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Ceramic Resonators (CERALOCK®)



muRata Innovator in Electronics

Murata
Manufacturing Co., Ltd.

Cat.No.P16E-20

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for EU RoHS Compliant

・All the products in this catalog comply with EU RoHS.
・EU RoHS is "the European Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment".
・For more details, please refer to our website 'Murata's Approach for EU RoHS' (http://www.murata.com/info/rohs.html).

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CONTENTS

CERALOCK®, CERALOCK(R) and "CERALOCK" in this catalog are the trademarks of Murata Manufacturing Co., Ltd.

Selection Guide — 2

Part Numbering — 3

1 **MHz Chip Type -Tight Frequency Tolerance for Automotive-** — 5

● Application Circuits Utilization — 7

2 **MHz Chip Type -Standard Frequency Tolerance for Automotive-** — 8

● Application Circuits Utilization — 12

Notice for Automotive — 13

Packaging for Automotive — 18

3 **MHz Chip Type -Tight Frequency Tolerance for General Usage-** — 20

● Application Circuits Utilization — 23

4 **MHz Chip Type -Standard Frequency Tolerance for General Usage-** — 24

● Application Circuits Utilization — 29

5 **MHz Lead Type -Standard Frequency Tolerance for General Usage-** — 31

6 **kHz Chip Type -Standard Frequency Tolerance for General Usage-** — 33

7 **kHz Lead Type -Standard Frequency Tolerance for General Usage-** — 35

Notice for General Usage

● MHz Chip Type — 37

● MHz Lead Type — 42

● kHz Chip Type — 43

● kHz Lead Type — 45

Packaging for General Usage

● MHz Chip Type — 47

● MHz Lead Type — 50

● kHz Type — 52

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Selection Guide

Applications

Automotive

Tight Tolerance

SMD



CSTCR_G15C
4.00–7.99MHz



CSTCE_G15C
8.00–13.99MHz

CSTCE_V13C
14.00–20.00MHz

Standard Tolerance

SMD



CSTCC_G_A
2.00–3.99MHz



CSTCR_G_B
4.00–7.99MHz

CSTCE_G_A
8.00–13.99MHz

CSTCE_V_C
14.00–20.00MHz



CSTCV_X_Q
20.01–70.00MHz



CSACV_X_Q
20.01–70.00MHz
(Two Terminals)

Consumer

Tight Tolerance

SMD



CSTCR_G15L
4.00–7.99MHz

CSTCE_G15L
8.00–13.99MHz

CSTCE_V13L
14.00–20.00MHz



CSTCW_X11
20.01–48.00MHz

Standard Tolerance

SMD



CSTCC_G
2.00–3.99MHz



CSTCR_G
4.00–7.99MHz

CSTCE_G
8.00–13.99MHz

CSTCE_V
14.00–20.00MHz



CSTCW_X
20.01–70.00MHz



CSACW_X
20.01–70.00MHz
(Two Terminals)



CSTCG_V
20.00–33.86MHz
Super Small!

kHz Range



CSBFB_J
430–519kHz



CSBFB_J
700–1250kHz

The kHz resonators have only two terminals.

Leaded



CSTLS_G
3.40–10.00MHz



CSTLS_X
16.00–70.00MHz

kHz Range



CSBLA_E
375–429kHz



CSBLA_E
430–509kHz



CSBLA_E
510–699kHz



CSBLA_J
700–1250kHz

The kHz resonators have only two terminals.

Notice: "CERALOCK® for consumer" and "CERALOCK® for automotive" is different in the specification of Operating Temperature Range, Environmental Characteristics, Physical Characteristics and so on. Please choose either "for consumer" or "for automotive" according to the required specification.

● Part Numbering

CERALOCK® (MHz)

(Part Number)

CS	T	CE	16M0	V	5	3	***	-R0
❶	❷	❸	❹	❺	❻	❼	❽	❾

❶Product ID

Product ID	
CS	Ceramic Resonators

❷Frequency/Capacitance

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

❸Structure/Size

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

❹Nominal Center Frequency

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

❺Design

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

□□ indicates initial frequency tolerance and load capacity.

❻Initial Frequency Tolerance

Code	Design
5	±0.5%
3	±0.3%
2	±0.2%
1	±0.1%
H	±0.07%

❼Load Capacity

Code	Design
1	3/5/6pF
2	10pF
3	15pF
4	22pF
5	30/33/39pF
6	47pF

❽Individual Specification

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

With standard products, "❽Individual Specification" is omitted.

❾Packaging

Code	Packaging
-B0	Bulk
-A0	Radial Taping H_0=18mm
-R0	Plastic Taping ø=180mm
-R1	Plastic Taping ø=330mm

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

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CERALOCK® (kHz)

(Part Number) **CS** **B** **FB** **500K** **J58** ******* **-R1**
❶ ❷ ❸ ❹ ❺ ❻ ❼

❶Product ID

Product ID	
CS	Ceramic Resonators

❷Frequency/Capacitance

Code	Frequency/Capacitance
B	kHz with No capacitance built-in

❸Structure/Size

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

❹Nominal Center Frequency

Expressed by four-digit alphanumerics. The unit is in hertz (Hz). Capital letter "**K**" following three figures expresses the unit of "kHz." 1.0MHz (1000kHz) or above is expressed by three figures and capital letter "**M**" for decimal point.

❺Design

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

□□ indicates initial frequency tolerance and load capacitance.

❻Individual Specification

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

With standard products, "❻Individual Specification" is omitted.

❼Packaging

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

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Ceramic Resonators (CERALOCK®)

MHz Chip Type -Tight Frequency Tolerance for Automotive-

Chip type CERALOCK(R) with built-in load capacitors provides high accuracy in an extremely small package. MURATA's frequency adjustment and package technology expertise has enabled the development of the chip CERALOCK(R) with built-in load capacitors.
This diverse series owes its development to MURATA's original mass production techniques and high reliability, and has achieved importance in the worldwide automotive market.

■ Features

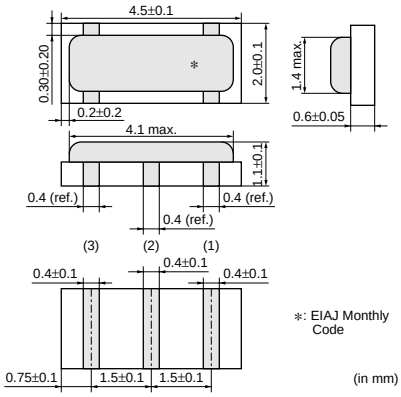
1. The series are high accuracy resonators whose total tolerance is available for less than +-3,000ppm.
2. The series has high reliability and is available for a wide temperature range.
3. Oscillation circuits do not require external load capacitors.
4. The series is available for a wide frequency range.
5. The resonators are extremely small and have a low profile.
6. No adjustment is necessary for oscillation circuits.

■ Applications

1. Cluster panel and Control panel
2. Safety control
   (Anti-lock Brake System, Electronic Stability Control, Airbag, etc.)
3. Engine ECU, Electronic Power Steering, Immobilizer, etc.
4. Car Airconditioner, Power Window, Remote Keyless Entry system, etc.
5. Intelligent Transportation System
   (Lane Keeping System, Millimeter wave radar, etc.)
6. Battery control for hybrid cars

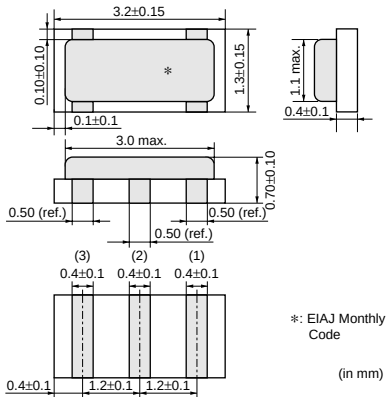


CSTCR_G15C
4.00-7.99MHz



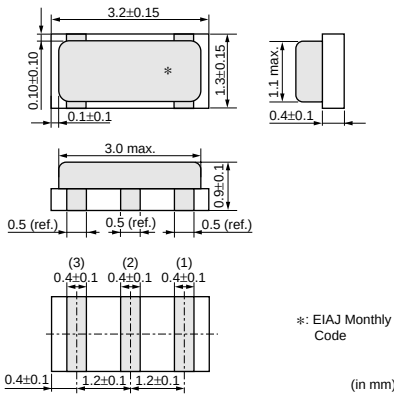


CSTCE_G15C
8.00-13.99MHz





CSTCE_V13C
14.00-20.00MHz

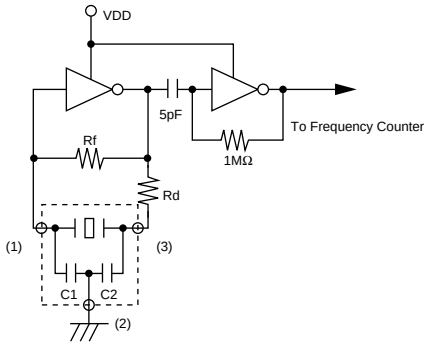


Part Number	Oscillating Frequency (MHz)	Initial Tolerance	Temperature Stability (%)	Temperature Range (°C)
CSTCR_G15C	4.00 to 7.99	±0.1%	±0.13	-40 to 125
CSTCE_G15C	8.00 to 13.99	±0.1%	±0.13	-40 to 125
CSTCE_V13C	14.00 to 20.00	±0.1%	±0.13	-40 to 125

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

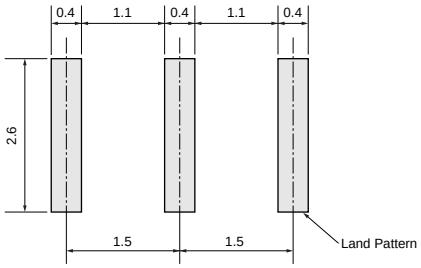
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■ Oscillation Frequency Measuring Circuit



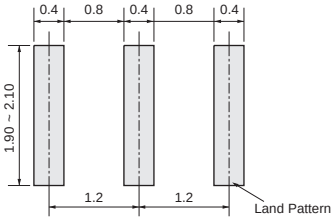
■ Standard Land Pattern Dimensions

CSTCR_G15C
(* This Land Pattern is not common to CSTCR_G.)



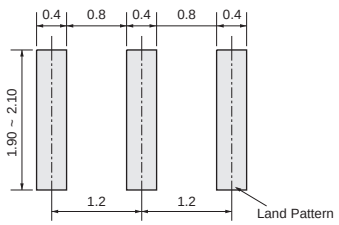
(in mm)

CSTCE_G15C



(in mm)

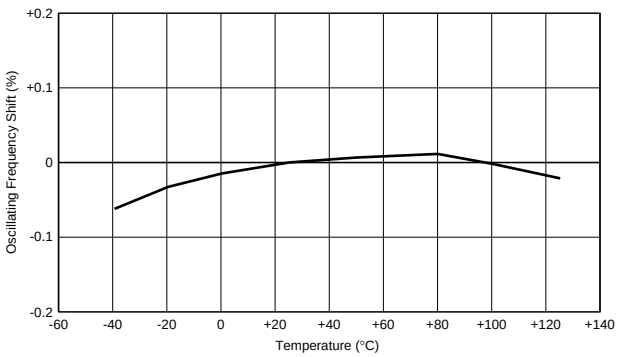
CSTCE_V13C
(* This Land Pattern is not common to CSTCE_V.)



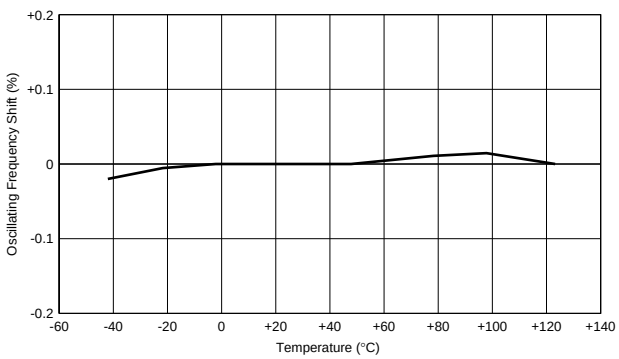
(in mm)

■ Oscillation Frequency Temperature Stability

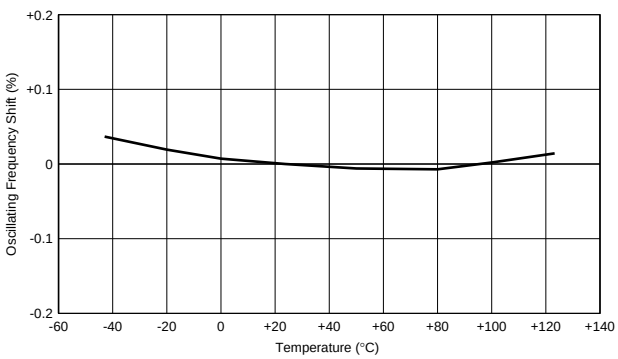
CSTCR_G15C



CSTCE_G15C



CSTCE_V13C

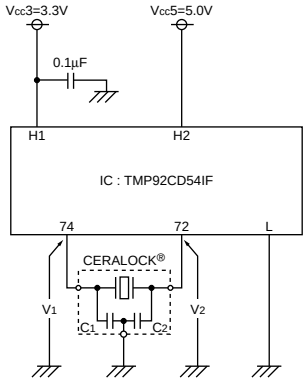


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Application Circuits Utilization

■ TMP92CD54IF (Toshiba)

16-bit Microcomputer

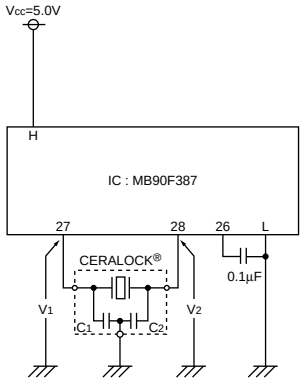


H1: 36, 68, 86
H2: 2, 4, 15, 40, 50, 61, 75
L: 1, 3, 13, 38, 51, 63, 73, 88

CERALOCK®: CSTCE10M0G15C□□-R0
C1=33pF (Typ.)
C2=33pF (Typ.)

■ MB90F387 (Fujitsu)

16-bit Microcomputer

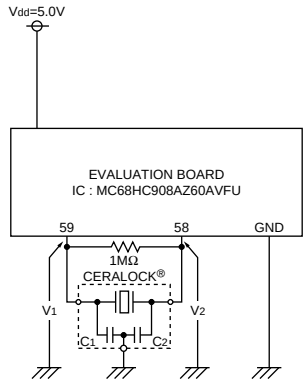


H: 1, 2, 21, 22, 24
L: 20, 23, 25, 48

CERALOCK®: CSTCE8M00G15C□□-R0
C1=33pF (Typ.)
C2=33pF (Typ.)

■ MC68HC908AZ60AVFU (Freescale)

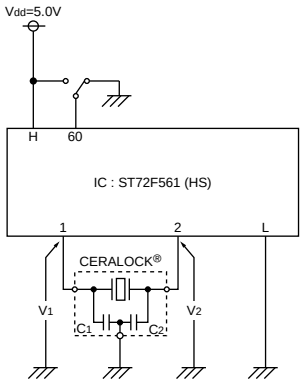
8-bit Microcomputer



CERALOCK®: CSTCE16M0V13C□□-R0
C1=15pF (Typ.)
C2=15pF (Typ.)

■ ST72F561 (HS) (ST Microelectronics)

8-bit Microcomputer

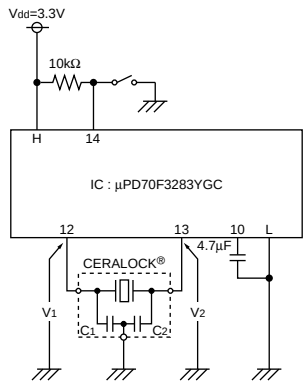


H: 9, 25, 41, 57, 58
L: 8, 24, 40, 55, 56

CERALOCK®: CSTCE8M00G15A□□-R0
C1=33pF (Typ.)
C2=33pF (Typ.)

■ μPD70F3283YGC (Renesas)

32-bit Microcomputer

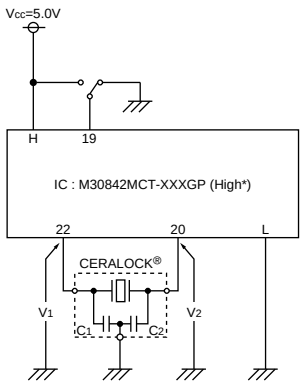


H: 1, 5, 9, 34, 70
L: 2, 8, 11, 15, 33, 69

CERALOCK®: CSTCE10M0G15C□□-R0
C1=33pF (Typ.)
C2=33pF (Typ.)

■ M30842MCT-XXXGP (Renesas)

16-bit Microcomputer



H: 23, 24, 37, 39, 59, 74, 91, 118, 122, 132, 142, 143
L: 15, 16, 21, 36, 41, 57, 76, 93, 110~113, 120, 121, 130, 140

*High: XIN-XOUT Drive Capacity Select Bit

CERALOCK®: CSTCE8M00G15C□□-R0
C1=33pF (Typ.)
C2=33pF (Typ.)

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Ceramic Resonators (CERALOCK®)

MHz Chip Type -Standard Frequency Tolerance for Automotive-

Chip type CERALOCK(R) with built-in load capacitors provides high accuracy in an extremely small package. MURATA's frequency adjustment and package technology expertise has enabled the development of the chip CERALOCK(R) with built-in load capacitors.
This diverse series owes its development to MURATA's original mass production techniques and high reliability, and has achieved importance in the worldwide automotive market.

■ Features

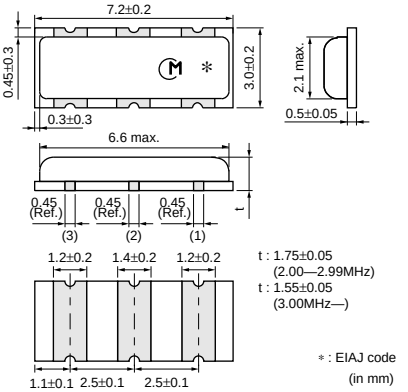
1. The series has high reliability and is available for a wide temperature range.
2. Oscillation circuits do not require external load capacitors.
3. The series is available in a wide frequency range.
4. The resonators are extremely small and have a low profile.
5. No adjustment is necessary for oscillation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

■ Applications

1. Cluster panel and Control panel
2. Safety control (Anti-lock Brake System, Electronic Stability Control, Airbag, etc.)
3. Engine ECU, Electronic Power Steering, Immobilizer, etc.
4. Car Airconditioner, Power Window, Remote Keyless Entry system, etc.
5. Electronic Toll Collection system, Car Navigation, etc.

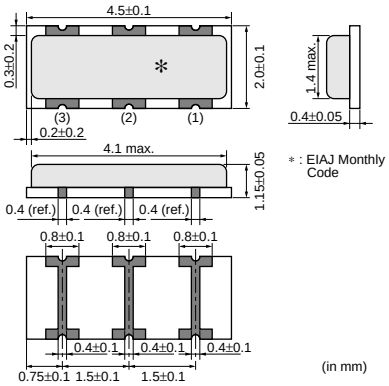


CSTCC_G_A
2.00-3.99MHz



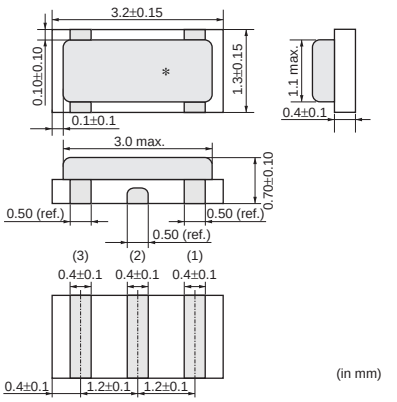


CSTCR_G_B
4.00-7.99MHz



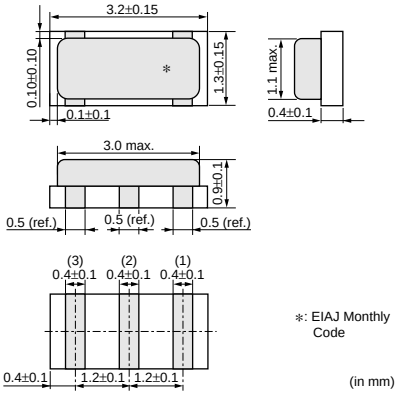


CSTCE_G_A
8.00-13.99MHz



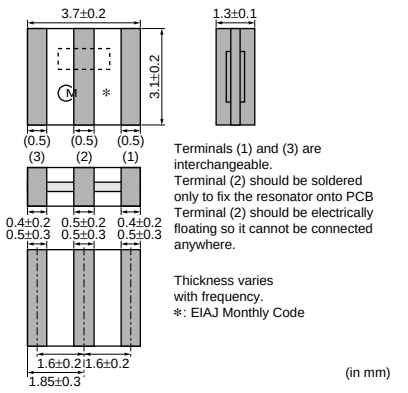


CSTCE_V_C
14.00-20.00MHz





CSACV_X_Q
20.01-70.00MHz

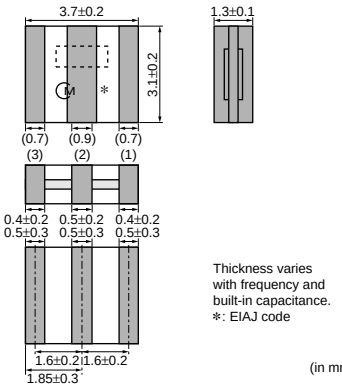


Continued on the following page.

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CSTCV_X_Q
20.01-70.00MHz



Thickness varies with frequency and built-in capacitance.
∗: EIAJ code

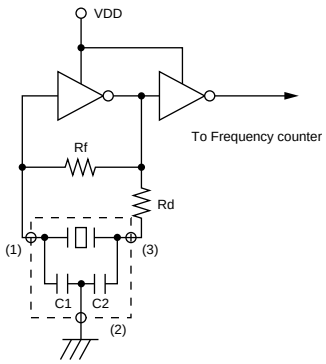
(in mm)

Part Number	Oscillating Frequency (MHz)	Initial Tolerance	Temperature Stability (%)	Temperature Range (°C)
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
CSTCR_G_B	4.00 to 7.99	±0.5%	±0.15	-40 to 125
CSTCE_G_A	8.00 to 13.99	±0.5%	±0.2	-40 to 125
CSTCE_V_C	14.00 to 20.00	±0.5%	±0.15	-40 to 125
CSACV_X_Q	20.01 to 70.00	±0.5%	±0.3	-40 to 125
CSTCV_X_Q	20.01 to 70.00	±0.5%	±0.3	-40 to 125

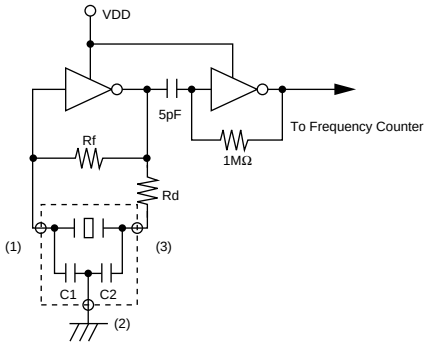
Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.

■ Oscillation Frequency Measuring Circuit

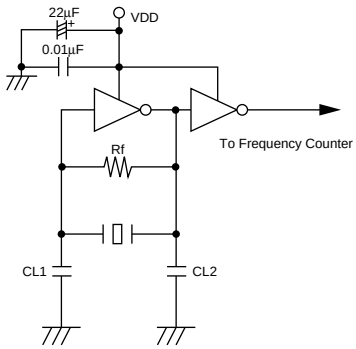
CSTCC_G_A



CSTCE_G_A/CSTCE_V_C/CSTCR_G_B/CSTCV_X_Q



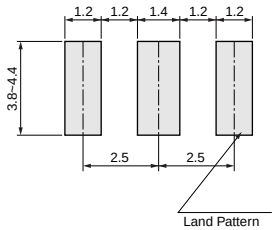
CSACV_X_Q



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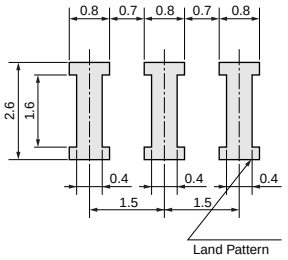
■ Standard Land Pattern Dimensions

CSTCC_G_A



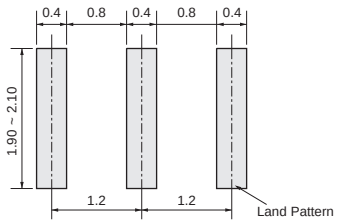
(in mm)

CSTCR_G_B



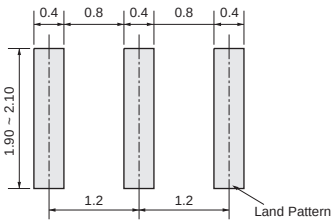
(in mm)

CSTCE_G_A



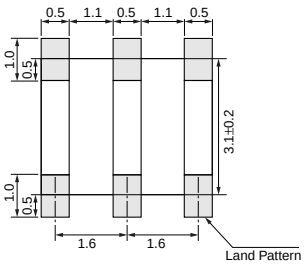
(in mm)

CSTCE_V_C
(* This Land Pattern is not common to CSTCE_V.)



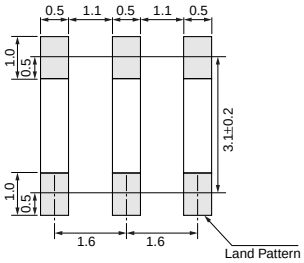
(in mm)

CSTCV_X_Q



(in mm)

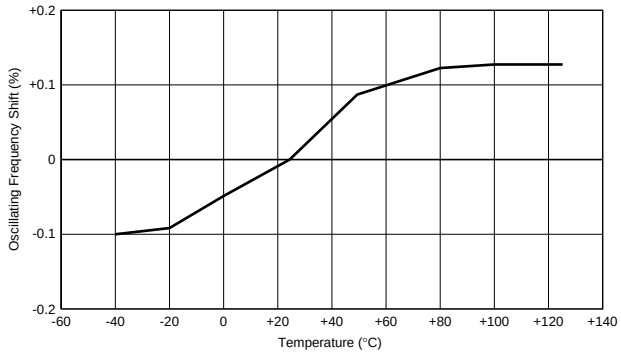
CSACV_X_Q



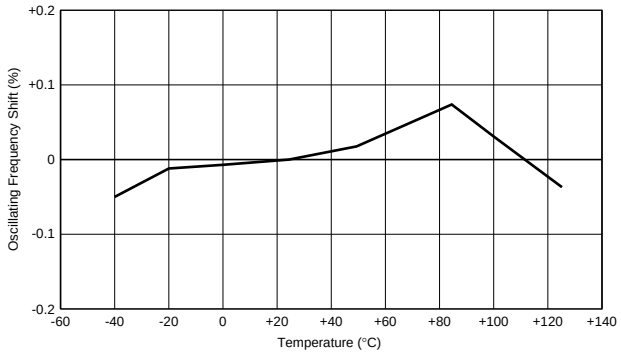
(in mm)

■ Oscillation Frequency Temperature Stability

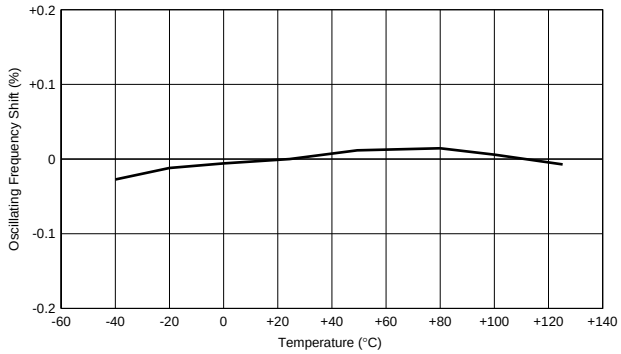
CSTCC_G_A



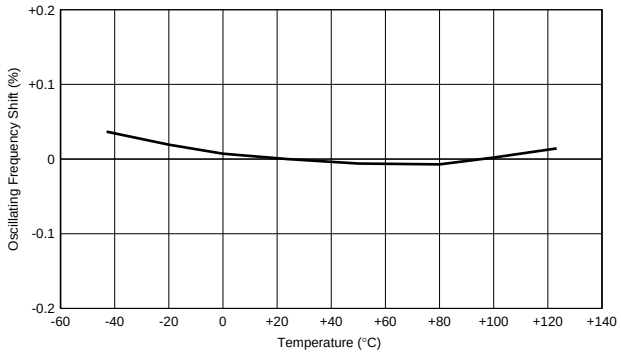
CSTCR_G_B



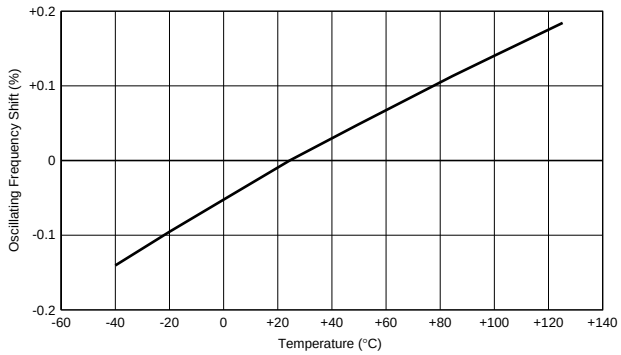
CSTCE_G_A



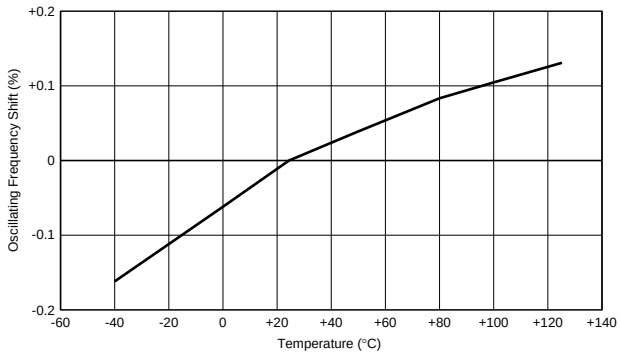
CSTCE_V_C



CSTCV_X_Q



CSACV_X_Q

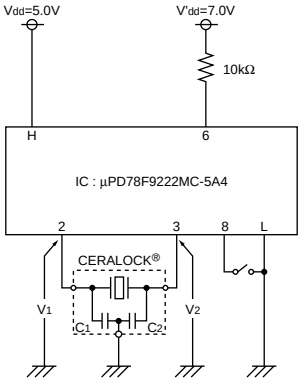


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Application Circuits Utilization

■ μPD78F9222MC-5A4 (Renesas)

8-bit Microcomputer

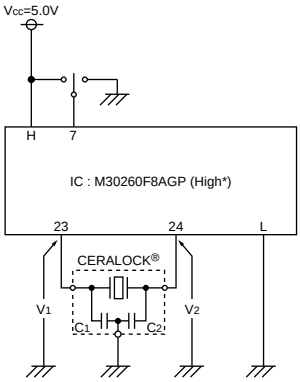


H: 5, 20
L: 1

CERALOCK®: CSTCR6M00G55B-R0
C1=39pF (Typ.)
C2=39pF (Typ.)

■ M30260F8AGP (Renesas)

16-bit Microcomputer



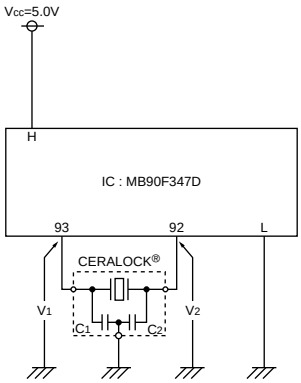
H: 11, 46, 47, 48
L: 4, 9, 44

*High: XIN-XOUT Drive Capacity Select Bit

CERALOCK®: CSTCE10M0G55A-R0
C1=33pF (Typ.)
C2=33pF (Typ.)

■ MB90F347D (Fujitsu)

16-bit Microcomputer

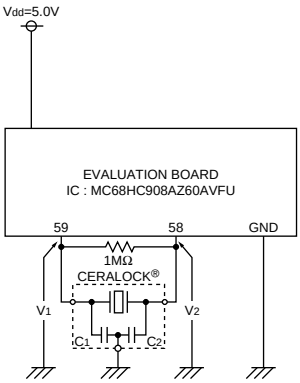


H: 15, 32, 65, 90
L: 16, 35, 44, 66, 91

CERALOCK®: CSTCE8M00G55A-R0
C1=33pF (Typ.)
C2=33pF (Typ.)

■ MC68HC908AZ60AVFU (Freescale)

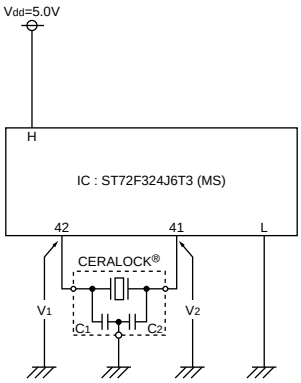
8-bit Microcomputer



CERALOCK®: CSTCE16M0V53C-R0
C1=15pF (Typ.)
C2=15pF (Typ.)

■ ST72F324J6T3 (MS) (ST Microelectronics)

8-bit Microcomputer

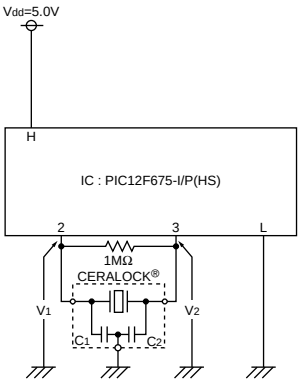


H: 13, 21, 32, 43
L: 14, 22, 33, 39, 40

CERALOCK®: CSTCR4M00G55B-R0
C1=39pF (Typ.)
C2=39pF (Typ.)

■ PIC12F675-I/P (HS) (Microchip)

8-bit Microcomputer



H: 1
L: 4, 8

CERALOCK®: CSTCE8M00G52A-R0
C1=10pF (Typ.)
C2=10pF (Typ.)

■ Soldering and Mounting (CSTCC/CSTCR/CSTCE_V/CSTCE_G Series)

1. Soldering

(1) Re-flow soldering

Please mount component on a circuit board by re-flow soldering. Flow soldering is not acceptable.

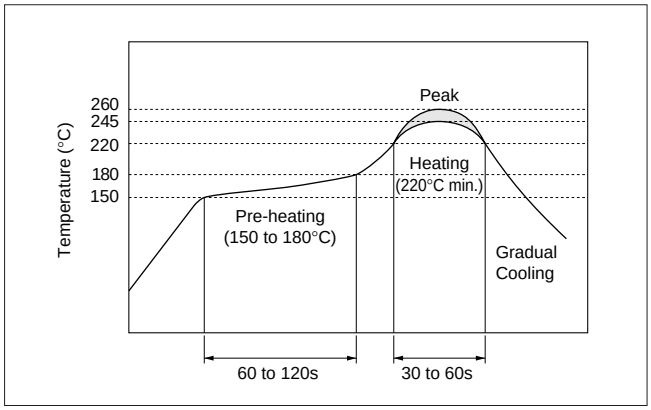
Recommendable Flux and Solder

Flux	Please use rosin based flux, but do not use water soluble flux.
Solder	Please use solder (Sn-3.0Ag-0.5Cu) under the following condition. Standard thickness of soldering paste: 0.10 to 0.15mm

Recommendable Soldering Profile

Pre-heating	150 to 180°C	60 to 120s
Heating	220°C min.	30 to 60s
Peak Temperature	upper limit: 260°C	1s max.
	lower limit: 245°C	5s max.

Temperature shall be measured on the surface of component.



(2) Soldering with Iron

Be compelled to mount component by using soldering iron, please do not directly touch the component with soldering iron. The terminals of component or electrical characteristics may be damaged if excess thermal stress is applied.

Recommendable Soldering with Iron

Heating of the soldering iron	350°C max.
Watt	30W max.
Shape of the soldering iron	ø3mm max.
Solering Time	5s max. at one terminal
Solder	Sn-3.0Ag-0.5Cu

(3) Solder Volume

Please make the solder volume less than the height of the substrate. When exceeding the substrate, the damage of adhesive for sealing between the metal cap and the substrate may occur.

(4) etc.

Do not reuse removed component from a circuit board after soldering.

(5) Condition for Placement Machines

The component is recommended with placement machines with employ optical placement capabilities. The component might be resulted in damage by excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines which utilize mechanical positioning. Please contact Murata for details beforehand.

2. Wash

(1) Cleaning Solvents

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

Continued on the following page.

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Notice for Automotive

Continued from the preceding page.

(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.

(3) Conditions
(a) Ultrasonic Wash
1 minute max. in above solvent at +60°C max.
(Frequency: 28kHz, Output: 20W/l)
(b) Immersion Wash
5 minutes max. in above solvent at +60°C max.
(c) 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
(a) Total washing time should be within 10 minutes.
(b) The component may be damaged if it is washed with chlorine, petroleum, or alkali cleaning solvent.

3. Coating
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 for Automotive

■ Soldering and Mounting (CSTCV/CSACV Series)

1. Soldering

(1) Re-flow soldering

Please mount component on a circuit board by re-flow soldering. Flow soldering is not acceptable.

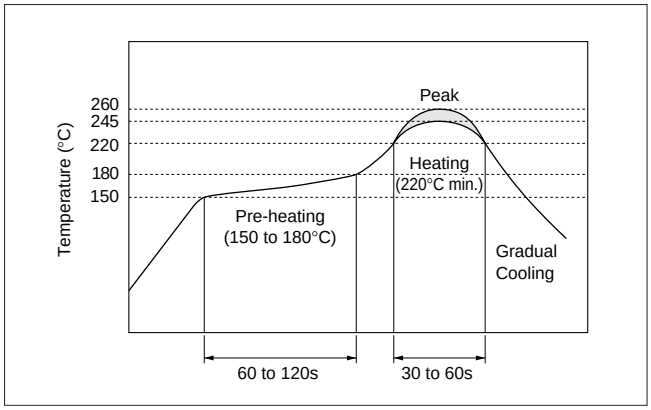
Recommendable Flux and Solder

Flux	Please use rosin based flux, but do not use water soluble flux.
Solder	Please use solder (Sn-3.0Ag-0.5Cu) under the following condition. Standard thickness of soldering paste: 0.10 to 0.15mm

Recommendable Soldering Profile

Pre-heating	150 to 180°C	60 to 120s
Heating	220°C min.	30 to 60s
Peak Temperature	upper limit: 260°C	1s max.
	lower limit: 245°C	5s max.

Temperature shall be measured on the surface of component.



(2) Soldering with Iron

Be compelled to mount component by using soldering iron, please do not directly touch the component with soldering iron. The terminals of component or electrical characteristics may be damaged if excess thermal stress is applied.

Recommendable Soldering with Iron

Heating of the soldering iron	350°C max.
Watt	30W max.
Shape of the soldering iron	ø3mm max.
Solering Time	5s max. at one terminal
Solder	Sn-3.0Ag-0.5Cu

(3) etc.

Do not reuse removed component from a circuit board after soldering.

(4) Condition for Placement Machines

The component is recommended with placement machines with employ optical placement capabilities. The component might be resulted in damage by excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines which utilize mechanical positioning. Please contact Murata for details beforehand.

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)

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

Continued on the following page.

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Notice for Automotive

Continued from the preceding page.

(3) Conditions

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

(b) Immersion Wash
5 minutes max. in above solvent at +60°C max.

(c) 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
(a) Total washing time should be within 10 minutes.
(b) The component may be damaged if it is washed with chlorine, petroleum, or alkali cleaning solvent.

3. Coating
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.

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Notice for Automotive

■ Storage and Operating Conditions

1. Product Storage Condition
   Please store the products in a room where the temperature/humidity is stable, and avoid such places where there are large temperature changes. Please store the products under the following conditions:
   Temperature: -10 to + 40 degrees C
   Humidity: 15 to 85% R.H.
2. Expiration Date on Storage
   Expiration date (Shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability and/or rusty.
   Please confirm solderability and characteristics for the products regularly.
3. Notice on Product Storage
   (1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because the characteristics may be reduced in quality, and/or be degraded in the solderability due to the storage in a chemical atmosphere.
   (2) Please do not put the products directly on the floor without anything under them to avoid damp and/or dusty places.
   (3) Please do not store the products in places such as: in a damp heated place, in a place where direct sunlight comes in, in a place applying vibrations.
   (4) Please use the products immediately after the package is opened, because the characteristics may be reduced in quality, and/or be degraded in the solderability due to storage under the poor conditions.
   (5) Please do not drop the products to avoid cracking of ceramic elements.
4. Others
   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 be sure to consult with our sales representatives or engineers whenever and prior to using the products.

■ Rating

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

■ Handling

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

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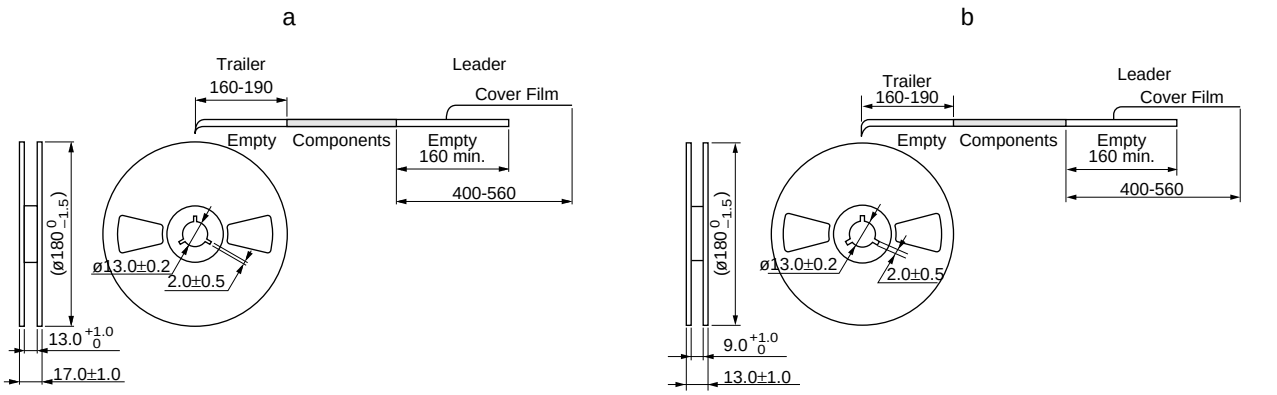
Packaging for Automotive

■ Minimum Quantity

Part Number	Plastic Tape ø180mm	Plastic Tape ø330mm	Bulk	Dimensions
CSTCC_G_A	2,000	6,000	500	a
CSTCR_G_B	3,000	9,000	500	a
CSTCR_G15C	3,000	9,000	500	a
CSTCE_G_A	3,000	9,000	500	b
CSTCE_G15C	3,000	9,000	500	b
CSTCE_V_C	3,000	9,000	500	b
CSTCE_V13C	3,000	9,000	500	b
CSTCV_X_Q	2,000	6,000	500	a
CSACV_X_Q	2,000	6,000	500	a

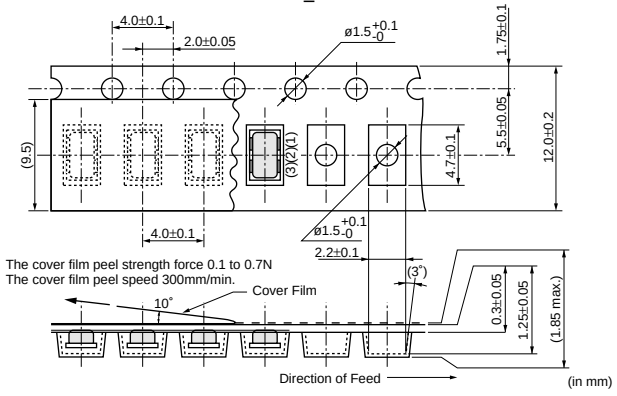
The order quantity should be an integral multiple of the "Minimum Quantity" shown above. (pcs.)

■ Dimensions of Reel

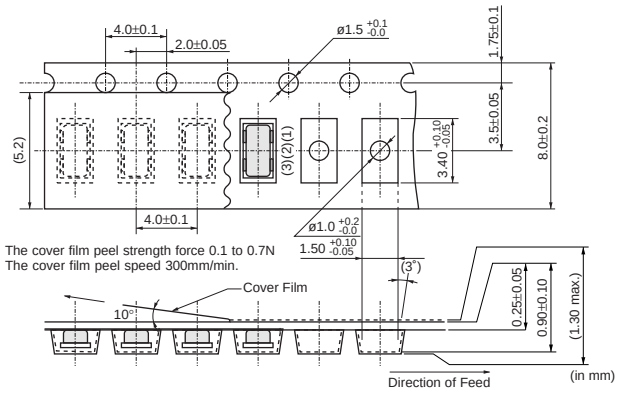


■ Dimensions of Taping

CSTCR_G15C



CSTCE_G15C



Continued on the following page.

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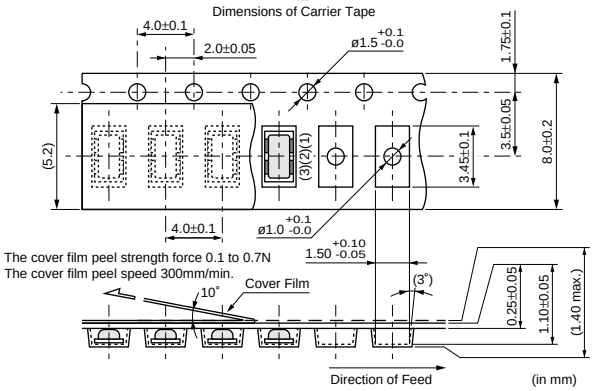
Packaging for Automotive

Continued from the preceding page.

■ Dimensions of Taping

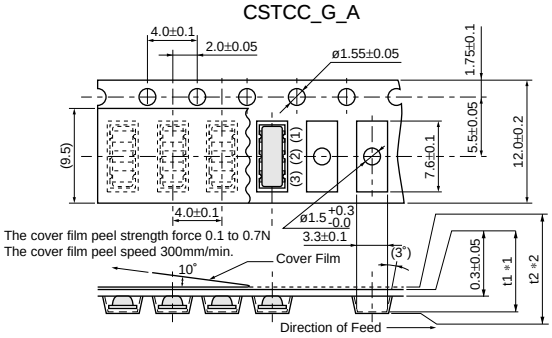
CSTCE_V13C

Dimensions of Carrier Tape



(in mm)

CSTCC_G_A

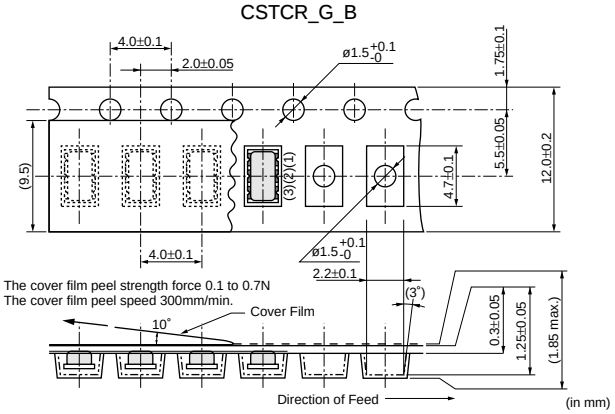


*1, *2: Dimensions vary with frequency range of CERALOCK®.

Frequency Range		2.00–2.99MHz	3.00–3.99MHz
t1	*1	1.85±0.05	1.65±0.05
t2	*2	2.45 max.	2.25 max.

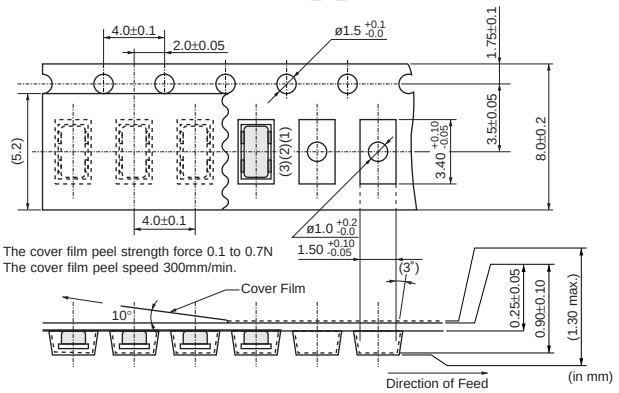
(in mm)

CSTCR_G_B



(in mm)

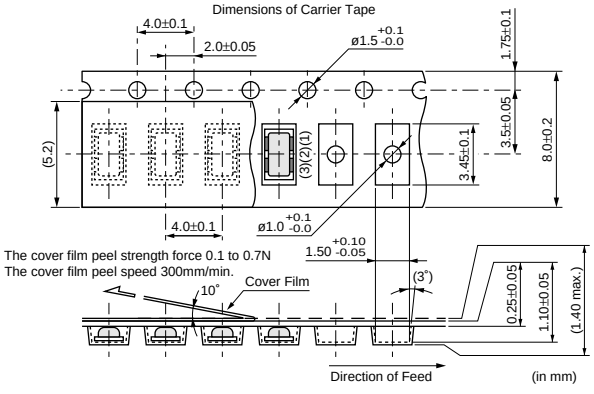
CSTCE_G_A



(in mm)

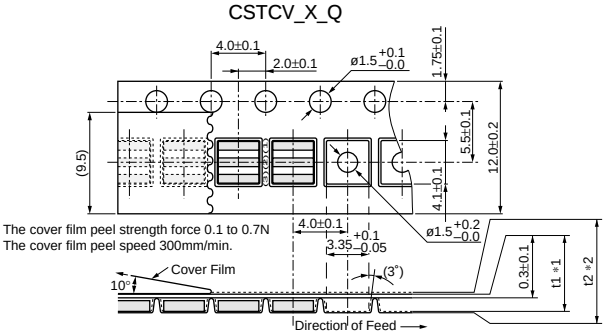
CSTCE_V_C

Dimensions of Carrier Tape



(in mm)

CSTCV_X_Q

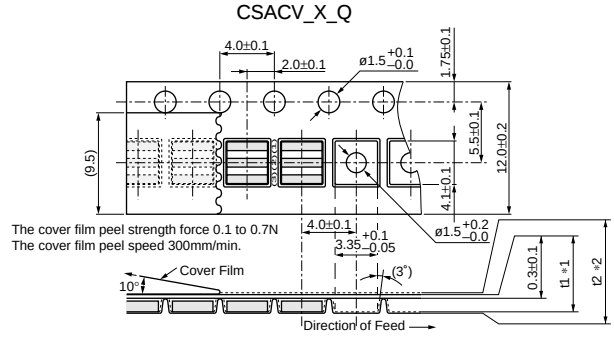


*1, *2: Dimensions vary with product thickness of CERALOCK®.

Thickness of CERALOCK®		1.50–1.40	1.30–1.20	1.10–1.00
t1	*1	1.65±0.1	1.45±0.1	1.2±0.1
t2	*2	2.0 max.	1.8 max.	1.5 max.

(in mm)

CSACV_X_Q



*1, *2: Dimensions vary with product thickness of CERALOCK®.

Thickness of CERALOCK®		1.50–1.40	1.30–1.20	1.10–1.00
t1	*1	1.65±0.1	1.45±0.1	1.2±0.1
t2	*2	2.0 max.	1.8 max.	1.5 max.

(in mm)

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Ceramic Resonators (CERALOCK®)

MHz Chip Type -Tight Frequency Tolerance for General Usage-

Chip type CERALOCK(R) with built-in load capacitors provides high accuracy in an extremely small package. MURATA's frequency adjustment and packaging technology expertise has enabled the development of the chip CERALOCK(R) with built-in load capacitors.
High-density mounting is made possible by the small package and the elimination of the need for an external load capacitor.

■ Features

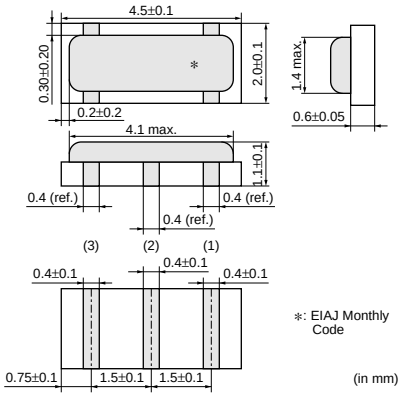
1. Oscillation circuits do not require external load capacitors.
2. Available in a wide frequency range.
3. Extremely small and have a low profile.
4. No adjustment is necessary for oscillation circuits.

■ Applications

1. Clock oscillators for USB (Full-speed) controller ICs
2. Audio equipment and musical instruments, etc.
3. Other applications for replacement of Crystal Oscillators



CSTCR_G15L
4.00-7.99MHz

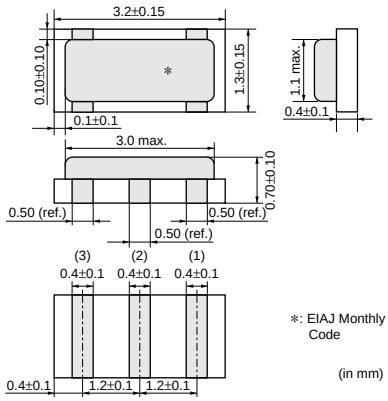


∗: EIAJ Monthly Code

(in mm)



CSTCE_G15L
8.00-13.99MHz

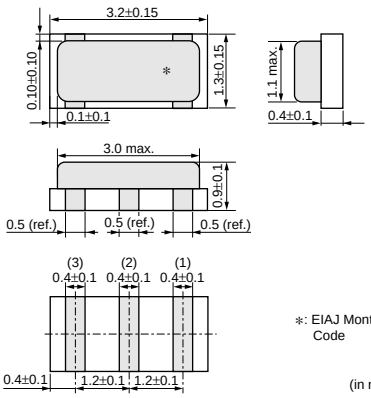


∗: EIAJ Monthly Code

(in mm)



CSTCE_V13L
14.00-20.00MHz

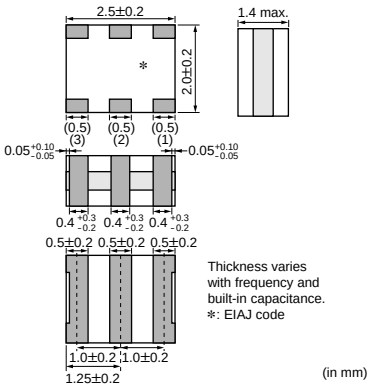


∗: EIAJ Monthly Code

(in mm)



CSTCW_X11
20.01-48.00MHz



Thickness varies with frequency and built-in capacitance.
∗: EIAJ code

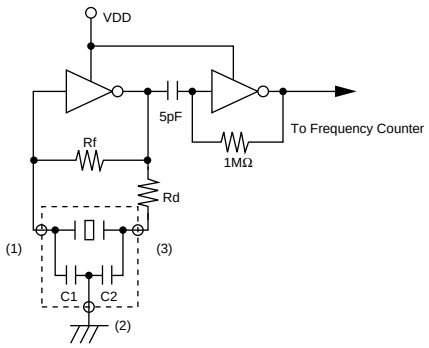
(in mm)

Part Number	Oscillating Frequency (MHz)	Initial Tolerance	Temperature Stability (%)	Temperature Range (°C)
CSTCR_G15L	4.00 to 7.99	±0.1%	±0.08	0 to 70
CSTCE_G15L	8.00 to 13.99	±0.1%	±0.08	0 to 70
CSTCE_V13L	14.00 to 20.00	±0.1%	±0.08	0 to 70
CSTCW_X11	20.01 to 48.00	±0.1%	±0.1	0 to 70

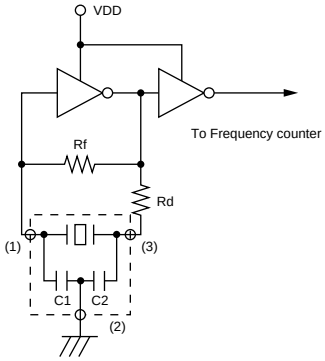
Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.

■ Oscillation Frequency Measuring Circuit

CSTCR_G15L/CSTCE_G15L/CSTCE_V13L



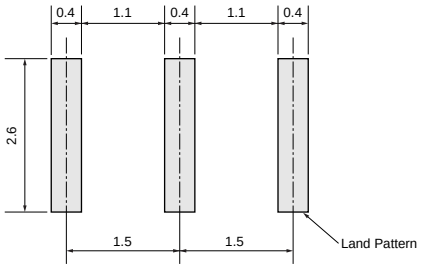
CSTCW_X11



3

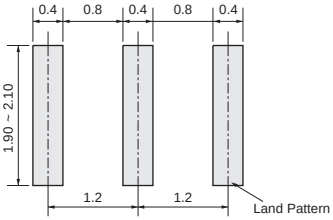
■ Standard Land Pattern Dimensions

CSTCR_G15L
(* This Land Pattern is not common to CSTCR_G.)



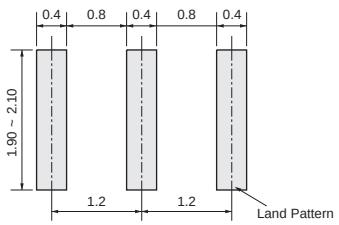
(in mm)

CSTCE_G15L



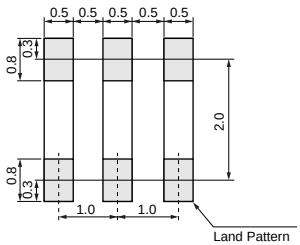
(in mm)

CSTCE_V13L
(* This Land Pattern is not common to CSTCE_V.)



(in mm)

CSTCW_X11

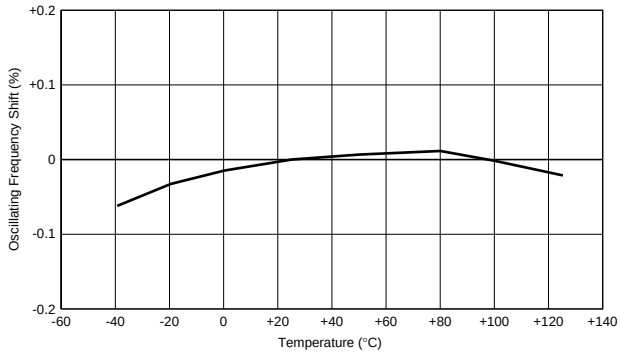


(in mm)

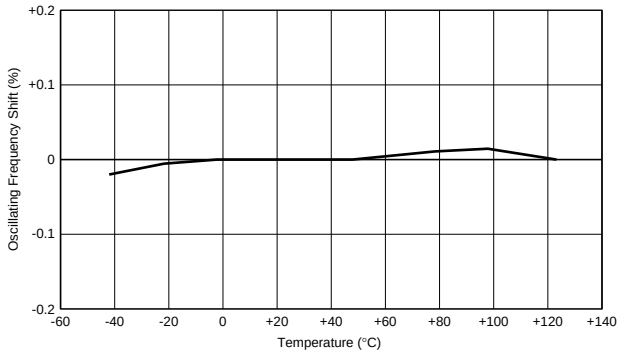
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■ Oscillation Frequency Temperature Stability

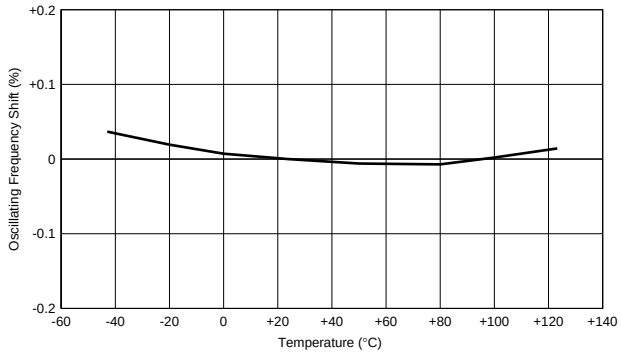
CSTCR_G15L



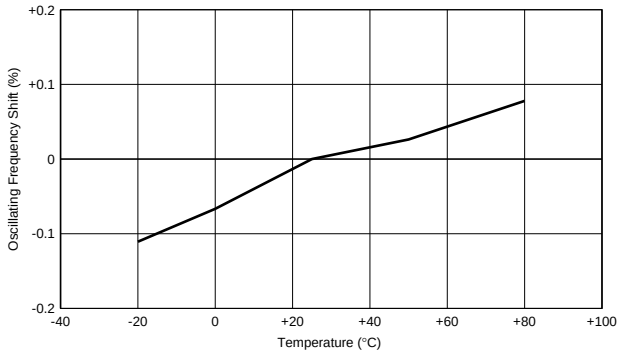
CSTCE_G15L



CSTCE_V13L



CSTCW_X11



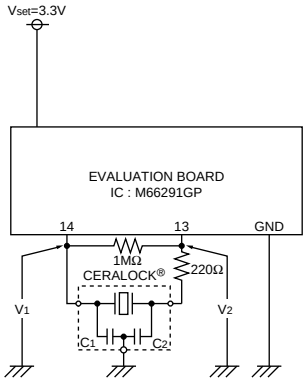
3

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Application Circuits Utilization

■ M66291GP (Renesas)

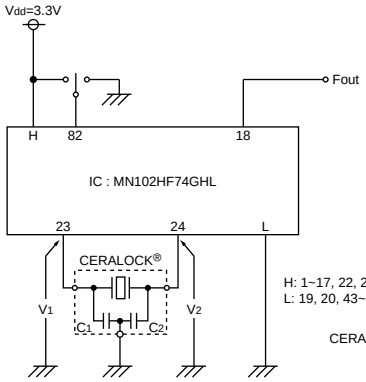
USB Transceiver



CERALOCK®: CSTCR6M00G15□□□-R0
C1=39pF (Typ.)
C2=39pF (Typ.)

■ MN102HF74GHL (Panasonic)

16-bit Microcontroller

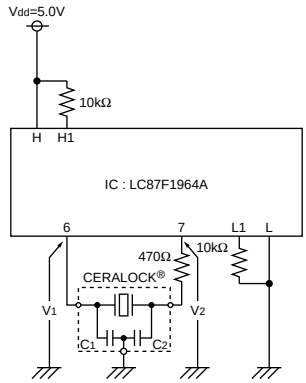


H: 1~17, 22, 25, 26~42, 54, 58~60, 66~81, 83~91
L: 19, 20, 43~53, 55~57, 61~65, 82, 92~100

CERALOCK®: CSTCE12M0G15L□□-R0
C1=33pF (Typ.)
C2=33pF (Typ.)

■ LC87F1964A (Sanyo)

8-bit Microcontroller

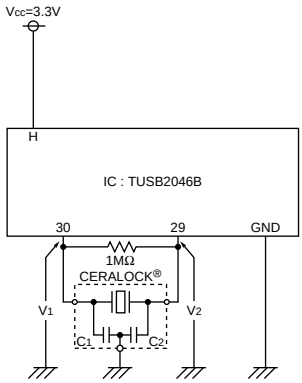


H: 8, 19, 39
L: 5, 20, 40
H1: 31, 33
L1: 29, 30, 32, 34~36

CERALOCK®: CSTCE12M0G15L□□-R0
C1=33pF (Typ.)
C2=33pF (Typ.)

■ TUSB2046B (Texas Instruments)

USB 4-port HUB

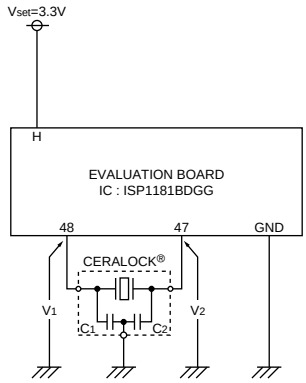


H: 3, 25
L: 7, 28

CERALOCK®: CSTCR6M00G15□□□-R0
C1=39pF (Typ.)
C2=39pF (Typ.)

■ ISP1181BDGG (Philips)

USB Controller



CERALOCK®: CSTCR6M00G15□□□-R0
C1=39pF (Typ.)
C2=39pF (Typ.)

3

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Ceramic Resonators (CERALOCK®)

MHz Chip Type -Standard Frequency Tolerance for General Usage-

Chip type CERALOCK(R) with built-in load capacitors provides an extremely small package.
MURATA's package technology expertise has enabled the development of the Chip CERALOCK(R) 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

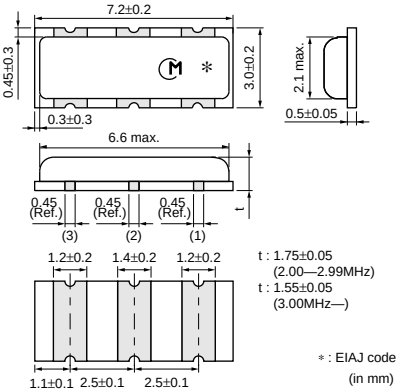
1. Oscillation circuits do not require external load capacitors.
2. Available in a wide frequency range.
3. Extremely small and have a low profile.
4. No adjustment is necessary for oscillation circuits.

■ Applications

1. Clock oscillators for microprocessors
2. Small electronic equipment such as handheld phone, digital video camcorder (DVC), digital still camera (DSC), portable audio player, etc.
3. Storage media and memory
   (HDD, Optical storage device, FDD, Flash memory card, etc.)
4. Office automation equipment
   (Mobile PC, Mouse, Keyboard, etc.)
5. Audio-visual applications
   (TV, DVD-HDD recorder, Audio equipment, Remote control, etc.)
6. Home appliances
   (Air conditioner, Microwave oven, Refrigerator, Washing machine, etc.)

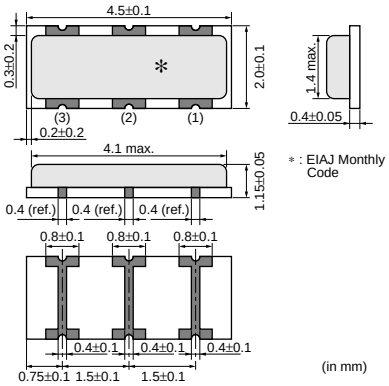


CSTCC_G
2.00-3.99MHz



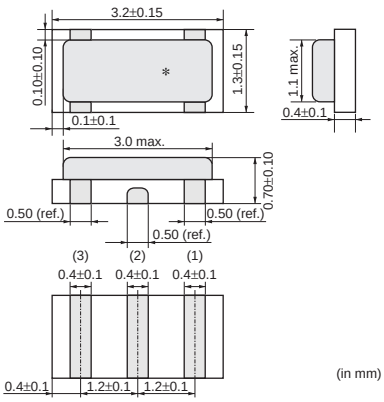


CSTCR_G
4.00-7.99MHz



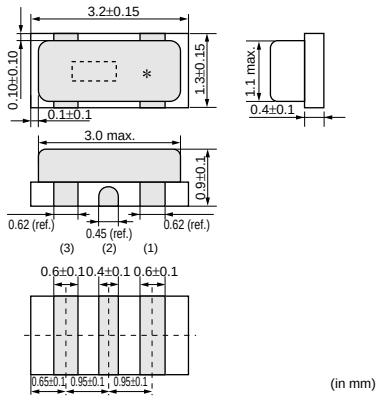


CSTCE_G
8.00-13.99MHz



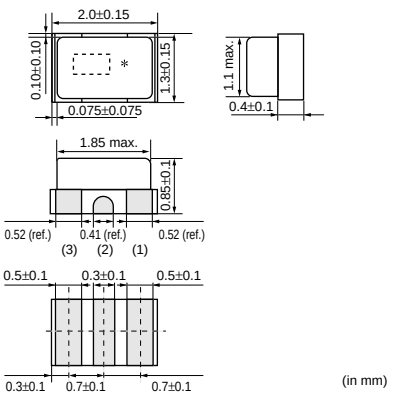


CSTCE_V
14.00-20.00MHz





CSTCG_V
20.00-33.86MHz
(Ultra Small)

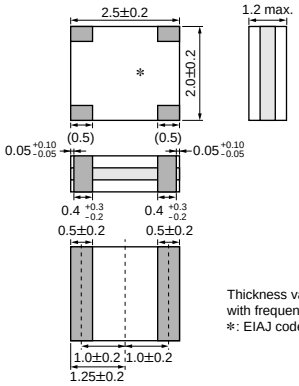


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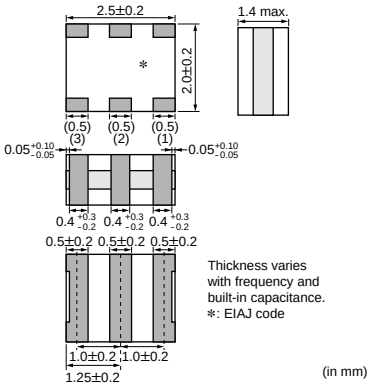
CSACW_X
20.01-70.00MHz



(in mm)



CSTCW_X
20.01-70.00MHz



(in mm)

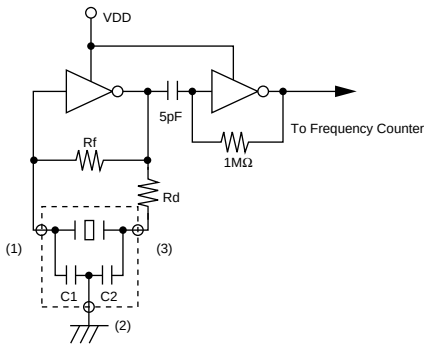
Part Number	Oscillating Frequency (MHz)	Initial Tolerance	Temperature Stability (%)	Temperature Range (°C)
CSTCC_G	2.00 to 3.99	±0.5%	±0.3 [±0.4%:Built-in Capacitance 47pF type within Freq.2.00 to 3.49MHz]	-20 to 80
CSTCR_G	4.00 to 7.99	±0.5%	±0.2	-20 to 80
CSTCE_G	8.00 to 13.99	±0.5%	±0.2	-20 to 80
CSTCE_G_Z	8.00 to 13.99	±0.5%	±0.2	-40 to 125
CSTCE_V	14.00 to 20.00	±0.5%	±0.3	-20 to 80
CSTCG_V	20.00 to 33.86	±0.5%	±0.3	-20 to 80
CSACW_X	20.01 to 70.00	±0.5%	±0.2	-20 to 80
CSTCW_X	20.01 to 70.00	±0.5%	±0.2	-20 to 80

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

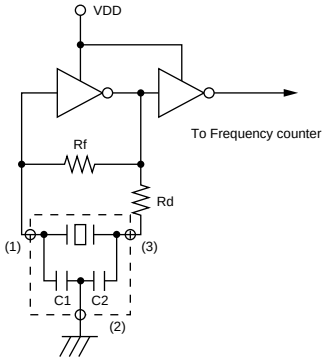
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■ Oscillation Frequency Measuring Circuit

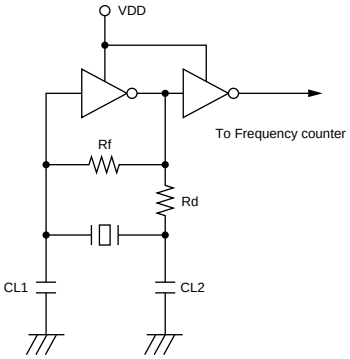
CSTCR_G/CSTCE_G/CSTCE_V/CSTCG_V



CSTCC_G/CSTCW_X



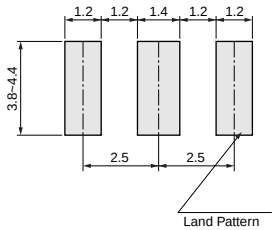
CSACW_X



4

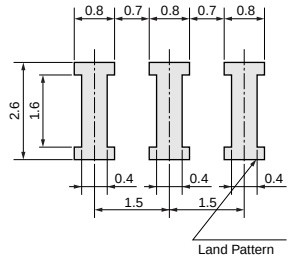
■ Standard Land Pattern Dimensions

CSTCC_G



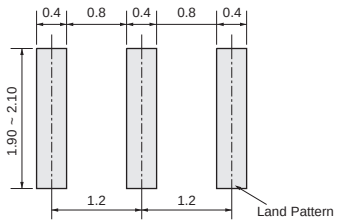
(in mm)

CSTCR_G
(* This Land Pattern is not common to CSTCR_G15C, CSTCR_G15L.)



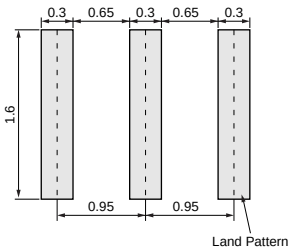
(in mm)

CSTCE_G



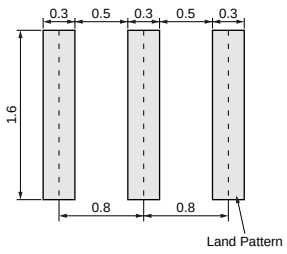
(in mm)

CSTCE_V
(* This Land Pattern is not common to CSTCE_V13C, CSTCE_V_C, CSTCE_V13L.)



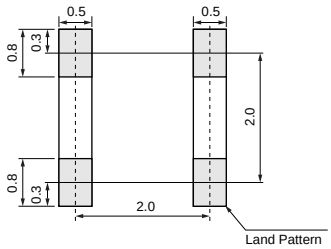
(in mm)

CSTCG_V



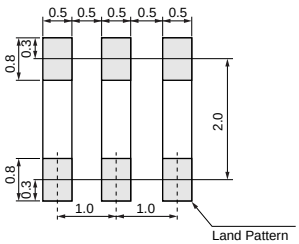
(in mm)

CSACW_X



(in mm)

CSTCW_X



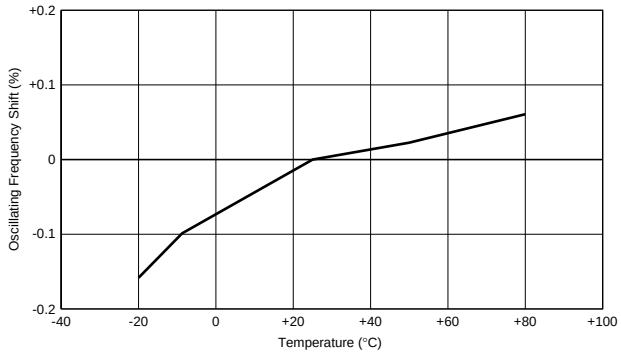
(in mm)

4

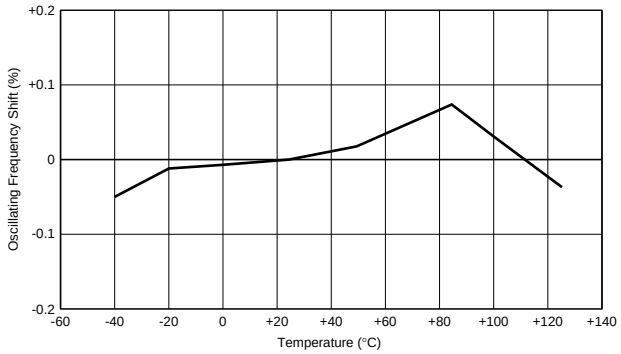
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■ Oscillation Frequency Temperature Stability

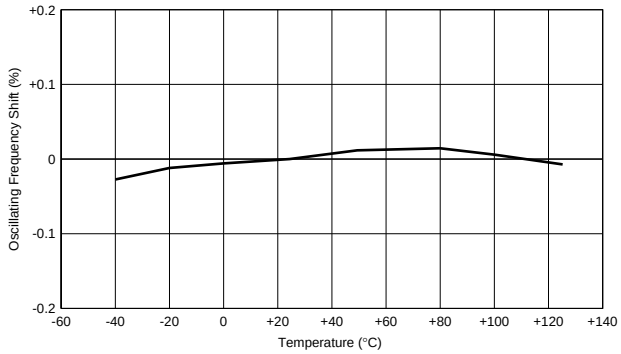
CSTCC_G



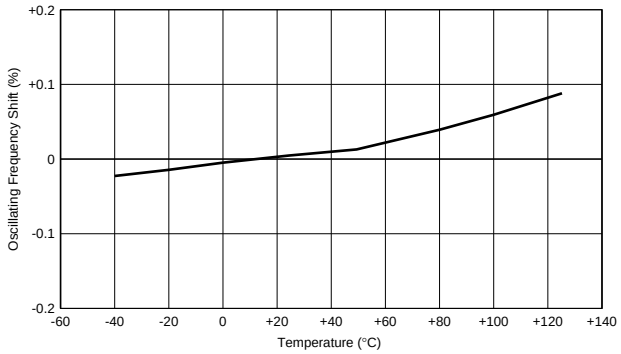
CSTCR_G



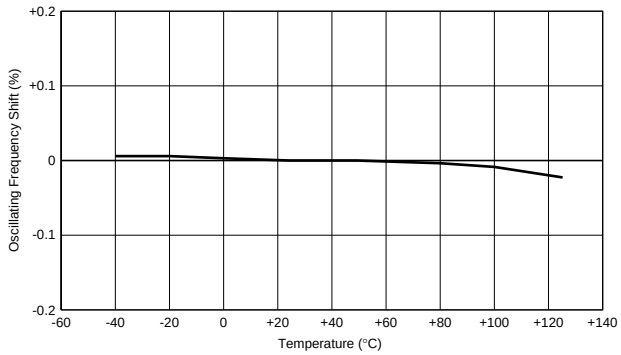
CSTCE_G



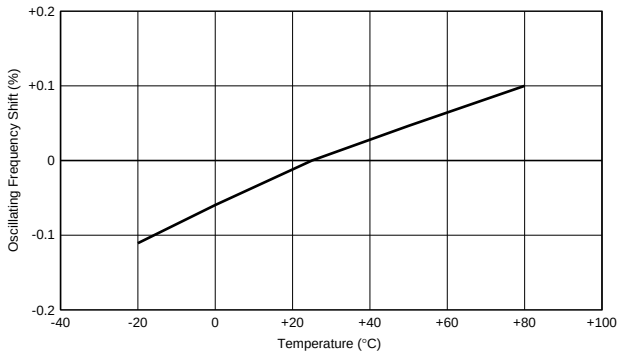
CSTCE_V



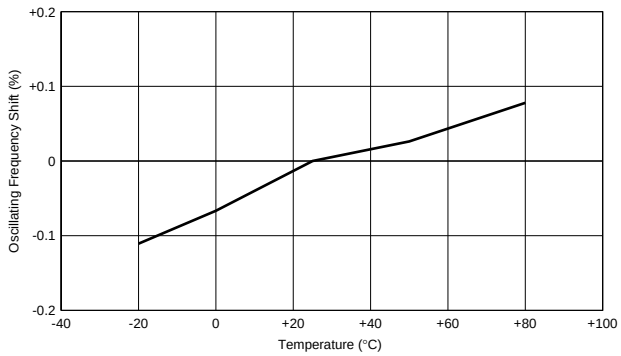
CSTCG_V



CSACW_X



CSTCW_X

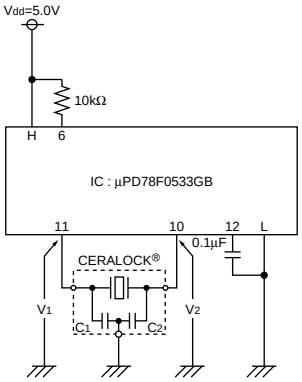


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Application Circuits Utilization

■ µPD78F0533GB (Renesas)

8-bit Microcomputer

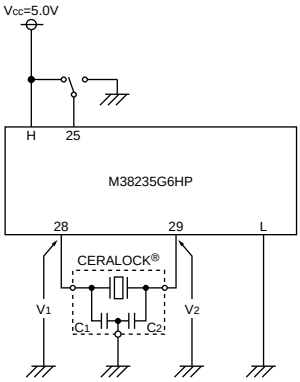


H: 15, 16, 47
L: 9, 13, 14, 48

CERALOCK®: CSTCR4M00G55-R0
C1=39pF (Typ.)
C2=39pF (Typ.)

■ M38235G6HP (Renesas)

8-bit Microcomputer

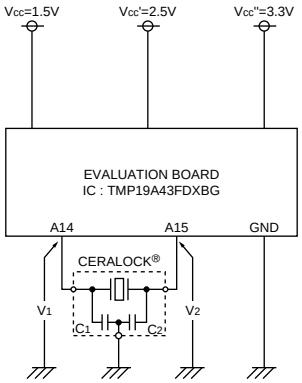


H: 71
L: 30, 73

CERALOCK®: CSTLS8M00G53-B0
C1=15pF (Typ.)
C2=15pF (Typ.)

■ TMP19A43FDXBG (Toshiba)

32-bit Microcomputer

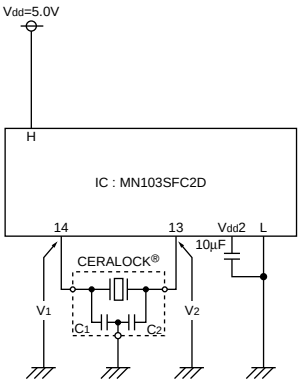


Xin: A14
Xout: A15

CERALOCK®: CSTCE10M0G52-R0
C1=10pF (Typ.)
C2=10pF (Typ.)

■ MN103SFC2D (Panasonic)

32-bit Microcomputer

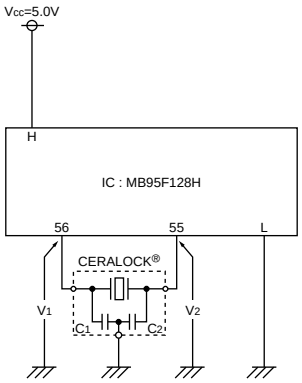


H: 9, 17, 34
L: 7, 15, 36
Vdd2: 16, 38

CERALOCK®: CSTCR5M00G55Z-R0
C1=39pF (Typ.)
C2=39pF (Typ.)

■ MB95F128H (Fujitsu)

8-bit Microcomputer

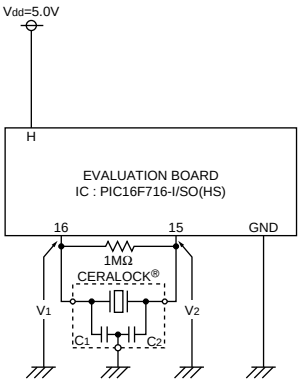


H: 3, 28, 51, 79
L: 4, 29, 54, 57

CERALOCK®: CSTCE8M00G52-R0
C1=10pF (Typ.)
C2=10pF (Typ.)

■ PIC16F716-I/SO (Microchip)

8-bit Microcomputer



CERALOCK®: CSTCE12M0G52-R0
C1=10pF (Typ.)
C2=10pF (Typ.)

Continued on the following page.

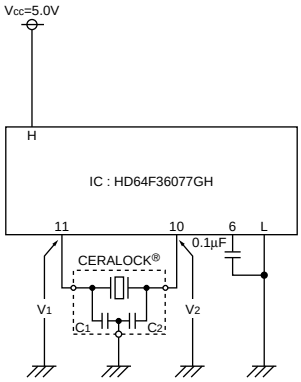
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Application Circuits Utilization

Continued from the preceding page.

■ HD64F36077GH (Renesas)

16-bit Microcomputer

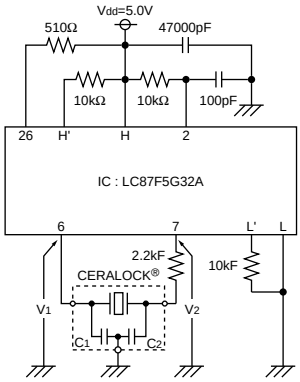


H: 3, 7, 12
L: 8, 9

CERALOCK®: CSTCE8M00G52-R0
C1=10pF (Typ.)
C2=10pF (Typ.)

■ LC87F5G32A (Sanyo)

8-bit Microcomputer

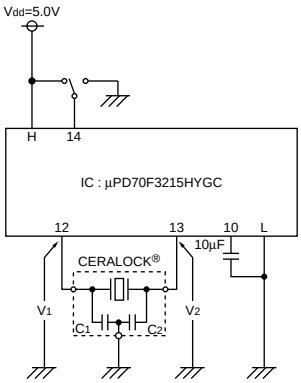


H: 8, 19, 39
L: 5, 20, 40
H': 29, 31, 35
L': 30, 32~34, 36

CERALOCK®: CSTLS5M00G53-B0
C1=15pF (Typ.)
C2=15pF (Typ.)

■ µPD70F3215HYGC (Renesas)

32-bit Microcomputer

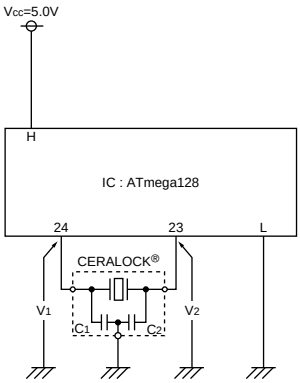


H: 1, 5, 9, 34, 70
L: 2, 8, 11, 33, 69

CERALOCK®: CSTCR5M00G55-R0
C1=39pF (Typ.)
C2=39pF (Typ.)

■ ATmega128 (Atmel)

8-bit Microcomputer

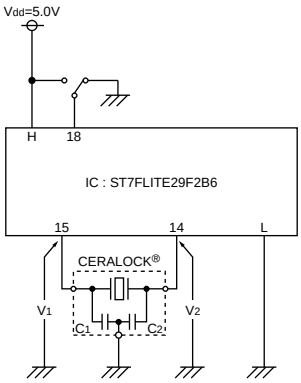


H: 21, 52, 64
L: 22, 53, 63

CERALOCK®: CSTCE8M00G52-R0
C1=10pF (Typ.)
C2=10pF (Typ.)

■ ST7FLITE29F2B6 (ST Microelectronics)

8-bit Microcomputer

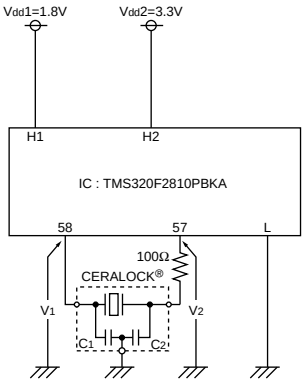


H: 17
L: 16

CERALOCK®: CSTCE16M0V53-R0
C1=15pF (Typ.)
C2=15pF (Typ.)

■ TMS320F2810PBKA (Texas Instruments)

32-bit Microcomputer



H1: 20, 29, 42, 56, 63, 74, 82, 94, 99, 100, 102, 110, 114
H2: 1, 13, 14, 25, 49, 52, 83, 104, 118
L: 12, 15, 17, 26, 30, 39, 53, 59, 62, 73, 88, 95, 103, 109, 115, 117, 128

CERALOCK®: CSTCE15M0V53-R0
C1=15pF (Typ.)
C2=15pF (Typ.)

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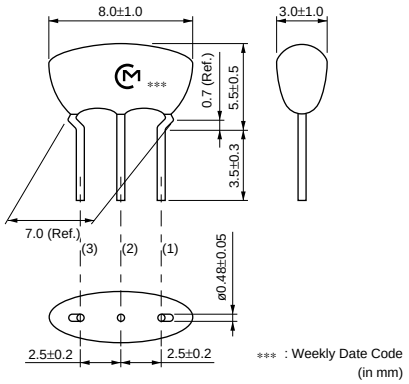
Ceramic Resonators (CERALOCK®)

MHz Lead Type -Standard Frequency Tolerance for General Usage-

MURATA's ceramic resonator, CERALOCK(R) with built-in load capacitors, 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.

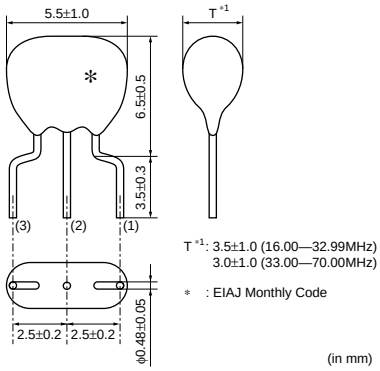


CSTLS_G
3.40-10.00MHz





CSTLS_X
16.00-70.00MHz



■ Features

1. Oscillation circuits do not require external load capacitors.
   There is some variation in built-in capacitance values applicable to various IC.
2. Stable over a wide temperature range.
3. Compact, lightweight and exhibit superior shock resistance performance.
4. Enable the design of oscillator circuits requiring no adjustment.
5. Cost-effective and reliable availability

■ Applications

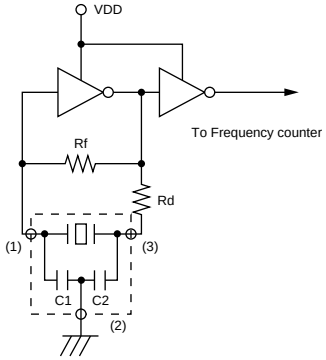
1. DTMF generators
2. Clock oscillators for microcomputers
3. Remote control units
4. Automated office equipment

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

CSTLS_G/CSTLS_X

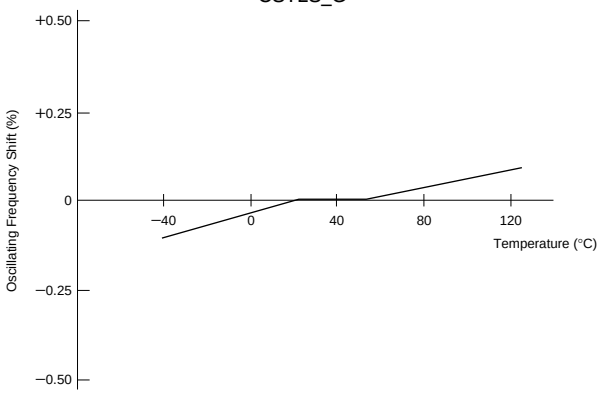


5

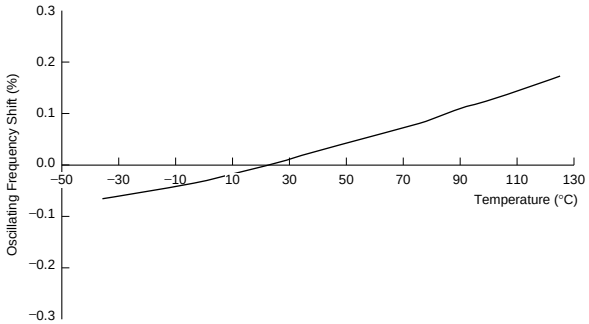
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■ Oscillation Frequency Temperature Stability

CSTLS_G



CSTLS_X



5

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Ceramic Resonators (CERALOCK®)

kHz Chip Type -Standard Frequency Tolerance for General Usage-

MURATA's original package technologies have enabled the development of the kHz band CERALOCK(R).
The series is perfect in miniature remote control units and AV modules.
CERALOCK(R) can be reflow soldered and mounted by automatic placement equipment.

■ Features

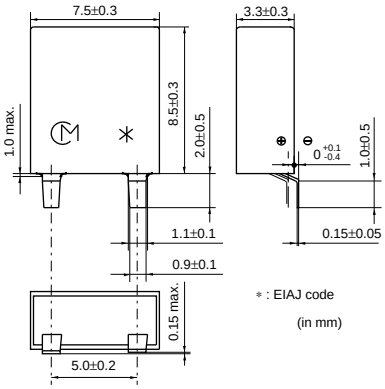
1. Withstands reflow soldering.
2. Compatible with automatic placement equipment.
3. No adjustment is necessary for oscillation circuits.

■ Applications

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

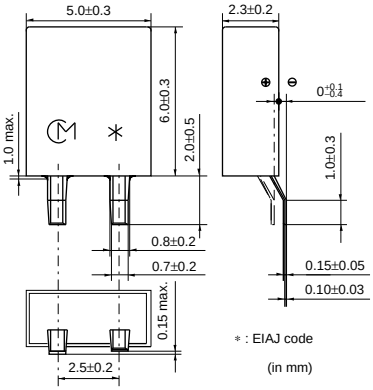


CSBFB_J
430-519kHz





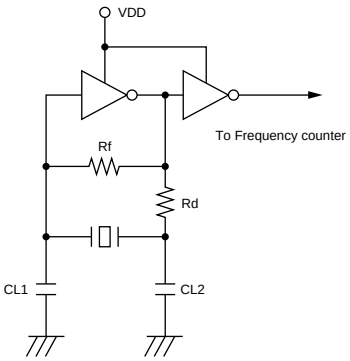
CSBFB_J
700-1250kHz



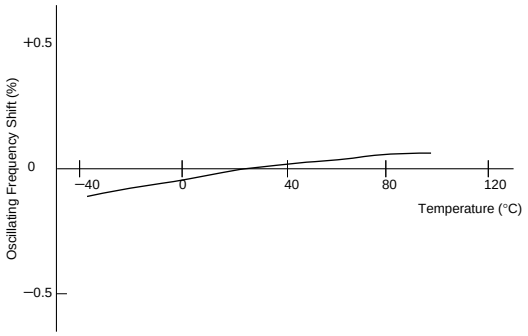
Part Number	Oscillating Frequency (kHz)	Initial Tolerance	Temperature Stability (%)	Temperature Range (°C)
CSBFB_J	430 to 519, 700 to 1250	±0.5%	±0.3	-20 to 80

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

■ Oscillation Frequency Measuring Circuit



■ Oscillation Frequency Temperature Stability



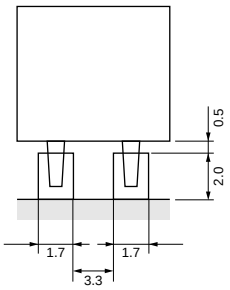
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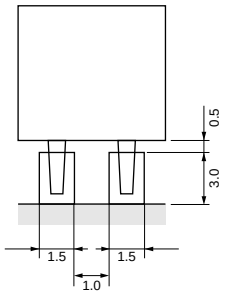
■ Standard Land Pattern Dimensions

CSBFB_J (430-519kHz)



(in mm)

CSBFB_J (700-1250kHz)



(in mm)

6

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Ceramic Resonators (CERALOCK®)

kHz Lead Type -Standard Frequency Tolerance for General Usage-

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

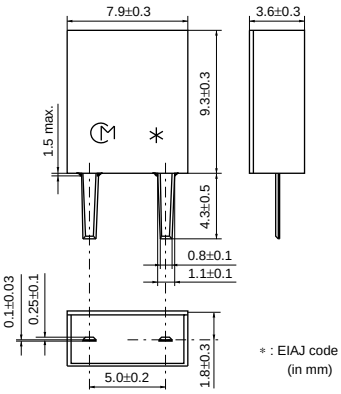
1. Stable over a wide temperature range and with respect to long-term aging.
2. Fixed, tuned, solid-state devices
3. Miniature and lightweight
4. Exhibit excellent shock resistance performance.
5. Oscillating circuits requiring no adjustment can be designed by utilizing these resonators in conjunction with transistors or appropriate ICs.

■ Applications

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

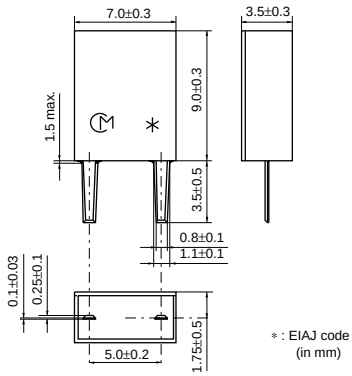


CSBLA_E
375-429kHz



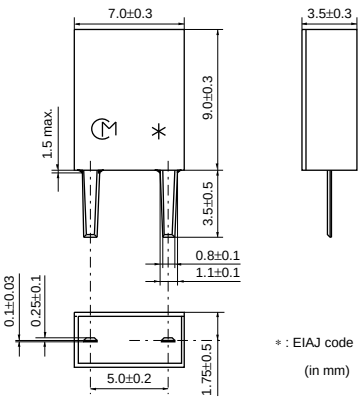


CSBLA_E
430-509kHz



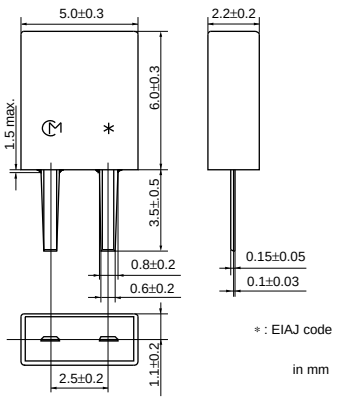


CSBLA_E
510-699kHz





CSBLA_J
700-1250kHz

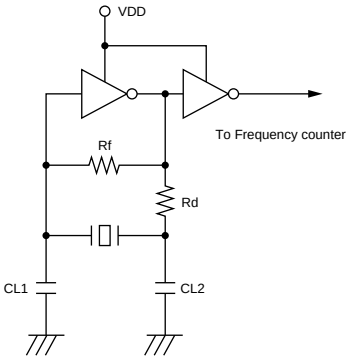


Part Number	Oscillating Frequency (kHz)	Initial Tolerance	Temperature Stability (%)	Temperature Range (°C)
CSBLA_E	375 to 699	-	±0.3	-20 to 80
CSBLA_J	700 to 1250	±0.5%	±0.3	-20 to 80

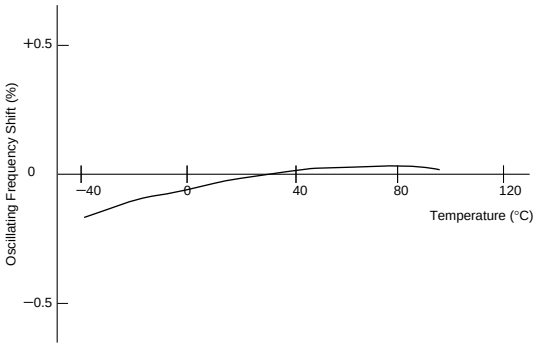
Irregular or stop oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.
The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

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■ Oscillation Frequency Measuring Circuit



■ Oscillation Frequency Temperature Stability



Notice for General Usage -MHz Chip Type-

■ Soldering and Mounting (CSTCC Series)

1. Soldering

(1) Re-flow soldering

Please mount component on a circuit board by re-flow soldering. Flow soldering is not acceptable.

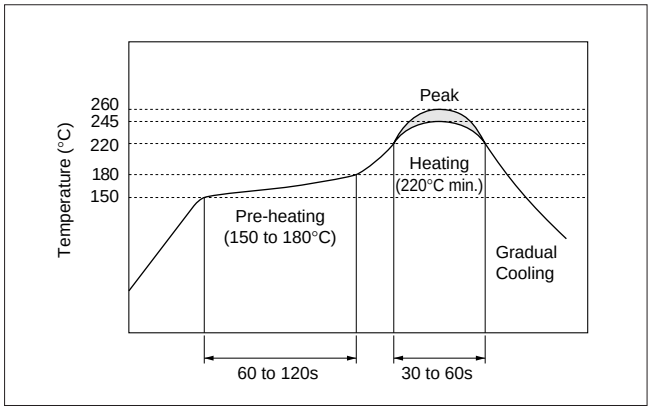
Recommendable Flux and Solder

Flux	Please use rosin based flux, but do not use water soluble flux.
Solder	Please use solder (Sn-3.0Ag-0.5Cu) under the following condition. Standard thickness of soldering paste: 0.10 to 0.15mm

Recommendable Soldering Profile

Pre-heating	150 to 180°C	60 to 120s
Heating	220°C min.	30 to 60s
Peak Temperature	upper limit: 260°C lower limit: 245°C	1s max. 5s max.

Temperature shall be measured on the surface of component.



(2) Soldering with Iron

Be compelled to mount component by using soldering iron, please do not directly touch the component with soldering iron. The terminals of component or electrical characteristics may be damaged if excess thermal stress is applied.

Recommendable Soldering with Iron

Heating of the soldering iron	350°C max.
Watt	30W max.
Shape of the soldering iron	ø3mm max.
Solering Time	5s max. at one terminal
Solder	Sn-3.0Ag-0.5Cu

(3) Solder Volume

Please make the solder volume less than the height of the substrate. When exceeding the substrate, the damage of adhesive for sealing between the metal cap and the substrate may occur.

(4) etc.

Do not reuse removed component from a circuit board after soldering.

(5) Condition for Placement Machines

The component is recommended with placement machines with employ optical placement capabilities. The component might be resulted in damage by excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines which utilize mechanical positioning. Please contact Murata for details beforehand.

Continued on the following page.

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Notice for General Usage -MHz Chip Type-

Continued from the preceding page.

2. Wash

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

Series	Wash
CSTCC (2.00 - 3.49MHz)	Not Available
CSTCC (3.50 - 3.99MHz)	Available

(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)

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

(3) Conditions

(a) Ultrasonic Wash

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

(b) Immersion Wash

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

(c) Shower or Rinse Wash

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

(4) Drying

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

(5) Others

(a) Total washing time should be within 10 minutes.

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

3. Coating

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.

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Notice for General Usage -MHz Chip Type-

■ Soldering and Mounting (CSTCR/CSTCE_V/CSTCG/CSTCE_G Series)

1. Soldering

(1) Re-flow soldering

Please mount component on a circuit board by re-flow soldering. Flow soldering is not acceptable.

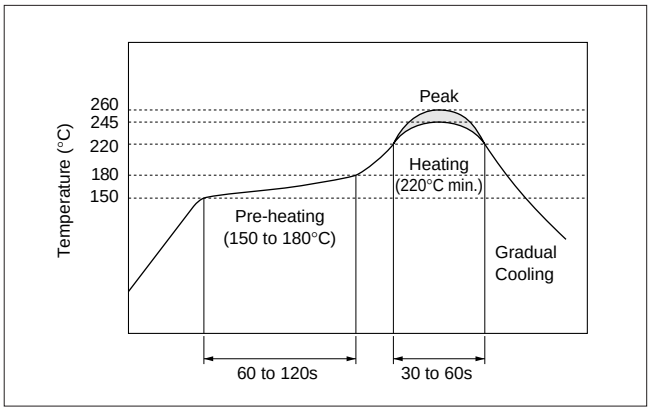
Recommendable Flux and Solder

Flux	Please use rosin based flux, but do not use water soluble flux.
Solder	Please use solder (Sn-3.0Ag-0.5Cu) under the following condition. Standard thickness of soldering paste: 0.10 to 0.15mm

Recommendable Soldering Profile

Pre-heating	150 to 180°C	60 to 120s
Heating	220°C min.	30 to 60s
Peak Temperature	upper limit: 260°C	1s max.
	lower limit: 245°C	5s max.

Temperature shall be measured on the surface of component.



(2) Soldering with Iron

Be compelled to mount component by using soldering iron, please do not directly touch the component with soldering iron. The terminals of component or electrical characteristics may be damaged if excess thermal stress is applied.

Recommendable Soldering with Iron

Heating of the soldering iron	350°C max.
Watt	30W max.
Shape of the soldering iron	ø3mm max.
Solering Time	5s max. at one terminal
Solder	Sn-3.0Ag-0.5Cu

(3) Solder Volume

Please make the solder volume less than the height of the substrate. When exceeding the substrate, the damage of adhesive for sealing between the metal cap and the substrate may occur.

(4) etc.

Do not reuse removed component from a circuit board after soldering.

(5) Condition for Placement Machines

The component is recommended with placement machines with employ optical placement capabilities. The component might be resulted in damage by excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines which utilize mechanical positioning. Please contact Murata for details beforehand.

2. Washing / Coating

Conformal coating or washing to the component is not acceptable, because it is not hermetically sealed.
Please contact us in case you need washable component.

Continued on the following page.

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Notice for General Usage -MHz Chip Type-

Continued from the preceding page.

■ Soldering and Mounting (CSACW/CSTCW Series)

1. Soldering

(1) Re-flow soldering

Please mount component on a circuit board by re-flow soldering. Flow soldering is not acceptable.

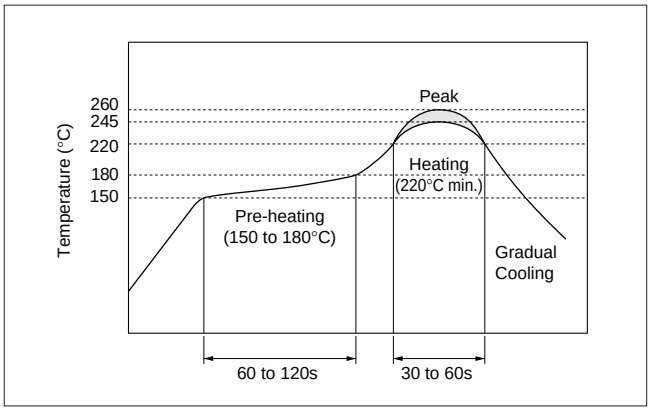
Recommendable Flux and Solder

Flux	Please use rosin based flux, but do not use water soluble flux.
Solder	Please use solder (Sn-3.0Ag-0.5Cu) under the following condition. Standard thickness of soldering paste: 0.10 to 0.15mm

Recommendable Soldering Profile

Pre-heating	150 to 180°C	60 to 120s
Heating	220°C min.	30 to 60s
Peak Temperature	upper limit: 260°C	1s max.
	lower limit: 245°C	5s max.

Temperature shall be measured on the surface of component.



(2) Soldering with Iron

Be compelled to mount component by using soldering iron, please do not directly touch the component with soldering iron. The terminals of component or electrical characteristics may be damaged if excess thermal stress is applied.

Recommendable Soldering with Iron

Heating of the soldering iron	350°C max.
Watt	30W max.
Shape of the soldering iron	ø3mm max.
Solering Time	5s max. at one terminal
Solder	Sn-3.0Ag-0.5Cu

(3) etc.

Do not reuse removed component from a circuit board after soldering.

(4) Condition for Placement Machines

The component is recommended with placement machines with employ optical placement capabilities. The component might be resulted in damage by excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines which utilize mechanical positioning. Please contact Murata for details beforehand.

2. Washing / Coating

Conformal coating or washing to the component is not acceptable, because it is not hermetically sealed.
Please contact us in case you need washable component.

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Notice for General Usage -MHz Chip Type-

■ Storage and Operating Conditions

1. Product Storage Condition
   Please store the products in a room where the temperature/humidity is stable, and avoid such places where there are large temperature changes. Please store the products under the following conditions:
   Temperature: -10 to + 40 degrees C
   Humidity: 15 to 85% R.H.
2. Expiration Date on Storage
   Expiration date (Shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability and/or rusty.
   Please confirm solderability and characteristics for the products regularly.
3. Notice on Product Storage
   (1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because the characteristics may be reduced in quality, and/or be degraded in the solderability due to the storage in a chemical atmosphere.
   (2) Please do not put the products directly on the floor without anything under them to avoid damp and/or dusty places.
   (3) Please do not store the products in places such as: in a damp heated place, in a place where direct sunlight comes in, in a place applying vibrations.
   (4) Please use the products immediately after the package is opened, because the characteristics may be reduced in quality, and/or be degraded in the solderability due to storage under the poor conditions.
   (5) Please do not drop the products to avoid cracking of ceramic elements.
4. Others
   Conformal coating or washing of the component is not acceptable because it is not hermetically sealed.
   Please be sure to consult with our sales representatives or engineers whenever and prior to using the products.

■ Rating

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

■ Handling

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

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Notice for General Usage -MHz Lead Type-

■ Soldering and Mounting

The component cannot withstand washing.
Please do not apply excessive mechanical stress to the component and lead terminals during soldering.

■ Storage and Operating Conditions

1. Product Storage Condition
   Please store the products in a room where the temperature/humidity is stable, and avoid such places where there are large temperature changes. Please store the products under the following conditions:
   Temperature: -10 to + 40 degrees C
   Humidity: 15 to 85% R.H.
2. Expiration Date on Storage
   Expiration date (Shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability and/or rusty.
   Please confirm solderability and characteristics for the products regularly.
3. Notice on Product Storage
   (1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because the characteristics may be reduced in quality, and/or be degraded in the solderability due to the storage in a chemical atmosphere.
   (2) Please do not put the products directly on the floor without anything under them to avoid damp and/or dusty places.
   (3) Please do not store the products in places such as: in a damp heated place, in a place where direct sunlight comes in, in a place applying vibrations.
   (4) Please use the products immediately after the package is opened, because the characteristics may be reduced in quality, and/or be degraded in the solderability due to storage under the poor conditions.
   (5) Please do not drop the products to avoid cracking of ceramic elements.
4. Others
   Conformal coating or washing of the component is not acceptable because it is not hermetically sealed.
   Please be sure to consult with our sales representatives or engineers whenever and prior to using the products.

■ Rating

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

■ Handling

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

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Notice for General Usage -kHz Chip Type-

■ Soldering and Mounting

CSBFB_J (430-519kHz/700-1250kHz)

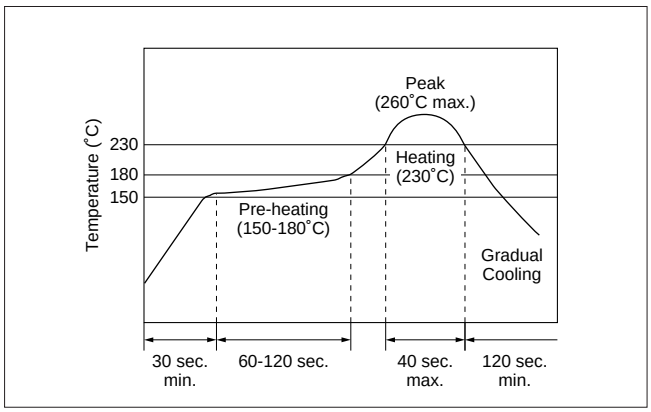
1. Soldering Conditions

(1) Reflow

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

(a) Pre-heating conditions should be +150 to +180°C for 60 to 120 seconds. Ascending time up +150°C should be longer than 30 seconds.

(b) Heating conditions should be within 40 seconds at +230°C min., but peak temperature should be lower than +260°C.



(2) Soldering Iron

Components shall be measured after soldering on PCB at +350±5°C for 3.0±0.5 seconds and leaving in natural condition for 24 hours. The soldering iron shall not touch the components while soldering.

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)

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

(3) Conditions

(a) Ultrasonic Wash

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

(b) Immersion Wash

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

(c) 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

(a) Total washing time should be within 10 minutes.

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

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

3. Notice for Mounting

(a) Please ensure the component is thoroughly evaluated in your application circuit.

(b) Please do not apply excessive mechanical stress to the component and lead terminals during soldering.

(c) 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.

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Notice for General Usage -kHz Chip Type-

■ Storage and Operating Conditions

CSBFB_J

1. Product Storage Condition
   Please store the products in a room where the temperature/humidity is stable, and avoid such places where there are large temperature changes. Please store the products under the following conditions:
   Temperature: -10 to + 40 degrees C
   Humidity: 15 to 85% R.H.
2. Expiration Date on Storage
   Expiration date (Shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability and/or rusty.
   Please confirm solderability and characteristics for the products regularly.
3. Notice on Product Storage
   (1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because the characteristics may be reduced in quality, and/or be degraded in the solderability due to the storage in a chemical atmosphere.
   (2) Please do not put the products directly on the floor without anything under them to avoid damp and/or dusty places.
   (3) Please do not store the products in places such as: in a damp heated place, in a place where direct sunlight comes in, in a place applying vibrations.
   (4) Please use the products immediately after the package is opened, because the characteristics may be reduced in quality, and/or be degraded in the solderability due to storage under the poor conditions.
   (5) Please do not drop the products to avoid cracking of ceramic elements.
4. Others
   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 be sure to consult with our sales representatives or engineers whenever and prior to using the products.

■ Rating

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

■ Handling

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

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Notice for General Usage -kHz Lead Type-

■ Soldering and Mounting

CSBLA_E

The component cannot withstand washing.
Please do not apply excessive mechanical stress to the component and lead terminals during soldering.

■ 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 degree C. immerses into cleaning solvent at +60 degree C., then dT=30 degree C.

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

(4) Drying
5 minutes max. by air blow at +80 degree C. max.

(5) Others
1. Total washing time should be within 10 minutes.
2. Please ensure the component is thoroughly evaluated in your application circuit.
3. The component may be damaged if it is washed with alkali cleaning solvent.
4. Please do not apply excessive mechanical stress to the component and lead terminals during soldering.
5. Ultrasonic cleaning of the component is acceptable. However, the size of bath, size and thickness of PBC should be evaluated to confirm stable electrical characteristics are maintained.

■ Storage and Operating Conditions

CSBLA_E

1. Product Storage Condition
Please store the products in a room where the temperature/humidity is stable, and avoid such places where there are large temperature changes. Please store the products under the following conditions:
Temperature: -10 to + 40 degrees C
Humidity: 15 to 85% R.H.

2. Expiration Date on Storage
Expiration date (Shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability and/or rusty.
Please confirm solderability and characteristics for the products regularly.

3. Notice on Product Storage
(1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because the characteristics may be reduced in quality, and/or be degraded in the solderability due to the storage in a chemical atmosphere.
(2) Please do not put the products directly on the floor without anything under them to avoid damp and/or dusty places.
(3) Please do not store the products in places such as: in a damp heated place, in a place where direct sunlight comes in, in a place applying vibrations.
(4) Please use the products immediately after the package is opened, because the characteristics may be reduced in quality, and/or be degraded in the solderability due to storage under the poor conditions.
(5) Please do not drop the products to avoid cracking of ceramic elements.

4. Others
Conformal coating or washing of the component is not acceptable because it is not hermetically sealed.
Please be sure to consult with our sales representatives or engineers whenever and prior to using the products.

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Notice for General Usage -kHz Lead Type-

■ Storage and Operating Conditions

CSBLA_J

1. Product Storage Condition
   Please store the products in a room where the temperature/humidity is stable, and avoid such places where there are large temperature changes.
   Please store the products under the following conditions:
   Temperature: -10 to + 40 degrees C
   Humidity: 15 to 85% R.H.
2. Expiration Date on Storage
   Expiration date (Shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability and/or rusty.
   Please confirm solderability and characteristics for the products regularly.
3. Notice on Product Storage
   (1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because the characteristics may be reduced in quality, and/or be degraded in the solderability due to the storage in a chemical atmosphere.
   (2) Please do not put the products directly on the floor without anything under them to avoid damp and/or dusty places.
   (3) Please do not store the products in places such as: in a damp heated place, in a place where direct sunlight comes in, in a place applying vibrations.
   (4) Please use the products immediately after the package is opened, because the characteristics may be reduced in quality, and/or be degraded in the solderability due to storage under the poor conditions.
   (5) Please do not drop the products to avoid cracking of ceramic elements.
4. Others
   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 be sure to consult with our sales representatives or engineers whenever and prior to using the products.

■ Rating

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

■ Handling

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

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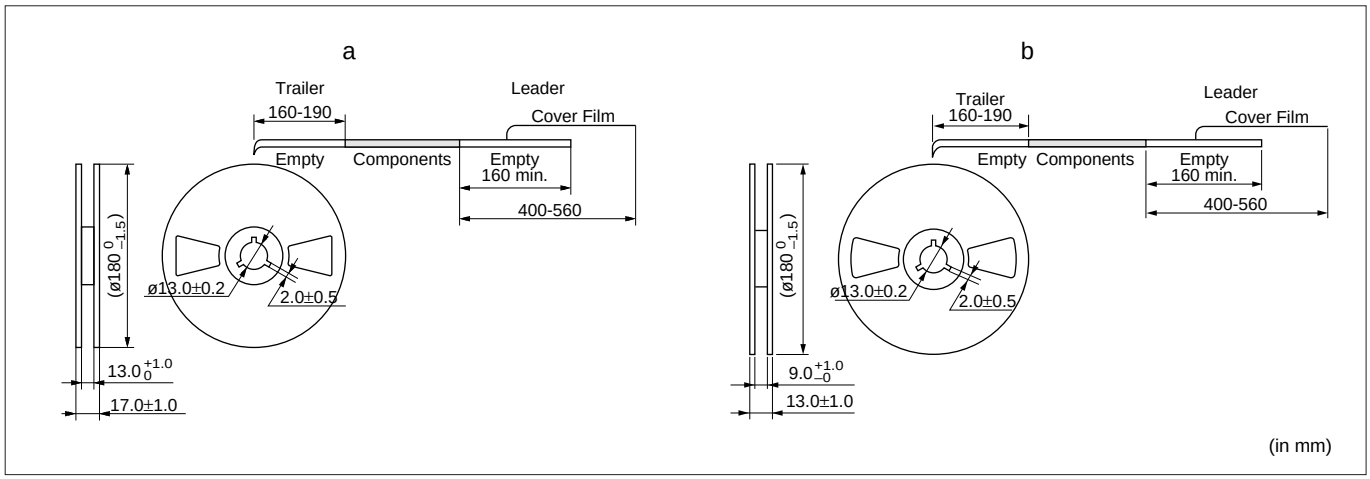
Packaging for General Usage -MHz Chip Type-

■ Minimum Quantity

Part Number	Plastic Tape ø180mm	Plastic Tape ø330mm	Bulk	Dimensions
CSTCC_G	2,000	6,000	500	a
CSTCR_G	3,000	9,000	500	a
CSTCR_G15L	3,000	9,000	500	a
CSTCE_G	3,000	9,000	500	b
CSTCE_G15L	3,000	9,000	500	b
CSTCE_V	3,000	9,000	500	b
CSTCE_V13L	3,000	9,000	500	b
CSTCG_V	3,000	9,000	500	b
CSTCW_X	3,000	9,000	500	b
CSTCW_X11	3,000	9,000	500	b
CSACW_X	3,000	9,000	500	b

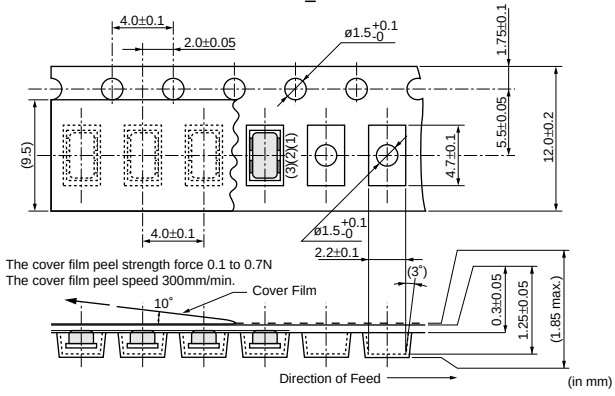
The order quantity should be an integral multiple of the "Minimum Quantity" shown above. (pcs.)

■ Dimensions of Reel

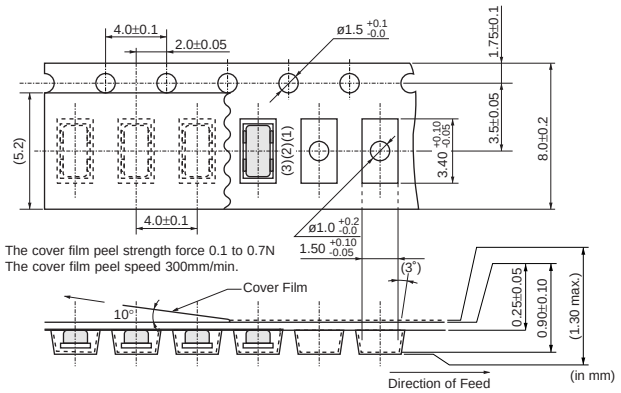


■ Dimensions of Taping

CSTCR_G15L



CSTCE_G15L



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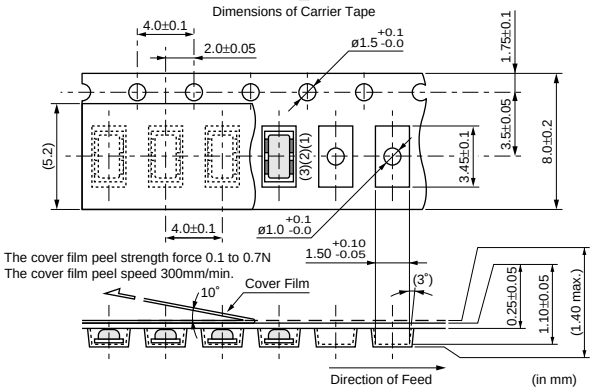
Packaging for General Usage -MHz Chip Type-

Continued from the preceding page.

■ Dimensions of Taping

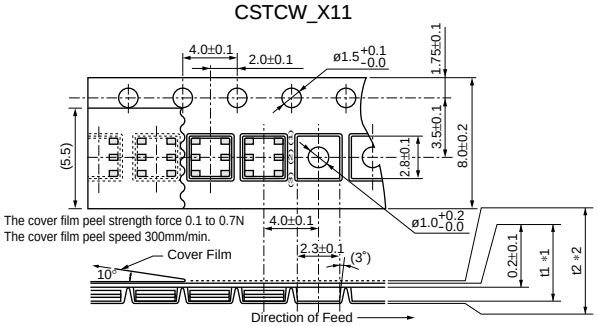
CSTCE_V13L

Dimensions of Carrier Tape



(in mm)

CSTCW_X11

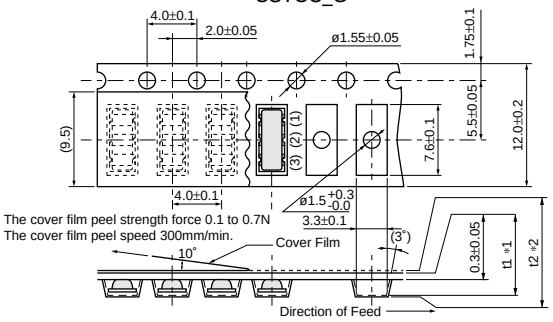


*1, *2: Dimensions vary with product thickness of CERALOCK®.

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 max.	1.9 max.	1.7 max.

(in mm)

CSTCC_G

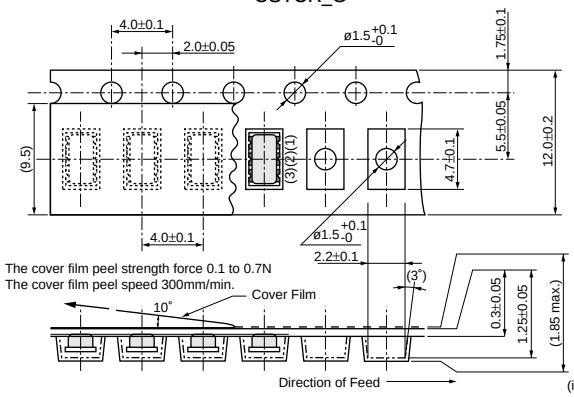


*1, *2: Dimensions vary with frequency range of CERALOCK®.

Frequency Range		2.00–2.99MHz	3.00–3.99MHz
t1	*1	1.85±0.05	1.65±0.05
t2	*2	2.45 max.	2.25 max.

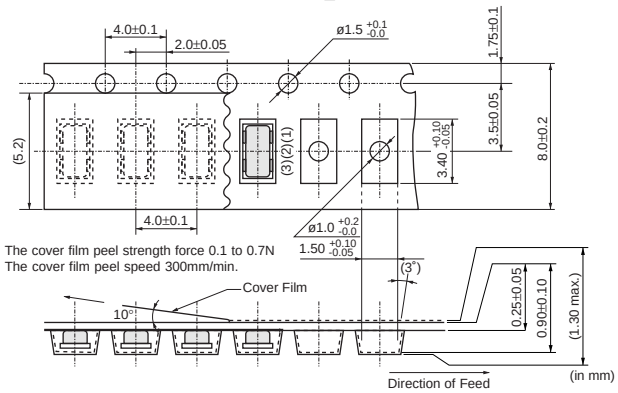
(in mm)

CSTCR_G



(in mm)

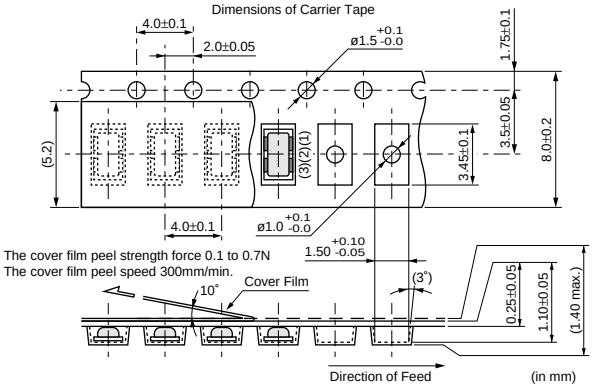
CSTCE_G



(in mm)

CSTCE_V

Dimensions of Carrier Tape



(in mm)

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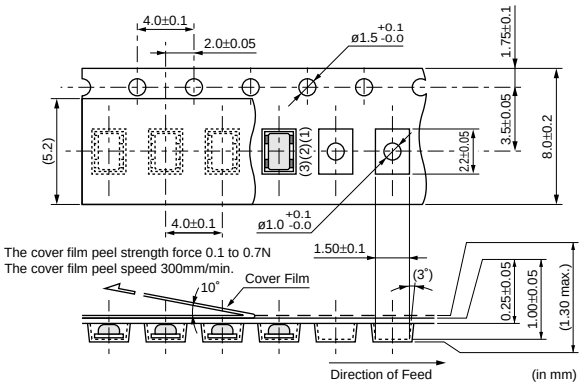
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Packaging for General Usage -MHz Chip Type-

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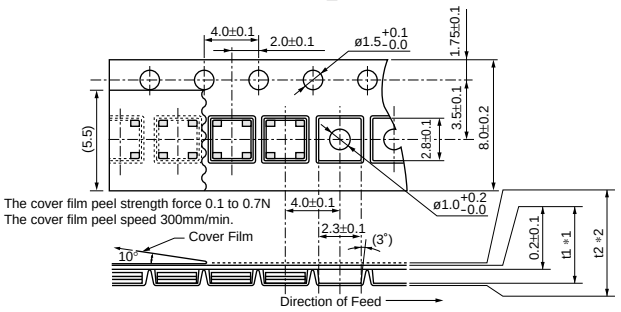
■ Dimensions of Taping

CSTCG_V



(in mm)

CSACW_X

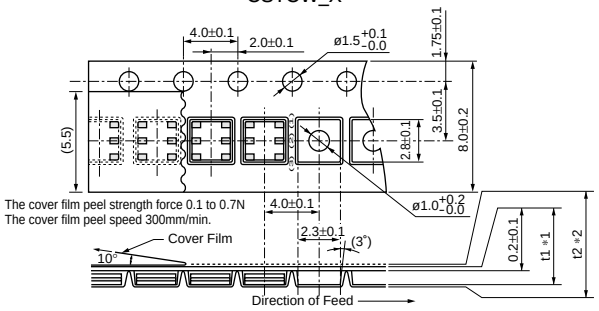


∗1, ∗2: Dimensions vary with product thickness of CERALOCK®.

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 max.	1.9 max.	1.7 max.

(in mm)

CSTCW_X



∗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 max.	1.9 max.	1.7 max.

(in mm)

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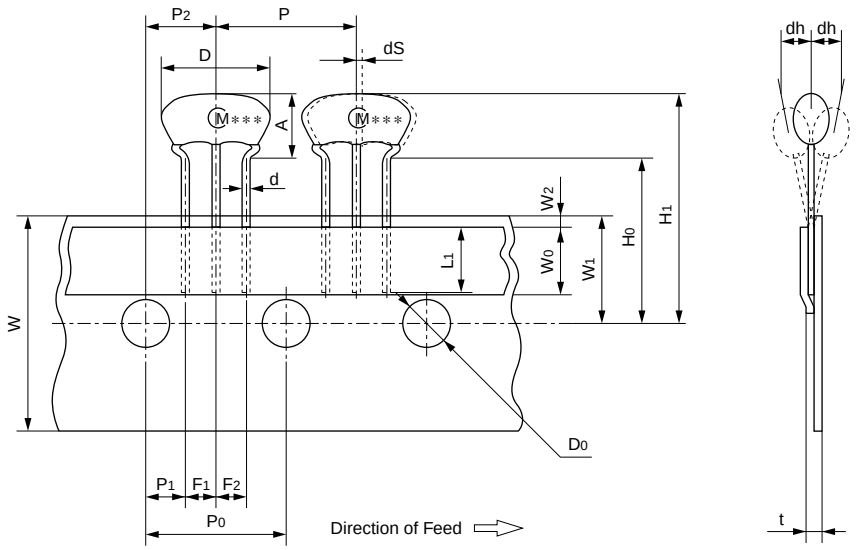
Packaging for General Usage -MHz Lead Type-

■ 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	A	5.5	±0.5	
Dimensions of terminal	d	ø0.48	±0.05	
Lead length under the hold down tape	L_1	5.0 min.	–	
Pitch of component	P	12.7	±0.5	Tolerance for Pitches 10xP_0=127±1
Pitch of sprocket hole	P_0	12.7	±0.2	
Length from sprocket hole center to lead	P_1	3.85	±0.5	
Length from sprocket hole center to component center	P_2	6.35	±0.5	
Lead spacing (I)	F_1	2.5	±0.2	
Lead spacing (II)	F_2	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	W_0	6.0 min.	–	Hold down tape does not exceed the carrier tape.
Position of sprocket hole	W_1	9.0	±0.5	
Gap of hold down tape and carrier tape	W_2	0	$^{+0.5}_{-0}$	
Distance between the center of sprocket hole and lead stopper	H_0	18.0	±0.5	
Total height of resonator	H_1	23.5	±1.0	
Diameter of sprocket hole	D_0	ø4.0	±0.2	
Total tape thickness	t	0.6	±0.2	
Body tilt	dS	0	±1.0	

(in mm)

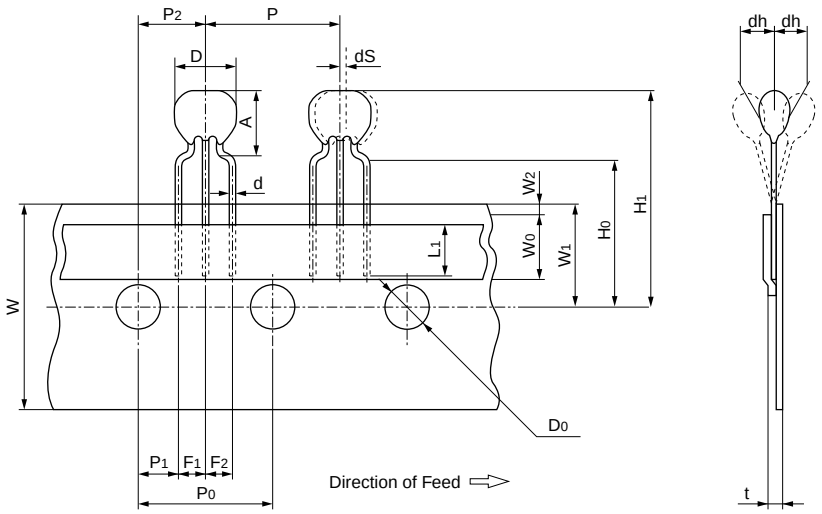
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Packaging for General Usage -MHz Lead Type-

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	L_1	5.0 min.	–	
Pitch of component	P	12.7	±0.5	Tolerance for Pitches 10xP_0=127±1
Pitch of sprocket hole	P_0	12.7	±0.2	
Length from sprocket hole center to lead	P_1	3.85	±0.5	
Length from sprocket hole center to component center	P_2	6.35	±0.5	
Lead spacing (I)	F_1	2.5	±0.2	
Lead spacing (II)	F_2	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	W_0	6.0 min.	–	Hold down tape does not exceed the carrier tape.
Position of sprocket hole	W_1	9.0	±0.5	
Gap of hold down tape and carrier tape	W_2	0	$^{+0.5}_{-0.0}$	
Distance between the center of sprocket hole and lead stopper	H_0	18.0	±0.5	
Total height of resonator	H_1	24.5	±1.0	
Diameter of sprocket hole	D_0	ø4.0	±0.2	
Total tape thickness	t	0.6	±0.2	
Body tilt	dS	0	±1.0	

(in mm)

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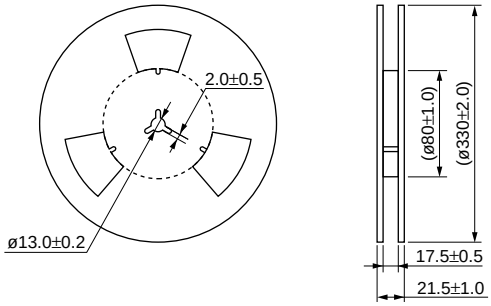
Packaging for General Usage -kHz Type-

■ 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.)

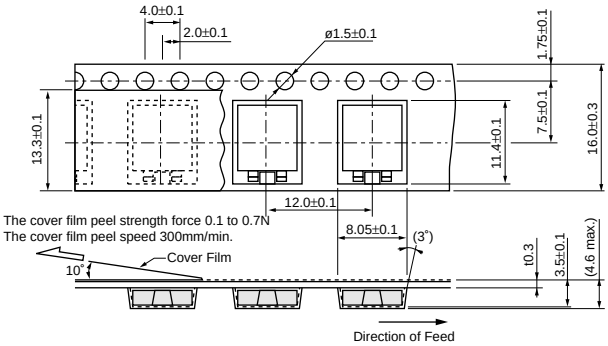
■ Dimensions of Reel



(in mm)

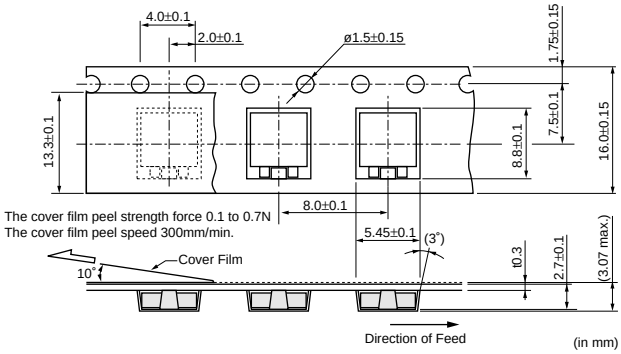
■ Dimensions of Taping

CSBFB_J 430-519kHz



(in mm)

CSBFB_J 700-1250kHz



(in mm)

■ CSBLA Series Minimum Quantity

Part Number	Bulk
CSBLA_E	500
CSBLA_J	1,000

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

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