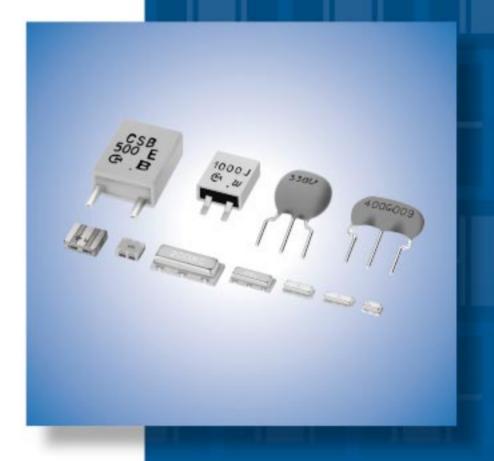
# Ceramic Resonators (CERALOCK®)



muRata

Innovator in Electronics

Murata Manufacturing Co., Ltd.

## **CONTENTS**

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Part Numbering ————————————————————————————————————	
1 Chip Type Three Terminals CSTCC/R/E/G/V/W Series	
2 Chip Type Two Terminals CSACV/W Series	
MHz Chip Type Notice	
MHz Chip Type CSTC Series Packaging	1
MHz Chip Type CSAC Series Packaging	1
3 Lead Type Three Terminals CSTLS Series	1
4 Lead Type Two Terminals CSALS Series	1
MHz Lead Type Notice	1
MHz Lead Type CSTLS Series Packaging	2
MHz Lead Type CSALS Series Packaging	2
5 Chip Type Two Terminals CSBFB Series —	2
● kHz Chip Type CSBFB_J 430-519kHz Notice (Soldering and Mounting)	2
● kHz Chip Type CSBFB_J 700-1250kHz Notice (Soldering and Mounting)	2
6 Lead Type Two Terminals CSBLA Series	2
kHz Lead Type Notice	2
kHz Type Notice	3
kHz Type Packaging	3
Utilizing Application Circuits ————————————————————————————————————	3

2

3

4

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4

#### Part Numbering

### CERALOCK® (MHz)

(Part Number) CS T CE 16M0 V53 \*\*\* -R0

#### Product ID

Product ID	
cs	Ceramic Resonators

#### 2Frequency/Capacitance

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

#### 3Structure/Size

Code	Structure/Size
LS	Round Lead Type
СС	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 (Hz). Decimal point is expressed by capital letter "**M**".

#### 6 Design

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

□□ indicates initial frequency tolerance and load capacity.

#### **6**Individual Specification

Code	Individual Specification
***	Three-digit alphanumerics express "Individual Specification".
With the standard and the standard standard Constitution in a standard and	

With standard products, "③Individual Specification" is omitted, and "⑦Package Specification Code" is carried up.

#### Packaging

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

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

## CERALOCK® (kHz)

(Part Number) CS B FB 500K J58 \*\*\* -R1

#### Product ID

Product ID	
CS	Ceramic Resonators

#### 2Frequency/Capacitance

Code	Frequency/Capacitance
В	kHz No capacitance built-in

#### 3Structure/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". In case of 1.0MHz (1000kHz) or above, expressed by three figures and capital letter "**M**" for decimal point.

#### 6 Design

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

 $\hfill\square\square$  indicates initial frequency tolerance and load capacitance.

#### **6**Individual Specification

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

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

#### Packaging

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



## Ceramic Resonators (CERALOCK®)



## Chip Type Three Terminals CSTCC/R/E/G/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

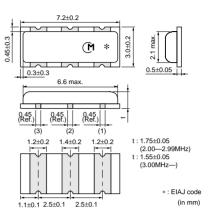
- 1. Oscillation circuits do not require external load
- 2. The series is available in a wide frequency range.
- 3. The resonators are extremely small and have a low profile.
- 4. No adjustment is necessary for oscillation circuits.

#### Applications

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

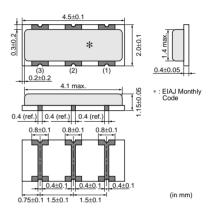


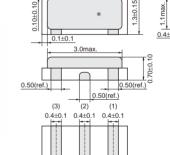
CSTCC G( A) 2.00-3.99MHz





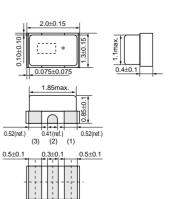
CSTCR G(B) 4 00-7 99MHz







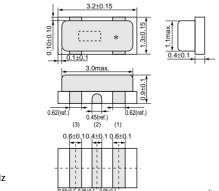
CSTCE\_G(\_A) 8.00-12.50MHz



Continued on the following page.

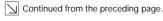
0.3±0.1

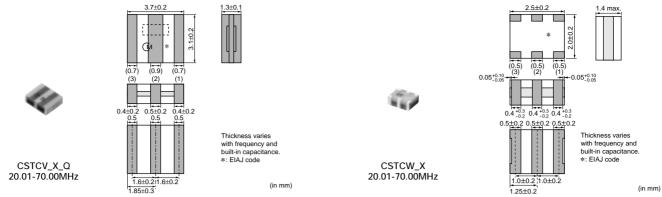
0.4±0.1



CSTCE\_V(\_A) 12.51-20.00MHz



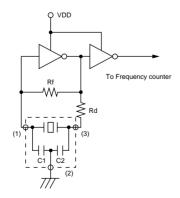




Part Number	Oscillating Frequency (MHz)	Initial Tolerance (%)	Temp. Stability (%)	Temperature Range (°C)	Use
CSTCC_G	2.00 to 3.99	±0.5	$\pm 0.3$ [±0.4%:Built-in Capacitance 47pF type within Freq.2.00 to 3.49MHz]	-20 to +80	For consumer electronics
CSTCC_G_A	2.00 to 3.99	±0.5	±0.4 [-0.6% to +0.3%:Built-in Capacitance 47pF type within Freq.2.00 to 3.49MHz]	-40 to +125	For automotive electronics
CSTCR_G	4.00 to 7.99	±0.5	±0.2	-20 to +80	For consumer electronics
CSTCR_G_B	4.00 to 7.99	±0.5	±0.15		For automotive electronics
CSTCE_G	8.00 to 12.50	±0.5	±0.2		For consumer electronics
CSTCE_G_A	8.00 to 12.50	±0.5	±0.2		For automotive electronics
CSTCE_V	12.51 to 20.00	±0.5	±0.3		For consumer electronics
CSTCE_V_A	12.51 to 20.00	±0.5	±0.3		For automotive electronics
CSTCG_V	20.00 to 33.86	±0.5	±0.3		For consumer electronics
CSTCV_X_Q	20.01 to 70.00	±0.5	±0.3		For automotive electronics
CSTCW_X	20.01 to 70.00	±0.5	±0.2	-20 to +80	For consumer electronics

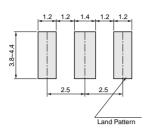
Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.

### ■ Oscillation Frequency Measuring Circuit



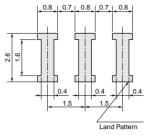
### ■ Standard Land Pattern Dimensions

CSTCC\_G(\_A)



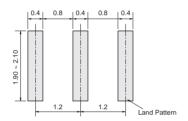
(in mm

#### CSTCR\_G(\_B)

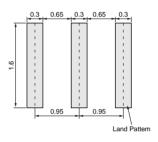


(in mm)

CSTCE\_G(\_A)

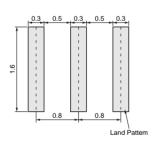


CSTCE\_V(\_A)

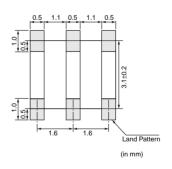


(in mm)

CSTCG\_V



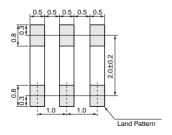
CSTCV\_X\_Q



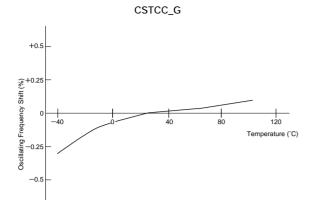
(in mm)

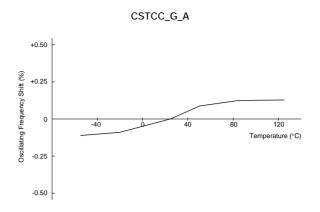
(in mm)

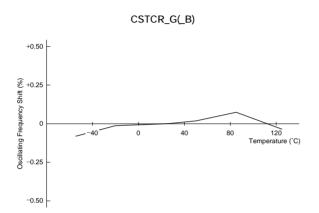
CSTCW\_X

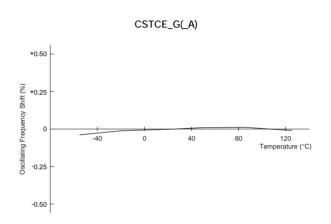


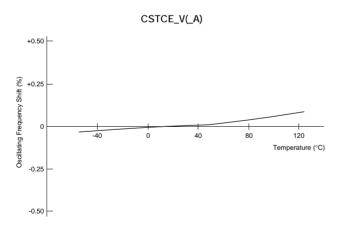
## ■ Oscillation Frequency Temperature Stability

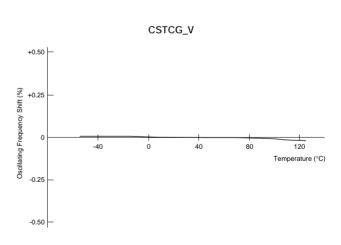


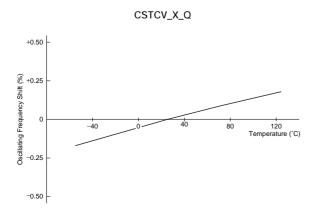


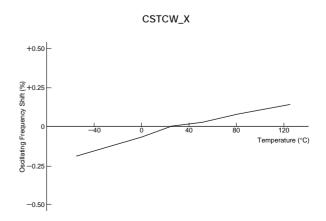












## Ceramic Resonators (CERALOCK®)



## **Chip Type Two Terminals CSACV/W Series**

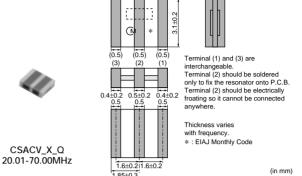
A wide range of chip "CERALOCK" is now available. This diverse series owes its development to MURATA's package technology expertise and original mass production techniques. It enables high-density mounting and further miniaturization of electronic equipment.

#### ■ 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.

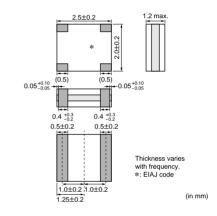
#### ■ Applications

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





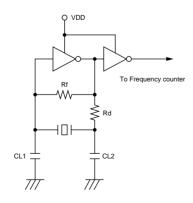




Part Number	Oscillating Frequency (MHz)	Initial Tolerance (%)	Temp. Stability (%)	Temperature Range (°C)	Use
CSACV_X_C	20.01 to 70.00	±0.5	±0.3	-40 to +125	For automotive electronics
CSACW_X	20.01 to 70.00	±0.5	±0.2	-20 to +80	For consumer electronics

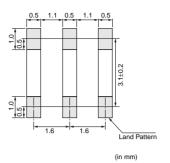
Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.

#### ■ Oscillation Frequency Measuring Circuit

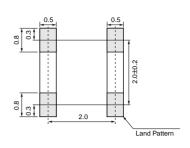


## ■ Standard Land Pattern Dimensions

### CSACV\_X\_Q



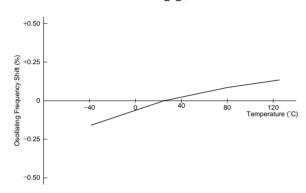
#### CSACW\_X



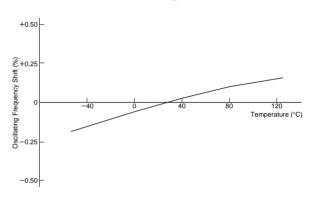
(in mm)

## ■ Oscillation Frequency Temperature Stability

CSACV\_X\_Q



#### CSACW\_X



## **MHz Chip Type Notice (Soldering and Mounting)**

#### 1. Soldering Conditions

#### (1) Reflow

One heat stress, shown in the profile at right, is applied to resonator; then, after being placed in natural conditions for 1 hour, the resonator is measured.

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

#### (2) Soldering Iron

Soldering iron of +270±5°C should be placed 0.5mm above electrode of resonator. Melting solder through soldering iron should be applied to electrode for 3±1 seconds; then, after being placed in natural conditions for 24 hour, the resonator should be measured.



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

#### (1) Cleaning Solvents

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

(2) Temperature Difference : dT \*1

dT<=60°C (dT=Component at ±90°C imm

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

#### (3) Conditions

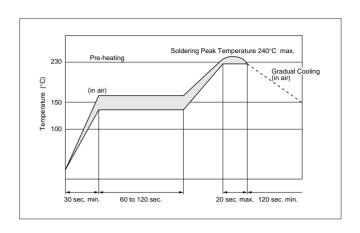
- 1. Ultrasonic Wash
  - 1 minute max. in above solvent at +60°C max. (Frequency: 28kHz, Output: 20W/L)
- 2. Immersion Wash
  - 5 minutes max. in above solvent at +60°C max.
- 3. Shower or Rinse Wash
  - 5 minutes max. in above solvent at +60°C max.

## (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.



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

<sup>\*</sup>All automotive types are available.

## **MHz Chip Type Notice**

## ■ Notice (Storage and Operating Conditions) CSTCC\_G

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

The component is recommended for use with placement machines which employ optical placement capabilities.

The component might be damaged by excessive mechanical force. Please make sure to evaluate by using placement machines before going into mass production. Do not use placement machines which utilize mechanical positioning. Please contact Murata for details beforehand.

- 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 during soldering.

  Conformal coating or washing of the component is not acceptable because it is not hermetically sealed.

  The component is recommended for use with placement machines which employ optical placement capabilities.

  The component might be damaged by excessive mechanical force. Please make sure to evaluate by using placement machines before going into mass production. Do not use placement machines which utilize mechanical positioning.
- Notice (Storage and Operating Conditions)
  CSTCC\_G\_A/CSTCR\_G\_B/CSTCE\_G\_A/CSTCE\_V\_A
  Please do not apply excess mechanical stress to the
  component and terminals during soldering.
  Conformal coating of the component is acceptable.
  However, the resin material, curing temperature, and
  other process conditions should be evaluated to
  confirm that stable electrical characteristics are
  maintained.

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 during soldering.

Conformal coating of the component is acceptable.

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

The component is recommended for use with placement

- CSTCC\_G (2.00MHz-3.49MHz)
   Conformal coating or washing of the component is not acceptable because it is not hermetically sealed.
- 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 that stable electrical characteristics are maintained.

The component is recommended for use with placement machines which employ optical placement capabilities. The component might be damaged by excessive mechanical force. Please make sure to evaluate by using placement machines before going into mass production. Do not use placement machines which utilize mechanical positioning. Please contact Murata for details beforehand.

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.



## MHz Chip Type Notice

## ■ Notice (Storage and Operating Conditions) CSTCW X/CSACW X

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

Conformal coating or washing of 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 Chip Type CSTC Series Packaging

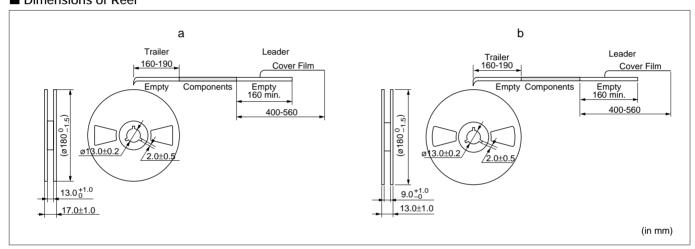
#### ■ Minimum Quantity

Part Number	Plastic Tape ø180mm	Plastic Tape ø330mm	Bulk	Dimensions
CSTCC_G	2,000	6,000	500	a
CSTCC_G_A	2,000	6,000	500	a
CSTCR_G	3,000	9,000	500	a
CSTCR_G_B	3,000	9,000	500	a
CSTCE_G	3,000	9,000	500	b
CSTCE_G_A	3,000	9,000	500	b
CSTCE_V	3,000	9,000	500	b
CSTCE_V_A	3,000	9,000	500	b
CSTCV_X_Q	2,000	6,000	500	а
CSTCW_X	3,000	9,000	500	b
CSTCG_V	3,000	9,000	500	b

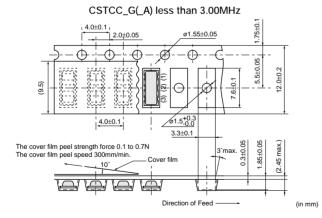
The order quantity should be an integral multiple of the "Minimum Quantity" shown above.

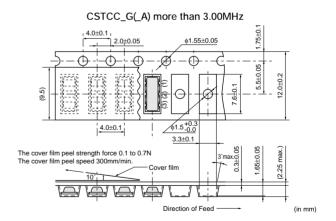
(pcs.)

#### ■ Dimensions of Reel



#### ■ Dimensions of Taping





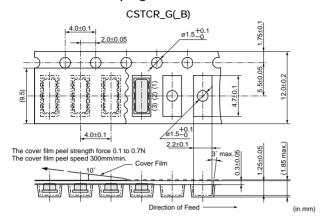


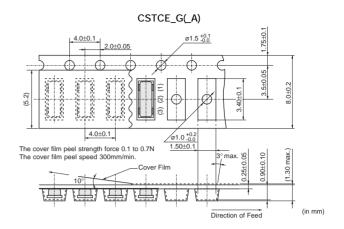


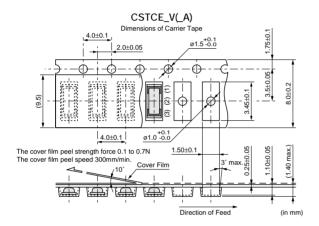
## **MHz Chip Type CSTC Series Packaging**

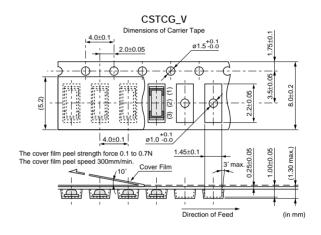
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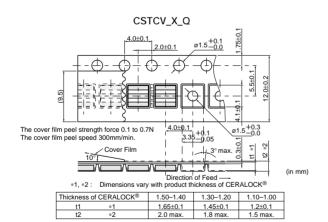
### ■ Dimensions of Taping

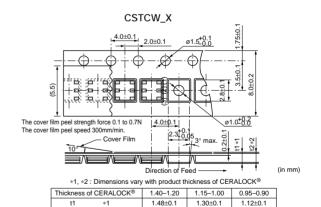












## MHz Chip Type CSAC Series Packaging

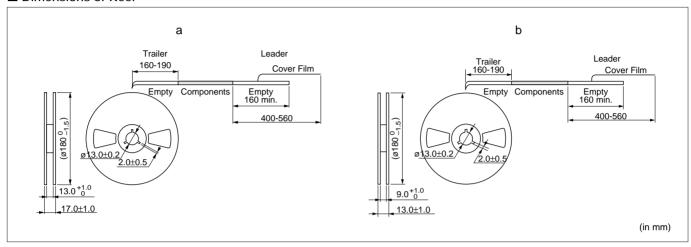
#### ■ Minimum Quantity

Part Number	Plastic Tape ø180mm	Plastic Tape ø330mm	Bulk	Dimensions
CSACV_X_Q	2,000	6,000	500	а
CSACW_X	3,000	9,000	500	b

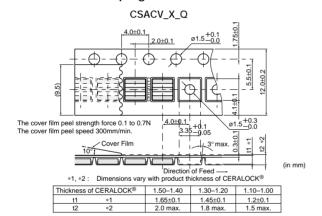
The order quantity should be an integral multiple of the "Minimum Quantity" shown above.

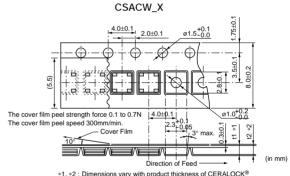
(pcs.)

#### ■ Dimensions of Reel



#### ■ Dimensions of Taping





*1, *2 : Dimensions vary 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	2.1 may	1 0 may	1.7 may		

## Ceramic Resonators (CERALOCK®)



## **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.

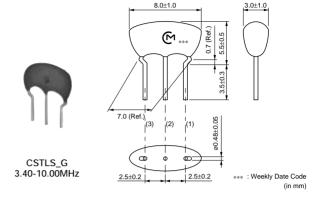
The CSTLS series can be used in the design of oscillation circuits not requiring external load capacitors, enabling both high-density mounting and cost reduction.

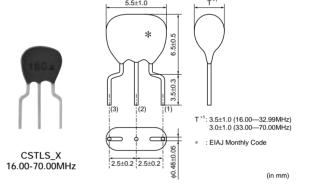
#### ■ Features

- 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 is some variation in built-in capacitance values applicable to various IC.

#### Applications

- 1. DTMF generators
- 2. Clock oscillators for microcomputers
- 3. Remote control units
- 4. Automated office equipment



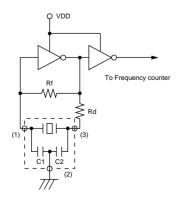


Part Number	Oscillating Frequency (MHz)	Initial Tolerance (%)	Temp. Stability (%)	Temperature Range (°C)	Use
CSTLS_G	3.40 to 10.00	±0.5	$\pm 0.2$ [-0.4% to +0.2%:Built-in Capacitance 47pF type]	-20 to +80	For consumer electronics
CSTLS_X	16.00 to 70.00	±0.5	±0.2	-20 to +80	For consumer electronics

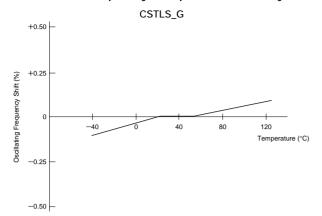
Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.

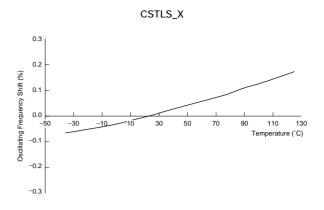
The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

#### ■ 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 resonators 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.
- The series comprises fixed, tuned, solid-state devices.
- 3. The resonators are miniature and light weight.
- 4. They exhibit excellent shock resistance performance.
- Oscillating circuits requiring no adjustment can be designed by utilizing these resonators in conjunction with transistors or appropriate ICs.

#### ■ Applications

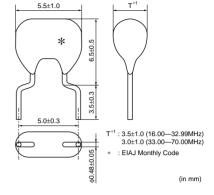
- 1. Square-wave and sine-wave oscillator
- 2. Clock generator for microprocessors
- 3. Remote control systems

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

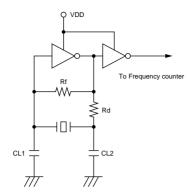
Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.

The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

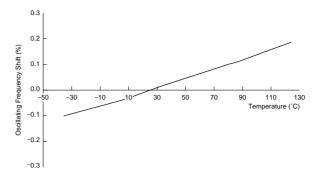




## ■ Oscillation Frequency Measuring Circuit



## ■ Oscillation Frequency Temperature Stability CSALS\_X



## **MHz Lead Type Notice**

#### ■ Notice (Soldering and Mounting)

The component cannot withstand washing.

### ■ Notice (Storage and Operating Conditions)

Please do not apply excess mechanical stress to the component and lead terminals during soldering. Conformal coating or washing of 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

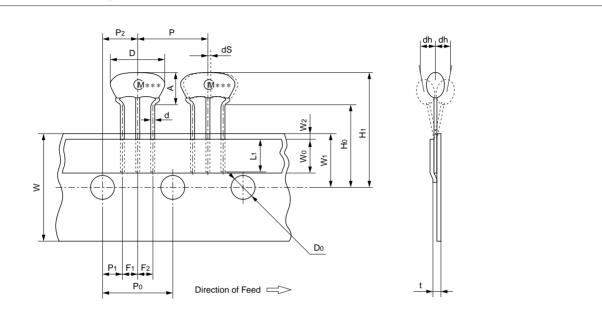
### ■ Minimum Quantity

Part Number	Ammo Pack	Bulk
CSTLS_G (3.40 to 10.0MHz)	2,000	500
CSTLS_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 CSTLS\_G



Item	Code	Dimensions	Tolerance	Remarks
Width of diameter	D	8.0	±1.0	
Height of resonator	А	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	Р	12.7	±0.5	Tolerance for Pitches 10xP <sub>0</sub> =127±1
Pitch of sprocket hole	P <sub>0</sub>	12.7	±0.2	
Length from sprocket hole center to lead	P1	3.85	±0.5	
Length from sprocket hole center to component center	P <sub>2</sub>	6.35	±0.5	
Lead spacing (I)	F1	2.5	±0.2	
Lead spacing (II)	F2	2.5	±0.2	
Slant forward or backward	dh	0	±1.0	1mm max.
Width of carrier tape	W	18.0	±0.5	
Width of hold down tape	Wo	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	H <sub>0</sub>	18.0	±0.5	
Total height of resonator	H1	23.5	±1.0	
Diameter of sprocket hole	D <sub>0</sub>	ø4.0	±0.2	
Total tape thickness	t	0.6	±0.2	
Body tilt	dS	0	±1.0	

Continued on the following page.

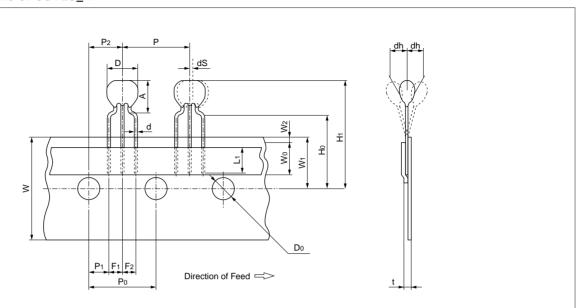


## MHz Lead Type CSTLS Series Packaging



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	А	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	Р	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	P <sub>2</sub>	6.35	±0.5	
Lead spacing (I)	F1	2.5	±0.2	
Lead spacing (II)	F2	2.5	±0.2	
Slant forward or backward	dh	0	±1.0	1mm max.
Width of carrier tape	W	18.0	±0.5	
Width of hold down tape	Wo	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	H <sub>0</sub>	18.0	±0.5	
Total height of resonator	H1	24.5	±0.1	
Diameter of sprocket hole	D <sub>0</sub>	ø4.0	±0.2	
Total tape thickness	t	0.6	±0.2	
Body tilt	dS	0	±1.0	



## MHz Lead Type CSALS Series Packaging

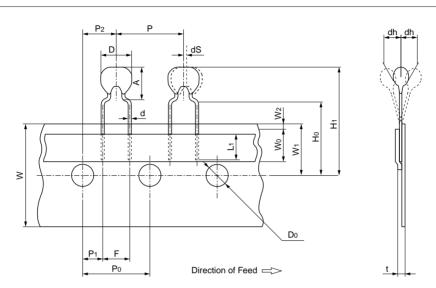
## ■ Minimum Quantity

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	Α	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	Р	12.7	±0.5	Tolerance for Pitches 10xP <sub>0</sub> =127±1
Pitch of sprocket hole	Po	12.7	±0.2	
Length from sprocket hole center to lead	P1	3.85	±0.5	
Length from sprocket hole center to component center	P <sub>2</sub>	6.35	±0.5	
Lead spacing	F	5.0	±0.3	
Slant forward or backward	dh	0	±1.0	1mm max.
Width of carrier tape	W	18.0	±0.5	
Width of hold down tape	Wo	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	H <sub>0</sub>	18.0	±0.5	
Total height of resonator	H1	24.5	±1.0	
Diameter of sprocket hole	D <sub>0</sub>	ø4.0	±0.2	
Total tape thickness	t	0.6	±0.2	
Body tilt	dS	0	±1.0	



## Ceramic Resonators (CERALOCK®)



## **Chip Type Two Terminals CSBFB Series**

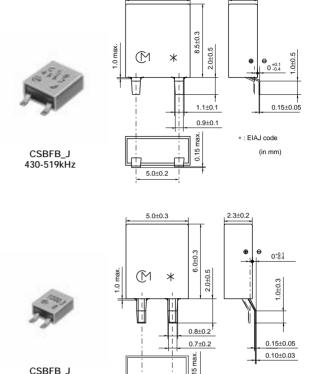
Can be reflow soldered and mounted by automatic placers. MURATA's original package technologies have enabled the development of the kHz band "CERALOCK". The series is perfect in miniature remote control units and AV modules.

#### ■ Features

- 1. The series withstands reflow soldering.
- 2. The series is mountable by automatic placers.
- 3. No adjustment is necessary for oscillation circuits.

## ■ Applications

- 1. Clock oscillators for microprocessors
- 2. OA equipment
- 3. AV modules



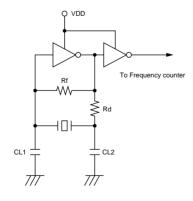
2.5±0.2

Part Number	Oscillating Frequency (kHz)	Initial Tolerance	Temp. Stability (%)	Temperature Range (°C)
CSBFB_J	430 to 519, 700 to 1250	±0.5%	±0.3	-20 to +80

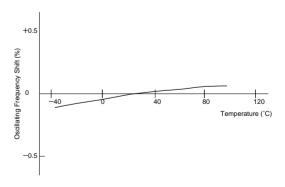
700-1250kHz

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

#### ■ Oscillation Frequency Measuring Circuit



#### ■ Oscillation Frequency Temperature Stability

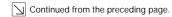


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\* : EIAJ code

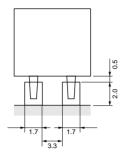




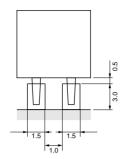


## ■ Standard Land Pattern Dimensions

## CSBFB\_J (430-519kHz)



CSBFB\_J (700-1250kHz)



(in mm) (in mm)

## kHz Chip Type CSBFB\_J 430-519kHz Notice (Soldering and Mounting)

#### 1. Soldering Conditions

#### (1) Reflow

One heat stress, shown in the profile at right, is applied to resonator; then, after being placed in natural conditions for 1 hour, the resonator is measured.

- Pre-heating conditions should be +140 to +160°C for 60 to 120 seconds. Ascending time up to +150°C should be longer than 30 seconds.
- Heating conditions should be within 20 seconds at +225°C min., but peak temperature should be lower than +235°C.

#### (2) Soldering Iron

Soldering iron of +270±5°C should be placed 0.5mm above electrode of resonator. Melting solder through soldering iron should be applied to electrode for 3±1 seconds; then, after being placed in natural conditions for 24 hours, the resonator should be measured.

#### 2. Wash

#### (1) Cleaning Solvents

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

#### (2) Temperature Difference : dT \*1 dT<=60°C (dT=Component-solvent)</p>

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

#### (3) Conditions

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

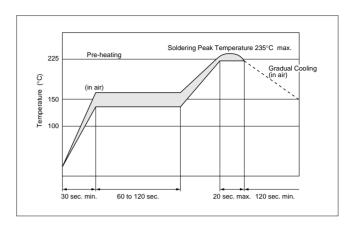
5 minutes max. in above solvent at +60°C max.

#### (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.



## kHz Chip Type CSBFB\_J 700-1250kHz Notice (Soldering and Mounting)

#### 1. Soldering Condition

#### (1) Reflow

One heat stress, shown in the profile at right, is applied to resonator; then, after being placed in natural conditions for 1 hour, the resonator is measured.

- Pre-heating conditions should be +140 to +160°C for 60 to 120 seconds. Ascending time up to +150°C should be longer than 30 seconds.
- Heating conditions should be within 20 seconds at +215°C min., but peak temperature should be lower than +225°C.

#### (2) Soldering Iron

Soldering iron of +270±5°C should be placed 0.5mm above electrode of resonator. Melting solder through soldering iron should be applied to electrode for 3±1 seconds; then, after being placed in natural conditions for 24 hours, the resonator should be measured.

#### 2. Wash

#### (1) Cleaning Solvents

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

(2) Temperature Difference : dT \*1 dT<=60°C (dT=Component-solvent)</li>\*1 ex. In case the component at +90°C immerses into

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

#### (3) Conditions

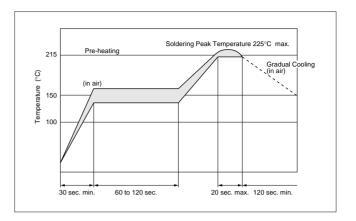
- 1. Ultrasonic Wash
  - 1 minute max. in above solvent at +60°C max. (Frequency: 28kHz, Output: 20W/L)
- 2. Immersion Wash
  - 5 minutes max. in above solvent at +60°C max.
- Shower or Rinse Wash
   minutes max. in above solvent at +60°C max.

#### (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.
- The component may be damaged if it is washed with chlorine, petroleum, or alkali cleaning solvent.



## Ceramic Resonators (CERALOCK®)



\* : EIAJ code

## **Lead Type Two Terminals CSBLA Series**

"CERALOCK" with two leaded terminals.

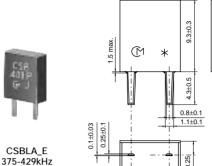
The CSBLA series ceramic resonators owe their development to MURATA's innovative expert technologies and the application of mass production techniques typically utilized in the manufacture of piezoelectric ceramic components. Because of their high mechanical Q and consistent high quality, the CSBLA series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

#### ■ 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.
- Oscillating circuits requiring no adjustment can be designed by utilizing these resonators in conjunction with transistors or appropriate ICs.

#### ■ Applications

- 1. Square-wave and sine-wave oscillators
- 2. Clock generator for microprocessors
- 3. Remote control systems

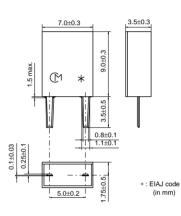


7.9+0.3

5.0+0.2

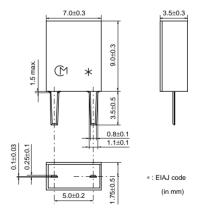


CSBLA\_E 430-509kHz



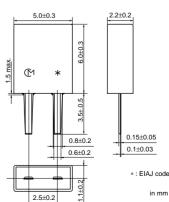


CSBLA\_E 510-699kHz





CSBLA\_J 700-1250kHz



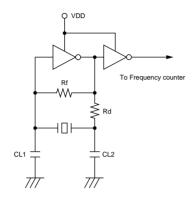


Part Number	Oscillating Frequency (kHz)	Initial Tolerance	Temp. Stability (%)	Temperature Range (°C)
CSBLA_E	375 to 699	±2kHz	±0.3	-20 to +80
CSBLA_J	700 to 1250	±0.5%	±0.3	-20 to +80

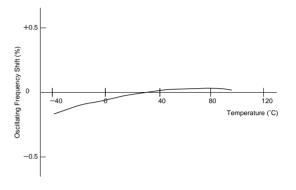
Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.

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



## kHz Lead Type Notice

#### ■ Notice (Soldering and Mounting)

#### CSBLA E

The component cannot withstand washing.

#### ■ Notice (Soldering and Mounting)

#### CSBLA\_J

- (1) Cleaning Solvents
  - HCFC, Isopropanol, Tap water, Demineralized water, Cleanthrough750H, Pine alpha 100S, Techno care FRW.
- (2) Temperature Difference: dT \*1 dT<=30 C. (dT=Component-solvent)
  - \*1 ex. In case the component at +90 C. immerses into cleaning solvent at +60 C., then dT=30 C.
- (3) Conditions
  - 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.
- Shower or Rinse Wash
   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 alkali cleaning solvent.



## **kHz Type Notice**

## ■ Notice (Storage and Operating Condition) CSBFB J

Please do not apply excess mechanical stress to the component and lead terminals during soldering. Conformal coating of the component is acceptable. However, the resin material, curing temperature, and other process conditions should be evaluated to confirm that stable electrical characteristics are maintained.

Ultrasonic cleaning of the component is acceptable.

## ■ Notice (Storage and Operating Condition) CSBLA\_E

Please do not apply excess mechanical stress to the component and lead terminals during soldering. Conformal coating or washing to the component is not acceptable because it is not hermetically sealed.

## ■ Notice (Storage and Operating Condition) CSBLA\_J

Please do not apply excess mechanical stress to the component and lead terminals during soldering. Conformal coating of the component is acceptable. However, the resin material, curing temperature, and other process conditions should be evaluated to confirm that stable electrical characteristics are maintained.

Ultrasonic cleaning of the component is acceptable. However, the size of bath, size and thickness of PBC should be evaluated to confirm that stable electrical characteristics are maintained.

#### ■ 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.

However, the size of bath, size and thickness of PBC should be evaluated to confirm that stable electrical characteristics are maintained.

In the case of the bulk component, dry heating treatment (130 C. for 5 hours min.) is required before reflow soldering. Then, the component should be soldered within 48 hours after dry heating treatment.



## kHz Type Packaging

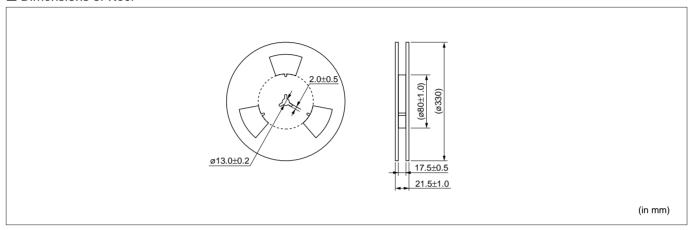
#### **■** CSBFB Series Minimum Quantity

Part Number	Plastic Tape ø330mm	Bulk
CSBFB_J (430 to 519kHz)	1,500	500
CSBFB_J (700 to 1250kHz)	3,000	1,000

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

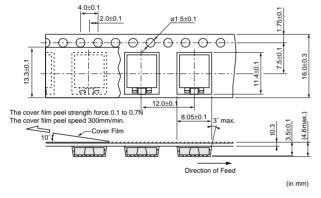
(pcs.)

#### ■ Dimensions of Reel

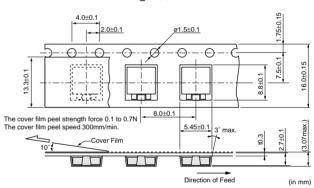


#### ■ Dimensions of Taping

## CSBFB\_J 430-519kHz



#### CSBFB\_J 700-1250kHz



#### **■** CSBLA Series Minimum Quantity

= cobert cones within an equation				
Part Number	Magazine	Bulk		
CSBLA_E	50	500		
CSBLA J	100	1,000		

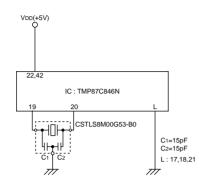
The order quantity should be an integral multiple of the "Minimum Quantity" shown above.

(pcs.)



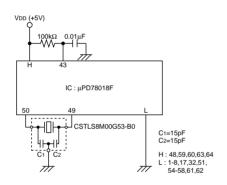
#### ■ TMP87CM40AN (TOSHIBA)

#### 8-bit Microcomputer



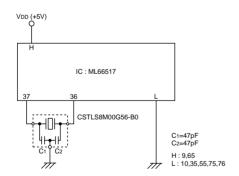
## ■ uPD78018F (NEC)

#### 8-bit Microcomputer



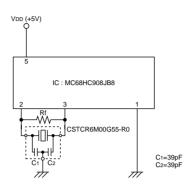
### ■ ML66517 (OKI)

#### 8-bit Microcomputer



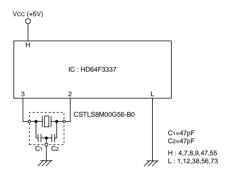
#### ■ MC68HC908JB8 (MOTOROLA)

#### 8-bit Microcomputer



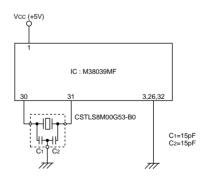
### ■ HD64F3337 (HITACHI)

#### 8-bit Microcomputer



### ■ M38039MF (MITSUBISHI)

#### 8-bit Microcomputer



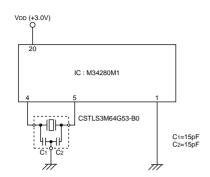




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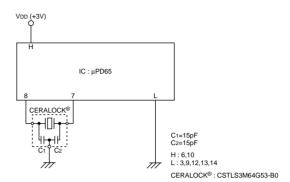
#### ■ M34280M1 (MITSUBISHI)

#### Remote Control Unit



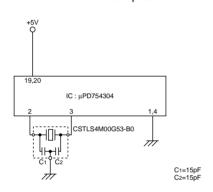
#### ■ uPD65 (NEC)

#### Speech Synthesizer



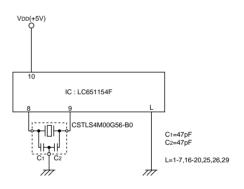
### ■ uPD754304 (NEC)

#### 4-bit Microcomputer



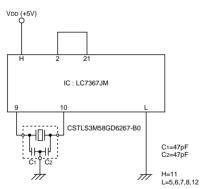
## ■ LC651154F (SANYO)

#### 4-bit Microcomputer



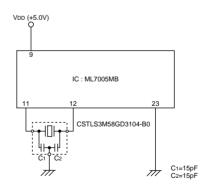
### ■ LC7367JM (SANYO)

#### Tone/Pulse Dialer



#### ■ ML7005MB (OKI)

#### Tone/Pulse Dialer



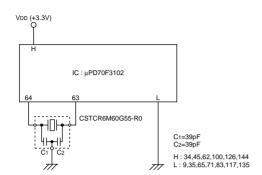




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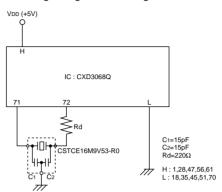
#### ■ uPD70F3102GJ (NEC)

#### 32-bit Microcomputer



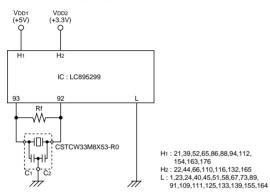
#### ■ CXD3068Q (SONY)

#### Digital Signal Processing IC for CD



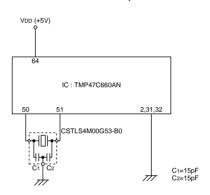
### ■ LC895299 (SANYO)

#### Error Correction of CD-ROM LSI



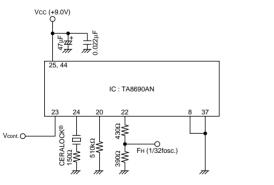
#### ■ TMP47C660AN (TOSHIBA)

#### 4-bit Microcomputer



### ■ TA8690AN (TOSHIBA)

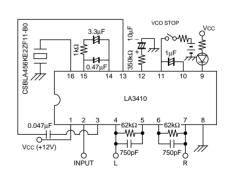
#### TV Horizontal/Compatible with Synthesizer Circuit



CERALOCK®: CSBLA503KEZZF46-B0

### ■ LA3410 (SANYO)

#### FM Stereo MPX

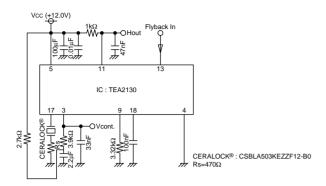




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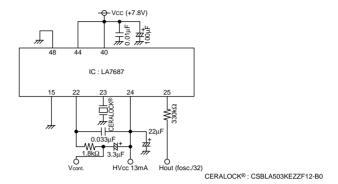
## ■ TEA2130 (THOMSON)

TV Horizontal/Compatible with Synthesizer Circuit

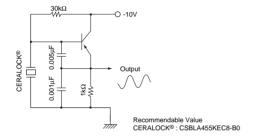


### ■ LA7687 (SANYO)

TV Horizontal/Compatible with Synthesizer Circuit



## ■ Oscillation Circuit Incorporating Transistor



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