

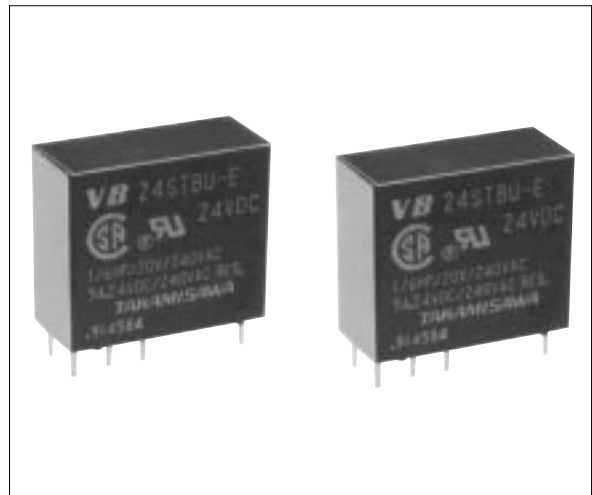
# POWER RELAY

## 2 POLE—5 A (MEDIUM LOAD CONTROL)

### VB SERIES

#### ■ FEATURES

- UL, CSA, VDE, SEV, SEMKO, FIMKO, IMQ recognized TV-3 rated
- Working class: C
- UL class B (130°C) insulation
- Type of service: continuous duty
- Heavy duty miniature slim type power relay
- High isolation in small package
  - Insulation distance: 8 mm
  - Dielectric strength: 5,000 VAC (between coil and contacts)
  - Surge strength: 10,000 V
- Standard and high sensitivity types available
- Flux free type and plastic sealed type available



#### ■ ORDERING INFORMATION

[Example]  $\frac{VB}{(a)}$  -  $\frac{12}{(*)}$   $\frac{S}{(b)}$   $\frac{M}{(c)}$   $\frac{B}{(d)}$   $\frac{U}{(e)}$  -  $\frac{5}{(*)}$   $\frac{5}{(g)}$

|     |                     |   |
|-----|---------------------|---|
| (a) | Series Name         | VB: VB Series   |
| (b) | Nominal Voltage     | Refer to the COIL DATA CHART  |
| (c) | Coil Type           | Nil : Standard type<br>S : High sensitive type (non TV-rating)  |
| (d) | Contact Arrangement | M : 2 form A (DPST-NO)<br>T : 2 form C (DPDT)   |
| (e) | Enclosure           | B : Flux free type<br>C : Plastic sealed type (with tape)<br>K : Plastic sealed type  |
| (f) | Standard            | Nil : TV-rating<br>U : General (non TV-rating)  |
| (g) | Contact Material    | Nil : Silver cadmium oxide (TV-3 rating)<br>5 : Silver cadmium oxide (non TV-rating)<br>Nil : Gold overlay silver-nickel (non TV-rating)<br>E : Silver-nickel (non TV-rating) |

Actual marking omits the hyphen (-) of (\*)

**■ SAFETY STANDARD AND FILE NUMBERS**

UL508, 873 (File No. E56140, E108658)

C 22.2 No. 1, No. 14 (File No. LR35579)

VDE0435, 0630, 0631, 0700, 0860 (File No. 11039-4940-1009)

Please note that UL/CSA ratings may differ from the standard ratings. Please request when the approval markings are required on the cover and/or when a relay recognized by VDE, SEV, SEMKO, FIMKO, IMQ is required.

|           | Type                                   | Nominal voltage | Contact rating  |
|-----------|--|-----------------|---|
| TV-Rating | VB-( ) M                               | 3 to 100 VDC    | TV-3 120 VAC<br>1/6HP 120 VAC/240 VAC<br>5 A 24 VDC/240 VAC resistive<br>1.9A 250VAC inductive (PF=0.4)<br>Pilot duty C 150 |
| Standard  | VB-( ) ( ) U-( )<br>VB-( ) S ( ) U-( ) | 3 to 100 VDC    | 1/6HP 120 VAC/240 VAC<br>5 A 24 VDC/240 VAC resistive<br>1.9A 250VAC inductive (PF=0.4)<br>Pilot duty C 150                 |

**■ SPECIFICATIONS**

| Item             |  | TV-3 Rating<br>VB-( ) M   | Standard Type  |                      |
|------------------|--|---|--|----------------------|
|                  |  |   | VB-( ) U-5   | VB-( ) U<br>VB-( )-E |
| Contact          | Arrangement                            | 2 form A (DPST-NO)  | 2 form A (DPST-NO) or 2 form C (DPDT)                                      |                      |
|                  | Material                               | Silver-cadmium oxide  | Gold overlay<br>silver-nickel<br>(non gold overlay<br>only VB-E)           |                      |
|                  | Style                                  | Single  |  |                      |
|                  | Resistance (initial)<br>(at 1 A 6 VDC) | Maximum 200 mΩ  | Maximum 100 mΩ   |                      |
|                  | Rating (resistive)                     | 5 A 240 VAC/24 VDC  |  |                      |
|                  | Maximum Carrying Current               | 7 A   |  |                      |
|                  | Maximum Switching Power                | 1,200 VA, 120 W   |  |                      |
|                  | Maximum Switching Voltage              | 380 VAC, 150 VDC  |  |                      |
|                  | Maximum Switching Current              | 5 A   |  |                      |
|                  | Minimum Switching Load *1              | 100 mA 5 VDC (VB-M, 5, E) 10 mA 5 VDC (VB-)                                     |  |                      |
|                  | Maximum Inrush Current                 | 51 A 120 VAC (at lamp load)   | —  |                      |
| Coil             | Nominal Power (at 20°C)                | Standard type: 0.70 to 0.75 W, high sensitivity type: 0.53 W                    |  |                      |
|                  | Operate Power (at 20°C)                | Standard type: 0.35 to 0.37 W, high sensitivity type: 0.26 W                    |  |                      |
|                  | Operating Temperature                  | Standard type: -40°C to +65°C, high sensitivity type: -40°C to +75°C (no frost) |  |                      |
| Time Value       | Operate (at nominal voltage)           | Maximum 15 ms   |  |                      |
|                  | Release (at nominal voltage)           | Maximum 10 ms   |  |                      |
| Insulation       | Resistance (at 500 VDC)                | Minimum 1,000 MΩ  |  |                      |
|                  | Dielectric Strength                    | between open contacts   | 1,000 VAC 1 minute (3000 VAC between adjacent contacts)                    |                      |
|                  |  | between coil and contacts*2   | 5,000 VAC 1 minute   |                      |
| Surge Strength*3 | 10,000 V at(1.2 × 50 μs)               |   |  |                      |
| Life             | Mechanical                             | 2 × 10 <sup>7</sup> operations minimum  |  |                      |
|                  | Electrical                             | 1 × 10 <sup>5</sup> operations minimum at rated load                            |  |                      |
|                  |  | 5 × 10 <sup>4</sup> operations<br>minimum at motor load<br>(1/8HP 120 VAC)      | 3 × 10 <sup>4</sup> operations minimum<br>at motor load<br>(1/8HP 120 VAC) |                      |
|                  |  | 5 × 10 <sup>4</sup> operations<br>minimum at lamp load                          | —  |                      |
| Other            | Vibration Resistance                   | Misoperation  | 10 to 55 Hz (double amplitude of 1.5 mm)                                   |                      |
|                  |  | Endurance   | 10 to 55 Hz (double amplitude of 1.5 mm)                                   |                      |
|                  | Shock Resistance                       | Misoperation  | 100 m/s <sup>2</sup> (11 ± 1 ms)   |                      |
|                  |  | Endurance   | 1,000 m/s <sup>2</sup> (6 ± 1 ms)  |                      |
|                  | Weight                                 | Approximately 17 g  |  |                      |

\*1 Minimum switching loads mentioned above are reference values. Please perform the confirmation test with the actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

\*2 IMQ 

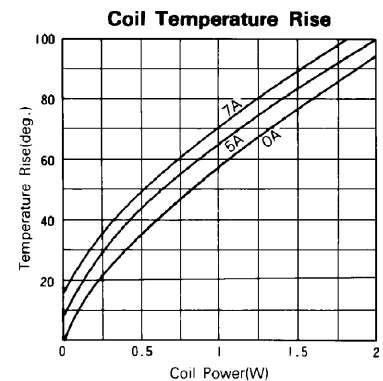
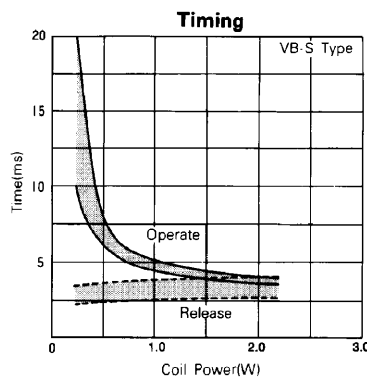
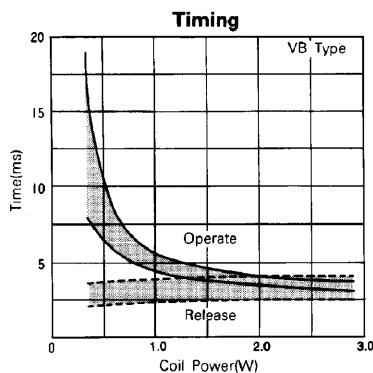
\*3 IMQ 

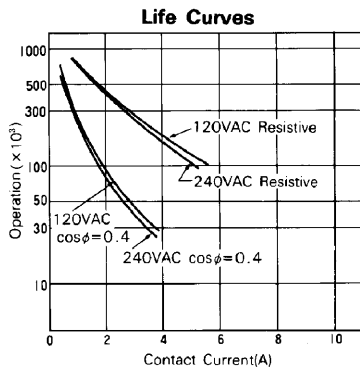
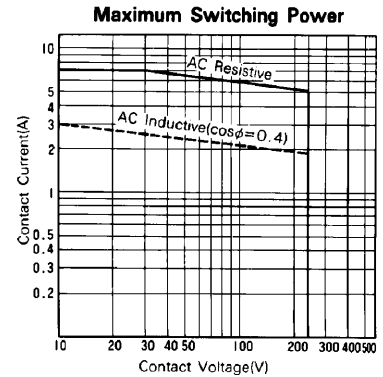
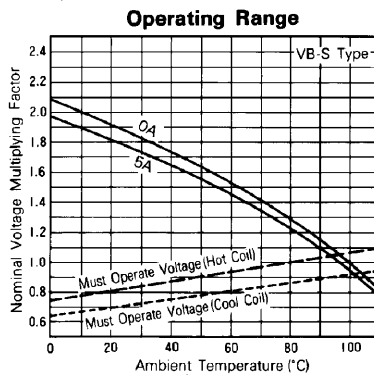
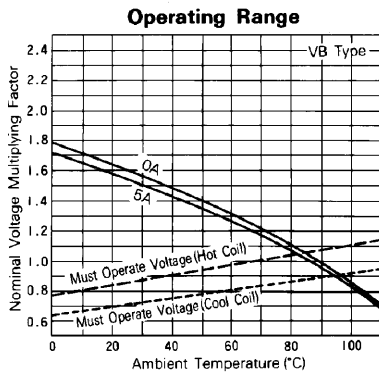
## COIL DATA CHART

| MODEL                 |                       | Nominal voltage      | Coil resistance (10%) | Must operate voltage | Must release voltage | Nominal power |        |
|-----------------------|-----------------------|----------------------|-----------------------|----------------------|----------------------|---------------|--------|
| TV-3 Rating           | Standard              |                      |                       |                      |                      |               |        |
| Standard Type         | VB- 3M ( )            | VB- 3 ( ) ( ) U-( )  | 3 V DC                | 12.5 Ω               | 2.1 VDC              | 0.3 VDC       | 0.72 W |
|                       | VB- 5M ( )            | VB- 5 ( ) ( ) U-( )  | 5 V DC                | 36 Ω                 | 3.5 VDC              | 0.5 VDC       | 0.70 W |
|                       | VB- 6M ( )            | VB- 6 ( ) ( ) U-( )  | 6 V DC                | 50 Ω                 | 4.2 VDC              | 0.6 VDC       | 0.72 W |
|                       | VB- 9M ( )            | VB- 9 ( ) ( ) U-( )  | 9 V DC                | 115 Ω                | 6.3 VDC              | 0.9 VDC       | 0.70 W |
|                       | VB- 12M ( )           | VB- 12 ( ) ( ) U-( ) | 12 V DC               | 200 Ω                | 8.4 VDC              | 1.2 VDC       | 0.72 W |
|                       | VB- 14M ( )           | VB- 14 ( ) ( ) U-( ) | 14 V DC               | 280 Ω                | 9.8 VDC              | 1.4 VDC       | 0.70 W |
|                       | VB- 18M ( )           | VB- 18 ( ) ( ) U-( ) | 18 V DC               | 460 Ω                | 12.6 VDC             | 1.8 VDC       | 0.70 W |
|                       | VB- 24M ( )           | VB- 24 ( ) ( ) U-( ) | 24 V DC               | 820 Ω                | 16.8 VDC             | 2.4 VDC       | 0.70 W |
|                       | VB- 36M ( )           | VB- 36 ( ) ( ) U-( ) | 36 V DC               | 1,850 Ω              | 25.2 VDC             | 3.6 VDC       | 0.70 W |
|                       | VB- 48M ( )           | VB- 48 ( ) ( ) U-( ) | 48 V DC               | 3,300 Ω              | 33.6 VDC             | 4.8 VDC       | 0.70 W |
|                       | VB- 60M ( )           | VB- 60 ( ) ( ) U-( ) | 60 V DC               | 5,100 Ω              | 42.0 VDC             | 6.0 VDC       | 0.70 W |
|                       | VB-100M ( )           | VB-100 ( ) ( ) U-( ) | 100 V DC              | 13,400 Ω             | 70.0 VDC             | 10.0 VDC      | 0.75 W |
| High Sensitivity Type | VB- 3S ( ) ( ) U-( )  | 3 V DC               | 17 Ω                  | 2.1 VDC              | 0.3 VDC              | 0.53 W        |        |
|                       | VB- 5S ( ) ( ) U-( )  | 5 V DC               | 47 Ω                  | 3.5 VDC              | 0.5 VDC              | 0.53 W        |        |
|                       | VB- 6S ( ) ( ) U-( )  | 6 V DC               | 68 Ω                  | 4.2 VDC              | 0.6 VDC              | 0.53 W        |        |
|                       | VB- 9S ( ) ( ) U-( )  | 9 V DC               | 155 Ω                 | 6.3 VDC              | 0.9 VDC              | 0.53 W        |        |
|                       | VB-12S ( ) ( ) U-( )  | 12 V DC              | 270 Ω                 | 8.4 VDC              | 1.2 VDC              | 0.53 W        |        |
|                       | VB-14S ( ) ( ) U-( )  | 14 V DC              | 370 Ω                 | 9.8 VDC              | 1.4 VDC              | 0.53 W        |        |
|                       | VB-18S ( ) ( ) U-( )  | 18 V DC              | 610 Ω                 | 12.6 VDC             | 1.8 VDC              | 0.53 W        |        |
|                       | VB-24S ( ) ( ) U-( )  | 24 V DC              | 1,100 Ω               | 16.8 VDC             | 2.4 VDC              | 0.53 W        |        |
|                       | VB-36S ( ) ( ) U-( )  | 36 V DC              | 2,450 Ω               | 25.2 VDC             | 3.6 VDC              | 0.53 W        |        |
|                       | VB-48S ( ) ( ) U-( )  | 48 V DC              | 4,400 Ω               | 33.6 VDC             | 4.8 VDC              | 0.53 W        |        |
|                       | VB-60S ( ) ( ) U-( )  | 60 V DC              | 6,800 Ω               | 42.0 VDC             | 6.0 VDC              | 0.53 W        |        |
|                       | VB-100S ( ) ( ) U-( ) | 100 V DC             | 18,860 Ω              | 70.0 VDC             | 10.0 VDC             | 0.53 W        |        |

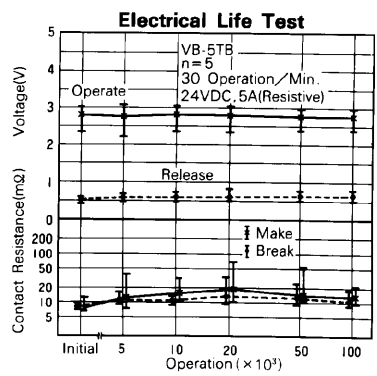
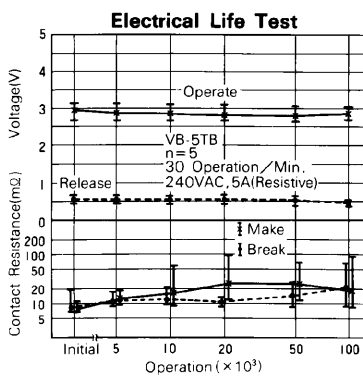
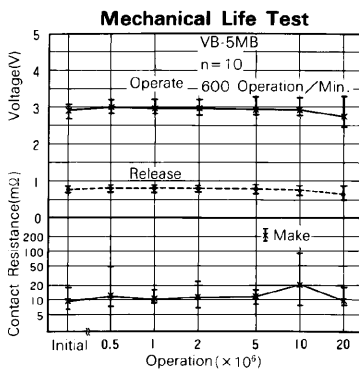
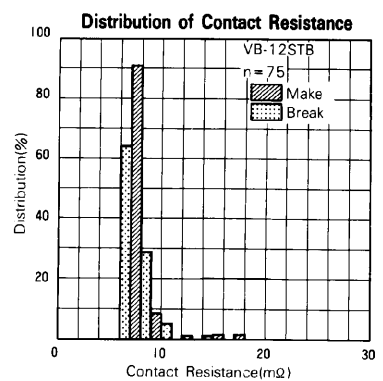
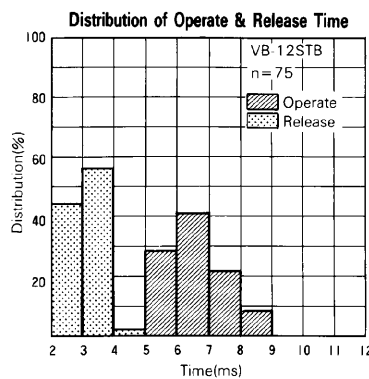
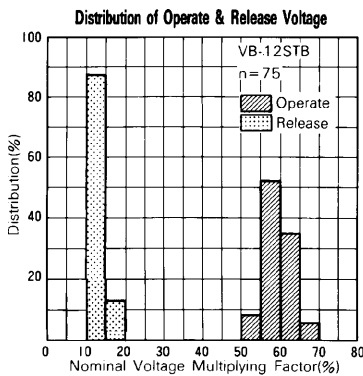
Note: All values in the table are measured at 20 °C.

## CHARACTERISTIC DATA





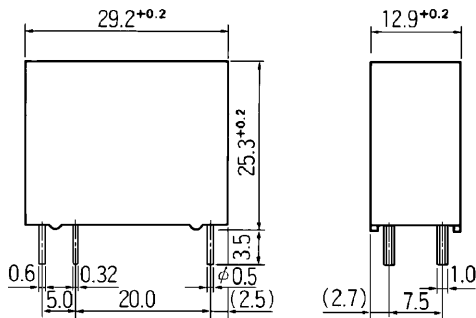
## REFERENCE DATA



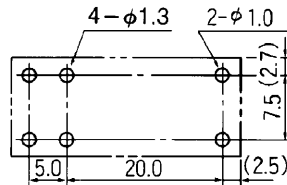
## ■ DIMENSIONS

### ● Dimensions

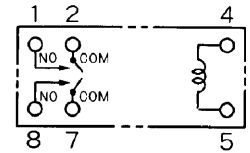
VB-M type



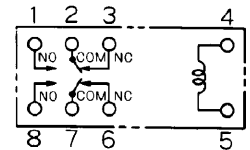
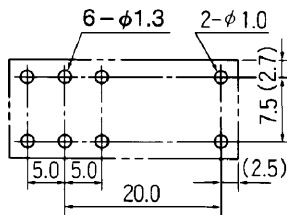
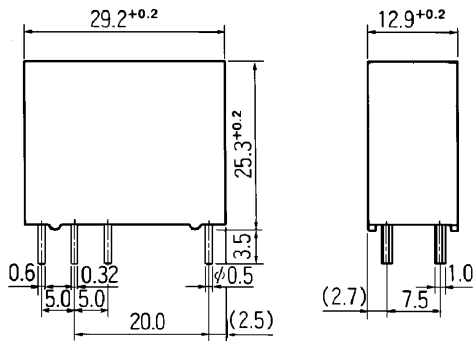
### ● Schematics (BOTTOM VIEW)



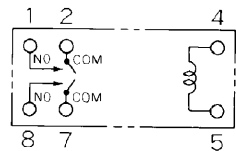
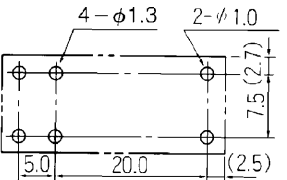
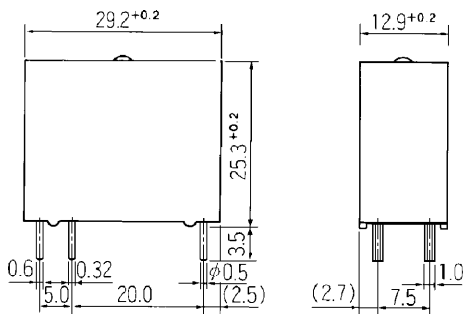
### ● PC board mounting hole layout (BOTTOM VIEW)



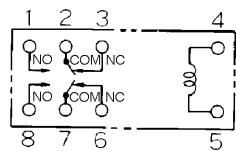
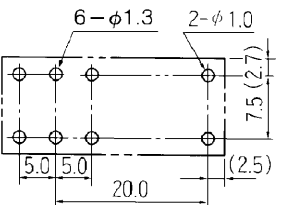
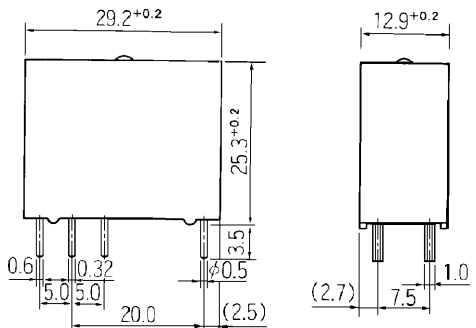
VB type



VB-MK type (Plastic sealed type)

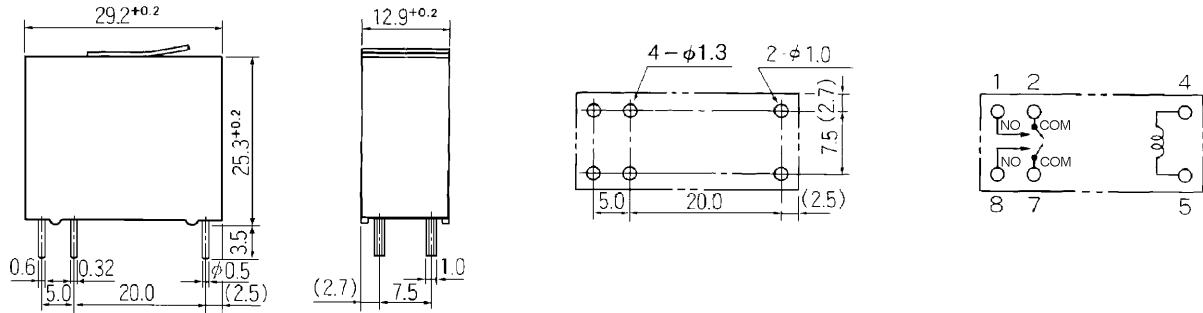


VB-K type (Plastic sealed type)

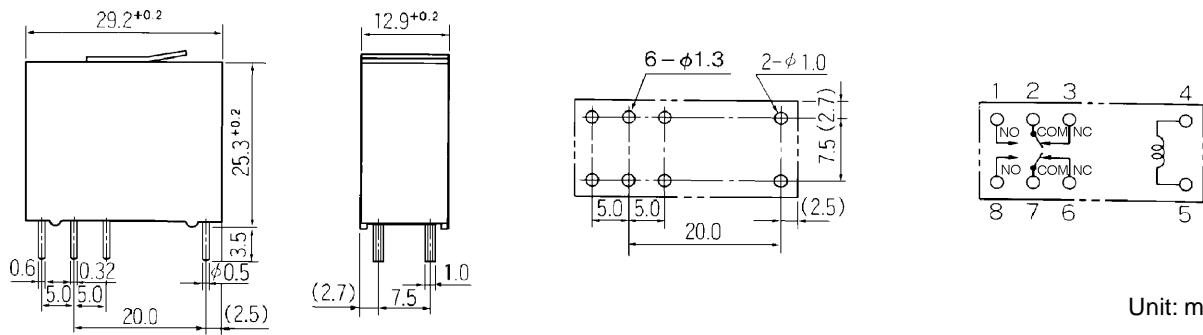


Unit: mm

### VB-MC type (Plastic sealed type with tape)



### VB-C type (Plastic sealed type with tape)



Unit: mm

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