muRata

Reference Specification

DEJ Series

Based on the Electrical Appliance and Material Safety Law of Japan

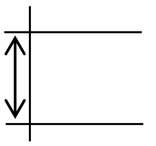
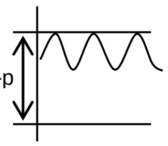
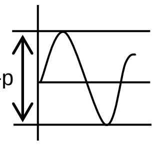
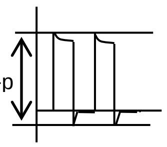
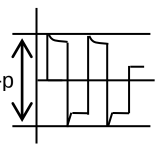
Lead Type Disc Ceramic Capacitors for General Purpose

Product specifications in this catalog are as of Dec. 2017, and are subject to change or obsolescence without notice.
Please consult the approval sheet before ordering.Please read rating and Cautions first.

⚠ CAUTION

1. OPERATING VOLTAGE

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the Vp-p value of the applied voltage or the Vo-p which contains DC bias within the rated voltage range. When the voltage is started to apply to the circuit or it is stopped applying, the irregular voltage may be generated for a transit period because of resonance or switching. Be sure to use a capacitor within rated voltage containing these irregular voltage.

Voltage	DC Voltage	DC+AC Voltage	AC Voltage	Pulse Voltage(1)	Pulse Voltage(2)
Positional Measurement	Vo-p 	Vo-p 	Vp-p 	Vp-p 	Vp-p 

2. OPERATING TEMPERATURE AND SELF-GENERATED HEAT

Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself.
When the capacitor is used in a high-frequency current, pulse current or the like, it may have the self-generated heat due to dielectric-loss. Applied voltage should be the load such as self-generated heat is within 20 °C <u>on the condition of atmosphere temperature 25 °C.</u> When measuring, use a thermocouple of small thermal capacity-K of ϕ0.1mm and be in the condition where capacitor is not affected by radiant heat of other components and wind of surroundings. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability.(Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

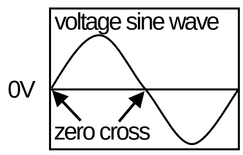
3. TEST CONDITION FOR WITHSTANDING VOLTAGE

(1) TEST EQUIPMENT

Test equipment for AC withstanding voltage should be used with the performance of the wave similar to 50/60 Hz sine wave.
If the distorted sine wave or over load exceeding the specified voltage value is applied, the defective may be caused.

(2) VOLTAGE APPLIED METHOD

When the withstanding voltage is applied, capacitor's lead or terminal should be firmly connected to the out-put of the withstanding voltage test equipment, and then the voltage should be raised from near zero to the test voltage.
If the test voltage without the raise from near zero voltage would be applied directly to capacitor, test voltage should be applied with the *zero cross. At the end of the test time, the test voltage should be reduced to near zero, and then capacitor's lead or terminal should be taken off the out-put of the withstanding voltage test equipment.
If the test voltage without the raise from near zero voltage would be applied directly to capacitor, the surge voltage may arise, and therefore, the defective may be caused.
*ZERO CROSS is the point where voltage sine wave pass 0V.
- See the right figure -



4. FAIL-SAFE

When capacitor would be broken, failure may result in a short circuit. Be sure to provide an appropriate fail-safe function like a fuse on your product if failure would follow an electric shock, fire or fume.

5. VIBRATION AND IMPACT

Do not expose a capacitor or its leads to excessive shock or vibration during use.

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6. SOLDERING

When soldering this product to a PCB/PWB, do not exceed the solder heat resistance specification of the capacitor. Subjecting this product to excessive heating could melt the internal junction solder and may result in thermal shocks that can crack the ceramic element.
When soldering capacitor with a soldering iron, it should be performed in following conditions.

Temperature of iron-tip : 400 °C max.
Soldering iron wattage : 50W max.
Soldering time : 3.5s max.

7. BONDING, RESIN MOLDING AND COATING

In case of bonding, molding or coating this product, verify that these processes do not affect the quality of capacitor by testing the performance of the bonded, molded or coated product in the intended equipment.
In case of the amount of applications, dryness / hardening conditions of adhesives and molding resins containing organic solvents (ethyl acetate, methyl ethyl ketone, toluene, etc.) are unsuitable, the outer coating resin of a capacitor is damaged by the organic solvents and it may result, worst case, in a short circuit.
The variation in thickness of adhesive, molding resin or coating may cause a outer coating resin cracking and/or ceramic element cracking of a capacitor in a temperature cycling.

8. TREATMENT AFTER BONDING, RESIN MOLDING AND COATING

When the outer coating is hot (over 100 ℃) after soldering, it becomes soft and fragile.
So please be careful not to give it mechanical stress.

Failure to follow the above cautions may result, worst case, in a short circuit and cause fuming or partial dispersion when the product is used.

9. OPERATING AND STORAGE ENVIRONMENT

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. And avoid exposure to moisture. Before cleaning, bonding, or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment. Store the capacitors where the temperature and relative humidity do not exceed -10 to 40 °C and 15 to 85%.
Use capacitors within 6 months after delivered. Check the solderability after 6 months or more.

10. LIMITATION OF APPLICATIONS

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property.

1. Aircraft equipment
2. Aerospace equipment
3. Undersea equipment
4. Power plant control equipment
5. Medical equipment
6. Transportation equipment (vehicles, trains, ships, etc.)
7. Traffic signal equipment
8. Disaster prevention / crime prevention equipment
9. Data-processing equipment exerting influence on public
10. Application of similar complexity and/or reliability requirements to the applications listed in the above.

NOTICE

1. CLEANING (ULTRASONIC CLEANING)

To perform ultrasonic cleaning, observe the following conditions.
Rinse bath capacity : Output of 20 watts per liter or less.
Rinsing time : 5 min maximum.
Do not vibrate the PCB/PWB directly.
Excessive ultrasonic cleaning may lead to fatigue destruction of the lead wires.

2. CAPACITANCE CHANGE OF CAPACITORS

· Class 1 capacitors

Capacitance might change a little depending on a surrounding temperature or an applied voltage.
Please contact us if you use for the strict time constant circuit.

· Class 2 and 3 capacitors

Class 2 and 3 capacitors like temperature characteristic B, E and F have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor leaves for a long time. Moreover, capacitance might change greatly depending on a surrounding temperature or an applied voltage. So, it is not likely to be able to use for the time constant circuit.
Please contact us if you need a detail information.

3. PERFORMANCE CHECK BY EQUIPMENT

Before using a capacitor, check that there is no problem in the equipment's performance and the specifications.
Generally speaking, CLASS 2 ceramic capacitors have voltage dependence characteristics and temperature dependence characteristics in capacitance. So, the capacitance value may change depending on the operating condition in a equipment. Therefore, be sure to confirm the apparatus performance of receiving influence in a capacitance value change of a capacitor, such as leakage current and noise suppression characteristic.
Moreover, check the surge-proof ability of a capacitor in the equipment, if needed, because the surge voltage may exceed specific value by the inductance of the circuit.

⚠ NOTE

1. Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
2. You are requested not to use our product deviating from this specification.

1. Application

This specification is applied to Based on the Electrical Appliance and Material Safety Law of Japan Lead Type Disc Ceramic Capacitors DEJ series used for General Electric equipment.
Do not use these products in any automotive power train or safety equipment including battery chargers for electric vehicles and plug-in hybrids

Conformable – standards

- The standards of the electrical appliance and material safety law of Japan, separated Table 4.

2. Rating

2-1. Operating temperature range

-25 ~ +85°C

2-2. Part number configuration

ex.)	DEJ	F3	E2	103	Z	B3	B	
	Series	Temperature characteristic	Rated voltage	Capacitance	Capacitance tolerance	Lead code	Packing style code	Individual specification

- Temperature characteristic

Code	Temperature characteristic
E3	E
F3	F

Please confirm detailed specification on [Specification and test methods].

- Rated voltage

Code	Rated voltage
E2	AC250V (r.m.s.)

- Capacitance

The first two digits denote significant figures ; the last digit denotes the multiplier of 10 in pF.
ex.) In case of 103.

10×10^3 = 10000pF

- Capacitance tolerance

Please refer to [Part number list].

- Lead code

Code	Lead style
A∗	Vertical crimp long type
C∗	Straight long type
B∗	Vertical crimp short type
D∗	Straight short type
N∗	Vertical crimp taping type
P∗	Straight taping type

∗ Please refer to [Part number list].

Solder coated copper wire is applied for termination.

- Packing style code

Code	Packing type
B	Bulk type
A	Ammo pack taping type

- Individual specification

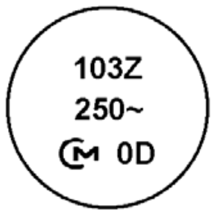
In case part number cannot be identified without ‘individual specification’ , it is added at the end of part number.

3. Marking

Nominal capacitance : 3 digit system
Capacitance tolerance : Code
Rated voltage : Letter code
Company name code : Abbreviation
(Omitted for maximum body diameter ϕ 8mm and under)
Manufacturing year : Letter code(The last digit of A.D. year.)
Manufacturing month : Code

Feb./Mar. → 2	Aug./Sep. → 8
Apr./May → 4	Oct./Nov. → O
Jun./Jul. → 6	Dec./Jan. → D

(Example)



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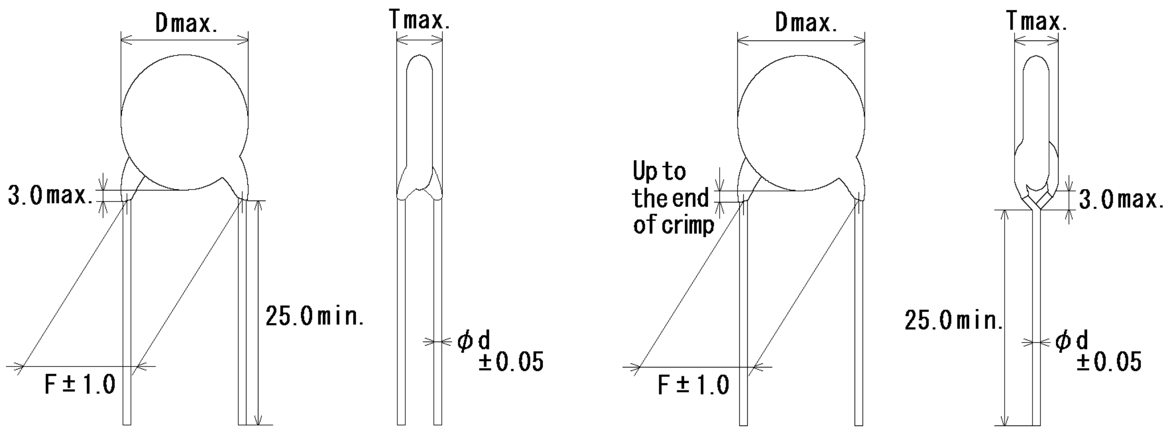
4. Part number list

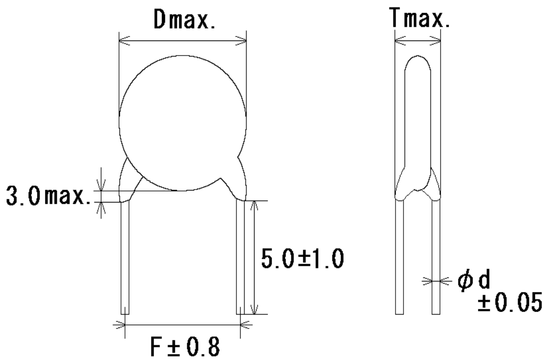


Note) The mark '*' of lead code differ from lead spacing(F) and lead diameter(d).
Please see the following list about details.

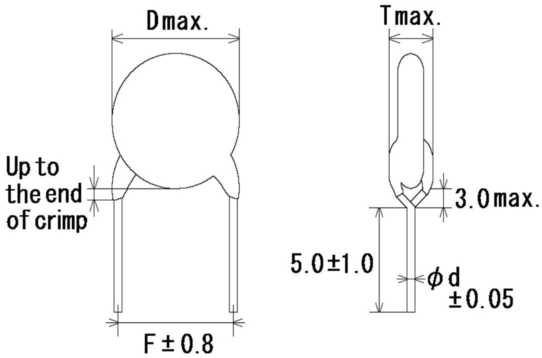
Unit : mm

T.C.	Cap. (pF)	Cap. tol.	Customer Part Number	Murata Part Number	Dimension (mm)				Lead code	Pack qty. (pcs)
					D	T	F	d		
E	1000	+80/-20%		DEJE3E2102ZC3B	7.0	4.0	7.5	0.6	C3	250
E	2200	+80/-20%		DEJE3E2222ZA3B	8.0	4.0	7.5	0.6	A3	250
E	3300	+80/-20%		DEJE3E2332ZA3B	9.0	4.0	7.5	0.6	A3	250
E	4700	+80/-20%		DEJE3E2472ZA3B	11.0	4.0	7.5	0.6	A3	250
F	4700	+80/-20%		DEJF3E2472ZA3B	8.0	4.0	7.5	0.6	A3	250
F	10000	+80/-20%		DEJF3E2103ZA3B	11.0	4.0	7.5	0.6	A3	250

·Straight short type
(Lead code:D*)



·Vertical crimp short type
(Lead code:B*)

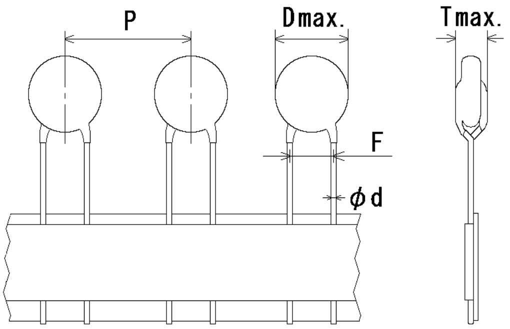


Note) The mark '*' of lead code differ from lead spacing(F) and lead diameter(d).
Please see the following list about details.

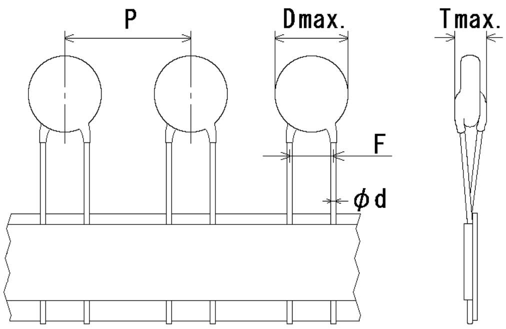
Unit : mm

T.C.	Cap. (pF)	Cap. tol.	Customer Part Number	Murata Part Number	Dimension (mm)				Lead code	Pack qty. (pcs)
					D	T	F	d		
E	1000	+80/-20%		DEJE3E2102ZD3B	7.0	4.0	7.5	0.6	D3	500
E	2200	+80/-20%		DEJE3E2222ZB3B	8.0	4.0	7.5	0.6	B3	500
E	3300	+80/-20%		DEJE3E2332ZB3B	9.0	4.0	7.5	0.6	B3	500
E	4700	+80/-20%		DEJE3E2472ZB3B	11.0	4.0	7.5	0.6	B3	500
F	4700	+80/-20%		DEJF3E2472ZB3B	8.0	4.0	7.5	0.6	B3	500
F	10000	+80/-20%		DEJF3E2103ZB3B	11.0	4.0	7.5	0.6	B3	500

·Vartical crimp taping type
(Lead code:N*)



·Straight taping type
(Lead code:P*)



Note) The mark '*' of lead code differ from lead spacing(F),
lead diameter(d) and pitch of component(P).
Please see the following list or taping specification about details.

Unit : mm

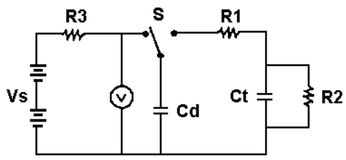
T.C.	Cap. (pF)	Cap. tol.	Customer Part Number	Murata Part Number	Dimension (mm)					Lead code	Pack qty. (pcs)
					D	T	F	d	P		
E	1000	+80/-20%		DEJE3E2102ZN2A	7.0	4.0	5.0	0.6	12.7	N2	1500
E	1000	+80/-20%		DEJE3E2102ZP3A	7.0	4.0	7.5	0.6	15.0	P3	1000
E	2200	+80/-20%		DEJE3E2222ZN2A	8.0	4.0	5.0	0.6	12.7	N2	1500
E	2200	+80/-20%		DEJE3E2222ZN3A	8.0	4.0	7.5	0.6	15.0	N3	1000
E	3300	+80/-20%		DEJE3E2332ZN2A	9.0	4.0	5.0	0.6	12.7	N2	1500
E	3300	+80/-20%		DEJE3E2332ZN3A	9.0	4.0	7.5	0.6	15.0	N3	1000
E	4700	+80/-20%		DEJE3E2472ZN2A	11.0	4.0	5.0	0.6	12.7	N2	1500
E	4700	+80/-20%		DEJE3E2472ZN3A	11.0	4.0	7.5	0.6	15.0	N3	1000
F	4700	+80/-20%		DEJF3E2472ZN2A	8.0	4.0	5.0	0.6	12.7	N2	1500
F	4700	+80/-20%		DEJF3E2472ZN3A	8.0	4.0	7.5	0.6	15.0	N3	1000
F	10000	+80/-20%		DEJF3E2103ZN2A	11.0	4.0	5.0	0.6	12.7	N2	1500
F	10000	+80/-20%		DEJF3E2103ZN3A	11.0	4.0	7.5	0.6	15.0	N3	1000

5. Specification and test methods

No.	Item		Specification	Test method
1	Appearance and dimensions		No marked defect on appearance form and dimensions. Please refer to [Part number list].	The capacitor should be inspected by naked eyes for visible evidence of defect. Dimensions should be measured with slide calipers.
2	Marking		To be easily legible.	The capacitor should be inspected by naked eyes.
3	Dielectric strength	Between lead wires	No failure.	The capacitor should not be damaged when AC1 500V(r.m.s.) are applied between the lead wires for 60 s.
		Body insulation	No failure.	First, the terminals of the capacitor should be connected together. Then, the capacitor should be immersed into 10% salt solution. Finally, AC1 500V(r.m.s.) is applied for 60 s between the capacitor lead wires and electrode plate.
4	Insulation Resistance (I.R.)		10 000MΩ min.	The insulation resistance should be measured with DC500±50V within 60±5 s of charging.
5	Capacitance		Within specified tolerance.	The capacitance should be measured at 20°C with 1±0.1kHz and AC5V(r.m.s.) max..
6	Dissipation Factor (D.F.)		Char. E : 2.5% max. Char. F : 5.0% max.	The dissipation factor should be measured at 20°C with 1±0.1kHz and AC5V(r.m.s.) max..
7	Temperature characteristic		Char. E : Within +20/-55% Char. F : Within +30/-80%	The capacitance measurement should be made at each step specified in Table.

Step	1	2	3	4	5
Temp.(°C)	20±2	-25±2	20±2	85±2	20±2

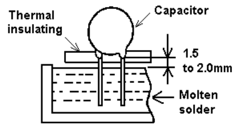
No.	Item		Specification	Test method
8	Discharge test	Appearance	No marked defect.	As in Figure, discharge is made 50 times at 5 s. Intervals from the capacitor (Cd) charged at DC voltage of specified.
		I.R.	1 000MΩ min.	
		Dielectric strength	Per item 3	

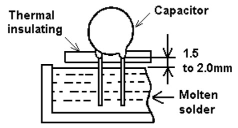


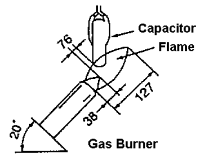
Ct : Capacitor under test
S : High-voltage switch
R1 : 1 000Ω
R2 : 100MΩ
R3 : Surge resistance

Cd	0.001μF
Vs	DC10kV

No.	Item		Specification	Test method
9	Robustness of terminations	Tensile	Lead wire should not cut off. Capacitor should not be broken.	Fix the body of capacitor, a tensile weight gradually to each lead wire in the radial direction of capacitor up to 10N and keep it for 10±1 s.
		Bending		With the termination in its normal position, the capacitor is held by its body in such a manner that the axis of the termination is vertical; a mass applying a force of 5N is then suspended from the end of the termination. The body of the capacitor is then inclined, within a period of 2 to 3 s, 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. One bend immediately followed by a second bend in the opposite direction.
10	Vibration resistance	Appearance	No marked defect.	The capacitor should 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.
		Capacitance	Within the specified tolerance.	
		D.F.	Char. E : 2.5% max. Char. F : 5.0% max.	

<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specification</th><th>Test method</th></tr>
<tr><td>11</td><td colspan="2">Solderability of leads</td><td>Lead wire should be soldered with uniformly coated on the axial direction over 3/4 of the circumferential direction.</td><td>The lead wire of a capacitor should be dipped into a ethanol solution of 25wt% rosin and then into molten solder for 2±0.5 s. In both cases the depth of dipping is up to about 1.5 to 2.0mm from the root of lead wires.
Temp. of solder :
245±5°C Lead Free Solder (Sn-3Ag-0.5Cu)
235±5°C H63 Eutectic Solder</td></tr>
<tr><td rowspan="4">12</td><td rowspan="4">Soldering effect
(Non-preheat)</td><td>Appearance</td><td>No marked defect.</td><td rowspan="4">Solder temperature: 350±10°C
Immersion time : 3.5±0.5 s
The depth of immersion is up to about 1.5 to 2.0mm from the root of lead wires.


Pre-treatment : Capacitor should be stored at 85±2°C for 1 h, then placed at * room condition for 24±2 h before initial measurements.
Post-treatment : Capacitor should be stored for 4 to 24 h at * room condition.</td></tr>
<tr><td>Capacitance change</td><td>Char. E : Within ±15%
Char. F : Within ±20%</td></tr>
<tr><td>I.R.</td><td>1000MΩ min.</td></tr>
<tr><td>Dielectric strength</td><td>Per item 3</td></tr>
<tr><td rowspan="4">13</td><td rowspan="4">Soldering effect
(On-preheat)</td><td>Appearance</td><td>No marked defect.</td><td rowspan="4">First the capacitor should be stored at 120+0/-5°C for 60+0/-5 s.
Then, as in figure, the lead wires should be immersed solder of 260+0/-5°C up to 1.5 to 2.0mm from the root of terminal for 7.5+0/-1 s.


Pre-treatment : Capacitor should be stored at 85±2°C for 1 h, then placed at * room condition for 24±2 h before initial measurements.
Post-treatment : Capacitor should be stored for 4 to 24 h at * room condition.</td></tr>
<tr><td>Capacitance change</td><td>Char. E : Within ±15%
Char. F : Within ±20%</td></tr>
<tr><td>I.R.</td><td>1000MΩ min.</td></tr>
<tr><td>Dielectric strength</td><td>Per item 3<table><tr><th>Cycle</th><th>Time</th></tr><tr><td>1 to 2</td><td>15 s max.</td></tr><tr><td>3</td><td>60 s max.</td></tr></table></td></tr>
<tr><td>14</td><td>Solvent resistance</td><td>Appearance</td><td>No marked defect.</td><td>The capacitor should be immersed into a isopropyl alcohol for 30±5 s.</td></tr>
<tr><td>15</td><td colspan="2">Flame test</td><td>The capacitor flame discontinue as follows.</td><td>The capacitor should be subjected to applied flame for 15 s. and then removed for 15 s until 3cycle.

</td></tr>
<tr><td rowspan="5">16</td><td rowspan="5">Humidity
(Under steady state)</td><td>Appearance</td><td>No marked defect.</td><td rowspan="5">Set the capacitor for 500±12 h at 40±2°C in 90 to 95% relative humidity.
Pre-treatment : Capacitor should be stored at 85±2°C for 1 h, then placed at * room condition for 24±2 h before initial measurements.
Post-treatment : Capacitor should be stored for 1 to 2 h at * room condition.</td></tr>
<tr><td>Capacitance change</td><td>Char. E : Within ±20%
Char. F : Within ±30%</td></tr>
<tr><td>D.F.</td><td>Char. E : 5.0% max.
Char. F : 7.5% max.</td></tr>
<tr><td>I.R.</td><td>1000MΩ min.</td></tr>
<tr><td>Dielectric strength</td><td>Per item 3</td></tr>
</table>

* "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specification</th><th>Test method</th></tr>
<tr><td rowspan="5">17</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°C in 90 to 95% relative humidity.

Pre-treatment : Capacitor should be stored at 85±2°C for 1 h, then placed at * room condition for 24±2 h before initial measurements.
Post-treatment : Capacitor should be stored for 1 to 2 h at * room condition.</td></tr>
<tr><td>Capacitance change</td><td>Char. E : Within ±20%
Char. F : Within ±30%</td></tr>
<tr><td>D.F.</td><td>Char. E : 5.0% max.
Char. F : 7.5% max.</td></tr>
<tr><td>I.R.</td><td>1000MΩ min.</td></tr>
<tr><td>Dielectric strength</td><td>Per item 3</td></tr>
<tr><td rowspan="4">18</td><td rowspan="4">Life</td><td>Appearance</td><td>No marked defect.</td><td rowspan="4">Apply the following voltage for 1500 h at 85±2°C in 50% relative humidity max..

Applied voltage : AC500V(r.m.s.),except that once each hour the voltage is increased to AC1000V(r.m.s.) for 0.1 s.
Pre-treatment : Capacitor should be stored at 85±2°C for 1 h, then placed at * room condition for 24±2 h before initial measurements.
Post-treatment : Capacitor should be stored for 4 to 24 h at * room condition.</td></tr>
<tr><td>Capacitance change</td><td>Char. E : Within ±20%
Char. F : Within ±30%</td></tr>
<tr><td>I.R.</td><td>1 000MΩ min.</td></tr>
<tr><td>Dielectric strength</td><td>Per item 3</td></tr>
<tr><td rowspan="5">19</td><td rowspan="5">Temperature and immersion cycle</td><td>Appearance</td><td>No marked defect.</td><td rowspan="5">The capacitor should be subjected to 5 temperature cycles, then consecutively to 2 immersion cycles.

<Temperature cycle>
<table><tr><th>Step</th><th>Temperature(°C)</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>+85+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(°C)</th><th>Time</th><th>Immersion 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>0±3</td><td>15 min</td><td>Salt water</td></tr></table>Cycle time : 2 cycle

Pre-treatment : Capacitor should be stored at 85±2°C for 1 h, then placed at * room condition for 24±2 h.

Post-treatment : Capacitor should be stored for 4 to 24 h at * room condition.</td></tr>
<tr><td>Capacitance change</td><td>Char. E : Within ±20%
Char. F : Within ±30%</td></tr>
<tr><td>D.F.</td><td>Char. E : 5.0% max.
Char. F : 7.5% max.</td></tr>
<tr><td>I.R.</td><td>1000MΩ min.</td></tr>
<tr><td>Dielectric strength</td><td>Per item 3</td></tr>
<tr><td rowspan="5">20</td><td rowspan="5">Humidity Insulation</td><td>Appearance</td><td>No marked defect.</td><td rowspan="5">The capacitor should be subjected to 40±2°C, relative humidity of 90% to 98% for 8 h, and then removed in room temperature for 16 h until 5 cycles.
Pre-treatment : Capacitor should be stored at 85±2°C for 1 h, then placed at * room condition for 24±2 h before initial measurements.
Post-treatment : Capacitor should be stored for 1 to 2 h at * room condition.</td></tr>
<tr><td>Capacitance change</td><td>Char. E : Within ±20%
Char. F : Within ±30%</td></tr>
<tr><td>D.F.</td><td>Char. E : 5.0% max.
Char. F : 7.5% max.</td></tr>
<tr><td>I.R.</td><td>1000MΩ min.</td></tr>
<tr><td>Dielectric strength</td><td>Per item 3</td></tr>
</table>

* "room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

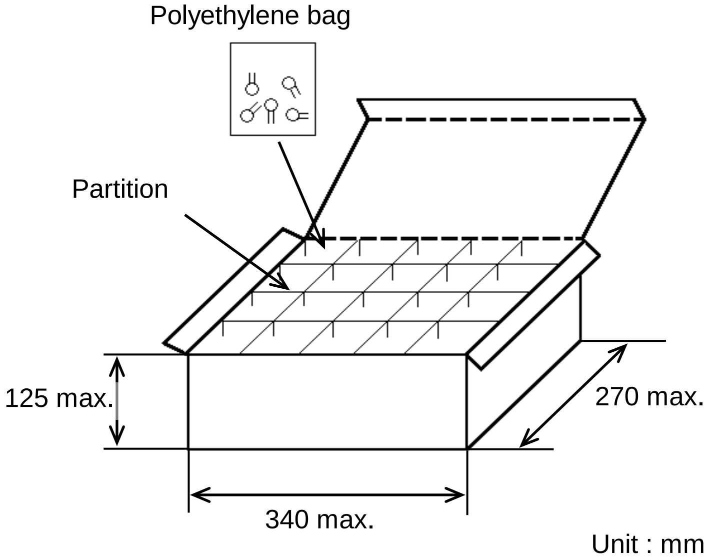
6.Packing specification

•Bulk type (Packing style code : B)

The size of packing case and packing way

The number of packing = ^{*1}Packing quantity × ^{*2}n

∗1 : Please refer to [Part number list].
∗2 : Standard n = 20 (bag)



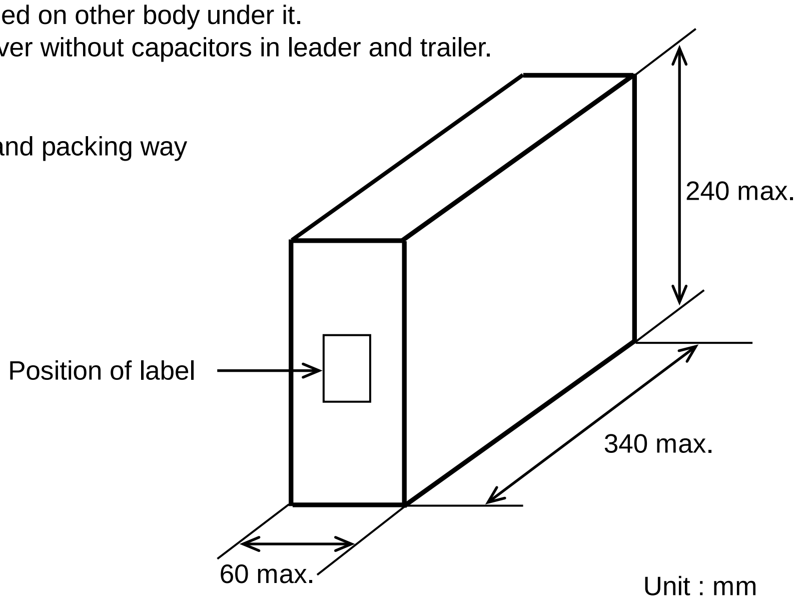
Unit : mm

Note)
The outer package and the number of outer packing be changed by the order getting amount.

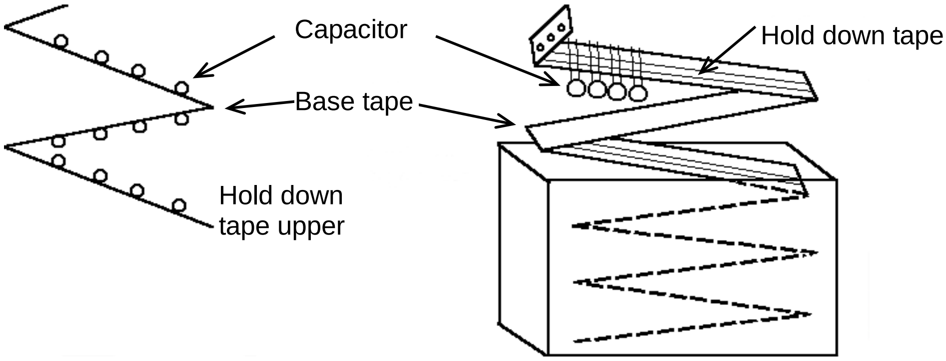
•Ammo pack taping type (Packing style code : A)

· The tape with capacitors is packed zigzag into a case.
· When body of the capacitor is piled on other body under it.
· There should be 3 pitches and over without capacitors in leader and trailer.

The size of packing case and packing way



Unit : mm

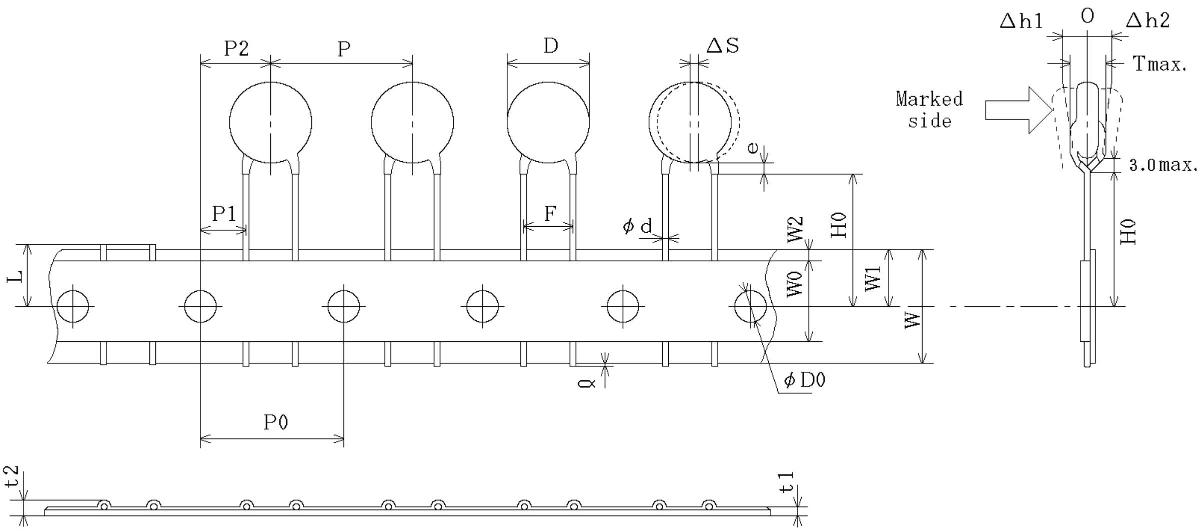


7. Taping specification

7-1. Dimension of capacitors on tape

Vertical crimp taping type < Lead code : N2 >

Pitch of component 12.7mm / Lead spacing 5.0mm



Unit : mm

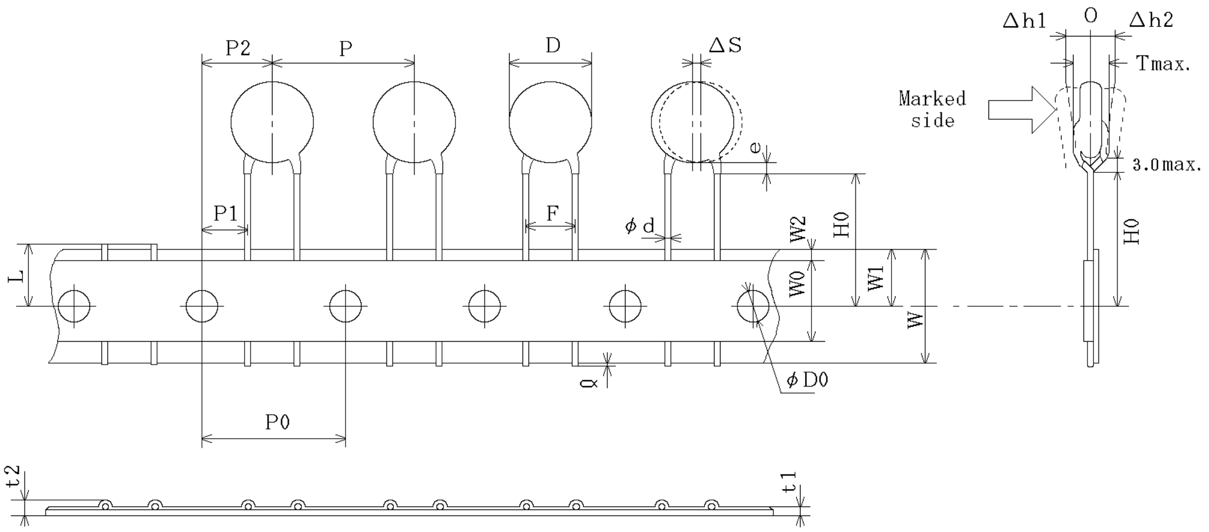
Item	Code	Dimensions	Remarks
Pitch of component	P	12.7±1.0	
Pitch of sprocket hole	P0	12.7±0.3	
Lead spacing	F	$5.0\pm^{0.8}_{0.2}$	
Length from hole center to component center	P2	6.35±1.3	Deviation of progress direction
Length from hole center to lead	P1	3.85±0.7	
Body diameter	D	Please refer to [Part number list].	
Deviation along tape, left or right	ΔS	0±1.0	They include deviation by lead bend .
Carrier tape width	W	18.0±0.5	
Position of sprocket hole	W1	9.0±0.5	Deviation of tape width direction
Lead distance between reference and bottom planes	H0	$18.0\pm^{2.0}_{0}$	
Protrusion length	ℓ	+0.5~−1.0	
Diameter of sprocket hole	φD0	4.0±0.1	
Lead diameter	φd	0.60±0.05	
Total tape thickness	t1	0.6±0.3	They include hold down tape thickness.
Total thickness, tape and lead wire	t2	1.5 max.	
Deviation across tape, front	Δh1	1.0 max.	
Deviation across tape, rear	Δh2		
Portion to cut in case of defect	L	$11.0\pm^{0}_{1.0}$	
Hold down tape width	W0	11.5 min.	
Hold down tape position	W2	1.5±1.5	
Coating extension on lead	e	Up to the end of crimp	
Body thickness	T	Please refer to [Part number list].	

7. Taping specification

7-1. Dimension of capacitors on tape

Vertical crimp taping type < Lead code : N3 >

Pitch of component 15.0mm / Lead spacing 7.5mm



Unit : mm

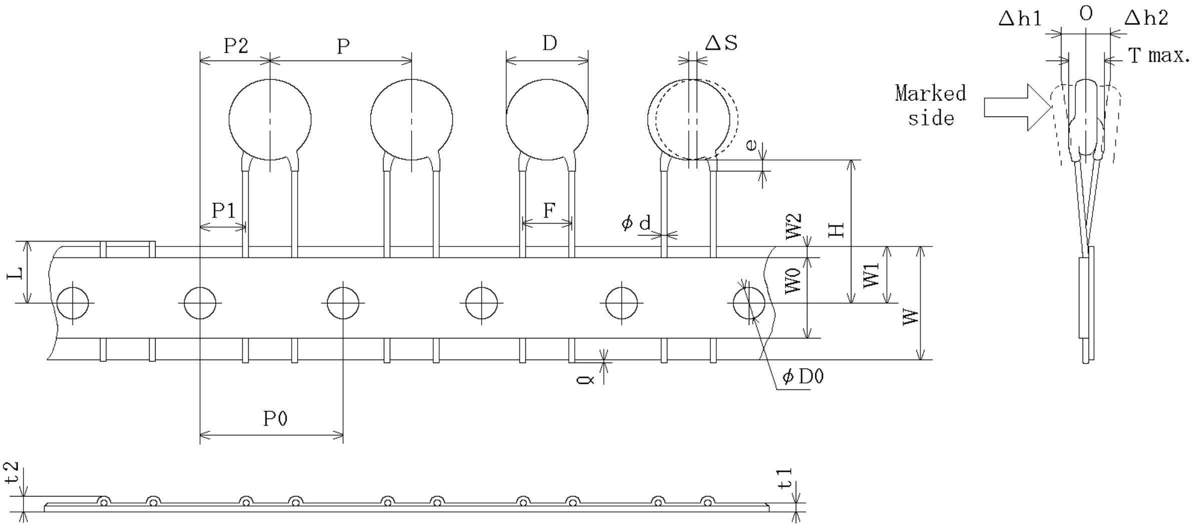
Item	Code	Dimensions	Remarks
Pitch of component	P	15.0±2.0	
Pitch of sprocket hole	P0	15.0±0.3	
Lead spacing	F	7.5±1.0	
Length from hole center to component center	P2	7.5±1.5	Deviation of progress direction
Length from hole center to lead	P1	3.75±1.0	
Body diameter	D	Please refer to [Part number list].	
Deviation along tape, left or right	ΔS	0±2.0	They include deviation by lead bend .
Carrier tape width	W	18.0±0.5	
Position of sprocket hole	W1	9.0±0.5	Deviation of tape width direction
Lead distance between reference and bottom planes	H0	$18.0\pm^{2.0}_{0}$	
Protrusion length	ℓ	+0.5~–1.0	
Diameter of sprocket hole	φD0	4.0±0.1	
Lead diameter	φd	0.60±0.05	
Total tape thickness	t1	0.6±0.3	They include hold down tape thickness.
Total thickness, tape and lead wire	t2	1.5 max.	
Deviation across tape, front	Δh1	2.0 max.	
Deviation across tape, rear	Δh2		
Portion to cut in case of defect	L	$11.0\pm^{0}_{1.0}$	
Hold down tape width	W0	11.5 min.	
Hold down tape position	W2	1.5±1.5	
Coating extension on lead	e	Up to the end of crimp	
Body thickness	T	Please refer to [Part number list].	

7. Taping specification

7-1. Dimension of capacitors on tape

Straight taping type < Lead code : P3 >

Pitch of component 15.0mm / Lead spacing 7.5mm

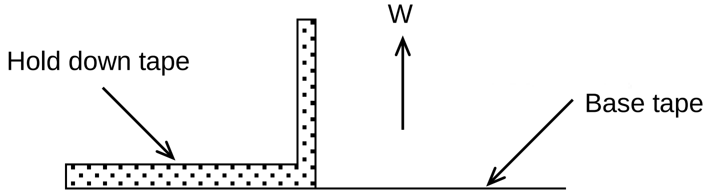


Unit : mm

Item	Code	Dimensions	Remarks
Pitch of component	P	15.0±2.0	
Pitch of sprocket hole	P0	15.0±0.3	
Lead spacing	F	7.5±1.0	
Length from hole center to component center	P2	7.5±1.5	Deviation of progress direction
Length from hole center to lead	P1	3.75±1.0	
Body diameter	D	Please refer to [Part number list].	
Deviation along tape, left or right	ΔS	0±2.0	They include deviation by lead bend .
Carrier tape width	W	18.0±0.5	
Position of sprocket hole	W1	9.0±0.5	Deviation of tape width direction
Lead distance between reference and bottom planes	H	$20.0^{+1.5}_{-1.0}$	
Protrusion length	ℓ	+0.5~−1.0	
Diameter of sprocket hole	φD0	4.0±0.1	
Lead diameter	φd	0.60±0.05	
Total tape thickness	t1	0.6±0.3	They include hold down tape thickness.
Total thickness, tape and lead wire	t2	1.5 max.	
Deviation across tape, front	Δh1	2.0 max.	
Deviation across tape, rear	Δh2		
Portion to cut in case of defect	L	$11.0^{+0}_{-1.0}$	
Hold down tape width	W0	11.5 min.	
Hold down tape position	W2	1.5±1.5	
Coating extension on lead	e	3.0 max.	
Body thickness	T	Please refer to [Part number list].	

7-2. Splicing way of tape

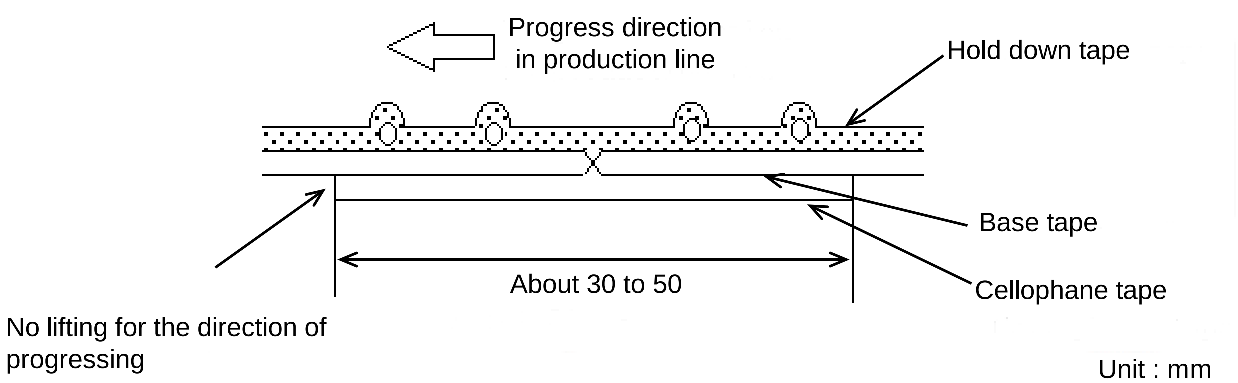
1) Adhesive force of tape is over 3N at test condition as below.



2) Splicing of tape

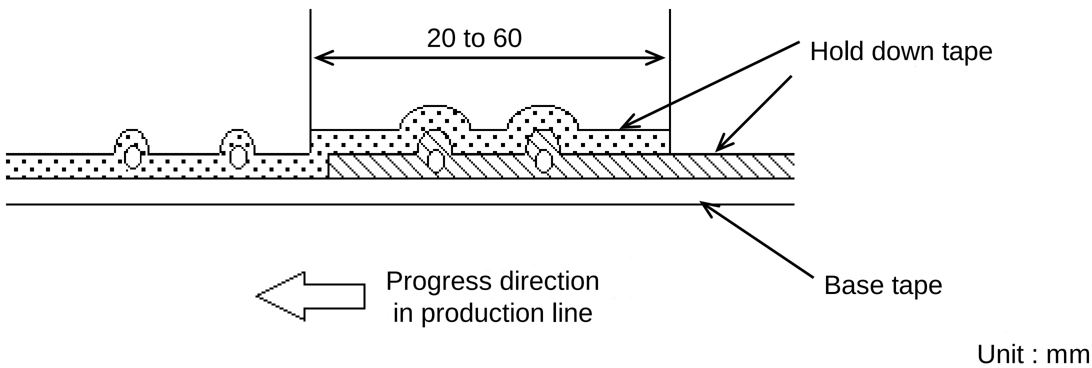
a) When base tape is spliced

•Base tape should be spliced by cellophane tape.
(Total tape thickness should be less than 1.05mm.)



b) When hold down tape is spliced

•Hold down tape should be spliced with overlapping.
(Total tape thickness should be less than 1.05mm.)



c) When both tape are spliced

•Base tape and hold down tape should be spliced with splicing tape.

3) Missing components

•There should be no consecutive missing of more than three components.
•The number of missing components should be not more than 0.5% of total components that should be present in a Ammo pack.

EU RoHS

This products of the following crresponds to EU RoHS.

RoHS

maximum concentration values tolerated by weight in homogeneous materials

・1000 ppm maximum Lead
・1000 ppm maximum Mercury
・100 ppm maximum Cadmium
・1000 ppm maximum Hexavalent chromium
・1000 ppm maximum Polybrominated biphenyls (PBB)
・1000 ppm maximum Polybrominated diphenyl ethers (PBDE)

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