

# MINIATURE SIGNAL RELAY EE2 SERIES

## Compact and lightweight, High breakdown voltage, Surface mounting type

#### DESCRIPTION

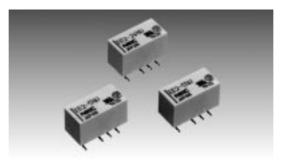
The EE2 series surface-mounting type sustaining high-performance of NEC EC2 series.

#### FEATURES

- Compact and light weight
- 2 form c contact arrangement
- $\circ\,$  Low power consumption
- $\,\circ\,$  Reduced mounting space : 15 mm  $\times\,$  9.5 mm
- High-breakdown voltage of coil to contacts : 1500 Vac, 2500 V (rise time : 2  $\mu$ s, fall time : 10  $\mu$ s)
- 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

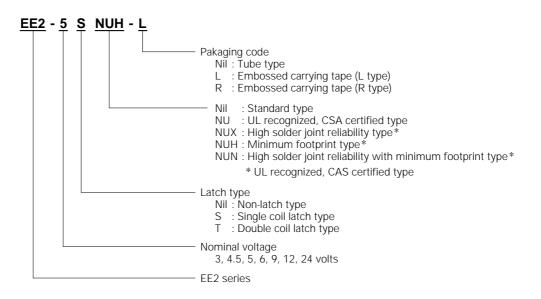
#### DO NOT EXCEED MAXIMUM RATINGS.

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.

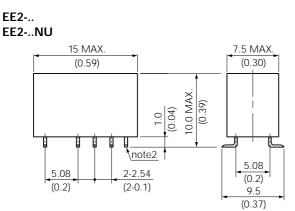
#### READ CAUTIONS IN THE SELECTION GUIDE.

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

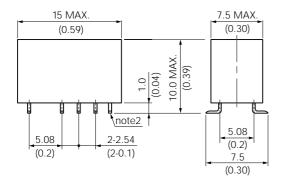
#### PART NUMBER SYSTEM



#### **OUTLINE DRAWINGS AND DIMENSIONS**

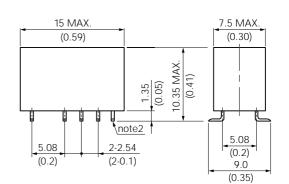


#### EE2-..NUH

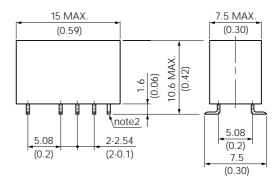


EE2-..NUX

Unit : mm (inch)



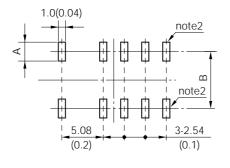




 Note 1. General torelance : ±0.2 (±0.008)
 Note 2. This pair of pins at the right end applies to double coil latch type only.

unit : mm (inch)

#### PAD LAYOUTS (bottom view)



Туре	А	В
EE2	3.0 (0.118)	7.3 (0.287)
EE2NU	3.0 (0.118)	7.3 (0.287)
EE2NUX	2.73 (0.107)	7.02 (0.276)
EE2NUH	2.0 (0.079)	6.29 (0.248)
EE2NUN	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)

Index mark of relay direction  $\bigcirc$ 



1 Part number

④ Date code

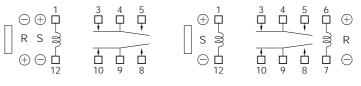
2 Manufacturer3 Country of origin

(pin No.1, 12)

6 UL, CSA Marking

5 Index mark of relay direction

Non-latch type (not energized position)



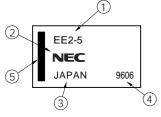
Single coil latch type (reset position)

Double coil latch type (reset position)

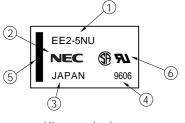
S : Coil polarity of set (operate)

R : Coil polarity of reset (release)

#### MARKINGS (top view)







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
110 Vdc, 0.3	(Resistive) 3A (Resistive) 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 Maximum Switching Power 60 W, 125 VA		60 W, 125 VA		
(UL / CSA Rating)	Maximum Switching Voltage	220 Vdc, 250 Vac		
	Maximum Switching Current	2 A		
	Maximum Carrying Current	2 A		
Minimum Contact Rating	JS	10 mVdc, 10 μA *1		
Initial Contact Resistance	<u>}</u>	50 m $\Omega$ typ. (Initial)		
	Non-Latch Type	140 mW (3 to 12 V), 200 n	רW (24 V)	
Nominal Operating Power	Single Coil Latch Type	100 mW		
	Single Coil Latch Type	140 mW		
Operate Time (Excluding	Fime (Excluding Bounce) Approx. 2 ms			
Release Time (Excluding Bounce) App		Approx. 1 ms without diode		
Insulation Resistance	nsulation Resistance 1000 MΩ at 500 Vdc			
	Between Open Contacts	1000 Vac (for one minute)		
Proakdown Voltago	Between Adjacent Contacts	1500 V surge (10 × 160 μs *2)		
Breakdown Voltage	Between Coil and Contact	1500 Vac (for one minute) 2500 V surge, (2 × 10 μs *3)	Double Coil 1000 Vac (for one minute) Latch type 1500 V surge ( $10 \times 160 \ \mu s *^2$ )	
Shock Resistance		735 m / s² (75 G) (misoperating) 980 m / s² (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	mbient Temperature -40 to 85°C			
Coil Temperature Rise 18 degrees at nominal coil voltage (140 mW)		il voltage (140 mW)		
	No-load	$1 \times 10^8$ *4 operations (Non-latch type) $1 \times 10^7$ operations (latch type)		
Running specifications	Lood	50 Vdc, 0.1 A (resistive) $1 \times 10^6$ operations at 85°C, 2 Hz		
	Load	10 Vdc, 10 mA (resistive) 1 × 10 <sup>6</sup> operations at 85°C, 2 Hz		
Weight Ap		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  $\mu$ s, fall time : 160  $\mu$ s

\*3 rise time : 2  $\mu$ s, fall time : 10  $\mu$ s

\*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 which a steady characteristic is maintained is  $1 \times 10^7$  times.

#### PRODUCT LINEUP

#### Non-latch Type

Non-latch Type			at 20°C
Nominal Coil	Coil	Must Operate	Must Release
Voltage	Resistance	Voltage	Voltage
(Vdc)	(Ω) ±10 %	(Vdc)	(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

Single-Coil Latch Type			at 20°C
Nominal Coil	Coil	Must Operate	Must Release
Voltage	Resistance	Voltage	Voltage
(Vdc)	(Ω) ±10 %	(Vdc)	(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°0

Nominal Coil		Coil	Must Operate	Must Release
Voltage	Res	istance	Voltage	Voltage
(Vdc)	(Ω)	±10 %	(Vdc)	(Vdc)
3	S	64.3	2.25	-
3	R	64.3	-	2.25
	S	145	3.38	-
4.5	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

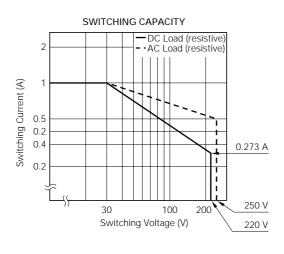
Note \* Test by pulse voltage

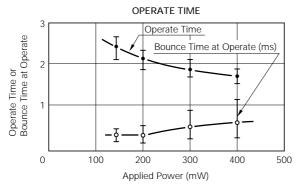
\*\* S : Set coil (pin No.1...⊕, pin No.5...⊖) R: Reset coil (pin No.10...⊕, pin No.6...⊖)

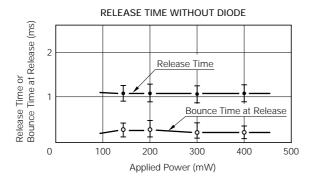
The latch type relays should be initialized at appointed position before using, and should be enegized to specific polanity by a bone polabity to avoid wrong operation.

Any special coil requirement, please contact NEC for availability.

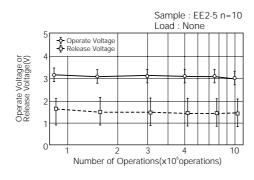
#### TYPICAL PERFORMANCE DATA

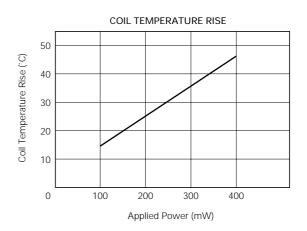


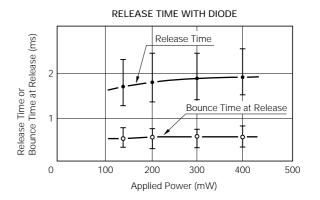


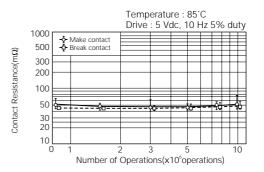


**RUNNING SPECIFICATIONS (Noload)** 

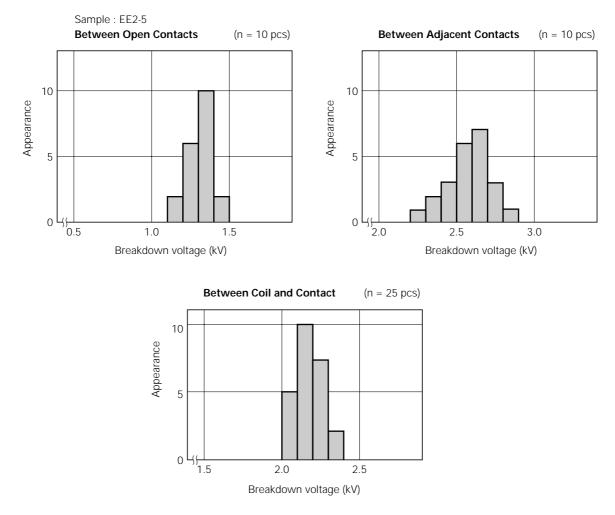








#### **BREAKDOWN VOLTAGE**



#### 40 40 Drift of Operate Voltage (%) Drift of Operate Voltage (%) 30 30 20 20 max 10 10 max 0 0 -10 Τ -10 min min. -20 -20 -30 -30 -40 -40 ш IV Ш II v VI I II IV V I Layout Layout 10.16 mm OFF ON ON OFF OFF ON ON OFF ╞┤╸ ╞┼═ ble Layout II Layout I Layout III Layout IV ∍⊧e ⊐∔c OFF ON ╞┝ ⊒∤e OFF ON ₽⊨ Sample I ON OFF 2.54 mm Layout V Layout VI Mounting Layout (mm)

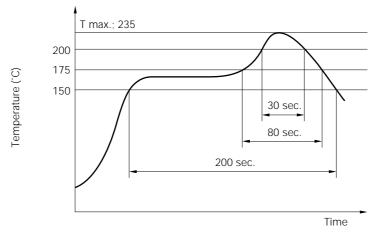
#### MAGNETIC INTERFERENCE

VI

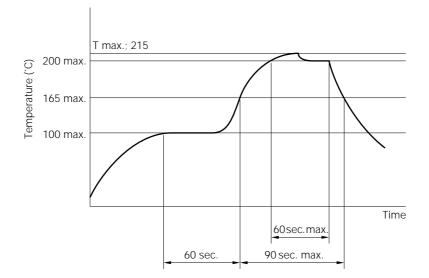
2.54 mm

#### SOLDERING CONDITION

#### IRS Method



#### VPS Method



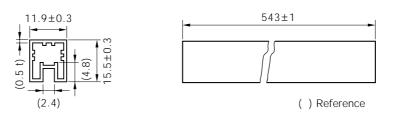
#### Note:

- 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.

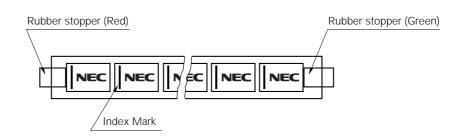
#### **TUBE PACKAGE**

#### Dimension of Package (Unit : mm)

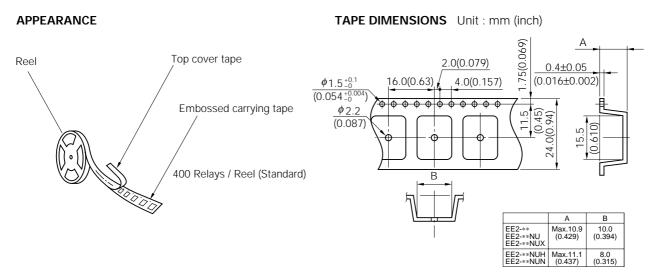
35 pieces / Tube Material : Polyvinyl chloride (anti-static treated)



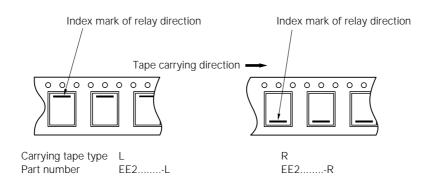
#### **Outline of Package**



#### TAPE PACKAGE



#### Relay orientation mark and tape carrying direction.



#### DATA SHEET ER0017EJ4V0DS00



#### **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.
- 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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- Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
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Anti-radioactive design is not implemented in this product.

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