

# Metal Oxide Varistor : TVR-D Series

## Disc Type Varistor for Surge Protection (High Surge Series)

### ■ Features

1. RoHS compliant
2. Halogen-free series are available
3. Body size:  $\Phi 7\text{mm} \sim \Phi 20\text{mm}$
4. Wide operating voltage range: 115Vac ~ 680Vac
5. High surge current rating up to 13KA
6. High energy rating up to 720 Joule
7. Operating temperature range:  $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$   
Storage temperature range:  $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
8. Agency recognition: UL 1449 3<sup>rd</sup>/cUL/VDE/CQC
9. TVR10-D, 14-D, and 20-D meet IEC60950-1:2013 Annex Q requirement
10. TVR20-D series for SPD Type 2 is available



Note: \* of the marking stands for TVR-D series

### ■ Recommended Applications

1. Power supply
2. Home appliance
3. Industrial equipment
4. Telecommunication or telephone system
5. Smart meter
6. PLC (Power line communication)
7. Lighting products
8. Photovoltaic industry

### ■ Part Number Code

$\Phi 7\text{mm} \sim \Phi 20\text{mm}$

| T            | V                            | R         | 1          | 4                                    | 2   | 4                                     | 1                             | K | S                     |           |       |  |    |   | W  |  |
|--------------|------------------------------|-----------|------------|--------------------------------------|-----|---------------------------------------|-------------------------------|---|-----------------------|-----------|-------|--|----|---|--|--|
| 1            | 2                            | 3         | 4          | 5                                    | 6   | 7                                     | 8                             | 9 | 10                    | 11        | 12    | 13   | 14 | 15  | 16   |  |
| Product Type |                              | Body Size |            | Varistor Voltage( $V_{1\text{mA}}$ ) |     |                                       | Tolerance of $V_{1\text{mA}}$ |   | Internal Control Code |           |       | Optional Suffix  |    |   |  |  |
| TVR          | THINKING Varistor TVR series |           | 07         | $\Phi 7\text{mm}$                    | 180 | $18 \times 10^0\text{V}=18\text{V}$   |                               | K | $\pm 10\%$            |           | 01~ZZ |  | D  | High surge series   |  |  |
|              |                              |           | 10         | $\Phi 10\text{mm}$                   | 241 | $24 \times 10^1\text{V}=240\text{V}$  |                               |   |                       |           |       |  | W  | High surge series, RoHS compliant   |  |  |
|              |                              |           | 14         | $\Phi 14\text{mm}$                   | 102 | $10 \times 10^2\text{V}=1000\text{V}$ |                               |   |                       |           |       |  | K  | High surge series, RoHS compliant & Halogen-Free  |  |  |
|              |                              |           | 20         | $\Phi 20\text{mm}$                   |     |                                       |                               |   |                       |           |       |  | S  | High surge series for UL 1449 3 <sup>rd</sup> SPD Type 2 application, RoHS compliant (TVR20 only) |  |  |
|              |                              |           | Appearance |                                      |     |                                       |                               |   |                       |           |       |  |    | N   | High surge series for UL 1449 3 <sup>rd</sup> SPD Type 2 application, RoHS compliant & Halogen-Free (TVR20 only) |  |
|              |                              |           | S          | Straight lead, epoxy coating         |     |                                       |                               |   |                       |           |       |  |    |   |  |  |
|              |                              |           | F          | Y kink lead, epoxy coating           |     |                                       |                               |   |                       |           |       |  |    |   |  |  |
|              |                              |           | T          | L kink lead, epoxy coating           |     |                                       |                               |   |                       |           |       |  |    |   |  |  |
|              |                              |           |            |                                      |     |                                       |                               |   |                       | Packaging |       |  |    |   |  |  |
|              |                              |           |            |                                      |     |                                       |                               |   |                       | AR        |       | Tape & reel packing (hole pitch:12.7mm)                    |    |   |  |  |
|              |                              |           |            |                                      |     |                                       |                               |   |                       | ER        |       | Tape & reel packing (hole pitch:15.0mm)                    |    |   |  |  |
|              |                              |           |            |                                      |     |                                       |                               |   |                       | AB        |       | Tape & ammo box packing (hole pitch:12.7mm)                |    |   |  |  |
|              |                              |           |            |                                      |     |                                       |                               |   |                       | EB        |       | Tape & ammo box packing (hole pitch:15.0mm)                |    |   |  |  |
|              |                              |           |            |                                      |     |                                       |                               |   |                       | C         |       | Bulk & cut lead (followed by the codes of 2 leaded length) |    |   |  |  |
|              |                              |           |            |                                      |     |                                       |                               |   |                       | Blank     |       | Bulk   |    |   |  |  |

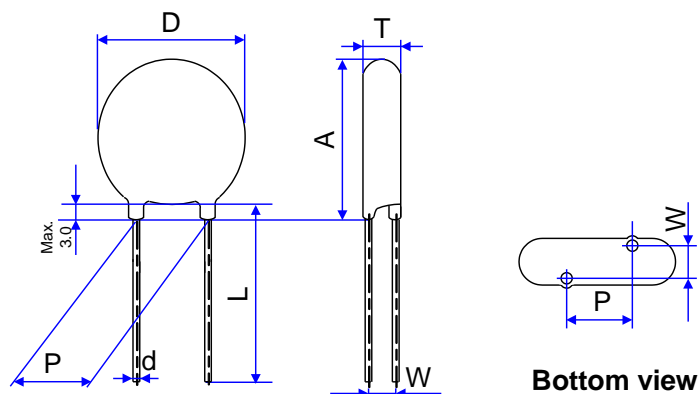
Note: Optional suffix will be the 11<sup>th</sup> digit if packaging and internal control codes are not coded.

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## Disc Type Varistor for Surge Protection (High Surge Series)

### Structures and Dimensions

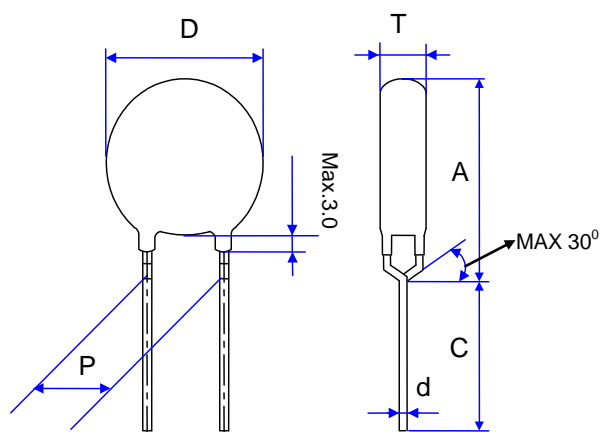
- S Type (Straight lead)



(Unit: mm)

| Series  | D         | Lmin. | d        | P     | Amax. | Tmax.  | W |
|---------|-----------|-------|----------|-------|-------|--|---|
| TVR07-D | 7.5~9.5   | 26.5  | 0.6±0.02 | 5±1   | 12.5  | Please refer to Electrical Characteristics Table |   |
| TVR10-D | 12.0~14.0 | 26.5  | 0.8±0.02 | 7.5±1 | 17.5  |  |   |
| TVR14-D | 16.0~18.5 | 26.5  | 0.8±0.02 | 7.5±1 | 21.5  |  |   |
| TVR20-D | 22~24.5   | 22.5  | 1.0±0.02 | 10±1  | 28.5  |  |   |

- F Type (Y kink lead)



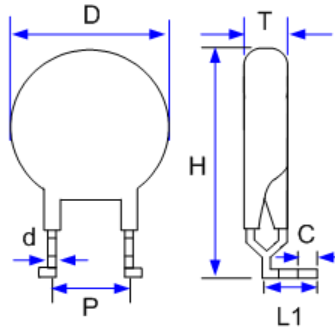
(Unit: mm)

| Series  | D         | Cmin. | d        | P     | Amax. | Tmax.  | W |
|---------|-----------|-------|----------|-------|-------|--|---|
| TVR07-D | 7.5~9.5   | 20    | 0.6±0.02 | 5±1   | 12.5  | Please refer to Electrical Characteristics Table |   |
| TVR10-D | 12.0~14.0 | 20    | 0.8±0.02 | 7.5±1 | 18.0  |  |   |
| TVR14-D | 16.0~18.5 | 20    | 0.8±0.02 | 7.5±1 | 22.0  |  |   |
| TVR20-D | 22~24.5   | 20    | 1.0±0.02 | 10±1  | 29.0  |  |   |

# Metal Oxide Varistor : TVR-D Series

## Disc Type Varistor for Surge Protection (High Surge Series)

- T Type (L kink lead)



(Unit: mm)

| Series  | D         | C       | d        | P     | Hmax. | L1    | Tmax.   |
|---------|-----------|---------|----------|-------|-------|-------|---|
| TVR10-D | 12.0~14.0 | 3.8±0.8 | 0.8±0.02 | 7.5±1 | 22.0  | 7.0±1 | Please refer to<br>Electrical<br>Characteristics<br>Table |
| TVR14-D | 16.0~18.5 |         | 0.8±0.02 | 7.5±1 | 26.5  | 7.0±1 |   |
| TVR20-D | 22.0~24.5 |         | 1.0±0.02 | 10±1  | 33.0  | 9.0±1 |   |

# Metal Oxide Varistor : TVR-D Series

## Disc Type Varistor for Surge Protection (High Surge Series)

### ■ Electrical Characteristics

#### 07-D Series

| Certified Model No. | Part No.    | Varistor Voltage (@ 1mA DC) | Max. Continuous Voltage |                      |                 | Max. Clamping Voltage (8/20μs) |                | Max. Surge Current (8/20μs) | Rated Power | Max. Energy (10/1000μs) | Reference Capacitance @1KHz | Dimension        |     |                       | UL 1449 3 <sup>rd</sup> SPD Application |                |                  |                  |        |
|---------------------|-------------|-----------------------------|-------------------------|----------------------|-----------------|--------------------------------|----------------|-----------------------------|-------------|-------------------------|-----------------------------|------------------|-----|-----------------------|---|----------------|------------------|------------------|--------|
|                     |             |                             | V <sub>1mA</sub>        | V <sub>AC(rms)</sub> | V <sub>DC</sub> | V <sub>P</sub>                 | I <sub>P</sub> |                             |             |                         |                             | I <sub>max</sub> | P   | W <sub>max</sub>      |   | C <sub>p</sub> | T <sub>min</sub> | T <sub>max</sub> | W ±1.0 |
|                     |             |                             |                         |                      |                 |                                |                |                             |             |                         |                             |                  |     |                       |   |                |                  |                  |        |
| TVR07181-D          | TVR07181KSW | 180 (162~198)               | 115                     | 150                  | 300             | 10                             | 1800           | 0.25                        | 19          | 255                     | 2.0                         | 3.9              | 1.4 | For Other Application |   |                |                  |                  |        |
| TVR07201-D          | TVR07201KSW | 200 (180~220)               | 130                     | 170                  | 340             | 10                             | 1800           | 0.25                        | 21          | 230                     | 2.1                         | 4.0              | 1.5 |                       |   |                |                  |                  |        |
| TVR07221-D          | TVR07221KSW | 220 (198~242)               | 140                     | 180                  | 360             | 10                             | 1800           | 0.25                        | 23          | 210                     | 2.1                         | 4.0              | 1.5 |                       |   |                |                  |                  |        |
| TVR07241-D          | TVR07241KSW | 240(216~264)                | 150                     | 200                  | 395             | 10                             | 1800           | 0.25                        | 25          | 195                     | 2.3                         | 4.2              | 1.6 |                       |   |                |                  |                  |        |
| TVR07271-D          | TVR07271KSW | 270 (243~297)               | 175                     | 225                  | 455             | 10                             | 1800           | 0.25                        | 28          | 175                     | 2.4                         | 4.4              | 1.7 |                       |   |                |                  |                  |        |
| TVR07301-D          | TVR07301KSW | 300 (270~330)               | 195                     | 250                  | 500             | 10                             | 1800           | 0.25                        | 32          | 155                     | 2.7                         | 4.4              | 1.9 |                       |   |                |                  |                  |        |
| TVR07331-D          | TVR07331KSW | 330 (297~363)               | 215                     | 275                  | 550             | 10                             | 1800           | 0.25                        | 34          | 140                     | 2.8                         | 4.5              | 2.0 |                       |   |                |                  |                  |        |
| TVR07361-D          | TVR07361KSW | 360 (324~396)               | 230                     | 300                  | 595             | 10                             | 1800           | 0.25                        | 37          | 130                     | 2.9                         | 4.6              | 2.1 |                       |   |                |                  |                  |        |
| TVR07391-D          | TVR07391KSW | 390 (351~429)               | 250                     | 320                  | 650             | 10                             | 1800           | 0.25                        | 40          | 120                     | 3.1                         | 4.8              | 2.3 |                       |   |                |                  |                  |        |
| TVR07431-D          | TVR07431KSW | 430 (387~473)               | 275                     | 350                  | 710             | 10                             | 1800           | 0.25                        | 46          | 100                     | 3.0                         | 5.1              | 2.3 |                       |   |                |                  |                  |        |
| TVR07471-D          | TVR07471KSW | 470 (423~517)               | 300                     | 385                  | 775             | 10                             | 1800           | 0.25                        | 49          | 90                      | 3.2                         | 5.2              | 2.4 |                       |   |                |                  |                  |        |
| TVR07511-D          | TVR07511KSW | 510 (459~561)               | 320                     | 410                  | 845             | 10                             | 1800           | 0.25                        | 54          | 85                      | 3.4                         | 5.4              | 2.6 |                       |   |                |                  |                  |        |
| TVR07561-D          | TVR07561KSW | 560 (504~616)               | 350                     | 450                  | 930             | 10                             | 1800           | 0.25                        | 55          | 80                      | 3.6                         | 5.5              | 2.8 |                       |   |                |                  |                  |        |
| TVR07621-D          | TVR07621KSW | 620 (558~682)               | 395                     | 510                  | 1020            | 10                             | 1800           | 0.25                        | 59          | 80                      | 3.9                         | 5.9              | 3.0 |                       |   |                |                  |                  |        |
| TVR07681-D          | TVR07681KSW | 680 (612~748)               | 420                     | 560                  | 1120            | 10                             | 1800           | 0.25                        | 62          | 75                      | 4.1                         | 6.2              | 3.2 |                       |   |                |                  |                  |        |
| TVR07751-D          | TVR07751KSW | 750 (675~825)               | 465                     | 615                  | 1235            | 10                             | 1800           | 0.25                        | 66          | 70                      | 4.4                         | 6.4              | 3.5 |                       |   |                |                  |                  |        |
| TVR07821-D          | TVR07821KSW | 820 (738~902)               | 510                     | 670                  | 1355            | 10                             | 1800           | 0.25                        | 71          | 65                      | 4.5                         | 6.4              | 3.2 |                       |   |                |                  |                  |        |







































