24.6	21.0	13.7	14.8	22.8	18.9	16.4
0.018 μF	29.9	27.4	23.9	15.4	16.9	25.5	21.4	18.6
0.022 μF	33.0	30.4	26.0	16.7	18.5	28.1	23.5	20.3
0.027 μF	36.5	34.2	29.4	18.6	20.7	31.6	26.5	22.8
0.033 μF	41.2	38.4	33.0	20.7	23.2	35.6	29.8	25.6
0.039 μF	45.7	43.0	37.1	23.0	26.0	39.8	33.3	28.7
0.047 μF	51.0	48.4	42.3	26.0	29.5	44.8	37.9	32.6
0.056 μF	56.7	54.3	47.0	29.2	33.5	50.3	42.6	36.8

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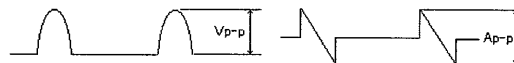
参考
Reference

PERMISSIBLE CURRENT vs. FREQUENCY (Pulse wave)

Rated voltage : 1600VDC (1200V_{P-P})

Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.

(Refer to Fig.2 when the temperature exceeds 85°C)



Frequency Duty Capacitance	Permissible current(A_{p-p})								
	65kHz			80kHz			95kHz		
	20%	25%	30%	20%	25%	30%	20%	25%	30%
0.0010 μ F	6.1	4.9	4.3	6.9	5.5	4.6	7.4	5.9	5.0
0.0012 μ F	6.8	5.5	4.8	7.6	6.2	5.2	8.1	6.5	5.5
0.0015 μ F	7.6	6.1	5.4	8.4	6.9	5.7	9.0	7.1	6.1
0.0018 μ F	8.4	6.9	5.9	9.1	7.4	6.4	9.8	8.0	6.8
0.0022 μ F	9.1	7.5	6.4	9.9	8.3	7.0	10.6	8.9	7.4
0.0027 μ F	10.1	8.3	7.1	11.1	9.1	7.8	11.8	9.5	8.3
0.0033 μ F	11.1	9.1	7.9	12.2	9.9	8.7	12.8	10.5	9.0
0.0039 μ F	12.3	10.1	8.8	13.4	11.1	9.5	14.0	11.5	10.0
0.0047 μ F	13.5	11.1	9.6	14.7	12.2	10.5	15.4	12.8	11.0
0.0056 μ F	14.8	12.1	10.5	16.1	13.3	11.5	16.8	13.9	11.9
0.0068 μ F	16.4	13.5	11.8	17.8	14.7	12.7	18.4	15.4	13.3
0.0082 μ F	18.1	15.0	13.0	19.6	16.2	14.1	20.3	16.9	14.6
0.010 μ F	19.9	16.8	14.5	21.4	17.9	15.7	22.1	18.6	16.3
0.012 μ F	22.1	18.6	16.1	23.7	20.0	17.5	24.4	20.6	18.0
0.015 μ F	24.9	20.9	18.1	26.3	22.4	19.7	27.0	23.0	20.1
0.018 μ F	27.5	23.4	20.4	29.1	24.8	21.8	29.6	25.4	22.4
0.022 μ F	30.3	25.6	22.5	31.9	27.3	24.1	32.4	27.9	24.6
0.027 μ F	33.6	28.9	25.4	35.3	30.4	27.0	35.6	30.9	27.5
0.033 μ F	37.9	32.5	28.5	39.3	34.2	30.4	39.5	34.5	30.8
0.039 μ F	42.1	36.3	32.0	43.7	38.1	33.9	43.9	38.4	34.4
0.047 μ F	47.1	40.8	36.0	48.7	42.6	38.1	48.8	42.9	38.4
0.056 μ F	52.5	45.6	40.4	54.0	47.5	42.6	53.6	47.5	42.9

Frequency Duty Capacitance	Permissible current(A_{p-p})					
	110kHz			130kHz		
	20%	25%	30%	20%	25%	30%
0.0010 μ F	8.0	6.4	5.3	8.8	7.0	5.9
0.0012 μ F	8.8	7.1	6.0	9.5	7.7	6.4
0.0015 μ F	9.5	7.7	6.6	10.4	8.4	7.1
0.0018 μ F	10.5	8.5	7.3	11.3	9.2	7.8
0.0022 μ F	11.5	9.2	8.0	12.3	9.9	8.5
0.0027 μ F	12.5	10.2	8.8	13.4	10.9	9.4
0.0033 μ F	13.6	11.2	9.7	14.6	12.0	10.2
0.0039 μ F	15.0	12.3	10.6	16.0	13.2	11.3
0.0047 μ F	16.2	13.6	11.8	17.1	14.3	12.3
0.0056 μ F	17.8	14.7	12.7	18.8	15.5	13.4
0.0068 μ F	19.5	16.2	14.1	20.4	17.1	14.8
0.0082 μ F	21.3	17.9	15.7	22.3	18.8	16.4
0.010 μ F	23.2	19.6	17.2	24.4	20.6	17.9
0.012 μ F	25.5	21.7	19.0	26.3	22.5	19.7
0.015 μ F	28.0	24.1	21.1	28.8	24.9	22.0
0.018 μ F	30.7	26.5	23.4	31.4	27.3	24.1
0.022 μ F	33.5	29.0	25.8	34.2	29.8	26.5
0.027 μ F	36.7	31.9	28.6	37.2	32.6	29.1
0.033 μ F	40.5	35.7	31.9	40.9	36.1	32.5
0.039 μ F	44.9	39.5	35.6	45.4	40.0	36.0
0.047 μ F	49.7	44.0	39.5	50.1	44.4	40.2
0.056 μ F	54.7	48.6	44.0	54.7	48.9	44.4

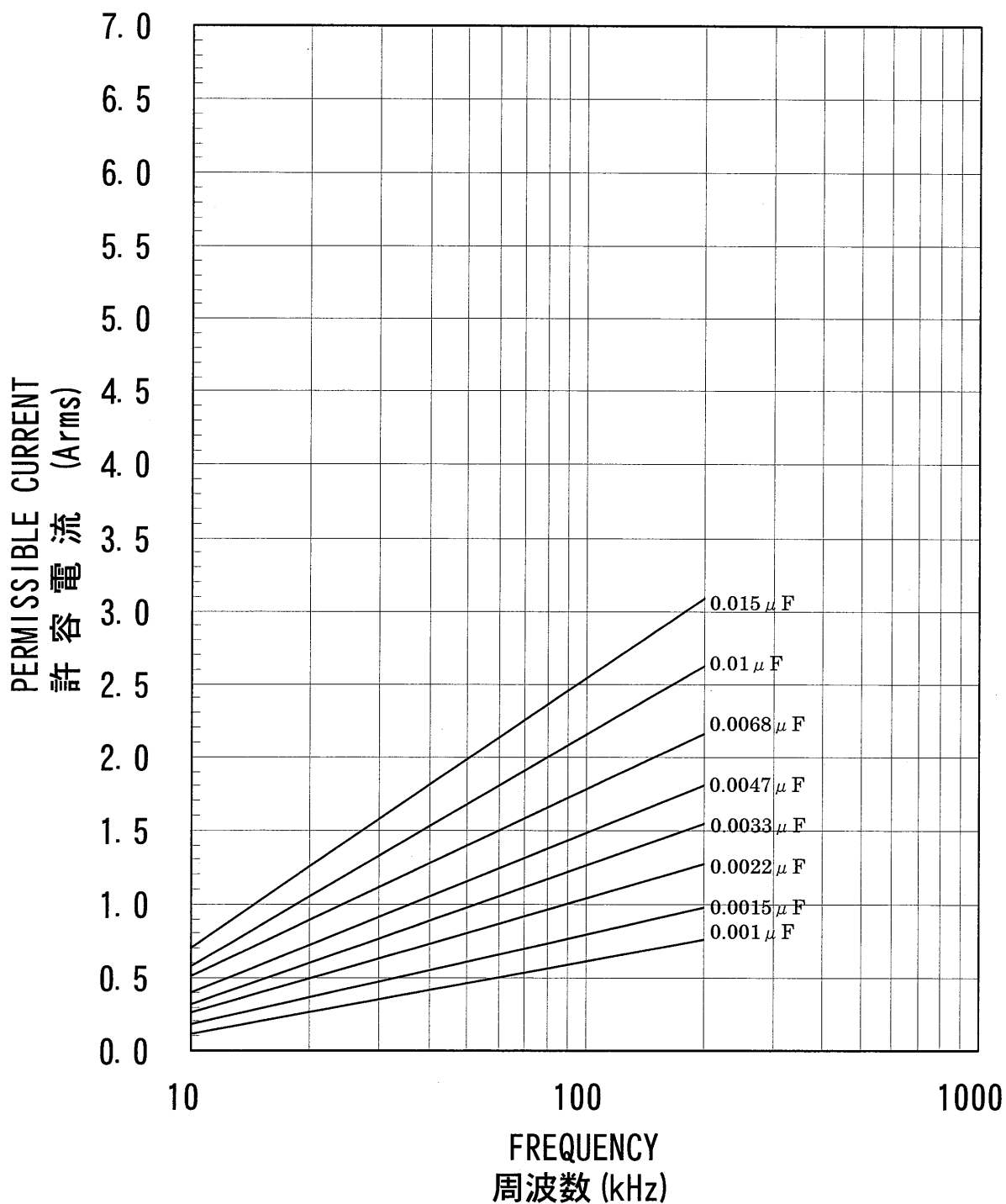
Standard Doc.	METALLIZED POLYPROPYLENE CAPACITOR TYPE ECWH(V)	Clasf.	28-07
Product Specifications		No.	1-14
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参考
Reference

PERMISSIBLE CURRENT vs. FREQUENCY

Rated voltage : 2000VDC

Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.
(Refer to Fig.2 when the temperature exceeds 85°C)



Standard Doc.	METALLIZED POLYPROPYLENE CAPACITOR TYPE ECWH(V)	Clasf.	28-07
Product Specifications		No.	1-14
		Revision Code	K
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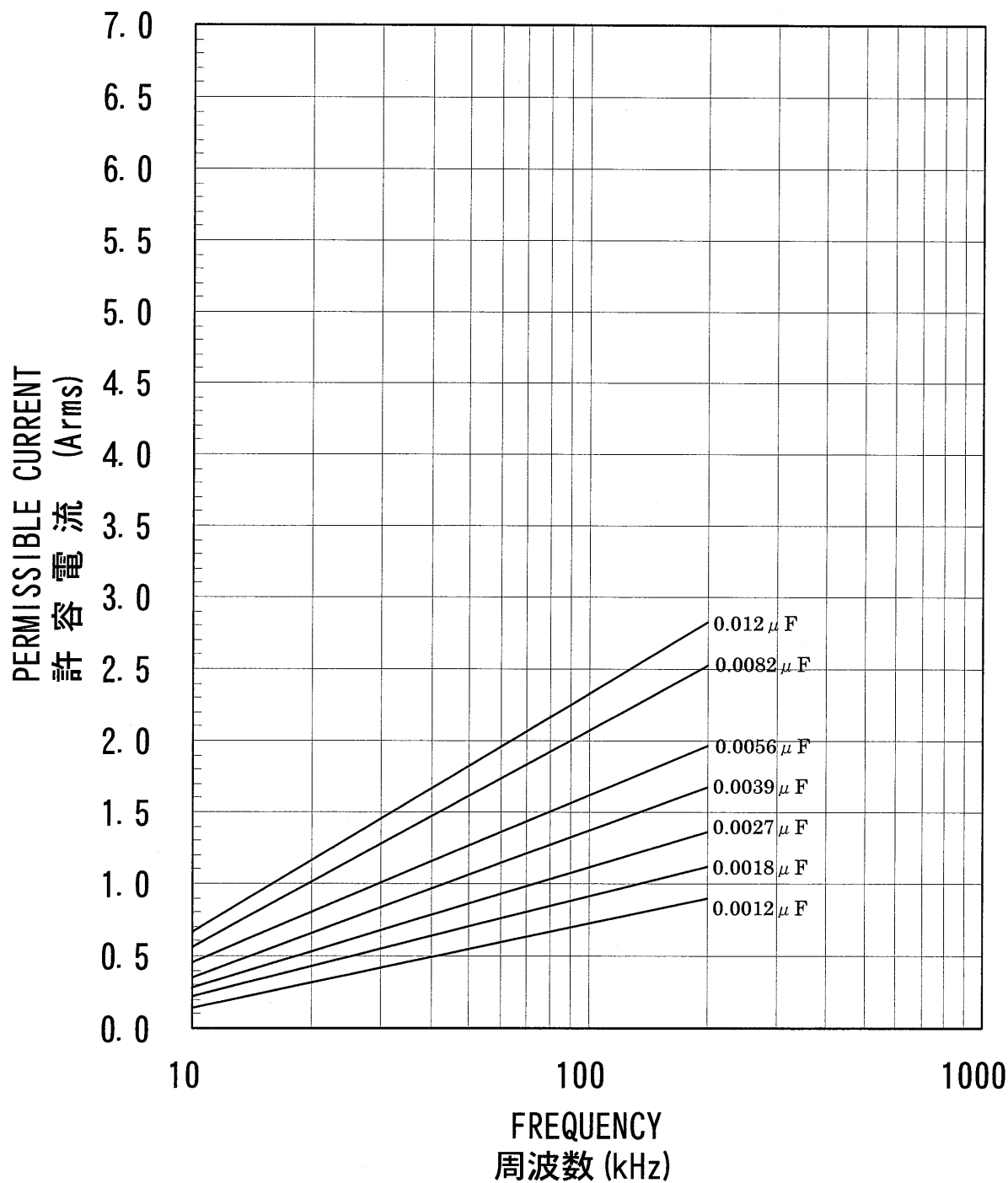
参考

Reference

PERMISSIBLE CURRENT vs. FREQUENCY

Rated voltage : 2000VDC

Operating temperature range : -25 to 85℃ (105℃) Including temperature rise on unit surface.
(Refer to Fig.2 when the temperature exceeds 85℃)



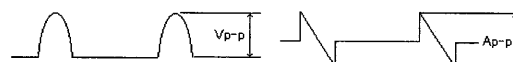
Standard Doc.	METALLIZED POLYPROPYLENE CAPACITOR TYPE ECWH(V)	Clst.	28-07
Product Specifications		No.	1-14
		Revision Code	K
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参考
Reference

PERMISSIBLE CURRENT vs. FREQUENCY (Pulse wave)

Rated voltage : 2000VDC (1500V_{P-P})

Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.
(Refer to Fig.2 when the temperature exceeds 85°C)



Frequency Duty Capacitance	Permissible current(A _{p-p})									
	15.75kHz					25kHz				
	10%	15%	20%	25%	30%	10%	15%	20%	25%	30%
0.0010 μ F	5.4	4.3	3.5	2.8	2.4	6.5	5.7	4.5	3.5	2.9
0.0012 μ F	6.1	5.0	3.9	3.1	2.7	7.4	6.2	4.9	3.9	3.2
0.0015 μ F	6.8	5.7	4.5	3.6	3.1	8.1	7.0	5.6	4.5	3.8
0.0018 μ F	7.8	6.5	5.0	4.1	3.5	9.1	8.0	6.3	5.0	4.3
0.0022 μ F	8.9	7.4	5.9	4.8	4.1	10.4	9.2	7.3	5.9	4.9
0.0027 μ F	10.1	8.4	6.7	5.3	4.6	11.4	10.3	8.1	6.6	5.6
0.0033 μ F	11.2	9.5	7.6	6.0	5.2	12.8	11.5	9.1	7.4	6.4
0.0039 μ F	12.4	10.7	8.5	6.9	6.0	14.1	12.7	10.4	8.5	7.3
0.0047 μ F	13.3	11.3	9.1	7.3	6.3	15.0	13.5	10.9	9.0	7.7
0.0056 μ F	14.5	12.4	9.9	8.0	7.0	16.5	14.9	11.9	9.8	8.4
0.0068 μ F	16.4	13.8	11.1	9.0	7.7	18.6	16.7	13.4	10.9	9.4
0.0082 μ F	18.4	15.7	12.5	10.1	8.7	20.7	18.8	15.3	12.3	10.6
0.010 μ F	20.5	17.4	14.0	11.3	9.8	22.9	20.9	16.9	13.9	11.9
0.012 μ F	22.7	19.4	15.7	12.6	10.9	25.4	23.2	18.8	15.3	13.2
0.015 μ F	25.3	21.6	17.2	13.9	12.0	28.0	25.8	20.9	17.1	14.6

Frequency Duty Capacitance	Permissible current(A _{p-p})							
	35kHz					45kHz		
	10%	15%	20%	25%	30%	20%	25%	30%
0.0010 μ F	7.8	6.2	5.2	4.2	3.5	5.7	4.8	3.9
0.0012 μ F	8.6	7.0	5.6	4.5	3.9	6.4	5.2	4.3
0.0015 μ F	9.6	7.9	6.6	5.2	4.5	7.3	5.9	4.9
0.0018 μ F	10.6	9.0	7.4	5.9	4.9	8.3	6.6	5.6
0.0022 μ F	11.9	10.3	8.4	6.9	5.7	9.4	7.7	6.6
0.0027 μ F	13.1	11.4	9.5	7.7	6.6	10.4	8.5	7.3
0.0033 μ F	14.4	12.7	10.6	8.5	7.3	11.6	9.5	8.1
0.0039 μ F	16.0	13.9	11.8	9.7	8.3	12.9	10.6	9.1
0.0047 μ F	16.9	14.7	12.5	10.2	8.8	13.6	11.2	9.7
0.0056 μ F	18.6	16.3	13.7	11.2	9.5	15.0	12.3	10.6
0.0068 μ F	20.8	18.2	15.4	12.6	10.8	16.8	13.9	11.9
0.0082 μ F	22.9	20.5	17.4	14.1	12.2	18.8	15.5	13.4
0.010 μ F	25.4	22.8	19.3	15.8	13.6	20.9	17.4	14.8
0.012 μ F	27.9	25.2	21.3	17.4	15.0	23.2	19.2	16.5
0.015 μ F	30.6	28.0	23.8	19.6	16.8	25.8	21.4	18.5

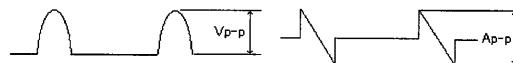
Standard Doc.	METALLIZED POLYPROPYLENE CAPACITOR TYPE ECWH(V)	Clasf.	28-07
Product Specifications		No.	1-14
		Revision Code	K
		23/ 23 P.	

参考
Reference

PERMISSIBLE CURRENT vs. FREQUENCY (Pulse wave)

Rated voltage : 2000VDC (1500V_{P-P})

Operating temperature range : -25 to 85°C (105°C) Including temperature rise on unit surface.
(Refer to Fig.2 when the temperature exceeds 85°C)



Frequency Duty Capacitance	Permissible current(A _{P-P})								
	65kHz			80kHz			95kHz		
	20%	25%	30%	20%	25%	30%	20%	25%	30%
0.0010 μ F	7.0	5.7	4.8	7.8	6.3	5.3	8.5	6.9	5.7
0.0012 μ F	7.8	6.3	5.3	8.7	7.0	5.9	9.5	7.6	6.4
0.0015 μ F	8.8	6.9	5.9	9.5	7.7	6.4	10.4	8.4	7.1
0.0018 μ F	9.8	7.8	6.6	10.6	8.7	7.3	11.5	9.2	8.0
0.0022 μ F	10.9	9.0	7.7	11.9	9.7	8.3	12.7	10.4	8.8
0.0027 μ F	12.0	9.8	8.5	13.0	10.6	9.1	13.9	11.5	9.8
0.0033 μ F	13.2	10.9	9.5	14.3	11.8	10.2	15.1	12.5	10.8
0.0039 μ F	14.7	12.0	10.5	15.8	13.0	11.3	16.7	13.9	11.9
0.0047 μ F	15.5	12.7	11.1	16.7	13.9	11.9	17.8	14.7	12.7
0.0056 μ F	17.1	14.1	12.2	18.3	15.3	13.2	19.5	16.1	13.9
0.0068 μ F	19.2	15.8	13.7	20.4	17.1	14.7	21.7	17.9	15.7
0.0082 μ F	21.3	17.6	15.3	22.4	18.8	16.4	23.8	19.9	17.2
0.010 μ F	23.5	19.6	16.9	24.8	20.9	18.2	26.2	22.0	19.2
0.012 μ F	25.9	21.7	18.9	27.2	23.0	20.2	28.6	24.1	21.0
0.015 μ F	28.4	23.9	20.9	29.7	25.3	22.1	30.9	26.3	23.2

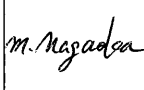
Frequency Duty Capacitance	Permissible current(A _{P-P})					
	110kHz			130kHz		
	20%	25%	30%	20%	25%	30%
0.0010 μ F	9.1	7.4	6.2	9.8	8.0	6.7
0.0012 μ F	9.9	8.1	6.9	10.8	8.8	7.4
0.0015 μ F	10.9	9.0	7.7	11.6	9.5	8.1
0.0018 μ F	11.9	9.8	8.4	12.7	10.5	9.0
0.0022 μ F	13.3	10.9	9.4	14.1	11.6	10.1
0.0027 μ F	14.6	12.0	10.5	15.4	12.7	11.1
0.0033 μ F	15.8	13.2	11.5	16.8	13.9	12.0
0.0039 μ F	17.5	14.6	12.6	18.5	15.4	13.4
0.0047 μ F	18.5	15.4	13.3	19.5	16.2	14.1
0.0056 μ F	20.3	16.8	14.7	21.4	17.8	15.5
0.0068 μ F	22.4	18.9	16.4	23.5	19.9	17.4
0.0082 μ F	24.8	20.7	18.1	25.9	21.8	19.0
0.010 μ F	26.9	22.8	19.9	28.0	23.8	21.0
0.012 μ F	29.4	24.9	21.8	30.2	25.9	22.8
0.015 μ F	31.6	27.2	23.9	32.6	28.0	24.8

METALLIZED POLYPROPYLENE CAPACITOR
TYPE ECWH (V)

参 考
Reference

28-07

1-14

issue	date	Page	Description	approval	check	design
	18.Nov'96		ESTABLISHMENT	S.Yamamura	Y.Deguchi	M.Amano
A	20.Jan'97	8 of 12	Deletion (They shall be measured both side of body)	S.Yamamura	Y.Deguchi	M.Amano
B	13.Feb'97	6 of 12 7 of 12	Correction(Inherent tempereture rise:5℃→10℃) Correction(Inherent tempereture rise:5℃→10℃) (Fig.1:PERMISSIBLE CURRENT)	S.Yamamura	Y.Deguchi	M.Amano
C	21.Jan'98	All	Addition(800V,1000V, 1250V) Correction (Permissible current of Pulse wave)	M.Kikuchi	K.Yamada	S.Ozasa
D	10.Apr'98	6 of 21 7 of 21 All	Correction(Inherent tempereture rise:10℃→20℃) Correction (Permissible current derating vs.temperature) Correction (Permissible current derating vs.frequency)	M.Kikuchi	K.Yamada	S.Ozasa
E	1.Oct'03	8 of 23 9 of 23	Addition Cautions about safety in use Correction soldering condition: Preheat 110℃→120℃ Soldering 260℃ 4Sec→260℃ 6Sec	M.Sakata	M.Aoto	N.Takahashi
issue	date	Page	Description	QA approval	Approval	Controller
F	1.Oct'04	All	Changed company name	K.Kuwata	M.Sakata	N.Takahashi
G	1.Apr'05	All	Changed company name	K.Ago	M.Nagaoka	M.Nishikoori
H	1.Apr'06	All	Changed company name	M.Okamura	M.Nagaoka	M.Nishikoori
I	4.Dec'06	1 of 23 2 of 23 4 of 23 4 of 23	Correction (3. PRODUCT RANGE Operating temperature range:-25℃→-40℃) Correction (9.CHARACTER Testing method JIS-C5102-1994→JIS-C5101-16 1999) Correction (Characteristics depending on temperature Low category temperature: -25℃→-40℃) Correction (Rapid change of temperature: -25℃→-40℃)	M.Okamura	M.Nagaoka	M.Nishikoori
J	1.Apr'08	All	Changed company name	M.Okamura	M.Nagaoka	M.Kashio
K	30.July'08	1 of 23	Addition (Flammability : UI94 V-0)	 M.Okamura	 M.Nagaoka	 M.Kashio