



SAMXON BRAND ALUMINUM ELECTROLYTIC CAPACITORS

PRODUCT SPECIFICATION

規格書

CUSTOMER :
(客戶) :

DATE :
(日期) : 2019-3-9

CATEGORY (品名) : ALUMINUM ELECTROLYTIC CAPACITORS
DESCRIPTION (型号) : VZ2 10V220 μ F (ϕ 6.3x7.7)
VERSION (版本) : 01
Customer P/N :
SUPPLIER :

| SUPPLIER | |
|------------------|-----------------|
| PREPARED (拟定) | CHECKED (审核) |
| 赵安平 | 刘渭清 |

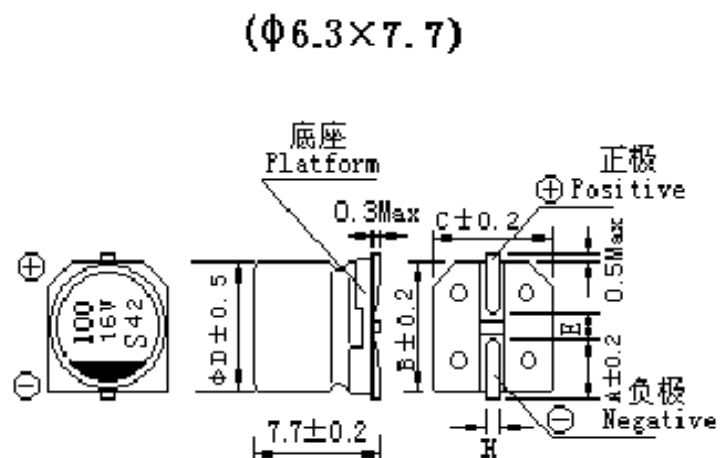
| CUSTOMER | |
|------------------|-------------------|
| APPROVAL (批准) | SIGNATURE (签名) |
| | |

| | | |
|--|--|---------------|
| MAN YUE ELECTRONICS COMPANY LIMITED | <i>ELECTROLYTIC CAPACITOR SPECIFICATION VZ2 SERIES</i> | SAMXON |
| | | |

| SPECIFICATION | | | | | ALTERNATION HISTORY RECORDS | | |
|---------------|------|------|------|----------|--------------------------------|---------|----------|
| VZ2 SERIES | | | | | | | |
| Rev. | Date | Mark | Page | Contents | Purpose | Drafter | Approver |
| | | | | | | | |

Table 1 Product Dimensions and Characteristics

Unit: mm



| | |
|-------------|---------|
| Size | 6.3x7.7 |
| A ± 0.2 | 2.6 |
| B ± 0.2 | 6.6 |
| C ± 0.2 | 6.6 |
| D ± 0.5 | 6.3 |
| E | 1.8 |
| L ± 0.2 | 7.7 |
| H | 0.5~0.9 |

| No. | SAMXON Part No. | WV (Vdc) | Cap. (μ F) | Cap. tolerance | Temp. range($^{\circ}$ C) | $\tan\delta$ (120Hz, 20 $^{\circ}$ C) | Leakage Current (μ A,2min) | Max Ripple Current at 105 $^{\circ}$ C 100kHz (mA rms) | Impedance at 20 $^{\circ}$ C 100kHz (Ω max) | Load lifetime (Hrs) | Dimension (mm) |
|-----|--------------------|-------------|--------------------|----------------|-------------------------------|---|---------------------------------------|--|--|---------------------------|-------------------|
| | | | | | | | | | | | D \times L |
| 1 | VZ2227M1AE77TR** | 10 | 220 | -20%~+20% | -55~105 | 0.19 | 22 | 280 | 0.34 | 2000 | 6.3X7.7 |

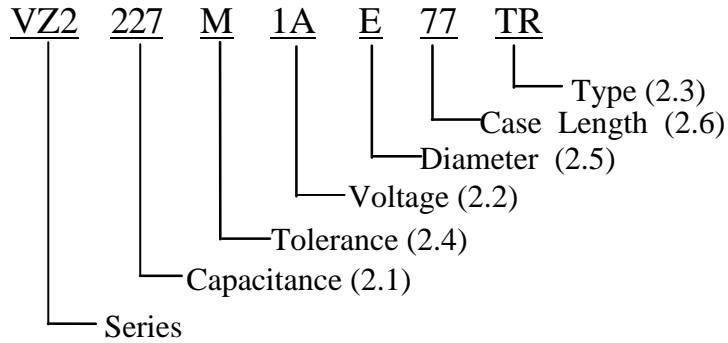
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1. Application

This specification applies to polar Aluminum electrolytic capacitor (foil type) used in electronic equipment. Designed capacitor's quality meets IEC60384.

2. Part Number System



2.1 Capacitance code

| | |
|------------------------|------------|
| Code | 227 |
| Capacitance (μ F) | 220 |

2.2 Rated voltage code

| | |
|----------------|-----------|
| Code | 1A |
| Voltage (W.V.) | 10 |

2.3 Type

| | |
|-------------|------------------|
| Code | TR |
| Reference | Embossed Taping. |

2.4 Capacitance tolerance

"M" stands for -20% ~ +20%

2.5 Diameter

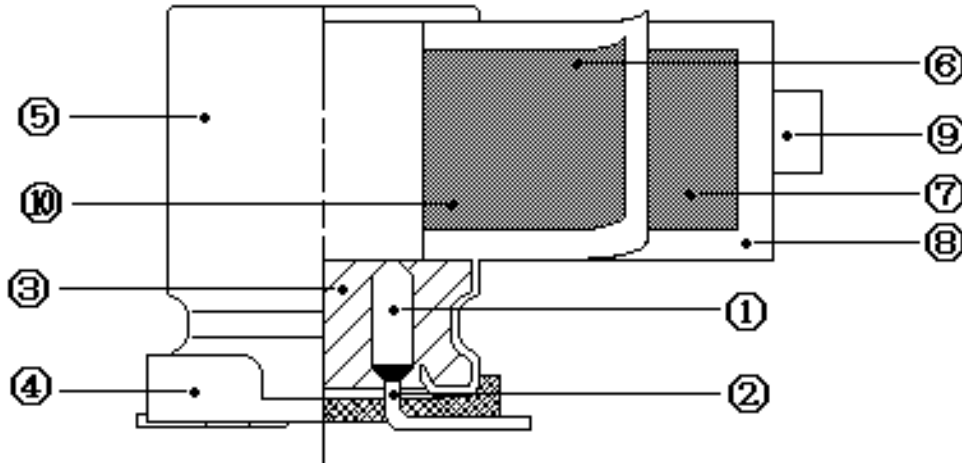
| | |
|-------------|----------|
| Code | E |
| Diameter | 6.3 |

2.6 Case length

77=7.7mm

3. Constructions

3-1 Inside Construction



3-2 Construction parts

| No. | Parts | Materials | No. | Parts | Materials |
|-----|-------------|--|-----|---------------|------------------------|
| 1 | Lead line | Aluminum 99.93% | 6 | Anode foil | Formed aluminum 99.99% |
| 2 | Terminal | Tinned copper-ply wire (Lead Free) (*2) | 7 | Cathode foil | Etched aluminum 98% |
| 3 | Sealing pad | I.I.R. | 8 | Separator | Pulp |
| 4 | Base plate | P.P.A | 9 | Adhesive tape | Poly propylene film |
| 5 | Case | Aluminum 98%+ PET coating | 10 | Electrolyte | GBL & EG |

4. Characteristics

Standard atmospheric conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests are as follows:

| | |
|---------------------|-------------------|
| Ambient temperature | : 15°C to 35°C |
| Relative humidity | : 45% to 85% |
| Air Pressure | : 86kPa to 106kPa |

If there is any doubt about the results, measurement shall be made within the following conditions:

| | |
|---------------------|-------------------|
| Ambient temperature | : 20°C ± 2°C |
| Relative humidity | : 60% to 70% |
| Air Pressure | : 86kPa to 106kPa |

Operating temperature range

The ambient temperature range at which the capacitor can be operated continuously at rated voltage
See table 1 temperature range.

As to the detailed information, please refer to table 2.

Table 2

| ITEM | | PERFORMANCE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|--|--|------|----|----|----|----|----|-----|--|--|-----------|-------------------------|------|----|--------|-----------------------------------|----|--------------------|-----------------------------------|-----|-----------|-----------------------------------|------|---------|-----------------------------------|----|--------|-----------------------------------|----|-----|
| 4.1 | Rated voltage (WV) Surge voltage (SV) | <table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <tr> <td style="text-align: center;">WV (V.DC)</td> <td style="text-align: center;">6.3</td> <td style="text-align: center;">10</td> <td style="text-align: center;">16</td> <td style="text-align: center;">25</td> <td style="text-align: center;">35</td> <td style="text-align: center;">50</td> <td style="text-align: center;">63</td> <td style="text-align: center;">80</td> <td style="text-align: center;">100</td> </tr> <tr> <td style="text-align: center;">SV (V.DC)</td> <td style="text-align: center;">7.3</td> <td style="text-align: center;">11.5</td> <td style="text-align: center;">18.4</td> <td style="text-align: center;">29</td> <td style="text-align: center;">40</td> <td style="text-align: center;">58</td> <td style="text-align: center;">73</td> <td style="text-align: center;">92</td> <td style="text-align: center;">115</td> </tr> </table> | | | | | | | | | | WV (V.DC) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | SV (V.DC) | 7.3 | 11.5 | 18.4 | 29 | 40 | 58 | 73 | 92 | 115 |
| WV (V.DC) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 80 | 100 | | | | | | | | | | | | | | | | | | | | | | |
| SV (V.DC) | 7.3 | 11.5 | 18.4 | 29 | 40 | 58 | 73 | 92 | 115 | | | | | | | | | | | | | | | | | | | | | | |
| 4.2 | Nominal capacitance (Tolerance) | <p><Condition> Measuring Frequency : 120Hz ± 12Hz Measuring Voltage : Not more than 0.5Vrms Measuring Temperature : 20 ± 2°C</p> <p><Criteria> Shall be within the specified capacitance tolerance.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.3 | Leakage current | <p><Condition> Connecting the capacitor with a protective resistor (1kΩ ± 10Ω) in series for 2 minutes, and then, measure Leakage Current.</p> <p><Criteria> Refer to Table 1</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.4 | tanδ | <p><Condition> See 4.2, Norm Capacitance, for measuring frequency, voltage and temperature.</p> <p><Criteria> Refer to Table 1</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.5 | Temperature characteristics | <p><Condition></p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <thead> <tr> <th style="text-align: center;">STEP</th> <th style="text-align: center;">Testing Temperature(°C)</th> <th style="text-align: center;">Time</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">20 ± 2</td> <td style="text-align: center;">Time to reach thermal equilibrium</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">-55(-40) (-25) ± 3</td> <td style="text-align: center;">Time to reach thermal equilibrium</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">20 ± 2</td> <td style="text-align: center;">Time to reach thermal equilibrium</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">105 ± 2</td> <td style="text-align: center;">Time to reach thermal equilibrium</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">20 ± 2</td> <td style="text-align: center;">Time to reach thermal equilibrium</td> </tr> </tbody> </table> <p>Capacitance, DF, and impedance shall be measured at 120Hz.</p> <p><Criteria></p> <p>a. At +105°C, capacitance shall be within ± 25% of their origin at +20°C, measured capacitance, dissipation factor shall be within limit of 4.4. The leakage current value at +105°C shall not more than 10 times the Specified value.</p> <p>b. At step 5. capacitance shall be within ± 10% of their original +20°C, measured capacitance, dissipation factor shall be within the limit of 4.4. The leakage current value shall not more than the specified value</p> | | | | | | | | | | STEP | Testing Temperature(°C) | Time | 1 | 20 ± 2 | Time to reach thermal equilibrium | 2 | -55(-40) (-25) ± 3 | Time to reach thermal equilibrium | 3 | 20 ± 2 | Time to reach thermal equilibrium | 4 | 105 ± 2 | Time to reach thermal equilibrium | 5 | 20 ± 2 | Time to reach thermal equilibrium | | |
| STEP | Testing Temperature(°C) | Time | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 20 ± 2 | Time to reach thermal equilibrium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | -55(-40) (-25) ± 3 | Time to reach thermal equilibrium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 20 ± 2 | Time to reach thermal equilibrium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 105 ± 2 | Time to reach thermal equilibrium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 20 ± 2 | Time to reach thermal equilibrium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

4.5

Temperature
characteristics

c. At-40°C (-25°C), impedance (z) ratio shall not exceed the value of the following table.

| | |
|---------------------|----|
| Working Voltage (V) | 10 |
| Z-40°C/Z+20°C | 3 |

4.6

Load
life
test

<Condition>

According to IEC60384-4No.4.13 methods, The capacitor is stored at a temperature of 105 °C ± 2 with DC bias voltage plus the rated ripple current for Table 1. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) Then the product should be tested after 16 hours recovering time at atmospheric conditions. The result should meet the following table:

<Criteria>

The characteristic shall meet the following requirements.

| | |
|--------------------|--|
| Leakage current | Value in 4.3 shall be satisfied |
| Capacitance Change | Within ± 20% of initial value. |
| tanδ | Not more than 200% of the specified value. |
| Appearance | There shall be no leakage of electrolyte. |

4.7

Shelf
life
test

<Condition>

The capacitors are then stored with no voltage applied at a temperature of 105 ± 2°C for 1000+48/0 hours. Following this period the capacitors shall be removed from the test chamber and be allowed to stabilize at room temperature for 4~8 hours. Next they shall be connected to a series limiting resistor(1k ± 100Ω) with D.C. rated voltage applied for 30min. After which the capacitors shall be discharged, and then, tested the characteristics.

<Criteria>

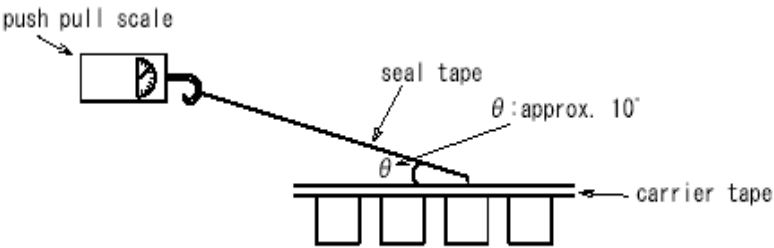
The characteristic shall meet the following requirements.

| | |
|--------------------|--|
| Leakage current | Value in 4.3 shall be satisfied |
| Capacitance Change | Within ± 20% of initial value. |
| tanδ | Not more than 200% of the specified value. |
| Appearance | There shall be no leakage of electrolyte. |

Remark: If the capacitors are stored more than 1 year, the leakage current may increase.

Please apply voltage through about 1 kΩ resistor, if necessary.

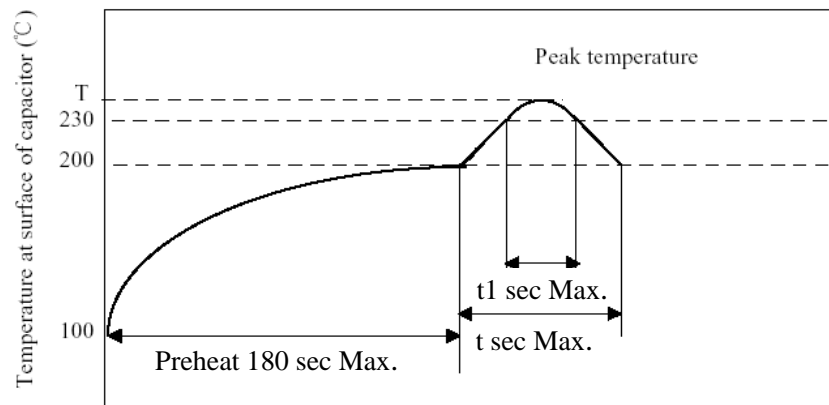
| | | | | | | | | | | |
|--------------------|--|---|--------------------|--|--------------------|--|--------------|------------------------------------|------------|---|
| 4.8 | Surge test | <p><Condition> Applied a surge voltage to the capacitor connected with a $(100 \pm 50)/C_R$ (kΩ) resistor. The capacitor shall be submitted to 1000 cycles, each consisting of charge of $30 \pm 5s$, followed discharge of 5 min 30s. The test temperature shall be 15~35°C. C_R :Nominal Capacitance (μ F)</p> <p><Criteria></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Leakage current</td> <td>Not more than the specified value.</td> </tr> <tr> <td>Capacitance Change</td> <td>Within $\pm 15\%$ of initial value.</td> </tr> <tr> <td>tanδ</td> <td>Not more than the specified value.</td> </tr> <tr> <td>Appearance</td> <td>There shall be no leakage of electrolyte.</td> </tr> </table> <p>Attention: This test simulates over voltage at abnormal situation only. It is not applicable to such over voltage as often applied.</p> | Leakage current | Not more than the specified value. | Capacitance Change | Within $\pm 15\%$ of initial value. | tan δ | Not more than the specified value. | Appearance | There shall be no leakage of electrolyte. |
| Leakage current | Not more than the specified value. | | | | | | | | | |
| Capacitance Change | Within $\pm 15\%$ of initial value. | | | | | | | | | |
| tan δ | Not more than the specified value. | | | | | | | | | |
| Appearance | There shall be no leakage of electrolyte. | | | | | | | | | |
| 4.9 | Vibration test | <p><Condition> The following conditions shall be applied for 2 hours in each 3 mutually perpendicular directions. Vibration frequency range : 10Hz ~ 55Hz Peak to peak amplitude : 1.5mm Sweep rate : 10Hz ~ 55Hz ~ 10Hz in about 1 minute Mounting method: The capacitor with diameter greater than 12.5mm or longer than 25mm must be fixed in place with a bracket.</p> <p><Criteria> After the test, the following items shall be tested:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Inner construction</td> <td>No intermittent contacts, open or short circuiting. No damage of tab terminals or electrodes.</td> </tr> <tr> <td>Appearance</td> <td>No mechanical damage in terminal. No leakage of electrolyte or swelling of the case. The markings shall be legible.</td> </tr> </table> | Inner construction | No intermittent contacts, open or short circuiting. No damage of tab terminals or electrodes. | Appearance | No mechanical damage in terminal. No leakage of electrolyte or swelling of the case. The markings shall be legible. | | | | |
| Inner construction | No intermittent contacts, open or short circuiting. No damage of tab terminals or electrodes. | | | | | | | | | |
| Appearance | No mechanical damage in terminal. No leakage of electrolyte or swelling of the case. The markings shall be legible. | | | | | | | | | |
| 4.10 | Solderability test | <p><Condition> The capacitor shall be tested under the following conditions: Soldering temperature : 245\pm3°C Dipping depth : 2mm Dipping speed : 25\pm2.5mm/s Dipping time : 3\pm0.5s</p> <p><Criteria></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Coating quality</td> <td>A minimum of 95% of the surface being immersed</td> </tr> </table> | Coating quality | A minimum of 95% of the surface being immersed | | | | | | |
| Coating quality | A minimum of 95% of the surface being immersed | | | | | | | | | |

| | | | | | | | | | | |
|--------------------|--|--|-----------------|------------------------------------|--------------------|-------------------------------------|--------------------|--|------------|---|
| 4.11 | Resistance to solder heat test | <p><Condition> Terminals of the capacitor shall be immersed into solder bath at $260 \pm 5^\circ\text{C}$ for 10 ± 1 seconds or $400 \pm 10^\circ\text{C}$ for 3_{-0}^{+1} seconds to 1.5~2.0mm from the body of capacitor . Then the capacitor shall be left under the normal temperature and normal humidity for 1~2 hours before measurement.</p> <p><Criteria></p> <table border="1" data-bbox="512 544 1329 716"> <tr> <td>Leakage current</td> <td>Not more than the specified value.</td> </tr> <tr> <td>Capacitance Change</td> <td>Within $\pm 10\%$ of initial value.</td> </tr> <tr> <td>$\tan\delta$</td> <td>Not more than the specified value.</td> </tr> <tr> <td>Appearance</td> <td>There shall be no leakage of electrolyte.</td> </tr> </table> | Leakage current | Not more than the specified value. | Capacitance Change | Within $\pm 10\%$ of initial value. | $\tan\delta$ | Not more than the specified value. | Appearance | There shall be no leakage of electrolyte. |
| Leakage current | Not more than the specified value. | | | | | | | | | |
| Capacitance Change | Within $\pm 10\%$ of initial value. | | | | | | | | | |
| $\tan\delta$ | Not more than the specified value. | | | | | | | | | |
| Appearance | There shall be no leakage of electrolyte. | | | | | | | | | |
| 4.12 | Damp heat test | <p><Condition> Humidity Test: According to IEC60384-4 No.4.12 methods, capacitor shall be exposed for 500 ± 8 hours in an atmosphere of 90~95% R H .at $40 \pm 2^\circ\text{C}$, the characteristic change shall meet the following requirement.</p> <p><Criteria></p> <table border="1" data-bbox="496 936 1283 1086"> <tr> <td>Leakage current</td> <td>Not more than the specified value.</td> </tr> <tr> <td>Capacitance Change</td> <td>Within $\pm 20\%$ of initial value.</td> </tr> <tr> <td>Dissipation Factor</td> <td>Not more than 120% of the specified value.</td> </tr> <tr> <td>Appearance</td> <td>There shall be no leakage of electrolyte.</td> </tr> </table> | Leakage current | Not more than the specified value. | Capacitance Change | Within $\pm 20\%$ of initial value. | Dissipation Factor | Not more than 120% of the specified value. | Appearance | There shall be no leakage of electrolyte. |
| Leakage current | Not more than the specified value. | | | | | | | | | |
| Capacitance Change | Within $\pm 20\%$ of initial value. | | | | | | | | | |
| Dissipation Factor | Not more than 120% of the specified value. | | | | | | | | | |
| Appearance | There shall be no leakage of electrolyte. | | | | | | | | | |
| 4.13 | Adhesion test | <p>Reasonable pulling strength :0.1~0.7N Pulling speed: 300mm/min</p>  | | | | | | | | |
| 4.14 | Reflow soldering temperature profile | <p>After the capacitor is subjected to the specified reflow soldering , (see temperature profile below) it shall meet the condition stated in the page 10, item 4.11.</p> <p><Reflow soldering condition > The temperature shall be measured with thermal couple. which shall be placed and fixed on the top of capacitor body.</p> <p>Maximum Permissible Reflow Soldering Temperature Profile We recommend soldering shall done according to following maximum permissible reflow soldering temperature reflow soldering temperature profile.</p> | | | | | | | | |

4.14

Reflow soldering temperature profile

Reflow soldering
(This is a method to heat parts and the substrate by hot air or infrared furnace.)



- 1) Temperature at surface of capacitor shall not exceed T(°C).
- 2) Period that temperature at surface of capacitor becomes more than 200°C and 230°C shall not exceed t and t1 seconds, respectively.
- 3) Preheat shall be made at 100°C~200°C and for maximum 180 seconds.

| Size | T(°C) | t(sec) | t1(sec) |
|---------|-------|--------|---------|
| Φ 4~6.3 | 255 | 100 | 50 |
| Φ 8 | 245 | 100 | 40 |
| Φ 10~16 | 245 | 100 | 40 |

4.15

Maximum permissible (ripple current)

<Condition>

The maximum permissible ripple current is the maximum A.C current at 120Hz and can be applied at maximum operating temperature Table-1

The combined value of D.C voltage and the peak A.C voltage shall not exceed the rated voltage and shall not reverse voltage.

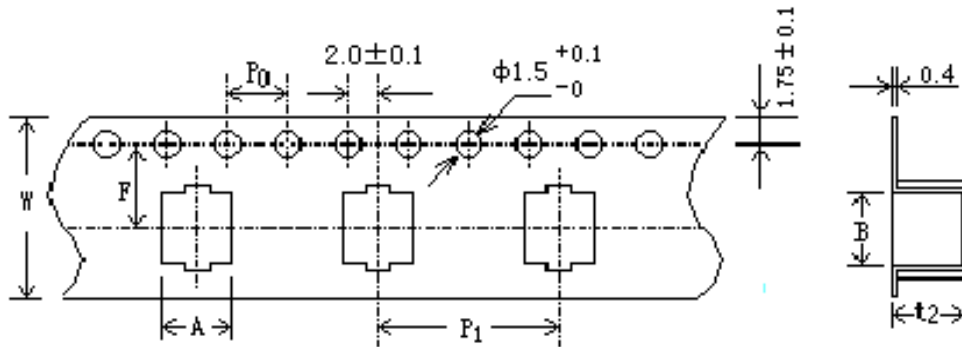
Frequency Multipliers:

| Frequency | | 50Hz | 120Hz | 1kHz | ≥10kHz |
|-------------|----------------------|------|-------|------|--------|
| Coefficient | $C \leq 1000$ | 0.80 | 1.00 | 1.25 | 1.40 |
| | $1000 < C \leq 4700$ | 0.80 | 1.00 | 1.15 | 1.25 |

5. Taping

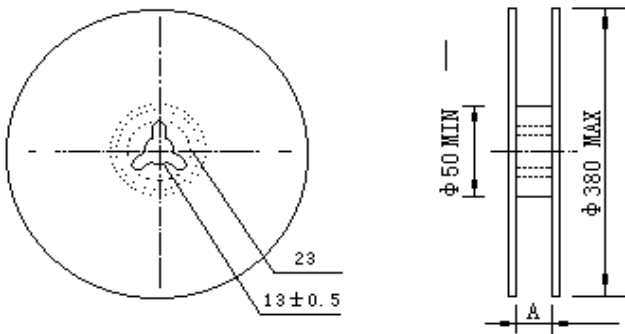
[Unit: mm]

a) Carrier Tape



| $\phi D \times L$ | $W \pm 0.3$ | $A \pm 0.2$ | $B \pm 0.2$ | $F \pm 0.1$ | $P_0 \pm 0.1$ | $P_1 \pm 0.1$ | $t_2 \pm 0.2$ |
|-----------------------|-------------|-------------|-------------|-------------|---------------|---------------|---------------|
| $\phi 6.3 \times 7.7$ | 16.0 | 7.0 | 7.0 | 7.5 | 4.0 | 12.0 | 8.4 |

b) Reel



| | | | |
|----------|-----|----|----|
| ϕD | 6.3 | 8 | 10 |
| A | 18 | 26 | 26 |

6. Packing Style

- (1). Carrier tape shall be reeled inside. (seal tape shall be outside)
- (2). End of the tape shall be inside to the reel physically as shown in the below figure and leader part of seal tape shall not be attached.

