P16E.pdf
Mar. 1,2021

muRata
INNOVATOR IN ELECTRONICS

Ceramic Resonators (CERALOCK)

EU RoHS Compliant

- All the products in this catalog comply with EU RoHS.
- EU RoHS is "the European Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment."
- For more details, please refer to our web page, "Murata's Approach for EU RoHS" (https://www.murata.com/en-eu/support/compliance/rohs).

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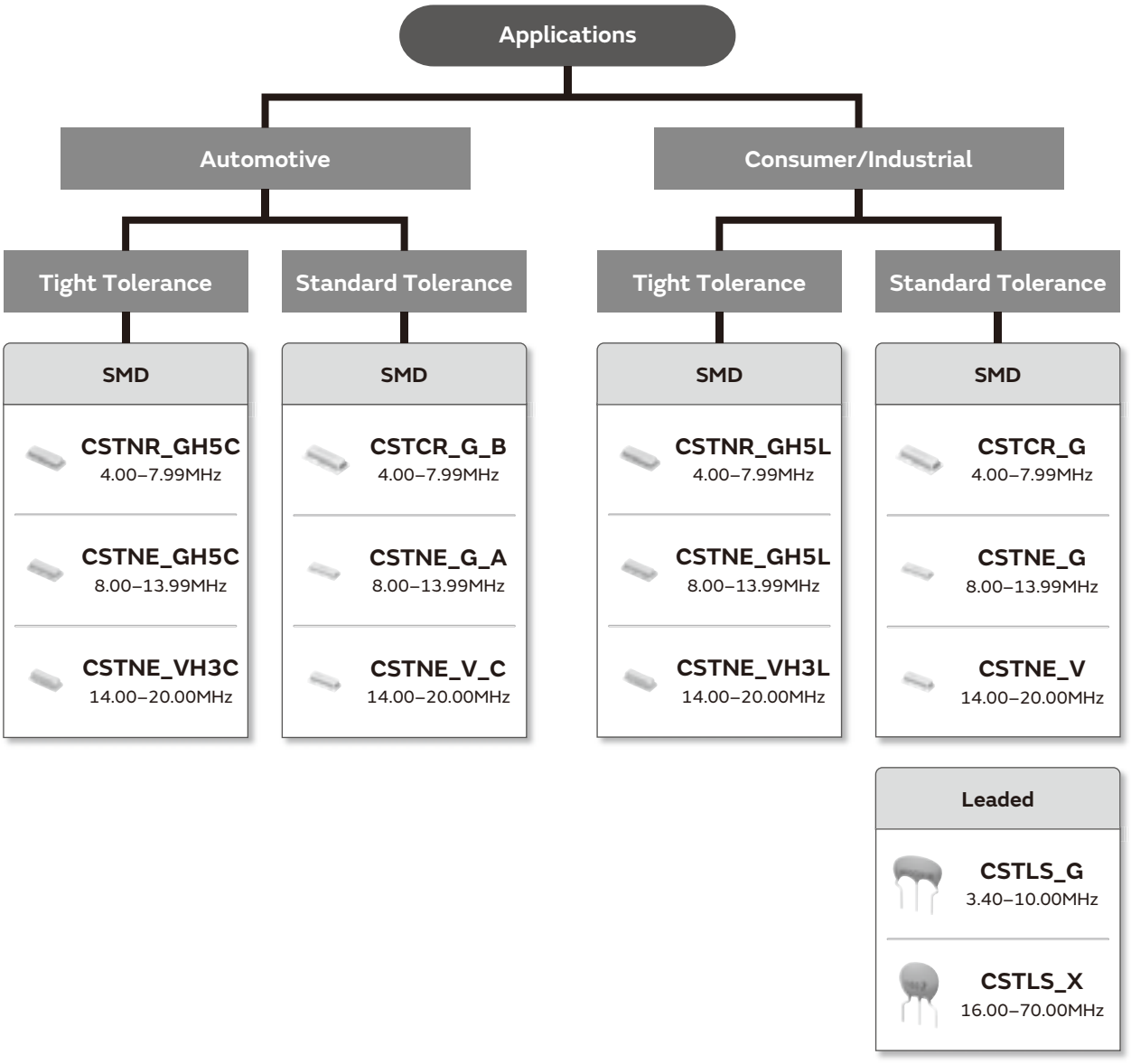
Please check the MURATA website (**https://www.murata.com/**) if you cannot find a part number in this catalog.

Selection Guide



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	NE	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
T	MHz with Built-in Capacitance

❸Structure/Size

Code	Structure/Size
LS	Round Lead Type
CR/NR/NE	Small-cap 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
V	Thickness Expander mode
X	Thickness Expander mode (3rd overtone)

❻Initial Frequency Tolerance

Code	Initial Frequency Tolerance
5	±0.5%
3	±0.3%
2	±0.2%
H	±0.07%

❼Load Capacity

Code	Load Capacity
1	5pF
2	10pF
3	15pF
5	33/39pF
6	47pF

❽Individual Specification

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

With standard products, "❽Individual Specification" and "❾Packaging" is omitted.

❾Packaging

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

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

Ceramic Resonators (CERALOCK)

MHz Chip Type -Tight Frequency Tolerance for Automotive

Chip type CERALOCK 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 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.

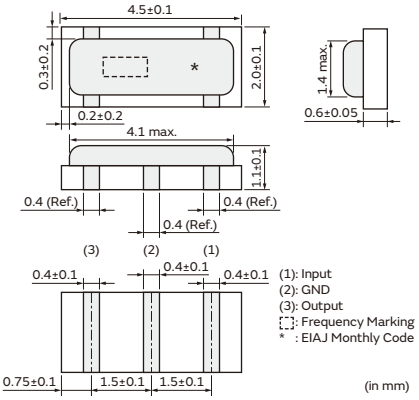
Features

1. High accuracy resonators whose total tolerance is available for less than ±3,000ppm.
2. High reliability and available for a wide temperature range.
3. Oscillation circuits do not require external load capacitors.
4. Available for a wide frequency range.
5. Extremely small and have a low profile.
6. No adjustment is necessary for oscillation circuits.
7. Stable supply is ensured due to not using precious metal (Paradium) in built-in Capacitance.

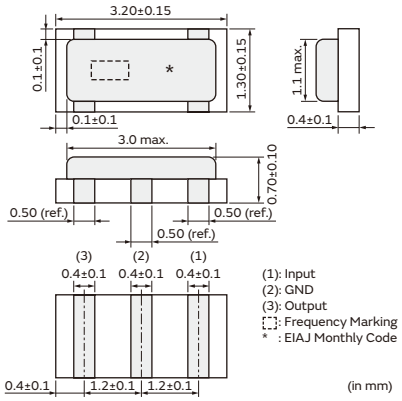
Applications

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 Air conditioner, Power Window, Remote Keyless Entry system, etc.
5. Intelligent Transportation System
   Lane Keeping System, Millimeter wave radar, etc.
6. Battery control for hybrid cars

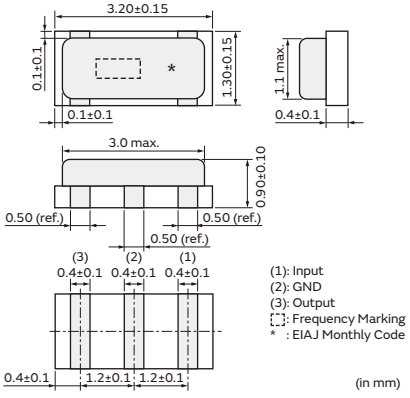
CSTNR_GH5C
4.00-7.99MHz



CSTNE_GH5C
8.00-13.99MHz



CSTNE_VH3C
14.00-20.00MHz

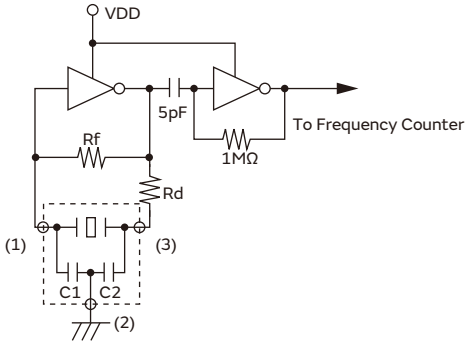


Part Number	Frequency (MHz)	Initial Frequency Tolerance (%)	Frequency Shift by Temperature (%)	Operating Temperature Range (°C)
CSTNR_GH5C	4.00 to 7.99	±0.07	±0.13	-40 to 125
CSTNE_GH5C	8.00 to 13.99	±0.07	±0.13	-40 to 125
CSTNE_VH3C	14.00 to 20.00	±0.07	±0.13	-40 to 125

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

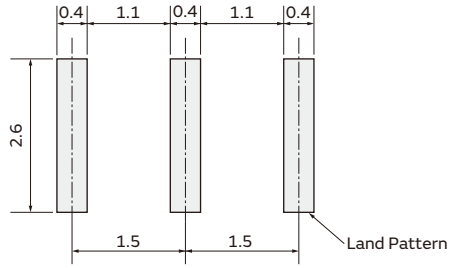
Measuring Circuit of Oscillating Frequency

CSTNR_GH5C/CSTNE_GH5C/CSTNE_VH3C



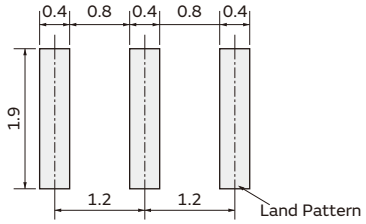
Standard Land Pattern Dimensions

CSTNR_GH5C
(* This Land Pattern is not common to CSTCR_G.)



(in mm)

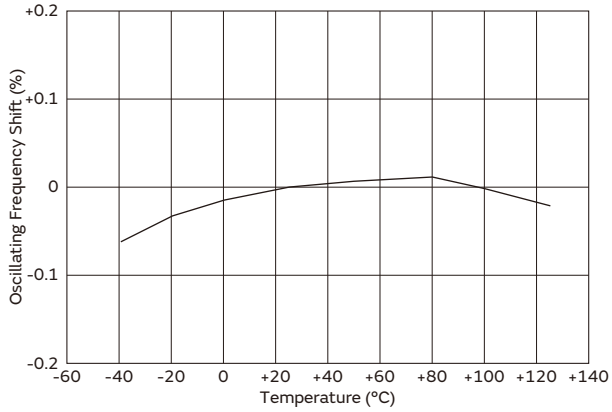
CSTNE_GH5C/CSTNE_VH3C



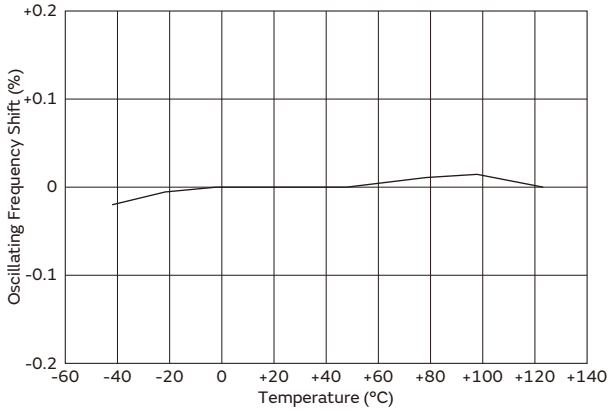
(in mm)

Frequency Temperature Characteristics

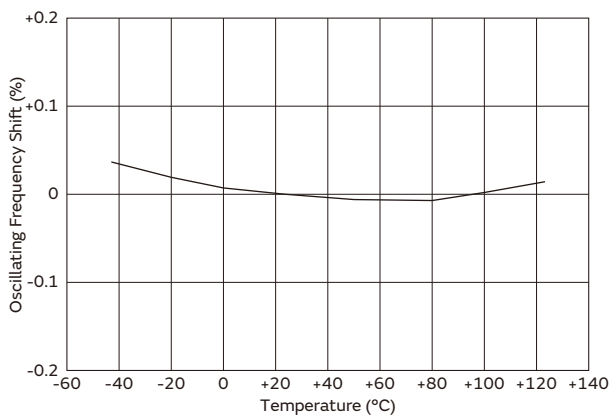
CSTNR_GH5C



CSTNE_GH5C



CSTNE_VH3C



Ceramic Resonators (CERALOCK)

MHz Chip Type -Standard Frequency Tolerance for Automotive

Chip type CERALOCK 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 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.

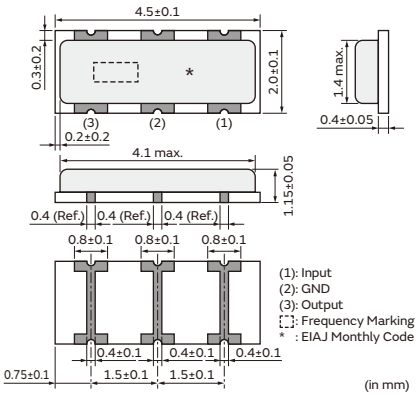
Features

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

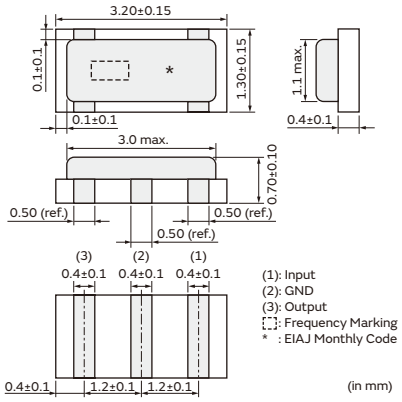
Applications

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 Air conditioner, Power Window, Remote Keyless Entry system, etc.
5. Electronic Toll Collection system, Car Navigation, etc.

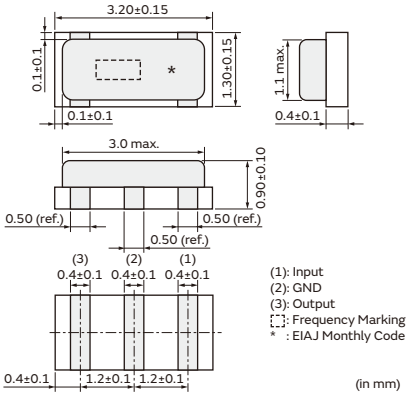
CSTCR_G_B
4.00-7.99MHz



CSTNE_G_A
8.00-13.99MHz



CSTNE_V_C
14.00-20.00MHz

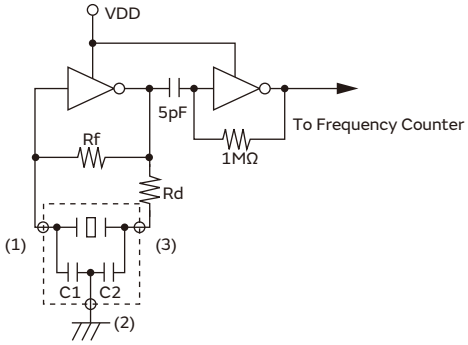


Part Number	Frequency (MHz)	Initial Frequency Tolerance (%)	Frequency Shift by Temperature (%)	Operating Temperature Range (°C)
CSTCR_G_B	4.00 to 7.99	±0.50	±0.15	-40 to 125
CSTNE_G_A	8.00 to 13.99	±0.50	±0.20	-40 to 125
CSTNE_V_C	14.00 to 20.00	±0.50	±0.15	-40 to 125

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

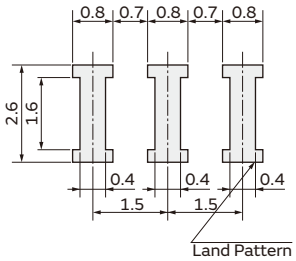
Measuring Circuit of Oscillating Frequency

CSTCR_G_B/CSTNE_G_A/CSTNE_V_C



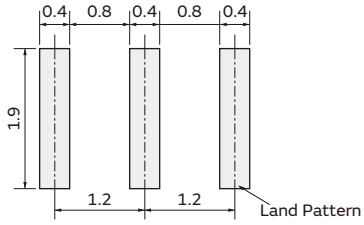
Standard Land Pattern Dimensions

CSTCR_G_B



(in mm)

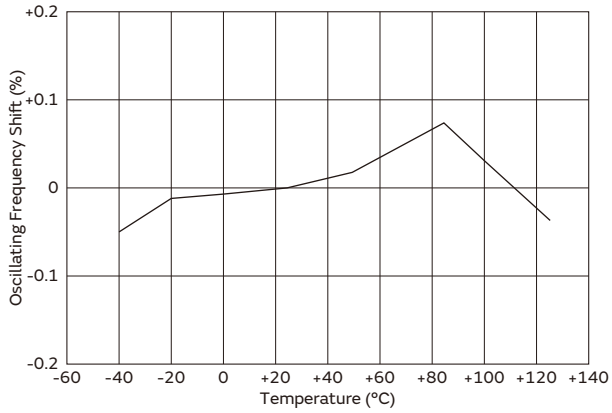
CSTNE_G_A/CSTNE_V_C



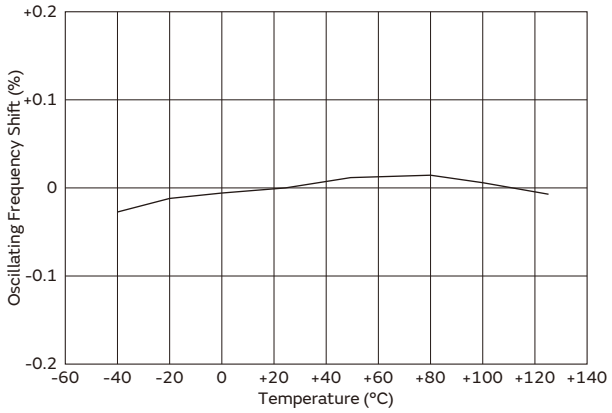
(in mm)

Frequency Temperature Characteristics

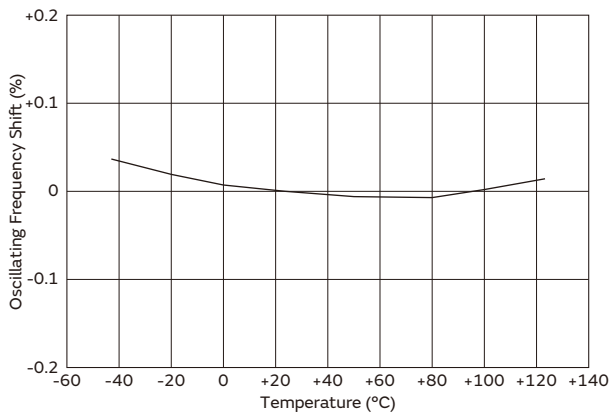
CSTCR_G_B



CSTNE_G_A



CSTNE_V_C



Notice for Automotive

Soldering and Mounting (CSTCR_G_B/CSTNR_GH5C, CSTNE_G_A/GH5C, CSTNE_V_C/VH3C Series)

1. Soldering

(1) Reflow soldering

Please mount the component on a circuit board by reflow soldering. Flow soldering is not acceptable.

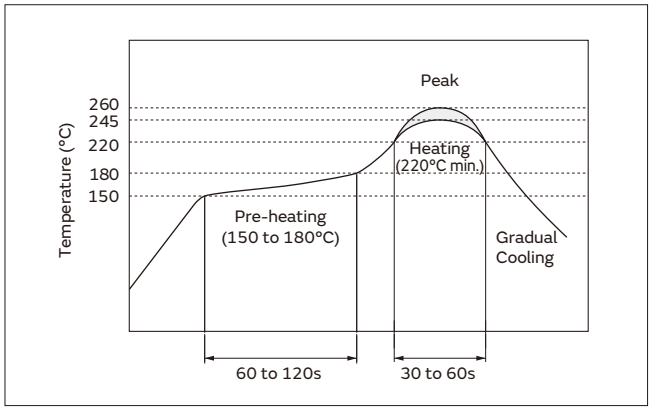
Recommendable Flux and Solder

Flux	Please use rosin based flux, not water soluble flux.
Solder	Please use solder (Sn-3.0Ag-0.5Cu) under the following conditions: 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

If compelled to mount the component by using a soldering iron, please do not directly touch the component with the soldering iron. The component terminals or electrical characteristics may be damaged if excessive 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.
Soldering 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 to avoid damage to the seal between the metal cap and the substrate.

(4) Other

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

(5) Conditions for Placement Machines

The component is recommended with placement machines that employ optical placement capabilities. The component may be damaged 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 that utilize mechanical positioning. Please contact Murata for details beforehand.

Continued on the following page.↗

Notice for Automotive

Continued from the preceding page.↘

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. If the component is immersed at +90°C 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 blowing air at +80°C max.

(5) Other
(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.

Continued on the following page.↗

Notice for Automotive

Continued from the preceding page.↘

Storage and Operating Conditions

1. Product Storage Conditions
Please store the products in a room where the temperature/humidity is stable, and avoid places where there are large temperature changes.
Please store the products under the following conditions:
Temperature: -10 to +40°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 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 poor conditions.
(5) Please do not drop the products to avoid cracking of ceramic elements.
4. Other
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.

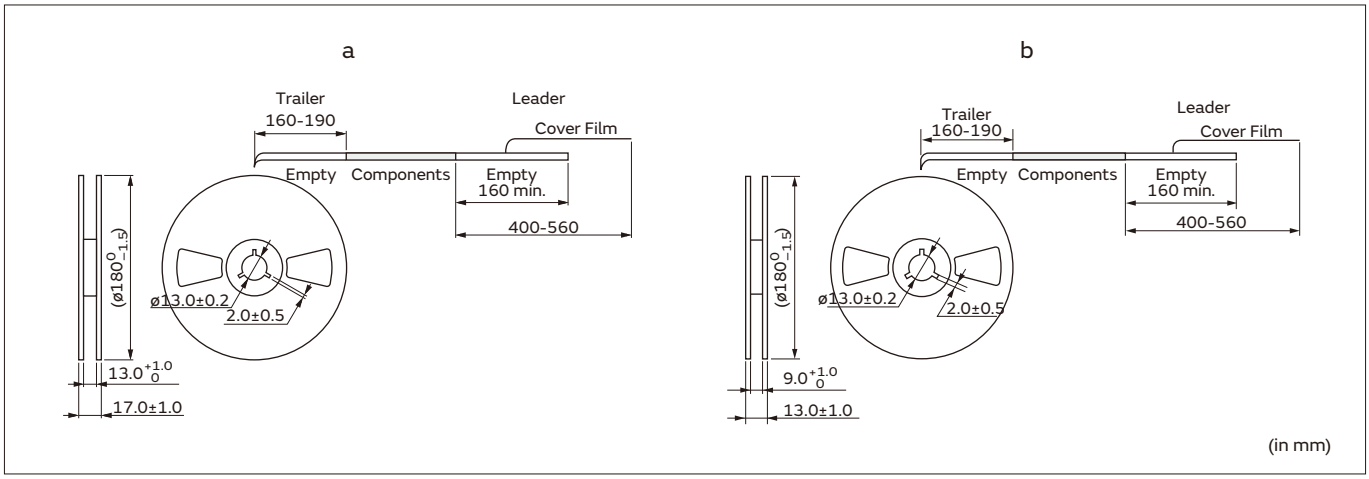
Packaging for Automotive

Minimum Quantity

Part Number	Plastic Tape ø180mm	Plastic Tape ø330mm	Bulk	Reel Dimensions
CSTCR_G_B	3,000	9,000	500	a
CSTNR_GH5C	3,000	9,000	500	a
CSTNE_G_A	3,000	9,000	500	b
CSTNE_GH5C	3,000	9,000	500	b
CSTNE_V_C	3,000	9,000	500	b
CSTNE_VH3C	3,000	9,000	500	b

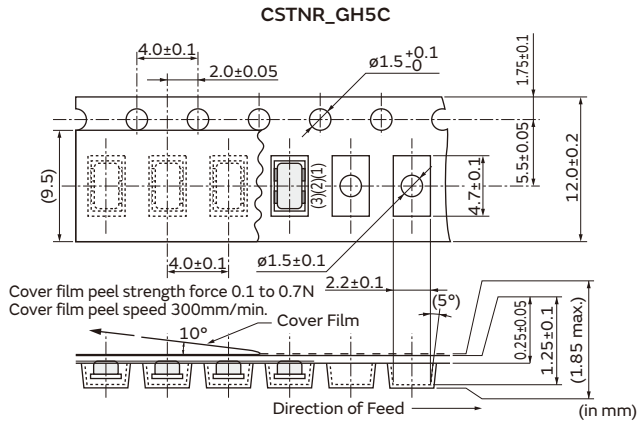
The order quantity should be an integral multiple of the "Minimum Quantity" shown above. (pcs.)

Dimensions of Reel

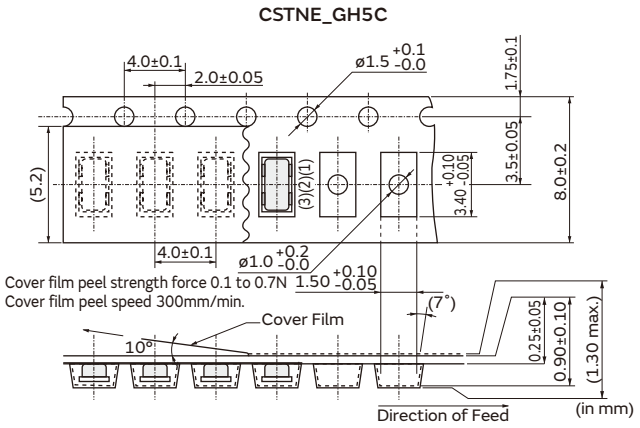


Dimensions of Taping

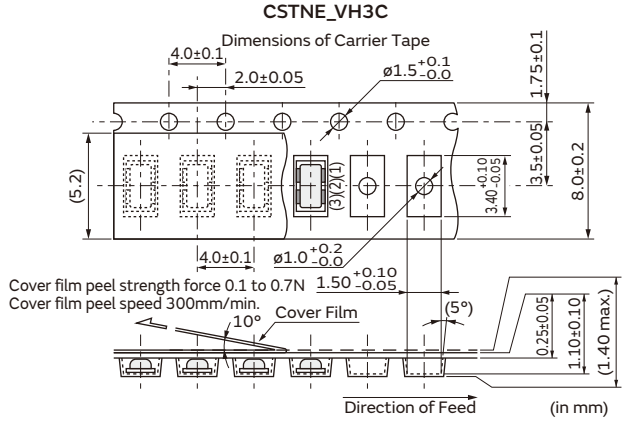
CSTNR_GH5C



CSTNE_GH5C



CSTNE_VH3C



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Packaging for Automotive

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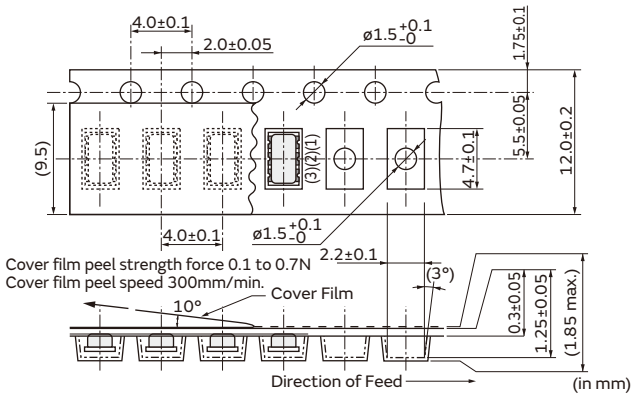
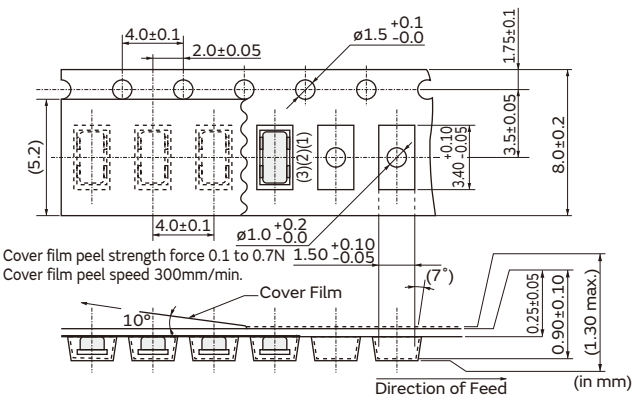
Dimensions of Taping

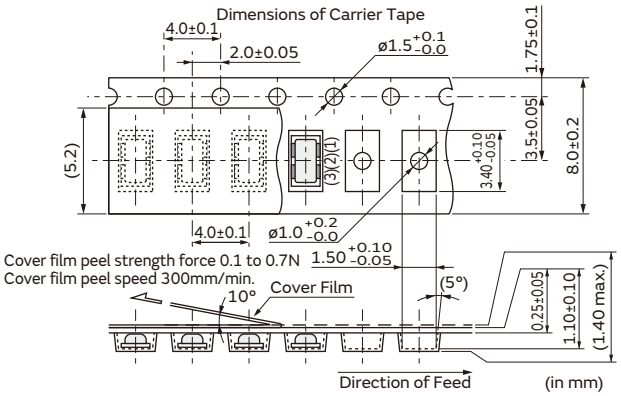
CSTCR_G_B



CSTNE_G_A



CSTNE_V_C



Ceramic Resonators (CERALOCK)

MHz Chip Type -Tight Frequency Tolerance for Consumer/Industrial Usage

Chip type CERALOCK 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 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.

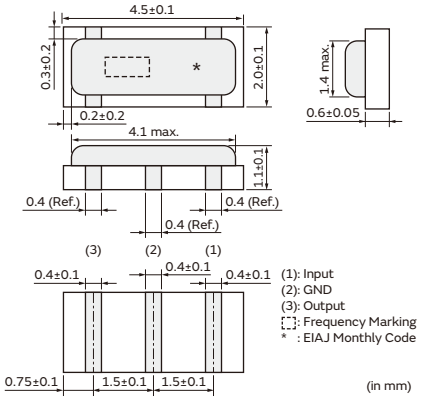
Features

1. Oscillation circuits do not require external load capacitors.
2. Available for a wide frequency range.
3. Extremely small and have a low profile.
4. No adjustment is necessary for oscillation circuits.
5. Stable supply is ensured due to not using precious metal (Paradium) in built-in Capacitance.

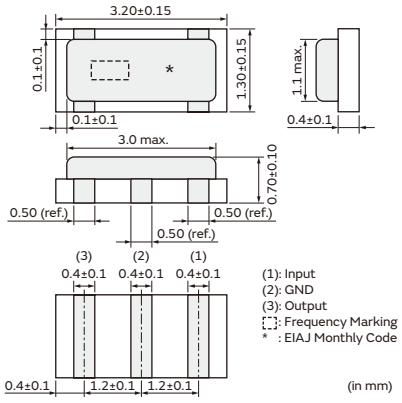
Applications

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

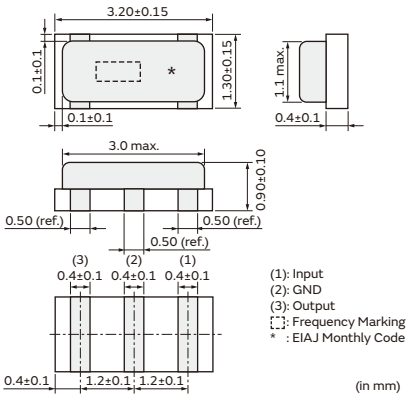
CSTNR_GH5L
4.00-7.99MHz



CSTNE_GH5L
8.00-13.99MHz



CSTNE_VH3L
14.00-20.00MHz

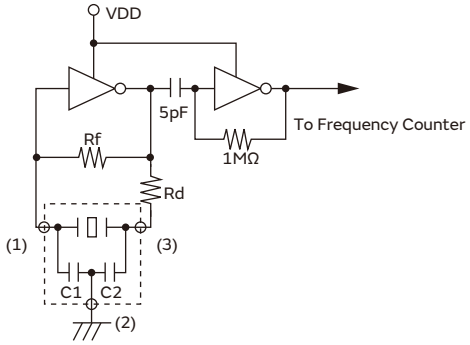


Part Number	Frequency (MHz)	Initial Frequency Tolerance (%)	Frequency Shift by Temperature (%)	Operating Temperature Range (°C)
CSTNR_GH5L	4.00 to 7.99	±0.07	±0.11	-20 to 85
CSTNE_GH5L	8.00 to 13.99	±0.07	±0.11	-40 to 85
CSTNE_VH3L	14.00 to 20.00	±0.07	±0.11	-40 to 85

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

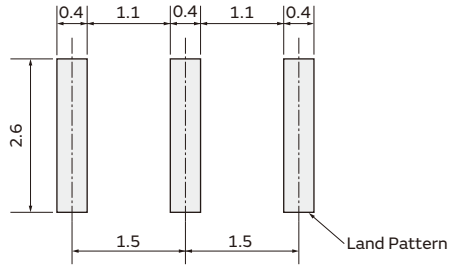
Measuring Circuit of Oscillating Frequency

CSTNR_GH5L/CSTNE_GH5L/CSTNE_VH3L



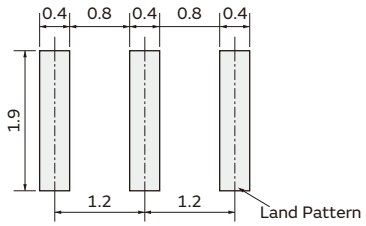
Standard Land Pattern Dimensions

CSTNR_GH5L
(* This Land Pattern is not common to CSTCR_G.)



(in mm)

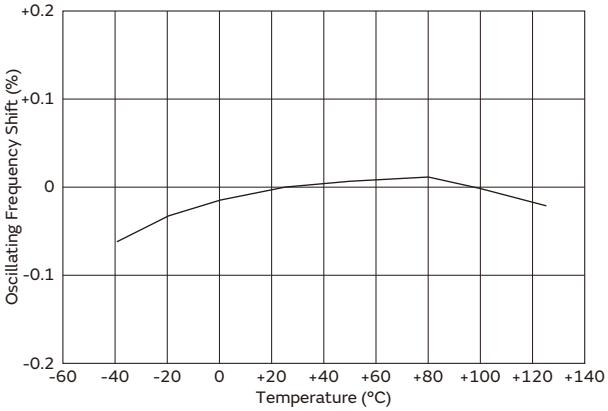
CSTNE_GH5L/CSTNE_VH3L



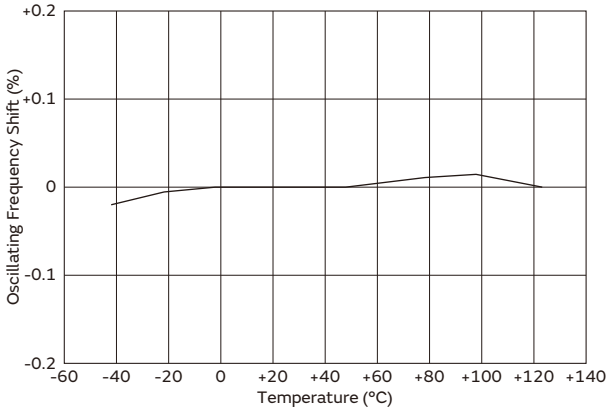
(in mm)

Frequency Temperature Characteristics

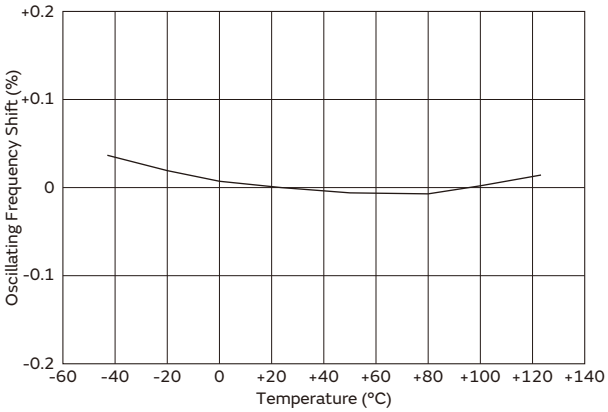
CSTNR_GH5L



CSTNE_GH5L



CSTNE_VH3L



Ceramic Resonators (CERALOCK)

MHz Chip Type -Standard Frequency Tolerance for Consumer/Industrial Usage

Chip type CERALOCK with built-in load capacitors provides an extremely small package.
MURATA's package technology expertise has enabled the development of the Chip CERALOCK with built-in load capacitors.
High-density mounting can be realized because of the small package and the elimination of the need for an external load capacitor.

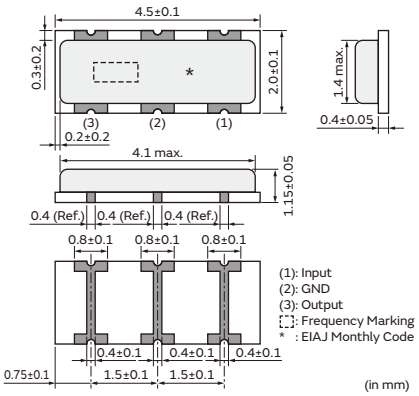
Features

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

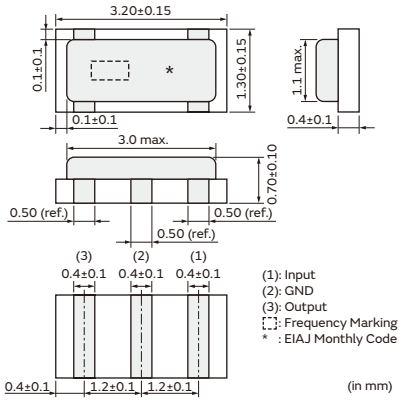
Applications

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.)

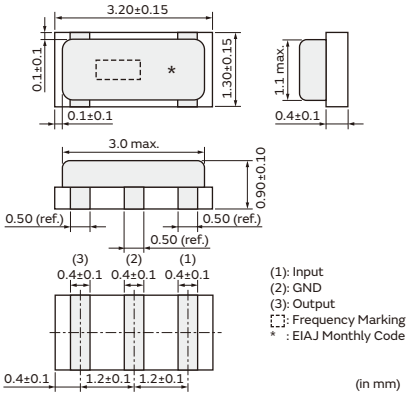
CSTCR_G
4.00-7.99MHz



CSTNE_G
8.00-13.99MHz



CSTNE_V
14.00-20.00MHz

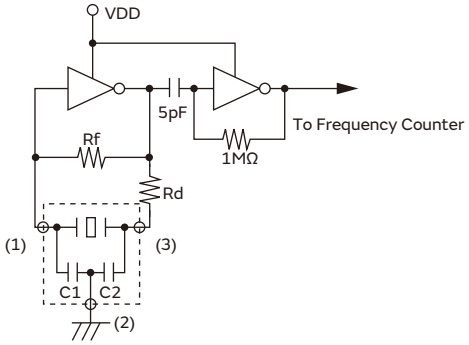


Part Number	Frequency (MHz)	Initial Frequency Tolerance (%)	Frequency Shift by Temperature (%)	Operating Temperature Range (°C)
CSTCR_G	4.00 to 7.99	±0.50	±0.20	-20 to 80
CSTNE_G	8.00 to 13.99	±0.50	±0.20	-40 to 85
CSTNE_V	14.00 to 20.00	±0.50	±0.30	-40 to 85

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

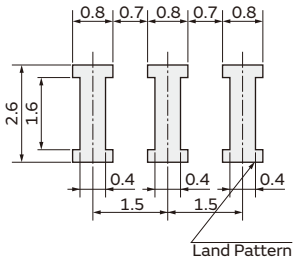
Measuring Circuit of Oscillating Frequency

CSTCR_G/CSTNE_G/CSTNE_G_Z/CSTNE_V



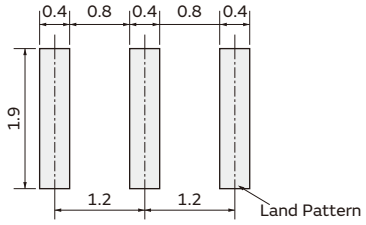
Standard Land Pattern Dimensions

CSTCR_G
(* This Land Pattern is not common to CSTNR_GH5C, CSTNR_GH5L.)



(in mm)

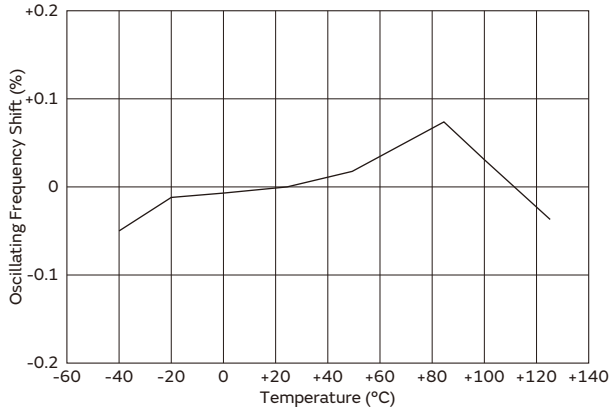
CSTNE_G/CSTNE_V



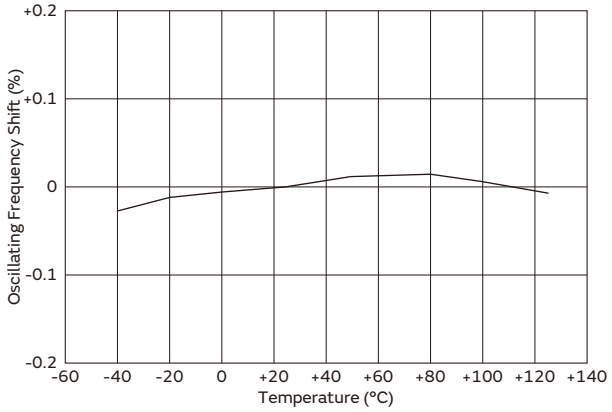
(in mm)

Frequency Temperature Characteristics

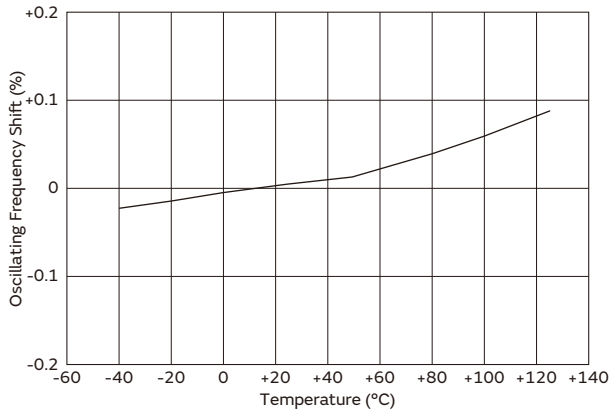
CSTCR_G



CSTNE_G



CSTNE_V

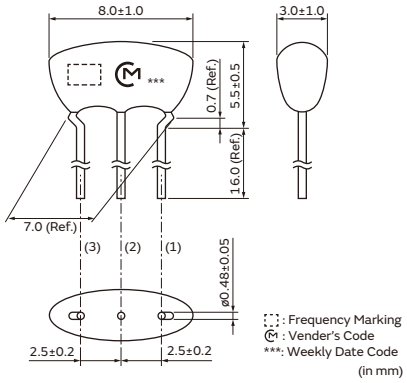


Ceramic Resonators (CERALOCK)

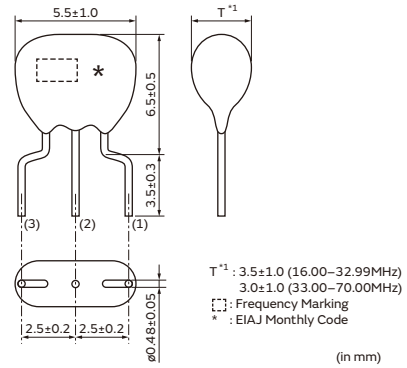
MHz Lead Type -Standard Frequency Tolerance for Consumer/Industrial Usage

MURATA's ceramic resonator, CERALOCK 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

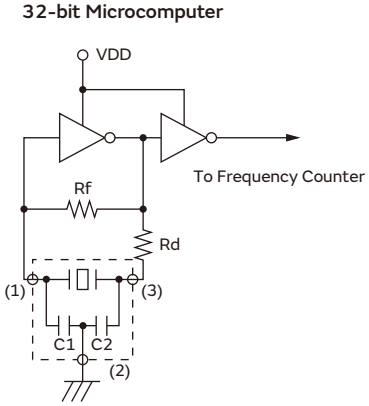
Applications

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

Part Number	Frequency (MHz)	Initial Frequency Tolerance (%)	Frequency Shift by Temperature (%)	Operating 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

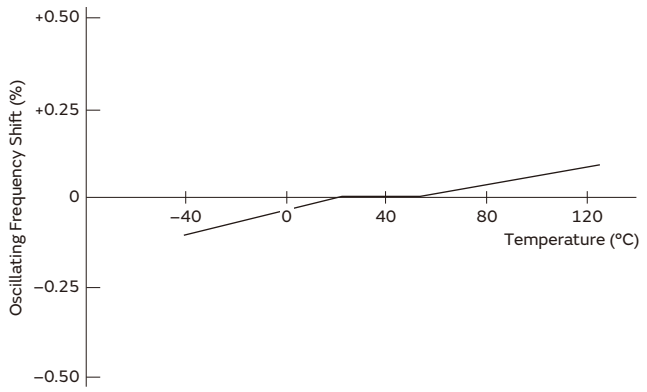
Irregular or stopped oscillation may occur under unmatched circuit conditions. Please check the actual conditions prior to use.
The order quantity should be an integral multiple of the "Minimum Quantity" shown on the packaging page.

Measuring Circuit of Oscillating Frequency

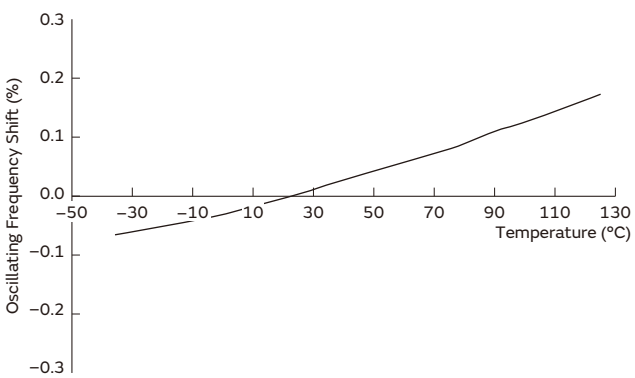


Frequency Temperature Characteristics

CSTLS_G



CSTLS_X



Notice for Consumer/Industrial Usage -MHz Chip Type

Soldering and Mounting (CSTCR_G/CSTNR_GH5L, CSTNE_G/GH5L, CSTNE_V/VH3L Series)

1. Soldering

(1) Reflow soldering

Please mount the component on a circuit board by reflow soldering. Flow soldering is not acceptable.

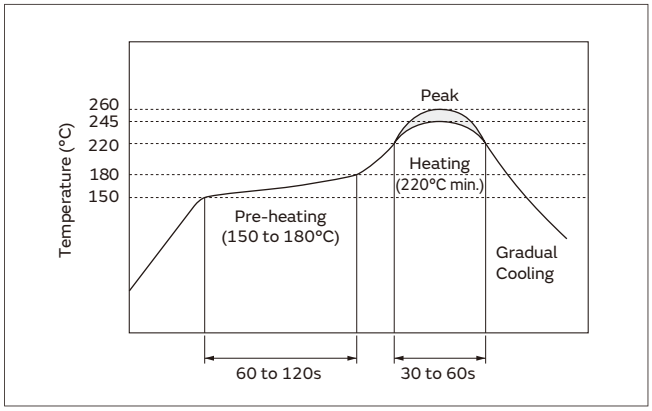
Recommendable Flux and Solder

Flux	Please use rosin based flux, not water soluble flux.
Solder	Please use solder (Sn-3.0Ag-0.5Cu) under the following conditions: 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

If compelled to mount the component by using a soldering iron, please do not directly touch the component with the soldering iron. The component terminals or electrical characteristics may be damaged if excessive 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.
Soldering 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 to avoid damage to the seal between the metal cap and the substrate.

(4) Other

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

(5) Conditions for Placement Machines

The component is recommended with placement machines that employ optical placement capabilities. The component may be damaged 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 that utilize mechanical positioning. Please contact Murata for details beforehand.

2. Washing / Coating

Conformal coating or washing of the component is not acceptable, because it is not hermetically sealed.
Please contact us if you need a washable component.

Continued on the following page.↗

Notice for Consumer/Industrial Usage -MHz Chip Type

Continued from the preceding page.↘

Storage and Operating Conditions

1. Product Storage Conditions
   Please store the products in a room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:
   Temperature: -10 to +40°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 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 poor conditions.
   (5) Please do not drop the products to avoid cracking of ceramic elements.
4. Other
   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.

Notice for Consumer/Industrial Usage -MHz Lead Type

Soldering and Mounting (CSTLS_G, CSTLS_X Series)

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 Conditions
   Please store the products in a room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:
   Temperature: -10 to +40°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 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 poor conditions.
   (5) Please do not drop the products to avoid cracking of ceramic elements.
4. Other
   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.

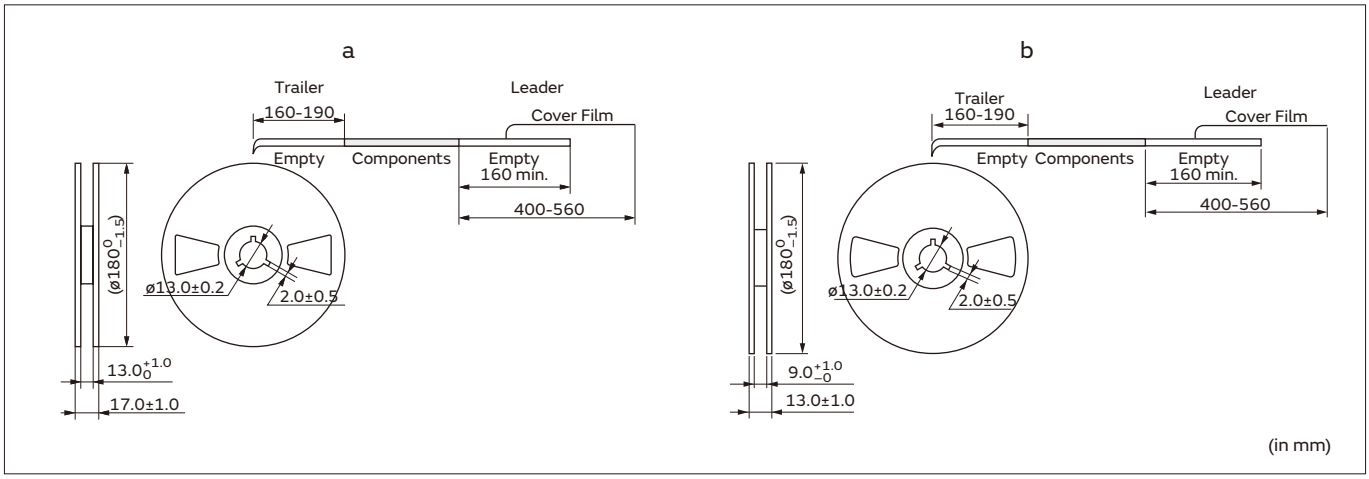
Packaging for Consumer/Industrial Usage -MHz Chip Type

Minimum Quantity

Part Number	Plastic Tape ø180mm	Plastic Tape ø330mm	Bulk	Reel Dimensions
CSTCR_G	3,000	9,000	500	a
CSTNR_GH5L	3,000	9,000	500	a
CSTNE_G	3,000	9,000	500	b
CSTNE_GH5L	3,000	9,000	500	b
CSTNE_V	3,000	9,000	500	b
CSTNE_VH3L	3,000	9,000	500	b

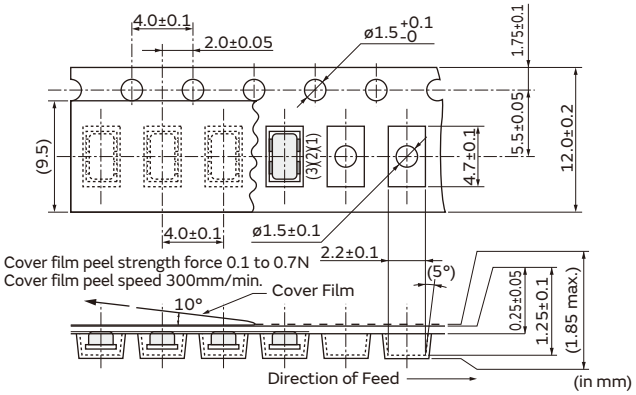
The order quantity should be an integral multiple of the "Minimum Quantity" shown above. (pcs.)

Dimensions of Reel

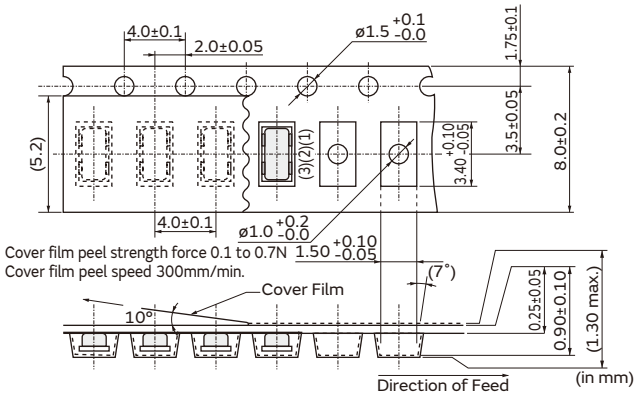


Dimensions of Taping

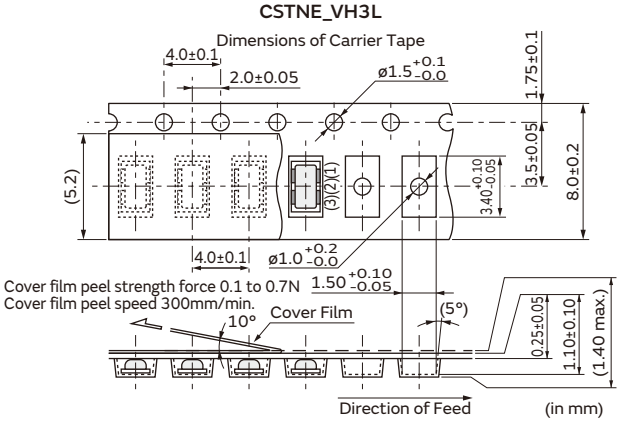
CSTNR_GH5L



CSTNE_GH5L



CSTNE_VH3L



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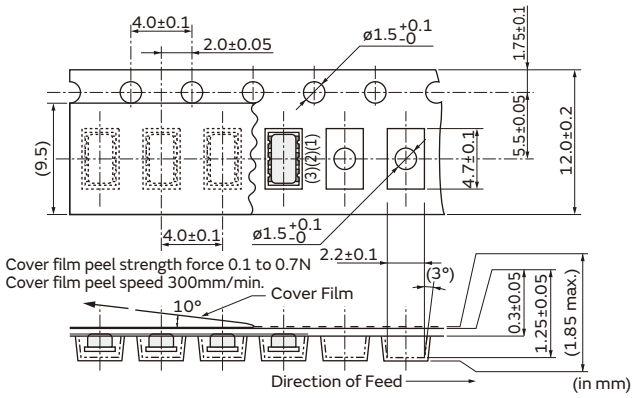
Packaging for Consumer/Industrial Usage -MHz Chip Type

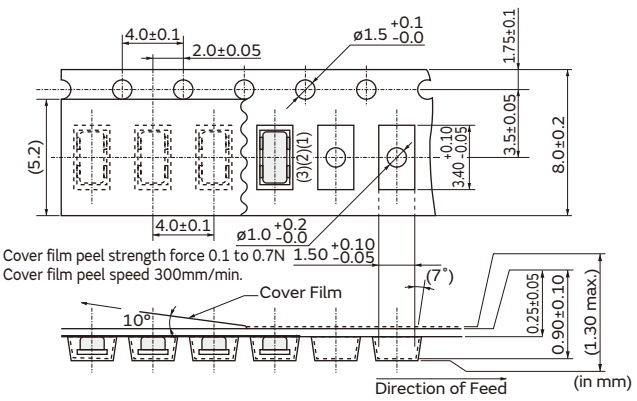
Continued from the preceding page.↘

Dimensions of Taping

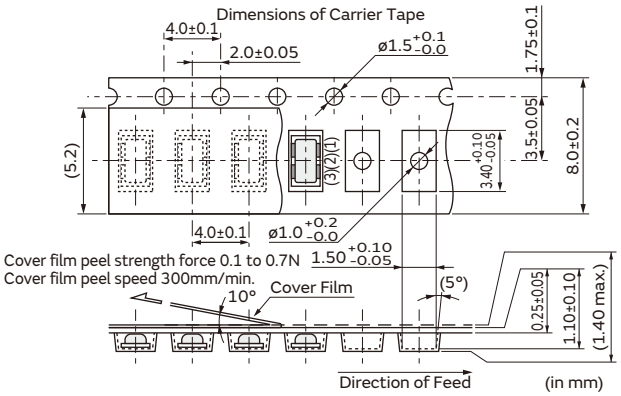
CSTCR_G



CSTNE_G



CSTNE_V



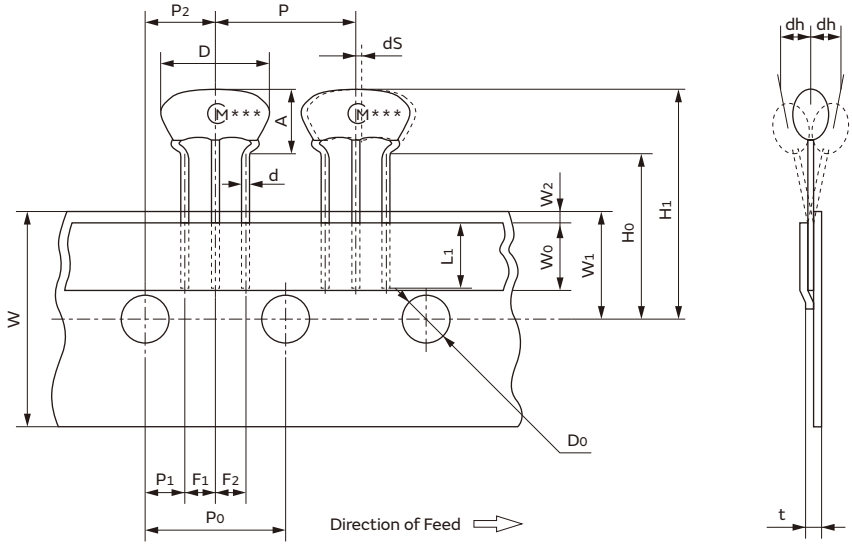
Packaging for Consumer/Industrial Usage -MHz Lead Type

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	

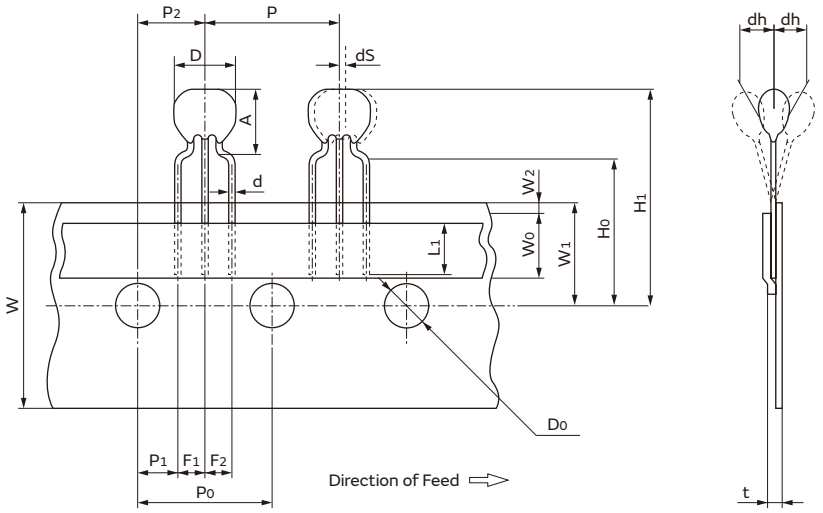
(in mm)

Continued on the following page.↗

Packaging for Consumer/Industrial 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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Global Locations

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⚠Note

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8. *Disaster prevention / crime prevention equipment*
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3 Product specifications in this catalog are as of March 2021. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering. If there are any questions, please contact our sales representatives or product engineers.

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