Specification Sheet

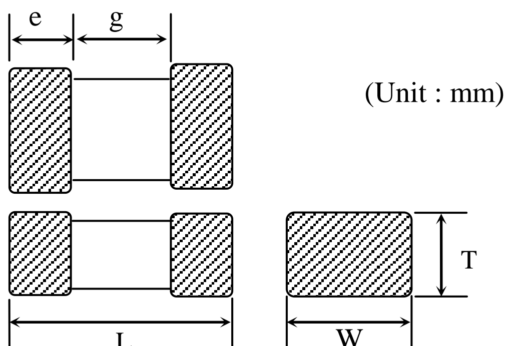
<Chip Monolithic Ceramic Capacitor>

Murata Global P/N : WBM155R71H103KA01D (0402,X7R,0.01μF,50V)

Corresponding products for RoHS directive

1.Dimensions (Unit : mm)

L	1.0+/-0.05
W	0.5+/-0.05
T	0.5+/-0.05
e	0.15 to 0.35
g	0.3 min.



2. Rated Value

TC code	R7
TC	X7R
Temp.Coeff or Cap.Change	+/-15% at -55 to 125°C
CAP. , CAP.TOL	0.01μF , +/-10%
DC Rated Voltage	50V
Size Code	0402

3.Packaging

Specification	Packaging unit [pcs/reel]
ϕ180 Paper Tape Carrier Packaging	10000

4.Specification

Please refer to next page.

⚠Note

(1)This specification sheet is applied for CHIP MONOLITHIC CERAMIC CAPACITOR "WBM series" used for General Electronics equipment for your design.

(2) Please contact our sales representative or product engineers before using our products for the application listed below.
① Aircraft equipment ② Aerospace equipment ③ Undersea equipment ④ Medical equipment
⑤ Transportation equipment ⑥ Traffic signal equipment ⑦ Disaster prevention / crime prevention equipment
⑧ Application of similar complexity and/or requirements to the applications listed in the above.

(3) 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.

(4)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.

(5)This specification sheet has only typical specification because there is no space for detailed specifications.
Therefore, please approve our product specification or transact the approval sheet for product specification before your ordering.
Especially, please read rating and CAUTION (for storage, operating, rating, soldering, mounting, and handling) in them to prevent smoking and /or burning, etc.

(6) Product material and design are subject to change without advance notice even though product specification is no change.

(7) This specification has no room to accept your special requests.

If there are any questions, please contact our sales representatives or product engineers.

■SPECIFICATIONS AND TEST METHODS

<table>
<tr><th>No</th><th>Item</th><th colspan="2">Specification</th><th>Test Method</th></tr>
<tr><td>1</td><td>Operating Temperature Range</td><td colspan="2">R6 : -55°C to +85°C
R7 : -55°C to +125°C</td><td>Reference Temperature : 25°C</td></tr>
<tr><td>2</td><td>Rated Voltage</td><td colspan="2">See the previous pages</td><td>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.</td></tr>
<tr><td>3</td><td>Appearance</td><td colspan="2">No defects or abnormalities</td><td>Visual inspection.</td></tr>
<tr><td>4</td><td>Dimensions</td><td colspan="2">Within the specified dimension</td><td>Using calipers or Microscope. (GRM02 size is based on Microscope)</td></tr>
<tr><td>5</td><td>Dielectric Strength</td><td colspan="2">No defects or abnormalities</td><td>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.</td></tr>
<tr><td>6</td><td>Insulation Resistance</td><td colspan="2">More than 50Ω· F</td><td>The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 25°C and 75%RH max. and within 1 minutes of charging.</td></tr>
<tr><td>7</td><td>Capacitance</td><td colspan="2">Within the specified tolerance</td><td rowspan="2">The capacitance/D.F. should be measured at 25°C at the frequency and voltage shown in the table.
<table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td>C≦10μF (10V min.)</td><td>1 ± 0.1kHz</td><td>1.0 ± 0.2 Vrms</td></tr><tr><td>C≦10μF (6.3V max.)</td><td>1 ± 0.1kHz</td><td>0.5 ± 0.1 Vrms</td></tr><tr><td>C > 10μF</td><td>120 ± 24Hz</td><td>0.5 ± 0.1 Vrms</td></tr></table></td></tr>
<tr><td>8</td><td>Dissipation Factor (D.F.)</td><td colspan="2">R6, R7 : 0.1 max.</td></tr>
<tr><td>9</td><td>Capacitance Temperature Characteristics</td><td colspan="2"><table><tr><th>Char.</th><th>Temp.Range</th><th>Reference Temp.</th><th>Cap.Change</th></tr><tr><td>R6</td><td>-55°C to +85°C</td><td>25°C</td><td>Within ±15%</td></tr><tr><td>R7</td><td>-55°C to +125°C</td><td>25°C</td><td>Within ±15%</td></tr></table></td><td>The capacitance change should be measured after 5 min.at each specified temperature stage.
The ranges of capacitance change compared with the 25°C value over the temperature ranges shown in the table shall be within the specified ranges.

· 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 hour at room temperature.
Perform the initial measurement.</td></tr>
<tr><td>10</td><td>Adhesive Strength of Termination</td><td colspan="2">No removal of the terminations or other defects should occur.

c
b
a
Solder resist
Baked electrode or copper foil
Fig.1</td><td>Solder the capacitor to the test jig (glass epoxy board) shown in Fig.1 using a eutectic solder. Then apply 5N force in parallel with the test jig for 10±1 sec. 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.
<table><tr><th>Type</th><th>a</th><th>b</th><th>c</th></tr><tr><td>WBM15</td><td>0.4</td><td>1.5</td><td>0.5</td></tr></table>(in:mm)</td></tr>
<tr><td rowspan="3">11</td><td rowspan="3">Vibration</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="3">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).</td></tr>
<tr><td>Capacitance</td><td>Within the specified tolerance</td></tr>
<tr><td>D.F</td><td>R6, R7 : 0.1 max.</td></tr>
</table>

■SPECIFICATIONS AND TEST METHODS

<table>
<tr><th>No</th><th>Item</th><th colspan="2">Specification</th><th>Test Method</th></tr>
<tr><td rowspan="3">12</td><td rowspan="3">Deflection</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="3">Solder the capacitor to the test jig (glass epoxy board) shown in Fig.2 using a eutectic solder. Then apply a force in the direction shown in Fig.3. 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.

b
φ4.5
40
c
a
100
Fig.2

<table><tr><th>Type</th><th>a</th><th>b</th><th>c</th></tr><tr><td>WBM15</td><td>0.4</td><td>1.5</td><td>0.5</td></tr></table>(in:mm)</td></tr>
<tr><td>Capacitance Change</td><td>Within ±10%</td></tr>
<tr><td colspan="2">20
50
Pressunzing
speed:1.0mm/sec.
Pressunze
R230
Flexure: ≦1
Capacitance meter
45 45
WBM15 : t : 0.8mm
Fig.3</td></tr>
<tr><td>13</td><td>Solderability of Termination</td><td colspan="2">75% of the terminations is to be soldered evenly and continuously</td><td>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 eutectic solder solution for 2±0.5 seconds at 230±5°C or Sn-3.0 Ag-0.5 Cu solder solution for 2±0.5 seconds at 245±5°C.</td></tr>
<tr><td rowspan="5">14</td><td rowspan="5">Resistance to Soldering Heat</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="5">Preheat the capacitor at 120 to 150°C for 1 minute. Immerse the capacitor in an eutectic solder solution or Sn-3.0 Ag-0.5 Cu solder solution at 270±5°C for 10±0.5 seconds. Set at room temperature for 24±2 hours, then measure.

· Initial measurement for high dielectric constant type
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.</td></tr>
<tr><td>Capacitance Change</td><td>R6, R7 : Within ±7.5%</td></tr>
<tr><td>D.F.</td><td>R6, R7 : 0.1 max.</td></tr>
<tr><td>I.R.</td><td>More than 50Ω· F</td></tr>
<tr><td>Dielectric Strength</td><td>No defects</td></tr>
<tr><td rowspan="5">15</td><td rowspan="5">Temperature Sudden Change</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="5">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><tr><th>Step</th><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><td>Temp.(°C)</td><td>Min. Operating Temp.+0/-3</td><td>Room Temp.</td><td>Max. Operating Temp.+3/-0</td><td>Room Temp.</td></tr><tr><td>Time(min.)</td><td>30±3</td><td>2 to 3</td><td>30±3</td><td>2 to 3</td></tr></table>· Initial measurement for high dielectric constant type
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.</td></tr>
<tr><td>Capacitance Change</td><td>R6, R7 : Within ±7.5%</td></tr>
<tr><td>D.F.</td><td>R6, R7 : 0.1 max.</td></tr>
<tr><td>I.R.</td><td>More than 50Ω· F</td></tr>
<tr><td>Dielectric Strength</td><td>No defects</td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">High Temperature High Humidity (Steady)</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="4">Apply the rated voltage at 40±2°C and 90 to 95% humidity for 500±12 hours.
The charge/discharge current is less than 50mA.
· Initial measurement
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.
· Measurement after test
Perform a heat treatment at 150+0/-10°C for one hour and then set for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Capacitance Change</td><td>R6, R7 : Within ±12.5%</td></tr>
<tr><td>D.F.</td><td>R6, R7 : 0.2max.</td></tr>
<tr><td>I.R.</td><td>More than 12.5Ω· F</td></tr>
<tr><td rowspan="4">17</td><td rowspan="4">Durability</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="4">Apply 150% of the rated voltage for 1000±12 hours at the maximum operating temperature ±3°C. Set for 24±2 hours at room temperature, then measure.
The charge/ discharge current is less than 50mA.
· Initial measurement
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.
· Measurement after test Perform a heat treatment at 150+0/-10°C for one hour and then set for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Capacitance Change</td><td>R6, R7 : Within ±12.5%</td></tr>
<tr><td>D.F.</td><td>R6, R7 : 0.2max.</td></tr>
<tr><td>I.R.</td><td>More than 25Ω· F</td></tr>
</table>

PACKAGING

WBM Type

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)

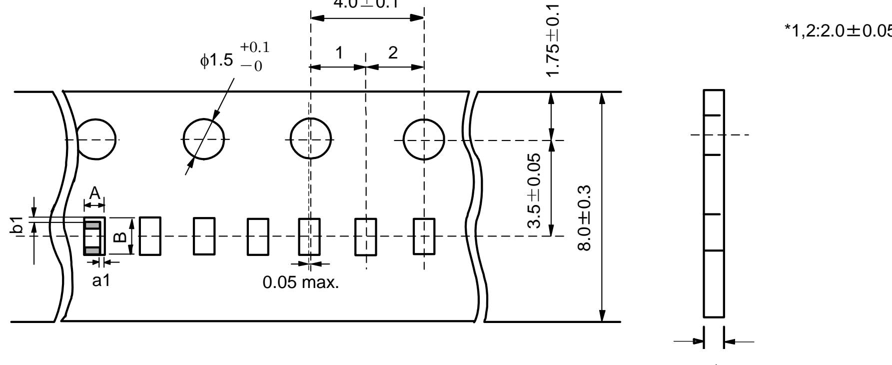
2.1 Minimum Quantity(pcs./reel)

Type	ϕ180 reel	ϕ330 reel
	Paper Tape	Paper Tape
	Code:D	Code:J
WBM15	10000	50000

2.2 Dimensions of Tape

(in : mm)

(2)WBM15



Code	WBM15
A *3	0.65
B *3	1.15
a1,b1 *3	0.15
t	0.8 max.

*3 Nominal value

PACKAGING
WBM Type

Fig.1 Package Chips

(in : mm)

Chip

Fig.2 Dimensions of Reel

2.0±0.5

ϕ21±0.8

ϕ 178±2.0/ ϕ 328±2.0

ϕ 50 min.

ϕ 13±0.5

W_1

W

Fig.3 Taping Diagram

	W	w_1
WBM15	16.5 max.	10±1.5

Top Tape : Thickness 0.06

Feeding Hole :As specified in 2.2.

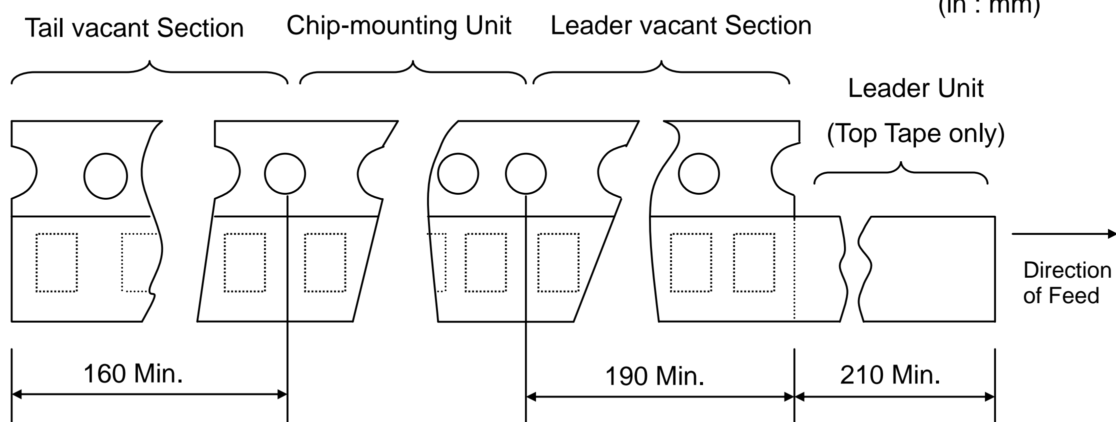
Hole for Chip : As specified in 2.2.

Bottom Tape :Thickness 0.05
(Only a bottom tape existence)

Base Tape : As specified in 2.2.

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±0.3mm

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.

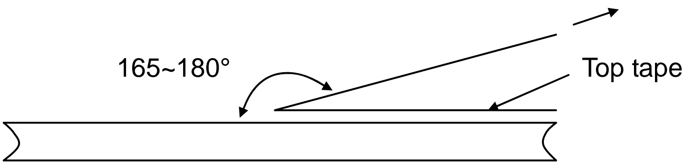
2.8 There are no jointing for top tape and bottom tape.

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 : 0.1 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.

⚠CAUTION

◆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

⚠CAUTION

◆Storage and Operating Conditions

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 temperatureof 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,cholorine. 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.

⚠CAUTION

◆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 Depane-lization)

- 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

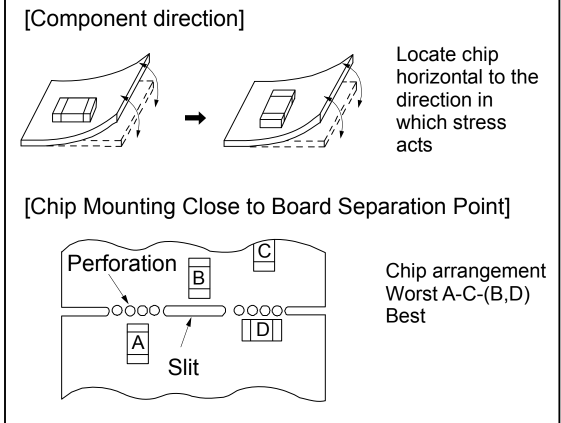
- In the handling of reel and case, please pay attention not to drop it. Please do not use chip of the case which dropped.

⚠CAUTION

◆Soldering and Mounting

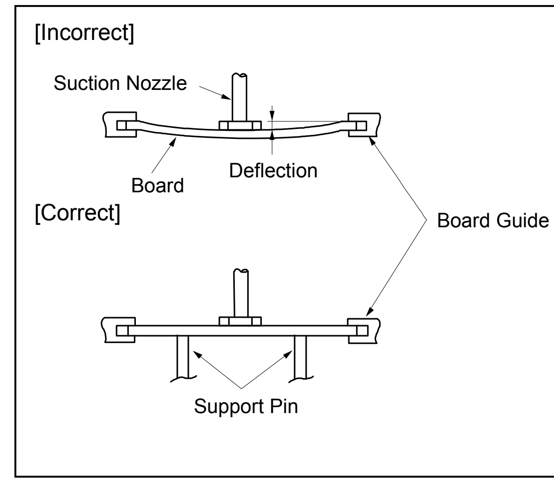
1.Mounting Position

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 solvent within the range shown in the table 1.

Table 1

Part Number	Temperature Differential
WBM15	Δ T ≦ 190°C

Recommended Conditions

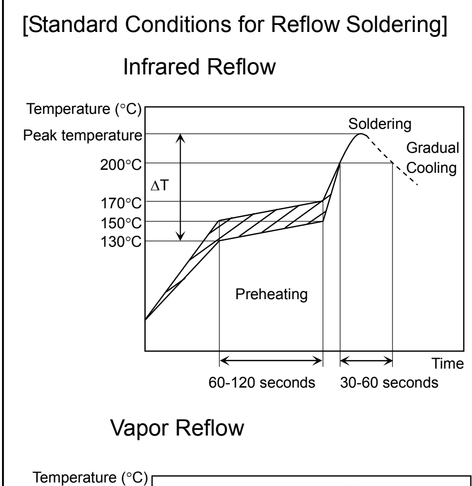
	Pb-Sn Solder		Lead Free Solder
	Infrared Reflow	Vapor Reflow	
Peak Temperature	230-250°C	230-240°C	240-260°C
Atmosphere	Air	Air	Air or N_2

Pb-Sn Solder: Sn-37Pb

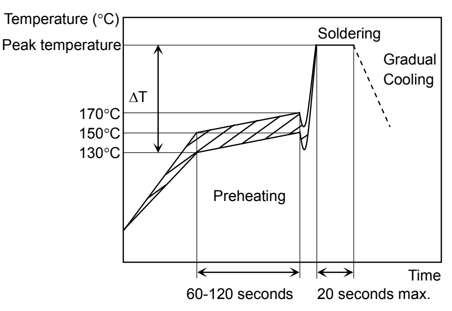
Lead Free Solder: Sn-3.0Ag-0.5Cu

[Standard Conditions for Reflow Soldering]

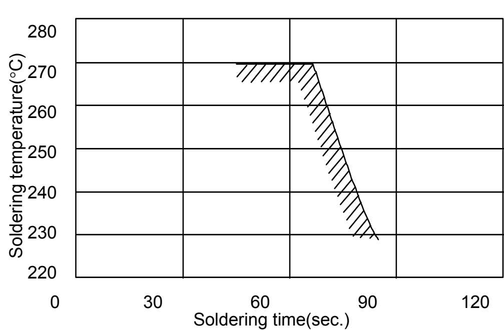
Infrared Reflow



Vapor Reflow



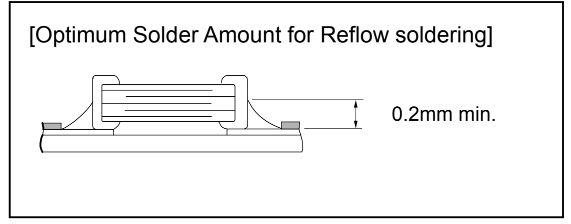
[Allowable Soldering Temperature and Time]



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 excessive fillet height solder.
  This makes the chip more susceptible to mechanical and thermal stress on the board and may cause cracked chips.
- ●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 an abnormal mechanical shock on 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)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 the 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 small 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.

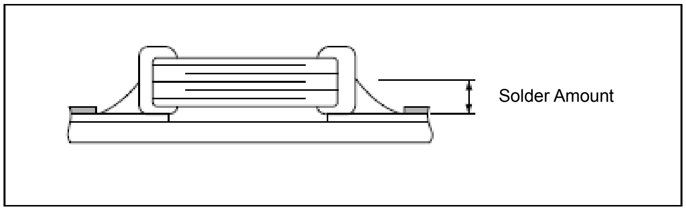
Table 3

Part Number	Temperature of Soldering Iron tip	Preheating Temperature	Temperature Differential	Atmosphere
WBM15	350°C max	150°C min	ΔT ≦ 190°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.
If the solder amount is excessive, the risk of cracking is higher during board bending or under any other stressful conditions.
A Soldering iron ϕ3mm 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 ϕ0.5mm 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.

NOTICE

◆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	Chassis Solder(Ground) Electrode pattern	Lead wire	Soldering iron Lead wire	
Correct	Solder resist	Solder resist	Solder resist	Solder resist

(2)Land Dimensions

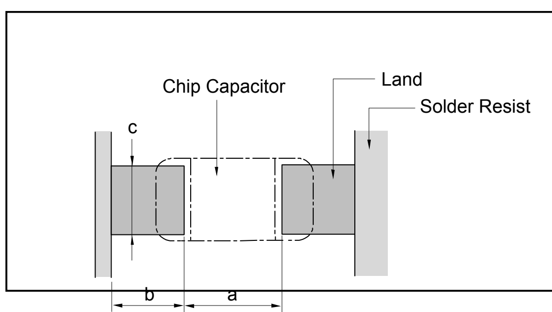


Table Reflow Soldering Method

Part Number \ Dimensions	Dimensions(L X W)	a	b	c
WBM15	1.0 X 0.5	0.3-0.5	0.35-0.45	0.4-0.6

(in : mm)

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 high a 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.)

◆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)This specification sheet is applied for CHIP MONOLITHIC CERAMIC CAPACITOR "WBM series" used for General Electronics equipment for your design.

(2) Please contact our sales representative or product engineers before using our products for the application listed below.

① Aircraft equipment ② Aerospace equipment ③ Undersea equipment ④ Medical equipment

⑤ Transportation equipment ⑥ Traffic signal equipment ⑦ Disaster prevention / crime prevention equipment

⑧ Application of similar complexity and/or requirements to the applications listed in the above.

(3) 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.

(4)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.

(5)This specification sheet has only typical specification because there is no space for detailed specifications.

Therefore, please approve our product specification or transact the approval sheet for product specification before your ordering.

Especially, please read rating and CAUTION (for storage, operating, rating, soldering, mounting, and handling) in them to prevent smoking and /or burning, etc.

(6) Product material and design are subject to change without advance notice even though product specification is no change.

(7) This specification has no room to accept your special requests.

If there are any questions, please contact our sales representatives or product engineers.

⚠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.Your are requested not to use our product deviating from this product specification.

3.Please return one copy of these specifications upon your acceptance.

If the copy is not returned by a day mentioned in a cover the specifications will be deemed to have been accepted.

4.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.