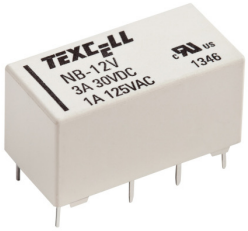
Subminiature DIP Relay	NB

Features

- High sensitive: 150mW
- Matching standard 16 pin IC socket
- High switching capacity: 125VA / 90W
- Bifurcated contacts
- Epoxy sealed for automatic wave soldering and cleaning
- Single side stable and latching type available



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1. COIL DATA (at 23°C)

1) Single side stable (Standard type)

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)
3	2.30	0.3	6	66.7	45 x (1±10%)	200
5	3.75	0.5	10	40.0	125 x (1±10%)	
6	4.50	0.6	12	33.3	180 x (1±10%)	
9	6.75	0.9	18	22.2	405 x (1±10%)	
12	9.00	1.2	24	16.7	720 x (1±10%)	
15	11.25	1.5	30	13.3	1125 x (1±10%)	
24	18.0	2.4	48	8.33	2880 x (1±10%)	
48	36.0	4.8	96	4.17	11520 x (1±10%)	

2) Single side stable (Sensitive type)

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)
3	2.4	0.3	7	50.0	60 x (1±10%)	150
5	4.0	0.5	11.5	30.0	167 x (1±10%)	
6	4.8	0.6	13.8	25.0	240 x (1±10%)	
9	7.2	0.9	20.8	16.7	540 x (1±10%)	
12	9.6	1.2	27.7	12.5	960 x (1±10%)	
15	12.0	1.5	34.6	10.0	1500 x (1±10%)	
24	19.2	2.4	55.4	6.25	3840 x (1±10%)	

3) 1 coil latching (Standard type)

Nominal Voltage (VDC)	Set / Reset Voltage (VDC) max.	Max Allowable Voltage (VDC)	Coil Current (mA)(±10%)	Coil Resistance (Ω)	Coil Power (mW)
3	2.25	8.4	33.3	90 x (1±10%)	100
5	3.75	14	20.0	250 x (1±10%)	
6	4.50	17	16.7	360 x (1±10%)	
9	6.75	25	11.1	810 x (1±10%)	
12	9.00	34	8.33	1440 x (1±10%)	
15	11.25	42	6.67	2220 x (1±10%)	
24	18.0	56	4.17	4000 x (1±10%)	

4) 1 coil latching (Sensitive type)

Nominal Voltage (VDC)	Set / Reset Voltage (VDC) max.	Max Allowable Voltage (VDC)	Coil Current (mA)(±10%)	Coil Resistance (Ω)	Coil Power (mW)
3	2.4	9.6	25.0	120 x (1±10%)	75
5	4.0	16	15.0	330 x (1±10%)	
6	4.8	19	12.5	480 x (1±10%)	
9	7.2	29	8.33	1080 x (1±10%)	
12	9.6	39	6.25	1920 x (1±10%)	
15	12.0	43	5.00	3000 x (1±10%)	
24	19.2	78	3.13	7680 x (1±10%)	

5) 2 coils latching (Standard type)

Nominal Voltage (VDC)	Set / Reset Voltage (VDC) max.	Max Allowable Voltage (VDC)	Coil Current (mA)(±10%)	Coil Resistance (Ω)	Coil Power (mW)
3	2.25	6	66.7	45 x (1±10%)	200
5	3.75	10	40.0	125 x (1±10%)	
6	4.50	12	33.3	180 x (1±10%)	
9	6.75	18	22.2	405 x (1±10%)	
12	9.00	24	16.7	720 x (1±10%)	
15	11.25	30	13.3	1125 x (1±10%)	
24	18.0	48	8.33	2040 x (1±10%)	

6) 2 coils latching (Sensitive type)

Nominal Voltage (VDC)	Set / Reset Voltage (VDC) max.	Max Allowable Voltage (VDC)	Coil Current (mA)(±10%)	Coil Resistance (Ω)	Coil Power (mW)
3	2.4	6.90	50.0	60 x (1±10%)	150
5	4.0	11.5	30.0	167 x (1±10%)	
6	4.8	13.8	25.0	240 x (1±10%)	
9	7.2	20.8	16.7	540 x (1±10%)	
12	9.6	27.7	12.5	960 x (1±10%)	
15	12.0	34.6	10.0	1500 x (1±10%)	
24	19.2	55.4	6.25	3840 x (1±10%)	

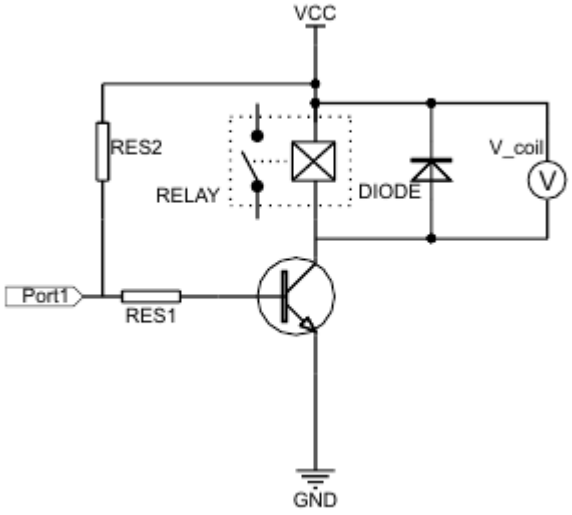
Note:

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. TYPICAL CONTACT LIFE EXPECTANCY

Voltage	Power	Electrical endurance	
		Resistive Load	Inductive Load (For AC cosΦ=0.7)
50mVDC	50μW	5 x 10^7 operations	5 x 10^7 operations
30VDC	20W	3 x 10^6 operations	1 x 10^6 operations
30VDC	30W	1 x 10^6 operations	3 x 10^5 operations
30VDC	60W	1 x 10^5 operations	1.5 x 10^4 operations
60VDC	20W	3 x 10^6 operations	--
60VDC	30W	5 x 10^5 operations	--
60VDC	60W	1 x 10^5 operations	--
30VAC	40VA	3 x 10^6 operations	1 x 10^6 operations
30VAC	80VA	1 x 10^6 operations	3 x 10^5 operations
30VAC	120VA	1 x 10^5 operations	1.5 x 10^4 operations
60VAC	40VA	3 x 10^6 operations	1 x 10^6 operations
60VAC	80VA	1 x 10^6 operations	3 x 10^5 operations
60VAC	120VA	1 x 10^5 operations	1.5 x 10^4 operations
125VAC	40VA	3 x 10^6 operations	1 x 10^6 operations
125VAC	80VA	1 x 10^6 operations	3 x 10^5 operations
125VAC	125VA	1 x 10^5 operations	1.5 x 10^4 operations

3. CONTACT DATA

Contact Arrangement		2 Form C
Contact Resistance		100mΩ max. (at 10mA 30mVDC)
Contact Material		Ag + Gold plated / Ag + Gold plated
Contact Ratings (Resistive load)		1A 125VAC / 2A 30VDC / 3A 30VDC
Max. Switching Voltage		250VAC / 220VDC
Max. Switching Current		3A
Max. Switching Power		125VA / 90W
Min. applicable load[1)]		10mV 10μA
Life Expectancy[2)]	Electrical	50,000 operations (at 2A 30VDC)
	Mechanical	100,000,000 operations

Notes:

1) Minimum 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, expected contact resistance and reliability.

2) Life expectancy data are collected in one pair CO contact test.

4. CHARACTERISTICS

Insulation Resistance		1000MΩ (at 500VDC)
Dielectric Strength	Open Contacts	1000VAC 1mm
	Coil and Contacts	1 coil: 1500VAC 1min 2 coils: 1000VAC 1min
Operate Time (at nominal voltage)		4.5ms max.
Release Time (at nominal voltage)		3.5ms max.
Set Time (latching)		4.5ms max.
Reset Time (latching)		4.5ms max.
Temperature Rise		65K max.
Temperature Range		-40℃ to 85℃
Vibration Resistance		10 ~ 55Hz 1.5mm DA
Shock Resistance	Functional	490m/s^2
	Destructive	980m/s^2
Humidity		5 ~ 85% RH
Termination		PCB (DIP)
Weight		Approx. 4.5g
Outline Dimension (L x W x H)		20.2 x 10.2 x 10.6mm

Notes:

1) The data shown above are initial values.

2) UL insulation system: Class A

5. ORDERING INFORMATION

NB - 5V L1 S ① ② ③ ④	
① Relay Model	NB
② Coil Voltage	3V=3VDC, 5V=5VDC, 6V=6VDC, 9V=9VDC, 12V=12VDC, 15V=15VDC, 24V=24VDC, 48V=48VDC[1)]
③ Sort	Nil: Single side stable L1: 1 coil latching L2: 2 coils latching
④ Coil Power	Nil: Standard S: Sensitive

6. SAFETY APPROVAL

UL / cUL	2A 30VDC 3A 30VDC (70℃) 1A 125VAC 2A 125VAC

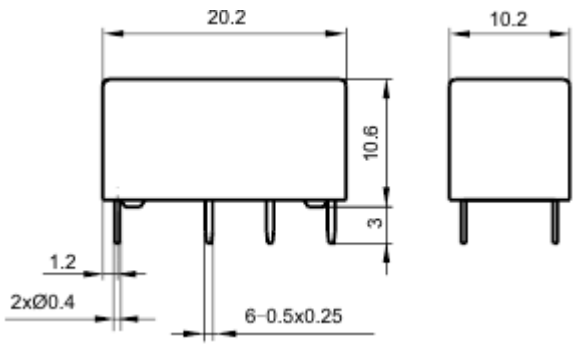
Notes: 1) All values unspecified are at room temperature

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

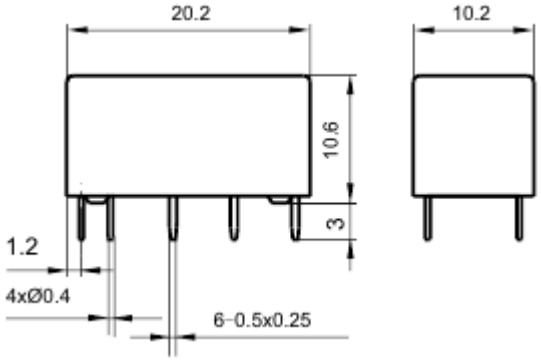
7. DIMENSIONS (Unit: mm)

Outline Dimensio

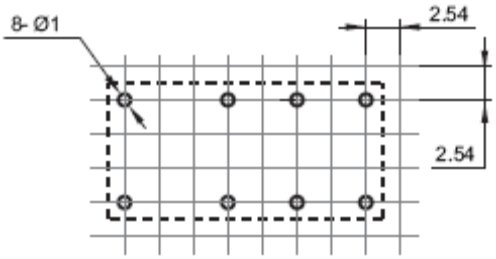
Single side stable or 1 coil latching



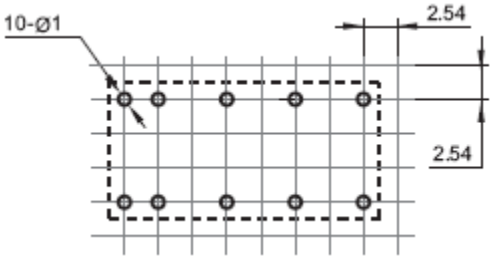
2 coils latching



PCB Layout
(Bottom view)

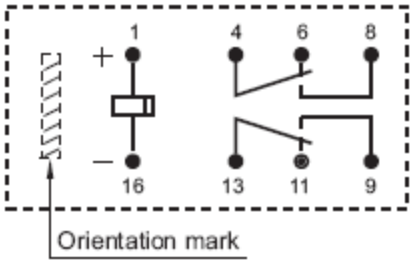


Matching 16 pin IC socket



Matching 16 pin IC socket

Wiring Diagram
(Bottom View)



For latching, diagram shows the “reset” position

Energize terminals 1 and 16 to “set”

Reverse energize terminals 1 and 16 to “reset”

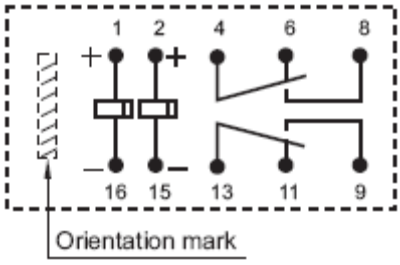


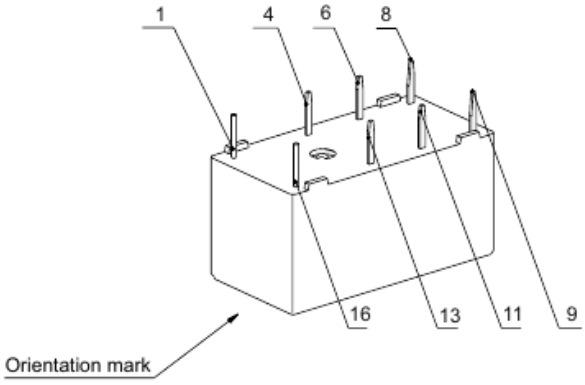
Diagram shows the “reset” position

Energize terminals 1 and 16 to “set”

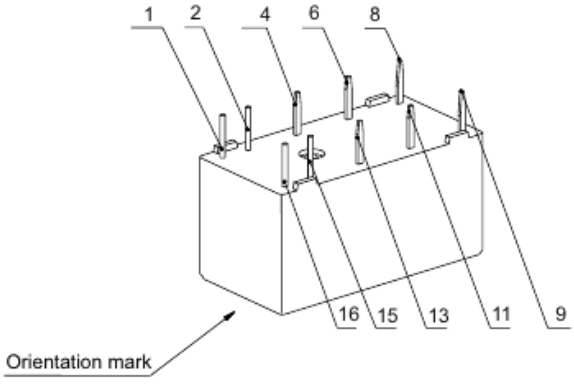
Energize terminals 2 and 15 to “reset”

Pin Layout

Single side stable or 1 coil latching



2 coils latching

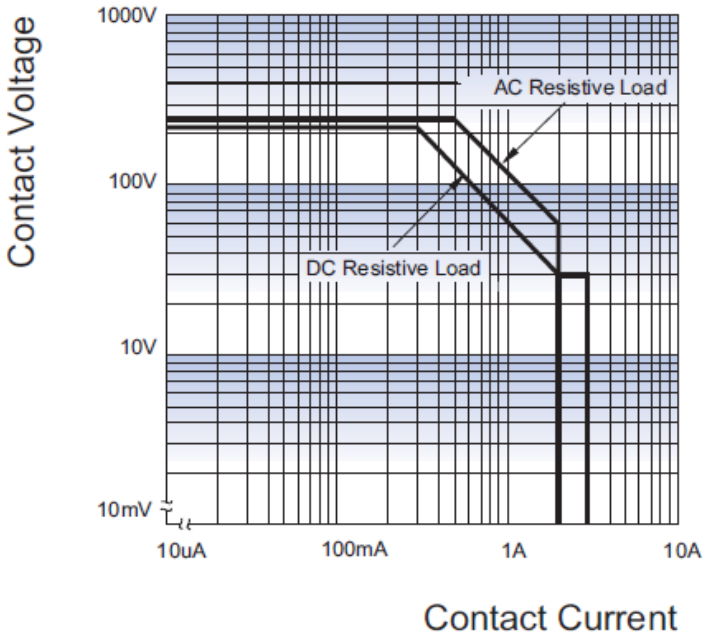


Remark:

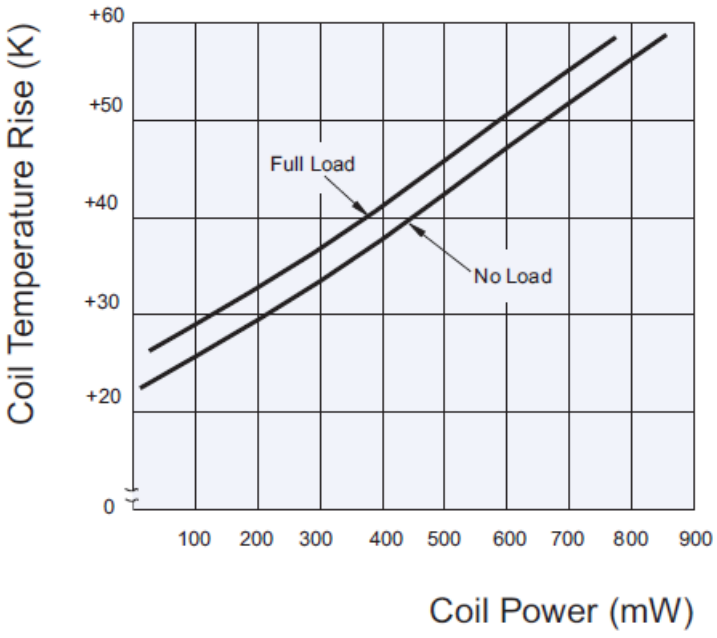
1) The pin dimension of the product outline drawing is the size before tinning (It will become larger after tinning), and the mounting hole size is the recommended design size of the PCB board hole. The specific PCB board hole design size can be mapped and adjusted according to the actual product.
2) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.
3) The tolerance without indicating for PCB layout is always ±0.1mm.
4) The width of the gridding is 2.54mm

8. CHARACTERISTIC CURVES

Maximum Switching Power



Coil Temperature Rise



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) Please use wave soldering or manual soldering for straight-in relay, If you need reflow welding, please confirm the feasibility with us.
8) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB
9) 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.
10) 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.
11) 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.
12) For 2 coil latching relay, do not energized voltage to “set” coil and “reset” coil simultaneously.
13) 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.