

**CHIP MONOLITHIC CERAMIC CAPACITOR LOW ACOUSTIC NOISE TYPE FOR GENERAL
GJ831CR71H475KA12_ (1206, X7R, 4.7uF, 50Vdc)**

_: packaging code

Reference Sheet

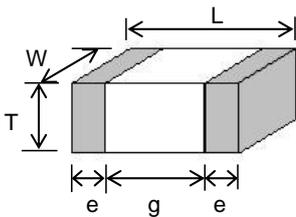
1.Scope

This product specification is applied to Chip Monolithic Ceramic Capacitor Low Acoustic Noise Type used for General Electronic equipment.

2.MURATA Part NO. System

(Ex.)	GJ8	31	C	R7	1H	475	K	A12	L
	(1)L/W Dimensions	(2)T Dimensions	(3)Temperature Characteristics	(4)DC Rated Voltage	(5)Nominal Capacitance	(6)Capacitance Tolerance	(7)Murata's Control Code	(8)Packaging Code	

3. Type & Dimensions



(Unit:mm)

(1)-1 L	(1)-2 W	(2) T	e	g
3.2±0.2	1.6±0.2	1.6±0.2	0.3 to 0.8	1.5 min.

4.Rated value

(3) Temperature Characteristics (Public STD Code):X7R(EIA)		(4) DC Rated Voltage	(5) Nominal Capacitance	(6) Capacitance Tolerance	Specifications and Test Methods (Operating Temp. Range)
Temp. coeff or Cap. Change	Temp. Range (Ref.Temp.)				
-15 to 15 %	-55 to 125 °C (25 °C)	50 Vdc	4.7 uF	±10 %	-55 to 125 °C

5.Package

mark	(8) Packaging	Packaging Unit
L	φ180mm Reel EMBOSED W8P4	2000 pcs./Reel
K	φ330mm Reel EMBOSED W8P4	6000 pcs./Reel

Product specifications in this catalog are as of Nov.18,2013,and are subject to change or obsolescence without notice.
Please consult the approval sheet before ordering.
Please read rating and !Cautions first.

■ SPECIFICATIONS AND TEST METHODS

No	Item	Specification		Test Method												
		High Dielectric Constant Type														
1	Operating Temperature Range	B3: -25°C to 85°C R7: -55°C to 125°C R6: -55°C to 85°C C8: -55°C to 105°C		Standard Temperature : 20°C (R7,R6,C8 : 25°C)												
2	Rated Voltage	See the previous pages.		The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V^{P-P} or V^{O-P} , whichever is larger, should be maintained within the rated voltage range.												
3	Appearance	No defects or abnormalities.		Visual inspection.												
4	Dimension	Within the specified dimensions.		Using calipers.												
5	Dielectric Strength	No defects or abnormalities.		No failure should be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA.												
6	Insulation Resistance	More than 500Ω·F		The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 20°C/25°C and 75%RH max. and within 2 minutes of charging, provided the charge/discharge current is less than 50mA.												
7	Capacitance	Within the specified tolerance.		The capacitance/D.F. should be measured at 20°C/25°C at the frequency and voltage shown in the table.												
8	Dissipation Factor (D.F.)	[B3,R7,R6,C8] 0.025max.		<table border="1"> <thead> <tr> <th colspan="2">Char.</th> <th>B3, R7, R6, C8</th> </tr> </thead> <tbody> <tr> <td>Item</td> <td>Frequency</td> <td>1±0.1kHz</td> </tr> <tr> <td></td> <td>Voltage</td> <td>1±0.2Vrms</td> </tr> </tbody> </table>	Char.		B3, R7, R6, C8	Item	Frequency	1±0.1kHz		Voltage	1±0.2Vrms			
Char.		B3, R7, R6, C8														
Item	Frequency	1±0.1kHz														
	Voltage	1±0.2Vrms														
9	Capacitance Temperature Characteristics	No bias	B3 : Within ±10% (-25°C to +85°C) R7 : Withn ±15% (-55°C to +125°C) R6 : Withn ±15% (-55°C to +85°C) C8 : Withn ±22% (-55°C to +105°C)	<p>The capacitance change should be measured after 5min. at each specified temp.stage. The ranges of capacitance change compared with the 20°C value over the temperature ranges shown in the table should be within the specified ranges.* In case of applying voltage, the capacitance change should be measured after 1 more min. with applying voltage in equilibration of each temp. stage.</p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature(°C)</th> <th>Applying voltage</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20±2 *</td> <td rowspan="4">No bias *R7, R6, C8 : 25±2°C</td> </tr> <tr> <td>2</td> <td>-55±3 (for R7, R6, C8) / -25±3 (for B3)</td> </tr> <tr> <td>3</td> <td>20±2 *</td> </tr> <tr> <td>4</td> <td>125±3 (for R7) / 105±3 (for C8) / 85±3 (for B3, R6)</td> </tr> </tbody> </table> <p>*Initial measurement for high dielectric constant type Perform a heat treatment at 150 +0/-10°C for one hour and then set for 24±2 hours at room temperature. Perform the initial measurement.</p>	Step	Temperature(°C)	Applying voltage	1	20±2 *	No bias *R7, R6, C8 : 25±2°C	2	-55±3 (for R7, R6, C8) / -25±3 (for B3)	3	20±2 *	4	125±3 (for R7) / 105±3 (for C8) / 85±3 (for B3, R6)
Step	Temperature(°C)	Applying voltage														
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3	20±2 *															
4	125±3 (for R7) / 105±3 (for C8) / 85±3 (for B3, R6)															
10	Adhesive Strength of Termination	No removal of the terminations or other defect should occur.		Solder the capacitor on the test jig (glass epoxy board) shown in Fig.3 using an eutectic solder. Then apply 10N force in parallel with the test jig for 10±1seconds. The soldering should be done either with an iron or using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock.												
11	Vibration Resistance	Appearance	No defects or abnormalities.	Solder the capacitor on the test jig (glass epoxy board) in the same manner and under the same conditions as (10). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz. The frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1 minute. This motion should be applied for a period of 2 hours in each 3 mutually perpendicular directions(total of 6 hours).												
		Capacitance	Within the specified tolerance.													
		D.F.	[B3,R7,R6,C8] 0.025max.													
12	Deflection	Appearance	No defects or abnormalities.	Solder the capacitor on the test jig (glass epoxy board) shown in Fig.1 using an eutectic solder. Then apply a force in the direction shown in Fig 2 for 5±1 seconds. The soldering should be done by the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock.												
		Capacitance Change	Within ±10%													

■ SPECIFICATIONS AND TEST METHODS

No	Item	Specification		Test Method													
		High Dielectric Constant Type															
13	Solderability of Termination	75% of the terminations is to be soldered evenly and continuously.		Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion) . Preheat at 80 to 120°C for 10-to 30 seconds. After preheating, immerse in an eutectic solder solution for 2±0.5 seconds at 230±5°C or Sn-3.0Ag-0.5Cu solder solution for 2±0.5 seconds at 245±5°C.													
14	Resistance to Soldering Heat	Appearance	No defects or abnormalities.	Preheat the capacitor at 120 to 150°C for 1 minute. Immerse the capacitor in an eutectic solder solution* or Sn-3.0Ag-0.5Cu solder solution at 270±5°C for 10±0.5 seconds. Set at room temperature for 24±2 hours, then measure. Perform a heat treatment at 150+0/-10°C for one hour and then set at room temperature for 24±2 hours. Perform the initial measurement. *Preheating for GJ832 Table1 <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>100°C to 120°C</td> <td>1 min.</td> </tr> <tr> <td>2</td> <td>170°C to 200°C</td> <td>1 min.</td> </tr> </tbody> </table>	Step	Temperature	Time	1	100°C to 120°C	1 min.	2	170°C to 200°C	1 min.				
		Step	Temperature		Time												
		1	100°C to 120°C		1 min.												
		2	170°C to 200°C		1 min.												
		Capacitance Change	B3,R7,R6,C8 :Within ±7.5%														
D.F.	[B3,R7,R6,C8] 0.025max.																
I.R.	More than 10,000MΩ or 500Ω·F(Whichever is smaller)																
Dielectric Strength	No defects.																
15	Temperature Cycle	Appearance	No defects or abnormalities.	Fix the capacitor to the supporting jig in the same manner and under the same conditions as (10). Perform the five cycles according to the four heat treatments shown in the following table. Set for 24±2 hours at room temperature, then measure. <table border="1"> <thead> <tr> <th>Step</th> <th>Temp.(°C)</th> <th>Time (min)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td>Min. Operating Temp.+0/-3</td> <td>30±3</td> </tr> <tr> <td>Room Temp</td> <td>2 to 3</td> </tr> <tr> <td rowspan="2">3</td> <td>Max. Operating Temp.+3/-0</td> <td>30±3</td> </tr> <tr> <td>Room Temp</td> <td>2 to 3</td> </tr> </tbody> </table>	Step	Temp.(°C)	Time (min)	1	Min. Operating Temp.+0/-3	30±3	Room Temp	2 to 3	3	Max. Operating Temp.+3/-0	30±3	Room Temp	2 to 3
		Step	Temp.(°C)		Time (min)												
		1	Min. Operating Temp.+0/-3		30±3												
			Room Temp		2 to 3												
		3	Max. Operating Temp.+3/-0		30±3												
Room Temp	2 to 3																
Capacitance Change	B3,R7,R6,C8 :Within ±7.5%																
D.F.	[B3,R7,R6,C8] 0.025max.																
I.R.	More than 10,000MΩ or 500Ω·F(Whichever is smaller)																
Dielectric Strength	No defects.																
16	Humidity (Steady State)	Appearance	No defects or abnormalities.	Set the capacitor at 40±2°C and in 90 to 95% humidity for 500±12 hours. Remove and set for 24±2 hours at room temperature, then measure.													
		Capacitance Change	B3,R7,R6,C8 :Within ±12.5%														
		D.F.	[B3,R7,R6,C8] 0.05max.														
		I.R.	More than 1,000MΩ or 50Ω·F(Whichever is smaller)														
17	Humidity Load	Appearance	No defects or abnormalities.	Apply the rated voltage at 40±2°C and 90 to 95% humidity for 500±12 hours. Remove and set for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.													
		Capacitance Change	B3,R7,R6,C8 :Within ±12.5%														
		D.F.	[B3,R7,R6,C8] 0.05max.														
		I.R.	More than 500MΩ or 25Ω·F(Whichever is smaller)														
18	High Temperature Load	Appearance	No defects or abnormalities.	Apply 150%* of the rated voltage at the maximum operating temperature±3°C for 1000±12 hours. Set for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA. Apply 150% of the rated DC voltage at the maximum operating temperature ±3°C for one hour. Remove and set for 24±2 hours at room temperature. Perform initial measurement. *GJ8319R61H105, GJ8319R61H225, GJ831CC81E105KA01L : 200% of the rated voltage													
		Capacitance Change	B3,R7,R6,C8 :Within ±12.5%														
		D.F.	[B3,R7,R6,C8] 0.05max.														
		I.R.	More than 1,000MΩ or 50Ω·F(Whichever is smaller)														

Test method : Deflection

• Test substrate
 Material : Copper-clad laminated sheets for PCBs
 (Glass fabric base, epoxy resin)
 Thickness : 1.6mm
 Copper foil thickness : 0.035mm
 Gray colored part of Fig.1: Solder resist
 (Coat with heat resistant resin for soldr)

Fig.1 (in:mm)

Type	a	b	c
GJ821	1.2	4.0	1.65
GJ831	2.2	5.0	2.0
GJ832	2.2	5.0	2.9

(in mm)

Adhesive Strength of Termination,Vibration Resistance,Temperature Cycle, Humidity ,Humidity Load,High Temperature Load

• Test substrate
 Material : Copper-clad laminated sheets for PCBs
 (Glass fabric base, epoxy resin)
 Thickness : 1.6mm
 Copper foil thickness : 0.035mm

Fig.3 (in:mm)

Type	a	b	c
GJ821	1.2	4.0	1.65
GJ831	2.2	5.0	2.0
GJ832	2.2	5.0	2.9

(in mm)

Fig.2 (in:mm)

There are three type of packaging for chip monolithic ceramic capacitor.
Please specify the packaging code.

1. Bulk Packaging(Packaging Code=B):In a bag.

Minimum Quantity : 1000(pcs./bag)

2. Tape Carrier Packaging(Packaging Code:D/L/J/K)

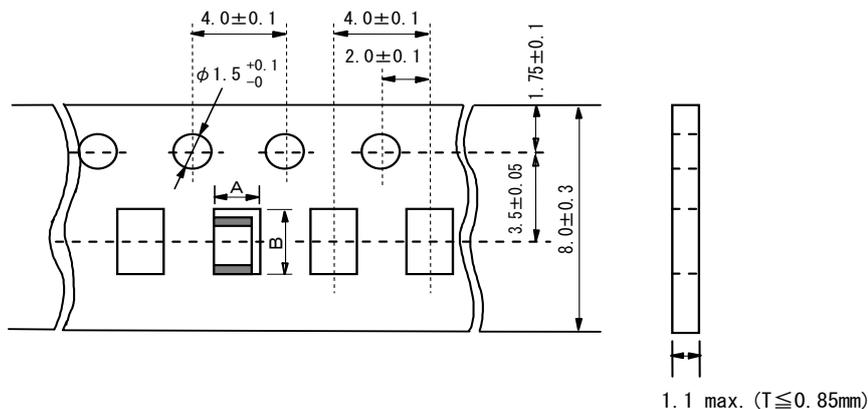
2.1 Minimum Quantity(pcs./reel)

Type	φ180mm reel		φ330mm reel	
	Paper Tape	Plastic Tape	Paper Tape	Plastic Tape
	Code:D	Code:L	Code:J	Code:K
GJ818	4000		10000	
GJ821		3000		10000
GJ831	9	4000	10000	
	C			6000
GJ832		1000		4000

2.2 Dimensions of Tape

(1)GJ818/GJ831(Paper Tape)

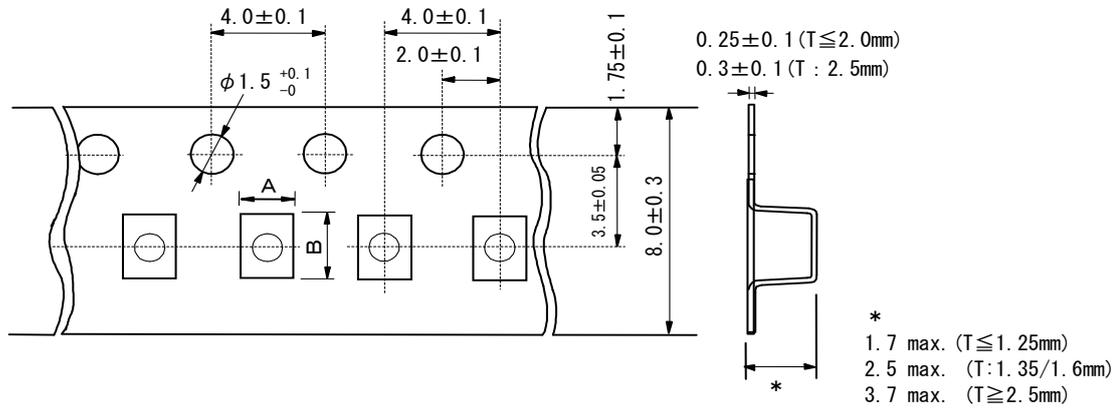
(in:mm)



Code	GJ818	GJ831
A	1.05±0.1	2.0±0.2
B	1.85±0.1	3.6±0.2

(2)GJ821/GJ831/GJ832(Plastic Tape)

(in:mm)



Code	GJ821	GJ831	GJ832
A	1.45 ± 0.2	1.9 ± 0.2	2.8 ± 0.2
B	2.25 ± 0.2	3.5 ± 0.2	3.5 ± 0.2

Fig.1 Package Chips

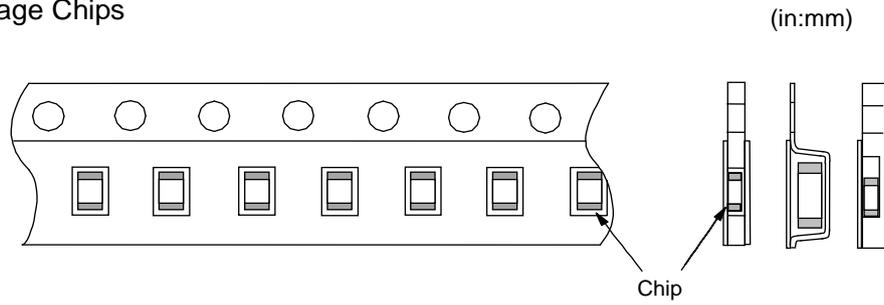


Fig.2 Dimensions of Reel

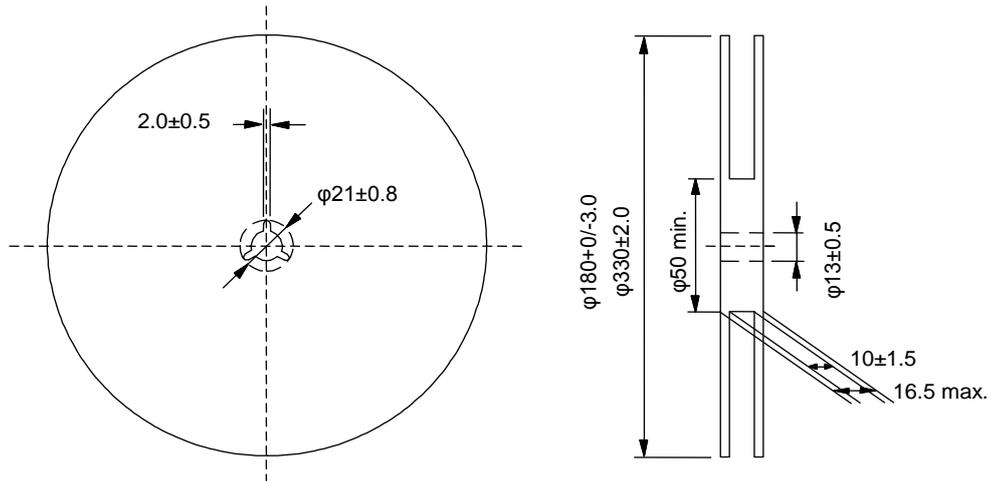
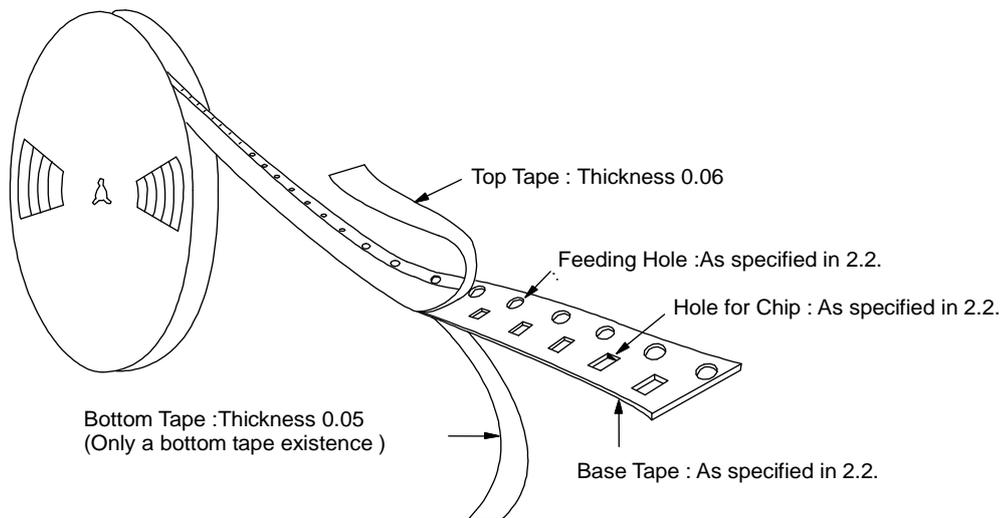
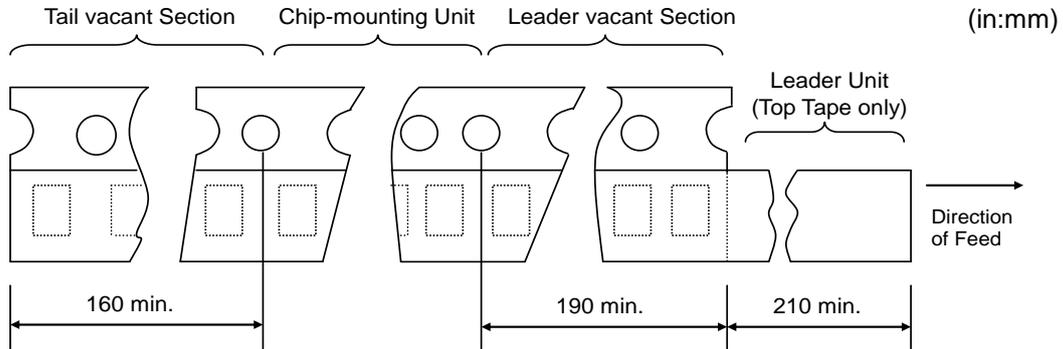


Fig.3 Taping Diagram



2.3 Tapes for capacitors are wound clockwise shown in Fig.3.
(The sprocket holes are to the right as the tape is pulled toward the user.)

2.4 Part of the leader and part of the vacant section are attached as follows.



2.5 Accumulate pitch : 10 of sprocket holes pitch = 40 ± 0.3 mm

2.6 Chip in the tape is enclosed by top tape and bottom tape as shown in Fig.1.

2.7 The top tape and base tape are not attached at the end of the tape for a minimum of 5 pitches.

2.8 There are no jointing for top tape and bottom tape.

2.9 There are no fuzz in the cavity.

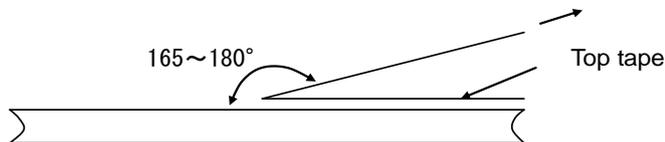
2.10 Break down force of top tape : 5N min.

Break down force of bottom tape : 5N min. (Only a bottom tape existence)

2.11 Reel is made by resin and appeaser and dimension is shown in Fig 2.

There are possibly to change the material and dimension due to some impairment.

2.12 Peeling off force : 0.1N to 0.6N in the direction as shown below.

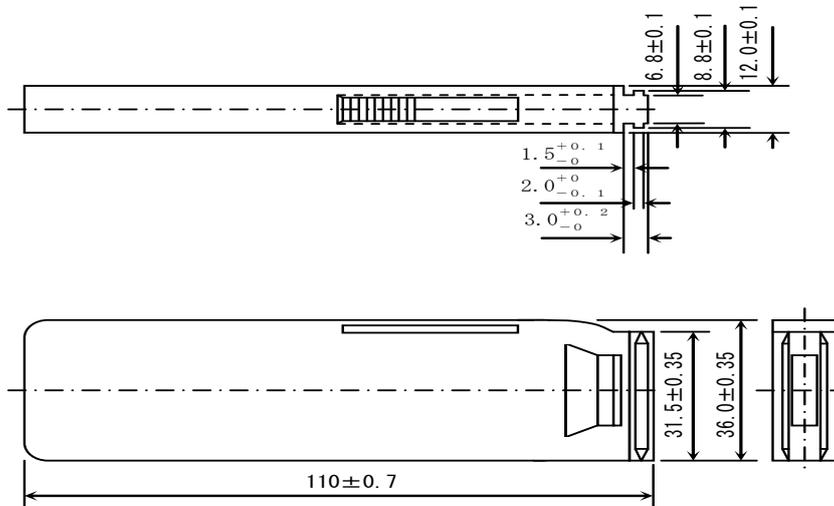


2.13 Label that show the customer parts number, our parts number, our company name, inspection number and quantity, will be put in outside of reel.

3. Bulk Case Packaging (Packaging Code=C)

Fig.4 Dimensions of Bulk case

(in:mm)



3.1 Minimum Quantity(pcs./case)

GJ821	B	5000
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3.2 Case is made by resin of transparence or semitransparency, and appeaser and dimension is shown in Fig.4.

There are possibility to change the material and dimension due to some impairment.

3.3 Case must be marked in Customer 's part number, MURATA part number, MURATA name, Inspection number and quantity(pcs).

■ Limitation of use

Please contact our sales representatives or product engineers before using our products for the applications listed below which require of our products for other applications than specified in this product.

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

■ Storage and Operation condition

1. Chip monolithic ceramic capacitors(chips) can experience degradation of termination solderability when subjected to high temperature or humidity, or if exposed to sulfur or chlorine gases. Storage environment must be at an ambient temperature of 5-40°C. and an ambient humidity of 20-70%RH. Use chip within 6 months. If 6 months or more have elapsed, check solderability before use. (Reference Data 1/ Solderability) Insulation Resistance should be deteriorated on specific condition of high humidity or incorrosion gas such as hydrogen sulfide, sulfurous acid gas, chlorine. Those condition are not suitable for use.

2. Use of Sn-Zn based solder will deteriorate reliability of MLCC. Please contact murata factory for the use of Sn-Zn based solder in advance.

3. Do not use under the condition that causes condensation.

Use dampproof countermeasure if using under the condition that causes condensation.

■ Handling

1. Inspection

- Thrusting force of the test probe can flex the PCB, resulting in cracked chips or open solder joints. Provide support pins on the back side of the PCB to prevent warping or flexing.

2. Board Separation (or Depanelization)

- Board flexing at the time of separation causes cracked chips or broken solder.
- Severity of stresses imposed on the chip at the time of board break is in the order of: Pushback < Slitter < V Slot < Perforator.
- Board separation must be performed using special jigs, not with hands.

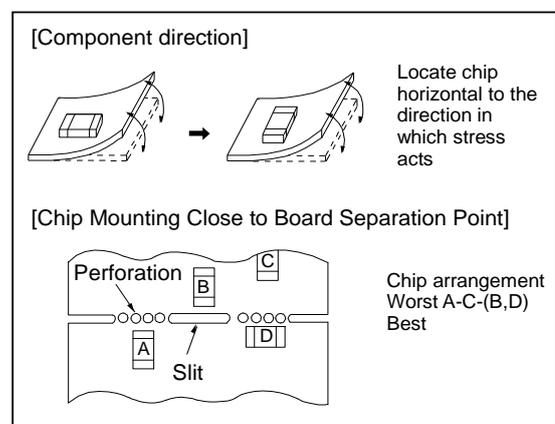
3. Reel and bulk case

- In the handling of reel and case, please pay attention not to drop it. Please do not use chip of the case which dropped.

■ Soldering and Mounting

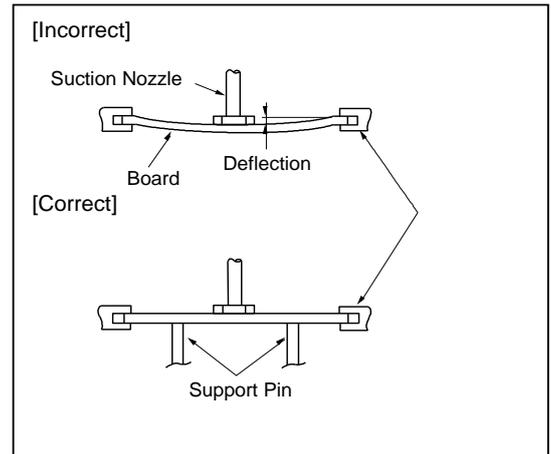
1. Mounting Position

Choose a mounting position that minimizes the stress imposed on the chip during flexing or bending of the board.



2. Chip Placing

- An excessively low bottom dead point of the suction nozzle imposes great force on the chip during mounting, causing cracked chips. So adjust the suction nozzle's bottom dead point by correcting warp in the board. Normally, the suction nozzle's bottom dead point must be set on the upper surface of the board. Nozzle pressure for chip mounting must be a 1 to 3N static load.
- Dirt particles and dust accumulated between the suction nozzle and the cylinder inner wall prevent the nozzle from moving smoothly. This imposes great force on the chip during mounting, causing cracked chips. And the locating claw, when worn out, imposes uneven forces on the chip when positioning, causing cracked chips. The suction nozzle and the locating claw must be maintained, checked and replaced periodically.



3. Caution for Soldering

(1) Reflow soldering

- When the sudden heat is given to the components, the mechanical strength of the components should go down because remarkable temperature change causes deformity of components inside. In order to prevent mechanical damage in the components, preheating should be required for both of the components and the PCB board. Preheating conditions are shown in table 1. It is required to keep temperature differential between the soldering and the components surface (ΔT) as small as possible.
- Solderability of Tin plating termination chip might be deteriorated when low temperature soldering profile where peak solder temperature is below the Tin melting point is used. Please confirm the solderability of Tin plating termination chip before use.
- When components are immersed in solvent after mounting, be sure to maintain the temperature difference (ΔT) between the component and the solvent within the range shown in the table 1.

[Standard Conditions for Reflow Soldering]

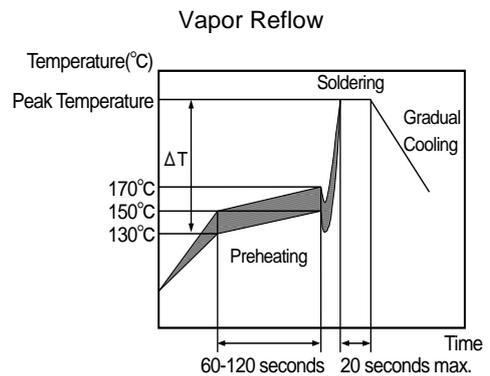
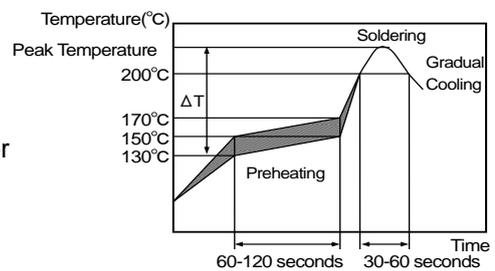


Table 1

Part Number	Temperature Differential
GJ818 / 821 / 831	$\Delta T \leq 190^\circ\text{C}$
GJ832	$\Delta T \leq 130^\circ\text{C}$

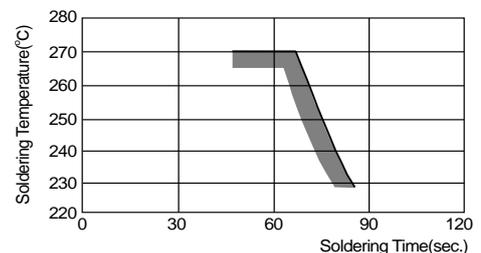
Recommended Conditions

	Pb-Sn Solder		Lead Free Solder
	Infrared Reflow	Vapor Reflow	
Peak Temperature	230~250°C	230~240°C	240~260°C
Atmosphere	Air	Air	Air or N ₂

Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

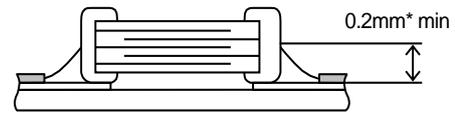
[Allowable Soldering Temperature and Time]



In case of repeated soldering, the accumulated soldering time must be within the range shown above.

- Optimum Solder Amount for Reflow Soldering
- Overly thick application of solder paste results in a excessive solder fillet height. This makes the chip more susceptible to mechanical and thermal stress on the board and may cause the chips to crack.
- Too little solder paste results in a lack of adhesive strength on the outer electrode, which may result in chips breaking loose from the PCB.
- Make sure the solder has been applied smoothly to the end surface to a height of 0.2mm* min.

[Optimum Solder Amount for Reflow soldering]



Inverting the PCB Make sure not to impose any abnormal mechanical shocks to the PCB.

(2) Leaded Component Insertion

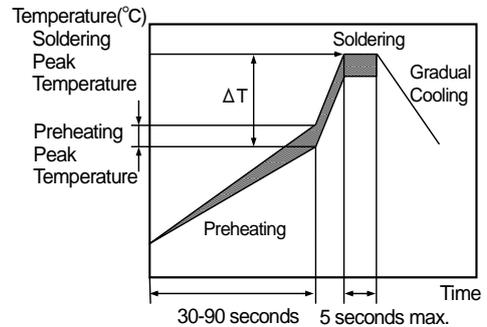
If the PCB is flexed when leaded components (such as transformers and ICs) are being mounted, chips may crack and solder joints may break.

Before mounting leaded components, support the PCB using backup pins or special jigs prevent warping.

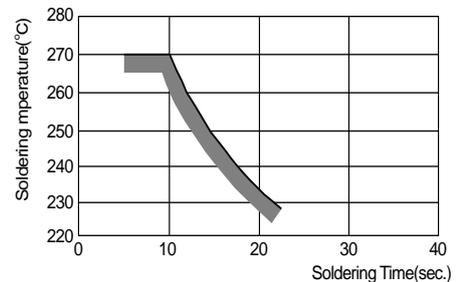
(3) Flow Soldering

- When sudden heat is given to the components, the mechanical strength of the components should go down because remarkable temperature change causes deformity of components inside. And an excessively long soldering time or high soldering temperature results in leaching of the outer electrodes, causing poor adhesion or a reduction in capacitance value due to loss of contact between electrodes and end termination.
- In order to prevent mechanical damage in the components, preheating should be required for both of the components and the PCB board. Preheating conditions are shown in table 2. It is required to keep temperature differential between the soldering and the components surface (ΔT) as small as possible. When components are immersed in solvent after mounting, be sure to maintain the temperature difference between the component and solvent within the range shown in Table 2. Do not apply flow soldering to chips not listed in Table 2.

[Standard Conditions for Flow Soldering]



[Allowable Soldering Temperature and Time]



In case of repeated soldering, the accumulated soldering time must be within the range shown above.

Table 2

Part Number	Temperature Differential
GJ818 / 821 / 831	$\Delta T \leq 150^\circ\text{C}$

* GJ831CC81E105K not apply Flow Soldering.

Recommended Conditions

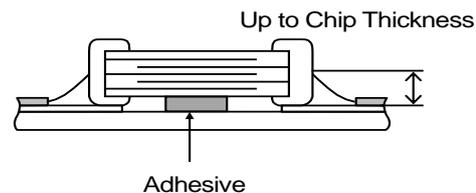
	Pb-Sn Solder	Lead Free Solder
Preheating Peak Temperature	90~110°C	100~120°C
Soldering Peak Temperature	240~250°C	250~260°C
Atmosphere	Air	N ₂

Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

●Optimum Solder Amount for Flow Soldering

The top of the solder fillet should be lower than the thickness of components. If the solder amount is excessive, the risk of cracking is higher during board bending or any other stressful condition.



(4)Correction with a Soldering Iron

●When sudden heat is applied to the components by use of a soldering iron, the mechanical strength of the components will go down because the extreme temperature change causes deformations inside the components. In order to prevent mechanical damage to the components, preheating is required for both the components and PCB board.

Preheating conditions, (The "Temperature of the Soldering Iron tip", "Preheating Temperature", "Temperature Differential" between the iron tip and the components and the PCB), should be within the conditions of table 3.

It is required to keep the temperature differential between the soldering Iron and the components surface (ΔT) as as possible.

After soldering, do not allow the component/PCB to cool down rapidly.

The operating time for the re-working should be as short as possible. When re-working time is too long, it may cause solder leaching, and that will cause a reduction of the adhesive strength of the terminations.

Table 3

Part Number	Temperature of Soldering Iron tip	Preheating Temperature	Temperature Differential	Atmosphere
GJ818/821/831	350°C max	150°C min	$\Delta T \leq 190^\circ\text{C}$	Air
GJ832	280°C max	150°C min	$\Delta T \leq 130^\circ\text{C}$	Air

*Applicable for both Pb-Sn and Lead Free Solder

Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

●Optimum Solder Amount when re-working Using a Soldering Iron

In case of smaller sizes than 0603, the top of the solder fillet should be lower than 2/3's of the thickness of the component or 0.5mm whichever is smaller.

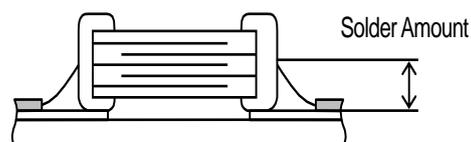
In case of 0805 and larger sizes, the top of the solder fillet should be lower than 2/3's of the thickness of the component.

If the solder amount is excessive, the risk of cracking is higher during board bending or under any other stressful conditions.

A Soldering iron Φ 3mm or smaller should be used.

It is also necessary to keep the soldering iron from touching the components during the re-work.

Solder wire with Φ 0.5mm or smaller is required for soldering.



4.Washing

Excessive output of ultrasonic oscillation during cleaning causes PCBs to resonate, resulting in cracked chips or broken solder. Take note not to vibrate PCBs.

Failure to follow the above cautions may result, worst case, in a short circuit and fuming when the products is used.

■ Soldering and Mounting

1. PCB Design

(1) Notice for Pattern Forms

● Unlike leaded components, chip components are susceptible to flexing stresses since they are mounted directly on the substrate.

They are also more sensitive to mechanical and thermal stresses than leaded components.

Excess solder fillet height can multiply these stresses and cause chip cracking. When designing substrates, take land patterns and dimensions into consideration to eliminate the possibility of excess solder fillet height.

● It has a possibility to happen the chip crack by the expansion and shrinkage of metal board. Please contact us if you want to use the ceramic capacitor on metal board such as Aluminum.

Pattern Forms

	Placing Close to Chassis	Placing of Chip Components and Leaded Components	Placing of Leaded Components after Chip Component	Lateral Mounting
prohibited				
Correct				

(2) Land Dimensions

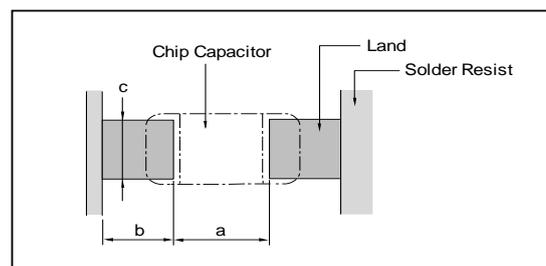


Table 1 Flow Soldering Method

Dimensions Part Number	L × W	a	b	c
GJ818	1.6 × 0.8	0.6-1.0	0.8-0.9	0.6-0.8
GJ821	2.0 × 1.25	1.0-1.2	0.9-1.0	0.8-1.1
GJ831	3.2 × 1.6	2.2-2.6	1.0-1.1	1.0-1.4

in : mm

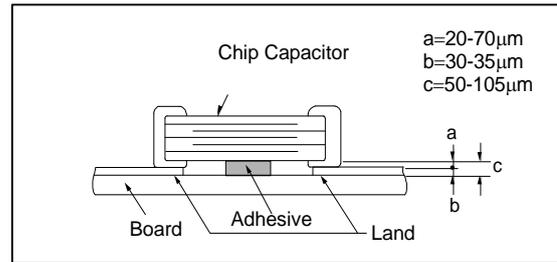
Table 2 Reflow Soldering Method

Dimensions Part Number	L × W (Dimensions Tolerance)	a	b	c
GJ818	1.6 × 0.8	0.6-0.8	0.6-0.7	0.6-0.8
GJ821	2.0 × 1.25 (±0.10)	1.0-1.2	0.6-0.7	0.8-1.1
	2.0 × 1.25 (±0.20)	1.0-1.4	0.6-0.8	1.2-1.4
GJ831	3.2 × 1.6	2.2-2.4	0.8-0.9	1.0-1.4
GJ832	3.2 × 2.5	2.0-2.4	1.0-1.2	1.8-2.3

in: mm

2. Adhesive Application

- Thin or insufficient adhesive causes chips to loosen or become disconnected when flow soldered. The amount of adhesive must be more than dimension c shown in the drawing below to obtain enough bonding strength. The chip's electrode thickness and land thickness must be taken into consideration.
- Low viscosity adhesive causes chips to slip after mounting. Adhesive must have a viscosity of 5000pa-s(500ps)min. (at 25°C)



3. Adhesive Curing

Insufficient curing of the adhesive causes chips to disconnect during flow soldering and causes deteriorated insulation resistance between outer electrodes due to moisture absorption. Control curing temperature and time in order to prevent insufficient hardening.

Inverting the PCB

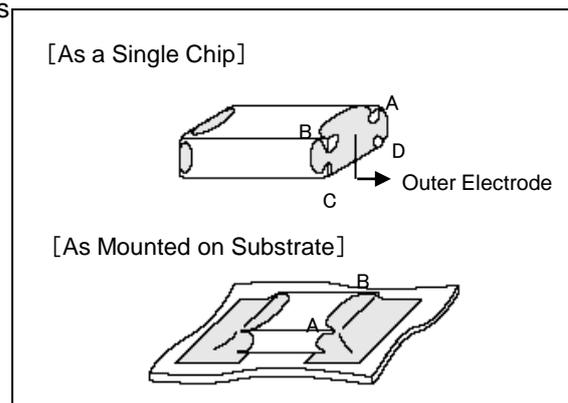
Make sure not to impose an abnormal mechanical shock on the PCB.

4. Flux Application

- An excessive amount of flux generates a large quantity of flux gas, causing deteriorated solderability. So apply flux thinly and evenly throughout. (A foaming system is generally used for flow soldering).
 - Flux containing too a high percentage of halide may cause corrosion of the outer electrodes unless sufficiently cleaning. Use flux with a halide content of 0.2% max. But do not use strong acidic flux. Do not use water-soluble flux*.
- (*Water-soluble flux can be defined as non resin type flux including wash-type flux and non-wash-type flux.)

5. Flow Soldering

- Set temperature and time to ensure that leaching of the outer electrode does not exceed 25% of the chip end area as a single chip (full length of the edge A-B-C-D shown right) and 25% of the length A-B shown below as mounted on substrate.



■ Others

1. Resin Coating

When selecting resin materials, select those with low contraction.

2. Circuit Design

These capacitors on this catalog are not safety recognized products.

3. Remarks

The above notices are for standard applications and conditions. Contact us when the products are used in special mounting conditions. Select optimum conditions for operation as they determine the reliability of the product after assembly.

■ NOTE

1. Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.

2. You are requested not to use our product deviating from this product specification.

3. We consider it not appropriate to include any terms and conditions with regard to the business transaction in the product specifications, drawings or other technical documents. Therefore, if your technical documents as above include such terms and conditions such as warranty clause, product liability clause, or intellectual property infringement liability clause, they will be deemed to be invalid.