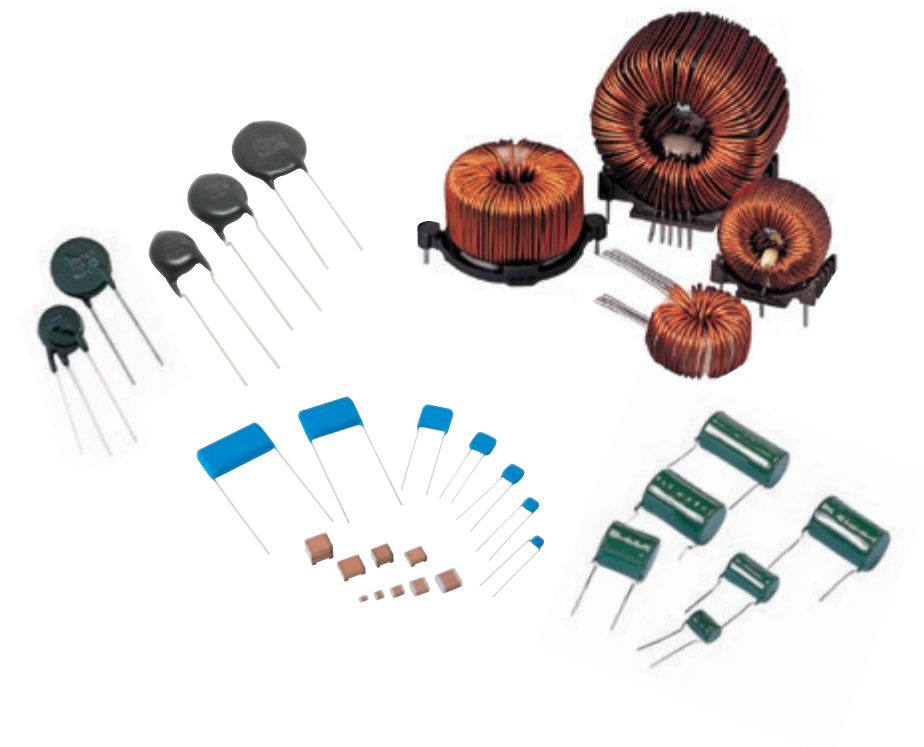


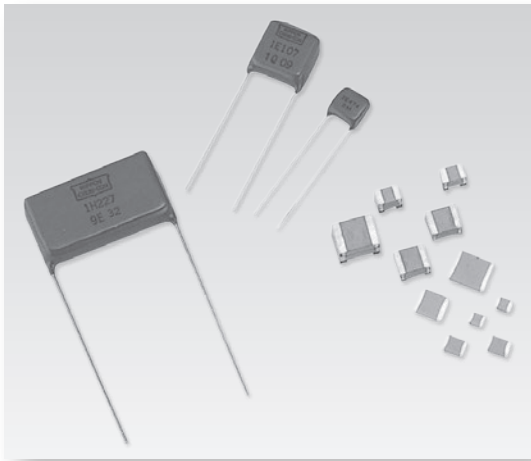


2018

# **CERAMIC CAPACITORS VARISTORS FILM CAPACITORS CHOKE COILS**

CAT.NO.E1002X / E1006A / E1003U / E1008S





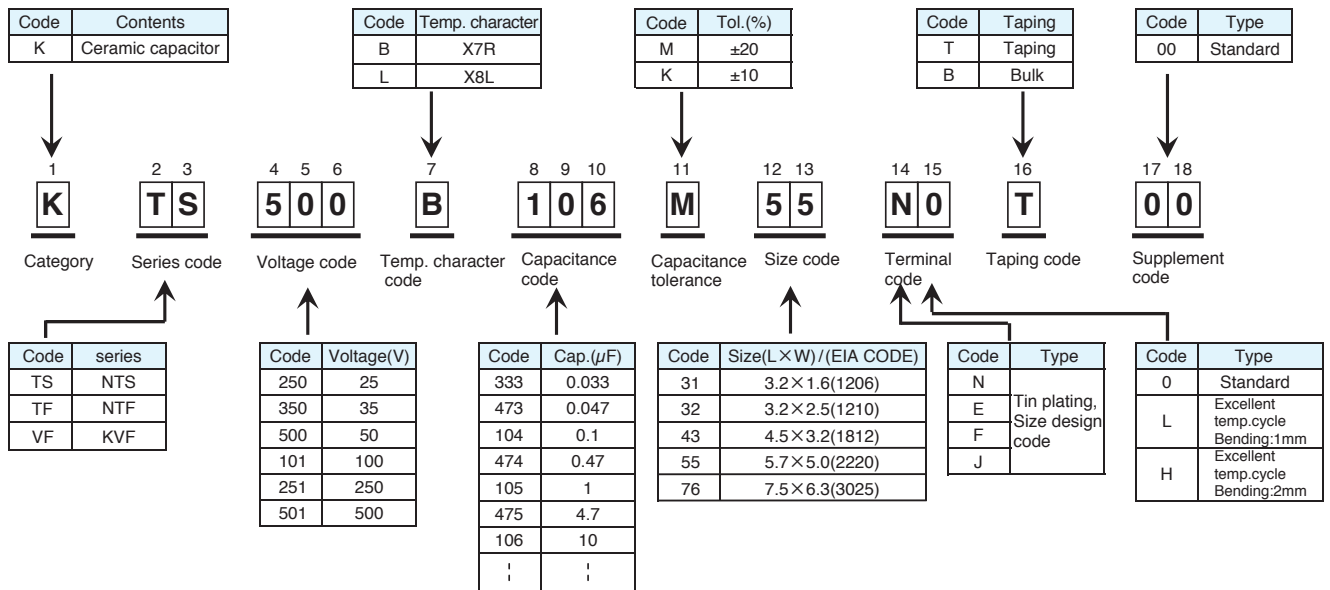
## MULTILAYER CERAMIC CAPACITORS

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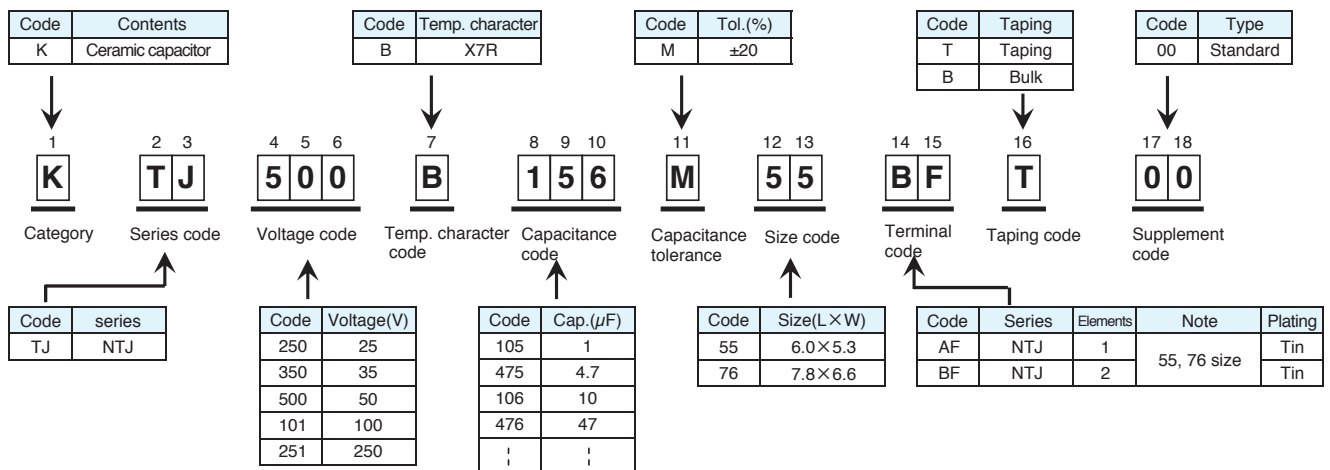
| Item           | Series | Rated Voltage Range (V <sub>dc</sub> ) | Rated Capacitance Range(μF) | Temperature Characteristics   | RoHS2 Compliant | Page |
|----------------|--------|--|-----------------------------|---|-----------------|------|
| Chip Type      | NTS    | 25 to 500                              | 0.010 to 47                 | X7R : -55~+125°C<br>ΔC/C 25°C=±15%  | Compliant       | 13   |
| Chip Type      | NTF    | 25 to 500                              | 0.033 to 33                 |   |                 |      |
| Chip Type      | KVF    | 25 to 100                              | 0.033 to 15                 | X8L : -55~+125°C<br>ΔC/C 25°C=±15%<br>+125~+150°C<br>ΔC/C 25°C=+15%, -40% |                 | 19   |
| Metal cap Type | NTJ    | 25 to 250                              | 1.0 to 100                  | X7R : -55~+125°C<br>ΔC/C 25°C=±15%  |                 | 22   |
| Lead Type      | NTD    | 25 to 500                              | 0.1 to 470                  |   |                 | 25   |
| Lead Type      | KVD    | 25 to 100                              | 0.1 to 15                   | X8L : -55~+125°C<br>ΔC/C 25°C=±15%<br>+125~+150°C<br>ΔC/C 25°C=+15%, -40% |                 | 29   |

## Part Numbering System

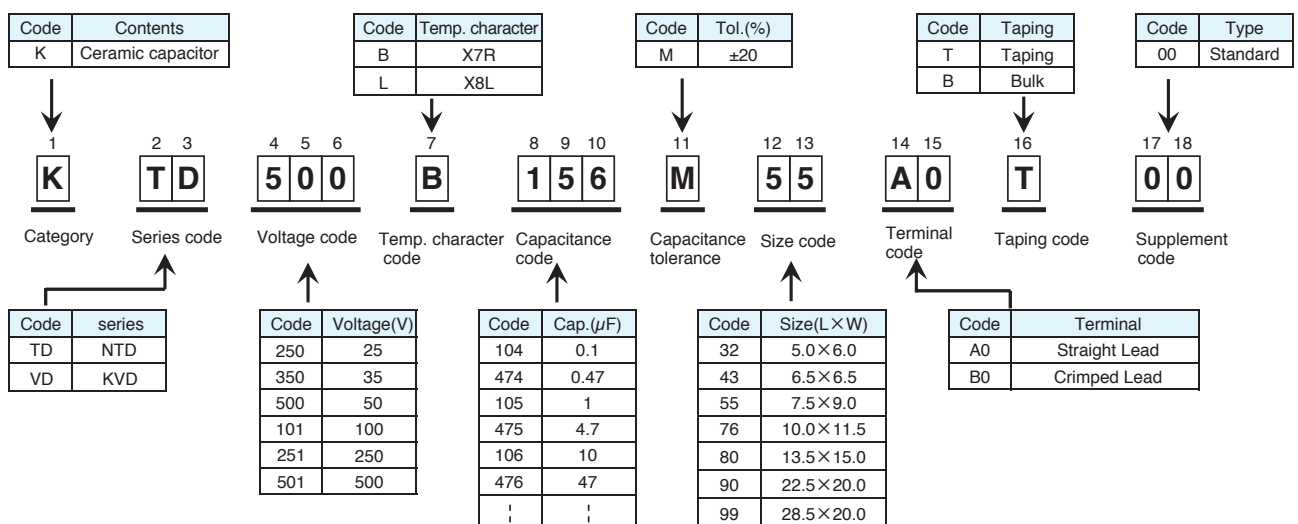
### ◆ PART NUMBERING SYSTEM (CHIP TYPE)



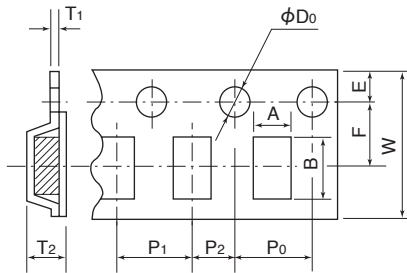
### ◆ PART NUMBERING SYSTEM (METAL CAP)



### ◆ PART NUMBERING SYSTEM (RADIAL LEAD TYPE)



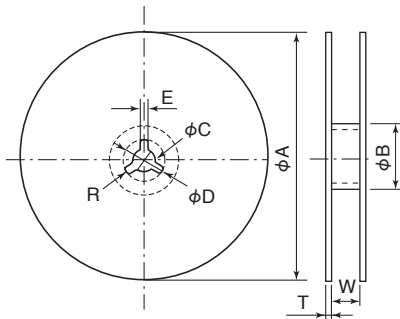
◆CHIP TYPE TAPING SPECIFICATION



| Type           | Size Code | Dimensions (mm) |      |      |      |      |                |                |                |     |                |                |
|----------------|-----------|-----------------|------|------|------|------|----------------|----------------|----------------|-----|----------------|----------------|
|                |           | A*              | B*   | W    | F    | E    | P <sub>1</sub> | P <sub>2</sub> | P <sub>0</sub> | ϕD  | T <sub>1</sub> | T <sub>2</sub> |
| Chip type      | 31        | 1.9             | 3.5  | 8.0  | 3.5  | 1.75 | 4.0            | 2.0            | 4.0            | 1.5 | 0.6            | 1.5            |
|                | 32        | 2.8             | 3.5  | 8.0  | 3.5  | 1.75 | 4.0            | 2.0            | 4.0            | 1.5 | 0.6            | 2.5            |
|                | 43        | 3.65            | 4.95 | 12.0 | 5.5  | 1.75 | 8.0            | 2.0            | 4.0            | 1.5 | 0.6            | 3.5            |
|                | 55        | 5.5             | 6.25 | 12.0 | 5.5  | 1.75 | 8.0            | 2.0            | 4.0            | 1.5 | 0.6            | 3.5            |
|                | 76        | 6.85            | 8.05 | 16.0 | 7.5  | 1.75 | 12.0           | 2.0            | 4.0            | 1.5 | 0.6            | 5.5            |
| Metal cap type | 55        | 5.3             | 6.4  | 16.0 | 7.5  | 1.75 | 8.0            | 2.0            | 4.0            | 1.5 | 0.6            | 6.0            |
|                | 76        | 6.9             | 8.2  | 16.0 | 7.5  | 1.75 | 12.0           | 2.0            | 4.0            | 1.5 | 0.6            | 7.5            |
|                |           | 6.9             | 8.2  | 24.0 | 11.5 | 1.75 | 24.0           | 2.0            | 4.0            | 1.5 | 0.4            | 8.5            |
|                |           | 6.9             | 8.2  | 32.0 | 14.2 | 1.75 | 24.0           | 2.0            | 4.0            | 1.5 | 0.5            | 10.0           |

\*Reference

●REEL SPECIFICATIONS



| Size Code | Dimensions (mm) |        |        |        |        |        |
|-----------|-----------------|--------|--------|--------|--------|--------|
|           | NTS, NTF, KVF   |        |        | NTJ    |        |        |
|           | 31, 32          | 43, 55 | 76     | 55, 76 | 76     |        |
| ϕA        | 178±2           | 178±2  | 178±2  | 382±2  | 382±2  | 382±2  |
| ϕB        | 50min.          | 50min. | 50min. | 80min. | 80min. | 80min. |
| ϕC        | 13±0.5          | 13±0.5 | 13±0.5 | 13±0.5 | 13±0.5 | 13±0.5 |
| ϕD        | 21±0.8          | 21±0.8 | 21±0.8 | 21±0.8 | 21±0.8 | 21±0.8 |
| E         | 2±0.5           | 2±0.5  | 2±0.5  | 2±0.5  | 2±0.5  | 2±0.5  |
| W         | 9±0.5           | 13±0.5 | 17±0.5 | 17±0.5 | 25±0.5 | 33±0.5 |
| T         | 1±0.5           | 1±0.5  | 1±0.5  | 2±0.5  | 2±0.5  | 2±0.5  |
| R         | 1.0             | 1.0    | 1.0    | 1.0    | 1.0    | 1.0    |

NTS, NTF, KVF Series quantity per reel (pcs. / reel)

| Size Code | 31   | 32   | 43  | 55  | 76      |
|-----------|------|------|-----|-----|---------|
| Quantity  | 3000 | 1600 | 800 | 800 | 300/500 |

Note : Refer to STANDARD RATINGS

NTJ Series quantity per reel (pcs. / reel)

| Size Code | 55       | 76           |
|-----------|----------|--------------|
| Quantity  | 400/2000 | 400/500/1200 |

Note : Refer to STANDARD RATINGS

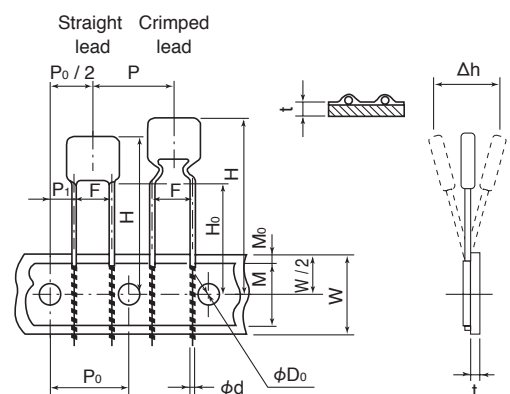
◆RADIAL LEAD TYPE TAPING SPECIFICATION

●NTD, KVD Series

Available for 32, 43, 55, 76 sizes. Ammo Packaging.

| Size Code | Dimensions H (mm) |              | Quantity per Packing (pcs.) |
|-----------|-------------------|--------------|-----------------------------|
|           | Straight lead     | Crimped lead |                             |
| 32        | 23max.            | 25max.       | 2000                        |
| 43        | 24max.            | 26max.       |                             |
| 55        | 26max.            | 28max.       |                             |
| 76        | 29max.            | 30max.       | 1000/1500                   |

Note : Refer to STANDARD RATINGS



| Code            | P    | P <sub>0</sub> | P <sub>1</sub> | P <sub>0</sub> / 2 | F            | W            | W / 2 | M    | M <sub>0</sub> | H <sub>0</sub> | ϕD <sub>0</sub> | ϕd    | t    | Δh |
|-----------------|------|----------------|----------------|--------------------|--------------|--------------|-------|------|----------------|----------------|-----------------|-------|------|----|
| Dimensions (mm) | 12.7 | 12.7           | 3.85           | 6.35               | 5.0          | 18.0         | 9.0   | 13.0 | 1.5            | 16.0           | 4.0             | 0.5   | 0.6  | 0  |
|                 | ±1   | ±0.3           | ±0.7           | ±1.3               | +0.8<br>-0.2 | +1.0<br>-0.5 | ±0.5  | ±1   | ±1.5           | min.           | ±0.2            | ±0.05 | ±0.2 | ±2 |

## Minimum Packaging Quantity

Please order by units of minimum packaging quantity.

### ◆ Chip

| Series        | Size code | Elements | Rated voltage (V <sub>dc</sub> ) | Rated Capacitance (μF) | Taping (pcs.) | Tray (pcs. / box) | Bagged (pcs. / box) |
|---------------|-----------|----------|----------------------------------|------------------------|---------------|-------------------|---------------------|
| NTS, NTF, KVF | 31        | -        | All Voltage Range                |                        | 3,000         | -                 | 9,000               |
|               | 32        | -        | All Voltage Range                |                        | 1,600         | -                 | 6,000               |
|               | 43        | -        | All Voltage Range                |                        | 800           | -                 | 3,000               |
|               | 55        | -        | All Voltage Range                |                        | 800           | -                 | 1,500               |
| NTS           | 76        | -        | 500                              | 0.68                   | 500           | -                 | 1,500               |
|               |           |          | Rating other than the above      |                        | 300           | -                 | 1,500               |

### ◆ Metal Cap

| Series | Size code | Elements | Rated voltage (V <sub>dc</sub> ) | Rated Capacitance (μF) | Taping (pcs.) | Tray (pcs. / box) | Bagged (pcs. / box) |
|--------|-----------|----------|----------------------------------|------------------------|---------------|-------------------|---------------------|
| NTJ    | 55        | 1        | All Voltage Range                |                        | 400           | 800               | -                   |
|        |           | 2        | All Voltage Range                |                        | 2,000         | 800               | -                   |
|        | 76        | 1        | All Voltage Range                |                        | 1,200         | 800               | -                   |
|        |           | 2        | 25                               | 100                    | 400           | 800               | -                   |
|        |           |          | All rating other than the above  |                        | 500           | 800               | -                   |

### ◆ Radial Lead

| Series   | Size code | Elements | Rated voltage (V <sub>dc</sub> ) | Rated Capacitance (μF) | Taping (pcs.) | Tray (pcs. / box) | Bagged (pcs. / box) |
|----------|-----------|----------|----------------------------------|------------------------|---------------|-------------------|---------------------|
| NTD, KVD | 32        | -        | All Voltage Range                |                        | 2,000         | -                 | 2,000               |
|          | 43        | -        | All Voltage Range                |                        | 2,000         | -                 | 2,000               |
|          | 55        | -        | All Voltage Range                |                        | 2,000         | -                 | 2,000               |
|          | 76        | -        | 500                              | 0.68                   | 1,500         | -                 | 500                 |
|          |           |          | 500                              | 1.0                    | 1,500         | -                 | 500                 |
|          |           |          | 500                              | 1.2                    | 1,500         | -                 | 500                 |
|          |           |          | Rating other than the above      |                        | 1,000         | -                 | 500                 |
|          | 80        | -        | All Voltage Range                |                        | -             | 100               | -                   |
|          | 90        | -        | All Voltage Range                |                        | -             | 60                | -                   |
|          | 99        | -        | All Voltage Range                |                        | -             | 50                | -                   |

## 1 In designing device circuits

- (1) Confirming the installation and operating environment of capacitors, use them within the rated performance limits prescribed in their catalog or product specifications. Otherwise, excessive use conditions cause the capacitors to have catastrophic failure such as short circuit, open circuit or firing.
- (2) Do not apply a DC voltage which exceeds the full rated voltage. The peak voltage of a superimposed AC voltage (ripple voltage) on the DC voltage must not exceed the full rated voltage.
- (3) By considering the temperature characteristic and the DC bias characteristic of the ceramic capacitors, please determine the right capacitance. The capacitance of the capacitors changes in low and high temperature ambiances and depends on the applied bias voltages. The capacitance change (i.e. reduction) may affect the performance of the circuit which is containing the capacitors. Therefore, please examine the capacitors in the actual operational conditions to verify that they are right ones.
- (4) The common failure mode of multilayer ceramic capacitors is contingent insulation breakdown or short circuit. When the capacitors are used in a high-power circuit, they may damage the surroundings of the capacitors when failed. Therefore, the high-power circuit should have protective device/protective devices to shut down the circuit from the capacitor/capacitors. The reliability of the capacitors improves when the ambient temperatures are in the normal temperature range and the applied voltages are low.
- (5) When large high frequency ripple current acrosses multilayer ceramic capacitor, the capacitor can vibrate. The phenomenon occurs as the capacitor, has natural vibration frequency due to the mechanical dimensions, resonates to the large high frequency ripple current.

To prevent the resonance, please select the capacitor or change the ripple current frequency.

For your information, we indicate the following resonance frequency to each chip size.

| Size Code | Chip Size  | (kHz)           |
|-----------|------------|-----------------|
| 31        | 3.2× 1.6   | 650, 1200, 1600 |
| 32        | 3.2× 2.5   | 650, 850, 1200  |
| 43        | 4.5× 3.2   | 450, 650, 1200  |
| 55        | 5.7× 5.0   | 350, 450, 850   |
| 76        | 7.5× 6.3   | 350, 600, 750   |
| 80        | 10.0× 9.0  | 230, 320, 620   |
| 90        | 20.0× 12.7 | 100, 170, 450   |
| 99        | 25.0× 12.7 | 80, 160, 250    |

- (6) The capacitance of the capacitors depends on the ambient temperatures and bias voltages. Therefore, please examine the capacitors when they are to be used in a time-constant circuit before the use.
- (7) Consult us for devices that requires high reliability. For components which are used to the devices whose failure affects human life or causes social loss by serious damage, higher reliable designs than general purpose components are required.
- (8) Please contact us,when you use it for AC use.

## 2 In designing PC boards

- (1) Put the proper volume of solder (the size of fillet) on PC boards for installing surface mount capacitors, because it directly affects the installed capacitors. The design of copper pad patterns and dimensions should be set so that the proper volume of solder can be provided. The standard land dimensions are shown below.

- (2) Land width of PC boards shall not exceed the width of chip capacitors.

●Chip type (mm)

| Code | Size Code | 31         | 32         | 43         | 55         | 76          |
|------|-----------|------------|------------|------------|------------|-------------|
| a    |           | 2.2 to 2.5 | 2.2 to 2.5 | 3.5 to 3.7 | 4.5 to 4.7 | 5.0 to 5.2  |
| b    |           | 4.2 to 5.8 | 4.2 to 5.8 | 5.5 to 6.1 | 6.7 to 8.3 | 8.8 to 10.8 |
| c    |           | 1.2 to 1.6 | 1.8 to 2.5 | 2.3 to 3.2 | 3.5 to 5.0 | 4.7 to 6.3  |
| d    |           | 0.4 to 0.8 | 0.5 to 1.0 | 0.6 to 1.1 | 0.7 to 1.2 | 0.8 to 1.3  |

●Metal Cap type (mm)

| Code | Size Code | 55         | 76         |
|------|-----------|------------|------------|
| a    |           | 3.5 to 4.5 | 5.5 to 6.5 |
| b    |           | 6.5 to 7.5 | 8.8 to 9.8 |
| c    |           | 4.0 to 5.0 | 5.5 to 6.5 |
| d    |           | 0.5 to 1.5 | 0.8 to 1.8 |

- (3) When the multilayer ceramic capacitors are mounted on a substrate, the chips may crack when mechanical stress is put. Also, when the substrate is bent, they may also crack. Therefore, please make sure that the material and size of the substrate and the capacitor positions are right.

- (4) For a leaded capacitor, design the PC boards with the correct terminal hole space equal to the lead space of the capacitor.

## 3 Installation

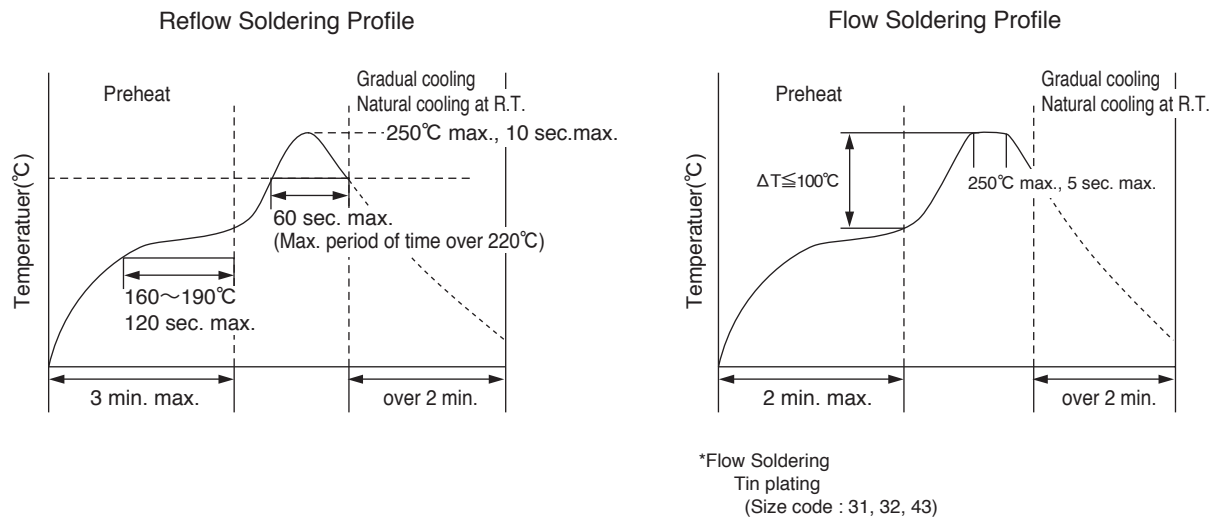
- (1) When installing leaded capacitors in the PC boards by means of an automatic insertion machine, minimize the mechanical shock applied to the capacitors by the lead clinch unit of the machine.
- (2) When the capacitors are to be mounted on a substrate, please minimize the shock and weight to the capacitor bodies. The nozzle pressure during the mounting process should be adjusted to 1N~3N maximum in static load.
- (3) Periodically maintain and inspect installation machines.
- (4) Where an adhesive is used to pre-anchor capacitors on PC boards, use appropriate copper pad dimensions, type of adhesive, coating volume, curing temperature and time, etc. to prevent the capacitors from deteriorating.

## 4 Soldering

- (1) Use flux with a halogen content of less than 0.1 wt. %. Do not use strong acid flux.
- (2) Minimize a volume of flux to coat the PC boards with.
- (3) Follow the soldering conditions prescribed in the catalog or product specifications. Excessive thermal stress affects the performance of the capacitors.
- (4) Note that surface mount capacitors with the size 3.2×1.6 or smaller tend to stand up during vapor phase reflow soldering.
- (5) For reflow soldering, place surface mount capacitors on the PC boards as soon as possible after solder paste was coated.
- (6) Please be aware that thermal deformation of substrates during mounting process cause stress to the substrates. Especially, substrates which are mounting chip capacitors are to be flow soldered to solder leaded parts or solder other parts onto the substrates, please make sure that the deformation during the soldering causes no harm. In fact, the deformation may cause stress to the substrates which leads to the capacitor element cracks/insulation-layer break down/insulation resistance degradation. The effect of the stress due to the deformation depends on the material of the substrates. Therefore, please be aware of the following information.
  - a) Ceramic substrates  
The stress due to the deformation of ceramic substrates is thought be the minimum. Heat contract difference during solder hardening can be the effect to ceramic capacitors mounted on the substrates. So, please avoid forced cooling during the hardening.
  - b) Glass epoxy substrates  
The stress due to the deformation and warp of glass epoxy substrates affects ceramic capacitors mounted. The stress depends on the size and material of the substrates, pattern positions and thermal gradient during soldering. Temperature difference between the both sides of the substrates may also cause the stress. When the material of the substrates, which are mounting ceramic capacitors, is FR-4 or the equivalent and other parts are to be flow soldered, the surface of the side with the capacitors shall be sufficiently preheated to 150°C or over before the flow soldering. During the soldering, the temperature difference between the side with the capacitors and the other side of the substrate should be 100°C maximum.
  - c) Metal substrates  
The deformation and warp of metal substrates considerably affect ceramic capacitors mounted. Therefore, please use metal caps which can moderate the stress of the substrates.
- (7) After reflow/flow soldering, please cool the PC boards which mounted capacitors naturally in the air.
- (8) Ceramic chip capacitors are solderable by twice maximum in reflow or flow soldering. When the capacitors are to be reflow soldered and then flow soldered, there shall be no additional soldering to the capacitors. However, the capacitors having a size of 5.7×5.0 or larger should be soldered by one time only.
- (9) Metal cap type capacitors (NTJ series) is two times reflow.
- (10) Due to the nature of ceramic, radical heating or cooling and partial heating may crack the ceramic capacitor element. Please have enough pre-heating process before soldering.
- (11) Ultrasonic cleaning time shall be ten minutes maximum.  
When the power of ultrasonic cleaner is too high, the strength of terminations may drop.  
Therefore, carefully examine the cleaning conditions before use.
- (12) Adjust the amount of solder cream in order that solder fillet shall be 1/2 to 2/3 height of chips. If fillet can confirm, size of 4.5×3.2 or larger is not this limit.
- (13) When more than two chips are mounted on a common land, please separate the chips by the solder resist.
- (14) In hand soldering, please take into consideration the following items.
  1. Fully pre-heat on a heating plate whose surface temperature is 100°C to 150°C .
  2. Soldering iron power shall not exceed 30W.
  3. Soldering iron tip diameter shall not exceed 3mm.
  4. Temperature of iron tip shall be adjusted to not exceed 300°C, 3sec.
  5. The soldering iron tip shall not touch ceramic body directly.
  6. After soldering, let the products to be room temperature to cool gradually.



## 5 Soldering profile



## 6 Cleaning

- (1) In the case that the assembly boards are washed, choose the appropriate cleaning agent for the washing purpose.
- (2) To determine the cleaning conditions, make sure by means of the actual washing equipment that the performance of the capacitors is not affected.
- (3) In the case that water-soluble flux was used, sufficiently wash the assembly boards.

## 7 Coating materials

- (1) When ceramic capacitors are to be resin coated or molded, please pay enough attention. Ceramic capacitors molded in resin, and please do not use it. There is fear to destroy a capacitor by stress to occur by the expansion / the shrinkage when resin stiffens. When a thermal expansion shrinkage coefficient in hardening uses big resin, coating in the resin which is soft with capacitors, please make that stress is added to capacitors small as much as possible.
- (2) Confirm that harmful resolution or formation gasses are not generated from the coating materials during the curing process or by spontaneously leaving the coated assembly boards.
- (3) If a coating material is cured at higher temperatures than the Category temperature of the capacitor, the exterior resin will deteriorate resulting in the capacitor damage.

## 8 Handling

- (1) When cutting off a multi-board to make individual units, curving or twisting the board may crack the capacitors. Appropriate tools should be used to cut it off.
- (2) Excessive mechanical shock to capacitors or their assembly boards may make the capacitors crack.
- (3) Use leaded capacitors without bending their lead wires as much as possible.
- (4) When ceramic capacitors are stored with no load, the capacitance reduces during the storage (named "aging characteristic"). As for the product that capacitance decreased, capacity recovers in an initial value by heat-treating it.
- (5) When the electrodes of the ceramic capacitors are made of silver, needle crystals may form on the electrodes in an ambience containing sulfur compounds.

## 9 Storage

- (1) Do not store and use capacitors in the following environment. Water or salt water splashes, dew wets or toxic gasses (hydrogen sulfide, sulfurous acid, chlorine, ammonium) fills, Vibration or mechanical shock exceeding the limits prescribed in the catalog or product specifications.
- (2) Do not store capacitors in places that direct sunlight pours down or dewy places.
- (3) Avoid high temperature and humidity.

The storage conditions should be : Temperature=Lower than 40°C  
Humidity=Lower than 70% RH

## 10 About AEC-Q200

The Automotive Electronics Council (AEC) was originally established by American major automotive manufactures. Today, the committees are composed of representatives from the sustaining Members of manufacturing companies in automotive electrical components. It has standardized the criteria for "stress test qualification" and "reliability test" for the electronic components.

AEC-Q200 is the reliability test standard for approval of passive components, it has been specified test subjects and quantity etc. for each components. Criteria of reliability tests such as our main products "Multilayer Ceramic Capacitors" are also described in this.

As customer requirement, Chemi-Con has submits the test results according to AEC-Q200 for the Multilayer Ceramic Capacitors used in automotive applications to increase in recent years.

AEC-Q200 compliant product is the product which we evaluated by AEC-Q200 standard.

Please contact us for more information.

Please obtain and verify our product specification sheet before you use our product.

## 11 Catalogs

Product specifications in this catalog are subject to change without notice.

Please request and make sure our product specifications before purchase and/or use.

## 12 Response to the Substances of Concern

(1) Nippon Chemi-Con aims for developing products that meet laws and regulations concerning substances of concern.

(Some products may contain regulated substances for exempted application. )

Please contact us for more information about law-compliance status.

(2) According to the content of REACH handbook (Guidance on requirements for substances in articles which is published on May 2008), our electronic components are "articles without any intended release". Therefore they are not applicable for "Registration" for EU REACH Regulation Article 7 (1).

Reference: Electrolytic Condenser Investigation Society

"Study of REACH Regulation in EU about Electrolytic Capacitor" (publicized on 13 March 2008)

For the details, refer to Guideline of notabilia for fixed multilayer ceramic capacitors for use in electronic equipment, EIAJ RCR-2335 issued by Electronic Industries Association of Japan.

## STANDARDIZATION

The following series were discontinued. Please use the replacements in the table.

### ◆ MULTILAYER CERAMIC CHIP CAPACITORS

| Discontinued series | Characteristics                                  | Replacements | Page |
|---------------------|--|--------------|------|
| TCCS                | Y5U, Termination (Tin Plating)                   | NTS          | 13   |
| TCCR                | Y5U, Termination (Silver)                        | NTS          | 13   |
| THCS                | Y5U, Termination (Tin Plating), Down sized       | NTS          | 13   |
| THCR                | Y5U, Termination (Silver), Down sized            | NTS          | 13   |
| TMCS                | Y5U, Termination (Tin Plating), High Reliability | NTF          | 13   |

### ◆ METAL CAP TYPE MULTILAYER CERAMIC CAPACITORS

| Discontinued series | Characteristics                   | Replacements | Page |
|---------------------|-----------------------------------|--------------|------|
| TCP                 | Y5U                               | NTJ          | 22   |
| THP                 | Y5U, Down sized                   | NTJ          | 22   |
| TMP                 | Y5U, Down sized, High Reliability | NTJ          | 22   |

### ◆ DIPPED RADIAL LEAD MULTILAYER CERAMIC CAPACITORS

| Discontinued series | Characteristics | Replacements | Page |
|---------------------|-----------------|--------------|------|
| TCD                 | Y5U             | NTD          | 25   |
| THD                 | Y5U, Down sized | NTD          | 25   |

Lead oxides are included as a dielectric material in the discontinued series (Y5U characteristics) on the above lists.

Under RoHS directive, such Lead (Pb) was already restricted from January 1, 2013. Under ELV directive, it is restricted from January 1, 2016.

Please use the replacements which are RoHS compliant.

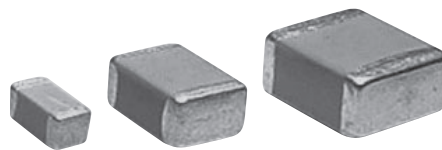
## NTS<sub>Series</sub> / NTF<sub>Series</sub>

Temperature cycle : 1000 cycles



### ◆FEATURES

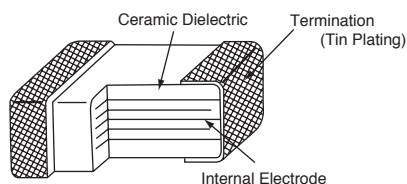
1. Large capacitance by small size.
2. Excellent noise absorption.
3. High permissible ripple current capability.
4. NTF: Temperature cycle : 1000 cycles.



### ◆APPLICATIONS

1. Smoothing circuit of DC-DC converters.
2. On-board power supplies.
3. Voltage regulators for computers.
3. Noise suppressor for various kinds of equipments.
4. High reliability equipments.

### ◆CONSTRUCTION



### ◆RATINGS

|                                |  |
|--------------------------------|--|
| 1. Category Temperature Range  | -55 to +125°C                            |
| 2. Rated Voltage Range         | 25, 35, 50, 100, 250, 500V <sub>dc</sub> |
| 3. Rated Capacitance Range     | 0.010 to 47μF                            |
| 4. Rated Capacitance Tolerance | M (±20%) : Standard, K (±10%)            |
| 5. Temperature Characteristics | X7R                                      |
| 6. Rated Ripple Current        | See No.5 on the following table          |

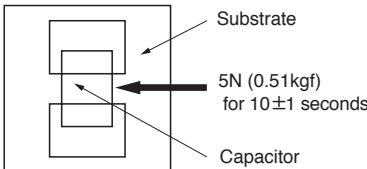
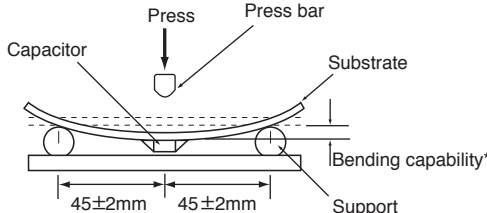
### ◆SPECIFICATIONS

| No. | Items                 | Specification   | Test Condition  |                                 |
|-----|-----------------------|---|---|---------------------------------|
| 1   | Withstand Voltage     | No abnormality.   | Rated voltage   | Withstand voltage               |
|     |                       |   | Less than 250V  | 250% of rated voltage           |
|     |                       |   | More than 250V<br>Less than 500V  | 100V +<br>150% of rated voltage |
|     |                       |   | More than 500V  | 130% of rated voltage           |
|     |                       |   | Shall be applied for 5 seconds.   |                                 |
| 2   | Insulation Resistance | 100/C <sub>R</sub> (MΩ) or 4000(MΩ)<br>whichever is less. | Rated voltage shall be applied for 60±5 seconds at<br>temperature 25±2°C. |                                 |
| 3   | Rated Capacitance     | Within specified tolerance.                               |   | CR≤10μF                         |
|     |                       |   |   | CR>10μF                         |
| 4   | Dissipation Factor    | 5.0% maximum.   | Temperature   | 25±2°C                          |
|     |                       |   | Frequency   | 1±0.1kHz                        |
|     |                       |   | Voltage   | 1±0.2Vrms                       |
| 5   | Rated Ripple Current  | See STANDARD RATINGS                                      | 10kHz~1MHz (sine curve)   |                                 |
|     |                       |   | Ripple voltage V <sub>p</sub> shall be less than<br>the rated voltage.    |                                 |

As customer requirement, Chemi-Con has submits the test results according to AEC-Q200 for Multilayer ceramic capacitors. Please contact us for more information.

## NTS Series / NTF Series

### ◆SPECIFICATIONS

| No.                | Items                             | Specification  | Test Condition   |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
|--------------------|-----------------------------------|--|--|--------|------------------|--------------------|---------|------------------------------|-----------|---|------------------|--------|---|------------------------------|------|---|------------------|--------|
| 6                  | Adhesion                          | No visible damage.   | <div></div>  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 7                  | Bend strength of the face plating | Appearance : No visible damage.<br>ΔC/C : ±15%   | <p>The substrate shall be bend at a rate of 1mm/s for 5 seconds.</p> <div></div> <p>*Bending capability<br/>NTS : 1mm<br/>NTF : 1mm or 2mm</p>   |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 8                  | Solderability                     | Min. 75% of surface of the termination shall be covered with new solder  | <table><tr><th>Solder</th><th>Pb Free</th></tr><tr><td>Solder Temperature</td><td>245±5°C</td></tr><tr><td>Dipping Time</td><td>2±0.5sec.</td></tr></table>  | Solder | Pb Free          | Solder Temperature | 245±5°C | Dipping Time                 | 2±0.5sec. |   |                  |        |   |                              |      |   |                  |        |
| Solder             | Pb Free                           |  |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| Solder Temperature | 245±5°C                           |  |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| Dipping Time       | 2±0.5sec.                         |  |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 9                  | Resistance to Soldering Heat      | Appearance : No visible damage.<br>ΔC/C : ±15%<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification. | <p>Preheating Condition :</p> <table><tr><th>Step</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>100±10°C</td><td>2min.</td></tr><tr><td>2</td><td>200±10°C</td><td>2min.</td></tr></table> <p>Solder Temperature : 260±5°C<br/>Dipping Time : 2±0.5 seconds</p>  | Step   | Temperature      | Time               | 1       | 100±10°C                     | 2min.     | 2 | 200±10°C         | 2min.  |   |                              |      |   |                  |        |
| Step               | Temperature                       | Time   |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 1                  | 100±10°C                          | 2min.  |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 2                  | 200±10°C                          | 2min.  |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 10                 | Temperature Cycle                 | Appearance : No visible damage.<br>ΔC/C : ±15%<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification. | <table><tr><th>Step</th><th>Temperature (°C)</th><th>(min.)</th></tr><tr><td>1</td><td>Min. Category temperature ±3</td><td>30±3</td></tr><tr><td>2</td><td>Room temperature</td><td>3 max.</td></tr><tr><td>3</td><td>Max. Category temperature ±3</td><td>30±3</td></tr><tr><td>4</td><td>Room temperature</td><td>3 max.</td></tr></table> <p>For above temperature cycle.<br/>NTS : For 5 cycles<br/>NTF : For 1000 cycles</p> | Step   | Temperature (°C) | (min.)             | 1       | Min. Category temperature ±3 | 30±3      | 2 | Room temperature | 3 max. | 3 | Max. Category temperature ±3 | 30±3 | 4 | Room temperature | 3 max. |
| Step               | Temperature (°C)                  | (min.)   |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 1                  | Min. Category temperature ±3      | 30±3   |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 2                  | Room temperature                  | 3 max.   |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 3                  | Max. Category temperature ±3      | 30±3   |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 4                  | Room temperature                  | 3 max.   |  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 11                 | Humidity Load Life                | Appearance : No abnormality.<br>ΔC/C : ±15%<br>D.F. : 10% maximum<br>I.R. : 25/C <sub>R</sub> (MΩ) or 1000(MΩ)<br>whichever is less.     | <p>Temperature : 40±2°C<br/>Humidity : 90 to 95%RH<br/>Voltage : Rated voltage<br/>Time : 500±<sup>24</sup><sub>0</sub>hours</p>   |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |
| 12                 | Endurance                         | Appearance : No abnormality.<br>ΔC/C : ±15%<br>D.F. : 10% maximum<br>I.R. : 50/C <sub>R</sub> (MΩ) or 1000(MΩ)<br>whichever is less.     | <p>Temperature : 125±3°C<br/>Voltage : Rated voltage<br/>Time : 1000±<sup>48</sup><sub>0</sub>hours</p>  |        |                  |                    |         |                              |           |   |                  |        |   |                              |      |   |                  |        |

\*C<sub>R</sub> : Rated Capacitance(μF)

### ◆STANDARD RATINGS

| Rated voltage<br>(Vdc) | Rated Capacitance<br>(μF) | Dimensions(mm)     |                    |         |         | Maximum ripple current<br>(Arms) | Part Number        | Taping Quantity per reel<br>(pcs. / reel) |
|------------------------|---------------------------|--------------------|--------------------|---------|---------|----------------------------------|--------------------|---|
|                        |                           | L                  | W                  | Tmax.   | a       |                                  |                    |   |
| 25                     | 1.0                       | 3.2±0.2            | 1.6±0.2            | 1.8     | 0.5±0.3 | 0.3                              | KTS250B105M31N0T00 | 3,000                                     |
|                        | 1.5                       |                    |                    |         |         |                                  | KTS250B155M31N0T00 | 3,000                                     |
|                        | 2.2                       |                    |                    |         |         |                                  | KTS250B225M31N0T00 | 3,000                                     |
|                        | 3.3                       | 3.2±0.4            | 2.5±0.3            | 2.6     | 0.6±0.3 | 0.5                              | KTS250B335M32N0T00 | 1,600                                     |
|                        | 4.7                       |                    |                    |         |         |                                  | KTS250B475M32N0T00 | 1,600                                     |
|                        | 6.8                       |                    |                    |         |         |                                  | KTS250B685M32N0T00 | 1,600                                     |
|                        | 10                        | 4.5±0.4            | 3.2±0.4            | 2.8     | 0.6±0.3 | 1.0                              | KTS250B106M43N0T00 | 800                                       |
|                        | 15                        |                    |                    |         |         |                                  | KTS250B156M43N0T00 | 800                                       |
|                        | 22                        |                    |                    |         |         |                                  | 5.7±0.4            | 5.0±0.4                                   |
|                        | 33                        | 3.0                | KTS250B336M55N0T00 | 800     |         |                                  |                    |   |
|                        | 47                        | 7.5±0.5            | 6.3±0.5            | 4.0     | 1.0±0.5 | 3.0                              | KTS250B476M76N0T00 | 300                                       |
|                        | 35                        | 1.0                | 3.2±0.2            | 1.6±0.2 | 1.8     | 0.5±0.3                          | 0.3                | KTS350B105M31N0T00                        |
| 1.5                    |                           | KTS350B155M31N0T00 |                    |         |         |                                  |                    | 3,000                                     |
| 2.2                    |                           | KTS350B225M31N0T00 |                    |         |         |                                  |                    | 3,000                                     |
| 3.3                    |                           | 3.2±0.4            | 2.5±0.3            | 2.6     | 0.6±0.3 | 0.5                              | KTS350B335M32N0T00 | 1,600                                     |
| 4.7                    |                           |                    |                    |         |         |                                  | KTS350B475M32N0T00 | 1,600                                     |
| 6.8                    |                           |                    |                    |         |         |                                  | KTS350B685M43N0T00 | 800                                       |
| 10                     |                           | 4.5±0.4            | 3.2±0.4            | 2.8     | 0.6±0.3 | 1.0                              | KTS350B106M43N0T00 | 800                                       |
| 15                     |                           |                    |                    |         |         |                                  | KTS350B156M55N0T00 | 800                                       |
| 22                     |                           |                    |                    |         |         |                                  | KTS350B226M55N0T00 | 800                                       |
| 33                     |                           | 7.5±0.5            | 6.3±0.5            | 4.0     | 1.0±0.5 | 3.0                              | KTS350B336M76N0T00 | 300                                       |
| 47                     |                           |                    |                    |         |         |                                  | KTS350B476M76N0T00 | 300                                       |
|                        |                           |                    |                    |         |         |                                  | KTS350B476M76N0T00 | 300                                       |
| 50                     | 0.33                      | 3.2±0.2            | 1.6±0.2            | 1.8     | 0.5±0.3 | 0.3                              | KTS500B334M31N0T00 | 3,000                                     |
|                        | 0.47                      |                    |                    |         |         |                                  | KTS500B474M31N0T00 | 3,000                                     |
|                        | 0.68                      |                    |                    |         |         |                                  | KTS500B684M31N0T00 | 3,000                                     |
|                        | 1.0                       | 3.2±0.4            | 2.5±0.3            | 2.6     | 0.6±0.3 | 0.5                              | KTS500B105M31N0T00 | 3,000                                     |
|                        | 1.5                       |                    |                    |         |         |                                  | KTS500B155M32N0T00 | 1,600                                     |
|                        | 2.2                       |                    |                    |         |         |                                  | KTS500B225M32N0T00 | 1,600                                     |
|                        | 3.3                       | 4.5±0.4            | 3.2±0.4            | 2.8     | 0.6±0.3 | 1.0                              | KTS500B335M32N0T00 | 1,600                                     |
|                        | 4.7                       |                    |                    |         |         |                                  | KTS500B475M43N0T00 | 800                                       |
|                        | 6.8                       |                    |                    |         |         |                                  | KTS500B685M43N0T00 | 800                                       |
|                        | 10                        | 5.7±0.4            | 5.0±0.4            | 2.8     | 0.8±0.5 | 2.0                              | KTS500B106M55N0T00 | 800                                       |
|                        | 15                        |                    |                    |         |         |                                  | KTS500B156M55N0T00 | 800                                       |
|                        | 22                        |                    |                    |         |         |                                  | KTS500B226M76N0T00 | 300                                       |
| 100                    | 0.1                       | 3.2±0.2            | 1.6±0.2            | 1.8     | 0.5±0.3 | 0.3                              | KTS101B104M31N0T00 | 3,000                                     |
|                        | 0.15                      |                    |                    |         |         |                                  | KTS101B154M31N0T00 | 3,000                                     |
|                        | 0.22                      |                    |                    |         |         |                                  | KTS101B224M31N0T00 | 3,000                                     |
|                        | 0.33                      |                    |                    |         |         |                                  | KTS101B334M31N0T00 | 3,000                                     |
|                        | 0.47                      |                    |                    |         |         |                                  | KTS101B474M31N0T00 | 3,000                                     |
|                        | 0.68                      |                    |                    |         |         |                                  | KTS101B684M31N0T00 | 3,000                                     |
|                        | 1.0                       | 3.2±0.4            | 2.5±0.3            | 2.6     | 0.6±0.3 | 0.5                              | KTS101B105M32N0T00 | 1,600                                     |
|                        | 1.5                       |                    |                    |         |         |                                  | KTS101B155M32N0T00 | 1,600                                     |
|                        | 2.2                       |                    |                    |         |         |                                  | KTS101B225M32N0T00 | 1,600                                     |
|                        | 1.5                       | 4.5±0.4            | 3.2±0.4            | 2.8     | 0.6±0.3 | 1.0                              | KTS101B155M43N0T00 | 800                                       |
|                        | 2.2                       |                    | 3.2±0.5            |         |         |                                  | KTS101B225M43N0T00 | 800                                       |
|                        | 3.3                       |                    |                    |         |         |                                  | KTS101B335M43J0T00 | 800                                       |
|                        | 4.7                       | 5.7±0.4            | 5.0±0.4            | 3.2     | 0.8±0.5 | 2.0                              | KTS101B475M43E0T00 | 800                                       |
|                        | 3.3                       |                    |                    | 2.8     |         |                                  | KTS101B335M55N0T00 | 800                                       |
|                        | 4.7                       |                    |                    |         |         |                                  | KTS101B475M55N0T00 | 800                                       |
|                        | 6.8                       | 7.5±0.5            | 6.3±0.5            | 3.2     | 1.0±0.5 | 3.0                              | KTS101B685M55F0T00 | 800                                       |
|                        | 6.8                       |                    |                    | 3.5     |         |                                  | KTS101B685M76N0T00 | 300                                       |

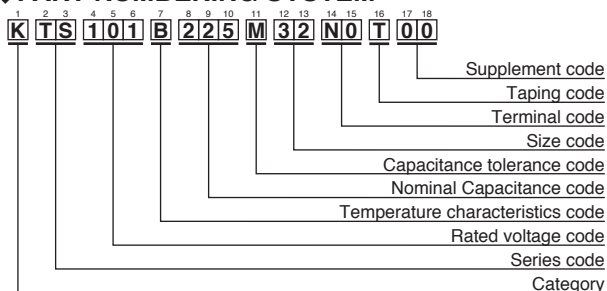
※Please consult with us when you consider the rating other than a standard table.

### ◆STANDARD RATINGS

| Rated voltage<br>(Vdc) | Rated Capacitance<br>(μF) | Dimensions(mm) |         |       |         | Maximum ripple current<br>(Arms) | Part Number        | Taping Quantity per reel<br>(pcs. / reel) |
|------------------------|---------------------------|----------------|---------|-------|---------|----------------------------------|--------------------|---|
|                        |                           | L              | W       | Tmax. | a       |                                  |                    |   |
| 250                    | 0.01                      | 3.2±0.2        | 1.6±0.2 | 1.8   | 0.5±0.3 | 0.3                              | KTS251B103M31N0T00 | 3,000                                     |
|                        | 0.022                     |                |         |       |         |                                  | KTS251B223M31N0T00 | 3,000                                     |
|                        | 0.033                     |                |         |       |         |                                  | KTS251B333M31N0T00 | 3,000                                     |
|                        | 0.047                     |                |         |       |         |                                  | KTS251B473M31N0T00 | 3,000                                     |
|                        | 0.068                     |                |         |       |         |                                  | KTS251B683M31N0T00 | 3,000                                     |
|                        | 0.1                       | 3.2±0.4        | 2.5±0.3 | 2.6   | 0.6±0.3 | 0.5                              | KTS251B104M31N0T00 | 3,000                                     |
|                        | 0.15                      |                |         |       |         |                                  | KTS251B154M32N0T00 | 1,600                                     |
|                        | 0.22                      |                |         |       |         |                                  | KTS251B224M32N0T00 | 1,600                                     |
|                        | 0.33                      |                |         |       |         |                                  | KTS251B334M32N0T00 | 1,600                                     |
|                        | 0.47                      | 4.5±0.4        | 3.2±0.4 | 2.8   | 0.6±0.3 | 1.0                              | KTS251B474M43N0T00 | 800                                       |
|                        | 0.68                      |                |         |       |         |                                  | KTS251B684M43N0T00 | 800                                       |
|                        | 1.0                       | 5.7±0.4        | 5.0±0.4 | 2.8   | 0.8±0.5 | 2.0                              | KTS251B105M55N0T00 | 800                                       |
|                        | 1.5                       |                |         |       |         |                                  | KTS251B155M55N0T00 | 800                                       |
|                        | 1.5                       | 7.5±0.5        | 6.3±0.5 | 3.5   | 1.0±0.5 | 3.0                              | KTS251B155M76N0T00 | 300                                       |
|                        | 2.2                       |                |         | 5.0   |         |                                  | KTS251B225M76N0T00 | 300                                       |
|                        |                           |                |         |       |         |                                  |                    |   |
| 500                    | 0.47                      | 5.7±0.4        | 5.0±0.4 | 2.7   | 0.8±0.5 | 1.5                              | KTS501B474M55N0T00 | 800                                       |
|                        | 0.56                      |                |         | 3.0   |         |                                  | KTS501B564M55N0T00 | 800                                       |
|                        | 0.68                      |                |         | 2.5   |         |                                  | KTS501B684M76N0T00 | 500                                       |
|                        | 1.0                       | 7.5±0.5        | 6.3±0.5 | 3.2   | 1.0±0.5 | 2.0                              | KTS501B105M76N0T00 | 300                                       |
|                        |                           |                |         | 3.5   |         |                                  | KTS501B125M76N0T00 | 300                                       |
|                        | 1.2                       |                |         |       |         |                                  |                    |   |

※Please consult with us when you consider the rating other than a standard table.

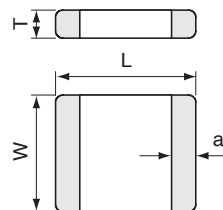
### ◆PART NUMBERING SYSTEM



Size Code

| Size Code | Code |      |
|-----------|------|------|
|           | JIS  | EIA  |
| 31        | 3216 | 1206 |
| 32        | 3225 | 1210 |
| 43        | 4532 | 1812 |
| 55        | 5750 | 2220 |
| 76        | 7563 | 3025 |

### ◆DIMENSIONS



Please refer to "Part Numbering System" of the beginning of a catalog for the details.

### ◆STANDARD RATINGS

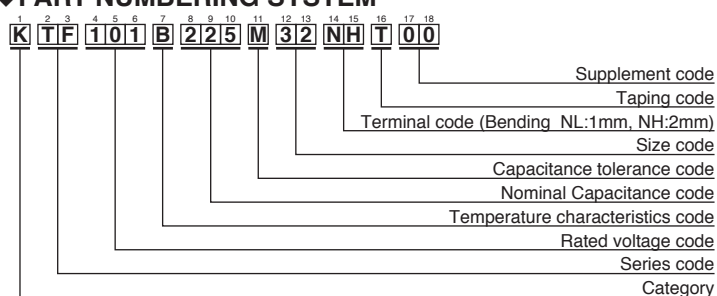
| Rated voltage<br>(Vdc) | Rated Capacitance<br>(μF) | Dimensions(mm) |         |       |         | Maximum ripple current<br>(Arms) | Part Number        | Taping Quantity per reel<br>(pcs. / reel) |
|------------------------|---------------------------|----------------|---------|-------|---------|----------------------------------|--------------------|---|
|                        |                           | L              | W       | Tmax. | a       |                                  |                    |   |
| 25                     | 1.0                       | 3.2±0.3        | 1.6±0.2 | 1.8   | 0.7±0.2 | 0.3                              | KTF250B105M31NLT00 | 3,000                                     |
|                        | 1.5                       |                |         |       |         |                                  | KTF250B155M31NLT00 | 3,000                                     |
|                        | 2.2                       |                |         |       |         |                                  | KTF250B225M31NLT00 | 3,000                                     |
|                        | 3.3                       |                |         |       |         |                                  | KTF250B335M32NHT00 | 1,600                                     |
|                        | 4.7                       | 3.2±0.4        | 2.5±0.3 | 2.6   | 0.7±0.2 | 0.5                              | KTF250B475M32NHT00 | 1,600                                     |
|                        | 6.8                       |                |         |       |         |                                  | KTF250B685M32NHT00 | 1,600                                     |
|                        | 10                        |                |         |       |         |                                  | KTF250B106M43NHT00 | 800                                       |
|                        | 15                        | 4.5±0.4        | 3.2±0.4 | 2.8   | 0.7±0.2 | 1.0                              | KTF250B156M43NHT00 | 800                                       |
|                        | 22                        |                |         |       |         |                                  | KTF250B226M55NHT00 | 800                                       |
|                        | 33                        |                |         |       |         |                                  | KTF250B336M55NHT00 | 800                                       |
| 35                     | 1.0                       | 3.2±0.3        | 1.6±0.2 | 1.8   | 0.7±0.2 | 0.3                              | KTF350B105M31NLT00 | 3,000                                     |
|                        | 1.5                       |                |         |       |         |                                  | KTF350B155M31NLT00 | 3,000                                     |
|                        | 2.2                       |                |         |       |         |                                  | KTF350B225M31NLT00 | 3,000                                     |
|                        | 3.3                       |                |         |       |         |                                  | KTF350B335M32NHT00 | 1,600                                     |
|                        | 4.7                       | 3.2±0.4        | 2.5±0.3 | 2.6   | 0.7±0.2 | 0.5                              | KTF350B475M32NHT00 | 1,600                                     |
|                        | 6.8                       |                |         |       |         |                                  | KTF350B685M43NHT00 | 800                                       |
|                        | 10                        |                |         |       |         |                                  | KTF350B106M43NHT00 | 800                                       |
|                        | 15                        | 4.5±0.4        | 3.2±0.4 | 2.8   | 0.7±0.2 | 1.0                              | KTF350B156M55NHT00 | 800                                       |
|                        | 22                        |                |         |       |         |                                  | KTF350B226M55NHT00 | 800                                       |
|                        | 33                        |                |         |       |         |                                  | KTF350B336M55NHT00 | 800                                       |
| 50                     | 0.33                      | 3.2±0.3        | 1.6±0.2 | 1.8   | 0.7±0.2 | 0.3                              | KTF500B334M31NLT00 | 3,000                                     |
|                        | 0.47                      |                |         |       |         |                                  | KTF500B474M31NLT00 | 3,000                                     |
|                        | 0.68                      |                |         |       |         |                                  | KTF500B684M31NLT00 | 3,000                                     |
|                        | 1.0                       |                |         |       |         |                                  | KTF500B105M31NLT00 | 3,000                                     |
|                        | 1.5                       | 3.2±0.4        | 2.5±0.3 | 2.6   | 0.7±0.2 | 0.5                              | KTF500B155M32NHT00 | 1,600                                     |
|                        | 2.2                       |                |         |       |         |                                  | KTF500B225M32NHT00 | 1,600                                     |
|                        | 3.3                       |                |         |       |         |                                  | KTF500B335M32NHT00 | 1,600                                     |
|                        | 4.7                       | 4.5±0.4        | 3.2±0.4 | 2.8   | 0.7±0.2 | 1.0                              | KTF500B475M43NHT00 | 800                                       |
|                        | 6.8                       |                |         |       |         |                                  | KTF500B685M43NHT00 | 800                                       |
|                        | 10                        |                |         |       |         |                                  | KTF500B106M55NHT00 | 800                                       |
| 100                    | 15                        | 5.7±0.4        | 5.0±0.4 | 2.8   | 1.0±0.4 | 2.0                              | KTF500B156M55NHT00 | 800                                       |
|                        | 0.1                       |                |         |       |         |                                  | KTF101B104M31NLT00 | 3,000                                     |
|                        | 0.15                      |                |         |       |         |                                  | KTF101B154M31NLT00 | 3,000                                     |
|                        | 0.22                      |                |         |       |         |                                  | KTF101B224M31NLT00 | 3,000                                     |
|                        | 0.33                      | 3.2±0.3        | 1.6±0.2 | 1.8   | 0.7±0.2 | 0.3                              | KTF101B334M31NLT00 | 3,000                                     |
|                        | 0.47                      |                |         |       |         |                                  | KTF101B474M31NLT00 | 3,000                                     |
|                        | 0.68                      |                |         |       |         |                                  | KTF101B684M31NLT00 | 3,000                                     |
|                        | 1.0                       |                |         |       |         |                                  | KTF101B105M32NHT00 | 1,600                                     |
|                        | 1.5                       | 3.2±0.4        | 2.5±0.3 | 2.6   | 0.7±0.2 | 0.5                              | KTF101B155M32NHT00 | 1,600                                     |
|                        | 2.2                       |                |         |       |         |                                  | KTF101B225M32NHT00 | 1,600                                     |
| 100                    | 3.3                       |                |         |       |         |                                  | KTF101B155M43NHT00 | 800                                       |
|                        | 4.7                       |                |         |       |         |                                  | KTF101B225M43NHT00 | 800                                       |
|                        | 6.8                       | 4.5±0.4        | 3.2±0.4 | 2.8   | 0.7±0.2 | 1.0                              | KTF101B335M43JHT00 | 800                                       |
|                        | 10                        |                |         |       |         |                                  | KTF101B475M43EHT00 | 800                                       |
|                        | 15                        |                |         |       |         |                                  | KTF101B475M55NHT00 | 800                                       |
|                        | 22                        |                |         |       |         |                                  | KTF101B685M55FHT00 | 800                                       |
|                        | 33                        | 5.7±0.4        | 5.0±0.4 | 3.2   | 1.0±0.4 | 2.0                              | KTF101B475M55NHT00 | 800                                       |
|                        | 47                        |                |         |       |         |                                  | KTF101B685M55FHT00 | 800                                       |
|                        | 68                        |                |         |       |         |                                  | KTF101B685M55FHT00 | 800                                       |
|                        | 100                       |                |         |       |         |                                  | KTF101B685M55FHT00 | 800                                       |



|     |       |         |         |     |         |     |                    |       |
|-----|-------|---------|---------|-----|---------|-----|--------------------|-------|
| 250 | 0.033 | 3.2±0.3 | 1.6±0.2 | 1.8 | 0.7±0.2 | 0.3 | KTF251B333M31NLT00 | 3,000 |
|     | 0.047 |         |         |     |         |     | KTF251B473M31NLT00 | 3,000 |
|     | 0.068 |         |         |     |         |     | KTF251B683M31NLT00 | 3,000 |
|     | 0.1   |         |         |     |         |     | KTF251B104M31NLT00 | 3,000 |
|     | 0.15  | 3.2±0.4 | 2.5±0.3 | 2.6 | 0.7±0.2 | 0.5 | KTF251B154M32NLT00 | 1,600 |
|     | 0.22  |         |         |     |         |     | KTF251B224M32NLT00 | 1,600 |
|     | 0.33  |         |         |     |         |     | KTF251B334M32NLT00 | 1,600 |
|     | 0.47  | 4.5±0.4 | 3.2±0.4 | 2.8 | 0.7±0.2 | 1.0 | KTF251B474M43NLT00 | 800   |
|     | 0.68  |         |         |     |         |     | KTF251B684M43NLT00 | 800   |
|     | 1.0   |         |         |     |         |     | KTF251B105M55NLT00 | 800   |
| 500 | 1.5   | 5.7±0.4 | 5.0±0.4 | 2.8 | 1.0±0.4 | 2.0 | KTF251B155M55NLT00 | 800   |
|     | 0.47  |         |         |     |         |     | KTF501B474M55NLT00 | 800   |
|     | 0.56  |         |         |     |         |     | KTF501B564M55NLT00 | 800   |

※Please consult with us when you consider the rating other than a standard table.

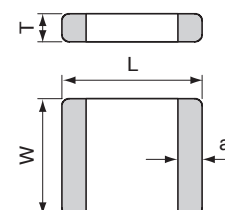
### ◆PART NUMBERING SYSTEM



Size Code

| Size Code | Code |      |
|-----------|------|------|
|           | JIS  | EIA  |
| 31        | 3216 | 1206 |
| 32        | 3225 | 1210 |
| 43        | 4532 | 1812 |
| 55        | 5750 | 2220 |
| 76        | 7563 | 3025 |

### ◆DIMENSIONS



Please refer to "Part Numbering System" of the beginning of a catalog for the details.

## KVF Series

RoHS2  
Compliant

AEC-  
Q200

High  
temperature  
150°C

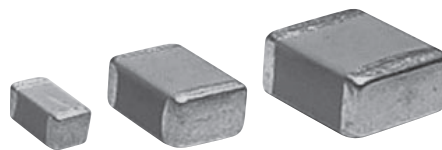
Temperature cycle : 1000 cycles

### ◆FEATURES

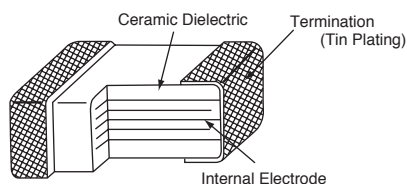
1. Temperature range : -55 to +150°C
2. Temperature characteristics : X8L
3. Excellent noise absorption.
4. Automotive grade (AEC-Q200)

### ◆APPLICATIONS

1. Noise filter for automotive equipment (ECU etc.)
2. Equipment used in a high temperature environment



### ◆CONSTRUCTION



### ◆RATINGS

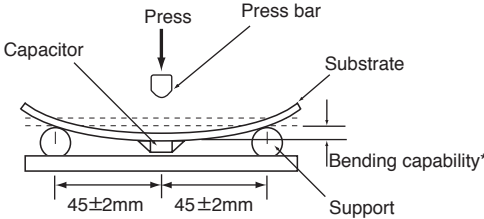
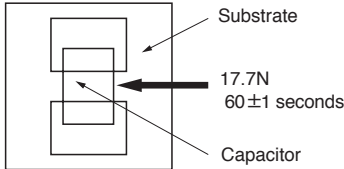
|                                |                                 |
|--------------------------------|---------------------------------|
| 1. Category Temperature Range  | -55~+150°C                      |
| 2. Rated Voltage Range         | 25, 50, 100 Vdc                 |
| 3. Rated Capacitance Range     | 0.033~15μF                      |
| 4. Rated Capacitance Tolerance | M(±20%)                         |
| 5. Temperature Characteristics | X8L                             |
| 6. Rated Ripple Current        | See No.5 on the following table |

### ◆SPECIFICATIONS

| No.         | Items                 | Specification  | Test Condition  |     |                      |                      |             |         |     |           |          |          |  |           |             |
|-------------|-----------------------|--|---|-----|----------------------|----------------------|-------------|---------|-----|-----------|----------|----------|--|-----------|-------------|
| 1           | Withstand Voltage     | No abnormality.  | 250% of rated voltage shall be applied for 5 seconds.<br>(Only 250V <sub>dc</sub> product : 475V)   |     |                      |                      |             |         |     |           |          |          |  |           |             |
| 2           | Insulation Resistance | 100/C <sub>R</sub> (MΩ) or 4000(MΩ)<br>whichever is less.  | Rated voltage shall be applied for 60±5 seconds at<br>temperature 25±2°C.   |     |                      |                      |             |         |     |           |          |          |  |           |             |
| 3           | Rated Capacitance     | Within specified tolerance.  | <table><tr><td></td><td>C<sub>R</sub>≤10μF</td><td>C<sub>R</sub>&gt;10μF</td></tr><tr><td>Temperature</td><td colspan="2">25± 2°C</td></tr><tr><td>Frequency</td><td>1±0.1kHz</td><td>120±12Hz</td></tr><tr><td>Voltage</td><td>1±0.2Vrms</td><td>0.5±0.2Vrms</td></tr></table> |     | C <sub>R</sub> ≤10μF | C <sub>R</sub> >10μF | Temperature | 25± 2°C |     | Frequency | 1±0.1kHz | 120±12Hz | Voltage  | 1±0.2Vrms | 0.5±0.2Vrms |
|             | C <sub>R</sub> ≤10μF  | C <sub>R</sub> >10μF   |   |     |                      |                      |             |         |     |           |          |          |  |           |             |
| Temperature | 25± 2°C               |  |   |     |                      |                      |             |         |     |           |          |          |  |           |             |
| Frequency   | 1±0.1kHz              | 120±12Hz   |   |     |                      |                      |             |         |     |           |          |          |  |           |             |
| Voltage     | 1±0.2Vrms             | 0.5±0.2Vrms  |   |     |                      |                      |             |         |     |           |          |          |  |           |             |
| 4           | Dissipation Factor    | 5.0% maximum.  |   |     |                      |                      |             |         |     |           |          |          |  |           |             |
| 5           | Rated Ripple Current  | <table><tr><td>Size code</td><td>31</td><td>32</td><td>43</td><td>55</td></tr><tr><td>Arms</td><td>0.3</td><td>0.5</td><td>1.0</td><td>2.0</td></tr></table> | Size code   | 31  | 32                   | 43                   | 55          | Arms    | 0.3 | 0.5       | 1.0      | 2.0      | 10kHz~1MHz (sine curve)<br>Ripple voltage V <sub>p</sub> shall be less than<br>the rated voltage.<br>The surface temperature MLCC must not exceed the<br>maximum category temperature when the ripple current<br>is applied. |           |             |
| Size code   | 31                    | 32   | 43  | 55  |                      |                      |             |         |     |           |          |          |  |           |             |
| Arms        | 0.3                   | 0.5  | 1.0   | 2.0 |                      |                      |             |         |     |           |          |          |  |           |             |

As customer requirement, Chemi-Con has submits the test results according to AEC-Q200 for Multilayer ceramic capacitors. Please contact us for more information.

## ◆SPECIFICATIONS

| No.                | Items                               | Specification   | Test Condition   |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
|--------------------|-------------------------------------|---|--|--------|------------------------------------|--------------------|--------------------------------|-----------------------------------|--------------|---|------------------|--------|---|-----------------------------------|------------|---|------------------|--------|
| 6                  | High Temperature Exposure (Storage) | Appearance : No abnormality.<br>$\Delta C/C : \pm 20\%$<br>D.F. : 10% maximum<br>I.R. : 50/C <sub>R</sub> (M $\Omega$ ) or 1000(M $\Omega$ ) whichever is less.             | Temperature : Max. category temperature $\pm 3^{\circ}\text{C}$<br>Time : 1000 $\pm$ <sup>48</sup> <sub>0</sub> hours  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 7                  | Temperature Cycle                   | Appearance : No visible damage.<br>$\Delta C/C : \pm 15\%$<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification.                        | <table><tr><th>Step</th><th>Temperature (<math>^{\circ}\text{C}</math>)</th><th>(min.)</th></tr><tr><td>1</td><td>Min. Category temperature <math>\pm 3</math></td><td>30 <math>\pm</math> 3</td></tr><tr><td>2</td><td>Room temperature</td><td>3 max.</td></tr><tr><td>3</td><td>Max. Category temperature <math>\pm 3</math></td><td>30 <math>\pm</math> 3</td></tr><tr><td>4</td><td>Room temperature</td><td>3 max.</td></tr></table><br>(Epoxy resin PCB t=1.6mm)<br>For 1000 cycles | Step   | Temperature ( $^{\circ}\text{C}$ ) | (min.)             | 1                              | Min. Category temperature $\pm 3$ | 30 $\pm$ 3   | 2 | Room temperature | 3 max. | 3 | Max. Category temperature $\pm 3$ | 30 $\pm$ 3 | 4 | Room temperature | 3 max. |
| Step               | Temperature ( $^{\circ}\text{C}$ )  | (min.)  |  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 1                  | Min. Category temperature $\pm 3$   | 30 $\pm$ 3  |  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 2                  | Room temperature                    | 3 max.  |  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 3                  | Max. Category temperature $\pm 3$   | 30 $\pm$ 3  |  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 4                  | Room temperature                    | 3 max.  |  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 8                  | Biased Humidity                     | Appearance : No abnormality.<br>$\Delta C/C : \pm 20\%$<br>D.F. : 10% maximum<br>I.R. : 25/C <sub>R</sub> (M $\Omega$ ) or 1000(M $\Omega$ ) whichever is less.             | Temperature : 85 $^{\circ}\text{C} \pm 3^{\circ}\text{C}$<br>Humidity : 80 ~ 85%RH<br>Voltage : Rated voltage<br>Time : 1000 $\pm$ <sup>48</sup> <sub>0</sub> hours  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 9                  | Operational Life                    | Appearance : No abnormality.<br>$\Delta C/C : \pm 20\%$<br>D.F. : 10% maximum<br>I.R. : 50/C <sub>R</sub> (M $\Omega$ ) or 1000(M $\Omega$ ) whichever is less.             | Temperature : Max. category temperature $\pm 3^{\circ}\text{C}$<br>Voltage : Rated voltage<br>Time : 1000 $\pm$ <sup>48</sup> <sub>0</sub> hours   |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 10                 | Mechanical Shock                    | Appearance : No abnormality.<br>$\Delta C/C$ : To meet the initial specification.<br>D.F. : To meet the initial specification.  | MIL-STD-202 Method213 Condition F<br>Peak value : 1,500 G<br>Normal duration : 0.5 ms<br>Velocity change : 15.4 ft/sec (4.7m/s)<br>Direction and time : 3 times each in X,Y, Z axis. Total 18 times  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 11                 | Resistance to Soldering Heat        | Appearance : No visible damage.<br>$\Delta C/C : \pm 15\%$<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification.                        | Preheating temperature : 150 $\pm$ 10 $^{\circ}\text{C}$<br>Preheating time : 1 to 2 minute<br>Solder temp. : 260 $\pm$ 5 $^{\circ}\text{C}$<br>Dipping Time : 10 $\pm$ 1s   |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 12                 | ESD                                 | Appearance : No abnormality.<br>$\Delta C/C$ : To meet the initial specification.<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification. | AEC-Q200-002<br>Connection : Between terminals<br>Direct Contact : 8kV (150pF 2000 $\Omega$ )<br>Times : $\pm$ 1time   |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 13                 | Solderability                       | Min. 75% of surface of the termination shall be covered with new solder.  | <table><tr><td>Solder</td><td>Pb Free</td></tr><tr><td>Solder Temperature</td><td>245 <math>\pm</math> 5<math>^{\circ}\text{C}</math></td></tr><tr><td>Dipping Time</td><td>2 <math>\pm</math> 0.5s</td></tr></table>  | Solder | Pb Free                            | Solder Temperature | 245 $\pm$ 5 $^{\circ}\text{C}$ | Dipping Time                      | 2 $\pm$ 0.5s |   |                  |        |   |                                   |            |   |                  |        |
| Solder             | Pb Free                             |   |  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| Solder Temperature | 245 $\pm$ 5 $^{\circ}\text{C}$      |   |  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| Dipping Time       | 2 $\pm$ 0.5s                        |   |  |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 14                 | Board Flex                          | Appearance : No visible damage.<br>$\Delta C/C : \pm 15\%$  | The substrate shall be bend at rate of 1mm/s for 5 seconds.<br><br>* Bending capability : 1mm or 2mm   |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |
| 15                 | Terminal Strength (SMD)             | No visible damage.  |    |        |                                    |                    |                                |                                   |              |   |                  |        |   |                                   |            |   |                  |        |

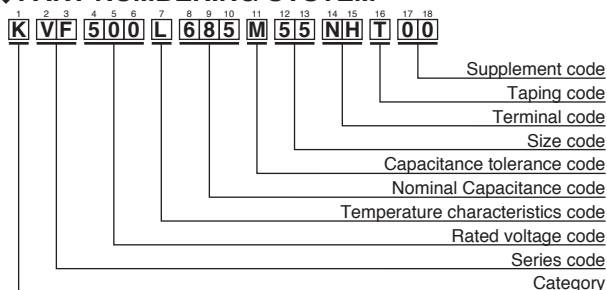
\*C<sub>R</sub> : Rated Capacitance( $\mu\text{F}$ )

## ◆STANDARD RATINGS

| Rated voltage<br>(Vdc) | Rated Capacitance<br>(μF) | Dimensions(mm)     |         |                    |         | Maximum ripple current<br>(Arms) | Part Number        | Taping<br>Quantity per reel<br>(pcs. / reel) |
|------------------------|---------------------------|--------------------|---------|--------------------|---------|----------------------------------|--------------------|--|
|                        |                           | L                  | W       | T max.             | a       |                                  |                    |  |
| 25                     | 0.33                      | 3.2±0.3            | 1.6±0.2 | 1.8                | 0.7±0.2 | 0.3                              | KVF250L334M31NLT00 | 3,000  |
|                        | 0.47                      |                    |         |                    |         |                                  | KVF250L474M31NLT00 | 3,000  |
|                        | 0.68                      |                    |         |                    |         |                                  | KVF250L684M31NLT00 | 3,000  |
|                        | 1.0                       |                    |         |                    |         |                                  | KVF250L105M31NLT00 | 3,000  |
|                        | 1.5                       | 3.2±0.4            | 2.5±0.3 | 2.6                | 0.7±0.2 | 0.5                              | KVF250L155M32NHT00 | 1,600  |
|                        | 2.2                       |                    |         |                    |         |                                  | KVF250L225M32NHT00 | 1,600  |
|                        | 3.3                       |                    |         |                    |         |                                  | KVF250L335M32NHT00 | 1,600  |
|                        | 4.7                       | 4.5±0.4            | 3.2±0.4 | 2.8                | 0.7±0.2 | 1.0                              | KVF250L475M43NHT00 | 800  |
|                        | 6.8                       |                    |         |                    |         |                                  | KVF250L685M43NHT00 | 800  |
|                        | 10                        | 5.7±0.4            | 5.0±0.4 | 2.8                | 1.0±0.4 | 2.0                              | KVF250L106M55NHT00 | 800  |
|                        | 15                        |                    |         |                    |         |                                  | KVF250L156M55NHT00 | 800  |
|                        | 50                        | 0.1                | 3.2±0.3 | 1.6±0.2            | 1.8     | 0.7±0.2                          | 0.3                | KVF500L104M31NLT00                           |
| 0.15                   |                           | KVF500L154M31NLT00 |         |                    |         |                                  |                    | 3,000  |
| 0.22                   |                           | KVF500L224M31NLT00 |         |                    |         |                                  |                    | 3,000  |
| 0.33                   |                           | KVF500L334M31NLT00 |         |                    |         |                                  |                    | 3,000  |
| 0.47                   |                           | KVF500L474M31NLT00 |         |                    |         |                                  |                    | 3,000  |
| 0.68                   |                           | 3.2±0.4            | 2.5±0.3 | 2.6                | 0.7±0.2 | 0.5                              | KVF500L684M32NLT00 | 1,600  |
| 1.0                    |                           |                    |         |                    |         |                                  | KVF500L105M32NHT00 | 1,600  |
| 1.5                    |                           | 4.5±0.4            | 3.2±0.4 | 2.8                | 0.7±0.2 | 1.0                              | KVF500L155M43NHT00 | 800  |
| 2.2                    |                           |                    |         |                    |         |                                  | KVF500L225M43NHT00 | 800  |
| 3.3                    |                           | 5.7±0.4            | 5.0±0.4 | 2.8                | 1.0±0.4 | 2.0                              | KVF500L335M55NLT00 | 800  |
| 4.7                    |                           |                    |         | KVF500L475M55NHT00 |         |                                  | 800                |  |
| 6.8                    |                           |                    |         | KVF500L685M55NHT00 |         |                                  | 800                |  |
|                        |                           |                    |         |                    |         |                                  |                    |  |
| 100                    |                           | 0.033              | 3.2±0.3 | 1.6±0.2            | 1.8     | 0.7±0.2                          | 0.3                | KVF101L333M31NLT00                           |
|                        | 0.047                     | KVF101L473M31NLT00 |         |                    |         |                                  |                    | 3,000  |
|                        | 0.068                     | KVF101L683M31NLT00 |         |                    |         |                                  |                    | 3,000  |
|                        | 0.1                       | KVF101L104M31NLT00 |         |                    |         |                                  |                    | 3,000  |
|                        | 0.15                      | 3.2±0.4            | 2.5±0.3 | 2.6                | 0.7±0.2 | 0.5                              | KVF101L154M32NLT00 | 1,600  |
|                        | 0.22                      |                    |         |                    |         |                                  | KVF101L224M32NLT00 | 1,600  |
|                        | 0.33                      |                    |         |                    |         |                                  | KVF101L334M32NLT00 | 1,600  |
|                        | 0.47                      |                    |         |                    |         |                                  | KVF101L474M43NLT00 | 800  |
|                        | 0.68                      | 4.5±0.4            | 3.2±0.4 | 2.8                | 0.7±0.2 | 1.0                              | KVF101L684M43NLT00 | 800  |
|                        | 1.0                       |                    |         |                    |         |                                  | KVF101L105M55NLT00 | 800  |
|                        | 1.5                       | 5.7±0.4            | 5.0±0.4 | 2.8                | 1.0±0.4 | 2.0                              | KVF101L155M55NLT00 | 800  |
|                        |                           |                    |         |                    |         |                                  |                    |  |

※ Please consult with us when you consider the rating other than a standard table.

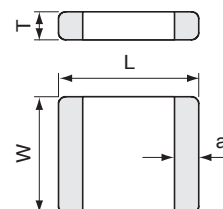
## ◆PART NUMBERING SYSTEM



Size Code

| Size Code | Code |      |
|-----------|------|------|
|           | JIS  | EIA  |
| 31        | 3216 | 1206 |
| 32        | 3225 | 1210 |
| 43        | 4532 | 1812 |
| 55        | 5750 | 2220 |
| 76        | 7563 | 3025 |

## ◆DIMENSIONS



Please refer to "Part Numbering System" of the beginning of a catalog for the details.

### ◆FEATURES

1. Small size and large capacitance, high ripple current.
2. Temperature cycle: 1000 cycles.
3. X7R temperature characteristics.
4. Excellent noise absorption.
5. For reflow soldering use.
6. Suitable for aluminum substrate.



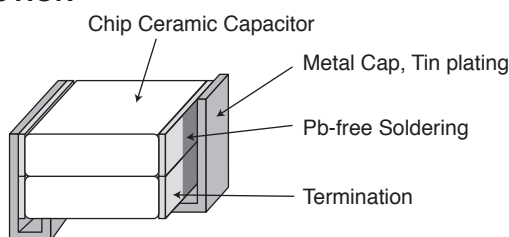
### ◆APPLICATIONS

1. Smoothing circuit of switching mode AC-DC or DC-DC converter.
2. On-board power supply.
3. Noise suppressor for various kinds of equipments.

### ◆CUSTOM MADE PRODUCTS

We can offer custom made one element metal cap type capacitors for request of customers.  
Please contact us if you have questions for details.

### ◆CONSTRUCTION



### ◆RATINGS

|                                |                                     |
|--------------------------------|-------------------------------------|
| 1. Category Temperature Range  | -55~+125°C                          |
| 2. Rated Voltage Range         | 25, 35, 50, 100, 250V <sub>dc</sub> |
| 3. Rated Capacitance Range     | 1.0 to 100μF                        |
| 4. Rated Capacitance Tolerance | M(±20%)                             |
| 5. Temperature Characteristics | X7R                                 |
| 6. Rated Ripple Current        | See No.5 on the following table     |

### ◆SPECIFICATIONS

| No. | Items                 | Specification  | Test Condition   |                      |                      |
|-----|-----------------------|--|--|----------------------|----------------------|
| 1   | Withstand Voltage     | No abnormality.  | 250% of rated voltage shall be applied for 5 seconds.<br>(Only 250V <sub>dc</sub> products : 475V) |                      |                      |
| 2   | Insulation Resistance | 100/C <sub>R</sub> (MΩ) or 4000(MΩ) whichever is less. | Rated voltage shall be applied for 60±5 seconds at temperature 25±2°C.                             |                      |                      |
| 3   | Rated Capacitance     | Within specified tolerance.                            |  | C <sub>R</sub> ≤10μF | C <sub>R</sub> >10μF |
|     |                       |  | Temperature  | 25±2°C               |                      |
| 4   | Dissipation Factor    | 5.0% maximum   | Frequency  | 1±0.1kHz             | 120±12Hz             |
|     |                       |  | Voltage  | 1±0.2Vrms            | 0.5±0.2Vrms          |
| 5   | Rated Ripple Current  | See STANDARD RATINGS                                   | 10kHz~1MHz (sine curve)<br>Ripple voltage V <sub>p</sub> shall be less than the rated voltage.     |                      |                      |

As customer requirement, Chemi-Con has submits the test results according to AEC-Q200 for Multilayer ceramic capacitors. Please contact us for more information.

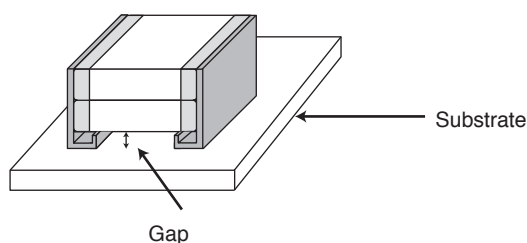
### ◆SPECIFICATIONS

| No.                    | Items              | Specification  | Test Condition  |                              |                  |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
|------------------------|--------------------|--|---|------------------------------|------------------|--------|---|------------------------------|------|---|------------------|--------|---|------------------------------|------|---|------------------|--------|
| 6                      | Temperature Cycle  | Appearance : No visible damage.<br>ΔC/C : ±15%<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification. | <table><tr><td>Step</td><td>Temperature (°C)</td><td>(min.)</td></tr><tr><td>1</td><td>Min. Category temperature ±3</td><td>30±3</td></tr><tr><td>2</td><td>Room temperature</td><td>3 max.</td></tr><tr><td>3</td><td>Max. Category temperature ±3</td><td>30±3</td></tr><tr><td>4</td><td>Room temperature</td><td>3 max.</td></tr></table> | Step                         | Temperature (°C) | (min.) | 1 | Min. Category temperature ±3 | 30±3 | 2 | Room temperature | 3 max. | 3 | Max. Category temperature ±3 | 30±3 | 4 | Room temperature | 3 max. |
|                        |                    |  | Step  | Temperature (°C)             | (min.)           |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
|                        |                    |  | 1   | Min. Category temperature ±3 | 30±3             |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
|                        |                    |  | 2   | Room temperature             | 3 max.           |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
|                        |                    |  | 3   | Max. Category temperature ±3 | 30±3             |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
|                        |                    |  | 4   | Room temperature             | 3 max.           |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
| <Cycle><br>1000 cycles |                    |  |   |                              |                  |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
|                        |                    |  |   |                              |                  |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
|                        |                    |  |   |                              |                  |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
|                        |                    |  |   |                              |                  |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
|                        |                    |  |   |                              |                  |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |
| 7                      | Humidity Load Life | Appearance : No abnormality.<br>ΔC/C : ±20%<br>D.F. : 10% max.<br>I.R. : 25/C <sub>R</sub> (MΩ) or 1000(MΩ)<br>                          |   |                              |                  |        |   |                              |      |   |                  |        |   |                              |      |   |                  |        |

\* $C_R$  : Rated Capacitance( $\mu\text{F}$ )

### ◆Note of mountig for NTJ series.

1. The gap of capacitor and a substrate shall be the mounting face.
2. To prevent degradation of temperature cycling capability, if need to be careful about amount of solder that would not go into the inner side of terminations.

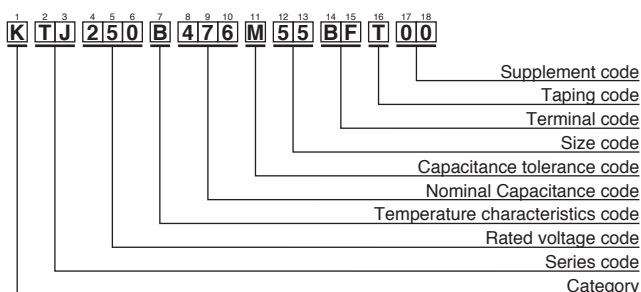


## ◆STANDARD RATINGS

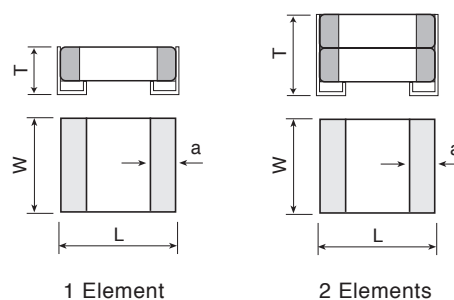
| Rated voltage<br>(Vdc) | Rated Capacitance<br>(μF) | Dimensions(mm) |         |       |         | Element | Maximum<br>ripple current<br>(Arms) | Part Number        | Taping<br>Quantity per reel<br>(pcs. / reel) |
|------------------------|---------------------------|----------------|---------|-------|---------|---------|-------------------------------------|--------------------|--|
|                        |                           | L              | W       | Tmax. | a       |         |                                     |                    |  |
| 25                     | 33                        | 6.0±0.4        | 5.3±0.4 | 3.8   | 1.3±0.3 | 1       | 2.0                                 | KTJ250B336M55AFT00 | 400  |
|                        | 33                        | 6.0±0.4        | 5.3±0.4 | 5.5   | 1.3±0.3 | 2       | 3.0                                 | KTJ250B336M55BFT00 | 2,000  |
|                        | 47                        | 6.0±0.4        | 5.3±0.4 | 5.5   | 1.3±0.3 | 2       | 3.0                                 | KTJ250B476M55BFT00 | 2,000  |
|                        | 47                        | 7.8±0.5        | 6.6±0.5 | 5.5   | 1.5±0.3 | 1       | 3.0                                 | KTJ250B476M76AFT00 | 1,200  |
|                        | 68                        | 7.8±0.5        | 6.6±0.5 | 8.5   | 1.5±0.3 | 2       | 4.0                                 | KTJ250B686M76BFT00 | 500  |
|                        | 100                       | 7.8±0.5        | 6.6±0.5 | 9.5   | 1.5±0.3 | 2       | 4.0                                 | KTJ250B107M76BFT00 | 400  |
| 35                     | 33                        | 6.0±0.4        | 5.3±0.4 | 5.5   | 1.3±0.3 | 2       | 3.0                                 | KTJ350B336M55BFT00 | 2,000  |
|                        | 47                        | 6.0±0.4        | 5.3±0.4 | 5.5   | 1.3±0.3 | 2       | 3.0                                 | KTJ350B476M55BFT00 | 2,000  |
|                        | 47                        | 7.8±0.5        | 6.6±0.5 | 5.5   | 1.5±0.3 | 1       | 3.0                                 | KTJ350B476M76AFT00 | 1,200  |
|                        | 68                        | 7.8±0.5        | 6.6±0.5 | 8.5   | 1.5±0.3 | 2       | 4.0                                 | KTJ350B686M76BFT00 | 500  |
|                        | 100                       | 7.8±0.5        | 6.6±0.5 | 8.5   | 1.5±0.3 | 2       | 4.0                                 | KTJ350B107M76BFT00 | 500  |
|                        | 100                       | 7.8±0.5        | 6.6±0.5 | 8.5   | 1.5±0.3 | 2       | 4.0                                 | KTJ350B107M76BFT00 | 500  |
| 50                     | 15                        | 6.0±0.4        | 5.3±0.4 | 3.8   | 1.3±0.3 | 1       | 2.0                                 | KTJ500B156M55AFT00 | 400  |
|                        | 15                        | 6.0±0.4        | 5.3±0.4 | 5.5   | 1.3±0.3 | 2       | 3.0                                 | KTJ500B156M55BFT00 | 2,000  |
|                        | 22                        | 6.0±0.4        | 5.3±0.4 | 5.5   | 1.3±0.3 | 2       | 3.0                                 | KTJ500B226M55BFT00 | 2,000  |
|                        | 22                        | 7.8±0.5        | 6.6±0.5 | 5.5   | 1.5±0.3 | 1       | 3.0                                 | KTJ500B226M76AFT00 | 1,200  |
|                        | 33                        | 7.8±0.5        | 6.6±0.5 | 8.5   | 1.5±0.3 | 2       | 4.0                                 | KTJ500B336M76BFT00 | 500  |
|                        | 47                        | 7.8±0.5        | 6.6±0.5 | 8.5   | 1.5±0.3 | 2       | 4.0                                 | KTJ500B476M76BFT00 | 500  |
| 100                    | 4.7                       | 6.0±0.4        | 5.3±0.4 | 3.8   | 1.3±0.3 | 1       | 2.0                                 | KTJ101B475M55AFT00 | 400  |
|                        | 6.8                       | 6.0±0.4        | 5.3±0.4 | 5.5   | 1.3±0.3 | 2       | 3.0                                 | KTJ101B685M55BFT00 | 2,000  |
|                        | 10                        | 6.0±0.4        | 5.3±0.4 | 5.5   | 1.3±0.3 | 2       | 3.0                                 | KTJ101B106M55BFT00 | 2,000  |
|                        | 6.8                       | 7.8±0.5        | 6.6±0.5 | 5.5   | 1.5±0.3 | 1       | 3.0                                 | KTJ101B685M76AFT00 | 1,200  |
|                        | 15                        | 7.8±0.5        | 6.6±0.5 | 8.5   | 1.5±0.3 | 2       | 4.0                                 | KTJ101B156M76BFT00 | 500  |
|                        | 15                        | 7.8±0.5        | 6.6±0.5 | 8.5   | 1.5±0.3 | 2       | 4.0                                 | KTJ101B156M76BFT00 | 500  |
| 250                    | 1.0                       | 6.0±0.4        | 5.3±0.4 | 3.8   | 1.3±0.3 | 1       | 2.0                                 | KTJ251B105M55AFT00 | 400  |
|                        | 1.5                       | 6.0±0.4        | 5.3±0.4 | 5.5   | 1.3±0.3 | 2       | 3.0                                 | KTJ251B155M55BFT00 | 2,000  |
|                        | 2.2                       | 6.0±0.4        | 5.3±0.4 | 6.5   | 1.3±0.3 | 2       | 3.0                                 | KTJ251B225M55BFT00 | 2,000  |
|                        | 2.2                       | 7.8±0.5        | 6.6±0.5 | 5.5   | 1.5±0.3 | 1       | 3.0                                 | KTJ251B225M76AFT00 | 1,200  |
|                        | 3.3                       | 7.8±0.5        | 6.6±0.5 | 8.5   | 1.5±0.3 | 2       | 3.0                                 | KTJ251B335M76BFT00 | 500  |
|                        | 3.3                       | 7.8±0.5        | 6.6±0.5 | 8.5   | 1.5±0.3 | 2       | 3.0                                 | KTJ251B335M76BFT00 | 500  |

※Please consult with us when you consider the rating other than a standard table.

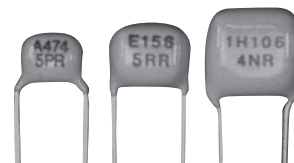
## ◆PART NUMBERING SYSTEM



## ◆DIMENSIONS



Please refer to "Part Numbering System" of the beginning of a catalog for the details.



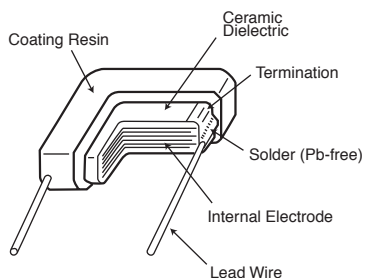
### ◆FEATURES

1. Small in size and wide capacitance range.  
Max. 470μF is available.
2. Temperature characteristic is X7R in EIA code.
3. Superior humidity characteristic and long life.
4. Excellent high frequency characteristic due to low ESR.
5. High rated ripple current.
6. 250V<sub>dc</sub> items are available.
7. Resin(UL94 V-0) used for coating.
8. Pb-free design(also ceramic dielectric)

### ◆APPLICATIONS

1. Smoothing circuit of switching mode AC-DC or DC-DC converter.
2. Noise suppressor for various kinds of equipments.
3. By-pass or decoupling circuits.
4. Automotive equipments.

### ◆CONSTRUCTION



### ◆RATINGS

|                                |  |
|--------------------------------|--|
| 1. Category Temperature Range  | -55 to +125°C                            |
| 2. Rated Voltage Range         | 25, 35, 50, 100, 250, 500V <sub>dc</sub> |
| 3. Rated Capacitance Range     | 0.1 to 470μF                             |
| 4. Rated Capacitance Tolerance | M(±20%)                                  |
| 5. Temperature Characteristics | X7R                                      |
| 6. Rated Ripple Current        | See No.5 on the following table          |

### ◆SPECIFICATIONS

| No. | Items                           |                            | Specification   | Test Condition   |                      |                                 |
|-----|---------------------------------|----------------------------|---|--|----------------------|---------------------------------|
| 1   | Withstand Voltage               | Between Terminals          | No abnormality.   | Rated voltage  |                      | Withstand voltage               |
|     |                                 | Terminals to Coating Resin |   | Less than 250V   |                      | 250% of rated voltage           |
|     |                                 |                            |   | More than 250V<br>Less than 500V                                       |                      | 100V +<br>150% of rated voltage |
|     |                                 |                            |   | More than 500V   |                      | 130% of rated voltage           |
|     | Shall be applied for 5 seconds. |                            |   |  |                      |                                 |
| 2   | Insulation Resistance           |                            | 100/C <sub>R</sub> (MΩ) or 4000(MΩ)<br>whichever is less. | Rated voltage shall be applied for 60±5 seconds at temperature 25±2°C. |                      |                                 |
| 3   | Rated Capacitance               |                            | Within specified tolerance.                               |  | C <sub>R</sub> ≤10μF | C <sub>R</sub> >10μF            |
|     |                                 |                            |   | Temperature  | 25±2°C               |                                 |
| 4   | Dissipation Factor              |                            | 5.0% maximum.   | Frequency  | 1±0.1kHz             | 120±12Hz                        |
|     |                                 |                            |   | Voltage  | 1±0.2Vrms            | 0.5±0.2Vrms                     |

As customer requirement, Chemi-Con has submits the test results according to AEC-Q200 for Multilayer ceramic capacitors. Please contact us for more information.



### ◆SPECIFICATIONS

| No.                | Items  |                  | Specification   | Test Condition   |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
|--------------------|--|------------------|---|--|------------------|-----------------------------|--------------------|--------------------------|-----------------------------------|-----------------|----------|------------------|------------|---|-----------------------------------|------------|---|------------------|--------|
| 5                  | Rated Ripple Current   |                  | See STANDARD RATINGS  | 10kHz to 1MHz (sine curve)<br>Ripple voltage $V_p$ shall be less than the rated voltage.   |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 6                  | Robustness of Terminations   | Tension          | No visible damage.  | The force applied shall be :   |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
|                    |  |                  |   | <table><tr><td>Lead <math>\phi</math> (mm)</td><td>Tensile(N)</td><td>(sec.)</td></tr><tr><td>0.5 max.</td><td>5</td><td>10<math>\pm</math> 1</td></tr><tr><td>0.6 min.</td><td>10</td><td>10<math>\pm</math> 1</td></tr></table>  | Lead $\phi$ (mm) | Tensile(N)                  | (sec.)             | 0.5 max.                 | 5                                 | 10 $\pm$ 1      | 0.6 min. | 10               | 10 $\pm$ 1 |   |                                   |            |   |                  |        |
|                    |  | Lead $\phi$ (mm) |   | Tensile(N)   | (sec.)           |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
|                    |  | 0.5 max.         |   | 5  | 10 $\pm$ 1       |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
|                    |  | 0.6 min.         |   | 10   | 10 $\pm$ 1       |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| Bending            | <table><tr><td>Lead <math>\phi</math> (mm)</td><td>Bending(N)</td><td>(kg)</td></tr><tr><td>0.5 max.</td><td>2.5</td><td>0.25</td></tr><tr><td>0.6 min.</td><td>5</td><td>0.51</td></tr></table> | Lead $\phi$ (mm) | Bending(N)  | (kg)   | 0.5 max.         | 2.5                         | 0.25               | 0.6 min.                 | 5                                 | 0.51            |          |                  |            |   |                                   |            |   |                  |        |
|                    | Lead $\phi$ (mm)   | Bending(N)       | (kg)  |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
|                    | 0.5 max.   | 2.5              | 0.25  |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 0.6 min.           | 5  | 0.51             |   |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| Time : 2times.     |  |                  |   |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 7                  | Vibration  |                  | Appearance : No abnormality.<br>Capacitance : To meet the initial specification.<br>D.F. : To meet the initial specification.                               | Amplitude : 1.5mm<br>Frequency range : 10-55-10Hz (1 min)<br>Direction and time :<br>2 hours each to X, Y, Z axis. Total 6 hours.  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 8                  | Solderability  |                  | Min. 75% of surface of the termination shall be covered with new solder.  | <table><tr><td>Solder</td><td>Pb Free</td></tr><tr><td>Solder Temperature</td><td>245<math>\pm</math>5<math>^{\circ}</math>C</td></tr><tr><td>Dipping Time</td><td>2<math>\pm</math>0.5sec.</td></tr></table>  | Solder           | Pb Free                     | Solder Temperature | 245 $\pm$ 5 $^{\circ}$ C | Dipping Time                      | 2 $\pm$ 0.5sec. |          |                  |            |   |                                   |            |   |                  |        |
| Solder             | Pb Free  |                  |   |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| Solder Temperature | 245 $\pm$ 5 $^{\circ}$ C   |                  |   |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| Dipping Time       | 2 $\pm$ 0.5sec.  |                  |   |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 9                  | Resistance to Soldering Heat   |                  | Appearance : No abnormality.<br>$\Delta C/C$ : $\pm$ 15%<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification.          | Solder Temperature : 350 $\pm$ 10 $^{\circ}$ C<br>Dipping Time : 3 $\pm$ 0.5 sec.<br>Depth : 1.5 to 2mm  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 10                 | Temperature Cycle  |                  | Appearance : No abnormality.<br>$\Delta C/C$ : $\pm$ 15%<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification.          | <table><tr><td>Step</td><td>Temperature (<math>^{\circ}</math>C)</td><td>(min.)</td></tr><tr><td>1</td><td>Min. Category temperature <math>\pm</math>3</td><td>30<math>\pm</math>3</td></tr><tr><td>2</td><td>Room temperature</td><td>3 max.</td></tr><tr><td>3</td><td>Max. Category temperature <math>\pm</math>3</td><td>30<math>\pm</math>3</td></tr><tr><td>4</td><td>Room temperature</td><td>3 max.</td></tr></table><br>For 5 cycles for above temperature cycle. | Step             | Temperature ( $^{\circ}$ C) | (min.)             | 1                        | Min. Category temperature $\pm$ 3 | 30 $\pm$ 3      | 2        | Room temperature | 3 max.     | 3 | Max. Category temperature $\pm$ 3 | 30 $\pm$ 3 | 4 | Room temperature | 3 max. |
| Step               | Temperature ( $^{\circ}$ C)  | (min.)           |   |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 1                  | Min. Category temperature $\pm$ 3  | 30 $\pm$ 3       |   |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 2                  | Room temperature   | 3 max.           |   |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 3                  | Max. Category temperature $\pm$ 3  | 30 $\pm$ 3       |   |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 4                  | Room temperature   | 3 max.           |   |  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 11                 | Humidity Load Life   |                  | Appearance : No abnormality.<br>$\Delta C/C$ : $\pm$ 20%<br>D.F. : 10% maximum<br>I.R. : 25/ $C_R$ (M $\Omega$ ) or 1000(M $\Omega$ )<br>whichever is less. | Temperature : 40 $\pm$ 2 $^{\circ}$ C<br>Humidity : 90 to 95%RH<br>Voltage : Rated voltage<br>Time : 500 $\pm$ $\frac{24}{0}$ hours  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |
| 12                 | Endurance  |                  | Appearance : No abnormality.<br>$\Delta C/C$ : $\pm$ 20%<br>D.F. : 10% maximum<br>I.R. : 50/ $C_R$ (M $\Omega$ ) or 1000(M $\Omega$ )<br>whichever is less. | Temperature : 125 $\pm$ 3 $^{\circ}$ C<br>Voltage : Rated voltage<br>Time : 1000 $\pm$ $\frac{48}{0}$ hours  |                  |                             |                    |                          |                                   |                 |          |                  |            |   |                                   |            |   |                  |        |

\* $C_R$  : Rated Capacitance( $\mu$ F)

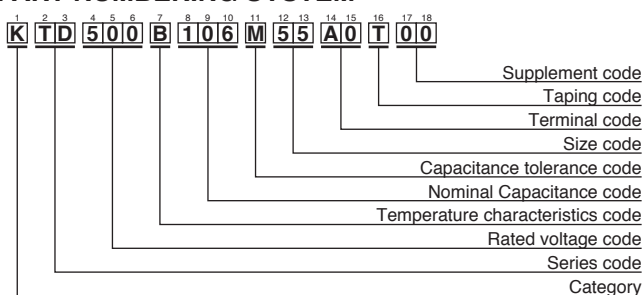
### ◆STANDARD RATINGS

| Rated voltage<br>(Vdc) | Rated Capacitance<br>(μF) | Dimensions (mm) |       |       |       |         | Maximum<br>ripple current<br>(Arms) | Part Number        | Taping<br>Quantity per reel<br>(pcs. / box) |
|------------------------|---------------------------|-----------------|-------|-------|-------|---------|-------------------------------------|--------------------|---|
|                        |                           | Lmax.           | Wmax. | Tmax. | F±0.8 | φd±0.05 |                                     |                    |   |
| 25                     | 3.3                       | 5.0             | 6.0   | 3.5   | 5.0   | 0.5     | 0.3                                 | KTD250B335M32A0T00 | 2,000                                       |
|                        | 4.7                       |                 |       |       |       |         |                                     | KTD250B475M32A0T00 | 2,000                                       |
|                        | 6.8                       |                 |       |       |       |         |                                     | KTD250B685M43A0T00 | 2,000                                       |
|                        | 10                        | 6.5             | 6.5   | 4.0   | 5.0   | 0.5     | 0.8                                 | KTD250B106M43A0T00 | 2,000                                       |
|                        | 15                        |                 |       |       |       |         |                                     | KTD250B156M43A0T00 | 2,000                                       |
|                        | 15                        |                 |       |       |       |         |                                     | KTD250B156M55A0T00 | 2,000                                       |
|                        | 22                        | 7.5             | 9.0   | 4.5   | 5.0   | 0.5     | 1.0                                 | KTD250B226M55A0T00 | 2,000                                       |
|                        | 33                        |                 |       |       |       |         |                                     | KTD250B336M55A0T00 | 2,000                                       |
|                        | 47                        |                 |       |       |       |         |                                     | KTD250B476M76A0T00 | 1,000                                       |
|                        | 68                        | 13.5            | 15.0  | 6.0   | 10.0  | 0.6     | 2.0                                 | KTD250B686M80A0B00 | —   |
|                        | 100                       |                 |       | 8.0   |       |         |                                     | KTD250B107M80A0B00 | —   |
|                        | 150                       |                 |       | 6.0   |       |         |                                     | KTD250B157M90A0B00 | —   |
|                        | 220                       | 22.5            | 20.0  | 8.0   | 20.0  | 0.8     | 3.0                                 | KTD250B227M90A0B00 | —   |
|                        | 330                       |                 |       | 8.0   |       |         |                                     | KTD250B337M99A0B00 | —   |
|                        | 470                       |                 |       | 11.5  |       |         |                                     | KTD250B477M99A0B00 | —   |
| 35                     | 3.3                       | 5.0             | 6.0   | 3.5   | 5.0   | 0.5     | 0.3                                 | KTD350B335M32A0T00 | 2,000                                       |
|                        | 4.7                       |                 |       |       |       |         |                                     | KTD350B475M32A0T00 | 2,000                                       |
|                        | 6.8                       |                 |       |       |       |         |                                     | KTD350B685M43A0T00 | 2,000                                       |
|                        | 10                        | 6.5             | 6.5   | 4.0   | 5.0   | 0.5     | 0.8                                 | KTD350B106M43A0T00 | 2,000                                       |
|                        | 15                        |                 |       |       |       |         |                                     | KTD350B156M55A0T00 | 2,000                                       |
|                        | 22                        |                 |       |       |       |         |                                     | KTD350B226M55A0T00 | 2,000                                       |
|                        | 33                        | 10.0            | 11.5  | 5.0   | 5.0   | 0.5     | 1.5                                 | KTD350B336M76A0T00 | 1,000                                       |
|                        | 47                        |                 |       | 5.5   |       |         |                                     | KTD350B476M76A0T00 | 1,000                                       |
| 50                     | 1.0                       | 5.0             | 6.0   | 3.5   | 5.0   | 0.5     | 0.3                                 | KTD500B105M32A0T00 | 2,000                                       |
|                        | 1.5                       |                 |       |       |       |         |                                     | KTD500B155M32A0T00 | 2,000                                       |
|                        | 2.2                       |                 |       |       |       |         |                                     | KTD500B225M32A0T00 | 2,000                                       |
|                        | 3.3                       |                 |       |       |       |         |                                     | KTD500B335M32A0T00 | 2,000                                       |
|                        | 4.7                       | 6.5             | 6.5   | 4.0   | 5.0   | 0.5     | 0.8                                 | KTD500B475M43A0T00 | 2,000                                       |
|                        | 6.8                       |                 |       |       |       |         |                                     | KTD500B685M43A0T00 | 2,000                                       |
|                        | 10                        |                 |       |       |       |         |                                     | KTD500B106M55A0T00 | 2,000                                       |
|                        | 15                        | 7.5             | 9.0   | 4.5   | 5.0   | 0.5     | 1.0                                 | KTD500B156M55A0T00 | 2,000                                       |
|                        | 22                        |                 |       |       |       |         |                                     | KTD500B226M76A0T00 | 1,000                                       |
|                        | 33                        |                 |       |       |       |         |                                     | KTD500B336M80A0B00 | —   |
|                        | 47                        | 13.5            | 15.0  | 5.5   | 10.0  | 0.6     | 2.0                                 | KTD500B476M90A0B00 | —   |
|                        | 68                        |                 |       | 6.0   |       |         |                                     | KTD500B686M90A0B00 | —   |
|                        | 100                       |                 |       | 7.0   |       |         |                                     | KTD500B107M90A0B00 | —   |
|                        | 150                       | 28.5            | 20.0  | 7.5   | 25.0  | 0.8     | 4.0                                 | KTD500B157M99A0B00 | —   |
|                        | 220                       |                 |       | 10.0  |       |         |                                     | KTD500B227M99A0B00 | —   |
|                        |                           |                 |       |       |       |         |                                     | KTD500B227M99A0B00 | —   |
| 100                    | 0.33                      | 5.0             | 6.0   | 3.5   | 5.0   | 0.5     | 0.3                                 | KTD101B334M32A0T00 | 2,000                                       |
|                        | 0.47                      |                 |       |       |       |         |                                     | KTD101B474M32A0T00 | 2,000                                       |
|                        | 0.68                      |                 |       |       |       |         |                                     | KTD101B684M32A0T00 | 2,000                                       |
|                        | 1.0                       |                 |       |       |       |         |                                     | KTD101B105M32A0T00 | 2,000                                       |
|                        | 1.5                       |                 |       |       |       |         |                                     | KTD101B155M32A0T00 | 2,000                                       |
|                        | 2.2                       |                 |       |       |       |         |                                     | KTD101B225M32A0T00 | 2,000                                       |
|                        | 1.5                       | 6.5             | 6.5   | 4.0   | 5.0   | 0.5     | 0.8                                 | KTD101B155M43A0T00 | 2,000                                       |
|                        | 2.2                       |                 |       |       |       |         |                                     | KTD101B225M43A0T00 | 2,000                                       |
|                        | 3.3                       |                 |       |       |       |         |                                     | KTD101B335M43A0T00 | 2,000                                       |
|                        | 4.7                       |                 |       |       |       |         |                                     | KTD101B475M43A0T00 | 2,000                                       |
|                        | 3.3                       | 7.5             | 9.0   | 4.5   | 5.0   | 0.5     | 1.0                                 | KTD101B335M55A0T00 | 2,000                                       |
|                        | 4.7                       |                 |       | 4.7   |       |         |                                     | KTD101B475M55A0T00 | 2,000                                       |
|                        | 6.8                       |                 |       | 5.0   |       |         |                                     | KTD101B685M55A0T00 | 2,000                                       |
|                        | 6.8                       | 10.0            | 11.5  | 5.0   | 5.0   | 0.5     | 1.5                                 | KTD101B685M76A0T00 | 1,000                                       |
|                        | 10                        |                 |       | 5.0   |       |         |                                     | KTD101B106M80A0B00 | —   |
|                        | 15                        |                 |       | 6.0   |       |         |                                     | KTD101B156M80A0B00 | —   |
|                        | 22                        | 22.5            | 20.0  | 6.0   | 20.0  | 0.8     | 3.0                                 | KTD101B226M90A0B00 | —   |
|                        | 33                        |                 |       | 6.0   |       |         |                                     | KTD101B336M90A0B00 | —   |
|                        | 47                        |                 |       | 7.5   |       |         |                                     | KTD101B476M99A0B00 | —   |
|                        | 68                        | 28.5            | 20.0  | 7.5   | 25.0  | 0.8     | 4.0                                 | KTD101B686M99A0B00 | —   |
|                        | 100                       |                 |       | 9.0   |       |         |                                     | KTD101B107M99A0B00 | —   |

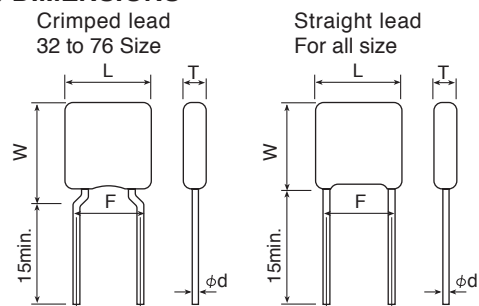
|     |      |      |      |     |      |     |     |                    |       |
|-----|------|------|------|-----|------|-----|-----|--------------------|-------|
| 250 | 0.1  | 5.0  | 6.0  | 3.5 | 5.0  | 0.5 | 0.3 | KTD251B104M32A0T00 | 2,000 |
|     | 0.15 |      |      |     |      |     |     | KTD251B154M32A0T00 | 2,000 |
|     | 0.22 |      |      |     |      |     |     | KTD251B224M32A0T00 | 2,000 |
|     | 0.33 |      |      |     |      |     |     | KTD251B334M32A0T00 | 2,000 |
|     | 0.47 | 6.5  | 6.5  | 4.0 | 5.0  | 0.5 | 0.8 | KTD251B474M43A0T00 | 2,000 |
|     | 0.68 |      |      |     |      |     |     | KTD251B684M43A0T00 | 2,000 |
|     | 1.0  |      |      |     |      |     |     | KTD251B105M55A0T00 | 2,000 |
|     | 1.5  |      |      |     |      |     |     | KTD251B155M55A0T00 | 2,000 |
|     | 2.2  | 10.0 | 11.5 | 6.0 | 5.0  | 0.5 | 1.5 | KTD251B225M76A0T00 | 1,000 |
|     | 2.2  | 13.5 | 15.0 | 5.0 | 10.0 | 0.6 | 2.0 | KTD251B225M80A0B00 | —     |
|     | 3.3  | 22.5 | 20.0 | 6.0 | 20.0 | 0.8 | 3.0 | KTD251B335M90A0B00 | —     |
|     | 4.7  |      |      |     |      |     |     | KTD251B475M90A0B00 | —     |
|     | 6.8  |      |      |     |      |     |     | KTD251B685M99A0B00 | —     |
|     | 10   |      |      |     |      |     |     | KTD251B106M99A0B00 | —     |
|     | 15   | 28.5 | 20.0 | 7.5 | 25.0 | 0.8 | 4.0 | KTD251B156M99A0B00 | —     |
| 500 | 0.47 | 7.5  | 9.0  | 3.5 | 5.0  | 0.5 | 0.8 | KTD501B474M55A0T00 | 2,000 |
|     | 0.56 |      |      |     |      |     |     | KTD501B564M55A0T00 | 2,000 |
|     | 0.68 | 10.0 | 11.5 | 3.4 | 5.0  | 0.5 | 1.0 | KTD501B684M76A0T00 | 1,500 |
|     | 1.0  |      |      | 3.8 |      |     |     | KTD501B105M76A0T00 | 1,500 |
|     | 1.2  |      |      | 4.2 |      |     |     | KTD501B125M76A0T00 | 1,500 |

※Please consult with us when you consider the rating other than a standard table.

### ◆PART NUMBERING SYSTEM



### ◆DIMENSIONS



Please refer to "Part Numbering System" of the beginning of a catalog for the details.

**KVD Series**

RoHS2  
Compliant

AEC-  
Q200

High  
temperature  
150°C

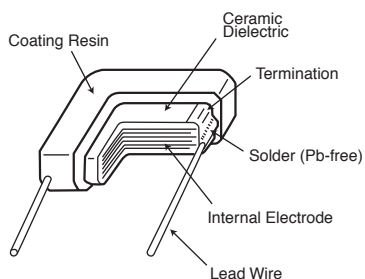
## ◆FEATURES

1. Temperature range : -55 to +150°C
2. Temperature characteristic : X8L
3. Small in size and wide capacitance range.  
Max. 15μF is available.
4. Epoxy resin(UL94 V-0)used for coating.
5. Automotive grade(AEC-Q200)

## ◆APPLICATIONS

1. Noise filter for automotive equipment(ECU etc.)
2. Equipment used in a high temperature environment

## ◆CONSTRUCTION



## ◆RATINGS

|                                |                                 |
|--------------------------------|---------------------------------|
| 1. Category Temperature Range  | -55~+150°C                      |
| 2. Rated Voltage Range         | 25, 50, 100 Vdc                 |
| 3. Rated Capacitance Range     | 0.1~15μF                        |
| 4. Rated Capacitance Tolerance | M(±20%)                         |
| 5. Temperature Characteristics | X8L                             |
| 6. Rated Ripple Current        | See No.5 on the following table |

## ◆SPECIFICATIONS

| No. | Items                 |                            | Specification  | Test Condition   |                      |                      |
|-----|-----------------------|----------------------------|--|--|----------------------|----------------------|
| 1   | Withstand Voltage     | Between Terminals          | No abnormality.  | 250% of rated voltage shall be applied for 5 seconds.<br>(Only 250Vdc products : 475V) |                      |                      |
|     |                       | Terminals to Coating Resin |  |  |                      |                      |
| 2   | Insulation Resistance |                            | 100/C <sub>R</sub> (MΩ) or 4000(MΩ) whichever is less. | Rated voltage shall be applied for 60±5 seconds at temperature 25±2°C.                 |                      |                      |
| 3   | Rated Capacitance     |                            | Within specified tolerance.                            |  | C <sub>R</sub> ≤10μF | C <sub>R</sub> >10μF |
|     |                       |                            |  | Temperature  | 25±2°C               |                      |
| 4   | Dissipation Factor    |                            | 5.0% maximum.  | Frequency  | 1±0.1kHz             | 120±12Hz             |
|     |                       |                            |  | Voltage  | 1±0.2Vrms            | 0.5±0.2Vrms          |

As customer requirement, Chemi-Con has submits the test results according to AEC-Q200 for Multilayer ceramic capacitors. Please contact us for more information.

### ◆SPECIFICATIONS

| No.                | Items                              |         | Specification   | Test Condition  |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
|--------------------|------------------------------------|---------|---|---|------------|-----------------|--------------------|----------|-----------------------------|--------|-----|---|--------|---|------------------------------|------|---|------------------|--------|
| 5                  | Rated Ripple Current               |         | <table><tr><td>Size code</td><td>32</td><td>43</td><td>55</td></tr><tr><td>Arms</td><td>0.3</td><td>0.8</td><td>1.0</td></tr></table>                               | Size code   | 32         | 43              | 55                 | Arms     | 0.3                         | 0.8    | 1.0 | 10kHz to 1MHz (sine curve)<br>Ripple voltage Vp shall be less than the rated voltage.<br>The surface temperature of MLCC must not exceed the maximum category temperature when the ripple current is applied. |        |   |                              |      |   |                  |        |
| Size code          | 32                                 | 43      | 55  |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| Arms               | 0.3                                | 0.8     | 1.0   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 6                  | High Temperature Exposure(Storage) |         | Appearance : No structural damage such as cracks<br>ΔC/C : ±20%<br>D.F. : 10% maximum<br>I.R. : 50/CR(MΩ) or 1000(MΩ) whichever is less.                            | Temperature : Max. category temperature±3°C<br>Time : 1000 ± <sup>48</sup> <sub>0</sub> hours   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 7                  | Temperature Cycle                  |         | Appearance : No visible damage.<br>ΔC/C : ±15%<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification.                            | <table><tr><td>Step</td><td>Temperature(°C)</td><td>(min)</td></tr><tr><td>1</td><td>Min Category temperature ±3</td><td>30±3</td></tr><tr><td>2</td><td>Room temperature</td><td>3 max.</td></tr><tr><td>3</td><td>Max. Category temperature ±3</td><td>30±3</td></tr><tr><td>4</td><td>Room temperature</td><td>3 max.</td></tr></table><br>For 1000 cycles | Step       | Temperature(°C) | (min)              | 1        | Min Category temperature ±3 | 30±3   | 2   | Room temperature  | 3 max. | 3 | Max. Category temperature ±3 | 30±3 | 4 | Room temperature | 3 max. |
| Step               | Temperature(°C)                    | (min)   |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 1                  | Min Category temperature ±3        | 30±3    |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 2                  | Room temperature                   | 3 max.  |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 3                  | Max. Category temperature ±3       | 30±3    |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 4                  | Room temperature                   | 3 max.  |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 8                  | Biased Humidity                    |         | Appearance : No abnormality.<br>ΔC/C : ±20%<br>D.F. : 10% maximum<br>I.R. : 25/CR(MΩ) or 1000(MΩ) whichever is less.  | Temperature : 85°C±3°C<br>Humidity : 80 ~ 85%RH<br>Voltage : Rated voltage<br>Time : 1000 ± <sup>48</sup> <sub>0</sub> hours  |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 9                  | Operational Life                   |         | Appearance : No structural damage such as cracks<br>ΔC/C : ±20%<br>D.F. : 10% maximum<br>I.R. : 50/CR(MΩ) or 1000(MΩ) whichever is less.                            | Temperature : Max. category temperature±3°C<br>Voltage : Rated voltage<br>Time : 1000 ± <sup>48</sup> <sub>0</sub> hours  |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 10                 | Terminal Strength (Leaded)         | Tension | No visible damage.  | The force applied shall be :  |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
|                    |                                    |         |   | <table><tr><td>Lead φ(mm)</td><td>Tensile(N)</td><td>(sec.)</td></tr><tr><td>0.5 max.</td><td>5</td><td>10±1</td></tr></table>  | Lead φ(mm) | Tensile(N)      | (sec.)             | 0.5 max. | 5                           | 10±1   |     |   |        |   |                              |      |   |                  |        |
| Lead φ(mm)         | Tensile(N)                         | (sec.)  |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 0.5 max.           | 5                                  | 10±1    |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
|                    | Bending                            |         | <table><tr><td>Lead φ(mm)</td><td>Bending(N)</td><td>(kg)</td></tr><tr><td>0.5 max.</td><td>2.5</td><td>0.25</td></tr></table><br>Time : 2times.                    | Lead φ(mm)  | Bending(N) | (kg)            | 0.5 max.           | 2.5      | 0.25                        |        |     |   |        |   |                              |      |   |                  |        |
| Lead φ(mm)         | Bending(N)                         | (kg)    |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 0.5 max.           | 2.5                                | 0.25    |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 11                 | Mechanical Shock                   |         | Appearance : No abnormality.<br>ΔC/C : To meet the initial specification.<br>D.F. : To meet the initial specification.  | MIL-STD-202 Method 213 Condition C<br>Peak value : 100G<br>Normal duration : 6 ms<br>Velocity change : 12.3 ft/sec(3.8m/s)<br>Direction and time : 3 times each in X,Y, Z axis. Total 18 times  |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 12                 | Vibration                          |         | Appearance : No abnormality.<br>ΔC/C : To meet the initial specification.<br>D.F. : To meet the initial specification.  | MIL-STD-202 Method 204<br>Test condition : 5G peak<br>Amplitude : 1.5mm max.<br>Frequency : 10-2000-10Hz(20 minute)<br>Direction and time : 12 times each in X,Y, Z axis. Total 36 times  |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 13                 | Resistance to Soldering Heat       |         | Appearance : No visible damage.<br>ΔC/C : ±15%<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification.                            | Solder temp. : 260±5°C<br>Dipping Time : 10±1s<br>Depth : 1.5 to 2mm  |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 14                 | ESD                                |         | Appearance : No abnormality.<br>ΔC/C : To meet the initial specification.<br>D.F. : To meet the initial specification.<br>I.R. : To meet the initial specification. | AEC-Q200-002<br>Connection : Between terminals<br>Direct Contact : 8kV(150pF 2000Ω)<br>Times : ±1time   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| 15                 | Solderability                      |         | Min. 75% of surface of the termination shall be covered with new solder.  | <table><tr><td>Solder</td><td>Pb Free</td></tr><tr><td>Solder Temperature</td><td>245±5°C</td></tr><tr><td>Dipping Time</td><td>2±0.5s</td></tr></table>  | Solder     | Pb Free         | Solder Temperature | 245±5°C  | Dipping Time                | 2±0.5s |     |   |        |   |                              |      |   |                  |        |
| Solder             | Pb Free                            |         |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| Solder Temperature | 245±5°C                            |         |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |
| Dipping Time       | 2±0.5s                             |         |   |   |            |                 |                    |          |                             |        |     |   |        |   |                              |      |   |                  |        |

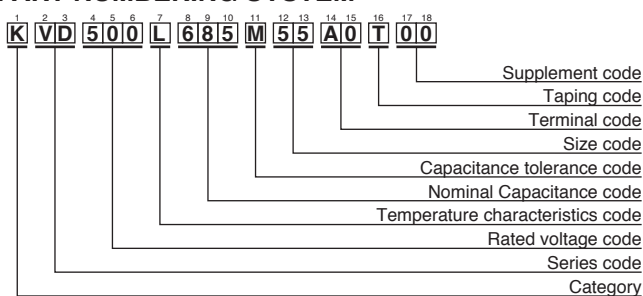
\*CR : Rated Capacitance( $\mu F$ )

### ◆STANDARD RATINGS

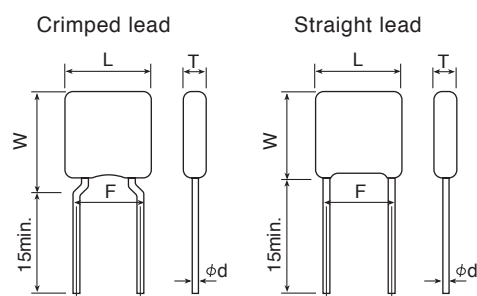
| Rated voltage<br>(Vdc) | Rated Capacitance<br>(μF) | Dimensions(mm) |        |        |        |           | Maximum ripple current<br>(Arms) | Part Number        | Taping Quantity per reel<br>(pcs. / box) |
|------------------------|---------------------------|----------------|--------|--------|--------|-----------|----------------------------------|--------------------|--|
|                        |                           | L max.         | W max. | T max. | F ±0.8 | φ d ±0.05 |                                  |                    |  |
| 25                     | 1.0                       | 5.0            | 6.0    | 3.5    | 5.0    | 0.5       | 0.3                              | KVD250L105M32A0T00 | 2,000                                    |
|                        | 1.5                       |                |        |        |        |           |                                  | KVD250L155M32A0T00 | 2,000                                    |
|                        | 2.2                       |                |        |        |        |           |                                  | KVD250L225M32A0T00 | 2,000                                    |
|                        | 3.3                       |                |        |        |        |           |                                  | KVD250L335M32A0T00 | 2,000                                    |
|                        | 4.7                       | 6.5            | 6.5    | 4.0    | 5.0    | 0.5       | 0.8                              | KVD250L475M43A0T00 | 2,000                                    |
|                        | 6.8                       |                |        |        |        |           |                                  | KVD250L685M43A0T00 | 2,000                                    |
|                        | 10                        | 7.5            | 9.0    | 4.5    | 5.0    | 0.5       | 1.0                              | KVD250L106M55A0T00 | 2,000                                    |
|                        | 15                        |                |        |        |        |           |                                  | KVD250L156M55A0T00 | 2,000                                    |
| 50                     | 0.33                      | 5.0            | 6.0    | 3.5    | 5.0    | 0.5       | 0.3                              | KVD500L334M32A0T00 | 2,000                                    |
|                        | 0.47                      |                |        |        |        |           |                                  | KVD500L474M32A0T00 | 2,000                                    |
|                        | 0.68                      |                |        |        |        |           |                                  | KVD500L684M32A0T00 | 2,000                                    |
|                        | 1.0                       |                |        |        |        |           |                                  | KVD500L105M32A0T00 | 2,000                                    |
|                        | 1.5                       | 6.5            | 6.5    | 4.0    | 5.0    | 0.5       | 0.8                              | KVD500L155M43A0T00 | 2,000                                    |
|                        | 2.2                       |                |        |        |        |           |                                  | KVD500L225M43A0T00 | 2,000                                    |
|                        | 3.3                       | 7.5            | 9.0    | 4.5    | 5.0    | 0.5       | 1.0                              | KVD500L335M55A0T00 | 2,000                                    |
|                        | 4.7                       |                |        |        |        |           |                                  | KVD500L475M55A0T00 | 2,000                                    |
|                        | 6.8                       |                |        | 4.7    |        |           |                                  | KVD500L685M55A0T00 | 2,000                                    |
|                        |                           |                |        |        |        |           |                                  |                    |  |
| 100                    | 0.1                       | 5.0            | 6.0    | 3.5    | 5.0    | 0.5       | 0.3                              | KVD101L104M32A0T00 | 2,000                                    |
|                        | 0.15                      |                |        |        |        |           |                                  | KVD101L154M32A0T00 | 2,000                                    |
|                        | 0.22                      |                |        |        |        |           |                                  | KVD101L224M32A0T00 | 2,000                                    |
|                        | 0.33                      |                |        |        |        |           |                                  | KVD101L334M32A0T00 | 2,000                                    |
|                        | 0.47                      | 6.5            | 6.5    | 4.0    | 5.0    | 0.5       | 0.8                              | KVD101L474M43A0T00 | 2,000                                    |
|                        | 0.68                      |                |        |        |        |           |                                  | KVD101L684M43A0T00 | 2,000                                    |
|                        | 1.0                       | 7.5            | 9.0    | 4.5    | 5.0    | 0.5       | 1.0                              | KVD101L105M55A0T00 | 2,000                                    |
|                        | 1.5                       |                |        |        |        |           |                                  | KVD101L155M55A0T00 | 2,000                                    |
|                        |                           |                |        |        |        |           |                                  |                    |  |
|                        |                           |                |        |        |        |           |                                  |                    |  |

※ Please consult with us when you consider the rating other than a standard table.

### ◆PART NUMBERING SYSTEM



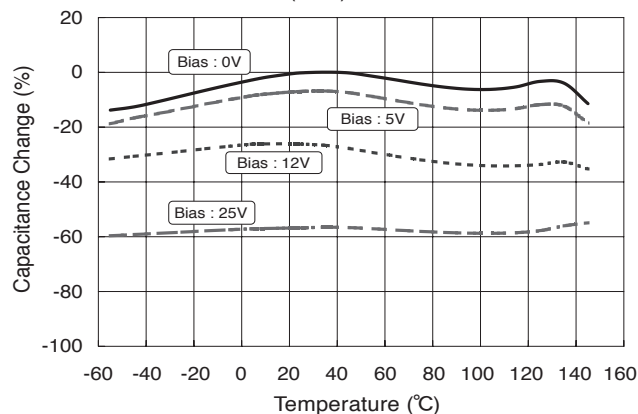
### ◆DIMENSIONS



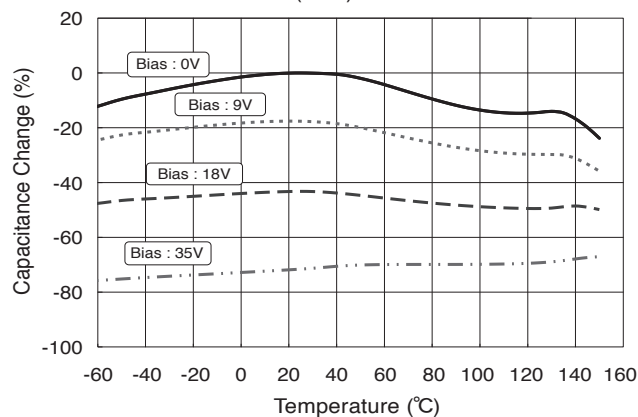
Please refer to "Part Numbering System" of the beginning of a catalog for the details.

## ◆Temperature and DC voltage Characteristics

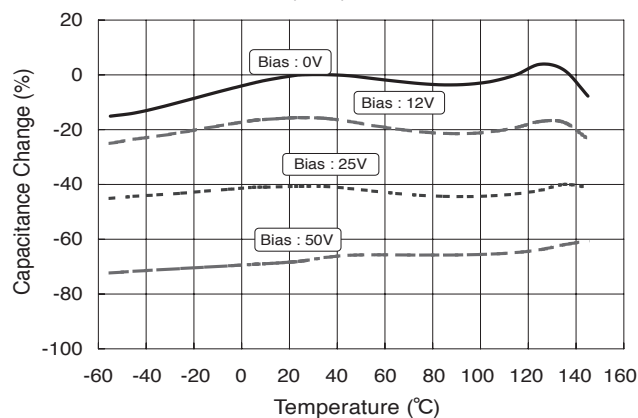
### ●NTS/NTF/NTD/NTJ series (X7R) 25V



### ●NTS/NTF/NTD/NTJ series (X7R) 35V

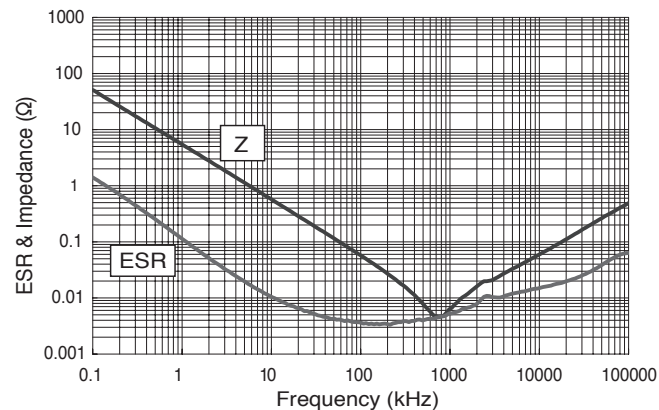


### ●NTS/NTF/NTD/NTJ series (X7R) 50V

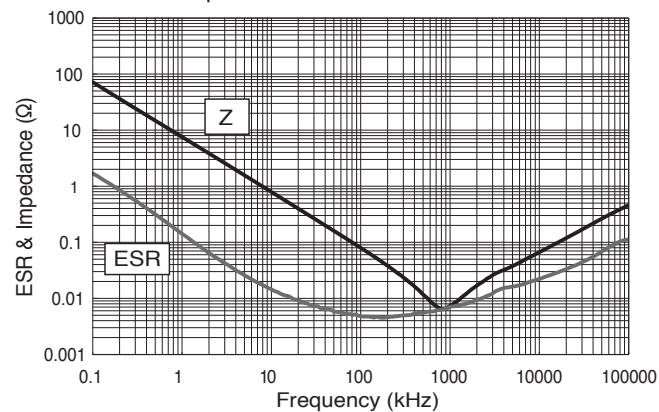


## ◆Frequency Characteristics

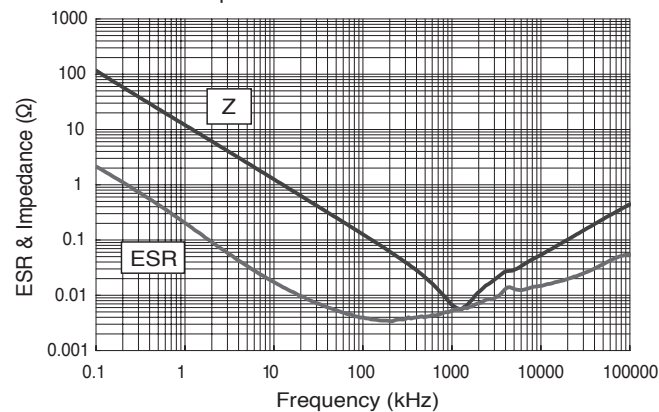
### ●NTS Series 25V/33μF



### ●NTS Series 35V/22μF

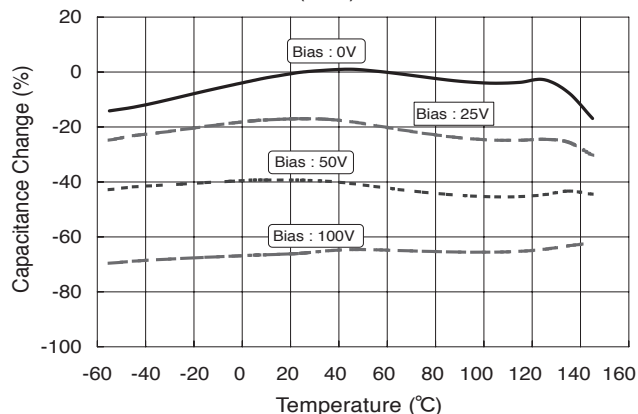


### ●NTS Series 50V/15μF

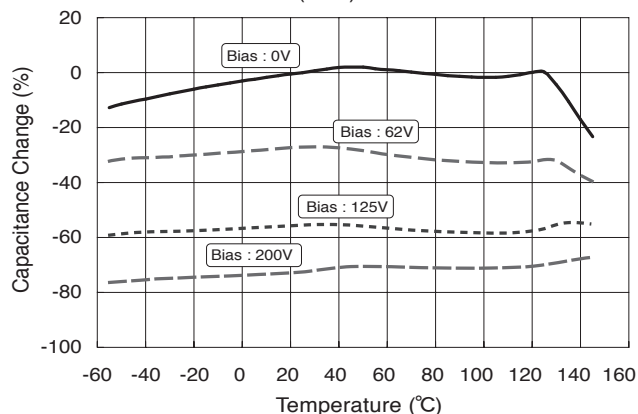


## ◆Temperature and DC voltage Characteristics

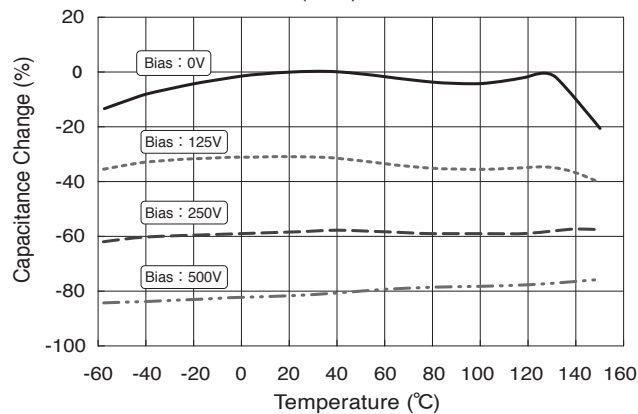
●NTS/NTF/NTD/NTJ series (X7R) 100V



●NTS/NTF/NTD/NTJ series (X7R) 250V

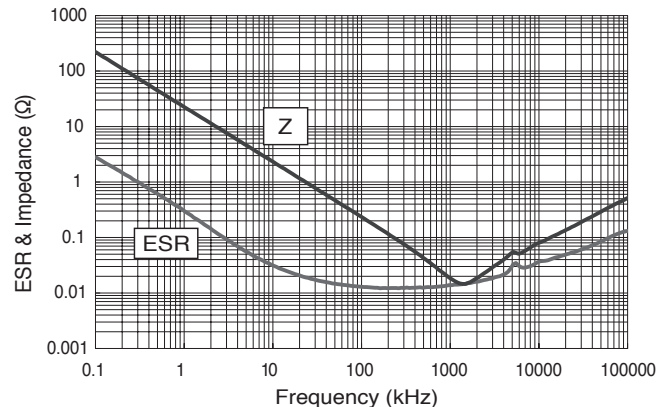


●NTS/NTF/NTD/NTJ Series (X7R) 500V

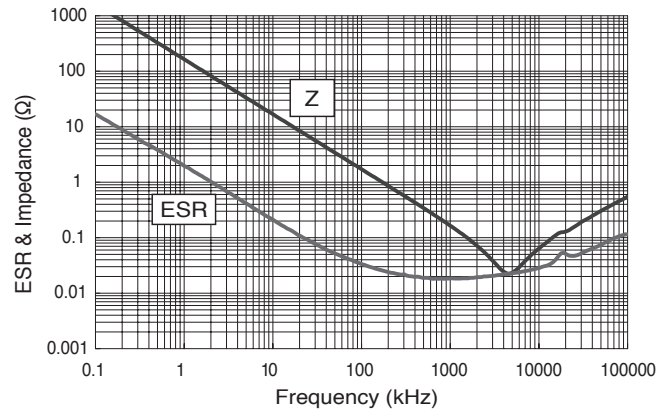


## ◆Frequency Characteristics

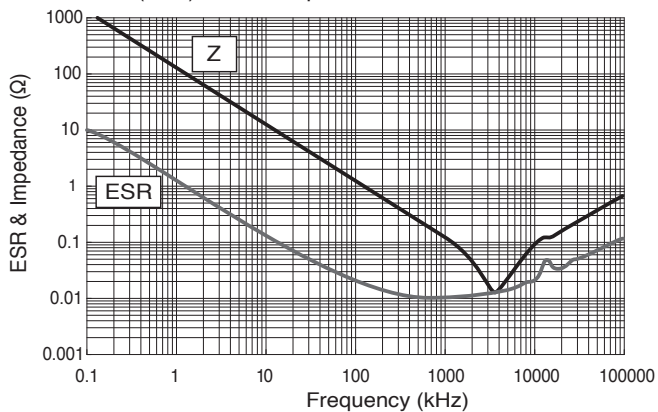
●NTS Series 100V/6.8μF



●NTS Series 250V/1.0μF



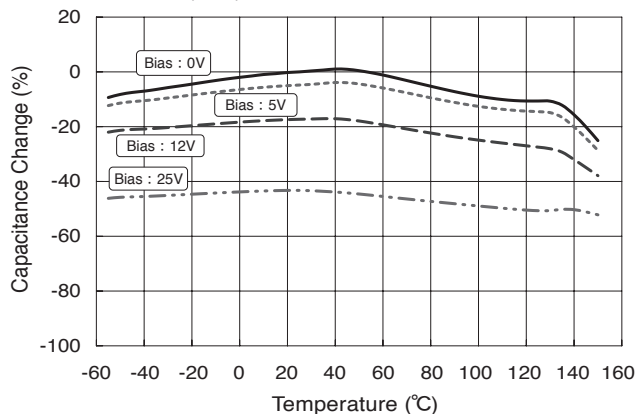
●NTS Series (X7R) 500V/1.2μF



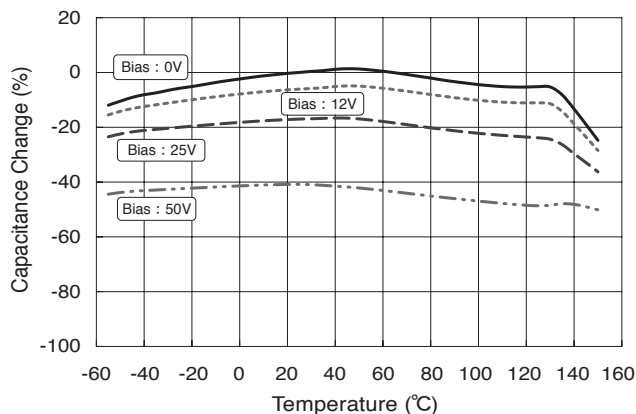


## ◆Temperature and DC voltage Characteristics

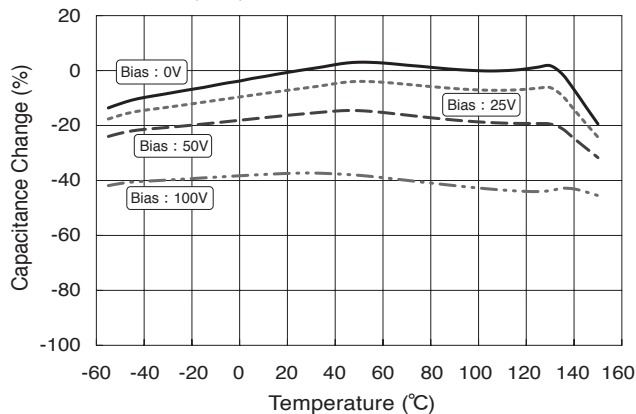
●KVF/KVD series (X8L) 25V



●KVF/KVD series (X8L) 50V

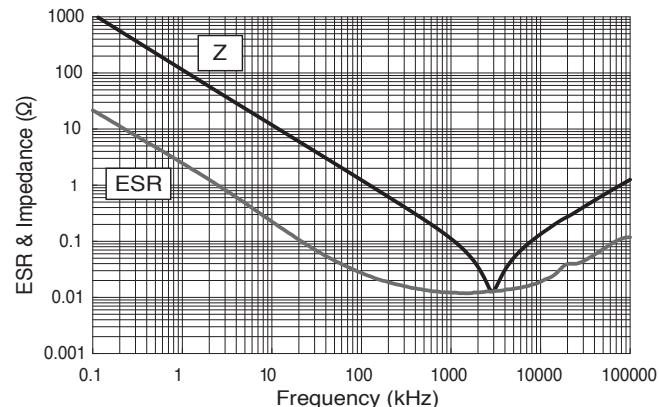


●KVF/KVD series (X8L) 100V

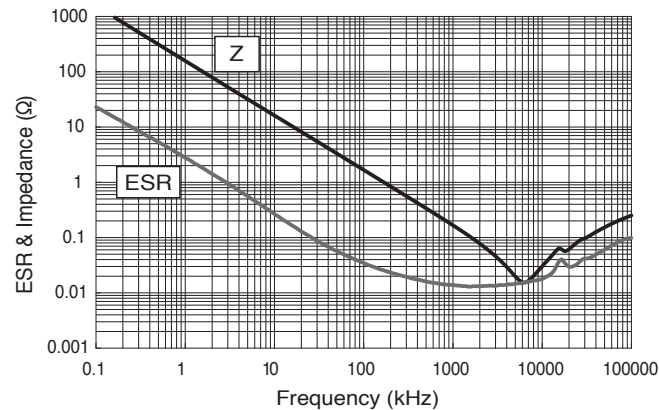


## ◆Frequency Characteristics

●KVF Series 25V/1.5μF



●KVF Series 50V/1.0μF



●KVF Series 100V/0.22μF

