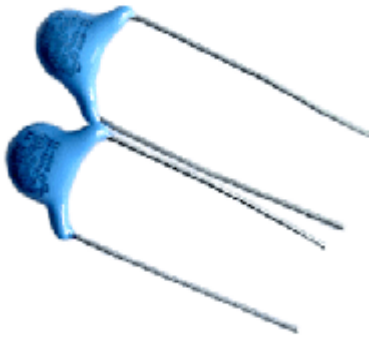
Y1、X1 安规陶瓷电容器



陶瓷 Y 电容也称交流安规陶瓷电容，即电容器失效后，不会导致电击，不危及人身安全. 它包括 X 电容各 Y 电容两种类型，x 电容是跨接在电力线两线（L-N）之间的电容，一般选用金属薄膜电容；Y 电容是分别跨接在电力线两线和地之间（L-E，N-E）的电容，一般是成对出现。基于漏电流的限制，Y 电容值不能太大，一般 X 电容是 uF 级，Y 电容是 nF 级。X 电容抑制差模干扰，Y 电容抑制共模干扰。

Rating and Characteristics

Type Y1,X1

Part Number	Temp. Char	Capacitance (pF)	Capacitance Tol.	Dimensions(Unit:mm)			
				D(max)	F±1.5	T(max)	d±0.05
101K	Y5P	100	±10%	9.0	10.0	8.0	0.6
121K	Y5P	120	±10%	9.0	10.0	8.0	0.6
151K	Y5P	150	±10%	9.0	10.0	8.0	0.6
181K	Y5P	180	±10%	9.0	10.0	8.0	0.6
221K	Y5P	220	±10%	9.0	10.0	8.0	0.6
271K	Y5P	270	±10%	9.0	10.0	8.0	0.6
331K	Y5P	330	±10%	9.0	10.0	8.0	0.6
391K	Y5P	390	±10%	9.5	10.0	8.0	0.6
471K	Y5P	470	±10%	10.0	10.0	8.0	0.6
561K	Y5P	560	±10%	11.0	10.0	8.0	0.6
681K	Y5P	680	±10%	12.0	10.0	8.0	0.6
821K	Y5P	820	±10%	13.0	10.0	8.0	0.6
102K	Y5P	1000	±10%	14.0	10.0	8.0	0.6
471M	Y5U	470	±20%	9.0	10.0	8.0	0.6
561M	Y5U	560	±20%	9.0	10.0	8.0	0.6
681M	Y5U	680	±20%	9.0	10.0	8.0	0.6
102M	Y5U	1000	±20%	10.0	10.0	8.0	0.6
122M	Y5U	1200	±20%	10.0	10.0	8.0	0.6
152M	Y5U	1500	±20%	11.0	10.0	8.0	0.6
182M	Y5U	1800	±20%	12.5	10.0	8.0	0.6
222M	Y5U	2200	±20%	13.5	10.0	8.0	0.6
272M	Y5U	2700	±20%	14.0	10.0	8.0	0.6
332M	Y5U	3300	±20%	16.0	10.0	8.0	0.8
392M	Y5U	3900	±20%	17.0	10.0	8.0	0.8
472M	Y5U	4700	±20%	18.0	10.0	8.0	0.8

**特殊规格可根据客户要求订做！

Temperature Characiteristics Code

Code	Temperature Characeristics	Cap.Change Of Temp.coeff.	Temperature Range
B	Y5P	±10%	-25 to 85℃
E	Y5U	+20%~-55%	

Nominal Capacitance Code

Nominal capactiance shall consist of three numerals in the unit of picofarad(Pf). The first and second numerals mean the significant figures, and the third numeral shall represent the number of zeros fllowing the significant figures.

Example:

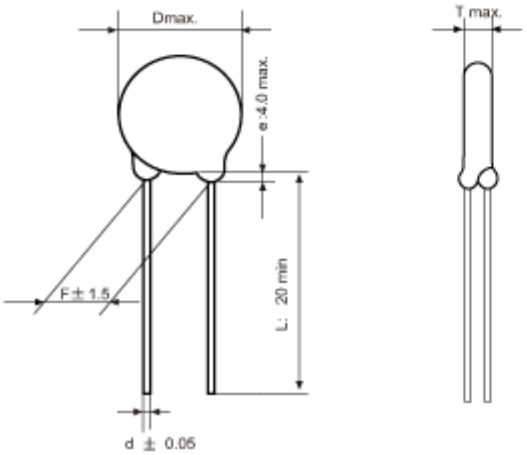
Code	Capacitance(pF)
101	100
102	1000
222	2200
103	10000

Capacitance Tolerance

Code	Tolerance
K	±10%
M	±20%

Lead style

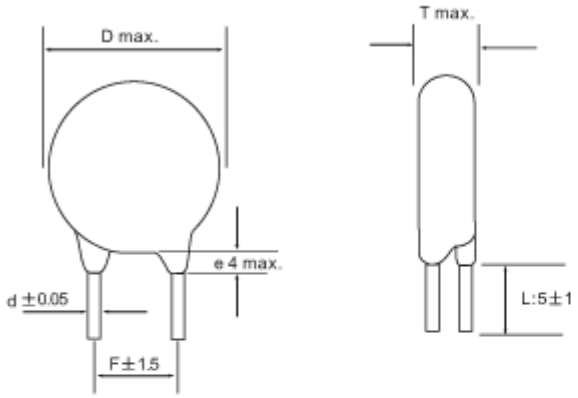
Straight long lead **(Lead Style Code :A)**



Lead code	A1	A2	A3	A4	A5
F	2.5	5	7.5	10	12.5
L	20 mm min				
d	0.5 or 0.6 or 0.8				
e	Max. 4.0mm				

Unit: mm

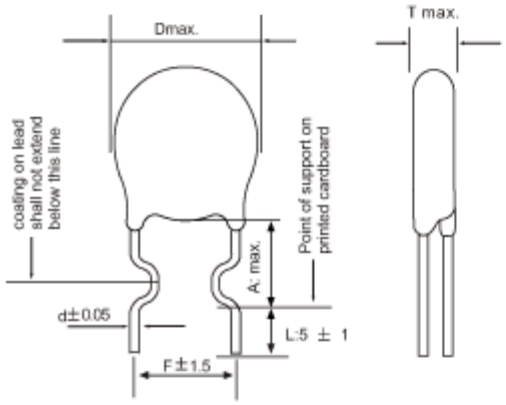
Straight short lead (**Lead Style Code : B**)



Lead code	B1	B2	B3	B4	B5
F	2.5	5	7.5	10	12.5
L	5±1 mm or bases on buyer request				
d	0.5 or 0.6 or 0.8				
e	Max. 4.0mm				

Unit: mm

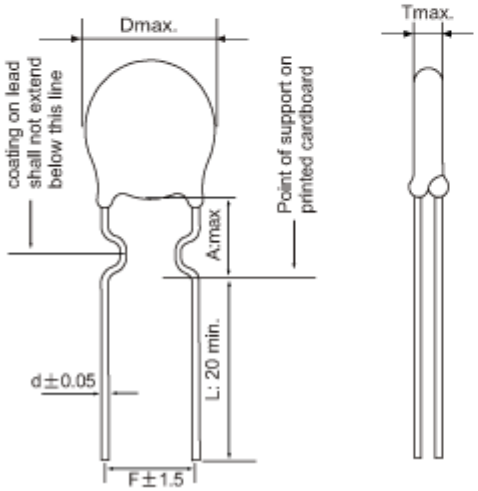
Inside Crimped Short lead (**Lead Style Code : C**)



Lead code	C2	C3	C4	C5
F	5	7.5	10	12.5
A	5	5	6.5	6.5
L	5±1 mm or bases on buyer request			
d	0.5 or 0.6 or 0.8			

Unit: mm

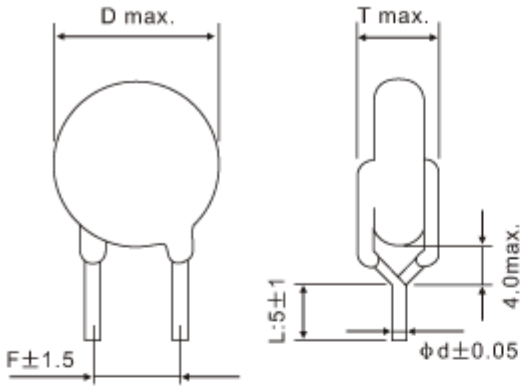
Inside crimped long lead (**Lead Style Code : D**)



Lead code	D2	D3	D4	D5
F	5	7.5	10	12.5
A	5	5	6.5	6.5
L	20 mm min			
d	0.5 or 0.6 or 0.8			

Unit: mm

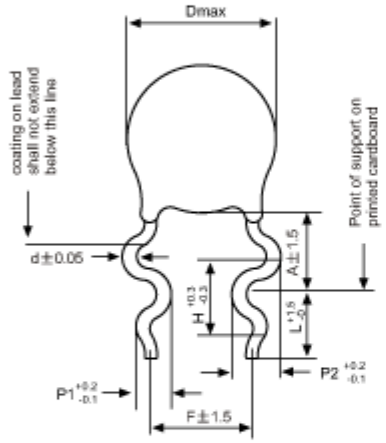
Vertical crimped short lead **(Lead Style Code: H)**



Lead code	H2	H3	H4	H5
F	5	7.5	10	12.5
L	5±1 mm or bases on buyer request			
d	0.5 or 0.6 or 0.8			

Unit: mm

Duoble crimped snap lead, **(Lead Style Code: M)**



Lead code	M2	M3	M4	M5
F	5	7.5	10	12.5
H	2.6	2.6	3.3	3.3
P1	1.25	1.25	1.65	1.65
P2	1.65	1.65	1.95	1.95
A	D<8: 6.0±1.5 , D>8:7.0±1.5			
L	3 to 30 mm			
d	0.5 or 0.6 or 0.8			

General Information: PCB max. thickness 1.6mm

Unit: mm

Lead Spacing Code

Code	Lead Spacing(mm)
2	5.0± 1.5
3	7.5± 1.5
4	10.0±1.5

Packaging Code

Code	Packaging
B	Bulk
A	Taping Ammo Pack
R	Taping Reel Pack

3.8 Internal Code

Specification and test method

Operating temperature range:-25℃ to 105℃
(But temperature range is -25℃ to 85℃ at safety stanard specification.)

Test and measurement shall be made at the standard condition,(Temperature 15 to 35℃,relative humidity 45 to 75% and atmospheric pressure 860-1060 hpa),unless otherwise specified herein
If doubt occurred on the value of measurement, and remeasurement was requested by customer capacitors shall be measured at the reference condition(Temperature 20±2℃,relative humidity 60 to 70% and atmospheric pressure 860-1060 hpa), unless otherwise specified herein

Performance

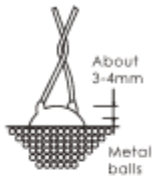
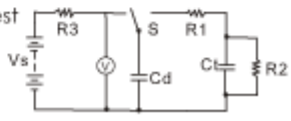
<table>
<tr><th>No.</th><th colspan="3">Item</th><th>Specification</th><th>Testing Method</th></tr>
<tr><td>1</td><td colspan="3">Appearance and Dimensions</td><td>No marked defect on appearance from and dimensions are within specified range.</td><td>The capacitor shall be inspected by naked eyes for Visible evidence of defect.
Dimensions shall be measured with slide calipers.</td></tr>
<tr><td>2</td><td colspan="3">Marking</td><td>To be easily legible.</td><td>The capacitor shall be inspected by naked eyes</td></tr>
<tr><td>3</td><td colspan="3">Capacitance</td><td>Within specified tolerance.</td><td rowspan="2">The capacitance, dissipation factor shall be measured at 25±2℃ with 1±0.1kHz.and AC1±0.1V(r.m.s).</td></tr>
<tr><td>4</td><td colspan="3">Dissipation Factor(D.F.)</td><td><table><tr><th>Char.</th><th>Specification</th></tr><tr><td>B</td><td>D.F≤2.5%</td></tr><tr><td>E</td><td>D.F≤2.5%</td></tr></table></td></tr>
<tr><td>5</td><td colspan="3">Insulation Resistance(I.R.)</td><td>10000MΩmin.</td><td>The insulation resistance shall be measured with DC500±50V within 60±5 s of charging.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Dielectric Strength</td><td>Between Lead Wires</td><td>No failure.</td><td>The capacitor shall not be damage when AC4000V(r.m.s.) are applied between the lead wires for 60 s.</td></tr>
<tr><td>Body Insulation</td><td>No failure.</td><td>First, the terminals of the capacitor shall be connected together. Then, as shown in Figure right, a metal foil shall be closely wrapped aroundthe body of the capacitor to the distance of about 3 to 4 mm from each terminal.Then,the capacitor shall be insertedinto a container filled with metal ballsof about 1mm diameter. Finally, AC AC4000(r.m.s.) is applied for 60 s between the capacitor lead wires and metal balls.
 
</td></tr>
<tr><td>7</td><td colspan="2">Temperature Characteristics</td><td><table><tr><th>Char.</th><th>Capacitance Change</th></tr><tr><td>B</td><td>Within±10%</td></tr><tr><td>E</td><td>Within $^{+20}_{-55}$ %</td></tr></table>Temperature characteristic guarantee is -25 to +85℃</td><td>The capacitance measurement shall be made at each step specified in Table 3.
<Table.3><table><tr><th>Step</th><th>Temperature(℃)</th></tr><tr><td>1</td><td>+20±2</td></tr><tr><td>2</td><td>-25 ±2</td></tr><tr><td>3</td><td>+20±2</td></tr><tr><td>4</td><td>+85±2</td></tr><tr><td>5</td><td>+20±2</td></tr></table></td></tr>
<tr><td rowspan="3">8</td><td rowspan="3">Discharge Test(I)</td><td>Appearance</td><td>No marked defect.</td><td rowspan="3">As in Figure 1, discharge is made 50 times at 5 s intervals from the capacitor(Cd) charged at DC voltage of specified.
Ct: Capacitor under test
Cd:0.001 μ F
S:High-voltage switch
R1:1000Ω
R2:100MΩ
R3:Surge resistance
Vs: DC 10kV
 

Fig.1</td></tr>
<tr><td>I.R.</td><td>1000MΩ min.</td></tr>
<tr><td>Dielectric Strength</td><td>Per Item 6.</td></tr>
</table>

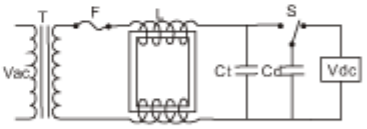
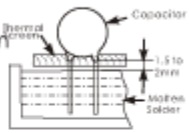
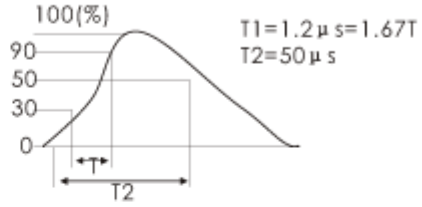
<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specification</th><th>Testing Method</th></tr>
<tr><td>9</td><td colspan="2">Discharge Test(Ⅱ)</td><td>The cheese-cloth around capacitors shall not glow or flame.</td><td>A single layer of cheese-cloth is to be placed around the body of the test capacitor. Each sample is to be subjected to four discharges from a dump capacitor charged to a voltage that, When discharged, placed DC 5kV across the capacitor under test. The interval between successive discharges is to be 5 s.
AC240V(r.m.s.), 60Hz potential is to be applied acrossthe capacitor under test and is to be maintained for 30s after the fourth discharge, unless the circuit is opened in a shorter time by breakdown of the test capacitor.
The direct current supply is to be adjusted to provide a potential in accordance with the following.
$Vdc=\frac{5000(Cd+Ct)}{Cd}(V)$
 

Fig.2
Vdc: Variable direct-current voltage source
S : High-voltage switch
L : Choke coil of approximately 3mH and 0.03Ω
F : Plug fuse rated 30A and 250V
Vac: Supply source rated 240V, 60Hz and 30A
Ct : Capacitor under test
Cd : Dump Capacitor
Capacitance value and D.F. are as follows.
<table><tr><td>Cap. Value of Ct</td><td>0.001 to 0.005 μF</td><td>0.0051 to 0.05 μF</td></tr><tr><td>Cap. Value of Cd</td><td>0.005 μF</td><td>0.05 μF</td></tr><tr><td>D.F. of Cd</td><td>0.5% max.</td><td>0.5% max.</td></tr></table></td></tr>
<tr><td>10</td><td colspan="2">Solderability of Leads</td><td>Lead wire shall be soldered with uniformly coated on the axial direction over 3/4 of the circumferential direction.</td><td>The lead wire of a capacitor shall be dipped into molten solder of 235±5℃ for 2±0.5 s.
The depth of immersion is up to about 1.5 to 2.0mm from the root of leat wires.</td></tr>
<tr><td rowspan="4">11</td><td rowspan="4">Soldering Effect</td><td>Appearance</td><td>No marked defect.</td><td rowspan="4">As in figure,the lead wires shall be immersed solder of 350±10℃ or 260±5℃ up to 1.5 to 2.0mm from the root of terminal for 3.5±0.5 s (10±1 s for 260±5℃).
 

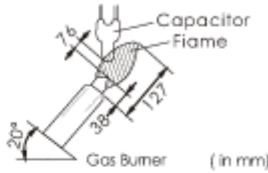
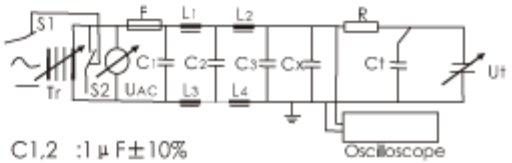
Pre-treatment:
Capacitor shall be stored at 85±2℃ for 1 h, then placed at *room condition for 24±2 h before initial measurements.
Post-treatment:
Capacitor shall be stored for 1 to 2 h at *room condition.</td></tr>
<tr><td>Capacitance Change</td><td>Within±10%</td></tr>
<tr><td>I.R.</td><td>1000MΩ min.</td></tr>
<tr><td>Dielectric Strength</td><td>Pre Item 6.</td></tr>
<tr><td rowspan="3">12</td><td rowspan="3">Vibration Resistance</td><td>Appearance</td><td>No marked defect.</td><td rowspan="3">The capacitor shall firmly be soldered to the supporting lead wire and vibration which is 10 to 55Hz in the vibration frequency range,1.5mm in total amplitude, and about 1min in the rate of vibration change from 10Hz to 55Hz and back to 10Hz is applied for a total of 6 h; 2 h each in 3 mutually perpendicular directions.</td></tr>
<tr><td>Capacitance</td><td>Within the specified tolerance.</td></tr>
<tr><td>D.F.</td><td><table><tr><th>Char.</th><th>Specification</th></tr><tr><td>B</td><td>D.F.≤2.5%</td></tr><tr><td>E</td><td>D.F.≤2.5%</td></tr></table></td></tr>
</table>

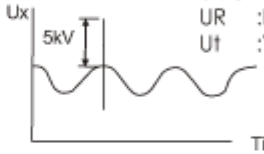
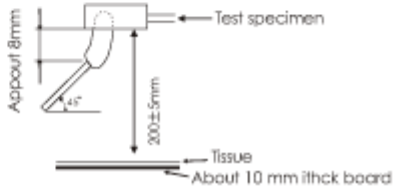
* "Room condition" ····· Temperature; 15 to35℃, Relative humidity; 45 to 75%, Atmospheric pressure: 86 to 106kPa

<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specification</th><th>Testing Method</th></tr>
<tr><td rowspan="4">13</td><td rowspan="4">Humidity (Under Steady State)</td><td>Appearance</td><td>No marked defect.</td><td rowspan="4">Set the capacitor for 500±12 h at 40±2℃ in 90 to 95%relative humidity.
Post-treatment:
Capacitor shall be stored for 1 to 2 h at *room condition.</td></tr>
<tr><td>Capacitance Change</td><td><table><tr><th>Char.</th><th>Capacitance Change</th></tr><tr><td>B</td><td>Within±10%</td></tr><tr><td>E</td><td>Within±15%</td></tr></table></td></tr>
<tr><td>D.F.</td><td><table><tr><th>Char.</th><th>Specification</th></tr><tr><td>B</td><td>D.F.≤5.0%</td></tr><tr><td>E</td><td>D.F.≤5.0%</td></tr></table></td></tr>
<tr><td>I.R.</td><td>3000MΩ min.</td></tr>
<tr><td rowspan="5">14</td><td rowspan="5">Humidity Loading</td><td>Appearance</td><td>No marked defect.</td><td rowspan="5">Apply the rated voltage for 500±12 h at 40±2℃, in 90 to 95% relative humidity.
Post-treatment:
Capacitor shall be stored for 1 to 2 h at *room condition.</td></tr>
<tr><td>Capacitance Change</td><td><table><tr><th>Char.</th><th>Capacitance Change</th></tr><tr><td>B</td><td>Within±10%</td></tr><tr><td>E</td><td>Within±15%</td></tr></table></td></tr>
<tr><td>D.F.</td><td><table><tr><th>Char.</th><th>Specification</th></tr><tr><td>B</td><td>D.F.≤5.0%</td></tr><tr><td>E</td><td>D.F.≤5.0%</td></tr></table></td></tr>
<tr><td>I.R.</td><td>3000MΩ min.</td></tr>
<tr><td>Dielectric Strength</td><td>Per Item 6.</td></tr>
<tr><td rowspan="6">15</td><td rowspan="6">Life</td><td>Appearance</td><td>No marked defect.</td><td rowspan="6">Impulse Voltage
Each individual capacitor shall be subjected to a 8kV impulses for three times.
After the capacitors are applied to life test.
 

Apply a voltage of table 4 for 1000 h at 105+2/0℃, and relative humidity of 50% max…
<Table.4>
<table><tr><th>Applied voltage</th></tr><tr><td>AC425V(r.m.s.), Except that once each hour the voltage is increased to AC1000V(r.m.s.)for 0.1s.</td></tr></table>
Post-treatment:
Capacitor shall be stored for 1 to 2 h at *room condition.</td></tr>
<tr><td>Capacitance Change</td><td>Within± 20%</td></tr>
<tr><td>I.R.</td><td>3000MΩ min.</td></tr>
<tr><td>Dielectric Strength</td><td>Per Item 6.</td></tr>
<tr><td>Discharge Test(Ⅱ)</td><td>Per Item 9.</td></tr>
</table>

* "Room condition" …… Temperature; 15 to 35℃, Relative humidity; 45 to 75%, Atmospheric pressure: 86 to 106kPa

<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specification</th><th>Testing Method</th></tr>
<tr><td>16</td><td colspan="2">Flame Test</td><td>The capacitor flame discontinue as follows.
<table><tr><th>Cycle</th><th>Time</th></tr><tr><td>1 to 4</td><td>30 s max.</td></tr><tr><td>5</td><td>60 s max.</td></tr></table></td><td>The capacitor shall be subjected to applied flame for 15 s and then removed for 15 s until 5 cycle.
 
</td></tr>
<tr><td rowspan="2">17</td><td rowspan="2">Robustness of terminations</td><td>Tensile</td><td rowspan="2">Lead wire shall not cut off.
Capacitor shall noit be broken.</td><td>As a figure,fix the body of capacitor apply a tensile weight gradually to each lead wire in the radial direction of capacitor up to 10N and keep it for 10±1 s.
 
</td></tr>
<tr><td>Bending</td><td>Each lead wire shall be subjected to 5N weight and then a 90° bend, at the point of egress,in one direction, return to original position,and then a 90° bend in the opposite direction at the rate of one bend in 2 to 3 s.</td></tr>
<tr><td>18</td><td colspan="2">Active Flammability</td><td>The cheese-cloth shall not be on fire.</td><td>The capacitor shall be individually wrapped in at least one but more than two complete layers of cheese-cloth.The capacitor shall be subjected to 20 discharges. The interval between successive discharges shall be 5 s. The UAC shall be maintained for 2 min after the last discharge.
 

C1,2 :1μF±10%
C3 :0.033μF±5% 10kV
Ct :3μF±5% 10kV
Cx :Capacitor under test
F :Fuse, Rated 10A
L1 to 4 :1.5mH±20%
:16A Rod core choke
R :100Ω±2%
UAC :UR±5%
UR :Rated volatage
Ut :Voltage applied to Ct
 
</td></tr>
<tr><td>19</td><td colspan="2">Passive Flammability</td><td>The burning time shall not be exceeded the time 30 s.
The tissue paper shall not ignite.</td><td>The capacitor under test shall be held in the flame in the position which best promotes burning. Each specimen shall only be exposed once to the flame. Time of exposure to flame: 30 s.
Length of flame: 12±1mm
Gas burner: Length 35mm min.
Inside Dia.: 0.5±0.1mm
Outside Dia.: 0.9mm max.
Gas:Butance gas Purity 95% min.
 
</td></tr>
</table>

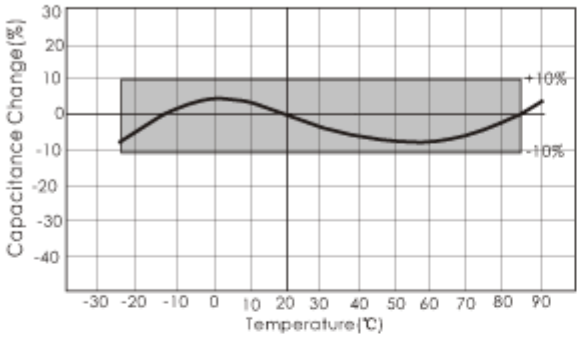
<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specification</th><th>Testing Method</th></tr>
<tr><td rowspan="5">20</td><td rowspan="5">Temperature and Immersion Cycle</td><td>Appearance</td><td>No marked defect.</td><td rowspan="5">The capacitor shall be subjected to 5 temperature cycies,then consecutively to 2 immersion cycies.
<Temperature cycle>
<table><tr><th>Step</th><th>Temperature(℃)</th><th>Time</th></tr><tr><td>1</td><td>-25+0/-3</td><td>30 min</td></tr><tr><td>2</td><td>Room temp.</td><td>3 min</td></tr><tr><td>3</td><td>+105+3/-0</td><td>30 min</td></tr><tr><td>4</td><td>Room temp.</td><td>3 min</td></tr></table>Cycle time:5 cycle
<Immersion cycle>
<table><tr><th>Step</th><th>Temperature(℃)</th><th>Time</th><th>mmersion water</th></tr><tr><td>1</td><td>+65+5/-0</td><td>15 min</td><td>Clean water</td></tr><tr><td>2</td><td>Room temp.</td><td>15 min</td><td>Salt water</td></tr></table>Pre-treatment:
Capacitor shall be stored at 85±2℃ for 1 h, thenplaced at *room condition for 24±2 h.
Post-treatment:
Capacitor shall be stored for 24±2 h at *room condition.</td></tr>
<tr><td>Capacitance Change</td><td><table><tr><th>Char.</th><th>Capacitance Change</th></tr><tr><td>B</td><td>Within±10%</td></tr><tr><td>E</td><td>Within±20%</td></tr></table></td></tr>
<tr><td>D.F.</td><td><table><tr><th>Char.</th><th>Specification</th></tr><tr><td>B</td><td>D.F.≤5.0%</td></tr><tr><td>E</td><td>D.F.≤5.0%</td></tr></table></td></tr>
<tr><td>I.R.</td><td>3000MΩ min.</td></tr>
<tr><td>Dielectric Strength</td><td>Per Item 6.</td></tr>
</table>

* "Room condition" ····· Temperature: 15 to35℃, Relative humidity: 45 to 75%, Atmospheric pressure: 6 to 106kPa

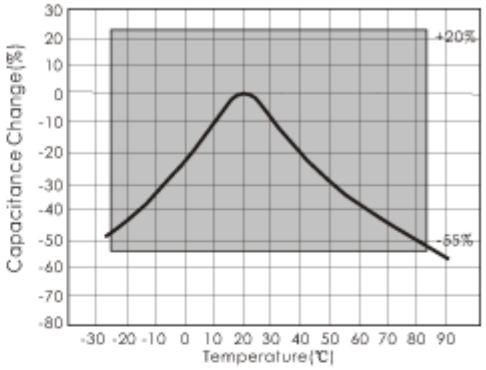
Characteristics Data (Typiccal Example)

Capacitance-Temperature Characteristics

Char：B(Y5P)

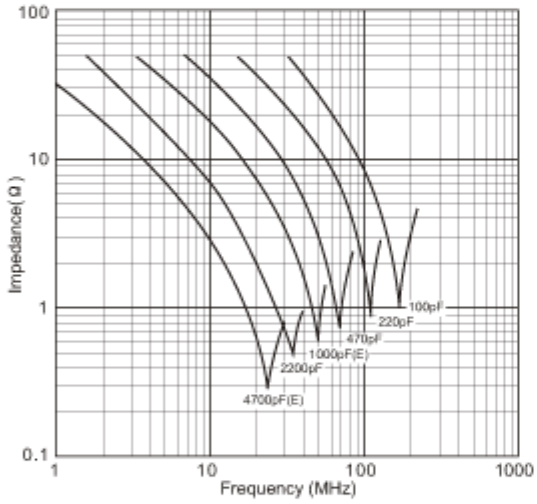


Char:E (Y5U)



Impedance vs. Frequency Characteristics

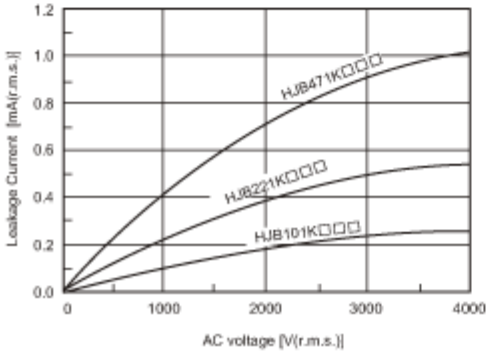
Type HJ



Leakage Current Characteristics

Type HJ (B char.)

AC voltage : 60Hz
Temperature : 25℃



Type HJ (E char.)

AC voltage : 60Hz
Temperature : 25℃