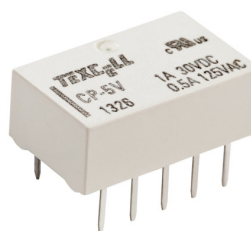


Subminiature Signal Relay

CP

Features

- Offers excellent board space savings
- Surge withstand voltage up to 1500V, meets FCC part 68
- High contact capacity 2A 30VDC
- Low power consumption
- Single side stable and latching type available
- Single or double coil winding type available



(File No.:E122258)

1. COIL DATA (at 23°C)

1) Single side stable

Nominal Voltage (VDC)	Pick-up Voltage (VDC)	Drop-out Voltage (VDC)	Max Allowable Voltage (VDC)	Coil Current (mA)(±10%)	Coil Resistance (Ω)	Coil Power (mW)
1.5	1.13	0.15	3.0	93.3	16 x (1±10%)	140
2.4	1.80	0.24	4.8	58.3	41.3 x (1±10%)	
3	2.25	0.30	6	46.7	64.3 x (1±10%)	
4.5	3.38	0.45	9	31.1	145 x (1±10%)	
5	3.75	0.5	10	28.0	178 x (1±10%)	
6	4.50	0.6	12	23.3	257 x (1±10%)	
9	6.75	0.9	18	15.6	579 x (1±10%)	
12	9	1.2	24	11.7	1028 x (1±10%)	
24	18	2.4	48	8.33	2880 x (1±10%)	200

2) 1 coil latching

Nominal Voltage (VDC)	Set Voltage (VDC) max.	Reset Voltage (VDC) max.	Max Allowable Voltage (VDC)	Coil Current (mA)(±10%)	Coil Resistance (Ω)	Coil Power (mW)
1.5	1.13	1.13	3.0	66.7	22.5 x (1±10%)	100
2.4	1.80	1.80	4.8	41.7	58 x (1±10%)	
3	2.25	2.25	6	33.3	90 x (1±10%)	
4.5	3.38	3.38	9	22.2	203 x (1±10%)	
5	3.75	3.75	10	20.0	250 x (1±10%)	
6	4.50	4.50	12	16.7	360 x (1±10%)	
9	6.75	6.75	18	11.1	810 x (1±10%)	
12	9	9	24	8.33	1440 x (1±10%)	
24	18	18	48	6.25	3840 x (1±10%)	150

3) 2 coils latching

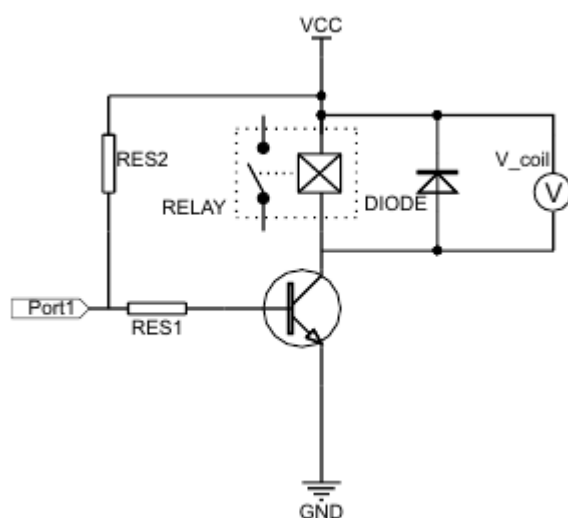
Nominal Voltage (VDC)	Set Voltage (VDC) max.	Reset Voltage (VDC) max.	Max Allowable Voltage (VDC)	Coil Current (mA)($\pm 10\%$)	Coil Resistance (Ω)	Coil Power (mW)
1.5	1.13	1.13	3.0	133	11.3 x ($1\pm 10\%$)	200
2.4	1.80	1.80	4.8	83.3	29 x ($1\pm 10\%$)	
3	2.25	2.25	6	66.7	45 x ($1\pm 10\%$)	
4.5	3.38	3.38	9	44.4	101 x ($1\pm 10\%$)	
5	3.75	3.75	10	40.0	125 x ($1\pm 10\%$)	
6	4.50	4.50	12	33.3	180 x ($1\pm 10\%$)	
9	6.75	6.75	18	22.2	405 x ($1\pm 10\%$)	
12	9	9	24	16.7	720 x ($1\pm 10\%$)	300
24	18	18	48	12.5	1920 x ($1\pm 10\%$)	

Note:

- 1) The data shown above are initial values.
- 2) To supply rated step voltage to coil is the foundation of relay proper operation.

Please make sure the applied voltage to the coil reach at rated values.

Please refer to the typical diagram below for single side stable relay. The "V_{coil}" is the rated voltage:



- 3) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay and 3V to use 2.4V type relay.
- 4) For monostable relays, if you need to drop down voltage and hold mode after reliably operating, make sure that the effective value of holding voltage is not less than 60% of the rated voltage.
- 5) The maximum allowable voltage refers to the maximum voltage which relay coil could endure in a short period of time.
- 6) When user's requirements can't be found in the above table, special order allowed.
- 7) During the relay pick-up or drop-out processes, there are stages of contact pressure change, contact vibration and unstable contact etc.
When the voltage applied to coil is gradually changed. It will lengthen the unstable stage and affect relay endurance. To reduce this influence, please apply step voltage (switching circuit) to relay coil.

2. CONTACT DATA

Contact Arrangement	2 Form C	
Contact Resistance	100mΩ max. (at 10mA 30mVDC)	
Contact Material	AgNi + Au plated	
Contact Ratings (Resistive load)	2A 30VDC / 1A 30VDC 0.5A 125VAC	
Max. Switching Voltage	250VAC / 220VDC	
Max. Switching Current	2A	
Max. Switching Power	62.5VA / 30W	
Min. applicable load ²⁾	10mV 10μA	
Life Expectancy ³⁾	Electrical	100,000 operations (at 0.5A 125VAC)
	Mechanical	100,000,000 operations

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

2) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.

3) Life expectancy test is conducted with load being connected to NO or NC contacts.

3. CHARACTERISTICS

Insulation Resistance	1000MΩ (at 500VDC)	
Dielectric Strength	Open Contacts	750VAC 1mm
	Coil and Contacts	1500VAC 1min
	Contact Sets	1500VAC 1min
Surge withstand voltage between open contacts (10/160μs)	1500VAC (FCC part 68)	
Operate Time (Set Time)	3ms max.	
Release Time (Reset Time)	3ms max.	
Temperature Range	-40℃ to 70℃	
Vibration Resistance	10 ~ 55Hz 3.0mm DA	
Shock Resistance	Functional	735m/s ²
	Destructive	980m/s ²
Humidity	5 ~ 85% RH	
Termination	PCB (DIP, SMT)	
Weight	Approx. 1.8g	
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)	MSL 3	
Outline Dimension (L x W x H)	DIP type: 14.0 x 9.0 x 5.4mm / SMT type: 14.0 x 9.0 x 5.9mm	

Notes:

- 1) The data shown above are initial values.
- 2) UL insulation system: Class A

4. ORDERING INFORMATION

<u>CP</u> ①	-	<u>5V</u> ②	<u>L1</u> ③	<u>S</u> ④	<u>R</u> ⑤
① Relay Model	CP				
② Coil Voltage	1.5V=1.5VDC, 2.4V=2.4VDC, 3V=3VDC, 4.5V=4.5VDC, 5V=5VDC, 6V=6VDC, 9V=9VDC, 12V=12VDC, 24V=24VDC				
③ Sort	Nil: Single side stable L1: 1 coil latching L2: 2 coils latching				
④ Termination	Nil: DIP S: Standard SMT S1: Short terminal SMT				
⑤ Packing	Nil: Tube packing (Only for DIP type) R: Tape & reel packing (Only for SMT type)				

Note:

R type (Tape and reel packing) is moisture-proof which meets requirement of MSL-3. Please choose R type packing for SMT products. For R type, the letter "R" will only printed be on packing tag but not on relay cover. Tube packing is normally not available for SMT products unless specially requested by customer. But please note that tube packing is not moisture-proof. so please bake the products before use according to description of Notice 10 herewith. In addition, tube packing will be adopted when the ordering quantity of R type is equal to or less than 100 pieces unless otherwise specified.

5. SAFETY APPROVAL

UL / cUL	1A 30VDC 70℃ 2A 30VDC 40℃ 0.5A 110VDC 70℃ 0.5A 125VAC 70℃
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Notes:

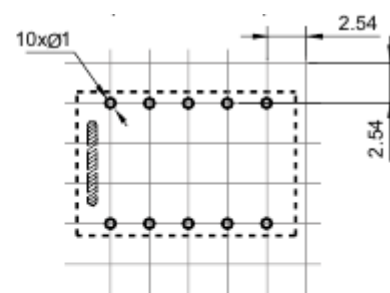
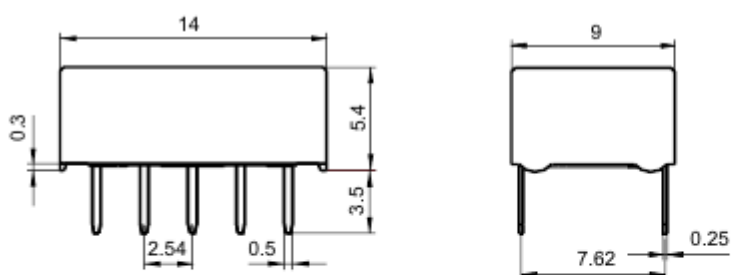
- 1) All values unspecified are at room temperature
- 2) Only typical loads are listed above. Other load specifications can be available upon request.

6. DIMENSIONS (Unit: mm)

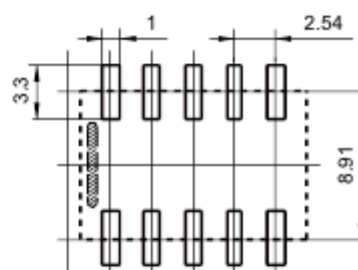
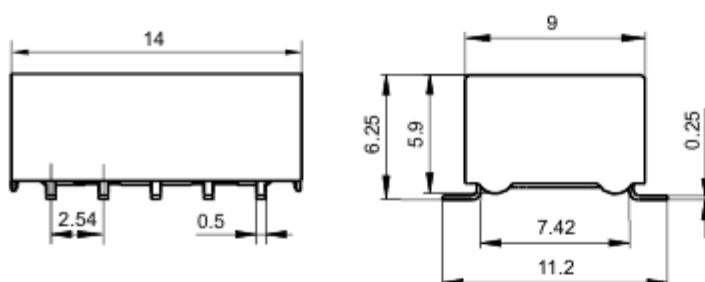
Outline Dimensions

PCB Layout (Bottom view)

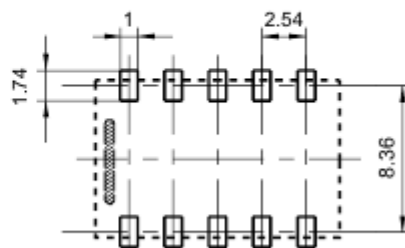
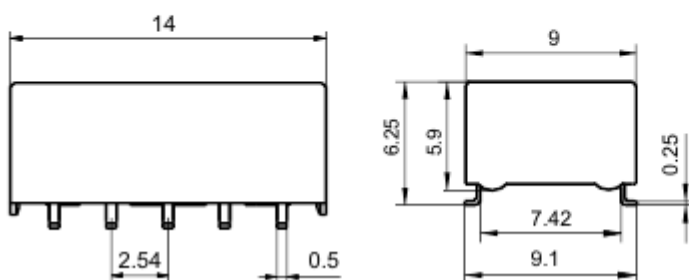
DIP



Standard SMT

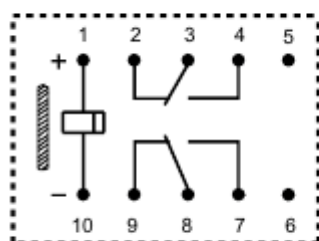


Short terminal SMT



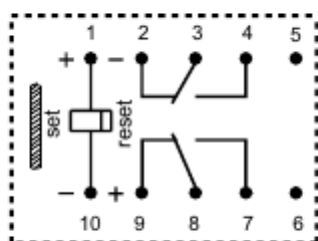
Wiring Diagram (Bottom View)

Single side stable



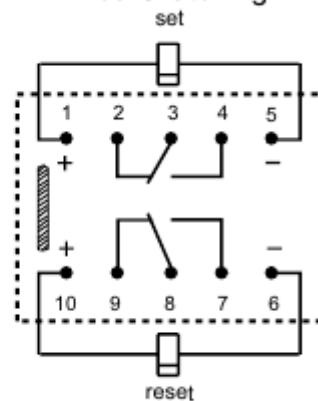
Deenergized condition

1 coil latching



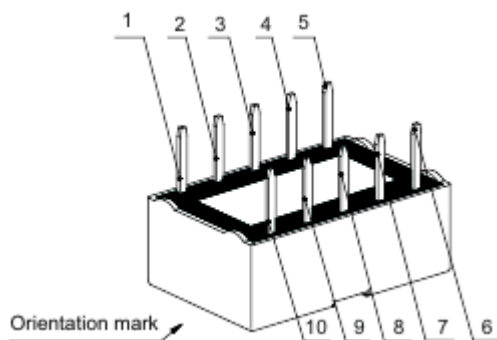
Reset condition

2 coils latching



Reset condition

PIN Layout

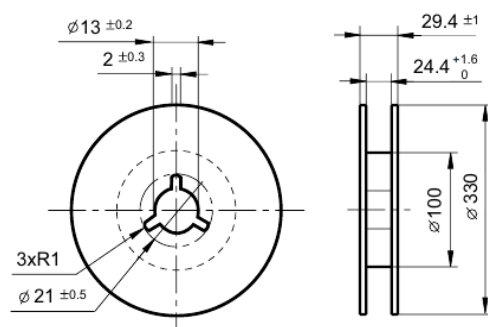


Remark:

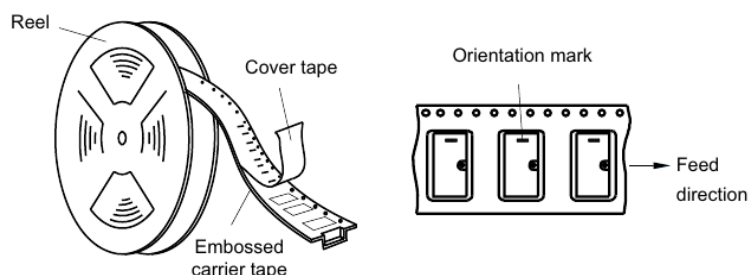
- 1) The pin dimension of the product outline drawing is the size before tinning (It will become larger after tinning), and the mounting hole size is the recommended design size of the PCB board hole. The specific PCB board hole design size can be mapped and adjusted according to the actual product.
- 2) 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 $\pm 0.4\text{mm}$.
- 3) The tolerance without indicating for PCB layout is always $\pm 0.1\text{mm}$.

6. TAPE & REEL PACKING CONSTRUCTION AND DIMENSION (Unit: mm)

Reel Dimensions



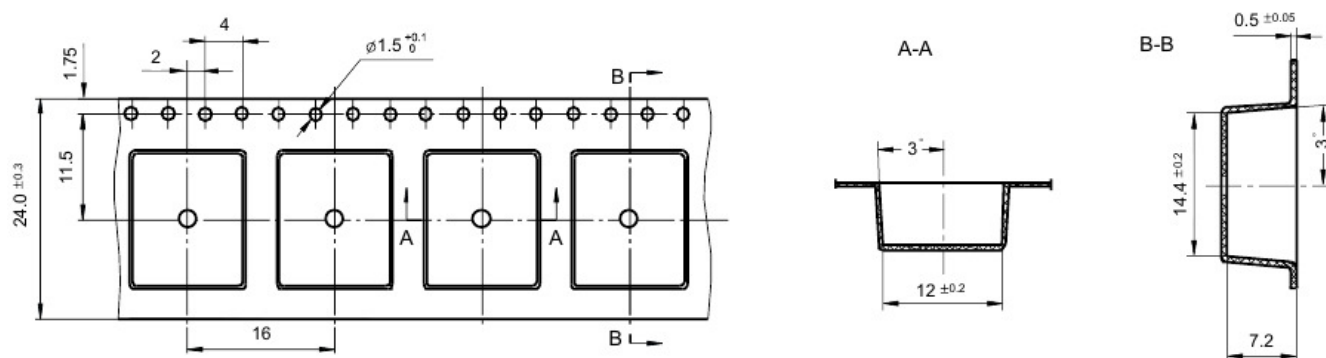
Direction of Relay Insertion



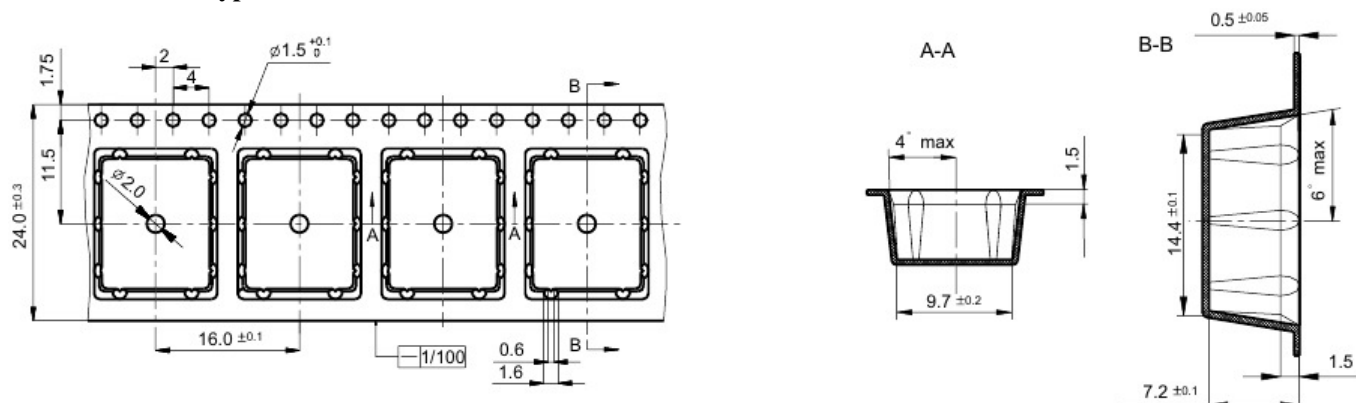
- Notes:** 1) Packing: 550pcs/reel, 4 reels/carton.
2) MOQ for reel packing is 550pcs.

Tape Dimensions

Standard SMT type

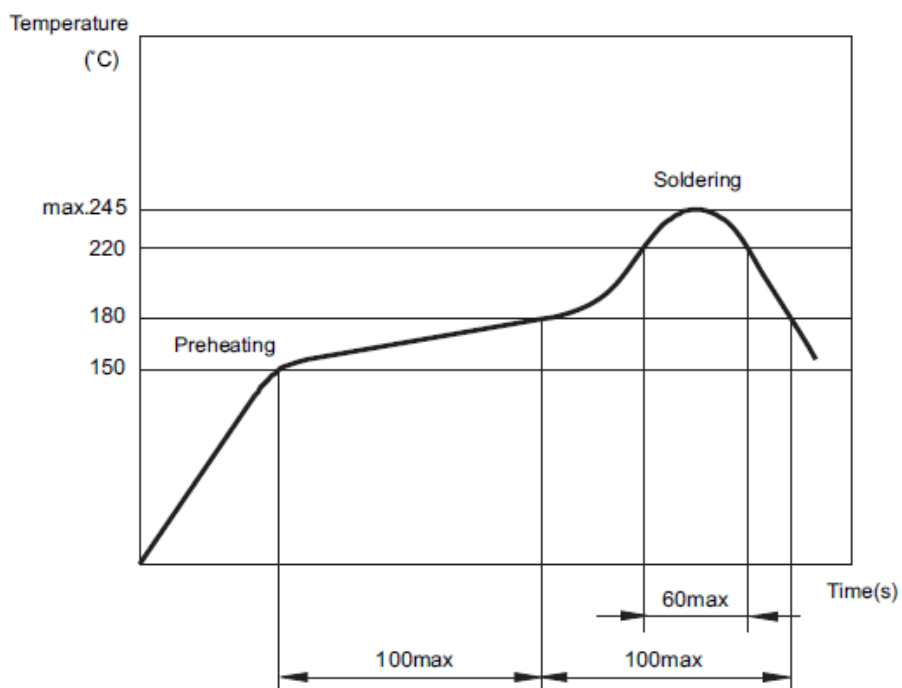


Short terminal SMT type



7. RECOMMENDED SOLDERING CONDITIONS

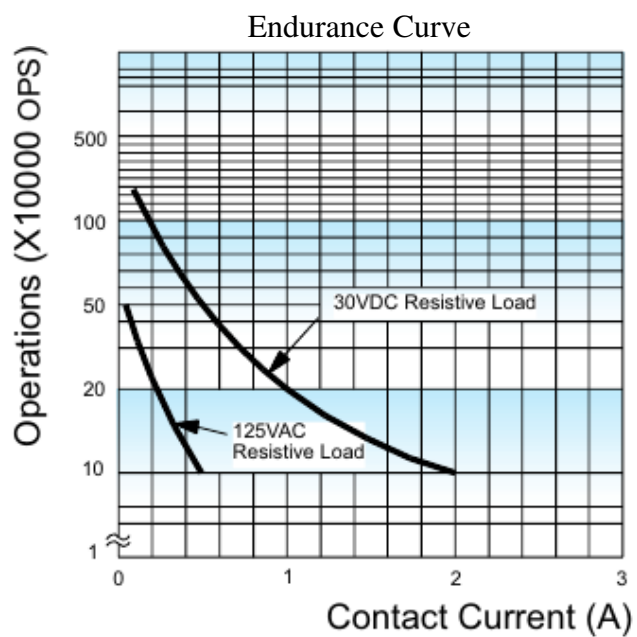
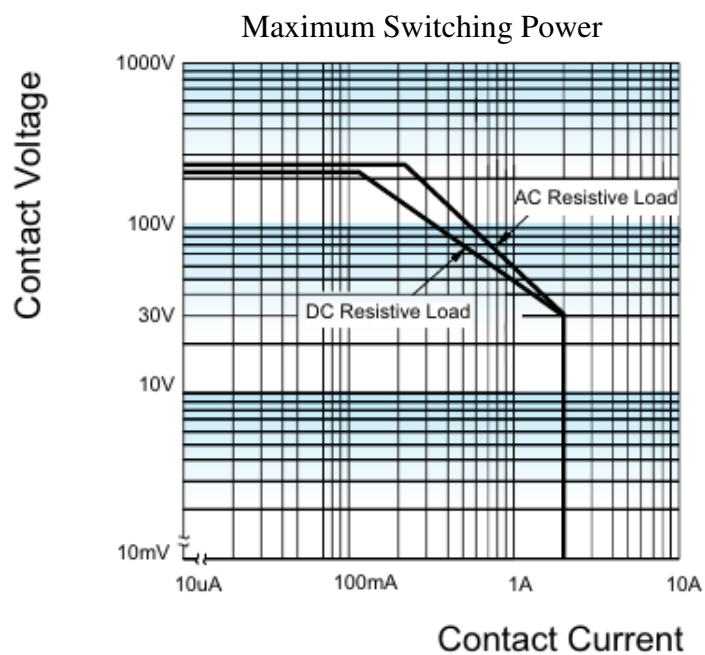
Temperature/Time profile of Reflow Soldering see below:



Note: 1) Temperature profile shows Printed Circuit Board surface temperature on the relay terminal portion.

2) Please check the actual soldering condition to use other method except above mentioned temperature profiles.

8. CHARACTERISTIC CURVES



Notice

- 1) This relay is highly sensitive polarized relay. If correct polarity is not applied to the coil terminals, the relay does not operate properly.
- 2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 3) Relay is on the "reset" status when being released from stock, with the consideration of shock risen from transit and relay mounting. It should be changed to the "set" status when application(connecting to the power supply). Please reset the relay to "set" or "reset" status on request.
- 4) Energizing coil with rated voltage is basic for normal operation of a relay, please make sure the energized voltage to relay coil have reached the rated voltage. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 5) For a monosteady state relay, after the relay is reliably operated, if it needs to be kept under pressure, make sure that the effective value of the voltage is not less than 60% of the rated voltage.
- 6) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 7) For SMT products, validation with real application should be done before your series production, if the reflow-soldering temperature curve is out of our recommendation. Generally, two-time reflow-soldering is not recommended for the relay. However, if two-time reflow-soldering is required, a 60-min. interval should be guaranteed and a validation should be done before production.
- 8) Please use wave soldering or manual soldering for straight-in relay, If you need reflow welding, please confirm the feasibility with us.
- 9) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB
- 10) Regarding the plastic sealed relay, we should leave it cooling naturally until below 40℃ after welding, then clean it and deal with coating, remarkably the temperature of solvents should also be controlled below 40℃. Please avoid cleaning the relay by ultrasonic, avoid using the solvents like gasoline, freon and so on, which would affect the configuration of relay or influence the environment.
- 11) Relays packaged in moisture barrier bags meet MSL-3 requirements. The relays should be stored at ambient conditions of $\leq 30^{\circ}\text{C}$ and $\leq 60\%$ RH after they are removed from their packaging, and should be used within 168 hours. If the relays cannot be used within 168 hours, please repack them or store them in a drying oven at $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, $\leq 10\%$ RH. Otherwise, relays may be subjected to a soldering test to check their performance, or they may be used after keeping them in an oven for 72 hours at with $50^{\circ}\text{C} \pm 5^{\circ}\text{C}$, $\leq 30\%$ RH.
- 12) When applied with continuous current, the heat from relay coil will age its isolation. Thus, please do not ground connected the coil to reduce electrical erosion if possible. And please provide protection circuit to avoid broken wire and losses.
- 13) Please make sure that there are no silicon-based substances (such as silicon rubber, silicon oil, silicon-based coating agents, silicon fillers, etc.) around the relay, because it will generates silicon-containing volatile gas, which may cause poor contact in case of silicon-containing volatile gas sticking on contact.
- 14) For 2 coil latching relay, do not energized voltage to "set" coil and "reset" coil simultaneously.
- 15) During the relay pick-up or drop-out processes, there are stages of contact pressure change, contact vibration and unstable contact etc.
When the voltage applied to coil is gradually changed. It will lengthen the unstable and affect relay endurance. To reduce this influence, please apply step voltage (switching circuit) to relay coil.