No.:12-12-006

SPECIFICATION FOR APPROVAL

CUSTOMER :

DESCRIPTION : DC CERAMIC DISC CAPACITOR

Prepared	Checked	Approved	Date

1.Scope

This specification relates to DC ceramic disc capacitor intended for use in telecommunication and electronic devices.

2. Part number

CC4102KY5P102B5LS-LF

CC	4	102	K	Y5P	102	B	5LS	-	LF
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

The part number consists of 10 sections. The meaning in each section is as follows:

(1) Capacitor type code

(2) No of total character 102=1000=4

(3) Rated capacitance

Numerical symbol	Capacitance
102	1000PF
101	100PF
100	10PF
1R0	1PF

(4) Capacitance tolerance

Letter symbol	Capacitance tolerance
C	±0.25pF
D	±0.5pF
J	±5%
K	±10%
M	±20%
Z	+80，-20%

（5）Temperature coefficient or temperature characteristics

Symbol	Temperature coefficient or temperature characteristics
C0H	0±60*10^{-6}/℃
SL	+100 to –1000*10^{-6}/℃
Y5P	±10%
Y5R,YR	±15%
Y5U,Z5U	+20% to -55%
Y5V,Z5V	+20% to -80%

(6) Rated voltage

Letter symbol	Rated voltage (V)
102	1000
500	50
630	63

(7) Packing

Numerical symbol	
B	Bulk Pack
A	Ammo BoX\

(8) Lead Spacing

Numerical symbol	Lead spacing *
2LS	2.5±0.8
5LS	5.0±0.8
7LS	7.5±1.0
10LS	10.0±1.0

* For the capacitors in bulk packing only. For taped capacitors the lead spacing conform to figure 2 or figure 3.

(9) –

(10) Lead Free

3. Standard atmospheric condition

3.1 Temperature: 15~35℃

3.2 Relative humidity: 45~75%

3.3 Atmospheric pressure: 86~106kPa (860~1060 mbar)

4. Operating and storage temperature range

4.1 Operating temperature range:

Temperature characteristic	Lowest operating temperature	Highest operating temperature
SL,C0H Y5P, Y5R,Y5U & Y5V	- 25℃	85℃
Z5U, Z5V	10℃	85℃
YR	- 25℃	125℃

4.2 Storage temperature range: -10 to +40℃

5. Characteristics and test methods

5.1 Electrical characteristics and test methods

	Item	Test method	Specification
1	Capacitance & tolerance	The capacitance shall be measured at 20℃ with 1 MHz and 1 Vrms (Class Ⅰ), 1 kHz and 1 Vrms (class Ⅱ), 1 kHz and 0.1 Vrms (for class Ⅲ).	Refer to individual sheet
2	Quality factor or dissipation factor	The quality factor or dissipation factor shall be measured at the same conditions as above.	Q≥400+20Cr (for Cr＜30pF) Q≥1000 (for Cr≥30pF) Cr- -rated capacitance in unit of pF 2.5% max. (for Y5P, YR,Y5U and Z5U) 3.5% max. (for Y5V and Z5V) 5% max.(for SBBLC Y5V and Y5U) 3.5% max.(for SBBLC Y5P)
3	Insulation resistance	The insulation resistance shall be measured with rated voltage within 60±5 seconds of charging.	10000MΩ min.
4	Voltage proof	The voltage of 300% rated voltage (for rated voltage 50V and 500V), 200% rated voltage (for rated voltage 1000V to 2000V), 175% rated voltage (for	No breakdown or flashover

<table>
<tr><th></th><th>Item</th><th>Test method</th><th>Specification</th></tr>
<tr><td></td><td></td><td>rated voltage 3000V), or 150% rated voltage (for DCG or SBBLC) shall be applied between leads for 1 to 5 seconds.
The voltage of 250% rated voltage (for 50V capacitors) or 1300V (for 500V, 1kV and over) shall be applied between leads connected together and metal foil wrapped on envelope for 1 to 5 seconds.</td><td></td></tr>
<tr><td>5</td><td>Temperature characteristic</td><td>The capacitor shall be kept for enough time to reach thermal equilibrium at specified temperature of each step in the following table.
The capacitance measurement shall be made only at the thermal equilibrium of each step.
<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℃(125±2℃ for YR)</td></tr>
<tr><td>5</td><td>20±2℃</td></tr>
</table>
For temperature characteristic SL the steps 1 and 2 may be omitted.
The temperature coefficient and the capacitance drift shall be calculated by the following formulas.
Temperature coefficient
$= \frac{(Cm - Co)}{Co\ (T - To)} \times 10^6$ (ppm/℃)
Capacitance drift = $\frac{Co - C_1}{Co}$ or $\frac{C_5 - Co}{Co}$ or
$\frac{C_5 - C_1}{Co}$ (whichever is the greater)
Where
Co: Capacitance at step 3
Cm: Capacitance at step 2 and/or step 4
C_1,C_5: Capacitance at step 1 and step 5
To: Measuring temperature at Step 3
T: Measuring temperature at step 2 and/or 4
Pre-treatment:
The capacitor shall be stored at a temperature of 55±2℃ and a relative humidity of 20% or less for 16 to 24 hours. And then the capacitor shall be allowed immediately to cool in container using appropriate dryer such as activated carbon, silica gel etc.</td><td>Class Ⅰ
Temperature coefficient:
Refer to specification sheet
Capacitance drift:
Within ±1% or± 0.05pF
(Whichever is the greater)

Class Ⅱ&Ⅲ
<table>
<tr><th>Temperature characteristic</th><th>Permitting capacitance change</th></tr>
<tr><td>Y5P</td><td>±10%</td></tr>
<tr><td>YR</td><td>+15% to-30%</td></tr>
<tr><td>Y5U</td><td>+20% to -55%</td></tr>
<tr><td>Z5U</td><td>+20% to -55%</td></tr>
<tr><td>Y5V</td><td>+20% to -80%</td></tr>
<tr><td>Z5V</td><td>+20% to -80%</td></tr>
</table></td></tr>
</table>

5.2 Mechanical characteristics and test methods

	Item	Test method	Specification
1	Robustness of Termination	The capacitor body shall be held in such a manner so that axis of the lead is vertical. The tensile force of 10 N (for Φ0.6mm lead) or 5N (for Φ 0.5mm lead) shall be applied to the lead in a direction of its axis and acting in a direction away from the body of the capacitor for 10±1 seconds.	The capacitor shall be no broken and the lead shall be no loosened or cut off.
2	Bending	The capacitor is held in such a manner so that axis of the lead is vertical. A mass applying a force of 5N (forΦ0.6mm lead) or 2.5N (for Φ0.5mm lead) is then suspended from the end of the lead. The body of the capacitor is then inclined within a period of 2 to 3 seconds, through an angle of approximately 90° in the vertical plane and then returned to its initial position over the same period of time. This operation constitutes one bend. The lead shall be subjected to a total of 2 alternating bends in two opposite directions.	The lead shall be no broken.

5.3 Endurance characteristics and test methods

	Item	Test method	Specification	
1	Solderability	Solder temperature: 235±5℃ Immersion time: 2±0.5 seconds Immersion speed: 25±6mm/s	A new uniform coating of solder shall cover a minimum of 95% of the surface being immersed.	
2	Vibration	Frequency range: 10~55Hz Amplitude (total excursion): 1.5mm Speed of frequency change: 10~55~10Hz in about 1 minute Total duration: 6 hours This motion shall be applied for 2 hours in each of three mutually perpendicular directions.	Appearance	No visible damage
			Capacitance change	Within specified tolerance
			Quality factor or dissipation factor	Refer to clause 5.1.2
3	Resistance to soldering heat	Solder temperature and immersion time: 260±5℃, 10±0.5 seconds The immersing depth shall be a position 1.27mm from the seating plane. Post-treatment: The capacitor shall be preserved at the standard atmospheric condition for 24±2 hours.	Appearance	No visible damage
			Capacitance change	±2.5% or ±0.25pF (whichever is the greater, for class Ⅰ) ±5% (for Y5P and YR) ±15%(forY5U and Z5U) ±20%(forY5V and Z5V)
			Voltage proof (for between leads only)	Refer to clause 5.1.4

	Item	Test method	Specification	
4	Solvent resistance	The capacitor shall be immersed into isopropylalcohol for 30 ± 5 seconds.	Appearance	No visible damage Legible marking
5	Temperature cycle	The capacitor shall be placed in the test chamber at temperature of –25 ±2℃ for 30minutes, then at room temperature for 3minutes, at 85± 2 ℃ (125 ± 2 ℃ for YR) for 30minutes and at room temperature for 3minutes. This operation constitutes one cycle. The capacitor shall be subjected to a total of 5 cycles. Post-treatment: The capacitor shall be preserved at the standard atmospheric condition for 24 ± 2 hours.	Appearance	No visible damage Legible marking
			Capacitance change	±5% or ±0.5pF (whichever is the greater, for class Ⅰ) ±10% (Y5P and YR) ±20% (Y5U and Z5U) ±30% (Y5V and Z5V)
			Quality factor or dissipation factor	Q≥200+10Cr (for Cr＜10pF Q≥275+(5/2)Cr (for 10pF≤Cr ＜30pF Q≥350 (for Cr≥30pF) 5% max. (Y5V& Z5V) 3%max.(Y5P, YR ,Y5U&Z5U) 7.5% max (SBBLC)
			Insulation resistance	1000MΩ min. 500MΩ min. (SBBLC)
			Voltage proof	For between leads only. Refer to clause 5.1.4
6	Damp heat	The capacitor shall be stored for 500^{+24} hours at a temperature of 40±2℃ and a relative humidity of 90 to 95%. Post-treatment: The capacitor shall be preserved for 1 to 2 hours at the standard atmospheric condition.	Appearance	No visible damage
			Capacitance change	As the same of clause 5.3.5.
			Q or DF	As the same of clause 5.3.5.
			Insulation resistance	2500MΩ min. (Class Ⅰ) 1000MΩ min (class Ⅱ) 500MΩ min (for class Ⅲ)
			Voltage proof	For between leads only. Refer to clause 5.1.4
7	Endurance	The voltage that is equal to 200% rated voltage (for 50V and 500V capacitors), 150% rated voltage (for 1KV~3KV capacitors), or 125% rated voltage (for DCG or SBBLC) shall be applied continuously to the capacitor at temperature of 85 ± 3 ℃ (125 ± 3 ℃ for YR) for 1000^{+48} hours. Post-treatment: The capacitor shall be preserved at the standard atmospheric condition for 24 ± 2 hours.	Appearance	As the same of clause 5.3.5.
			Capacitance change	
			Quality factor or dissipation factor	
			Insulation resistance	
			Voltage proof	

LEAD STYLE

STYLE W

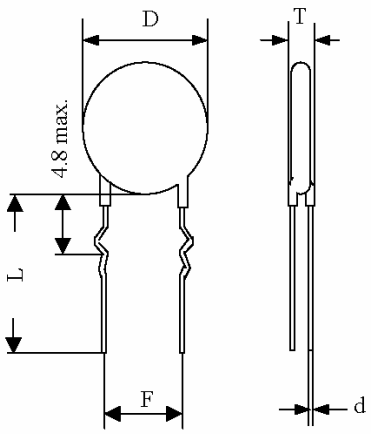


Figure 1-1

STYLE J

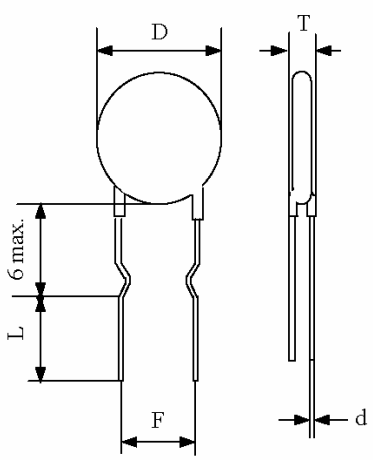


Figure 1-3

STYLE L

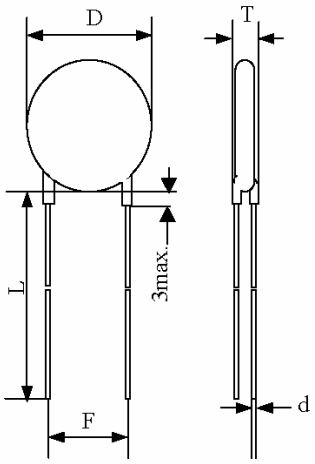


Figure 1-2

STYLE K

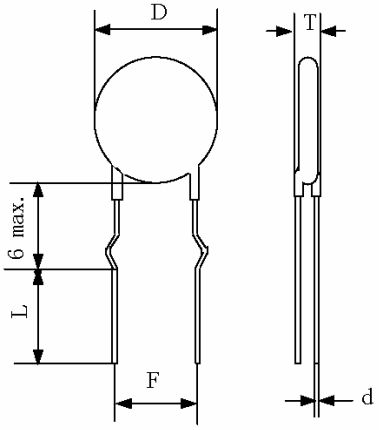


Figure 1-4

STYLE P

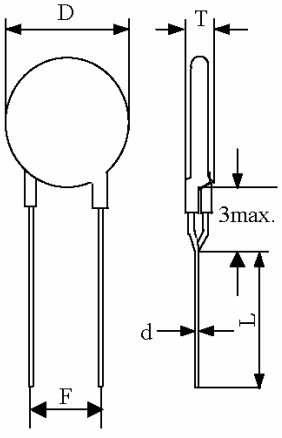


Figure 1-5

STYLE H

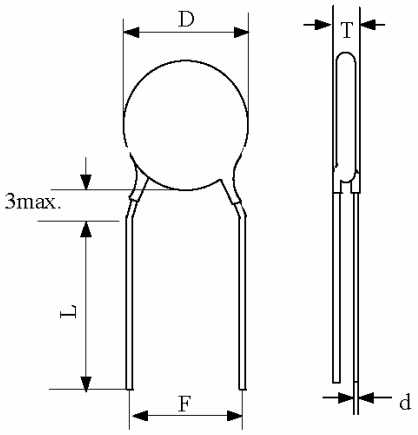
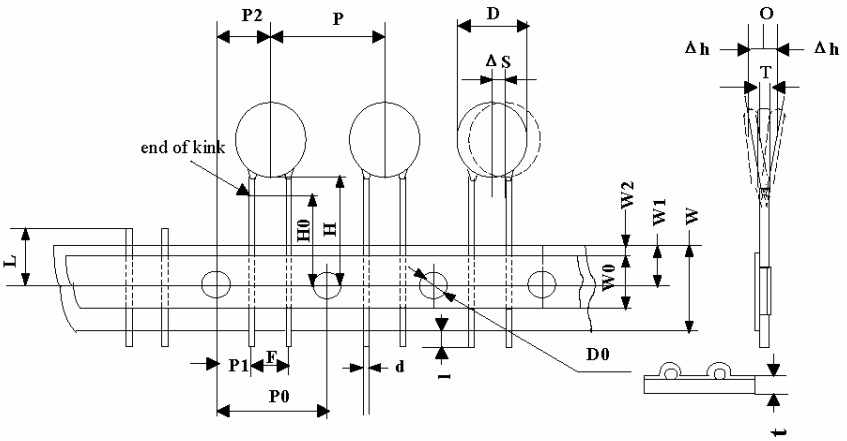
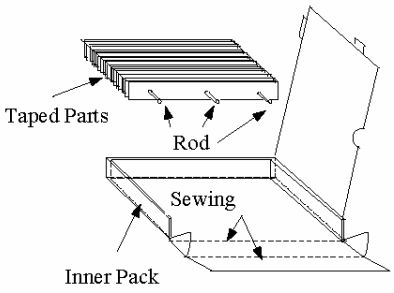


Figure 1-6

TAPING STYLE F





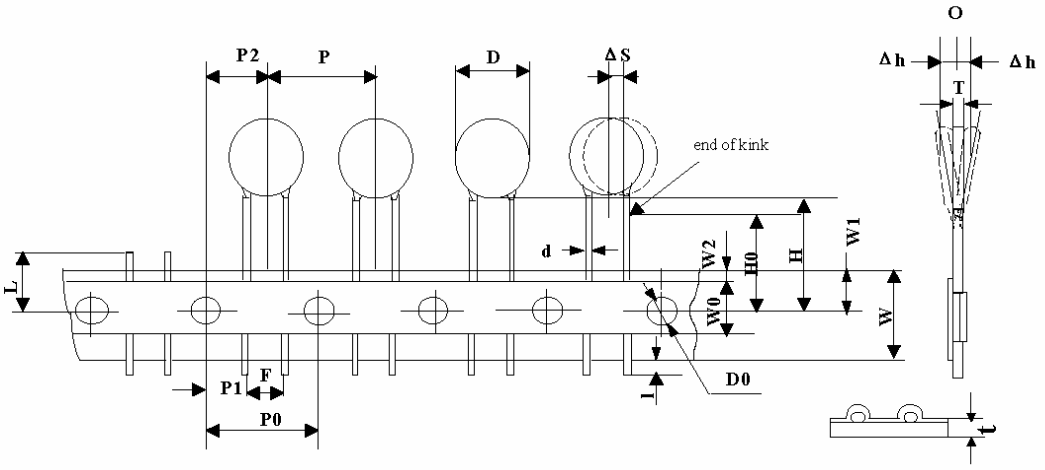
1.* For lead styles of inside kink and outside kink only

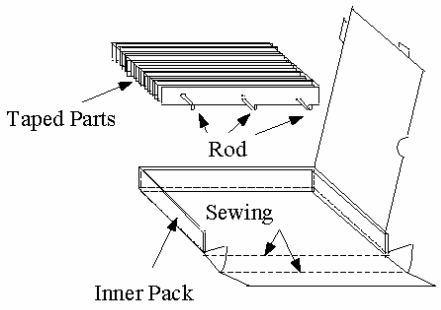
2. The lead sharp shall change with lead style.

Symbol	Dimension(mm)
P0	12.7±0.2
P	12.7±1.0
F	$5.0^{+0.5}_{-0.2}$
P1	3.85±0.4
P2	6.35±0.4
H0	16.0±0.5*
H	20.0±0.5
W	18.0±0.5
W0	8.0min.
W1	9.0±0.3
W2	3.0max.
t	0.7±0.2
D	To comply with individual sheet
D0	4±0.2
d	To comply with individual sheet
l	0max.
L	11max.
T	To comply with individual sheet
Δ S	0.5max.
Δ h	0.5max.

Figure 2

TAPING STYLE V



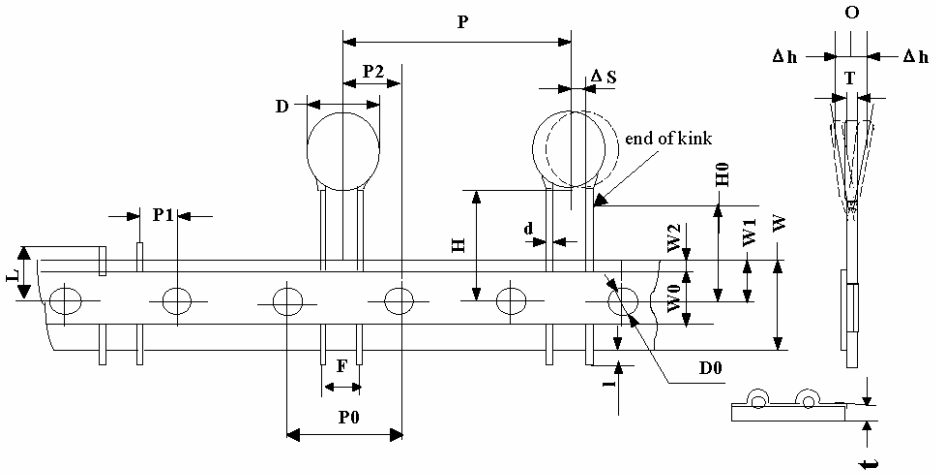


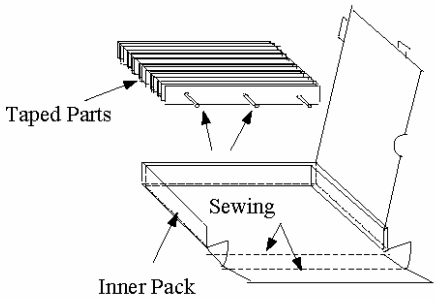
1. * For lead styles of inside kink and outside kink only.
2. The lead sharp shall change with lead style.

Symbol	Dimension(mm)
P0	15.0±0.2
P	15.0±1.0
F	$7.5^{+0.5}_{-0.2}$
P1	3.75±0.4
P2	7.5±0.4
H0	16.0±0.5*
H	20.0±0.5
W	18.0±0.5
W0	11.5min.
W1	9.0±0.3
W2	3.0max.
t	0.7±0.2
D	To comply with individual sheet
D0	4±0.2
d	To comply with individual sheet
l	0max.
L	11max.
T	To comply with individual sheet
Δ S	0.5max.
Δ h	0.5max.

Figure 3

TAPING STYLE Y



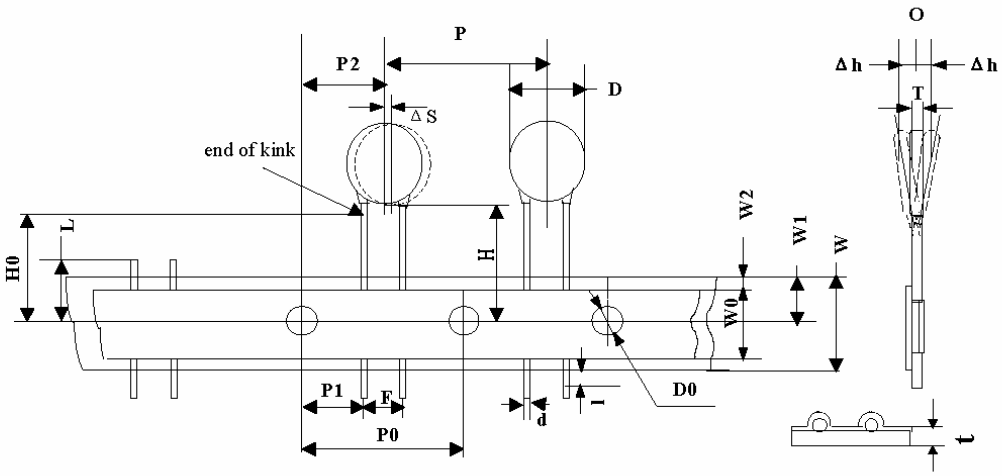


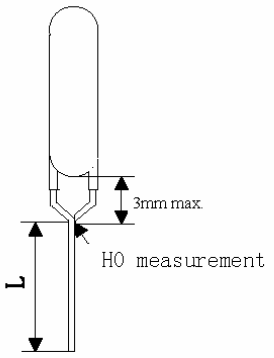
1. *For lead styles of inside kink and outside kink only
2. The lead sharp shall change with difference of lead style.

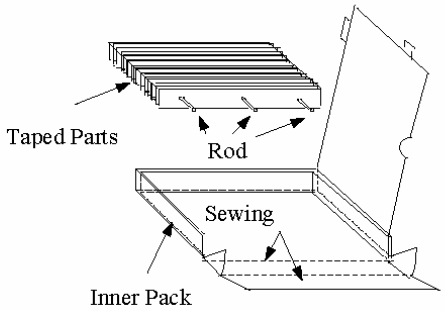
Symbol	Dimension(mm)
P0	15.0±0.2
P	30.0±1.0
F	$7.5^{+0.5}_{-0.2}$
P1	3.75±040
P2	7.5±0.4
H0	16.0±0.5*
H	20.0±0.5
W	18.0±0.5
W0	11.5min.
W1	9.0±0.3
W2	3.0max.
t	0.7±0.2
D	To comply with individual sheet
D0	4±0.2
d	To comply with individual sheet
l	0max.
L	11max.
T	To comply with individual sheet
Δ S	0.5max.
Δ h	0.5max.

Figure 4

TAPING STYLE S





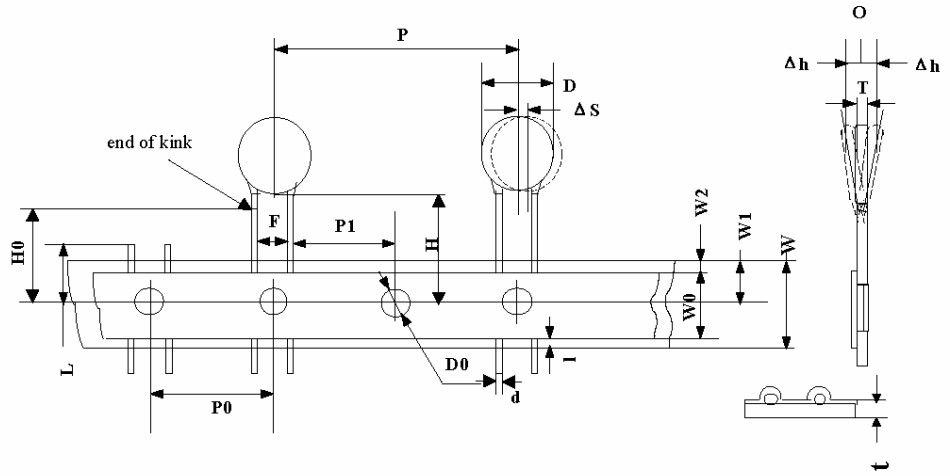


1.*For crimp lead style only.
2.Crimp shape of lead shall change with lead style.

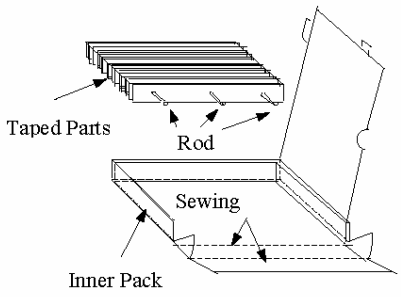
Symbol	Dimension(mm)
P0	15.0±0.3
P	30.0±2.0
F	7.5±1.0
P1	3.75±1.0
P2	7.5±1.5
H0	16.0±0.5*
H	$20.0^{+1.5}_{-1.0}$
W	18.0±0.5
W0	11.5min.
W1	9.0±0.5
W2	3.0max.
t	0.7±0.2
D	To comply with individual sheet
D0	4±0.3
d	To comply with individual sheet
l	2max.
L	11max.
T	To comply with individual sheet
Δ S	0±1.5
Δ h	2max.

Figure 5

TAPING STYLE U



Symbol	Dimension(mm)
P0	12.7±0.2
P	25.4±1.0
F	$10.0^{+0.5}_{-0.2}$
P1	7.7±0.4
P2	
H0	16.0±0.5*
H	20.0±0.5
W	18.0±0.5
W0	11.5min.
W1	9.0±0.3
W_2	3.0max.
t	0.7±0.2
D	To comply with individual sheet
D0	4±0.2
d	To comply with individual sheet
l	0max.
L	11max.
T	To copmply with individual shee
ΔS	0.5max.
Δh	0.5max.



1. *For lead styles of inside kink and outside kink only
2. The lead sharp shall change with lead style.

Figure 6