

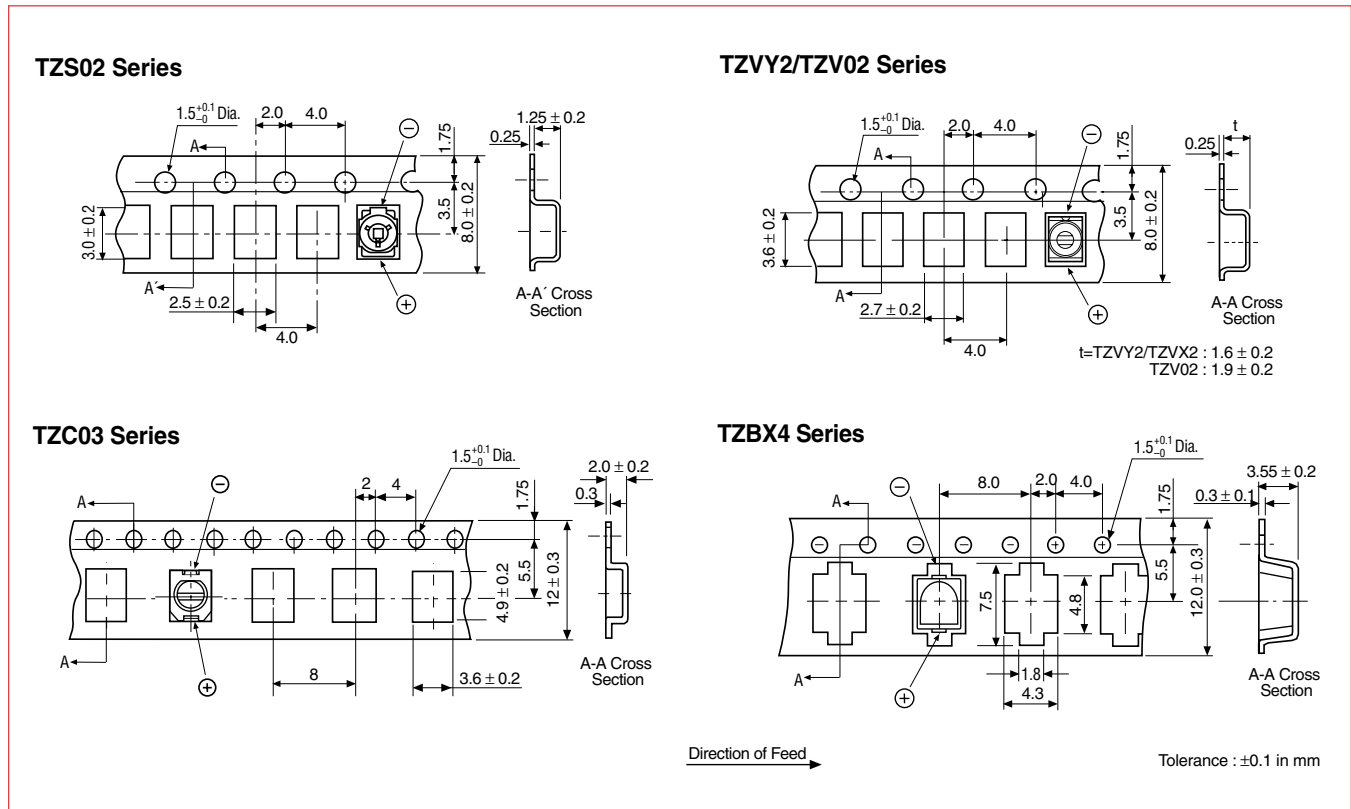
# TRIMMER CAPACITORS

## CHIP TRIMMER CAPACITORS

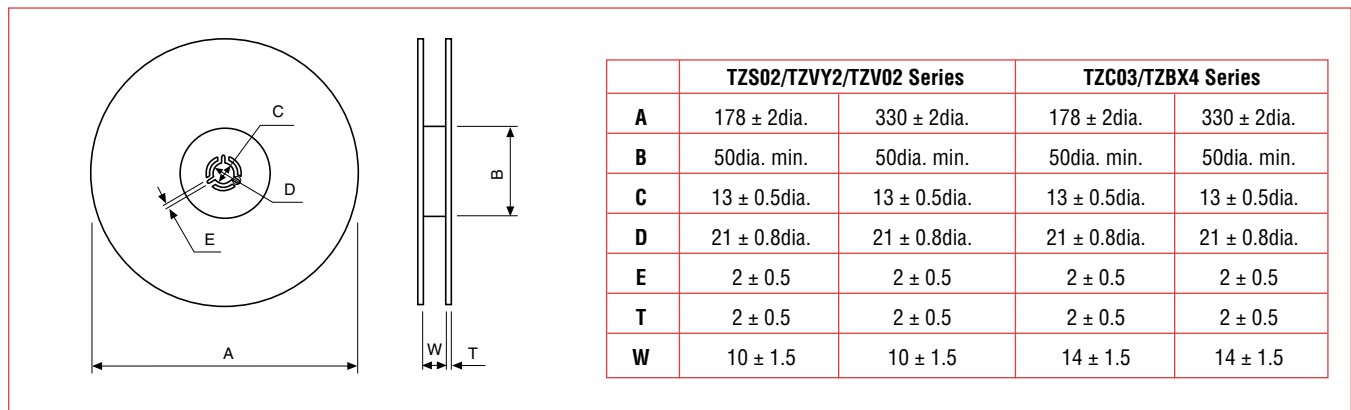
### TAPE AND REEL, ORDER INFO

TZS02/TZVY2/TZV02/TZC03/TZBX4/TZ03 Series

### DIMENSIONS FOR PLASTIC TAPE CARRIER: mm



### REEL DIMENSIONS : mm



### MINIMUM ORDER QUANTITY (Order in sets only)

#### TZS02 SERIES

3,000pcs./reel (180mm dia.)  
10,000pcs./reel (330mm dia.)  
500pcs./bag

#### TZVY2 SERIES

2,000pcs./reel (180mm dia.)  
10,000pcs./reel (330mm dia.)  
500pcs./bag

#### TZV02 SERIES

2,000pcs./reel (180mm dia.)  
8,000pcs./reel (330mm dia.)  
500pcs./bag

#### TZC03 SERIES

1,000pcs./reel (180mm dia.)  
4,000pcs./reel (330mm dia.)  
500pcs./bag

#### TZBX4 SERIES

500pcs./reel (180mm dia.)  
2,500pcs./reel (330mm dia.)  
500pcs./bag

#### TZ03 SERIES

1,000pcs./bag  
500pcs./bag (YR style only)

# TRIMMER CAPACITORS

## MOUNTING, SOLDERING, CLEANING, ADJUSTING

### INTRODUCTION:

Trimmer capacitors made by MURATA MFG. CO., LTD. are designed to achieve high reliability and cost efficiency. We offer the following usage guidelines to ensure our trimmer capacitors perform effectively and meet your requirements. Rapid innovations will certainly create new applications for our trimmer capacitors. We welcome you to contact us concerning application questions.

### MOUNTING TRIMMER CAPACITORS ON PCBs

Ensure that PCB hole spacing complies with the terminal spacing requirement of the intended trimmer capacitor model. Incorrect hole spacing may lower trimmer capacitor performance due to excessive stress applied to the terminal.

Mount trimmer capacitor in contact with PCB.

Do not apply bending stress after the trimmer capacitor has been mounted to the PCB. See the stress specification listed below.

Model	Allowable Stress
TZ03/TZBX4 (Terminal Style CZD)	10.0N(Ref.1kgf)

Note trimmer capacitor polarity to minimize the influence of stray capacitance. Refer to the outlines of each model. (⊕Terminal:Stator side; ⊖Terminal:Rotor side)

Do not warp and/or bend PC board to prevent trimmer capacitor from breakage.

### SOLDERING

Standard soldering conditions are shown below. Before using soldering conditions other than those listed below, please consult MURATA factory representative. If the soldering conditions are not suitable for the product, the trimmer capacitor may deviate from the specified performances characteristic.

#### Soldering Iron

	TZS02/TZVY2/ TZV02/TZC03	TZBX4/TZ03
Tip temperature	260°C±10°C	260°C±10°C
Soldering time	3 sec. max.	3 sec. max.
Tip diameter	1 mm dia. max.	2mm dia. max.
Iron wattage	20W max.	30W max.

#### Flow Soldering

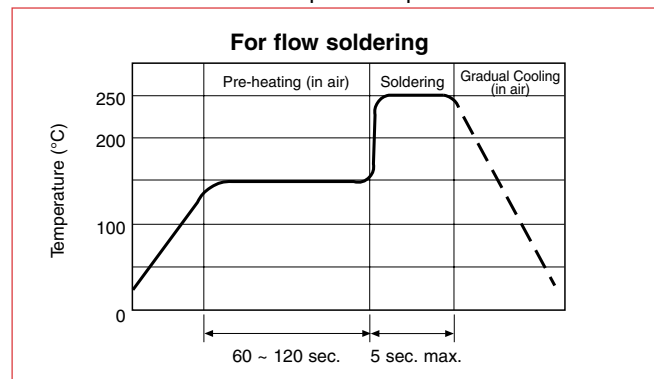
TZBX4 Cover film type

Immerse the body in solder bath

TZBX4 Terminal style C and D / TZ03 series

Only immerse terminal in solder bath

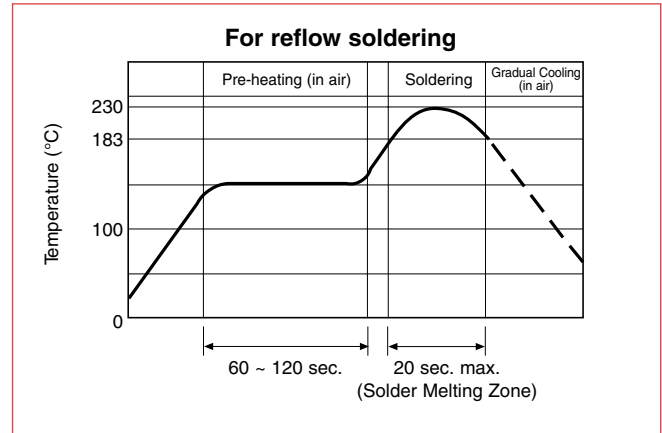
Refer to the standard temperature profile listed below.



### Reflow Soldering

TZS02/TZVY2/TZV02/TZC03/TZBX4 series

Refer to the standard temperature profile listed below.



### Notice When Soldering

The solder iron should contact neither the trimmer capacitor's resin case nor its ceramic substrate.

To prevent the deterioration of trimmer capacitor characteristics, apply flux only to terminals.

The amount of solder is critical. Insufficient amounts of solder can lead to insufficient soldering strength on the PCB. Excessive amounts of solder may cause bridging between the terminals resulting in terminal shorts.

Do not use water-soluble flux if using water for washing.

TZS02/TZVY2/TZV02/TZC03/TZBX4 series without cover films can not be soldered using the flow soldering method (dipping).

TZ03 series can not be soldered using the reflow soldering method.

When soldering the TZC03 series, the solder should not flow into the staking part of the substrate. If such flow does occur, driver slot rotation will be impeded.

Use our standard land dimension. Excessive land area causes displacement due to effect of the surface tension of the solder or the contact failure due to flux wicking up. Insufficient land area causes insufficient soldering strength of the chip.

Series	Standard applying thickness
TZS02/TZVY2/TZV02	120 - 170μm
TZC03	150 - 200μm
TZBX4	200 - 250μm

## CLEANING

TZS02 / TZVY2 / TZV02 / TZC03 / TZBX4 Series  
(without cover film) can not be cleaned because of open construction.

### Cleaning Solvents

Isopropyl-alcohol and ethyl-alcohol are satisfactory cleaning agents. Water-based agents like Pinealpha and Cleanthre cannot be used. Before using other agents, please consult a MURATA factory representative.

### Cleaning Precautions

TZBX4 Series (with cover film)

The total cleaning time for either the dipping or vapor method shall not exceed 2 minutes. The total cleaning time for the ultrasonic method shall be less than 1 minute and for the cold dipping method shall be less than 5 minutes.

TZ03 Series

Cleaning time shall be less than 2 minutes for the dipping method and less than 30 seconds for the ultrasonic method.

### Ultrasonic Cleaning

Specifications are as follows.

Power: 20W / liter max.  
Frequency: 28kHz  
Temperature: Ambient temperature

Many variables are associated with using ultrasonic cleaning equipment such as the equipment's self resonance point, its jig construction, and cleaning conditions such as the depth of immersion. Therefore, please test cleaning equipment to determine suitable conditions.

## ADJUSTING

To maintain specified performance characteristics, do not apply excessive force (preferably, not exceeding 1.0N (Ref.100g f)).

For high-frequency capacitors, use suitable screwdrivers whose thickness is appropriate for the adjustment slot.

Note the following for the TZBX4 series with cover film.

Do not break the cover film before the completion of PCB mounting, soldering, and cleaning.

Do not clean the trimmer capacitor after the cover film has been broken.

To break the cover film, first turn the screwdriver more than 45°, then set the capacitance value. (The cover film cannot be broken by only inserting the screwdriver.)

Before finding the screwdriver slot, applying pressure on the driver plate should be kept less than 1.96N. Higher pressure leads to extensive setting drift or damage to internal elements. After finding the screwdriver slot, the applied force should be less than 3.0N (Ref.300gf).

## EXTERNAL SUBSTANCES

Do not externally apply silicone or any other substances to the trimmer capacitors to secure adjustment position. This may cause electrical contact problems or trimmer capacitor corrosion.

## STORAGE

Before using trimmer capacitor, please store under the condition of -10 to +40°C and 30 to 85%RH.

Do not store in or near corrosive gasses.

Use within 6 months of delivery.

Do not open the package until just prior to using.

Prior to storing opened packages, the packaging should be heat sealed. Avoid using rubber bands when repackaging.

## NOTE

Before using trimmer capacitors, please test after assembly in your particular mass production system.

MURATA cannot guarantee trimmer capacitor integrity when used under conditions other than those specified in this document.

### **CAPACITANCE:**

When measured at room temperature (25 ± 5°C) and a frequency of 0.1 to 1 MHz, the minimum capacitance shall not be greater than the specified min. and the maximum capacitance shall not be less than the specified max.

### **“Q” FACTOR:**

When measured at room temperature using a Boonton Electronic’s Type 75A bridge or equivalent at 1 MHz, the trimmer capacitor shall have a “Q” value not less than specified when the trimmer is set at 75% of rated max. capacity (Note: Air dielectric trimmers are usually measured at 100 MHz using a Boonton Radio type 190; Sapphire dielectric trimmers are read at 250 MHz also using the BR 190 or a coaxial line system).

### **INSULATION RESISTANCE:**

Measured at room temperature through a one megohm source resistance, at approximate max. cap. setting shall equal or exceed rated value (Note: Failures measured over 50% Relative Humidity are not counted).

### **DIELECTRIC STRENGTH:**

The capacitor, set at approximate max. capacity shall withstand rated Withstanding Volts for 5 seconds.

### **TORQUE:**

Room temperature torque required to start and maintain rotation shall be within specified range.

### **TEMPERATURE COEFFICIENT:**

The TC shall be measured with the capacitor set at approximately 75% rated max. capacity, then remeasured at –55, –10, +25, +85 and/or +125, and finally, at +25°C as required. The Temperature Coefficient shall remain within specified limits.

$$TC = \frac{(Cx - Co)}{Co} \times \frac{(10^6)}{(Tx - To)} / ^\circ C$$

### **CAPACITANCE DRIFT:**

Drift is the greatest change between any two readings at 25°C after the normal excursions taken for TC measurements.

### **ACCELERATED LIFE TEST:**

The capacitor shall be set for approximately 75% of rated max. capacity and tested for specified time at twice rated working volts. After return to stabilized room temperature, the capacitor shall remain within specified Q, Insulation Resistance and other limits specified.

### **TEMPERATURE CYCLING:**

The capacitor shall be set for 75% of rated max. capacity and then be subjected to five each of the following cycles.

1. –55°C (30 minutes)
2. +25°C (15 minutes)
3. +85 (or +125)°C (30 minutes)
4. +25°C (15 minutes)

The rate of cooling or heating shall not be less than 3°C per minute. The temperature cycles shall be followed by 96 hour exposure to 95% RH at specified temperature. The capacitor shall then be removed and held at 25°C and 50% max. RH Q, Insulation Resistance, and capacity change shall remain within specified limits.

### **RELATIVE HUMIDITY:**

Capacitors shall be set for 75% of rated max. capacity and subjected to specified time of 96% Relative Humidity (RH) at specified atmospheric temperature. (Note: standard time is 96 hours and standard temperature is +40°C). The capacitor shall then be removed from the humidity chamber and held at +25°C for the specified time with a maximum humidity of 50%. After the test sequence, the capacitor shall be tested for Q, I.R. & capacity change which are all required to remain within specified limits.

### **TUNING LINEARITY:**

Test capacitors are rigidly mounted in the normal manner and turned through a standard number of degrees with capacity measured after each turning procedure. Plotted points shall not deviate from an average straight line by more than the allowable percentage. (i.e., theoretical line point capacity x 100).