

mm inch

### FEATURES

- **High sensitivity:**  
2 Form C: 140 mW power consumption (single side stable type)  
4 Form C: 280 mW power consumption (single side stable type)
- **Surge voltage withstand: 1500 V FCC Part 68**
- **Sealed construction allows automatic washing**
- **Self-clinching terminal also available**
- **M.B.B. contact types available**

### SPECIFICATIONS

#### Contact

		Standard (B.B.M) type		M.B.B.type	
Arrangement		2 Form C	4 Form C	2 Form D	
Initial contact resistance, max. (By voltage drop 6 V DC 1A)		50 mΩ			
Contact material		Gold-clad silver			
Rating	Nominal switching capacity (resistive load)	1 A 30 V DC 0.5 A 125 V AC	1 A 30 V DC		
	Max. switching power (resistive load)	30 W, 62.5 V A	30 W		
	Max. switching voltage	110 V DC, 125 V AC	110 V DC		
	Max. switching current	1 A			
	Min. switching capacity *1	10 μA 10 mV DC			
Nominal operating power	Single side stable	140 mW (3 to 12 V DC) 200 mW (24 V DC) 300 mW (48 V DC)	280 mW (3 to 24 V DC) 400 mW (48 V DC)	200 mW	
	1 coil latching	100 mW (3 to 12 V DC) 150 mW (24 V DC)	200 mW	—	
	2 coil latching	200 mW (3 to 12 V DC) 300 mW (24 V DC)	400 mW	—	
	Mechanical (at 180 cpm)	10 <sup>8</sup>		10 <sup>7</sup>	
	Expected life (min. operations)	Electrical (at 20 cpm) (1 A 30 V DC resistive)	2×10 <sup>5</sup>		10 <sup>5</sup>
		(0.5 A 125 V AC resistive)	10 <sup>5</sup>		—

#### Note:

\*1 This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load. (SX relays are available for low level load switching [10 μA 1 mV DC – 10 mA 10 V DC])

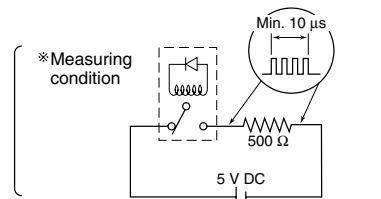
#### Remarks

- \* Specifications will vary with foreign standards certification ratings.
- \*1 Measurement at same location as "Initial breakdown voltage" section.
- \*2 By resistive method, nominal voltage applied to the coil; contact carrying current: 1 A.
- \*3 Nominal voltage applied to the coil, excluding contact bounce time.
- \*4 Nominal voltage applied to the coil, excluding contact bounce time without diode.
- \*5 Half-wave pulse of sine wave: 11 ms; detection time: 10 μs.
- \*6 Half-wave pulse of sine wave: 6 ms.
- \*7 Detection time: 10 μs.

#### Characteristics

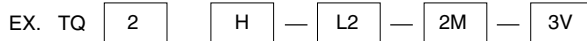
		Standard (B.B.M) type	M.B.B.type
Initial insulation resistance*1		Min. 1,000 MΩ (at 500 V DC)	
Initial breakdown voltage	Between open contacts	750 Vrms for 1 min. (Detection current: 10 mA)	300 Vrms for 1 min. (Detection current: 10 mA)
	Between contact and coil	1,000 Vrms for 1 min. (Detection current: 10 mA)	
	Between contact sets	1,000 Vrms for 1 min. (Detection current: 10 mA)	
FCC surge voltage between open contacts		1,500 V	
Operate time [Set time]*3 (at 20°C)		Max. 3 ms (Approx. 2 ms) [Max. 3 ms (Approx. 2 ms)]	
Release time [Reset time]*4 (at 20°C)		Max. 3 ms (Approx. 1 ms) [Max. 3 ms (Approx. 2 ms)]	
M.B.B. time*8		—	Min. 10 μs.
Temperature rise*2 (at 20°C)		Max. 50°C	
Shock resistance	Functional*5	Min. 490 m/s <sup>2</sup> {50G}	
	Destructive*6	Min. 980 m/s <sup>2</sup> {100G}	
Vibration resistance	Functional*7	176.4 m/s <sup>2</sup> {18G}, 10 to 55 Hz at double amplitude of 3 mm	
	Destructive	294 m/s <sup>2</sup> {30G}, 10 to 55 Hz at double amplitude of 5 mm	
Conditions for operation, transport and storage*9 (Not freezing and condensing at low temperature)	Ambient temperature	-40°C to +70°C -40°F to +158°F	-40°C to +50°C -40°F to +122°F
	Humidity	5 to 85% R.H.	
Unit weight	2 Form C:	Approx. 1.5 g .053 oz	
	4 Form C:	Approx. 3 g .106 oz.	—

\*8 M.B.B. time:



\*9 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT

**ORDERING INFORMATION**



Contact arrangement	Terminal shape	Operating function	MBB function	Coil voltage (DC)
2: 2 Form C 4: 4 Form C	Nil: Standard PC board terminal H: Self-clinching terminal	Nil: Single side stable L: 1 coil latching L2: 2 coil latching	Nil: Standard (B.B.M.) type 2M: 2M.B.B. type	3, 4.5, 5, 6, 9, 12, 24, 48* V

\*48 V coil type: Single side stable only

Notes: 1. AgPd stationary contact types available for high resistance against contact sticking.

When ordering, please add suffix “-3” like TQ2-12V-3.

2. M.B.B. contact types are available only for TQ2 type.

**TYPES AND COIL DATA (at 20°C 68°F)**

**1. Standard (B.B.M.) type**

**2 Form C type**

**1. Single side stable**

Part No.		Nominal voltage, V DC	Pick-up voltage, V DC (max.)	Drop-out voltage, V DC (min.)	Nominal operating current, mA (±10%)	Coil resistance, Ω (±10%)	Nominal operating power, mW	Max. allowable voltage, V DC
Standard PC board terminal	Self-clinching terminal							
TQ2-3 V	TQ2H-3 V	3	2.25	0.3	46.7	64.3	140	4.5
TQ2-4.5 V	TQ2H-4.5 V	4.5	3.38	0.45	31.1	144.6	140	6.7
TQ2-5 V	TQ2H-5 V	5	3.75	0.5	28.1	178	140	7.5
TQ2-6 V	TQ2H-6 V	6	4.5	0.6	23.3	257	140	9
TQ2-9 V	TQ2H-9 V	9	6.75	0.9	15.5	579	140	13.5
TQ2-12 V	TQ2H-12 V	12	9	1.2	11.7	1,028	140	18
TQ2-24 V	TQ2H-24 V	24	18	2.4	8.3	2,880	200	36
TQ2-48 V	TQ2H-48 V	48	36	4.8	6.25	7,680	300	57.6

**2. 1 Coil latching**

Part No.		Nominal voltage, V DC	Set voltage, V DC (max.)	Reset voltage, V DC (min.)	Nominal operating current, mA (±10%)	Coil resistance, Ω (±10%)	Nominal operating power, mW	Max. allowable voltage, V DC
Standard PC board terminal	Self-clinching terminal							
TQ2-L-3 V	TQ2H-L-3 V	3	2.25	2.25	33.3	90	100	4.5
TQ2-L-4.5 V	TQ2H-L-4.5 V	4.5	3.38	3.38	22.2	202.5	100	6.7
TQ2-L-5 V	TQ2H-L-5 V	5	3.75	3.75	20	250	100	7.5
TQ2-L-6 V	TQ2H-L-6 V	6	4.5	4.5	16.7	360	100	9
TQ2-L-9 V	TQ2H-L-9 V	9	6.75	6.75	11.1	810	100	13.5
TQ2-L-12 V	TQ2H-L-12 V	12	9	9	8.3	1,440	100	18
TQ2-L-24 V	TQ2H-L-24 V	24	18	18	6.3	3,840	150	36

**3. 2 Coil latching**

Part No.		Nominal voltage, V DC	Set voltage, V DC (max.)	Reset voltage, V DC (min.)	Nominal operating current, mA (±10%)	Coil resistance, Ω (±10%)	Nominal operating power, mW	Max. allowable voltage, V DC
Standard PC board terminal	Self-clinching terminal							
TQ2-L2-3 V	TQ2H-L2-3 V	3	2.25	2.25	66.7	45	200	4.5
TQ2-L2-4.5 V	TQ2H-L2-4.5 V	4.5	3.38	3.38	44.4	101.2	200	6.7
TQ2-L2-5 V	TQ2H-L2-5 V	5	3.75	3.75	40	125	200	7.5
TQ2-L2-6 V	TQ2H-L2-6 V	6	4.5	4.5	33.3	180	200	9
TQ2-L2-9 V	TQ2H-L2-9 V	9	6.75	6.75	22.2	405	200	13.5
TQ2-L2-12 V	TQ2H-L2-12 V	12	9	9	16.7	720	200	18
TQ2-L2-24 V	TQ2H-L2-24 V	24	18	18	12.5	1,920	300	28.8

Notes: 1. Specified value of the pick-up, drop-out, set and reset voltage is with the condition of square wave coil pulse.

2. Standard packing: Tube: 50 pcs.; Case: 1,000 pcs.

3. In case of 5 V transistor drive circuit, it is recommend to use 4.5 V type relay.

4. AgPd stationary contact types available for high resistance against contact sticking. When ordering, please add suffix “-3” like TQ2-12V-3.

## II. Surface-mount terminal

### TYPES

#### 1) Tube packing

Contact arrangement	Nominal coil voltage	Single side stable	1 coil latching	2 coil latching
		Part No.	Part No.	Part No.
2c	1.5V DC	TQ2S□-1.5V	TQ2S□-L-1.5V	TQ2S□-L2-1.5V
	3V DC	TQ2S□-3V	TQ2S□-L-3V	TQ2S□-L2-3V
	4.5V DC	TQ2S□-4.5V	TQ2S□-L-4.5V	TQ2S□-L2-4.5V
	5V DC	TQ2S□-5V	TQ2S□-L-5V	TQ2S□-L2-5V
	6V DC	TQ2S□-6V	TQ2S□-L-6V	TQ2S□-L2-6V
	9V DC	TQ2S□-9V	TQ2S□-L-9V	TQ2S□-L2-9V
	12V DC	TQ2S□-12V	TQ2S□-L-12V	TQ2S□-L2-12V
	24V DC	TQ2S□-24V	TQ2S□-L-24V	TQ2S□-L2-24V
	48V DC	TQ2S□-48V	—	—

□: For each surface-mounted terminal identification, input the following letter. SA type: Δ, SL type: L, SS type: S  
 Standard packing: Tube: 50 pcs.; Case: 1,000 pcs.

#### 2) Tape and reel packing

Contact arrangement	Nominal coil voltage	Single side stable	1 coil latching	2 coil latching
		Part No.	Part No.	Part No.
2 Form C	1.5V DC	TQ2S□-1.5V-Z	TQ2S□-L-1.5V-Z	TQ2S□-L2-1.5V-Z
	3V DC	TQ2S□-3V-Z	TQ2S□-L-3V-Z	TQ2S□-L2-3V-Z
	4.5V DC	TQ2S□-4.5V-Z	TQ2S□-L-4.5V-Z	TQ2S□-L2-4.5V-Z
	5V DC	TQ2S□-5V-Z	TQ2S□-L-5V-Z	TQ2S□-L2-5V-Z
	6V DC	TQ2S□-6V-Z	TQ2S□-L-6V-Z	TQ2S□-L2-6V-Z
	9V DC	TQ2S□-9V-Z	TQ2S□-L-9V-Z	TQ2S□-L2-9V-Z
	12V DC	TQ2S□-12V-Z	TQ2S□-L-12V-Z	TQ2S□-L2-12V-Z
	24V DC	TQ2S□-24V-Z	TQ2S□-L-24V-Z	TQ2S□-L2-24V-Z
	48V DC	TQ2S□-48V-Z	—	—

□: For each surface-mounted terminal identification, input the following letter. SA type: Δ, SL type: L, SS type: S  
 Standard packing: Tape and reel: 500 pcs.; Case: 1,000 pcs.  
 Note: Tape and reel packing symbol "Z" is not marked on the relay. "X" type tape and reel packing (picked from 1/2/3/4-pin side) is also available.

## RATING

### 1. Coil data

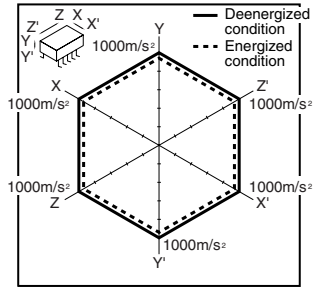
#### 1) Single side stable

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power	Max. allowable voltage (at 20°C 68°F)
1.5V DC	75%V or less of nominal voltage* (Initial)	10%V or more of nominal voltage* (Initial)	93.8mA	16Ω	140mW	150%V of nominal voltage
3V DC			46.7mA	64.3Ω		
4.5V DC			31mA	145Ω		
5V DC			28.1mA	178Ω		
6V DC			23.3mA	257Ω		
9V DC			15.5mA	579Ω		
12V DC			11.7mA	1,028Ω	200mW	
24V DC			8.3mA	2,880Ω		
48V DC			6.3mA	7,680Ω	300mW	120%V of nominal voltage

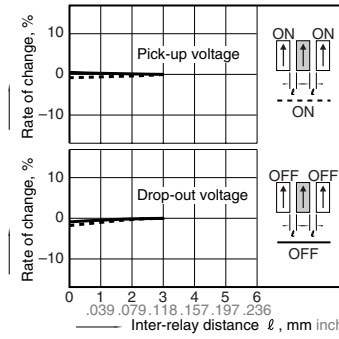
#### 2) 1 coil latching

Nominal coil voltage	Set voltage (at 20°C 68°F)	Reset voltage (at 20°C 68°F)	Nominal operating current (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power	Max. allowable voltage (at 20°C 68°F)
1.5V DC	75%V or less of nominal voltage* (Initial)	75%V or less of nominal voltage* (Initial)	46.9mA	32Ω	70mW	150%V of nominal voltage
3V DC			23.3mA	128.6Ω		
4.5V DC			15.6mA	289.3Ω		
5V DC			14mA	357Ω		
6V DC			11.7mA	514Ω		
9V DC			7.8mA	1,157Ω		
12V DC			5.8mA	2,057Ω	100mW	
24V DC			4.2mA	5,760Ω		

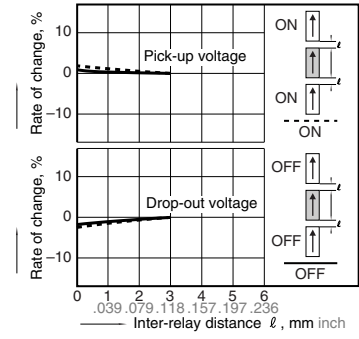
9. Malfunctional shock (single side stable)  
Tested sample: TQ2SA-12V, 6 pcs



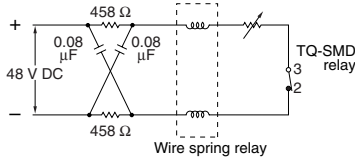
10.-(1) Influence of adjacent mounting  
Tested sample: TQ2SA-12V, 5 pcs.



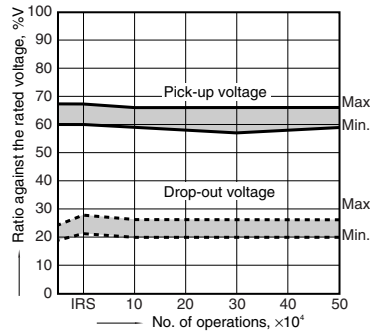
10.-(2) Influence of adjacent mounting  
Tested sample: TQ2SA-12V, 6 pcs.



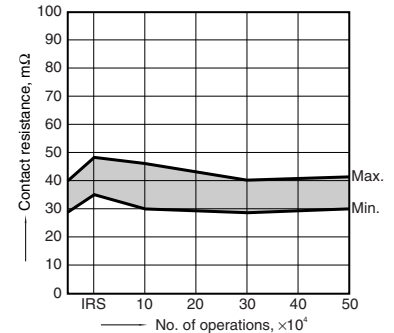
11. Pulse dialing test  
(35 mA 48 V DC wire spring relay load)  
Tested sample: TQ2SA-12V, 6 pcs.  
Circuit



Change of pick-up and drop-out voltage  
(mounting by IRS method)

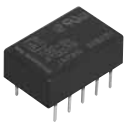


Change of contact resistance  
(mounting by IRS method)

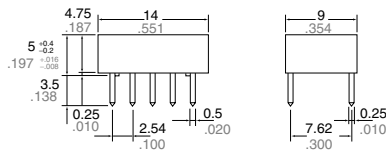


**DIMENSIONS** (Unit: mm inch)

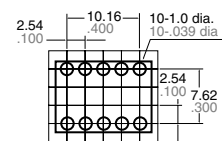
1. Standard PC board terminal and Self-clinching terminal  
1) 2 Form C



External dimensions  
Standard PC board terminal

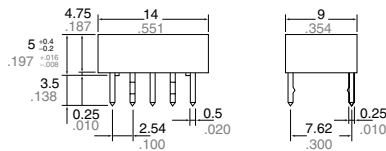


PC board pattern (Bottom view)



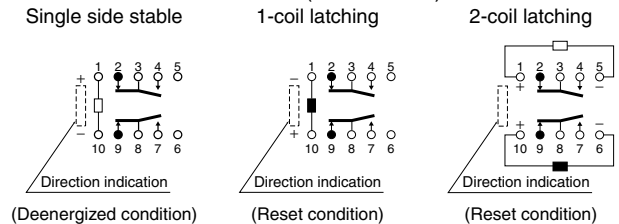
Tolerance: ±0.1 ±0.04

Self-clinching terminal

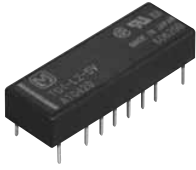


General tolerance: ±0.3 ±0.012

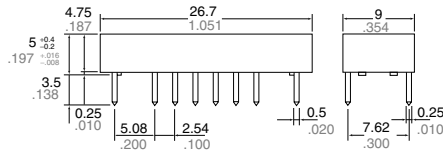
Schematic (Bottom view)



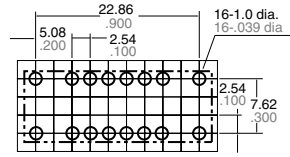
## 2) 4 Form C



External dimensions  
Standard PC board terminal

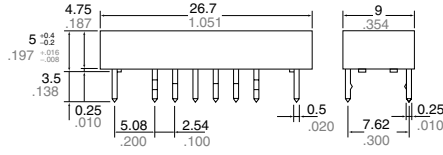


PC board pattern (Bottom view)



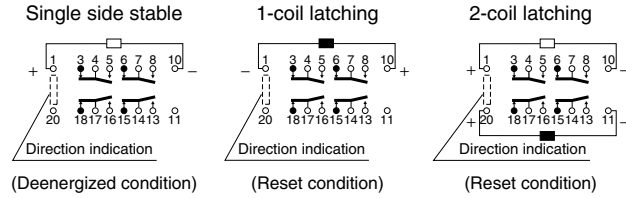
Tolerance:  $\pm 0.1 \pm 0.04$

Self-clinching terminal



General tolerance:  $\pm 0.3 \pm 0.12$

Schematic (Bottom view)



## 2. Surface-mount terminal



Type	External dimensions (General tolerance: $\pm 0.3 \pm 0.12$ )	Suggested mounting pad (Top view) (Tolerance: $\pm 0.1 \pm 0.04$ )
SA type		
SL type		
SS type		

Schematic (Top view)

