

## ● Part Numbering

### CERALOCK® (MHz)

(Global Part Number) 

CS	T	CV	16M0	X53	***	-R0
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1234567

#### ① Product ID

Product ID	
CS	Ceramic Resonators

#### ② Frequency/Capacitance

Code	Frequency/Capacitance
A	MHz No capacitance built-in
T	MHz Built-in Capacitance

#### ③ Structure/Size

Code	Structure/Size
LA	Lead Type
LS	Round Lead Type
CC	Cap Chip Type
CR/CE/CG	Small-cap Chip Type
CV	Monolithic Chip Type
CW	Small Monolithic Chip Type

#### ④ Nominal Center Frequency

Expressed by four-digit alphanumerics. The unit is in hertz (MHz).  
Decimal point is expressed by capital letter "M".

#### ⑤ Design

Code	Design
G□□	Thickness Shear mode
T/□□	Thickness Expander mode
X□□	Thickness Expander mode (3rd overtone)

□□ indicates initial frequency tolerance and load capacity.

### CERALOCK® (kHz)

(Global Part Number) 

CS	B	FB	1M00	J58	***	-R1
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1234567

#### ① Product ID

Product ID	
CS	Ceramic Resonators

#### ② Frequency/Capacitance

Code	Frequency/Capacitance
B	kHz No capacitance built-in

#### ③ Structure/Size

Code	Structure/Size
LA	Two-Terminal Lead Type
FB	SMD Type

#### ④ Nominal Center Frequency

Expressed by four-digit alphanumerics. The unit is in hertz (Hz).  
Capital letter "K" following three figures expresses the unit of "kHz".

#### ⑥ Individual Specification

Code	Individual Specification
***	Three-digit alphanumerics express "Individual Specification".

With standard products, "⑥ Individual Specification" is omitted, and "⑦ Package Specification Code" is carried up.

#### ⑦ Packaging

Code	Packaging
-B0	Bulk
-A0	Radial Taping H <sub>0</sub> =18mm
-A1	Radial Taping H <sub>0</sub> =16mm
-R0	Plastic Taping ø=180mm
-R1	Plastic Taping ø=330mm

Radial taping is applied to lead type and plastic taping to chip type.

#### ⑤ Design

Code	Design
E□□	Area Expansion mode
J□□	Area Expansion mode (Closed Type)

□□ indicates initial frequency tolerance and load capacitance.

#### ⑥ Individual Specification

Code	Individual Specification
***	Three-digit alphanumerics express "Individual Specification".

With standard products, "⑥ Individual Specification" is omitted, and "⑦ Package Specification Code" is carried up.

#### ⑦ Packaging

Code	Packaging
-B0	Bulk
-R1	Plastic Taping ø=330mm

# Ceramic Resonators (CERALOCK®)

**muRata**

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## Chip Type Three-Terminals CSTCC/E/G/R/V/W Series

Chip "CERALOCK" with built-in load capacitance in an extremely small package.

MURATA's package technology expertise has enabled the development of the Chip "CERALOCK" with built-in load capacitors.

High-density mounting can be realized because of the small package and the elimination of the need for an external load capacitor.

### ■ Features

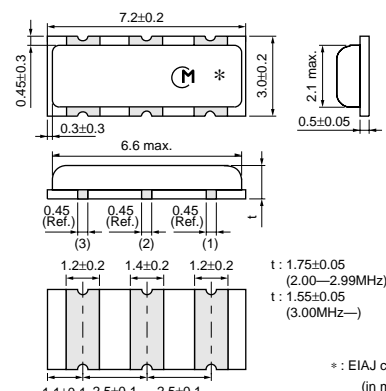
1. Oscillation circuits do not require external load capacitors.
2. The series is available in a wide frequency range.
3. The resonators are extremely small and have a low profile.
4. No adjustment is necessary for oscillation circuits.

### ■ Applications

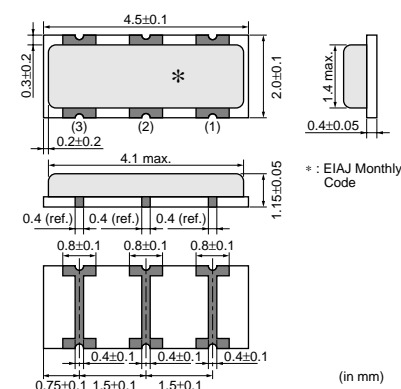
- Clock oscillators for microprocessors.
- Electronic control circuits for small electronic equipment such as hand held movie.
- Audio-visual applications (Camcorder, Remote Controller, etc.)
- Office automation equipments (DVD, CD-ROM, HDD, FDD, etc.)
- Automotive electronics. (CSTCC\_G\_A series, CSTCR\_G\_A series, CSTCE\_G\_A series, CSTCV\_X\_Q series)
- Dual Tone Multi Frequency (DTMF) generator for cordless telephones.



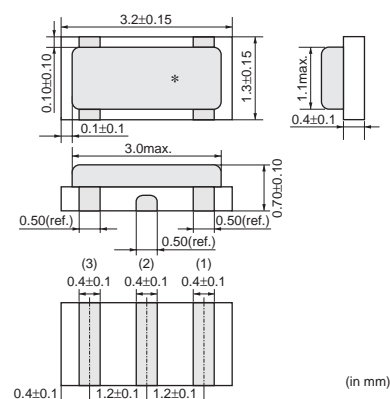
CSTCC\_G(A)  
2.00-3.99MHz



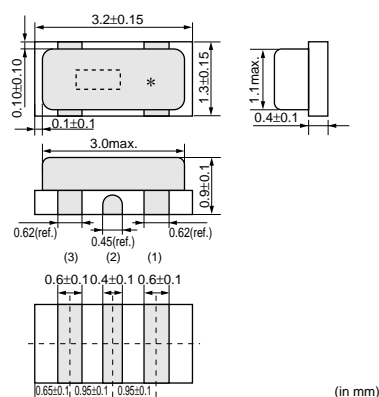
CSTCR\_G(A)  
4.00-7.99MHz



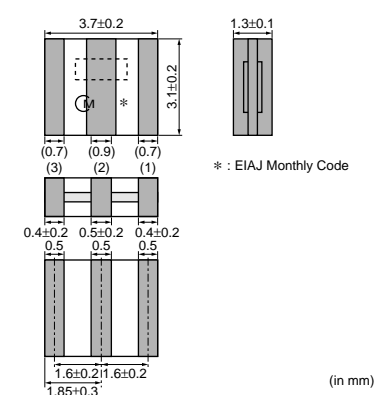
CSTCE\_G(A)  
8.00-12.50MHz



CSTCE\_V  
12.51-19.99MHz



CSTCV\_X\_Q  
14.70-70.00MHz

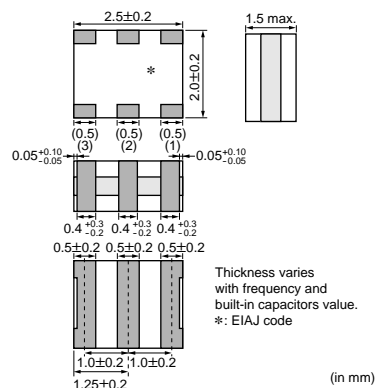


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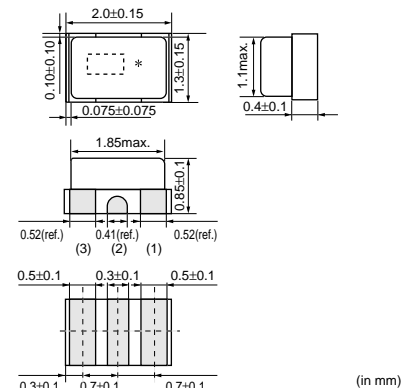
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**CSTCW\_X**  
20.00-70.00MHz



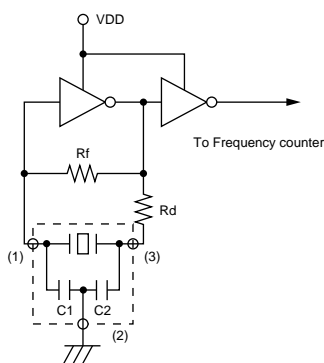
**CSTCG\_V**  
20.00-33.86MHz  
(Ultra small)



Part Number	Oscillating Frequency (MHz)	Initial Tolerance (%)	Temp.Stability (%)	Temperature Range (°C)	Aging (10 years) (%)	Use
<b>CSTCC_G</b>	2.00 to 3.99	±0.5	±0.3	-20 to 80	±0.3	For consumer electronics
<b>CSTCC_G_A</b>	2.00 to 3.99	±0.5	±0.4	-40 to 125	±0.3	For automotive electronics
<b>CSTCR_G</b>	4.00 to 7.99	±0.5	±0.2	-20 to 80	±0.1	For consumer electronics
<b>CSTCR_G_A</b>	4.00 to 7.99	±0.5	±0.3	-40 to 125	±0.1	For automotive electronics
<b>CSTCE_G</b>	8.00 to 12.50	±0.5	±0.2	-20 to 80	±0.1	For consumer electronics
<b>CSTCE_G_A</b>	8.00 to 12.50	±0.5	±0.2	-40 to 125	±0.1	For automotive electronics
<b>CSTCE_V</b>	12.51 to 19.99	±0.5	±0.3	-20 to 80	±0.3	For consumer electronics
<b>CSTCV_X_Q</b>	14.70 to 70.00	±0.5	±0.3	-40 to 125	±0.1	For automotive electronics
<b>CSTCG_V</b>	20.00 to 33.86	±0.5	±0.3	-20 to 80	±0.3	Ultra small type
<b>CSTCW_X</b>	20.00 to 70.00	±0.5	±0.2	-20 to 80	±0.1	For consumer electronics

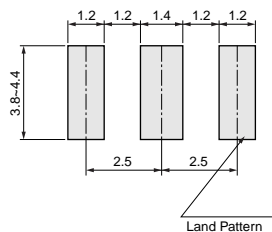
Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.

## ■ Oscillation Frequency Measuring Circuit



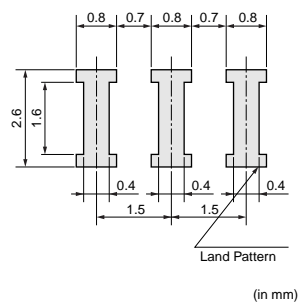
## ■ Standard Land Pattern Dimensions

CSTCC\_G(A)



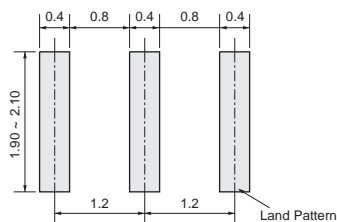
(in mm)

CSTCR\_G(A)



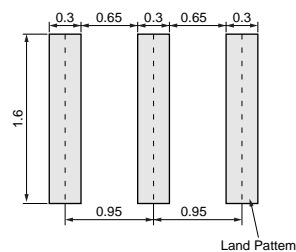
(in mm)

CSTCE\_G(A)



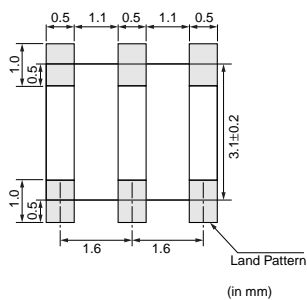
(in mm)

CSTCE\_V



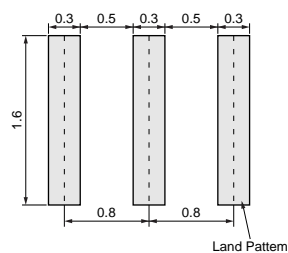
(in mm)

CSTCV\_X\_Q



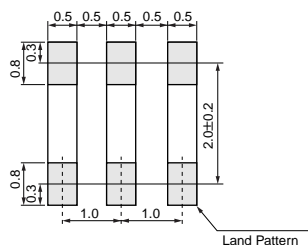
(in mm)

CSTCG\_V



(in mm)

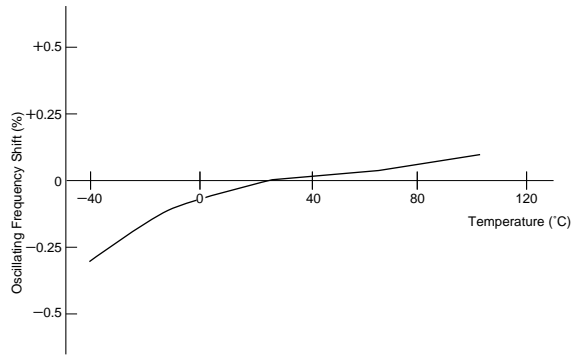
CSTCW\_X



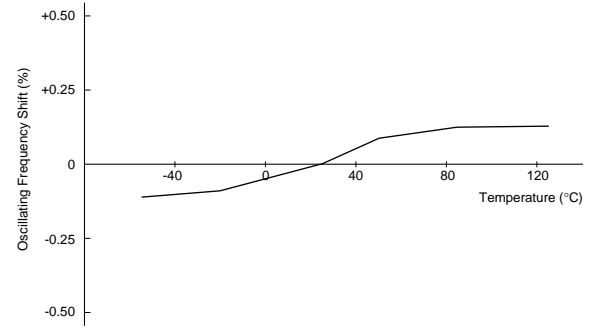
(in mm)

## ■ Oscillation Frequency Temperature Stability

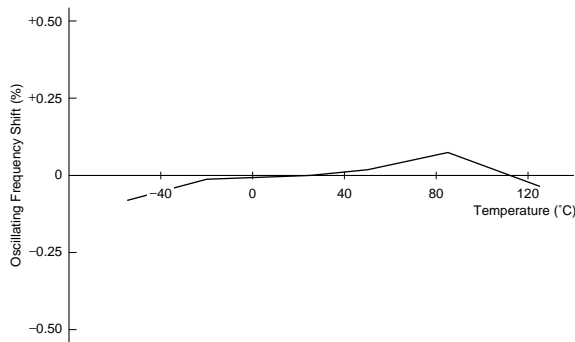
CSTCC\_G



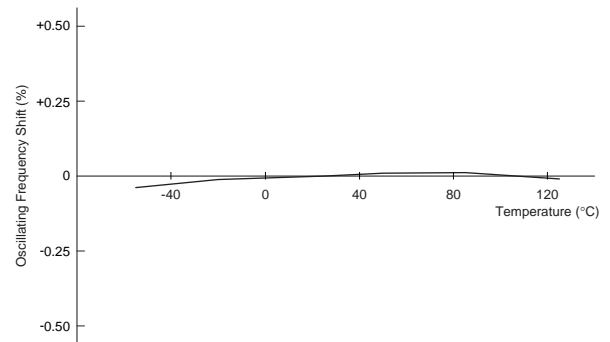
CSTCC\_G\_A



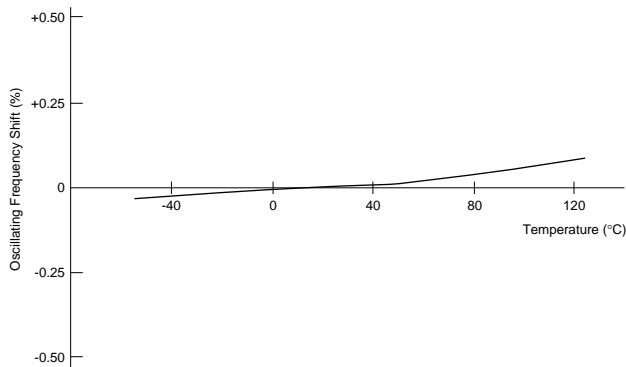
CSTCR\_G(A)



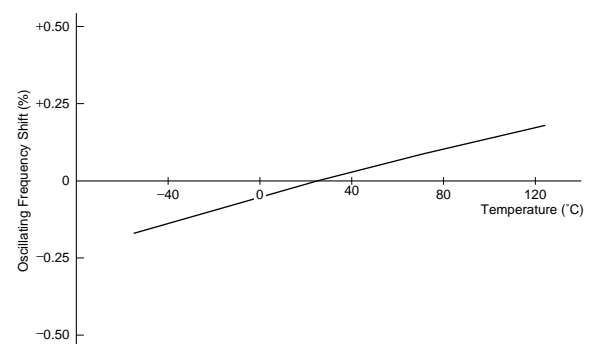
CSTCE\_G(A)



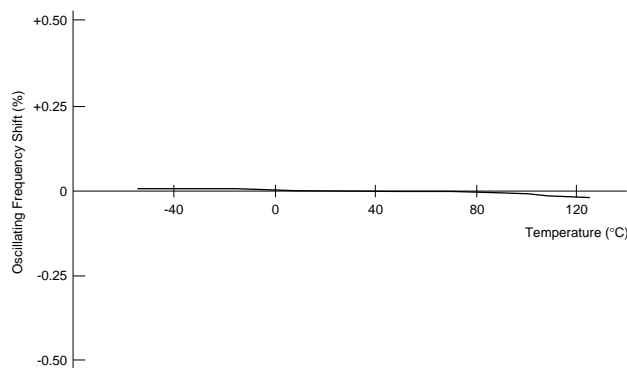
CSTCE\_V



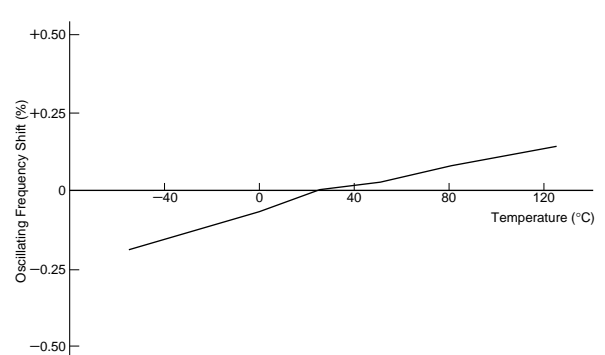
CSTCV\_X\_Q



CSTCG\_V



CSTCW\_X



# Ceramic Resonators (CERALOCK®)



## Chip Type Two-Terminals CSACV/W Series

Wide range of chip "CERALOCK" is now available.  
This diverse series owes its development to MURATA's package technology expertise and original mass production techniques. It enables high-density mounting and further miniaturization of electronic equipment.

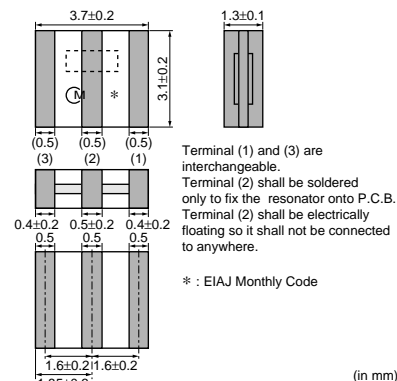
### ■ Features

1. The series is available in a wide frequency range.
2. The resonators are extremely small and have a low profile. (CSACW series)
3. No adjustment is necessary for oscillation circuits.

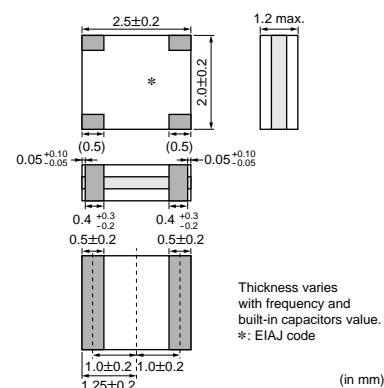
### ■ Applications

- Clock oscillators for microprocessors.
- Electronic control circuits for small electronic equipment.
- Automotive electronics. (CSACV\_X\_Q series)

CSACV\_X\_Q  
14.70-70.00MHz



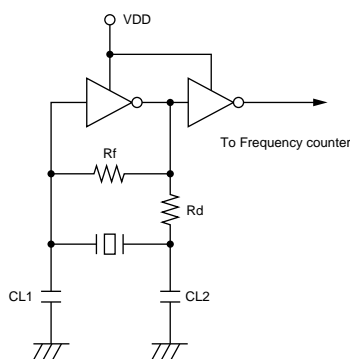
CSACW\_X  
20.00-70.00MHz



Part Number	Oscillating Frequency (MHz)	Initial Tolerance (%)	Temp.Stability (%)	Temperature Range (°C)	Aging (10 years) (%)	Use
CSACV_X_Q	14.70 to 70.00	±0.5	±0.3	-40 to 125	±0.1	For automotive electronics
CSACW_X_53	20.00 to 24.99	±0.5	±0.2	-20 to 80	±0.1	For consumer electronics
CSACW_X_51	25.00 to 70.00	±0.5	±0.2	-20 to 80	±0.1	For consumer electronics

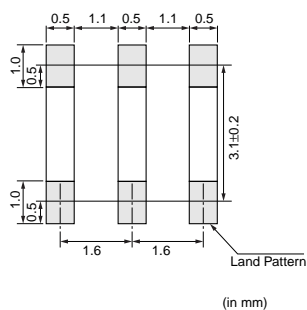
Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.

### ■ Oscillation Frequency Measuring Circuit

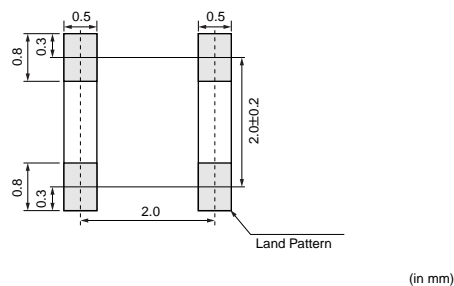


## ■ Standard Land Pattern Dimensions

CSACV\_X\_Q

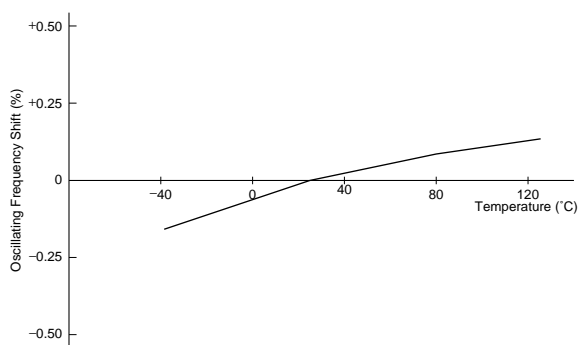


CSACW\_X

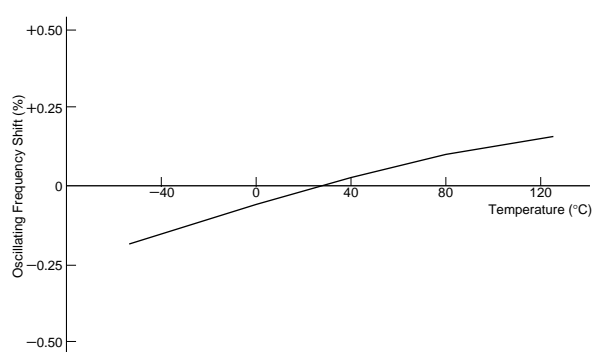


## ■ Oscillation Frequency Temperature Stability

CSACV\_X\_Q



CSACW\_X



## MHz Chip Type Notice (Soldering and Mounting)

### 1. Soldering Condition

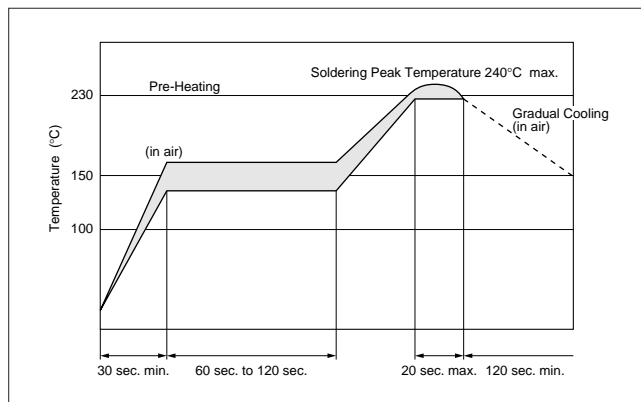
#### (1) Reflow

One heat stress shown in the right profile is applied to resonator, then being place in natural condition for 1 hour, resonator shall be measure.

1. Pre-heating conditions shall be +140 to +160°C for 60 to 120 seconds. Ascending time up to +150°C shall be longer than 30 second.
2. Heating conditions shall be within 20 seconds at +230°C min., but peak temperature shall be lower than +240°C.

#### (2) Soldering Iron

Soldering iron of +270±5°C shall be placed 0.5mm above from electrode of resonator. Melting solder through soldering iron shall be applied to electrode for 3±1 seconds, then being place in natural condition for 24 hour, resonator shall be measured.



### 2. Wash

Some series are not withstand washing.  
Please check the right list before use.

#### (1) Cleaning Solvent

HCFC, Isopropanol, Tap water, Demineralized water,  
Cleanthrough750H, Pine alpha 100S, Techno care FRW

#### (2) Temperature Difference : dT \*1

dT≤60°C (dT=Component-solvent)

\*1 ex. In case the component at +90°C immerses into cleaning solvent at +60°C, then dT=30°C.

Series	Wash
<b>CSTCC (Except 2.00-3.49MHz)</b>	Available
<b>CSTCV</b>	Available
<b>CSACV</b>	Available
<b>CSTCR</b>	Not Available
<b>CSTCC (Only 2.00-3.49MHz)</b>	Not Available
<b>CSTCW</b>	Not Available
<b>CSACW</b>	Not Available
<b>CSTCE</b>	Not Available
<b>CSTCG</b>	Not Available

\*All automotive types are Available.

#### (3) Condition

##### 1. Ultrasonic Wash

1 minute max. in above solvent at +60°C max.  
(Frequency : 28kHz, Output : 20W/L)

##### 2. Immersion Wash

5 minutes max. in above solvent at +60°C max.

##### 3. Shower or Rinse Wash

5 minutes max. in above solvent at +60°C max.

#### (4) Drying

5 minutes max. by air blow at +80°C max.

#### (5) Others

1. Total washing time should be within 10 minutes.
2. Please insure the component is thoroughly evaluated in your application circuit.
3. The component may be damaged if it is washed with chlorine, petroleum, or alkali cleaning solvent.



## MHz Chip Type Notice

### ■ Notice (Storage and Operating Conditions)

#### CSTCC\_G

Please do not apply excess mechanical stress to the component and terminals at soldering.

The component is recommended with placement machines with employ optical placement capabilities.

The component might be resulted in damage by excessivemechanical force. Please make sure that you have evaluated by using placementmachines before going into mass production. Do not use placement machines whichutilize mechanical positioning. Please contact Murata for details beforehand.

#### 1. CSTCC\_G (2.00MHz-3.49MHz)

Conformal coating or washing to the component is not acceptable. Because it is not hermetically sealed.

#### 2. CSTCC\_G (3.50MHz-10.0MHz)

Conformal coating of the component is acceptable. However, the resin material, curing temperature, and other process conditions should be evaluated to confirm stable electrical characteristics are maintained.

### ■ Notice (Storage and Operating Conditions)

#### CSTCC\_G\_A/CSTCR\_G\_A/CSTCE\_G\_A

Please do not apply excess mechanical stress to the component and terminals at soldering.

Conformal coating of the component is acceptable.

However, the resin material, curing temperature, and other process conditions should be evaluated to confirm stable electrical characteristics are maintained.

The component is recommended with placement machines

with employ optical placement capabilities.

The component might be resulted in damage by excessivemechanical force. Please make sure that you have evaluated by using placementmachines before going into mass production. Do not use placement machines whichutilize mechanical positioning. Please contact Murata for details beforehand.

### ■ Notice (Storage and Operating Conditions)

#### CSTCV\_X\_Q/CSACV\_X\_Q

Please do not apply excess mechanical stress to the component and terminals at soldering.

Conformal coating of the component is acceptable.

However, the resin material, curing temperature, and other process conditions should be evaluated to confirm stable electrical characteristics are maintained.

The component is recommended with placement machines

which employ optical placement capabilities. In some cases, placement machines which utilize mechanical positioning may apply excessive mechanical force which might result in damage to the ceramic resonator. Please contact Murata before mounting this product using placement machines which use mechanical positioning.

### ■ Notice (Storage and Operating Conditions)

#### CSTCW\_X/CSACW\_X

Please do not apply excess mechanical stress to the component and terminals at soldering.

Conformal coating or washing to the component is not acceptable. Because it is not hermetically sealed.

## MHz Chip Type Notice

### ■ Notice (Storage and Operating Conditions)

CSTCR\_G/CSTCE\_G/CSTCE\_V/CSTCG\_V

Please do not apply excess mechanical stress to the component and terminals at soldering.

Conformal coating or washing to the component is not acceptable. Because it is not hermetically sealed.

The component is recommended with placement machines with employ optical placement capabilities.

The component might be resulted in damage by excessivemechanical force. Please make sure that you have evaluated by using placementmachines before going into mass production. Do not use placement machines whichutilize mechanical positioning. Please contact Murata for details beforehand.

### ■ Notice (Rating)

The component may be damaged if excess mechanical stress is applied.

### ■ Notice (Handling)

"CERALOCK" may stop oscillating or oscillate irregularly under improper circuit conditions.

■ Minimum Quantity

The order quantity should be an integral multiple of the "Minimum Quantity" shown above. (pcs.)

Technical drawings of two types of film reels, labeled 'a' and 'b'. Each drawing includes a side view and a top view.

**Reel 'a' Dimensions:**

- Side View:**
  - Flange diameter:  $\phi 180$
  - Flange thickness:  $12.5^{+2.0}_{-0}$
  - Reel body thickness:  $20.5 \text{ max.}$
- Top View:**
  - Reel diameter:  $\phi 13.0 \pm 0.2$
  - Spoke width:  $2.0 \pm 0.5$
  - Trailer length: 40-190
  - Components length: 160 min.
  - Empty length: 400-560
  - Cover Film length: 400-560

**Reel 'b' Dimensions:**

- Side View:**
  - Flange diameter:  $\phi 180$
  - Flange thickness:  $9.0^{+1.0}_{-0.5}$
  - Reel body thickness:  $14.0 \text{ max.}$
- Top View:**
  - Reel diameter:  $\phi 13.0 \pm 0.2$
  - Spoke width:  $2.0 \pm 0.5$
  - Trailer length: 40-190
  - Components length: 160 min.
  - Empty length: 400-560
  - Cover Film length: 400-560

(in mm)

The drawing consists of two views: a top view (plan) and a side view (elevation).

**Top View Dimensions:**

- Overall width:  $12.0 \pm 0.2$
- Overall length:  $4.0 \pm 0.1$
- Distance between first two rollers:  $2.0 \pm 0.05$
- Roller diameter:  $\phi 1.55 \pm 0.05$
- Distance between roller centers:  $1.75 \pm 0.1$
- Distance from roller center to edge:  $5.5 \pm 0.05$
- Distance between two rollers:  $7.6 \pm 0.1$
- Distance between two rollers:  $3.3 \pm 0.1$
- Distance between two rollers:  $\phi 1.5 \pm 0.3$
- Distance between two rollers:  $4.0 \pm 0.1$

**Side View Dimensions:**

- Overall height:  $1.65 \pm 0.05$
- Distance between two rollers:  $0.3 \pm 0.05$
- Angle:  $3^\circ \text{ max}$
- Angle:  $10^\circ$

**Labels and Text:**

- Top view label: (1), (2), (3), (4)
- Side view label: Cover film
- Direction of Feed
- Unit: (in mm)

**Text below the drawing:**

The cover film peel strength force 0.1 to 0.7N  
The cover film peel speed 300mm/min.

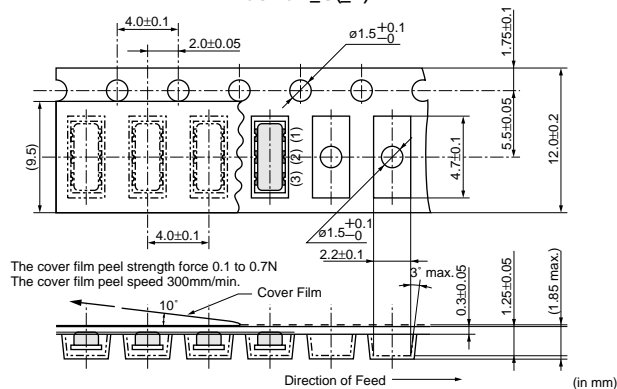
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## MHz Chip Type CSTC Series Packaging

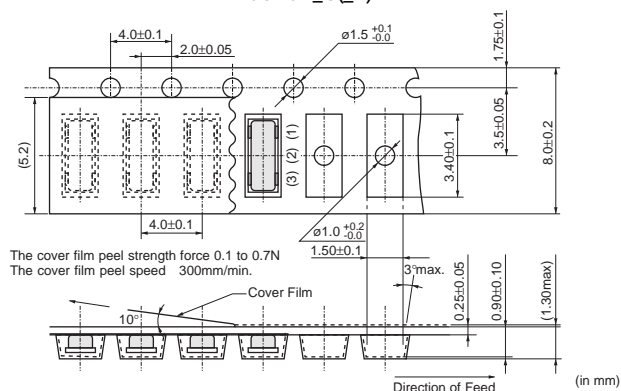
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### ■ Dimensions of Taping

CSTCR\_G(A)

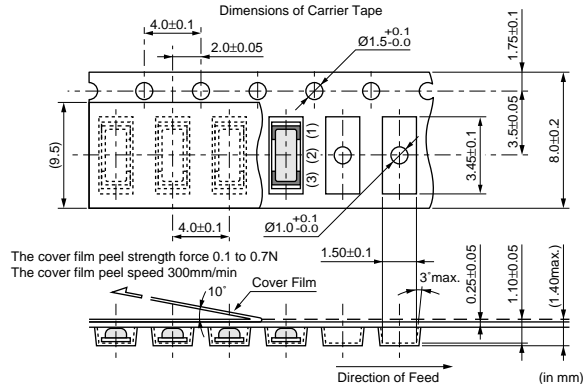


CSTCE\_G(A)

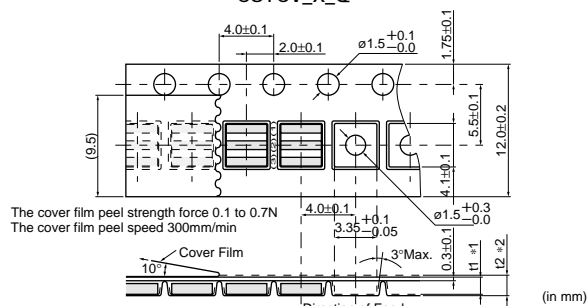


CSTCE\_V

Dimensions of Carrier Tape



CSTCV\_X\_Q

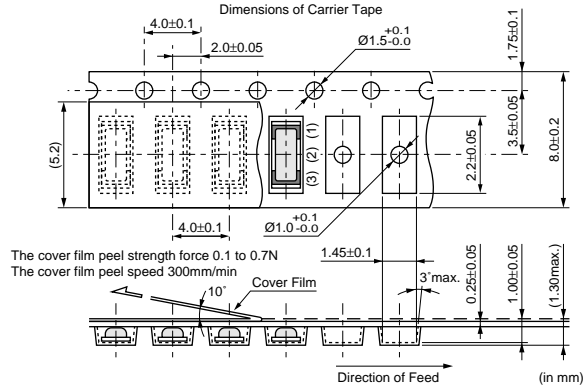


\*1, \*2 : Dimensions varies with product thickness of CERALOCK®

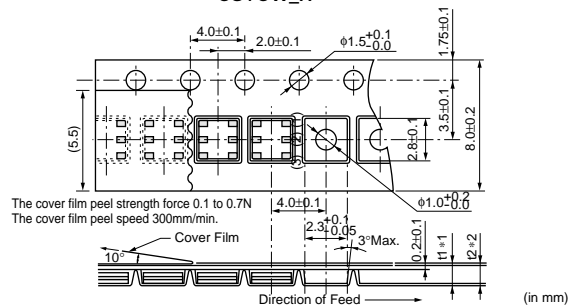
Thickness of CERALOCK®		1.5 • 1.4	1.3 • 1.2	1.1 • 1.0
t1	*1	1.65±0.1	1.45±0.1	1.2±0.1
t2	*2	2.0max.	1.8max.	1.5max.

CSTCG\_V

Dimensions of Carrier Tape



CSTCW\_X



\*1, \*2 : Dimensions varies with product thickness of CERALOCK®

Thickness of CERALOCK®		1.40-1.20	1.15-1.00	0.95-0.90
t1	*1	1.48±0.1	1.30±0.1	1.12±0.1
t2	*2	2.1max.	1.9max.	1.7max.

## MHz Chip Type CSAC Series Packaging

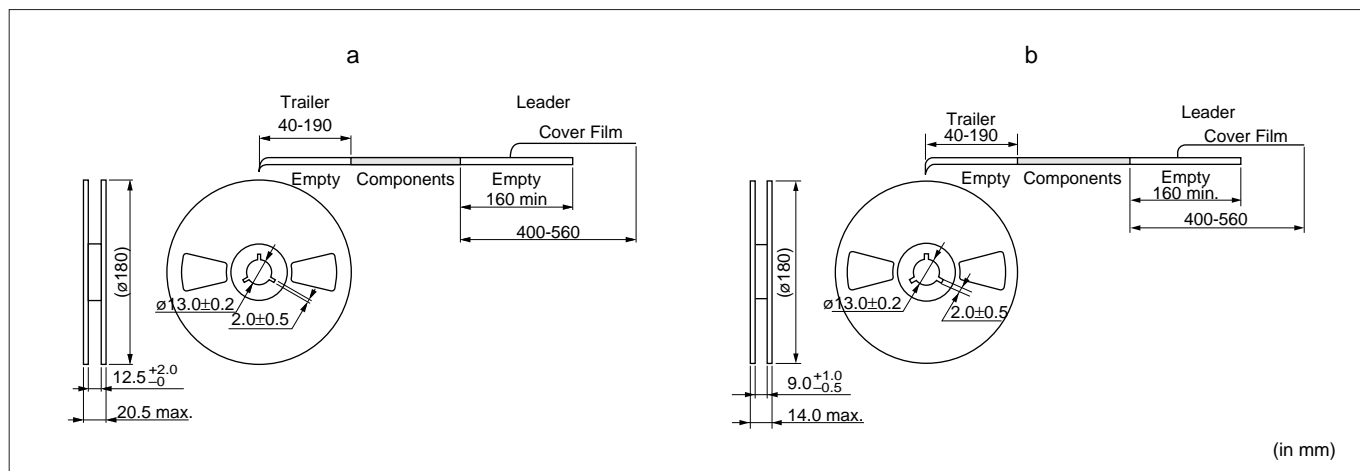
### ■ Minimum Quantity

Part Number	Plastic Tape ø180mm	Plastic Tape ø330mm	Bulk	Dimensions
<b>CSACV_X_Q</b>	2,000	6,000	500	a
<b>CSACW_X</b>	3,000	9,000	500	b

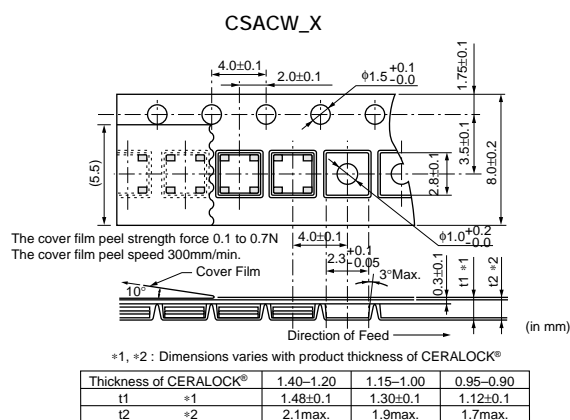
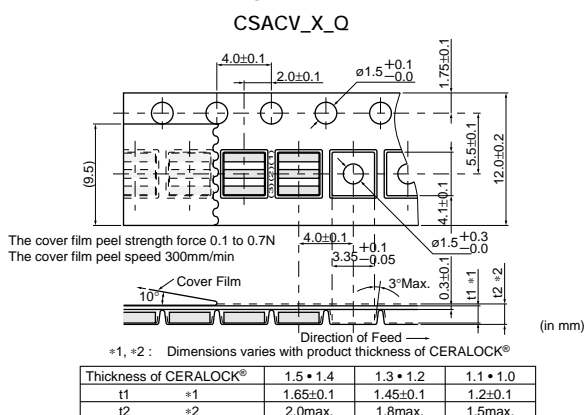
The order quantity should be an integral multiple of the "Minimum Quantity" shown above.

(pcs.)

### ■ Dimensions of Reel



### ■ Dimensions of Taping



# Ceramic Resonators (CERALOCK®)

**muRata**

## Lead Type Three-Terminals CSTLS Series

"CERALOCK" with built-in load capacitors.

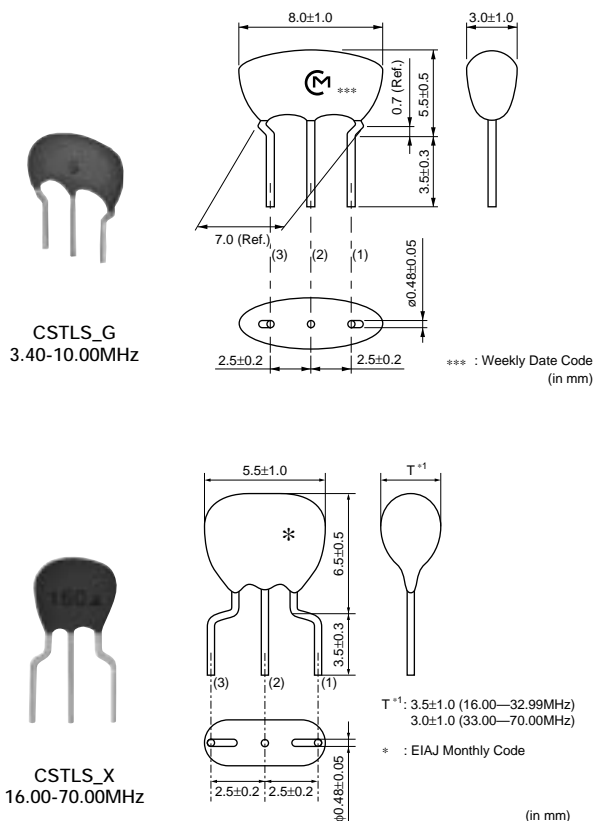
MURATA's ceramic resonator, "CERALOCK", has been widely applied as the most suitable component for clock oscillators in a broad range of microprocessors. The CSTLS series can be used in the design of oscillation circuits not requiring external load capacitors, enabling both high-density mounting and cost reduction.

### ■ Features

1. Oscillation circuits do not require external load capacitors.
2. The series is stable over a wide temperature range.
3. The resonators are compact, light weight and exhibit superior shock resistance performance.
4. They enable the design of oscillator circuits requiring no adjustment.
5. The series is inexpensive and available in stable supply.
6. There are some variation of built-in capacitance value to apply various of IC.

### ■ Applications

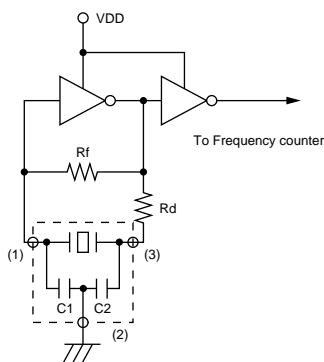
- DTMF generators.
- Clock oscillators for microcomputers.
- Remote control units.
- Automated office equipment.



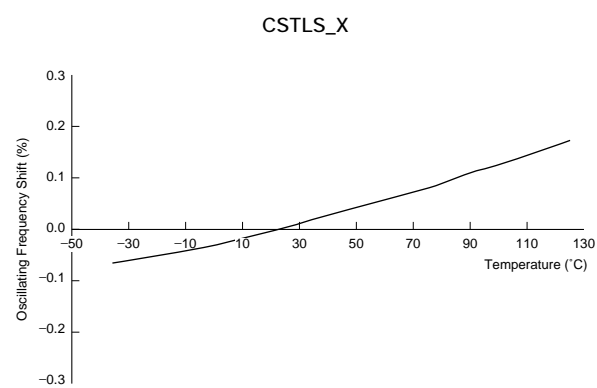
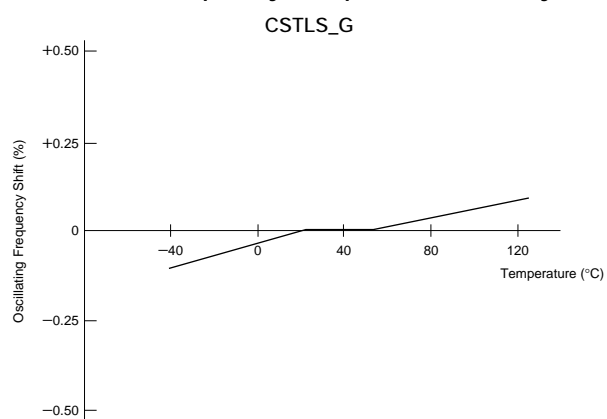
Part Number	Oscillating Frequency (MHz)	Initial Tolerance (%)	Temp.Stability (%)	Temperature Range (°C)	Aging (10 years) (%)	Use
<b>CSTLS_G</b>	3.40 to 10.00	±0.5	±0.2	-20 to 80	±0.2	For consumer electronics
<b>CSTLS_X</b>	16.00 to 70.00	±0.5	±0.2	-20 to 80	±0.2	For consumer electronics

Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.  
The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

### ■ Oscillation Frequency Measuring Circuit



## ■ Oscillation Frequency Temperature Stability



# Ceramic Resonators (CERALOCK®)

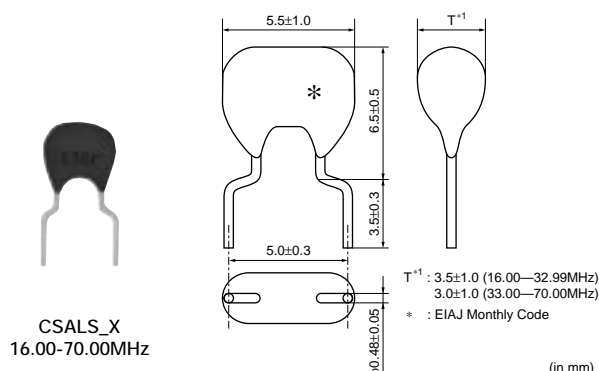


## Lead Type Two-Terminals CSALS Series

"CERALOCK" with two leaded terminals.

The CSALS series ceramic resonator owe their development to MURATA's innovative expert technologies and the application of mass production techniques typically utilized in the manufacture of piezoelectric ceramic components. Because of their high mechanical Q and consistent high quality, CSALS series are ideally suited to microprocessor and remote control unit applications.

In addition, MURATA offers a special "CERALOCK" version suitable for automatic insertion utilizing tape and reel and other packaging forms. For further information, please contact your local MURATA representative office or authorized distributor.



### ■ Features

1. The series is stable over a wide temperature range and with respect to long-term aging.
2. The series comprises fixed, tuned, solid-state devices.
3. The resonators are miniature and light weight.
4. They exhibit excellent shock resistance performance.
5. Oscillating circuits requiring no adjustment can be designed by utilizing these resonators in conjunction with transistors or appropriate ICs.

### ■ Applications

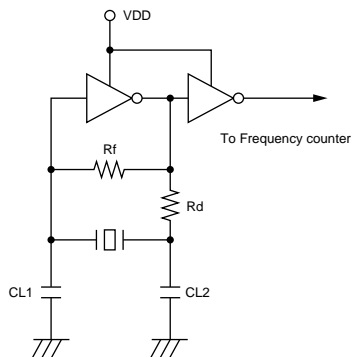
- Square-wave and sine-wave oscillator.
- Clock generator for microprocessors.
- Remote control systems.

Part Number	Oscillating Frequency (MHz)	Initial Tolerance (%)	Temp.Stability (%)	Temperature Range (°C)	Aging (10 years) (%)	Use
CSALS_X	16.00 to 70.00	±0.5	±0.2	-20 to 80	±0.2	For consumer electronics

Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.  
The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

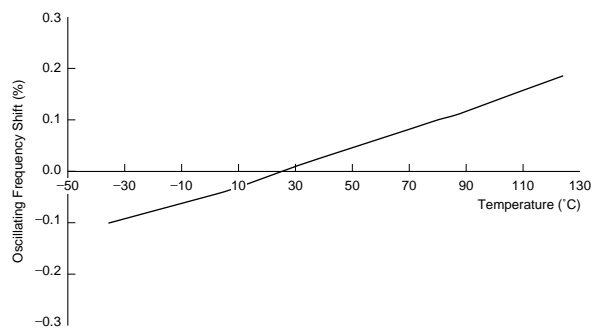


## ■ Oscillation Frequency Measuring Circuit



## ■ Oscillation Frequency Temperature Stability

CSALS\_X



## MHz Lead Type Notice

### ■ Notice (Soldering and Mounting)

The component cannot be withstand washing.

### ■ Notice (Storage and Operating Conditions)

Please do not apply excess mechanical stress to the component and lead terminals at soldering.

Conformal coating or washing to the component is not acceptable. Because it is not hermetically sealed.

### ■ Notice (Rating)

The component may be damaged if excess mechanical stress is applied.

### ■ Notice (Handling)

"CERALOCK" may stop oscillating or oscillate irregularly under improper circuit conditions.

## MHz Lead Type CSTLS Series Packaging

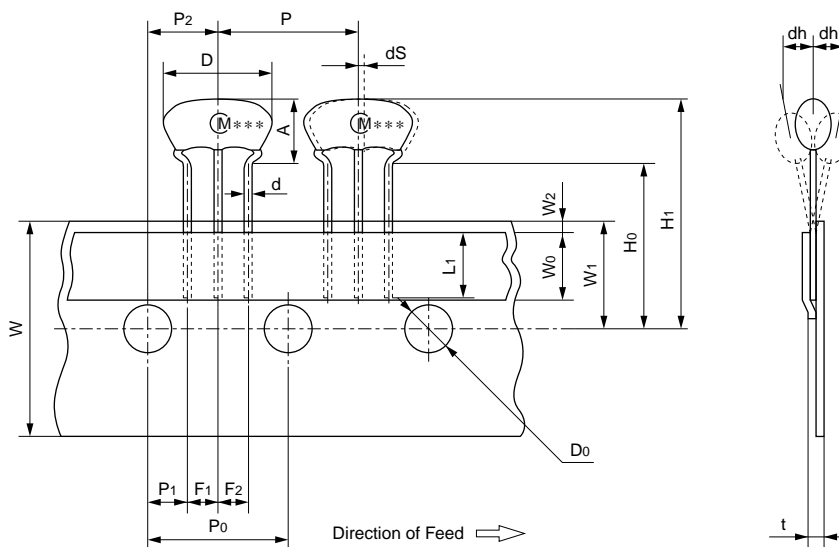
### ■ Minimum Quantity

Part Number	Ammo Pack	Bulk
<b>CSTLS_G (3.40 to 10.0MHz)</b>	2,000	500
<b>CSTLS_X (16.00 to 70.00MHz)</b>	2,000	500

The order quantity should be an integral multiple of the "Minimum Quantity" shown above.

(pcs.)

### ■ Tape Dimensions of CSTLS\_G



Item	Code	Dimensions	Tolerance	Remarks
Width of diameter	D	8.0	±1.0	
Height of resonator	A	5.5	±0.5	
Dimensions of terminal	d	ø0.48	±0.05	
Lead length under the hold down tape	L1	5.0 min.	—	
Pitch of component	P	12.7	±0.5	Tolerance for Pitches 10xP0=127±1
Pitch of sprocket hole	P0	12.7	±0.2	
Length from sprocket hole center to lead	P1	3.85	±0.5	
Length from sprocket hole center to component center	P2	6.35	±0.5	
Lead spacing (I)	F1	2.5	±0.2	
Lead spacing (II)	F2	2.5	±0.2	
Slant to the forward or backward	dh	0	±1.0	1mm max.
Width of carrier tape	W	18.0	±0.5	
Width of hold down tape	W0	6.0 min.	—	Hold down tape does not exceed the carrier tape.
Position of sprocket hole	W1	9.0	±0.5	
Gap of hold down tape and carrier tape	W2	0	+0.5 -0	
Distance between the center of sprocket hole and lead stopper	H0	18.0	±0.5	
Total height of resonator	H1	23.5	±1.0	
Diameter of sprocket hole	D0	ø4.0	±0.2	
Total tape thickness	t	0.6	±0.2	
Body tilt	dS	0	±1.0	

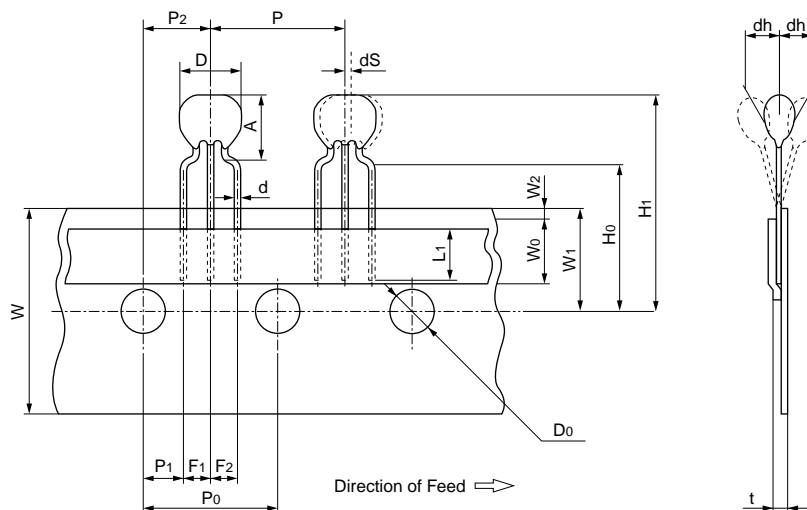
(in mm)

Continued on the following page. ➤

## MHz Lead Type CSTLS Series Packaging

Continued from the preceding page.

### ■ Tape Dimensions of CSTLS\_X



Item	Code	Dimensions	Tolerance	Remarks
Width of diameter	D	5.5	±1.0	
Height of resonator	A	6.5	±0.5	
Dimensions of terminal	d	ø0.48	±0.05	
Lead length under the hold down tape	L1	5.0 min.	—	
Pitch of component	P	12.7	±0.5	Tolerance for Pitches 10xP0=127±1
Pitch of sprocket hole	P0	12.7	±0.2	
Length from sprocket hole center to lead	P1	3.85	±0.5	
Length from sprocket hole center to component center	P2	6.35	±0.5	
Lead spacing (I)	F1	2.5	±0.2	
Lead spacing (II)	F2	2.5	±0.2	
Slant to the forward or backward	dh	0	±1.0	1mm max.
Width of carrier tape	W	18.0	±0.5	
Width of hold down tape	W0	6.0 min.	—	Hold down tape doesn't exceed the carrier tape.
Position of sprocket hole	W1	9.0	±0.5	
Gap of hold down tape and carrier tape	W2	0	+0.5 -0.0	
Distance between the center of sprocket hole and lead stopper	H0	18.0	±0.5	
Total height of resonator	H1	24.5	±0.1	
Diameter of sprocket hole	D0	ø4.0	±0.2	
Total tape thickness	t	0.6	±0.2	
Body tilt	dS	0	±1.0	

(in mm)

## MHz Lead Type CSALS Series Packaging

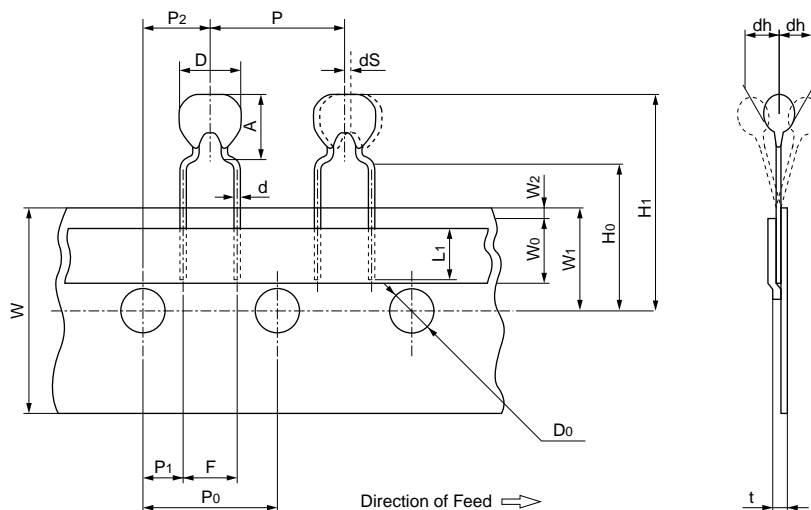
### ■ Minimum Quantity

Part Number	Ammo Pack	Bulk
CSALS_X (16.00 to 70.00MHz)	2,000	500

The order quantity should be an integral multiple of the "Minimum Quantity" shown above.

(pcs.)

### ■ Tape Dimensions of CSALS



Item	Code	Dimensions	Tolerance	Remarks
Width of diameter	D	5.5	±1.0	
Height of resonator	A	6.5	±0.5	
Dimensions of terminal	d	ø0.48	±0.05	
Lead length under the hold down tape	L1	5.0 min.	—	
Pitch of component	P	12.7	±0.5	Tolerance for Pitches 10xP0=127±1
Pitch of sprocket hole	P0	12.7	±0.2	
Length from sprocket hole center to lead	P1	3.85	±0.5	
Length from sprocket hole center to component center	P2	6.35	±0.5	
Lead spacing	F	5.0	±0.3	
Slant to the forward or backward	dh	0	±1.0	1mm max.
Width of carrier tape	W	18.0	±0.5	
Width of hold down tape	W0	6.0 min.	—	Hold down tape doesn't exceed the carrier tape.
Position of sprocket hole	W1	9.0	±0.5	
Gap of hold down tape and carrier tape	W2	0	+0.5 -0	
Distance between the center of sprocket hole and lead stopper	H0	18.0	±0.5	
Total height of resonator	H1	24.5	±1.0	
Diameter of sprocket hole	D0	ø4.0	±0.2	
Total tape thickness	t	0.6	±0.2	
Body tilt	dS	0	±1.0	

(in mm)