NEC

MINIATURE SIGNAL RELAY
EE2 SERIES

Compact and lightweight, High breakdown voltage, Surface mounting type

DESCRIPTION

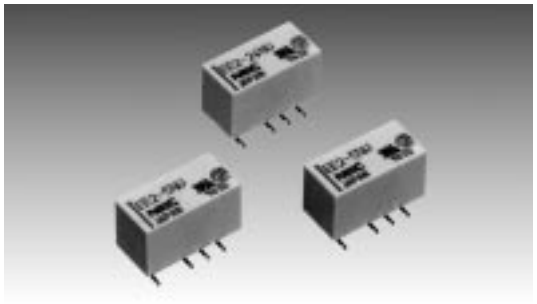
The EE2 series surface-mounting type sustaining high-performance of NEC EC2 series.

FEATURES

- ○ Compact and light weight
- ○ 2 form c contact arrangement
- ○ Low power consumption
- ○ Reduced mounting space : 15 mm × 9.5 mm
- ○ High-breakdown voltage of coil to contacts : 1500 Vac, 2500 V
  (rise time : 2 μs, fall time : 10 μs)
- ○ Low power consumption : 100 to 140 mW
- ○ Capable of High-power switching : 700 Vac, 4.2 A, 4 times in case of accident
- ○ UL recognized (E73266), CAS certified (LR46266)

APPLICATIONS

Electronic switching systems, PBX, terminal equipment, telephone system.



For Right Use of Miniature Relays

DO NOT EXCEED MAXIMUM RATINGS.

Do not use relays under exceeding conditions such as over ambient temperature, over voltage and over current. Incorrect use could result in abnormal heating, damage to related parts or cause burning.

READ CAUTIONS IN THE SELECTION GUIDE.

Read the cautions described in NEC's "Miniature Relays" (ER0046EJ∗) when you choose relays for your application.

Document No. ER0017EJ4V0DS00 (4th edition)
Date Published June 1999 M
Printed in Japan

PART NUMBER SYSTEM

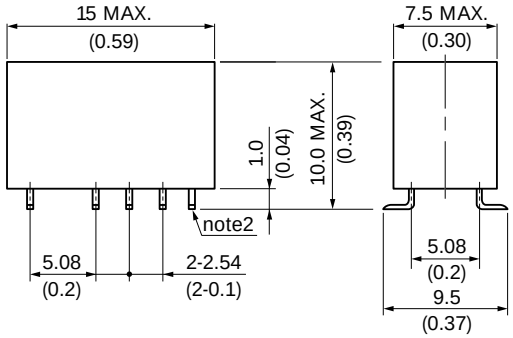
EE2 - 5 S NUH - L

- Pakaging code
  - Nil : Tube type
  - L : Embossed carrying tape (L type)
  - R : Embossed carrying tape (R type)
- Nil : Standard type
  - NU : UL recognized, CSA certified type
  - NUX : High solder joint reliability type*
  - NUH : Minimum footprint type*
  - NUN : High solder joint reliability with minimum footprint type*
  - * UL recognized, CAS certified type
- Latch type
  - Nil : Non-latch type
  - S : Single coil latch type
  - T : Double coil latch type
- Nominal voltage
  - 3, 4.5, 5, 6, 9, 12, 24 volts
- EE2 series

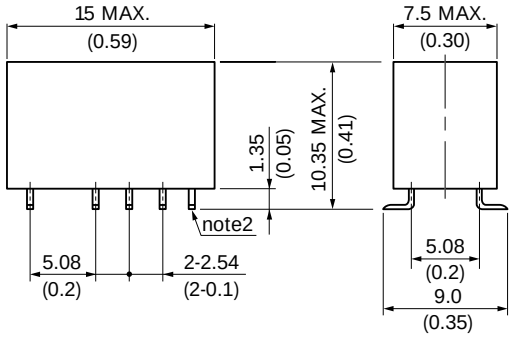
OUTLINE DRAWINGS AND DIMENSIONS

Unit : mm (inch)

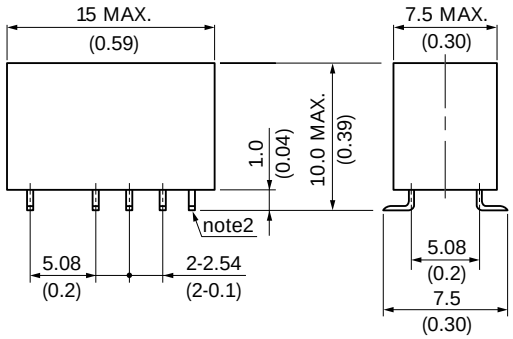
EE2-..
EE2-..NU



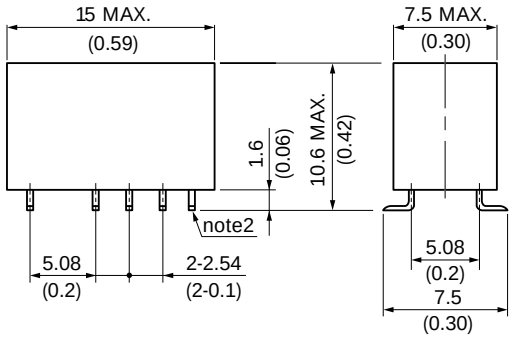
EE2-..NUX



EE2-..NUH



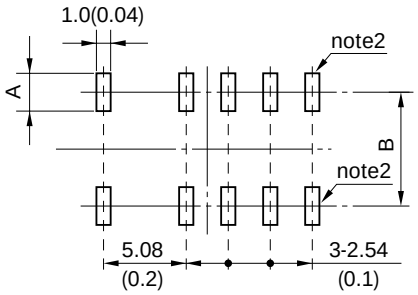
EE2-..NUN



Note 1. General torelance : ±0.2 (±0.008)
Note 2. This pair of pins at the right end applies to double coil latch type only.

PAD LAYOUTS (bottom view)

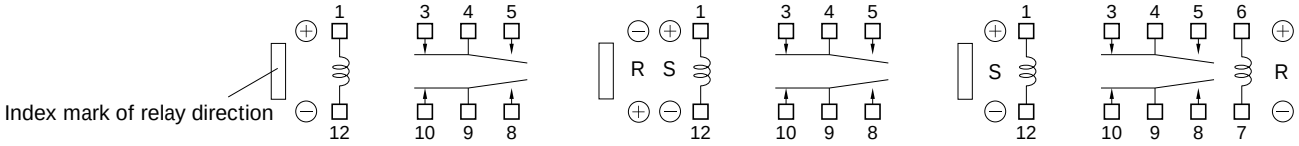
unit : mm (inch)



Type	A	B
EE2-..	3.0 (0.118)	7.3 (0.287)
EE2-..NU	3.0 (0.118)	7.3 (0.287)
EE2-..NUX	2.73 (0.107)	7.02 (0.276)
EE2-..NUH	2.0 (0.079)	6.29 (0.248)
EE2-..NUN	2.0 (0.079)	6.29 (0.248)

Note 1. General torelance : ±0.1 (±0.004)
Note 2. This pair of pads at the right end applies to double coil latch type only.

PIN CONFIGURATIONS (bottom view)



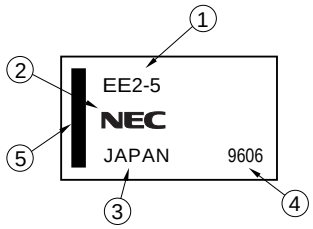
Non-latch type
(not energized position)

Single coil latch type
(reset position)

Double coil latch type
(reset position)

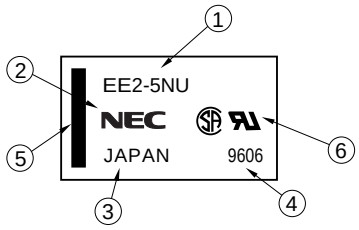
S : Coil polarity of set (operate)
R : Coil polarity of reset (release)

MARKINGS (top view)



① Part number
② Manufacturer
③ Country of origin
④ Date code
⑤ Index mark of relay direction (pin No.1, 12)
⑥ UL, CSA Marking

Standard type



UL recognized
CSA certified type

SAFETY STANDARD AND RATING

UL Recognized (UL508)* File No E73266	CSA Certificated (CSA C22.2 No 14) File No LR46266
30 Vdc, 2A (Resistive) 110 Vdc, 0.3A (Resistive) 125 Vdc, 0.5A (Resistive)	

* Spacing : UL114, UL478

TUV Certificate (EN60255 / IEC60255)
No. R 9751153 (Nonlatch and Single-coil-latch)
Creepage and clearance of coil to contact is more than 2 mm. (According EN60950)
Basic insulation class

PERFORMANCE CHARACTERISTICS

Contact Form		2 Form c	
Contact Material		Silver alloy with gold alloy overlay	
Contact Ratings (UL / CSA Rating)	Maximum Switching Power	60 W, 125 VA	
	Maximum Switching Voltage	220 Vdc, 250 Vac	
	Maximum Switching Current	2 A	
	Maximum Carrying Current	2 A	
Minimum Contact Ratings		10 mVdc, 10 μA *1	
Initial Contact Resistance		50 mΩ typ. (Initial)	
Nominal Operating Power	Non-Latch Type	140 mW (3 to 12 V), 200 mW (24 V)	
	Single Coil Latch Type	100 mW	
	Single Coil Latch Type	140 mW	
Operate Time (Excluding Bounce)		Approx. 2 ms	
Release Time (Excluding Bounce)		Approx. 1 ms without diode	
Insulation Resistance		1000 MΩ at 500 Vdc	
Breakdown Voltage	Between Open Contacts	1000 Vac (for one minute) 1500 V surge (10 $\times$ 160 μs *2)	
	Between Adjacent Contacts		
	Between Coil and Contact	1500 Vac (for one minute) 2500 V surge, (2 $\times$ 10 μs *3)	Double Coil 1000 Vac (for one minute) Latch type 1500 V surge (10 $\times$ 160 μs *2)
Shock Resistance		735 m / s^2 (75 G) (misoperating) 980 m / s^2 (100 G) (destructive failure)	
Vibration Resistance		10 to 55 Hz double amplitude of 3 mm (20 G) (misoperating) 10 to 55 Hz, double amplitude of 5 mm (30 G) (Destructive failure)	
Ambient Temperature		–40 to 85˚C	
Coil Temperature Rise		18 degrees at nominal coil voltage (140 mW)	
Running specifications	No-load	1×10^8 *4 operations (Non-latch type) 1×10^7 operations (latch type)	
	Load	50 Vdc, 0.1 A (resistive) 1×10^6 operations at 85˚C, 2 Hz	
		10 Vdc, 10 mA (resistive) 1×10^6 operations at 85˚C, 2 Hz	
Weight		Approx. 1.9 g	

*1 This value is reference value in the resistance load.
Minimum capacity changes depending on switching frequency and environment temperatur and the load.

*2 rise time : 10 μs, fall time : 160 μs

*3 rise time : 2 μs, fall time : 10 μs

*4 This shows a number of operation where it can be running by which a fatal defect is not caused, and a number of operation by whicha steady characteristic is maintained is 1×10^7 times.

PRODUCT LINEUP

Non-latch Type

at 20˚C

Nominal Coil Voltage (Vdc)	Coil Resistance (Ω) ±10 %	Must Operate Voltage (Vdc)	Must Release Voltage (Vdc)
3	64.3	2.25	0.3
4.5	145	3.38	0.45
5	178	3.75	0.5
6	257	4.5	0.6
9	579	6.75	0.9
12	1028	9	1.2
24	2880	18	2.4

Single-Coil Latch Type

at 20˚C

Nominal Coil Voltage (Vdc)	Coil Resistance (Ω) ±10 %	Must Operate Voltage (Vdc)	Must Release Voltage (Vdc)
3	90	2.25	2.25
4.5	202.5	3.38	3.38
5	250	3.75	3.75
6	360	4.5	4.5
9	810	6.75	6.75
12	1440	9	9
24	5760	18	18

Double-Coil Latch Type ** (Can not be driven by revese polarity for reverse operation.)

at 20˚C

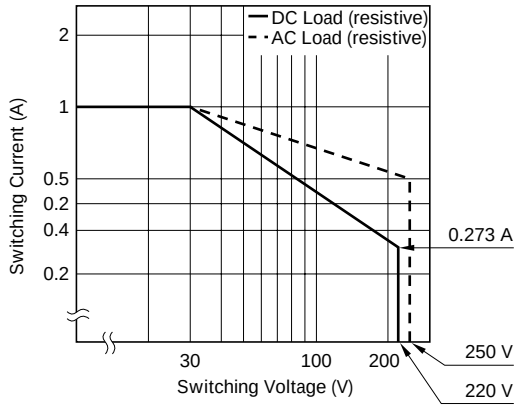
Nominal Coil Voltage (Vdc)	Coil Resistance (Ω) ±10 %		Must Operate Voltage (Vdc)	Must Release Voltage (Vdc)
3	S	64.3	2.25	–
	R	64.3	–	2.25
4.5	S	145	3.38	–
	R	145	–	3.38
5	S	178	3.75	–
	R	178	–	3.75
6	S	257	4.5	–
	R	257	–	4.5
9	S	579	6.75	–
	R	579	–	6.75
12	S	1028	9	–
	R	1028	–	9
24	S	4114	18	–
	R	4114	–	18

Note * Test by pulse voltage

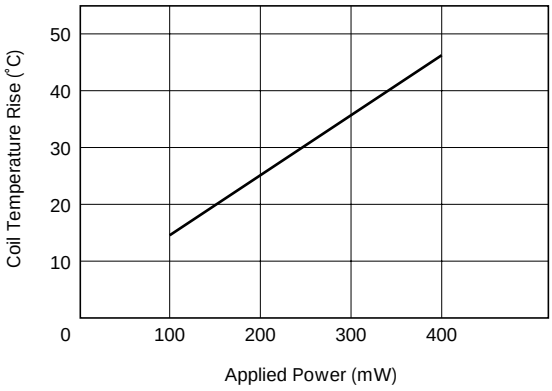
** S : Set coil (pin No.1...⊕, pin No.5...⊖) R: Reset coil (pin No.10...⊕, pin No.6...⊖)
The latch type relays should be initalized at appointed position before using, and should be enegized to specific polanity by a bone polabity to avoid wrong operation.
Any special coil requirement, please contact NEC for availability.

TYPICAL PERFORMANCE DATA

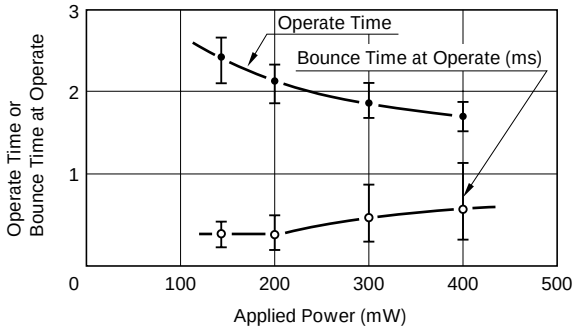
SWITCHING CAPACITY



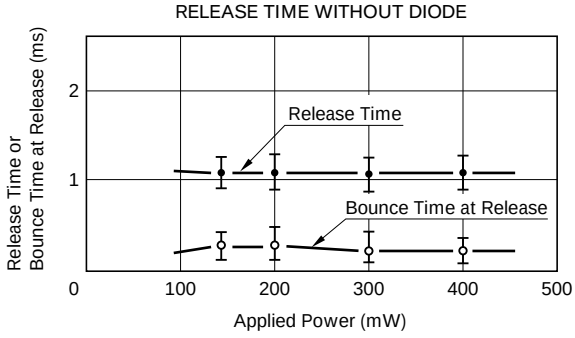
COIL TEMPERATURE RISE



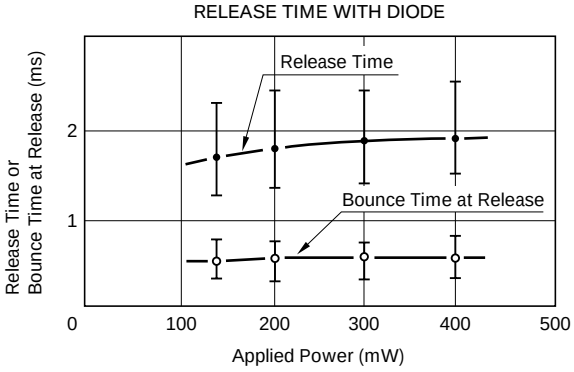
OPERATE TIME



RELEASE TIME WITHOUT DIODE

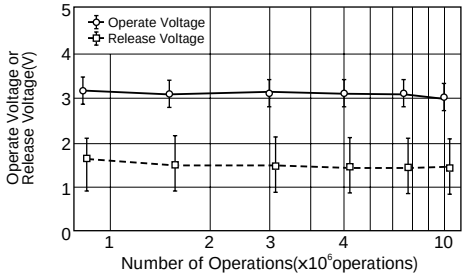


RELEASE TIME WITH DIODE

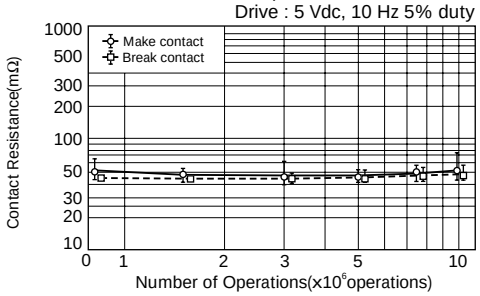


RUNNING SPECIFICATIONS (Noload)

Sample : EE2-5 n=10
Load : None



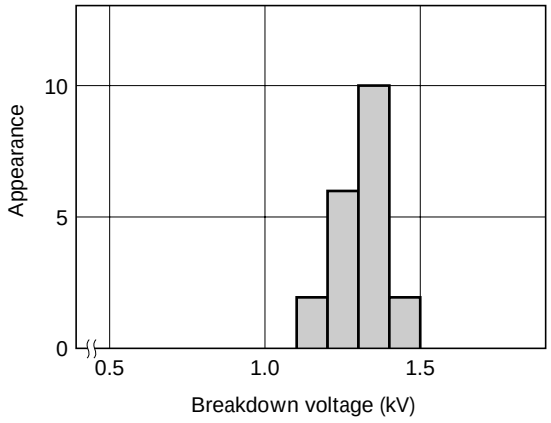
Temperature : 85°C
Drive : 5 Vdc, 10 Hz 5% duty



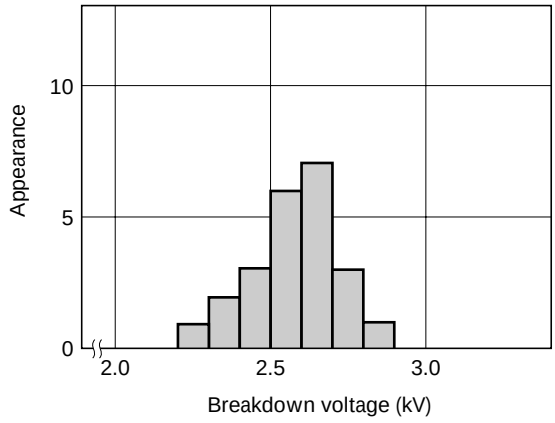
BREAKDOWN VOLTAGE

Sample : EE2-5

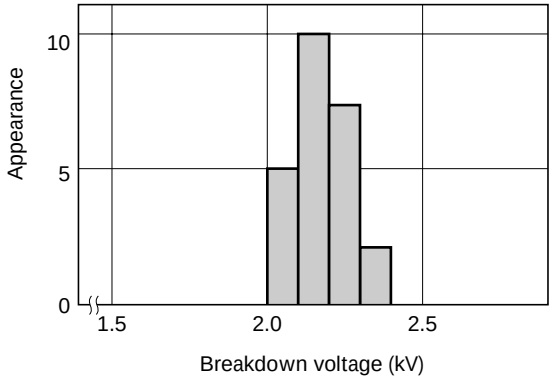
Between Open Contacts (n = 10 pcs)



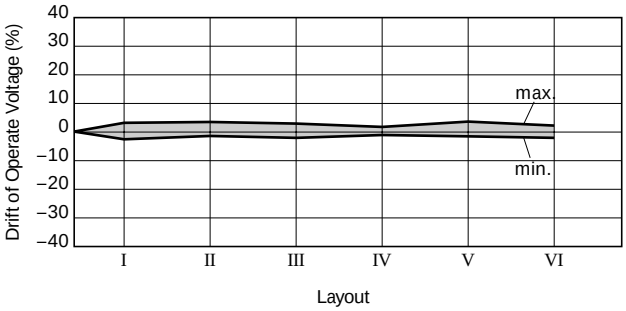
Between Adjacent Contacts (n = 10 pcs)

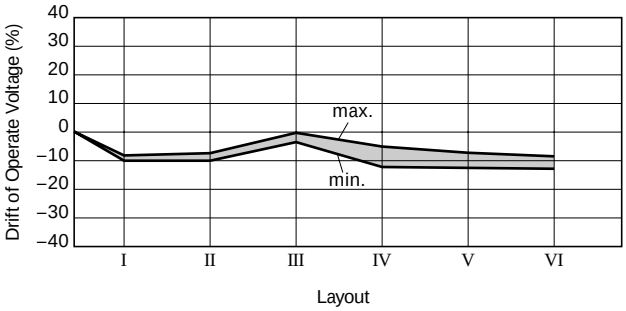


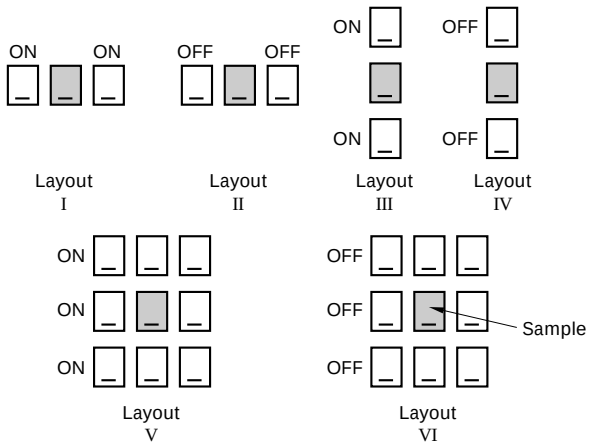
Between Coil and Contact (n = 25 pcs)

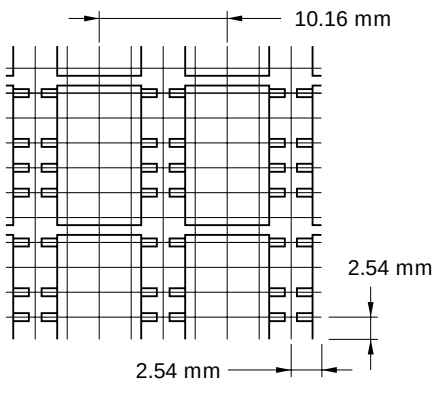


MAGNETIC INTERFERENCE





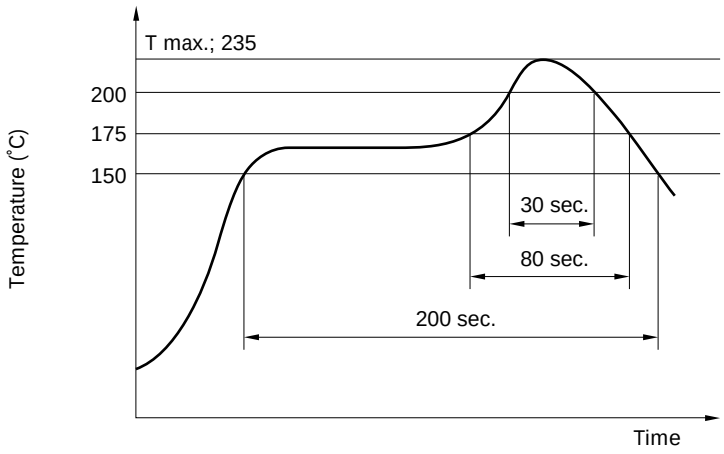




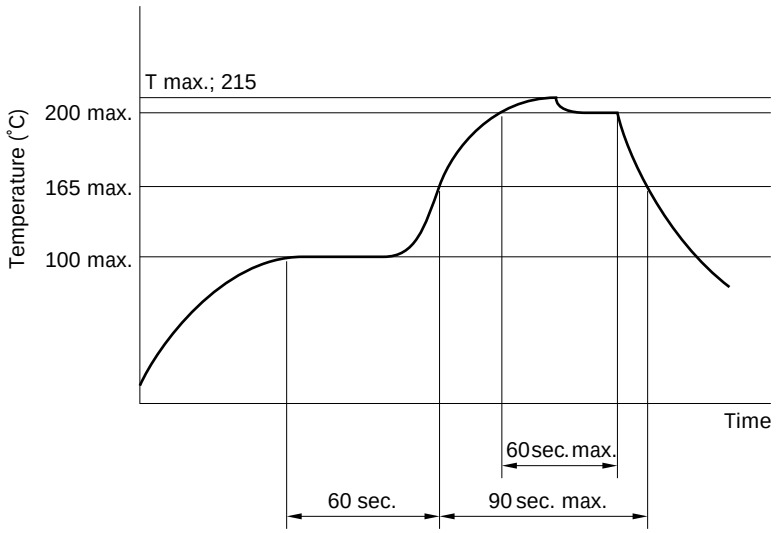
Mounting Layout (mm)

SOLDERING CONDITION

IRS Method



VPS Method



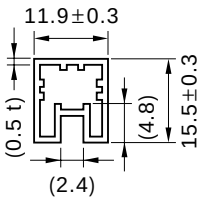
Note:

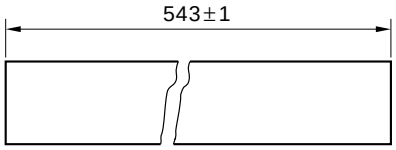
1. Temperature profile shows printed circuit board surface temperature on the relay terminal portion.
2. Check the actual soldering condition to use other method except above mentioned temperature profiles.

TUBE PACKAGE

Dimension of Package (Unit : mm)

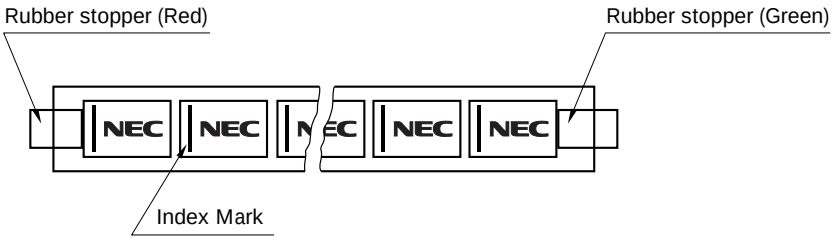
35 pieces / Tube
Material : Polyvinyl chloride
(anti-static treated)





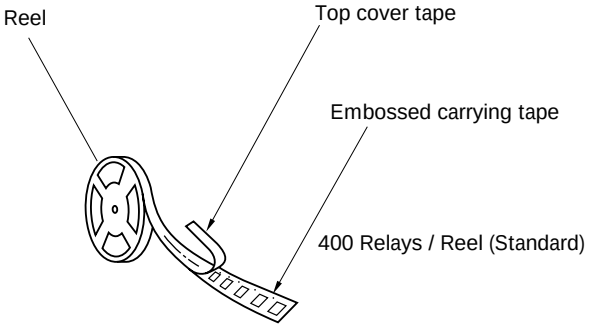
( ) Reference

Outline of Package

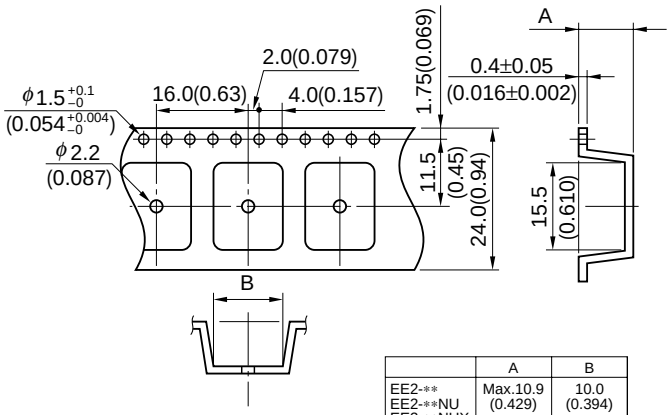


TAPE PACKAGE

APPEARANCE

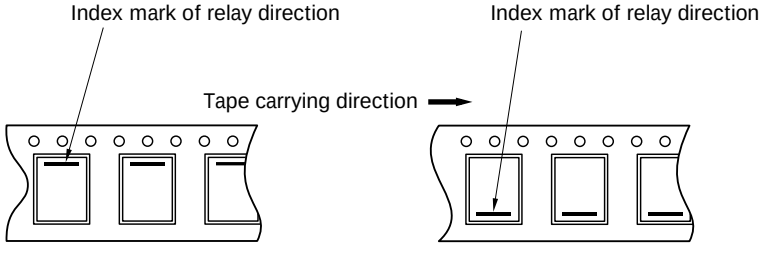


TAPE DIMENSIONS Unit : mm (inch)



	A	B
EE2-** EE2-**NU EE2-**NUX	Max.10.9 (0.429)	10.0 (0.394)
EE2-**NUH EE2-**NUN	Max.11.1 (0.437)	8.0 (0.315)

Relay orientation mark and tape carrying direction.



Carrying tape type	L	R
Part number	EE2.....-L	EE2.....-R

GUIDE TO APPLICATIONS

1. When connecting coils, refer to the pin configuration to prevent misoperation or malfunction.
2. The latch type relay should be initialized at the appointed position (set or reset position) when using, and should be energized or deenergized to the specified polarity to avoid wrong operations by reversed contact state.
3. Ultrasonic cleaning is not recommended to keep contact performance reliable. Alcohol based solvents are available as proper solvents.
4. Pressurized stress on the relay cover may affect reliable operation.
5. Minimum contact load of the relay is 10 mV, 10 μA
   This value is a reference value in the resistance load.
   Minimum capacity changes depending on swiching frequency and environment temperature and the load.

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