

DESCRIPTION

The NEC TOKIN EP2 / EP1 series are PC-board mount type automotive relays suitable for various motor controls and other applications that require a high level of quality and performance.

EP2 series is a twin-relay and divided into two types for different usage.

One is an H-bridge type designed for forward and reverse control of the motors, and the other, a separate type containing two separated relays in one package.

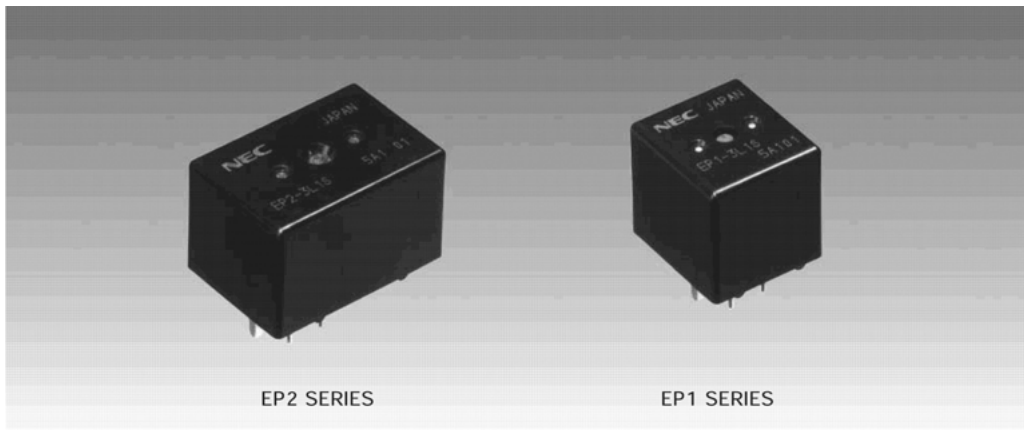
EP1 series is a 1 Form c relay equivalent to EP2 series in performance.

FEATURES

- For motor reversible control and solenoid control
- Approx. 50% less relay space than conventional relay
- High performance and productivity by unique structure
- Flux tight housing

APPLICATIONS

- Power window
- Antenna lifter
- Auto-seat positioning
- Electrical door lock
- Passive seat belt control
- Keyless/Remote entry system
- Sliding roof control



The information in this document is subject to change without notice.

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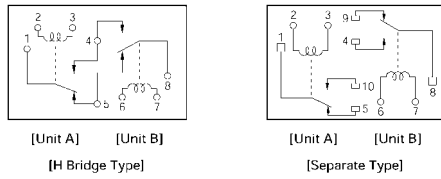
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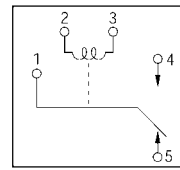
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SCHEMATIC (BOTTOM VIEW)

EP2 SERIES

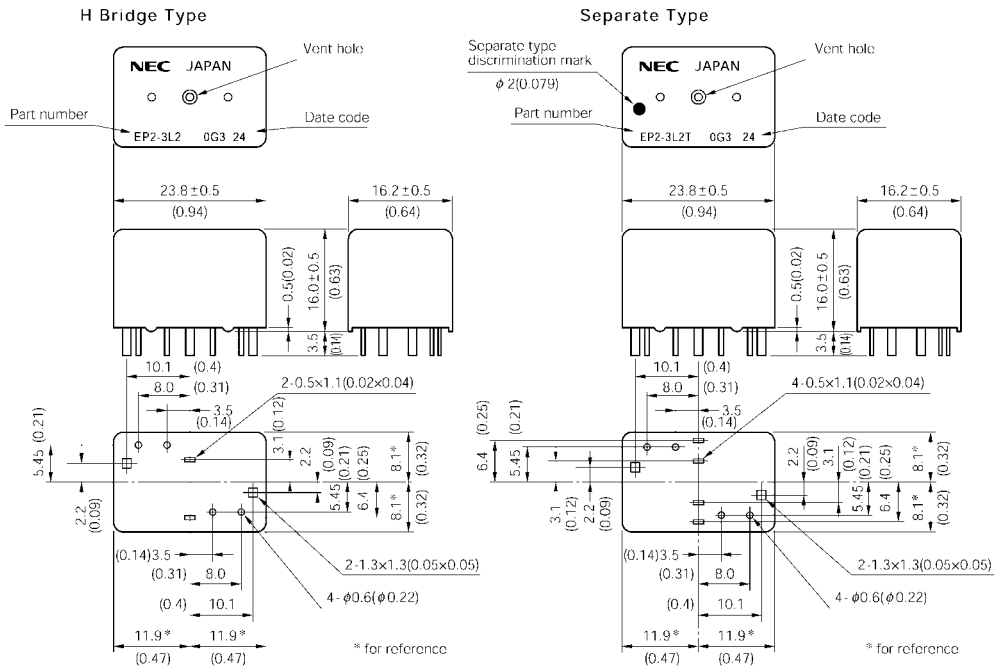


EP1 SERIES



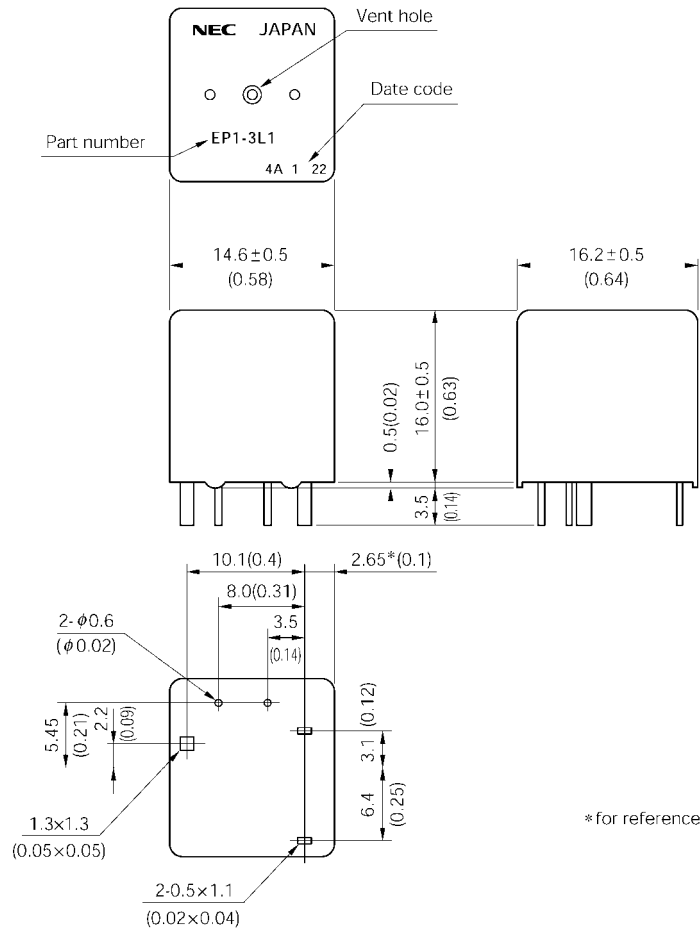
DIMENSIONS mm (inch)

EP2 SERIES

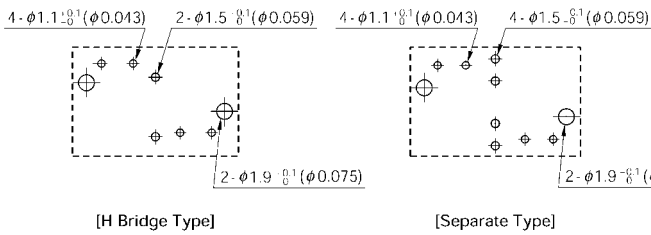


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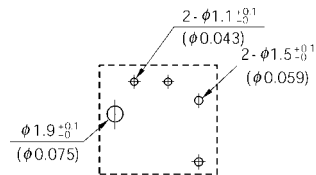
EP1 SERIES



PCB PAD LAYOUT mm (inch) (BOTTOM VIEW)
EP2 SERIES



EP1 SERIES



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SPECIFICATIONS

at 25°C(77°F)

| Items | EP2 | EP1 |
|---------------------------|--|---|
| Contact Form | 1 Form c × 2 (H bridge type and separate type) | 1 Form c |
| Contact Material | Silver oxide complex alloy(special type available) | |
| Contact Resistance | 50 mΩ max. (measured at 7 A) initial | |
| Contact Switching Voltage | 16 Vdc max. | |
| Contact Switching Current | 25 A max. (at 16 Vdc) | |
| Contact Carrying Current | 20 A max. (1 hour max.), 25 A max. (2 minutes max.) at 12 Vdc | 25 A max. (1 hour max.), 30 A max. (2 minutes max.) at 12 Vdc |
| Operate Time | Approx. 5 ms (at 12 Vdc) initial | |
| Release Time | Approx. 2 ms (at 12 Vdc) initial. without diode | |
| Normal Operate Power | 0.48 W / 0.64 W (at 12 Vdc) | |
| Insulation Resistance | 100 MΩ min. (at 500 Vdc) initial | |
| Breakdown Voltage | 500 Vdc min. (for 1 minute) initial | |
| Shock Resistance | 98 m / s ² [10 G] min. (misoperating), 980 m / s ² [100 G] min. (destructive failure) | |
| Vibration Resistance | 10 to 300 Hz, 43 m/s ² [4.4 G] min. (misoperating) 10 to 500 Hz, 43 m/s ² , [4.4 G] 200 hours (destructive failure) | |
| Ambient Temperature | -40 °C to +85 °C (-40 °F to +185 °F) | |
| Coil Temperature | 50 °C / W (122 °F/W)(contact carrying current 0 A) | |
| Life Expectancy | Mechanical | 1 × 10 ⁶ operations |
| | Electrical | 100 × 10 ³ operations (at 14 Vdc. Motor Load 20 A / 3 A) |
| Weight | Approx. 15 gn (0.53oz) | Approx. 8 gr (0.28 oz) |

COIL RATING

EP2 SERIES

at 25°C(77°F)

| Part Number | | Nominal Voltage (Vdc) | Coil Resistance (Ω ±10%) | Nominal Current (mA) | Must Operate Voltage (Vdc max.) | Must Release Voltage (Vdc min.) | Nominal Operate Power (W) |
|---------------|---------------|-----------------------|--------------------------|----------------------|---------------------------------|---------------------------------|---------------------------|
| H Bridge Type | Separate Type | | | | | | |
| EP2-3L1 | EP2-3L1T | 12 | 225 | 53.5 | 6.5 | 0.9 | 0.64 |
| EP2-3L2 | EP2-3L2T | 12 | 225 | 53.5 | 7.0 | 0.9 | 0.64 |
| EP2-3L3 | EP2-3L3T | 12 | 225 | 53.5 | 7.5 | 0.9 | 0.64 |
| EP2-4L3 | EP2-4L3T | 12 | 300 | 40.0 | 7.5 | 0.9 | 0.48 |
| EP2-4L4 | EP2-4L4T | 12 | 300 | 40.0 | 8.0 | 0.9 | 0.48 |
| EP2-4L5 | EP2-4L5T | 12 | 300 | 40.0 | 8.5 | 0.9 | 0.48 |

* High carrying current type available

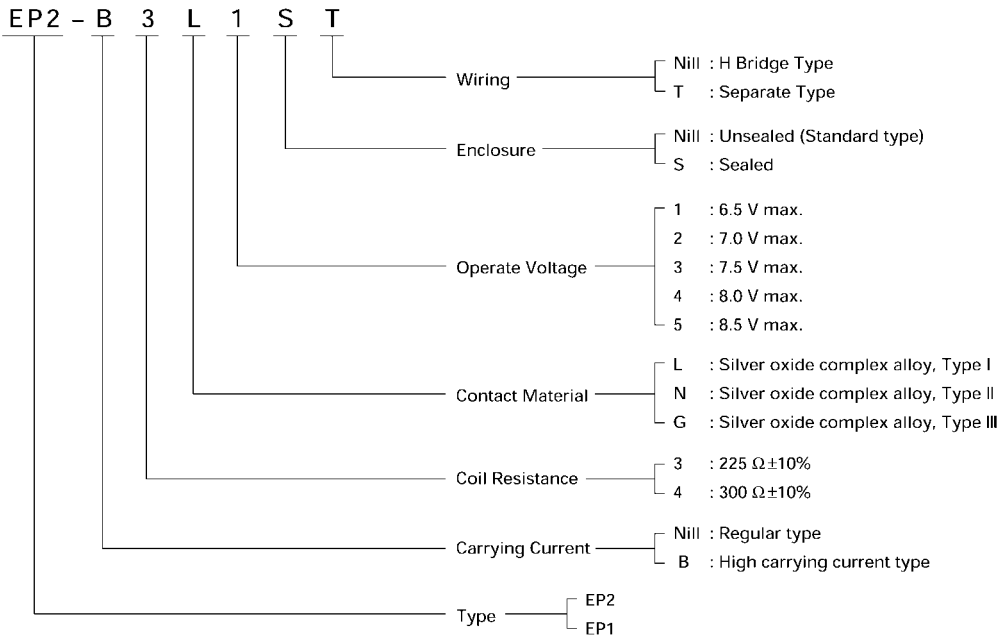
EP1 SERIES

| Part Number | | Nominal Voltage (Vdc) | Coil Resistance (Ω ±10%) | Nominal Current (mA) | Must Operate Voltage (Vdc max.) | Must Release Voltage (Vdc min.) | Nominal Operate Power (W) |
|--------------|----------------------------|-----------------------|--------------------------|----------------------|---------------------------------|---------------------------------|---------------------------|
| Regular Type | High Carrying Current Type | | | | | | |
| EP1-3L1 | EP1-B3G1 | 12 | 225 | 53.3 | 6.5 | 0.9 | 0.64 |
| EP1-3L2 | EP1-B3G2 | 12 | 225 | 53.3 | 7.0 | 0.9 | 0.64 |
| EP1-3L3 | EP1-B3G3 | 12 | 225 | 53.3 | 7.5 | 0.9 | 0.64 |
| EP1-4L3 | EP1-B4G3 | 12 | 300 | 40.0 | 7.5 | 0.9 | 0.48 |
| EP1-4L4 | EP1-B4G4 | 12 | 300 | 40.0 | 8.0 | 0.9 | 0.48 |
| EP1-4L5 | EP1-B4G5 | 12 | 300 | 40.0 | 8.5 | 0.9 | 0.48 |

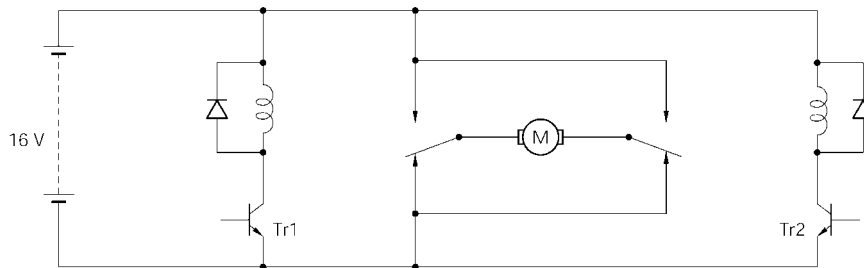


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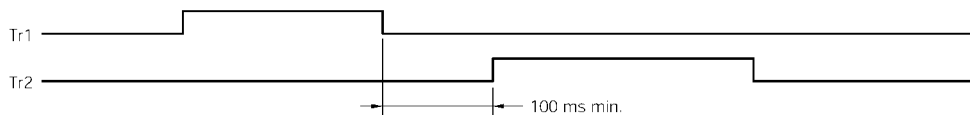
NUMBERING SYSTEM



TYPICAL APPLICATION (H Bridge Type)



| | | |
|---------|-----|-----|
| MOTOR | Tr1 | Tr2 |
| STOP | off | off |
| FORWARD | on | off |
| REVERSE | off | on |



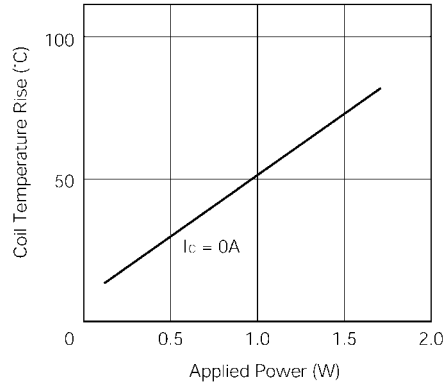
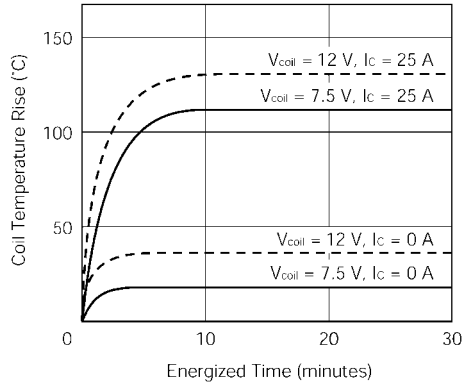
It is necessary to take more than 100 ms intervals for on / off timing between driving Tr1 and Tr2. If the interval is less than 100 ms, an excessive current happens to flow to the relay contacts.



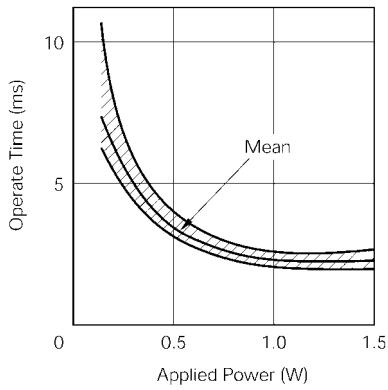
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TECHNICAL DATA

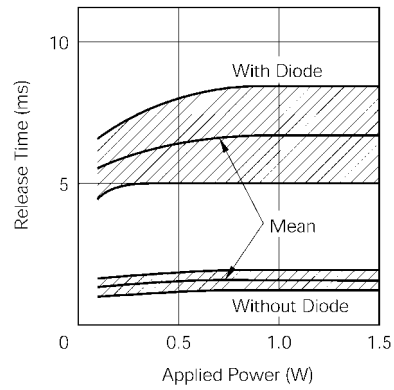
Coil Temperature Rise (EP2-3L1)



Operate Time (EP2-3L1)



Release time (EP2-3L1)



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"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

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)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC/TOKIN devices is "Standard" unless otherwise specified in NEC/TOKIN's Data Sheets or Data Books. If customers intend to use NEC/TOKIN devices for applications other than those specified for Standard quality grade, they should contact an NEC/TOKIN sales representative in advance.

(Note)

- (1) "NEC/TOKIN" as used in this statement means NEC/TOKIN Corporation and also includes its majorityowned subsidiaries.
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DE0202

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