

## Miniature High Power Relay

THK

### Features

- Low height: 15.7mm
- 16A switching capability
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 10mm
- Meeting reinforce insulation
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F
- Through-Hole Reflow Version available
- Plastic sealed Type
- Socket available



cULus  
(File No.:E134581)

TV-8

## 1. COIL DATA (at 23°C)

### 1) Standard type

| Nominal Voltage (VDC) | Pick-up Voltage(VDC) <sup>1)</sup> | Drop-out Voltage(VDC) <sup>1)</sup> | Max. Allowable Voltage(VDC) <sup>2)</sup> | Coil Current (mA)(±10%) | Coil Resistance (Ω) | Coil Power (mW) |
|-----------------------|------------------------------------|-------------------------------------|---|-------------------------|---------------------|-----------------|
| 5                     | 3.50                               | 0.5                                 | 7.5                                       | 80.0                    | 62 x (1±10%)        | Approx.<br>400  |
| 6                     | 4.20                               | 0.6                                 | 9.0                                       | 66.7                    | 90 x (1±10%)        |                 |
| 9                     | 6.30                               | 0.9                                 | 13.5                                      | 44.4                    | 202 x (1±10%)       |                 |
| 12                    | 8.40                               | 1.2                                 | 18  | 33.3                    | 360 x (1±10%)       |                 |
| 18                    | 12.6                               | 1.8                                 | 27  | 22.2                    | 810 x (1±10%)       |                 |
| 24                    | 16.8                               | 2.4                                 | 36  | 16.7                    | 1440 x (1±10%)      |                 |
| 48                    | 33.6                               | 4.8                                 | 72  | 8.33                    | 5760 x (1±15%)      |                 |

### 2) High power consumption type

| Nominal Voltage (VDC) | Pick-up Voltage(VDC) <sup>1)</sup> | Drop-out Voltage(VDC) <sup>1)</sup> | Max. Allowable Voltage(VDC) <sup>2)</sup> | Coil Current (mA)(±10%) | Coil Resistance (Ω) | Coil Power (mW) |
|-----------------------|------------------------------------|-------------------------------------|---|-------------------------|---------------------|-----------------|
| 5                     | 3.50                               | 0.5                                 | 7.5                                       | 106                     | 47 x (1±10%)        | Approx.<br>530  |
| 6                     | 4.20                               | 0.6                                 | 9.0                                       | 88.3                    | 68 x (1±10%)        |                 |
| 9                     | 6.30                               | 0.9                                 | 13.5                                      | 58.9                    | 153 x (1±10%)       |                 |
| 12                    | 8.40                               | 1.2                                 | 18  | 44.2                    | 271 x (1±10%)       |                 |
| 18                    | 12.6                               | 1.8                                 | 27  | 29.4                    | 611 x (1±10%)       |                 |
| 24                    | 16.8                               | 2.4                                 | 36  | 22.1                    | 1086 x (1±10%)      |                 |
| 48                    | 33.6                               | 4.8                                 | 72  | 11.0                    | 4347 x (1±15%)      |                 |

Notes: 1) The data shown above are initial values.

2) The maximum allowable voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## 2. CONTACT DATA

|                                  |                           |                       |            |
|----------------------------------|---------------------------|-----------------------|------------|
| Contact Arrangement              | 1A, 1C                    |                       | 2A, 2C     |
| Contact Resistance <sup>1)</sup> | 100mΩ max. (at 1A 6VDC)   |                       |            |
| Contact Material                 | AgSnO <sub>2</sub> , AgNi |                       |            |
| Contact Ratings (Resistive load) | 12A 250VAC                | 16A 250VAC            | 8A 250VAC* |
| Max. Switching Voltage           | 400VAC                    |                       |            |
| Max. Switching Current           | 12A                       | 16A                   | 8A         |
| Max. Switching Power             | 3000VA                    | 4000VA                | 2000VA     |
| Life Expectancy                  | Electrical                | 100,000 operations    |            |
|                                  | Mechanical                | 10,000,000 operations |            |

**Notes:** 1) The data shown above are initial values.

## 3. CHARACTERISTICS

|   |                   |                      |
|---|-------------------|----------------------|
| Insulation Resistance                     |                   | 1000MΩ (at 500VDC)   |
| Dielectric Strength                       | Open Contacts     | 1000VAC 1min         |
|   | Coil and Contacts | 5000VAC 1min         |
|   | Contact Sets      | 2500VAC 1min         |
| Surge voltage (between coil and contacts) |                   | 10kV (1.2 x 50μs)    |
| Operate Time (at nominal voltage)         |                   | 10ms max.            |
| Release Time (at nominal voltage)         |                   | 5ms max.             |
| Temperature Range                         |                   | -40 °C ~ 85 °C       |
| Shock Resistance*                         | Functional        | 98m/s <sup>2</sup>   |
|   | Destructive       | 980m/s <sup>2</sup>  |
| Vibration Resistance*                     |                   | 10 ~ 150Hz 10g/5g    |
| Humidity                                  |                   | 5 ~ 85% RH           |
| Termination                               |                   | PCB                  |
| Weight                                    |                   | Approx. 13g          |
| Outline Dimension (L x W x H)             |                   | 29.0 x 12.7 x 15.7mm |

**Notes:** 1) The data shown above are initial values.

2) \*Index is not in relay length direction.

#### 4. ORDERING INFORMATION

| THK                     | 1  | - | H | 12 | S | H | T | (XX) |
|-------------------------|--|---|---|----|---|---|---|------|
| ①                       | ②  |   | ③ | ④  | ⑤ | ⑥ | ⑦ | ⑧    |
| ① Relay Model           | THK  |   |   |    |   |   |   |      |
| ② Contact Arrangement   | 11: 1 Form A (SPST-NO)<br>1: 1 Form C (SPDT)<br>22: 2 Form A (DPST-NO)<br>2: 2 Form C (DPDT)                                       |   |   |    |   |   |   |      |
| ③ Contact Current       | Nil: 8A (5.0mm pinning, 2poles)<br>E: 16A (5.0mm pinning, 1pole)<br>H: 12A (3.5mm pinning, 1pole)<br>Q: 12A (5.0mm pinning, 1pole) |   |   |    |   |   |   |      |
| ④ Coil Voltage          | 5=5VDC, 6=6VDC, 9=9VDC, 12=12VDC, 18=18VDC, 24=24VDC, 48=48VDC   |   |   |    |   |   |   |      |
| ⑤ Construction          | Nil: Flux proofed<br>S: Sealed Type (Only applicable to 1pole)   |   |   |    |   |   |   |      |
| ⑥ Coil Type             | Nil: Standard<br>H: High power consumption type  |   |   |    |   |   |   |      |
| ⑦ Contact Material      | Nil: AgNi<br>T: AgSnO <sub>2</sub>   |   |   |    |   |   |   |      |
| ⑧ Customer Special Code | (XX): May be followed by additional letters or numbers<br>(Does not affect the construction)                                       |   |   |    |   |   |   |      |

#### Notes:

- 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust etc.).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

#### 5. SAFETY APPROVAL

##### 1) Standard type

|        |                    |           |                   |
|--------|--------------------|-----------|-------------------|
| UL/cUL | AgSnO <sub>2</sub> | THK1-H**T | 12A 250VAC at 85℃ |
|        |                    | THK1-Q**T | 12A 250VAC at 85℃ |
|        |                    | THK1-E**T | 16A 250VAC at 85℃ |
|        |                    | THK2-**T  | 8A 250VAC at 85℃  |
|        | AgNi               | THK1-H**  | 12A 250VAC at 85℃ |
|        |                    | THK1-Q**  | 12A 250VAC at 85℃ |
|        |                    | THK1-E**  | 16A 250VAC at 85℃ |
|        |                    | THK2-**   | 8A 250VAC at 85℃  |

## 2) High power consumption type

|        |                    |            |   |
|--------|--------------------|------------|---|
| UL/cUL | AgSnO <sub>2</sub> | THK1-H**HT | 12A 277VAC at 85℃<br>16A 277VAC room temperature<br>TV8 NO room temperature |
|        |                    | THK1-Q**HT | 12A 277VAC at 85℃<br>6A 277VAC room temperature<br>TV8 NO room temperature  |
|        |                    | THK1-E**HT | 16A 277VAC at 85℃<br>TV8 NO room temperature                                |
|        |                    | THK2-**HT  | 8A 250VAC at 85℃  |

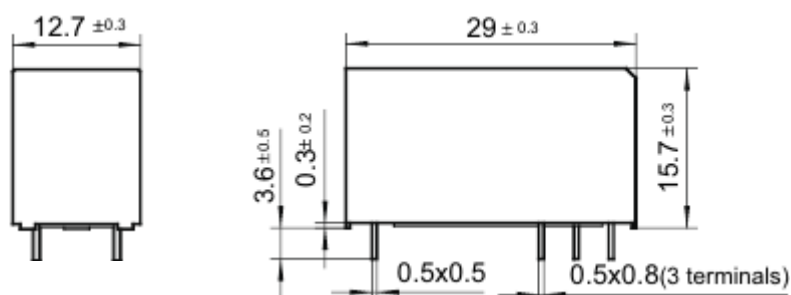
**Notes:** 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

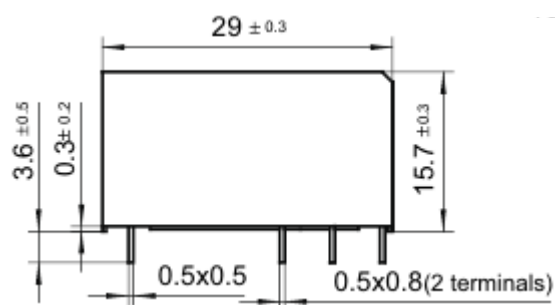
## 6. DIMENSIONS (Unit: mm)

### Outline Dimensions

#### 3.5mm pinning (1pole, 12A)



#### 5mm pinning (1pole 12A, 1pole 16A, 2pole 8A)

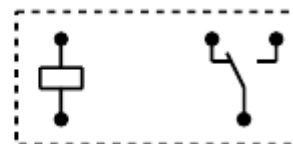


Wiring Diagram (Bottom View)

3.5/5mm pinning (1pole, 12A)

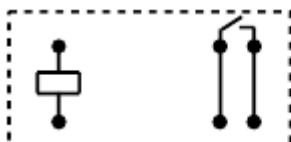


1 Form A

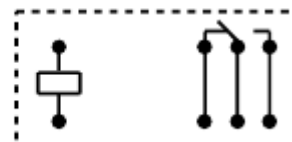


1 Form C

5mm pinning (1pole, 16A)

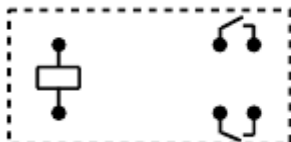


1 Form A

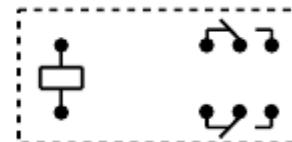


1 Form C

5mm pinning (2pole, 8A)



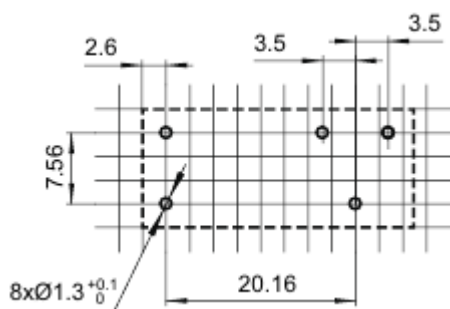
2 Form A



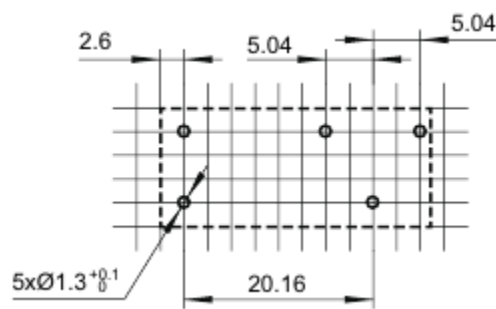
2 Form C

PCB Layout (Bottom view)

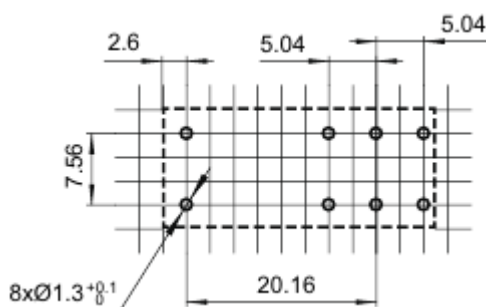
3.5mm 1Pole 12A



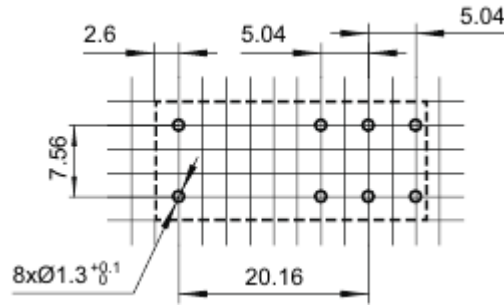
5mm 1Pole 12A



5mm 1Pole 16A



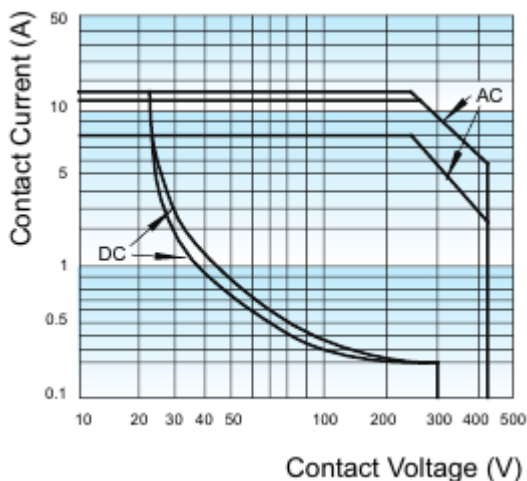
5mm 2Pole 8A



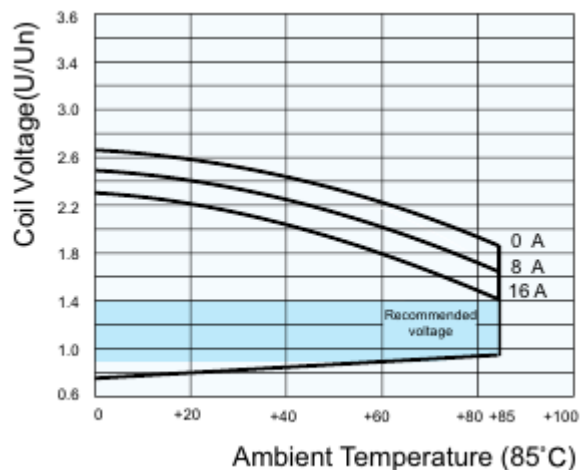
- Remark:** 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .
- 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$
- 3) The width of the gridding is  $2.52\text{mm}$ .

## 7. CHARACTERISTIC CURVES

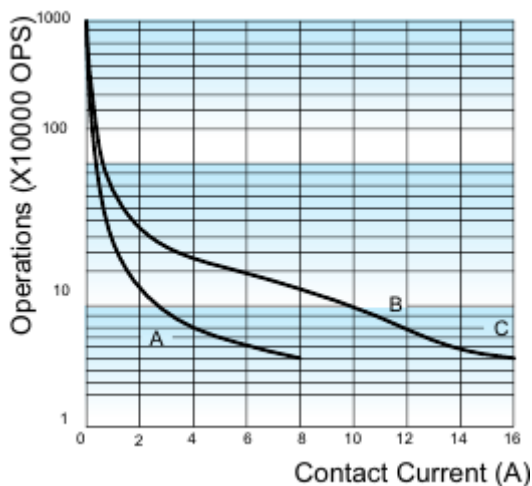
Maximum Switching Power



Coil Operating Range\*



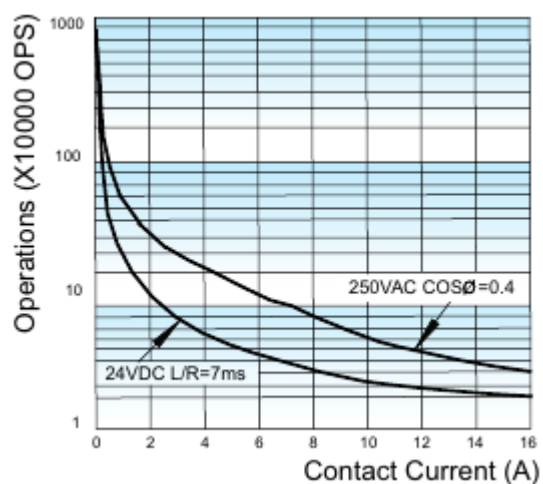
Endurance Curve (Resistive)



**Note:**

1. Curve A: THK2-\*\*T
2. Curve B: THK1-Q\*\*T
3. Curve C: THK1-E\*\*T

Endurance Curve (Inductive)



**Note:**

Curve: THK11-E\*\*T

**Note: \*Coil Operating Range**

The use of a relay with an energizing voltage other than the rated coil voltage may lead to reduced electrical life.

An energizing voltage over the above range may damage the insulation of relay coil.