

# Metal Oxide Varistor : TVA Series



## Disc/Block Type Varistor for Lightning Protection

### ■ Features

1. RoHS compliant
2. Body size:  $\Phi 25\text{mm} \sim \Phi 60\text{mm}$
3. Wide operating voltage range
4. Excellent clamping ratio
5. Low leakage current
6. Large withstanding surge current capability
7. Bidirectional and symmetrical V/I characteristics
8. Operating temperature range:  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
9. Agency recognition: UL/ cUL
10. For UL 1449 3<sup>rd</sup> SPD Type 2 application



### ■ Recommended Applications

1. Power supply
2. Home appliance
3. Industrial equipment
4. Telecommunication or telephone system

### ■ Part Number Code

$\Phi 25\text{mm} \sim \Phi 60\text{mm}$

|              |                                 |      |                    |    |                                       |     |  |   |            |           |                 |          |         |                |    |  |
|--------------|---------------------------------|------|--------------------|----|---------------------------------------|-----|--|---|------------|-----------|-----------------|----------|---------|----------------|----|--|
| T            | V                               | A    | 2                  | 5  | 2                                     | 0   | 1  | K | G          | K         | G               | E        |         |                |    |  |
| 1            | 2                               | 3    | 4                  | 5  | 6                                     | 7   | 8  | 9 | 10         | 11        | 12              | 13       | 14      | 15             | 16 |  |
| Product Type |                                 | Size |                    |    | Varistor Voltage ( $V_{1\text{mA}}$ ) |     | Tolerance of $V_{1\text{mA}}$            |   | Structure  |           | Optional Suffix |          |         |                |    |  |
| TVA          | THINKING varistor<br>TVA series | 25   | $\Phi 25\text{mm}$ | 32 | $\Phi 32\text{mm}$                    | 241 | $24 \times 10^1 \text{V} = 240\text{V}$  | K | $\pm 10\%$ | AAAA~ZZZZ | 001~499         | Standard | 500~999 | RoHS compliant |    |  |
|              |                                 | 34   | $34^*34\text{mm}$  | 40 | $\Phi 40\text{mm}$                    | 102 | $10 \times 10^2 \text{V} = 1000\text{V}$ |   |            |           |                 |          |         |                |    |  |
|              |                                 | 60   | $\Phi 60\text{mm}$ |    |                                       |     |  |   |            |           |                 |          |         |                |    |  |

# Metal Oxide Varistor : TVA Series

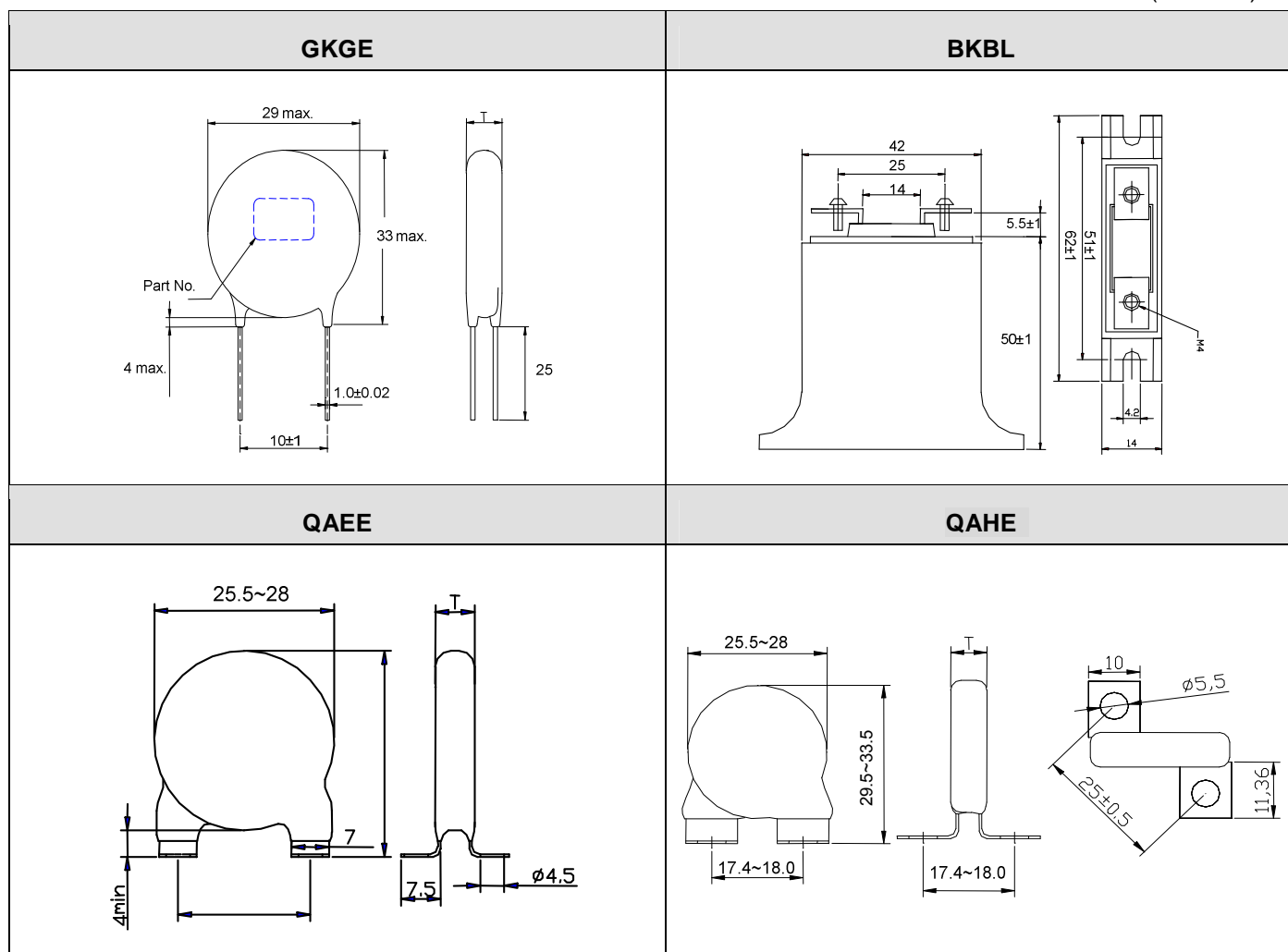
## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 25 Type

(Unit:mm)



Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 32 Type

(Unit:mm)

| GKGE | BKBL |
|------|------|
|      |      |
| QKQE | QKUS |
|      |      |
| QKLS | QKLE |
|      |      |
| QKVE | QKDE |
|      |      |

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request

# Metal Oxide Varistor : TVA Series

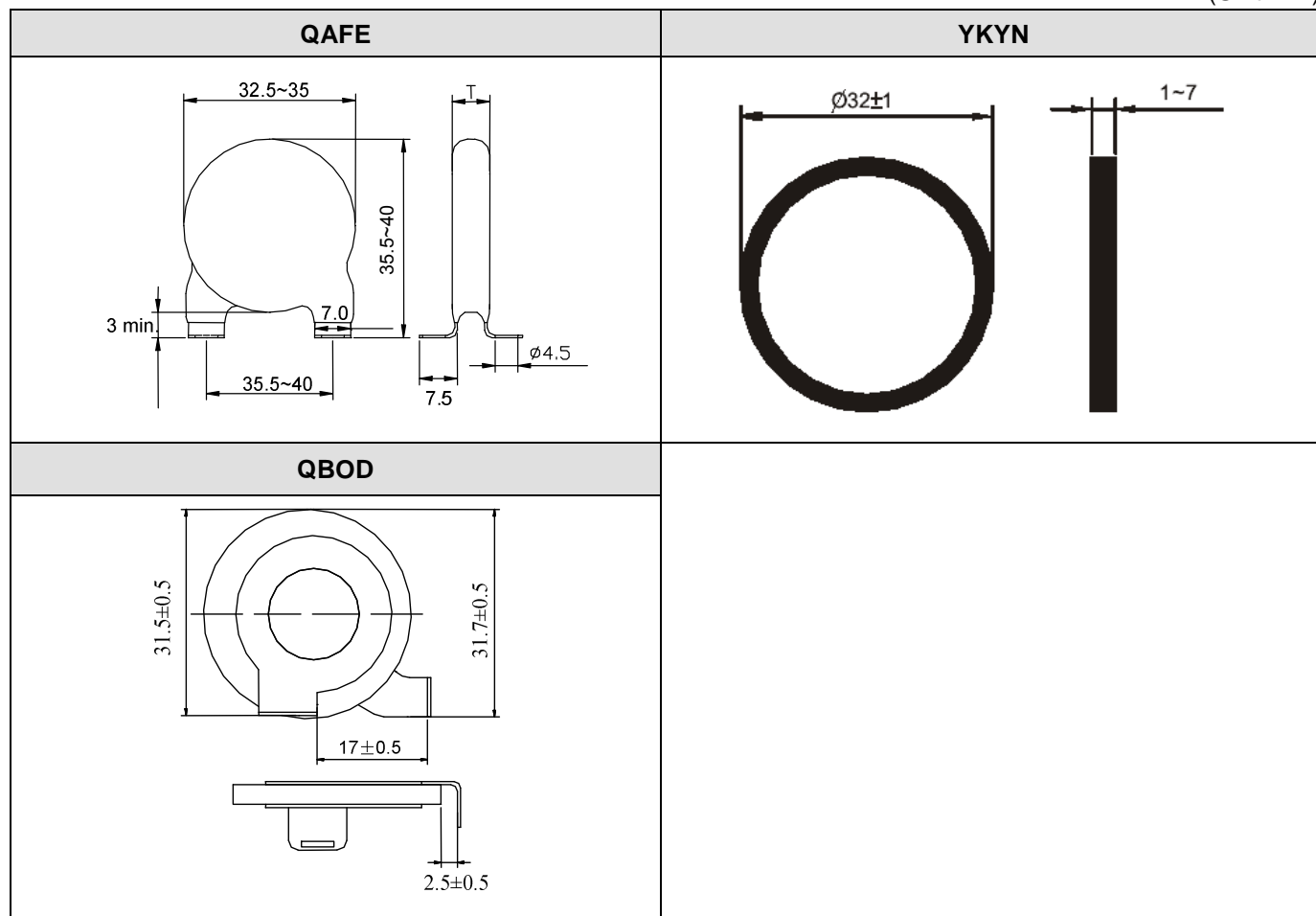
## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 32 Type

(Unit:mm)

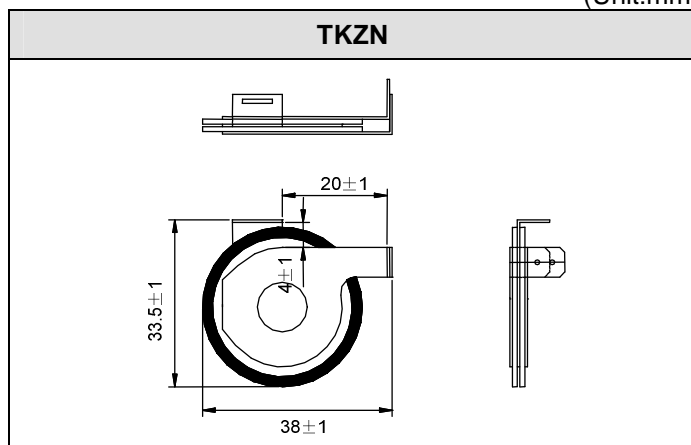


Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request

#### TVA 32 -T type (T is the parallel structure of two discs)

(Unit:mm)



Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions TVA 34 Type

(Unit:mm)

| QKQE | QKUS |
|------|------|
|      |      |
| QKLS | QBAD |
|      |      |
| BKBL | QKLE |
|      |      |
| QKXE | QKWE |
|      |      |

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 34 Type

(Unit:mm)

| QKDE | QKID      |
|------|-----------|
|      |           |
| QKRE | QKQS      |
|      |           |
| QKEE | YKYN      |
|      |           |
| QACN | QADE/QADS |
|      |           |

Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request

# Metal Oxide Varistor : TVA Series

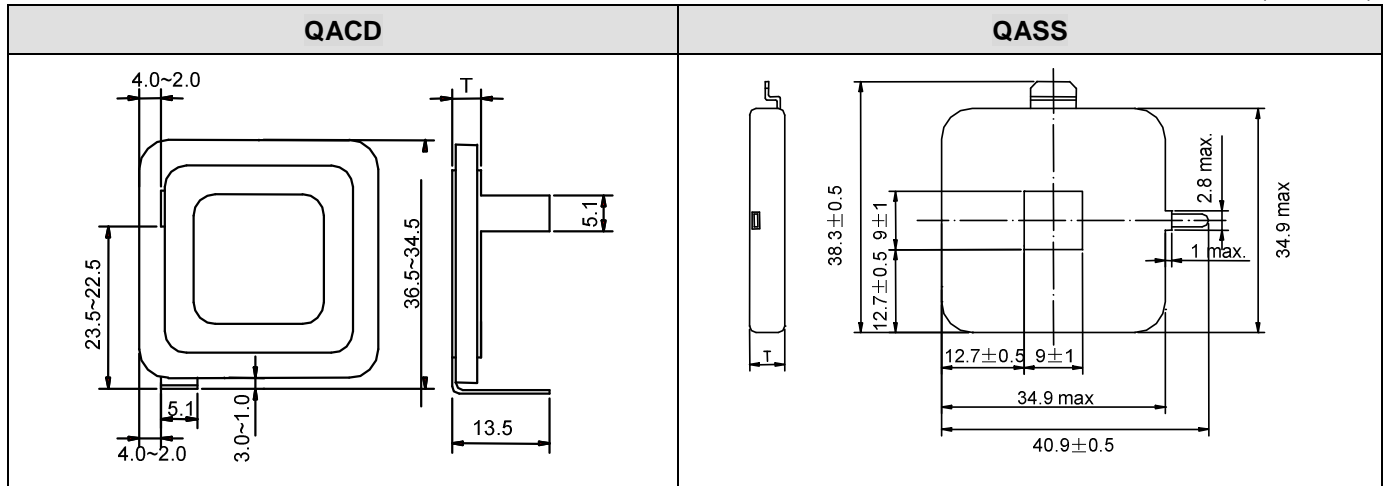
## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions

#### TVA 34 Type

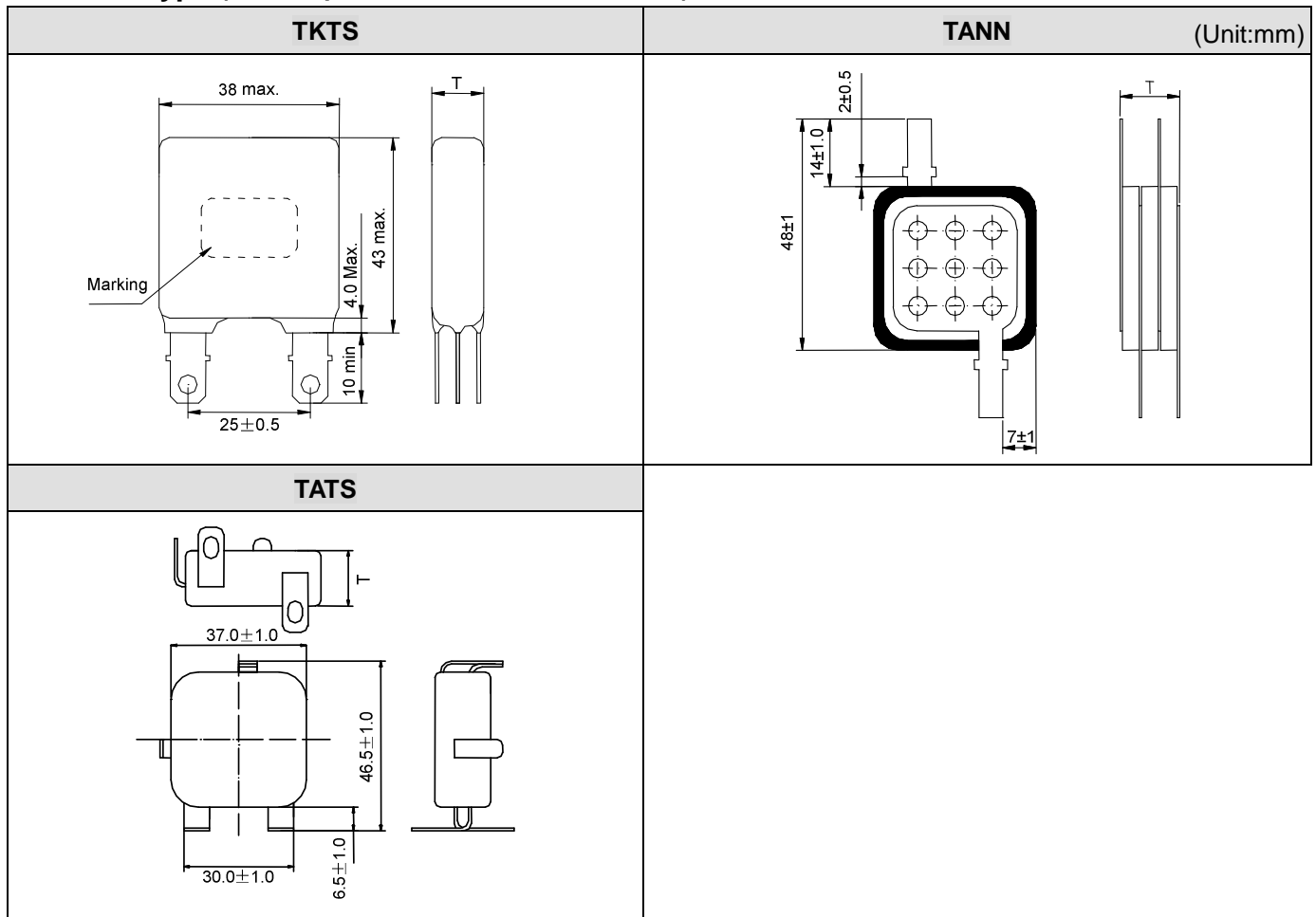
(Unit:mm)



Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request

#### TVA 34-T Type (T is the parallel structure of two discs)



Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request

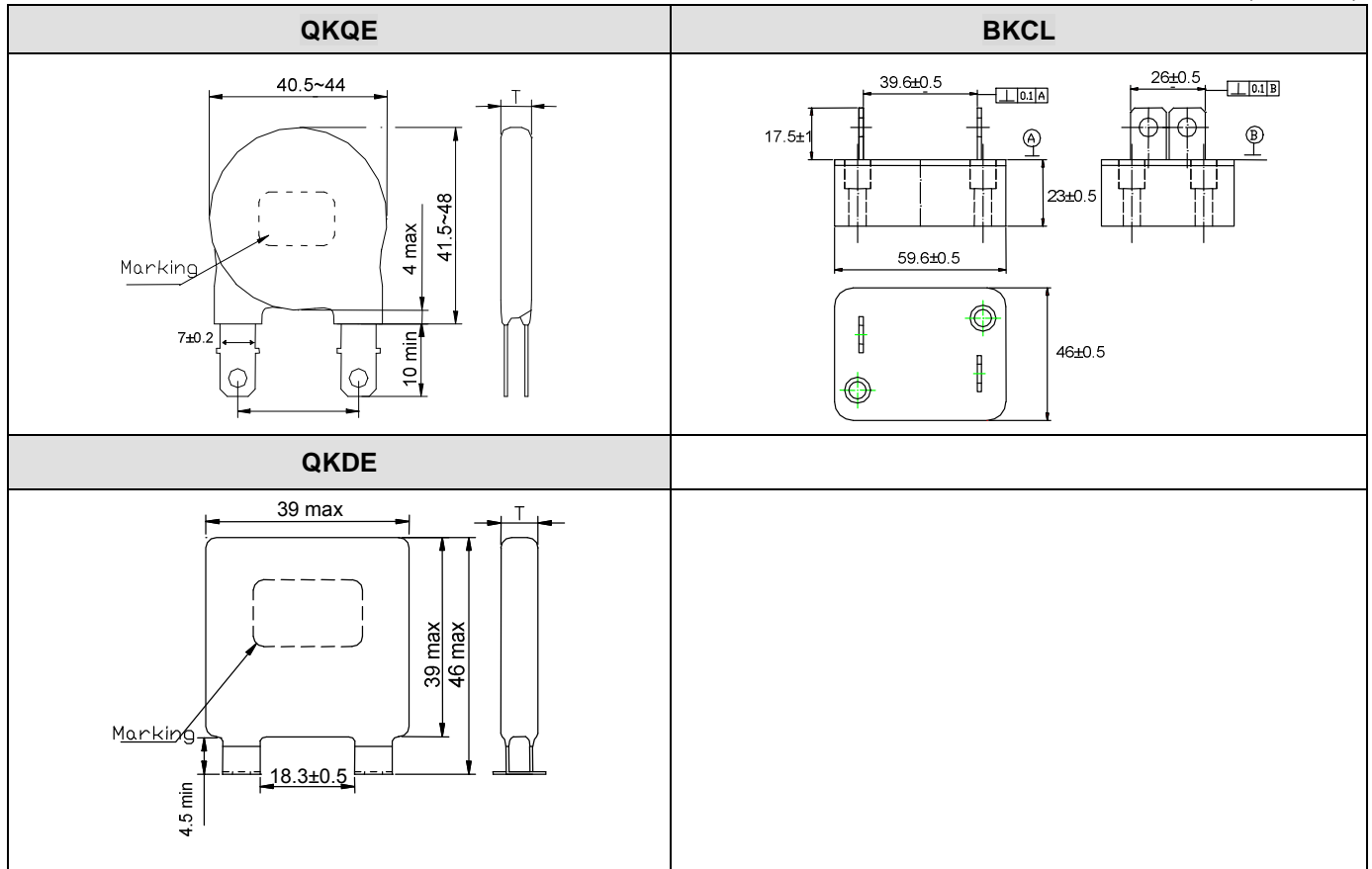
# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### Structures and Dimensions TVA 40 Type

(Unit:mm)

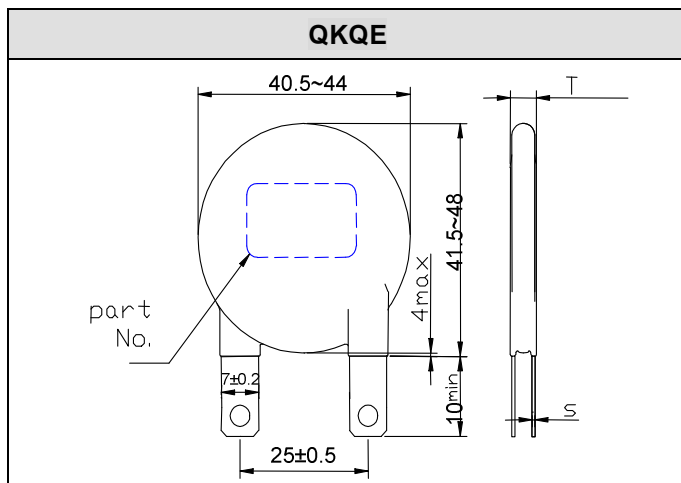


Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request

### TVA 60 type

(Unit:mm)



Note 1: T is the thickness of the product.

Note 2: The specifications of thickness are available upon request



# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### ■ Electrical Characteristics

| Part No.       | Varistor Voltage (@ 1mA DC) | Max. Operating Voltage |              | Max. Clamping Voltage (8/20μs) |           | Max. Surge Current (8/20μs) | Max. Energy (2ms) | Rated Power | Reference Capacitance @1KHZ | Safety Approvals              |                 |    |     |
|----------------|-----------------------------|------------------------|--------------|--------------------------------|-----------|-----------------------------|-------------------|-------------|-----------------------------|-------------------------------|-----------------|----|-----|
|                |                             | $V_{AC(rms)}$ (V)      | $V_{DC}$ (V) | $V_P$ (V)                      | $I_P$ (A) |                             |                   |             |                             | UL                            | cUL             | UL | cUL |
|                | $V_{1mA}$ (V)               | $V_{AC(rms)}$ (V)      | $V_{DC}$ (V) | $V_P$ (V)                      | $I_P$ (A) | $I_{max}$ (A)               | $W_{max}$ (J)     | P (W)       | C (pF)                      | UL1449 <sup>3rd</sup> E314979 | UL 1414 E186499 |    |     |
| TVA25201K□□□□  | 200                         | 130                    | 170          | 340                            | 150       | 15000                       | 128               | 1           | 2200                        | √                             | √               | √  | √   |
| TVA32201K□□□□  | 200                         | 130                    | 170          | 340                            | 200       | 25000                       | 210               | 1.2         | 3900                        | √                             | √               | √  | √   |
| TVA34201K□□□□  | 200                         | 130                    | 170          | 340                            | 300       | 40000                       | 310               | 1.4         | 5600                        | √                             | √               | √  | √   |
| TVA34201KT□□□□ | 200                         | 130                    | 170          | 340                            | 500       | 70000                       | 410               | 1.6         | 14040                       | √                             | √               | √  | √   |
| TVA40201K□□□□  | 200                         | 130                    | 170          | 340                            | 300       | 40000                       | 310               | 1.4         | 6000                        | √                             | √               | √  | √   |
| TVA25221K□□□□  | 220                         | 140                    | 180          | 365                            | 150       | 15000                       | 135               | 1           | 2000                        | √                             | √               | √  | √   |
| TVA32221K□□□□  | 220                         | 140                    | 180          | 365                            | 200       | 25000                       | 225               | 1.2         | 3500                        | √                             | √               | √  | √   |
| TVA34221K□□□□  | 220                         | 140                    | 180          | 365                            | 300       | 40000                       | 340               | 1.4         | 5000                        | √                             | √               | √  | √   |
| TVA34221KT□□□□ | 220                         | 140                    | 180          | 365                            | 500       | 70000                       | 451               | 1.6         | 12760                       | √                             | √               | √  | √   |
| TVA40221K□□□□  | 220                         | 140                    | 180          | 365                            | 300       | 40000                       | 340               | 1.4         | 5500                        | √                             | √               | √  | √   |
| TVA25241K□□□□  | 240                         | 150                    | 200          | 395                            | 150       | 15000                       | 146               | 1           | 1900                        | √                             | √               | √  | √   |
| TVA32241K□□□□  | 240                         | 150                    | 200          | 395                            | 200       | 25000                       | 240               | 1.2         | 3300                        | √                             | √               | √  | √   |
| TVA34241K□□□□  | 240                         | 150                    | 200          | 395                            | 300       | 40000                       | 360               | 1.4         | 4800                        | √                             | √               | √  | √   |
| TVA34241KT□□□□ | 240                         | 150                    | 200          | 395                            | 500       | 70000                       | 490               | 1.6         | 11700                       | √                             | √               | √  | √   |
| TVA40241K□□□□  | 240                         | 150                    | 200          | 395                            | 300       | 40000                       | 360               | 1.4         | 5000                        | √                             | √               | √  | √   |
| TVA60241K□□□□  | 240                         | 150                    | 200          | 395                            | 500       | 70000                       | 490               | 1.6         | 11700                       |                               |                 | √  | √   |
| TVA25271K□□□□  | 270                         | 175                    | 225          | 455                            | 150       | 15000                       | 170               | 1           | 1600                        | √                             | √               | √  | √   |
| TVA32271K□□□□  | 270                         | 175                    | 225          | 455                            | 200       | 25000                       | 250               | 1.2         | 2800                        | √                             | √               | √  | √   |
| TVA34271K□□□□  | 270                         | 175                    | 225          | 455                            | 300       | 40000                       | 400               | 1.4         | 4100                        | √                             | √               | √  | √   |
| TVA34271KT□□□□ | 270                         | 175                    | 225          | 455                            | 500       | 70000                       | 550               | 1.6         | 10400                       | √                             | √               | √  | √   |
| TVA40271K□□□□  | 270                         | 175                    | 225          | 455                            | 300       | 40000                       | 400               | 1.4         | 4500                        | √                             | √               | √  | √   |
| TVA60271K□□□□  | 270                         | 175                    | 225          | 455                            | 500       | 70000                       | 550               | 1.6         | 10400                       |                               |                 | √  | √   |
| TVA25361K□□□□  | 360                         | 230                    | 300          | 595                            | 150       | 15000                       | 190               | 1           | 1300                        | √                             | √               | √  | √   |
| TVA32361K□□□□  | 360                         | 230                    | 300          | 595                            | 200       | 25000                       | 300               | 1.2         | 2200                        | √                             | √               | √  | √   |
| TVA34361K□□□□  | 360                         | 230                    | 300          | 595                            | 300       | 40000                       | 460               | 1.4         | 3200                        | √                             | √               | √  | √   |
| TVA34361KT□□□□ | 360                         | 230                    | 300          | 595                            | 500       | 70000                       | 730               | 1.6         | 7800                        | √                             | √               | √  | √   |
| TVA40361K□□□□  | 360                         | 230                    | 300          | 595                            | 300       | 40000                       | 460               | 1.4         | 3500                        | √                             | √               | √  | √   |
| TVA60361K□□□□  | 360                         | 230                    | 300          | 595                            | 500       | 70000                       | 730               | 1.6         | 7800                        |                               |                 | √  | √   |
| TVA25391K□□□□  | 390                         | 250                    | 320          | 650                            | 150       | 15000                       | 210               | 1           | 1100                        | √                             | √               | √  | √   |
| TVA32391K□□□□  | 390                         | 250                    | 320          | 650                            | 200       | 25000                       | 330               | 1.2         | 2000                        | √                             | √               | √  | √   |
| TVA34391K□□□□  | 390                         | 250                    | 320          | 650                            | 300       | 40000                       | 490               | 1.4         | 2800                        | √                             | √               | √  | √   |
| TVA34391KT□□□□ | 390                         | 250                    | 320          | 650                            | 500       | 70000                       | 800               | 1.6         | 7200                        | √                             | √               | √  | √   |
| TVA40391K□□□□  | 390                         | 250                    | 320          | 650                            | 300       | 40000                       | 490               | 1.4         | 3000                        | √                             | √               | √  | √   |
| TVA60391K□□□□  | 390                         | 250                    | 320          | 650                            | 500       | 70000                       | 800               | 1.6         | 7200                        |                               |                 | √  | √   |
| TVA25431K□□□□  | 430                         | 275                    | 350          | 710                            | 150       | 15000                       | 220               | 1           | 1000                        | √                             | √               | √  | √   |
| TVA32431K□□□□  | 430                         | 275                    | 350          | 710                            | 200       | 25000                       | 360               | 1.2         | 1800                        | √                             | √               | √  | √   |
| TVA34431K□□□□  | 430                         | 275                    | 350          | 710                            | 300       | 40000                       | 550               | 1.4         | 2600                        | √                             | √               | √  | √   |
| TVA34431KT□□□□ | 430                         | 275                    | 350          | 710                            | 500       | 70000                       | 860               | 1.6         | 6600                        | √                             | √               | √  | √   |
| TVA40431K□□□□  | 430                         | 275                    | 350          | 710                            | 300       | 40000                       | 550               | 1.4         | 2800                        | √                             | √               | √  | √   |
| TVA60431K□□□□  | 430                         | 275                    | 350          | 710                            | 500       | 70000                       | 860               | 1.6         | 6600                        |                               |                 | √  | √   |

Note : □□□□/□□□□ : Please read the dimensions

T is the parallel structure of two discs

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## Disc/Block Type Varistor for Lightning Protection



| Part No.       | Varistor Voltage<br>(@ 1mA DC) | Max. Operating Voltage      |                        | Max. Clamping Voltage<br>(8/20µs) |                       | Max. Surge Current<br>(8/20µs) | Max. Energy<br>(2ms)    | Rated Power | Reference Capacitance<br>@1KHZ | Safety Approvals  |     |                    |     |
|----------------|--------------------------------|-----------------------------|------------------------|-----------------------------------|-----------------------|--------------------------------|-------------------------|-------------|--------------------------------|-------------------|-----|--------------------|-----|
|                |                                | V <sub>AC(rms)</sub><br>(V) | V <sub>DC</sub><br>(V) | V <sub>P</sub><br>(V)             | I <sub>P</sub><br>(A) |                                |                         |             |                                | UL                | cUL | UL                 | cUL |
|                | V <sub>1mA</sub><br>(V)        | V <sub>AC(rms)</sub><br>(V) | V <sub>DC</sub><br>(V) | V <sub>P</sub><br>(V)             | I <sub>P</sub><br>(A) | I <sub>max</sub><br>(A)        | W <sub>max</sub><br>(J) | P<br>(W)    | C<br>(pF)                      | UL1449<br>E173642 |     | UL 1414<br>E186499 |     |
| TVA25471K□□□□  | 470                            | 300                         | 385                    | 775                               | 150                   | 15000                          | 225                     | 1           | 950                            | √                 | √   | √                  | √   |
| TVA32471K□□□□  | 470                            | 300                         | 385                    | 775                               | 200                   | 25000                          | 405                     | 1.2         | 1700                           | √                 | √   | √                  | √   |
| TVA34471K□□□□  | 470                            | 300                         | 385                    | 775                               | 300                   | 40000                          | 595                     | 1.4         | 2400                           | √                 | √   | √                  | √   |
| TVA34471KT□□□□ | 470                            | 300                         | 385                    | 775                               | 500                   | 70000                          | 950                     | 1.6         | 6100                           | √                 | √   | √                  | √   |
| TVA40471K□□□□  | 470                            | 300                         | 385                    | 775                               | 300                   | 40000                          | 595                     | 1.4         | 2600                           | √                 | √   | √                  | √   |
| TVA60471K□□□□  | 470                            | 300                         | 385                    | 775                               | 500                   | 70000                          | 950                     | 1.6         | 6100                           |                   |     | √                  | √   |
| TVA25511K□□□□  | 510                            | 320                         | 415                    | 845                               | 150                   | 15000                          | 230                     | 1           | 900                            | √                 | √   | √                  | √   |
| TVA32511K□□□□  | 510                            | 320                         | 415                    | 845                               | 200                   | 25000                          | 430                     | 1.2         | 1600                           | √                 | √   | √                  | √   |
| TVA34511K□□□□  | 510                            | 320                         | 415                    | 845                               | 300                   | 40000                          | 640                     | 1.4         | 2300                           | √                 | √   | √                  | √   |
| TVA34511KT□□□□ | 510                            | 320                         | 415                    | 845                               | 500                   | 70000                          | 1000                    | 1.6         | 5800                           | √                 | √   | √                  | √   |
| TVA40511K□□□□  | 510                            | 320                         | 415                    | 845                               | 300                   | 40000                          | 640                     | 1.4         | 2500                           | √                 | √   | √                  | √   |
| TVA60511K□□□□  | 510                            | 320                         | 415                    | 845                               | 500                   | 70000                          | 1000                    | 1.6         | 5800                           |                   |     | √                  | √   |
| TVA25561K□□□□  | 560                            | 350                         | 450                    | 930                               | 150                   | 15000                          | 235                     | 1           | 800                            | √                 | √   | √                  | √   |
| TVA32561K□□□□  | 560                            | 350                         | 450                    | 930                               | 200                   | 25000                          | 470                     | 1.2         | 1400                           | √                 | √   | √                  | √   |
| TVA34561K□□□□  | 560                            | 350                         | 450                    | 930                               | 300                   | 40000                          | 710                     | 1.4         | 2000                           | √                 | √   | √                  | √   |
| TVA34561KT□□□□ | 560                            | 350                         | 450                    | 930                               | 500                   | 70000                          | 1100                    | 1.6         | 5100                           | √                 | √   | √                  | √   |
| TVA40561K□□□□  | 560                            | 350                         | 450                    | 930                               | 300                   | 40000                          | 710                     | 1.4         | 2200                           | √                 | √   | √                  | √   |
| TVA60561K□□□□  | 560                            | 350                         | 450                    | 930                               | 500                   | 70000                          | 1100                    | 1.6         | 5100                           |                   |     | √                  | √   |
| TVA25621K□□□□  | 620                            | 385                         | 505                    | 1025                              | 150                   | 15000                          | 240                     | 1           | 700                            | √                 | √   | √                  | √   |
| TVA32621K□□□□  | 620                            | 385                         | 505                    | 1025                              | 200                   | 25000                          | 550                     | 1.2         | 1250                           | √                 | √   | √                  | √   |
| TVA34621K□□□□  | 620                            | 385                         | 505                    | 1025                              | 300                   | 40000                          | 800                     | 1.4         | 1800                           | √                 | √   | √                  | √   |
| TVA34621KT□□□□ | 620                            | 385                         | 505                    | 1025                              | 500                   | 70000                          | 1200                    | 1.6         | 4600                           | √                 | √   | √                  | √   |
| TVA40621K□□□□  | 620                            | 385                         | 505                    | 1025                              | 300                   | 40000                          | 800                     | 1.4         | 2000                           | √                 | √   | √                  | √   |
| TVA60621K□□□□  | 620                            | 385                         | 505                    | 1025                              | 500                   | 70000                          | 1200                    | 1.6         | 4600                           | √                 | √   | √                  | √   |
| TVA25681K□□□□  | 680                            | 420                         | 560                    | 1120                              | 150                   | 15000                          | 250                     | 1.0         | 650                            | √                 | √   | √                  | √   |
| TVA32681K□□□□  | 680                            | 420                         | 560                    | 1120                              | 200                   | 25000                          | 600                     | 1.2         | 1150                           | √                 | √   | √                  | √   |
| TVA34681K□□□□  | 680                            | 420                         | 560                    | 1120                              | 300                   | 40000                          | 910                     | 1.4         | 1700                           | √                 | √   | √                  | √   |
| TVA34681KT□□□□ | 680                            | 420                         | 560                    | 1120                              | 500                   | 70000                          | 1500                    | 1.6         | 4300                           | √                 | √   | √                  | √   |
| TVA40681K□□□□  | 680                            | 420                         | 560                    | 1120                              | 300                   | 40000                          | 910                     | 1.4         | 1800                           | √                 | √   | √                  | √   |
| TVA60681K□□□□  | 680                            | 420                         | 560                    | 1120                              | 500                   | 70000                          | 1500                    | 1.6         | 4300                           |                   |     | √                  | √   |
| TVA25751K□□□□  | 750                            | 460                         | 615                    | 1240                              | 150                   | 15000                          | 275                     | 1.0         | 600                            | √                 | √   | √                  | √   |
| TVA32751K□□□□  | 750                            | 460                         | 615                    | 1240                              | 200                   | 25000                          | 660                     | 1.2         | 1100                           | √                 | √   | √                  | √   |
| TVA34751K□□□□  | 750                            | 460                         | 615                    | 1240                              | 300                   | 40000                          | 1000                    | 1.4         | 1600                           | √                 | √   | √                  | √   |
| TVA34751KT□□□□ | 750                            | 460                         | 615                    | 1240                              | 500                   | 70000                          | 1650                    | 1.6         | 4100                           | √                 | √   | √                  | √   |
| TVA40751K□□□□  | 750                            | 460                         | 615                    | 1240                              | 300                   | 40000                          | 1000                    | 1.4         | 1700                           | √                 | √   | √                  | √   |
| TVA60751K□□□□  | 750                            | 460                         | 615                    | 1240                              | 500                   | 70000                          | 1650                    | 1.6         | 4100                           |                   |     | √                  | √   |
| TVA25781K□□□□  | 780                            | 485                         | 640                    | 1290                              | 150                   | 15000                          | 290                     | 1           | 550                            | √                 | √   | √                  | √   |
| TVA32781K□□□□  | 780                            | 485                         | 640                    | 1290                              | 200                   | 25000                          | 680                     | 1.2         | 1050                           | √                 | √   | √                  | √   |
| TVA34781K□□□□  | 780                            | 485                         | 640                    | 1290                              | 300                   | 40000                          | 1030                    | 1.4         | 1500                           | √                 | √   | √                  | √   |
| TVA34781KT□□□□ | 780                            | 485                         | 640                    | 1290                              | 500                   | 70000                          | 1700                    | 1.6         | 3800                           | √                 | √   | √                  | √   |
| TVA40781K□□□□  | 780                            | 485                         | 640                    | 1290                              | 300                   | 40000                          | 1030                    | 1.4         | 1600                           | √                 | √   | √                  | √   |
| TVA60781K□□□□  | 780                            | 485                         | 640                    | 1290                              | 500                   | 70000                          | 1700                    | 1.6         | 3800                           |                   |     | √                  | √   |

Note : □□□□/□□□□ : Please read the dimensions

T is the parallel structure of two discs

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



| Part No.       | Varistor Voltage<br>(@ 1mA DC) | Max. Operating Voltage      |                        | Max. Clamping Voltage<br>(8/20µs) |                       | Max. Surge Current<br>(8/20µs) | Max. Energy<br>(2ms)    | Rated Power | Reference Capacitance<br>@1KHZ | Safety Approvals  |                    |    |     |
|----------------|--------------------------------|-----------------------------|------------------------|-----------------------------------|-----------------------|--------------------------------|-------------------------|-------------|--------------------------------|-------------------|--------------------|----|-----|
|                |                                | V <sub>AC(rms)</sub><br>(V) | V <sub>DC</sub><br>(V) | V <sub>P</sub><br>(V)             | I <sub>P</sub><br>(A) |                                |                         |             |                                | UL                | cUL                | UL | cUL |
|                | V <sub>1mA</sub><br>(V)        | V <sub>AC(rms)</sub><br>(V) | V <sub>DC</sub><br>(V) | V <sub>P</sub><br>(V)             | I <sub>P</sub><br>(A) | I <sub>max</sub><br>(A)        | W <sub>max</sub><br>(J) | P<br>(W)    | C<br>(pF)                      | UL1449<br>E173642 | UL 1414<br>E186499 |    |     |
| TVA25821K□□□□  | 820                            | 510                         | 670                    | 1355                              | 150                   | 15000                          | 300                     | 1           | 520                            | √                 | √                  | √  | √   |
| TVA32821K□□□□  | 820                            | 510                         | 670                    | 1355                              | 200                   | 25000                          | 550                     | 1.2         | 950                            | √                 | √                  | √  | √   |
| TVA34821K□□□□  | 820                            | 510                         | 670                    | 1355                              | 300                   | 40000                          | 860                     | 1.4         | 1400                           | √                 | √                  | √  | √   |
| TVA34821KT□□□□ | 820                            | 510                         | 670                    | 1355                              | 500                   | 70000                          | 1350                    | 1.6         | 3600                           | √                 | √                  | √  | √   |
| TVA40821K□□□□  | 820                            | 510                         | 670                    | 1355                              | 300                   | 40000                          | 860                     | 1.4         | 1500                           | √                 | √                  | √  | √   |
| TVA60821K□□□□  | 820                            | 510                         | 670                    | 1355                              | 500                   | 70000                          | 1350                    | 1.6         | 3600                           |                   |                    | √  | √   |
| TVA25911K□□□□  | 910                            | 550                         | 745                    | 1500                              | 150                   | 15000                          | 340                     | 1           | 500                            | √                 | √                  | √  | √   |
| TVA32911K□□□□  | 910                            | 550                         | 745                    | 1500                              | 200                   | 25000                          | 620                     | 1.2         | 900                            | √                 | √                  | √  | √   |
| TVA34911K□□□□  | 910                            | 550                         | 745                    | 1500                              | 300                   | 40000                          | 960                     | 1.4         | 1300                           | √                 | √                  | √  | √   |
| TVA34911KT□□□□ | 910                            | 550                         | 745                    | 1500                              | 500                   | 70000                          | 1500                    | 1.6         | 3300                           | √                 | √                  | √  | √   |
| TVA40911K□□□□  | 910                            | 550                         | 745                    | 1500                              | 300                   | 40000                          | 960                     | 1.4         | 1400                           | √                 | √                  | √  | √   |
| TVA60911K□□□□  | 910                            | 550                         | 745                    | 1500                              | 500                   | 70000                          | 1500                    | 1.6         | 3300                           |                   |                    | √  | √   |
| TVA25951K□□□□  | 950                            | 575                         | 765                    | 1570                              | 150                   | 15000                          | 355                     | 1           | 450                            |                   |                    | √  | √   |
| TVA32951K□□□□  | 950                            | 575                         | 765                    | 1570                              | 200                   | 25000                          | 660                     | 1.2         | 850                            | √                 | √                  | √  | √   |
| TVA34951K□□□□  | 950                            | 575                         | 765                    | 1570                              | 300                   | 40000                          | 1000                    | 1.4         | 1200                           | √                 | √                  | √  | √   |
| TVA34951KT□□□□ | 950                            | 575                         | 765                    | 1570                              | 500                   | 70000                          | 1560                    | 1.6         | 3000                           | √                 | √                  | √  | √   |
| TVA40951K□□□□  | 950                            | 575                         | 765                    | 1570                              | 300                   | 40000                          | 1000                    | 1.4         | 1300                           | √                 | √                  | √  | √   |
| TVA60951K□□□□  | 950                            | 575                         | 765                    | 1570                              | 500                   | 70000                          | 1570                    | 1.6         | 3000                           |                   |                    | √  | √   |
| TVA25102K□□□□  | 1000                           | 625                         | 825                    | 1650                              | 150                   | 15000                          | 375                     | 1           | 430                            | √                 | √                  | √  | √   |
| TVA32102K□□□□  | 1000                           | 625                         | 825                    | 1650                              | 200                   | 25000                          | 690                     | 1.2         | 800                            | √                 | √                  | √  | √   |
| TVA34102K□□□□  | 1000                           | 625                         | 825                    | 1650                              | 300                   | 40000                          | 1050                    | 1.4         | 1150                           | √                 | √                  | √  | √   |
| TVA34102KT□□□□ | 1000                           | 625                         | 825                    | 1650                              | 500                   | 70000                          | 1650                    | 1.6         | 2900                           | √                 | √                  | √  | √   |
| TVA40102K□□□□  | 1000                           | 640                         | 825                    | 1650                              | 300                   | 40000                          | 1050                    | 1.4         | 1200                           | √                 | √                  | √  | √   |
| TVA60102K□□□□  | 1000                           | 625                         | 825                    | 1650                              | 500                   | 70000                          | 1650                    | 1.6         | 2900                           |                   |                    | √  | √   |
| TVA25112K□□□□  | 1100                           | 680                         | 895                    | 1815                              | 150                   | 15000                          | 390                     | 1           | 400                            | √                 | √                  | √  | √   |
| TVA32112K□□□□  | 1100                           | 680                         | 895                    | 1815                              | 200                   | 25000                          | 760                     | 1.2         | 750                            | √                 | √                  | √  | √   |
| TVA34112K□□□□  | 1100                           | 680                         | 895                    | 1815                              | 300                   | 40000                          | 1150                    | 1.4         | 1050                           | √                 | √                  | √  | √   |
| TVA34112KT□□□□ | 1100                           | 680                         | 895                    | 1815                              | 500                   | 70000                          | 1800                    | 1.6         | 2700                           | √                 | √                  | √  | √   |
| TVA40112K□□□□  | 1100                           | 680                         | 895                    | 1815                              | 300                   | 40000                          | 1100                    | 1.4         | 1100                           | √                 | √                  | √  | √   |
| TVA60112K□□□□  | 1100                           | 680                         | 895                    | 1815                              | 500                   | 70000                          | 1800                    | 1.6         | 2700                           |                   |                    | √  | √   |
| TVA25122K□□□□  | 1200                           | 750                         | 980                    | 2000                              | 150                   | 15000                          | 420                     | 1.0         | 370                            | √                 | √                  |    |     |
| TVA32122K□□□□  | 1200                           | 750                         | 980                    | 2000                              | 200                   | 25000                          | 800                     | 1.2         | 650                            | √                 | √                  | √  | √   |
| TVA34122K□□□□  | 1200                           | 750                         | 980                    | 2000                              | 300                   | 40000                          | 1250                    | 1.4         | 950                            | √                 | √                  | √  | √   |
| TVA34122KT□□□□ | 1200                           | 750                         | 980                    | 2000                              | 500                   | 70000                          | 2000                    | 1.6         | 2500                           | √                 | √                  | √  | √   |
| TVA40122K□□□□  | 1200                           | 750                         | 980                    | 2000                              | 300                   | 40000                          | 1200                    | 1.4         | 1000                           | √                 | √                  | √  | √   |
| TVA60122K□□□□  | 1200                           | 750                         | 980                    | 2000                              | 500                   | 70000                          | 2000                    | 1.6         | 2500                           |                   |                    | √  | √   |
| TVA32182K□□□□  | 1800                           | 1000                        | 1465                   | 2970                              | 200                   | 25000                          | 1200                    | 1.2         | 450                            | √                 | √                  |    |     |
| TVA34182K□□□□  | 1800                           | 1000                        | 1465                   | 2970                              | 300                   | 40000                          | 1800                    | 1.4         | 700                            | √                 | √                  |    |     |
| TVA40182K□□□□  | 1800                           | 1000                        | 1465                   | 2970                              | 300                   | 40000                          | 1800                    | 1.4         | 750                            | √                 | √                  |    |     |
| TVA60182K□□□□  | 1800                           | 1000                        | 1465                   | 2970                              | 500                   | 70000                          | 3000                    | 1.6         | 1800                           |                   |                    | √  | √   |

Note : □□□□/□□□□: Please read the dimensions

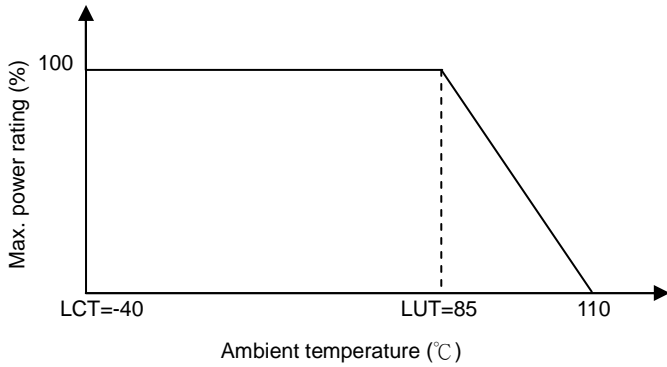
T is the parallel structure of two discs

# Metal Oxide Varistor : TVA Series

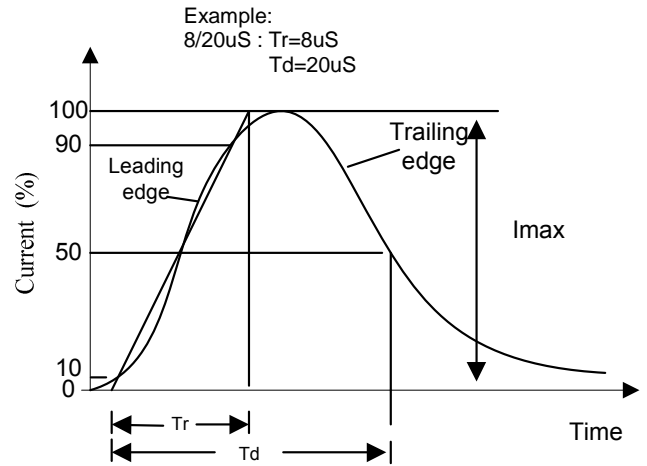
## Disc/Block Type Varistor for Lightning Protection



### Power Derating Curve

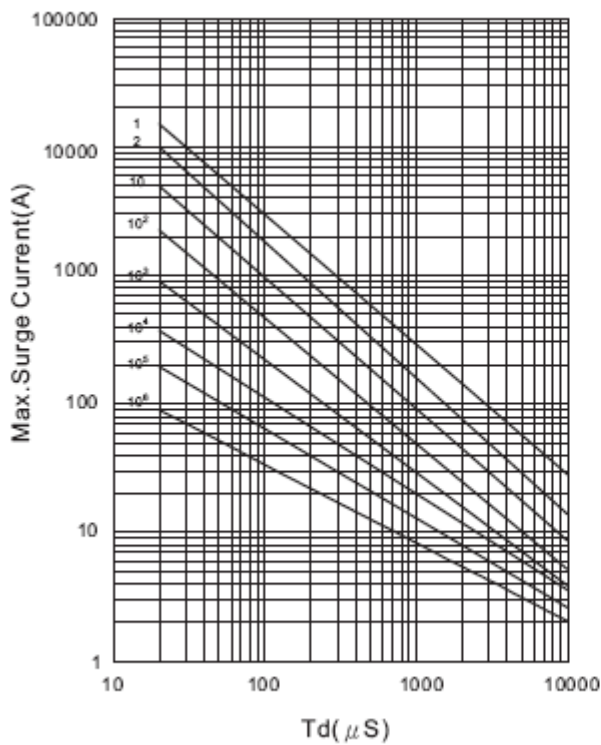


### Surge Current Standard Waveform

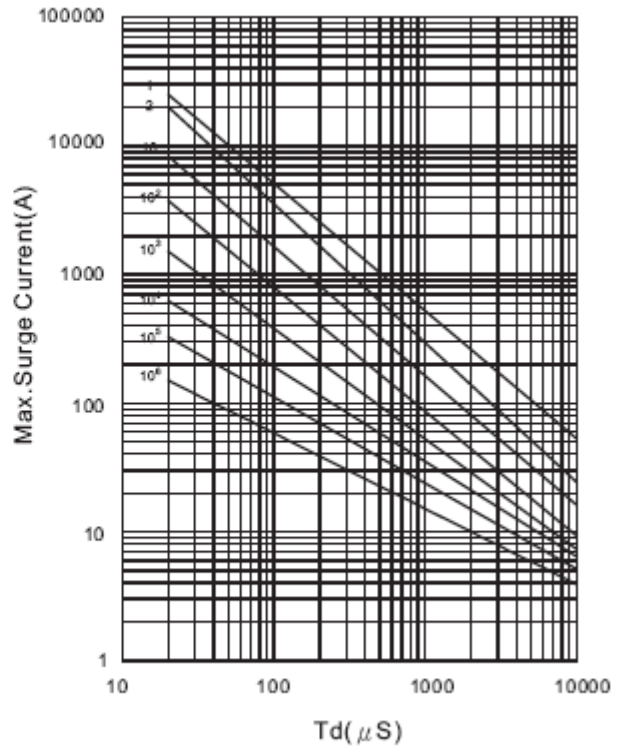


### Max. Surge Current Derating Curves

TVA25201 to TVA25122



TVA32201 to TVA32182

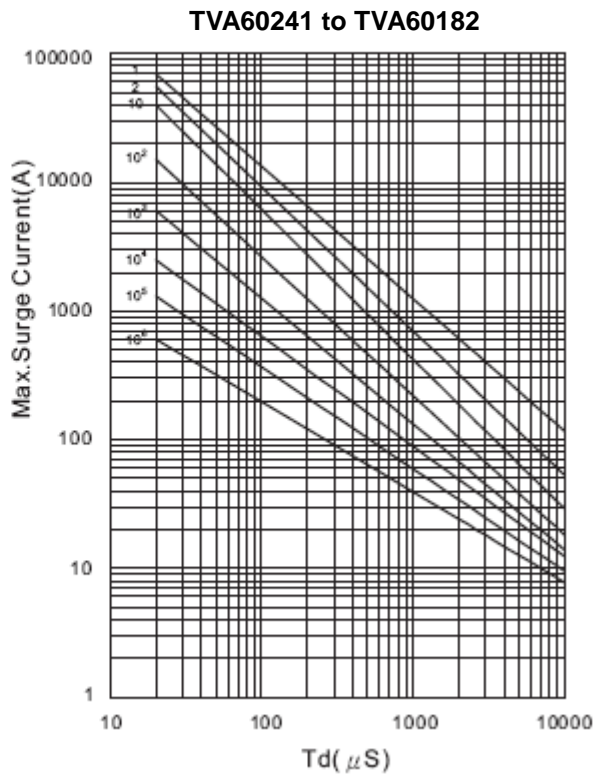
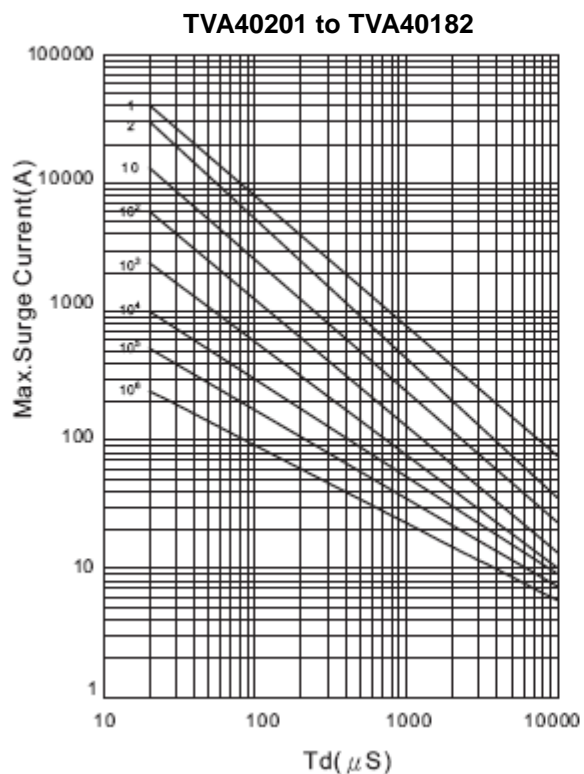
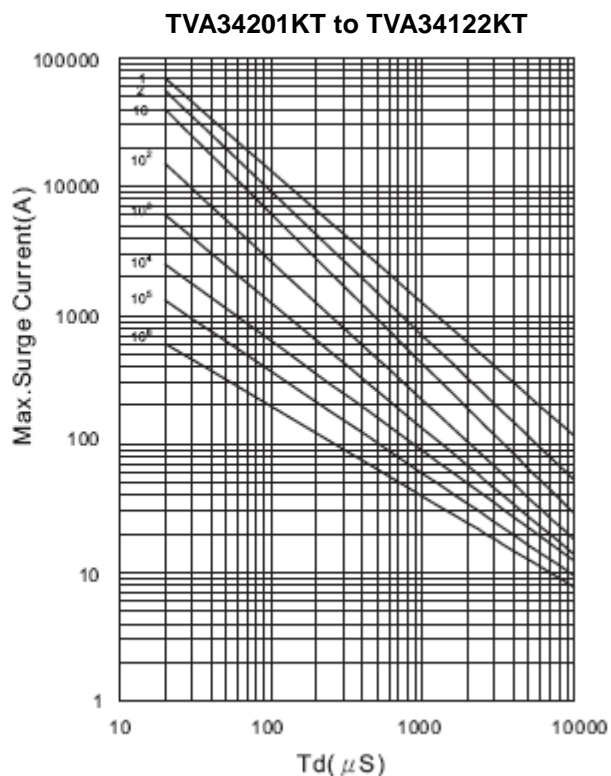
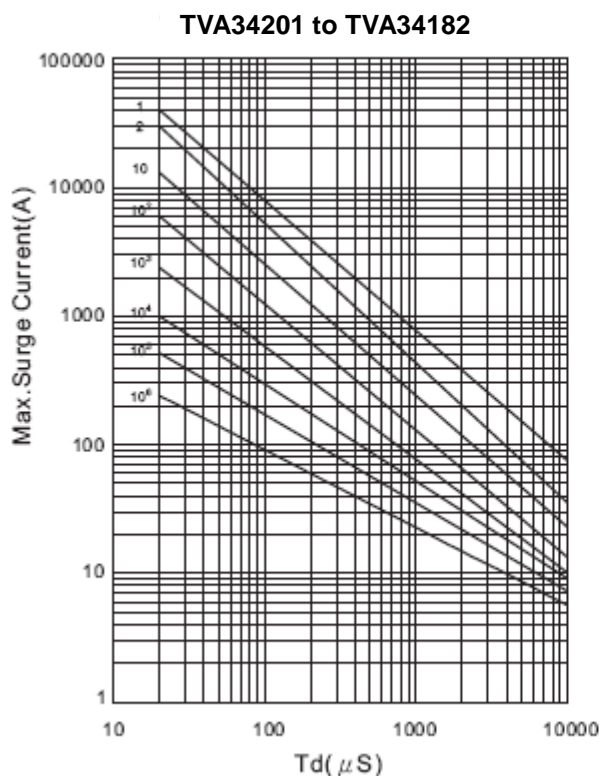


# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### ■ Max. Surge Current Derating Curves



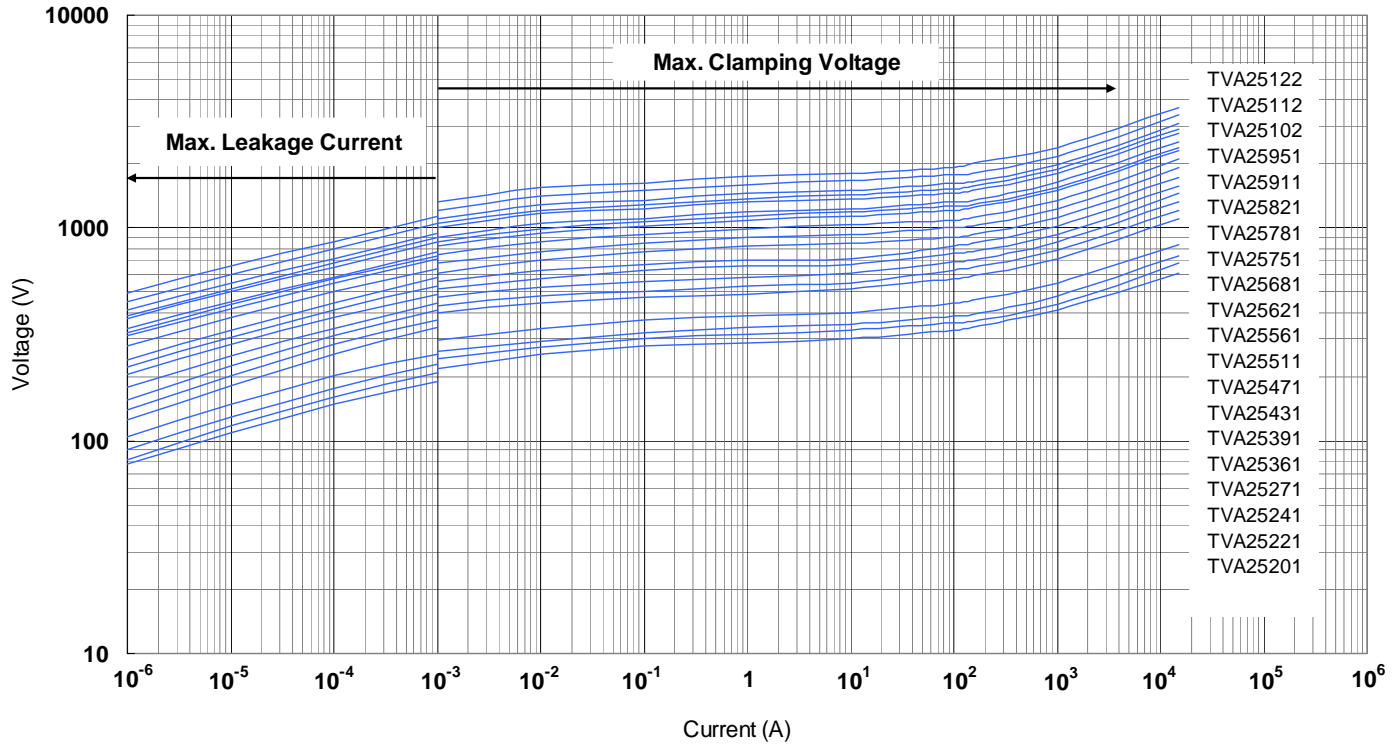
# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection

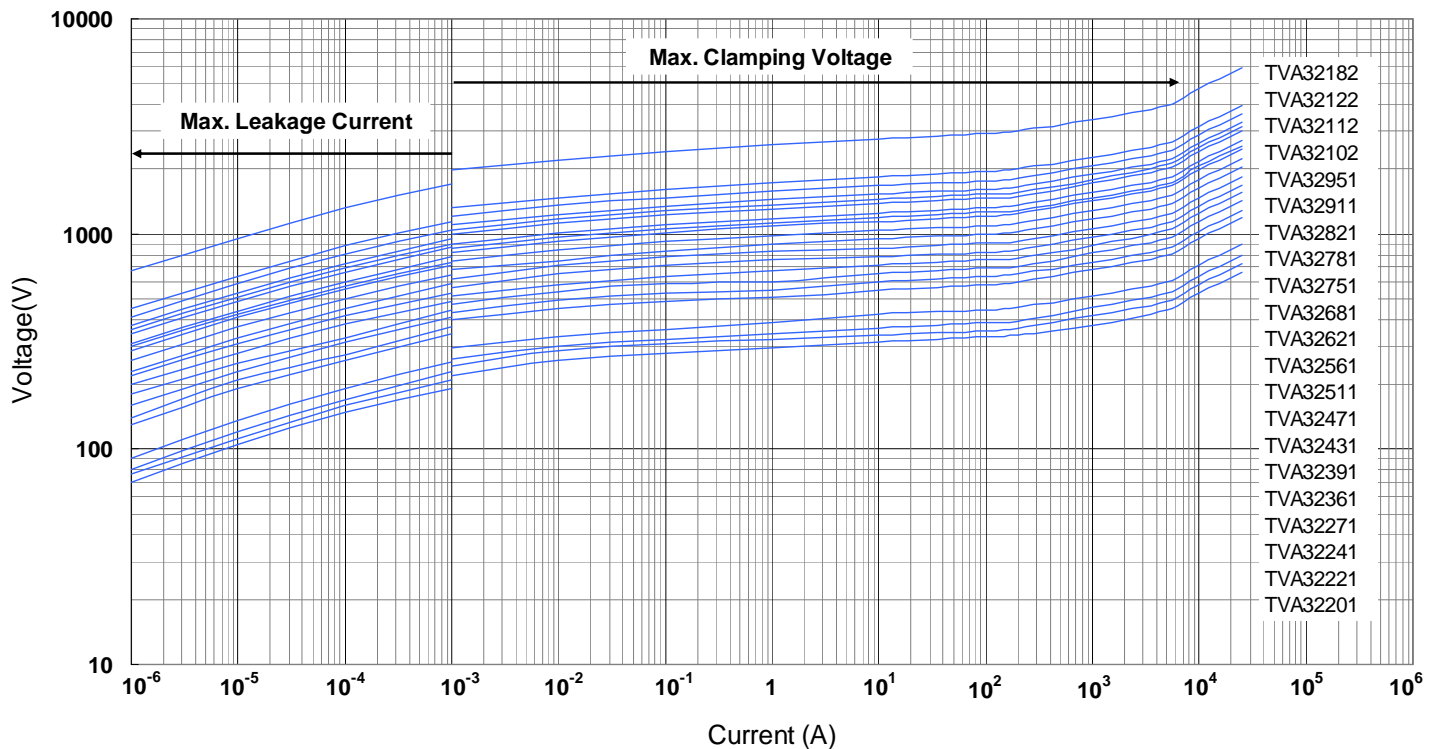


### Max. Leakage Current and Max. Clamping Voltage Curves

**Max. Leakage Current and Max. Clamping Voltage Curves (TVA25201 to TVA25122)**



**Max. Leakage Current and Max. Clamping Voltage Curves (TVA32201 to TVA32182)**

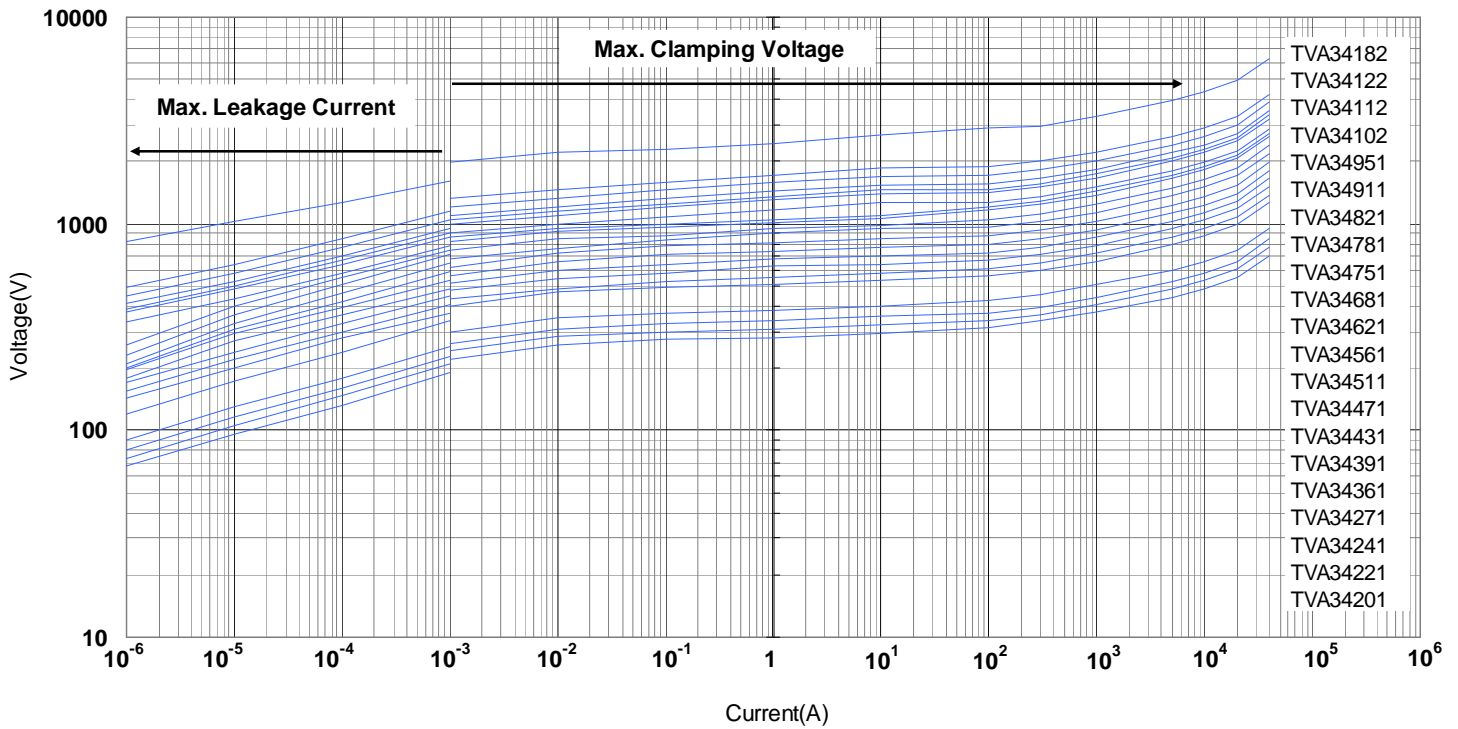


# Metal Oxide Varistor : TVA Series

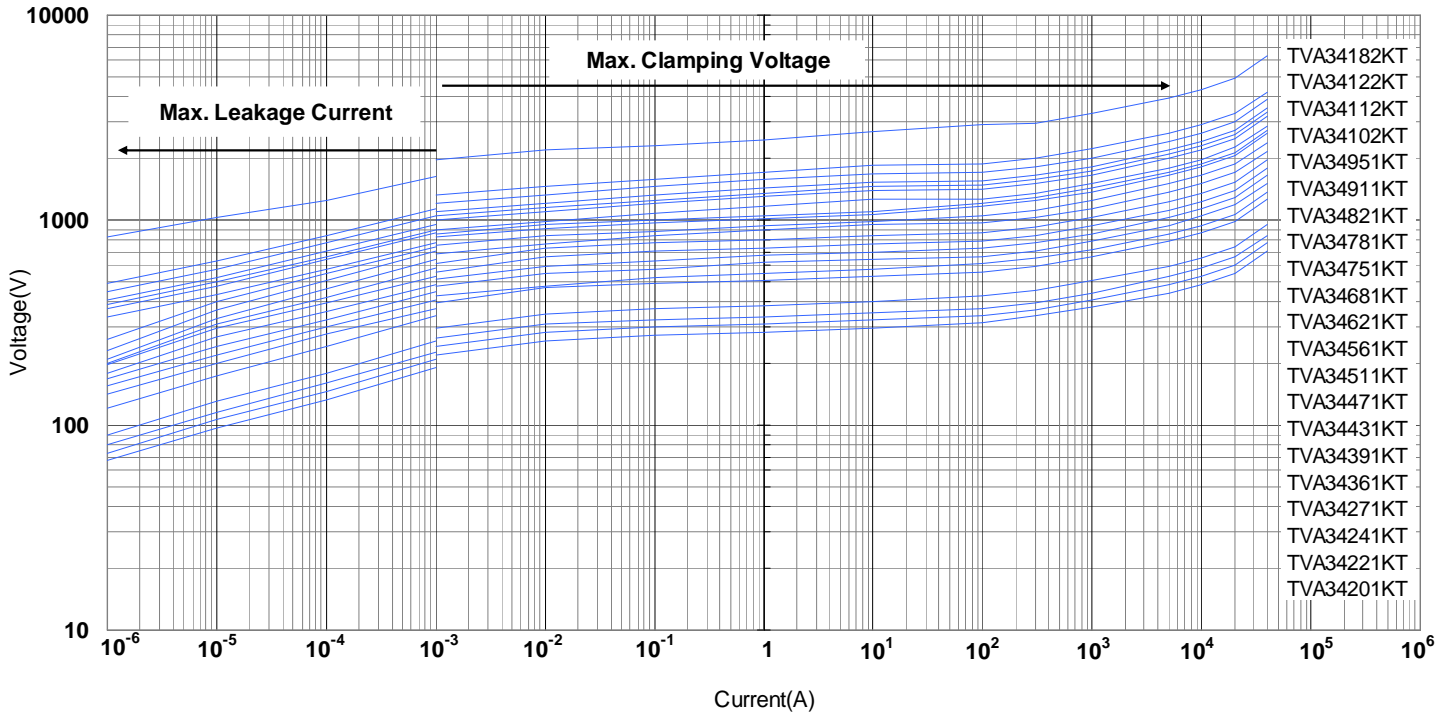
## Disc/Block Type Varistor for Lightning Protection



**Max. Leakage Current and Max. Clamping Voltage Curves (TVA34201 to TVA34182)**



**Max. Leakage Current and Max. Clamping Voltage Curves (TVA34201KT to TVA34122KT)**

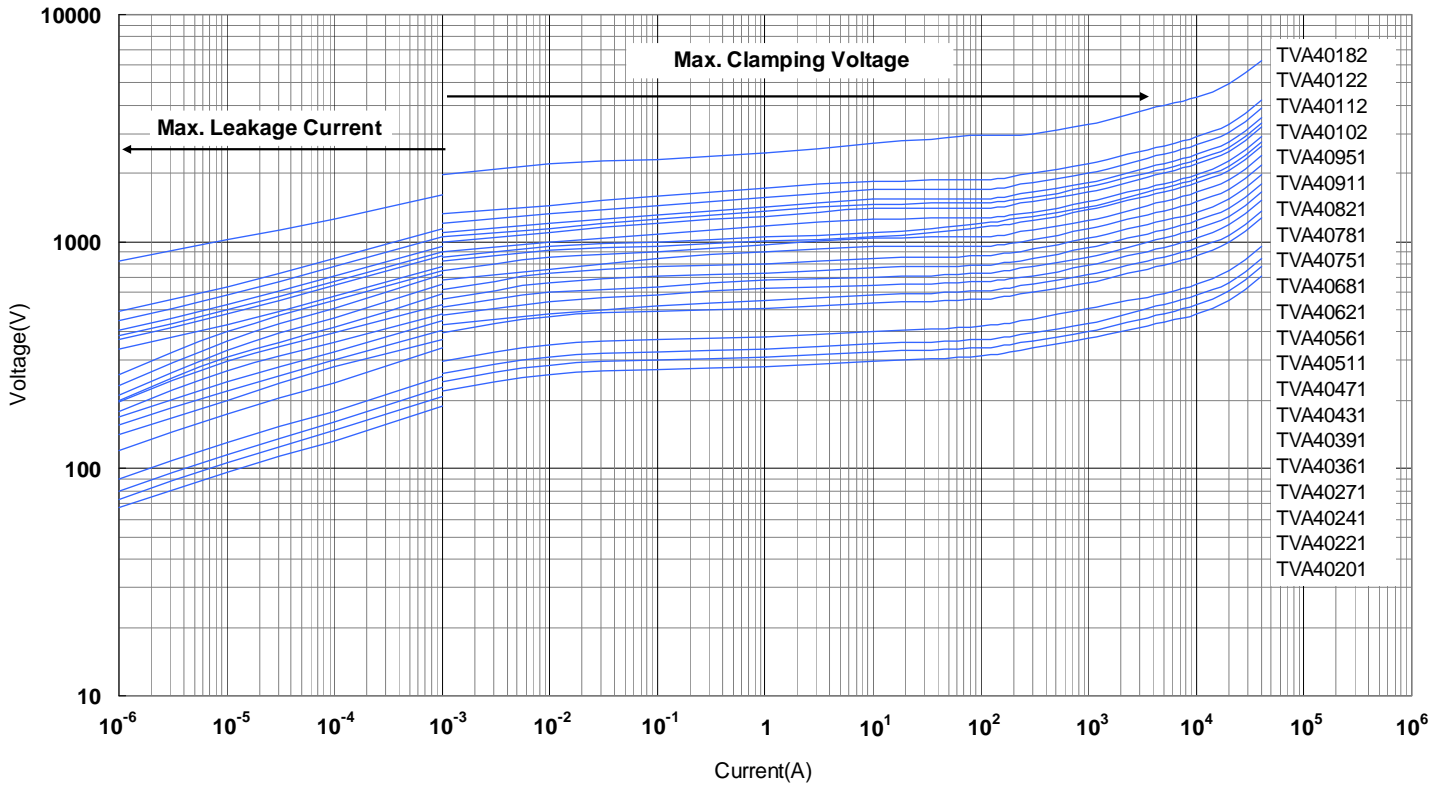


# Metal Oxide Varistor : TVA Series

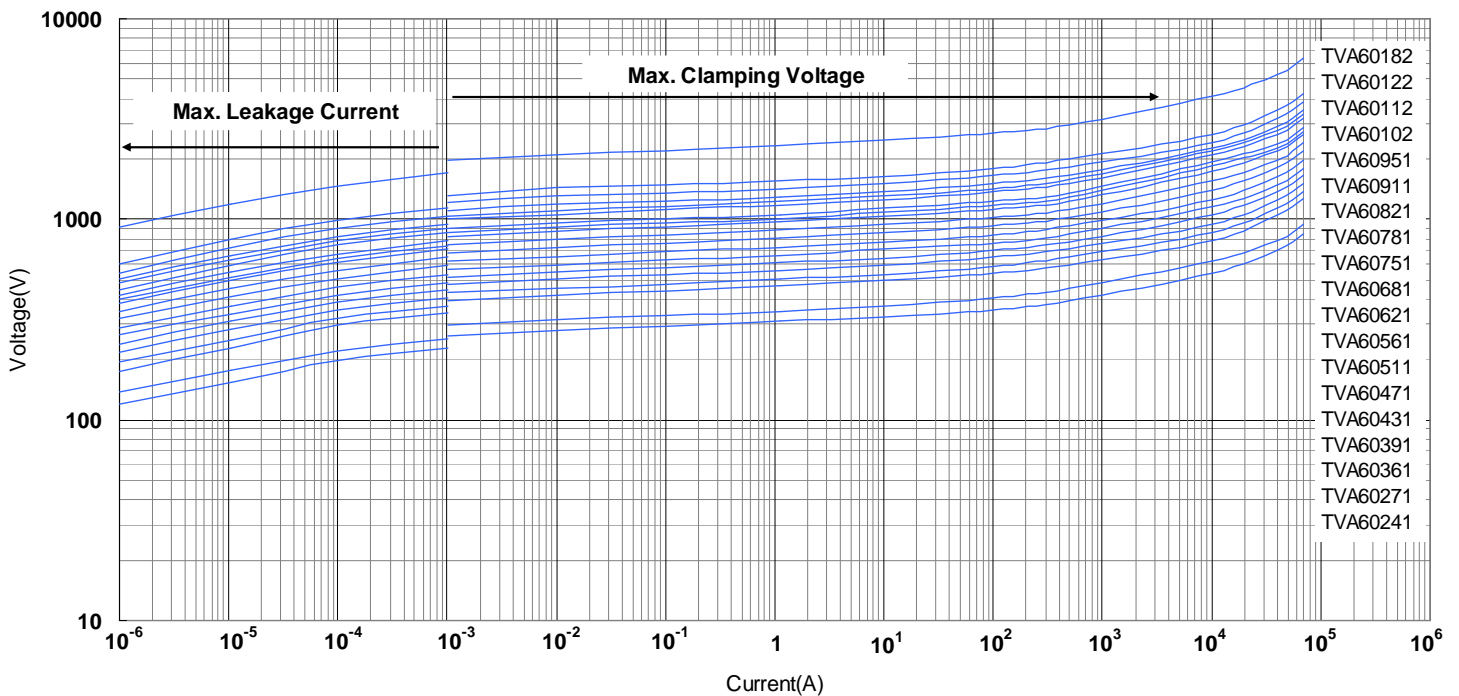
## Disc/Block Type Varistor for Lightning Protection



**Max. Leakage Current and Max. Clamping Voltage Curves (TVA40201 to TVA40182)**



**Max. Leakage Current and Max. Clamping Voltage Curves (TVA60241 to TVA60182)**





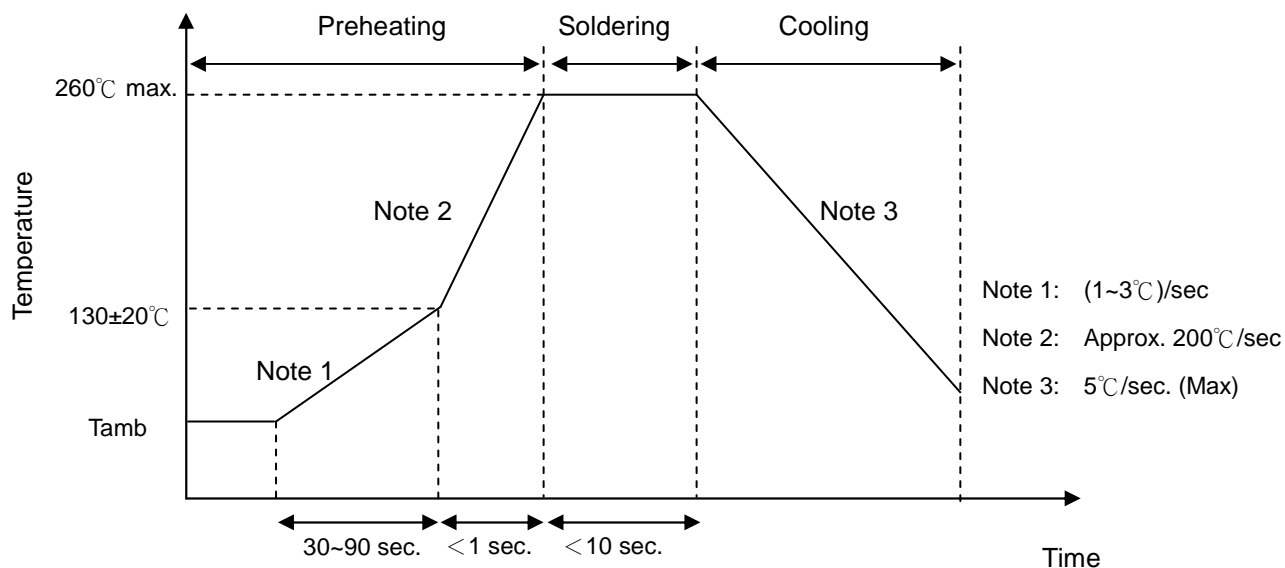
# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### ■ Soldering Recommendation

#### ● Wave Soldering Profile



#### ● Recommended Reworking Conditions with Soldering Iron

| Item                              | Conditions   |
|-----------------------------------|--------------|
| Temperature of Soldering Iron-tip | 360°C (max.) |
| Soldering Time                    | 3sec (max.)  |
| Distance from Varistor            | 2 mm (min.)  |

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### ■ Reliability

| Item   | Standard               | Test conditions / Methods   | Specifications  |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
|--|------------------------|---|---|------------------------|------------------|-----------|------------|------|-----------|------------------|------|--|--------|------|--|------------------|------|--|
| Tensile Strength of Terminals                    | IEC 60068-2-21         | Gradually applying the force specified and keeping the unit fixed for 10±1 sec.<br><table border="1"> <thead> <tr> <th>Terminal cross-sectional area (mm<sup>2</sup>)</th> <th>Terminal diameter (mm)</th> <th>Force (Kg)</th> </tr> </thead> <tbody> <tr> <td>0.5&lt;S≤1.2</td> <td>0.8&lt;d≤1.25</td> <td>2.0</td> </tr> <tr> <td>1.2&lt;S</td> <td>1.25&lt;d</td> <td>4.0</td> </tr> </tbody> </table>   | Terminal cross-sectional area (mm <sup>2</sup> )  | Terminal diameter (mm) | Force (Kg)       | 0.5<S≤1.2 | 0.8<d≤1.25 | 2.0  | 1.2<S     | 1.25<d           | 4.0  | $ \Delta V/V_{1mA}  \leq 5\%$<br>No visible damage |        |      |  |                  |      |  |
| Terminal cross-sectional area (mm <sup>2</sup> ) | Terminal diameter (mm) | Force (Kg)  |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| 0.5<S≤1.2  | 0.8<d≤1.25             | 2.0   |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| 1.2<S  | 1.25<d                 | 4.0   |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| Bending Strength of Terminals (Optional)         | IEC 60068-2-21         | Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction.<br><table border="1"> <thead> <tr> <th>Terminal cross-sectional area (mm<sup>2</sup>)</th> <th>Terminal diameter (mm)</th> <th>Force (Kg)</th> </tr> </thead> <tbody> <tr> <td>0.2&lt;S≤0.5</td> <td>0.5&lt;d≤0.8</td> <td>0.5</td> </tr> <tr> <td>0.5&lt;S≤1.2</td> <td>0.8&lt;d≤1.25</td> <td>1.0</td> </tr> <tr> <td>1.2&lt;S</td> <td>1.25&lt;d</td> <td>2.0</td> </tr> </tbody> </table> | Terminal cross-sectional area (mm <sup>2</sup> )  | Terminal diameter (mm) | Force (Kg)       | 0.2<S≤0.5 | 0.5<d≤0.8  | 0.5  | 0.5<S≤1.2 | 0.8<d≤1.25       | 1.0  | 1.2<S  | 1.25<d | 2.0  | $ \Delta V/V_{1mA}  \leq 5\%$<br>No visible damage |                  |      |  |
| Terminal cross-sectional area (mm <sup>2</sup> ) | Terminal diameter (mm) | Force (Kg)  |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| 0.2<S≤0.5  | 0.5<d≤0.8              | 0.5   |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| 0.5<S≤1.2  | 0.8<d≤1.25             | 1.0   |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| 1.2<S  | 1.25<d                 | 2.0   |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| Vibration (Optional)                             | IEC 61051-1            | Frequency range:10~55Hz<br>Amplitude:0.75mm or 98m/S <sup>2</sup><br>Direction:3 mutually perpendicular directions,2hrs each.   | $ \Delta V/V_{1mA}  \leq 5\%$<br>No visible damage  |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| Solderability                                    | IEC 60068-2-20         | 245±3°C , 3±0.3 sec   | At least 95% of terminal electrode is covered by new solder                                 |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| Resistance to Soldering Heat                     | IEC 60068-2-20         | 260±3°C , 10±1 sec  | $ \Delta V/V_{1mA}  \leq 5\%$<br>No visible damage  |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| High Temperature Storage                         | IEC 60068-2-2          | 110±5°C x 1000±24 hrs   | $ \Delta V/V_{1mA}  \leq 5\%$   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| Damp Heat, Steady State                          | IEC 60068-2-3          | a. 40±2°C, 90 ~ 95 % RH, 1344 hrs<br>b. 40±2°C, 90 ~ 95 % RH, at 10%Vdc,1344 hrs  | No visible damage<br>$ \Delta V_{1mA}/V_{1mA}  \leq 5\%$<br>Insulation Resistance<br>≥100MΩ |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| Rapid Change of Temperature (optional)           | IEC 60068-2-14         | The conditions shown below shall be repeated 5 cycles<br><table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> <th>Period (minutes)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-40±3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>15±3</td> </tr> <tr> <td>3</td> <td>85±2</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>15±3</td> </tr> </tbody> </table>  | Step  | Temperature (°C)       | Period (minutes) | 1         | -40±3      | 30±3 | 2         | Room temperature | 15±3 | 3  | 85±2   | 30±3 | 4  | Room temperature | 15±3 | $ \Delta V/V_{1mA}  \leq 5\%$<br>No visible damage |
| Step   | Temperature (°C)       | Period (minutes)  |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| 1  | -40±3                  | 30±3  |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| 2  | Room temperature       | 15±3  |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| 3  | 85±2                   | 30±3  |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| 4  | Room temperature       | 15±3  |   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| Endurance at Upper Category Temperature          | IEC61051-4.20          | 85 ± 2 °C, 1000 ± 24 hrs, at VDC or Vrms(Max. Operating Voltage)  | $ \Delta V/V_{1mA}  \leq 10\%$  |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| 8/20μs Surge Life                                | CECC42000              | 10,000 pulses ( 8/20 μ S ), unipolar, interval 10 secs, amplitude corr. to max. surge current derating curves for 20 μ S  | $ \Delta V/V_{1mA}  \leq 10\%$<br>No visible damage   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| Varistor Voltage Temp. Coefficient               | Specification Standard | $\frac{V_{1mA} \text{ at } 85^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{60} \times 100 (\% / ^{\circ}\text{C})$ $\frac{V_{1mA} \text{ at } -40^{\circ}\text{C} - V_{1mA} \text{ at } 25^{\circ}\text{C}}{V_{1mA} \text{ at } 25^{\circ}\text{C}} \times \frac{1}{65} \times 100 (\% / ^{\circ}\text{C})$  | -0.05≤T <sub>C</sub> ≤0.05 (% / °C)   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |
| Voltage Proof                                    | IEC61051-4.8           | Metal balls method, 2500 V <sub>ac</sub> 1 min  | No visible damage   |                        |                  |           |            |      |           |                  |      |  |        |      |  |                  |      |  |

# Metal Oxide Varistor : TVA Series

## Disc/Block Type Varistor for Lightning Protection



### ■ Packaging

#### ● Bulk Packing

| Disc Size | Quantity pcs/ bag |
|-----------|-------------------|
| 25 mm     | 20                |
| 32 mm     | 20                |
| 34*34 mm  | 15                |
| 40 mm     | 15                |
| 60 mm     | 2                 |

#### ● Box Packing

1) For encapsulated in plastic housing structure (B Type)

| Disc Size | Quantity pcs/ box |
|-----------|-------------------|
| 25 mm     | 100               |
| 32 mm     | 100               |

2) For two-disc paralleled structure (T Type)

For strap-terminaled structure (Q Type)

For pellet structure (Y Type)

| Disc Size | Quantity pcs/ box* |
|-----------|--------------------|
| 25 mm     | 25~125             |
| 32 mm     | 25~125             |
| 34*34 mm  | 25~125             |
| 40 mm     | 25~125             |
| 60 mm     | 25~125             |

\* Base on the thickness of the product and the terminal type

### ■ Storage Conditions of Products

#### ● Storage Conditions :

1. Storage Temperature : -10°C ~+40°C

2. Relative Humidity :  $\leq 75\%RH$

3. Keep away from corrosive atmosphere and sunlight.

#### ● Period of Storage : 1 year