

**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.

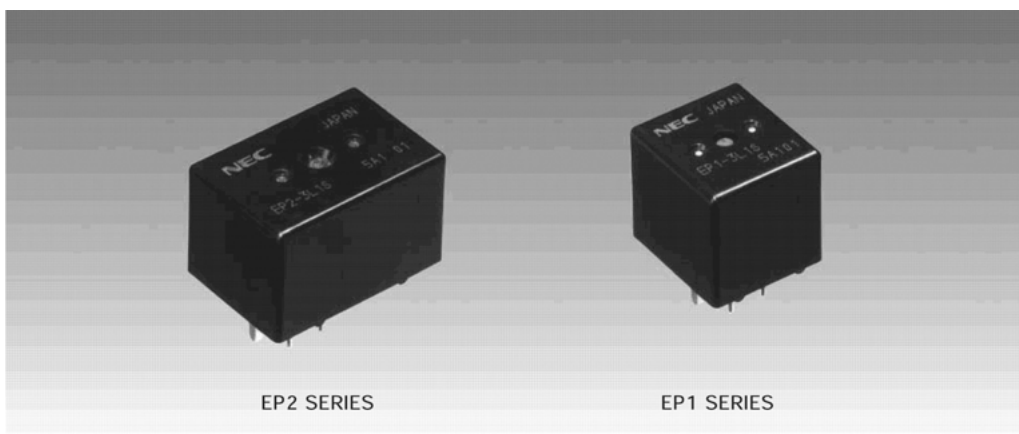
EP1 series is a 1 Form c relay equivalent to EP2 series in performance.

**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.

Date Published August 2002 M  
Printed in Japan

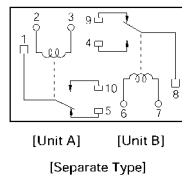
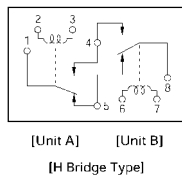
© NEC TOKIN Corporation 2002



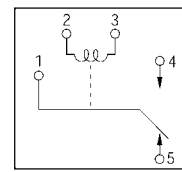
- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact NEC Tokin for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

SCHEMATIC (BOTTOM VIEW)

EP2 SERIES

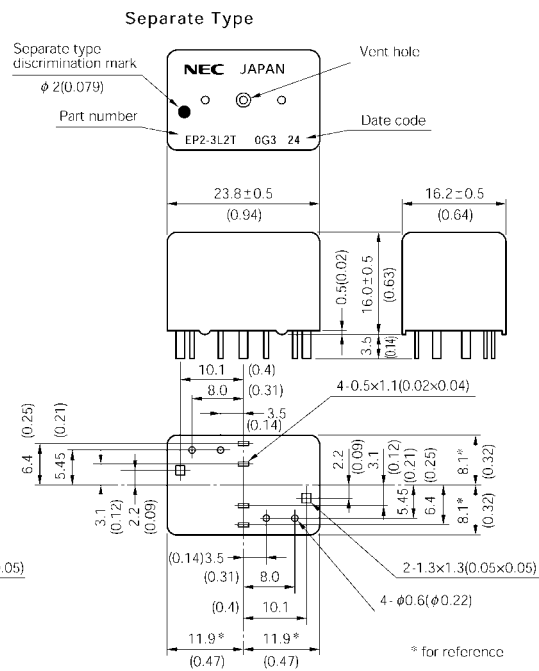
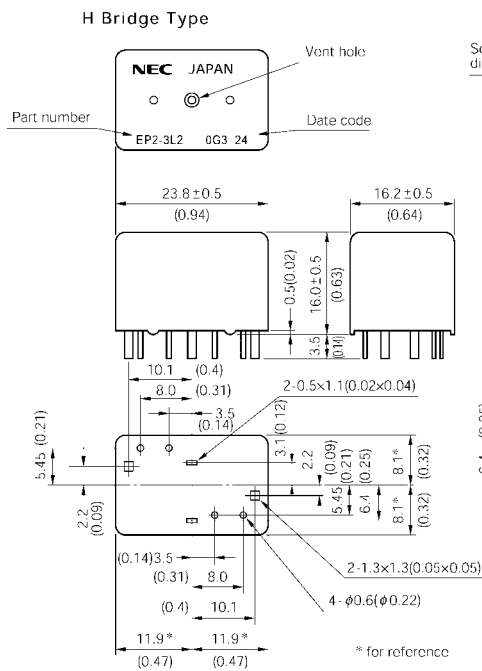


EP1 SERIES



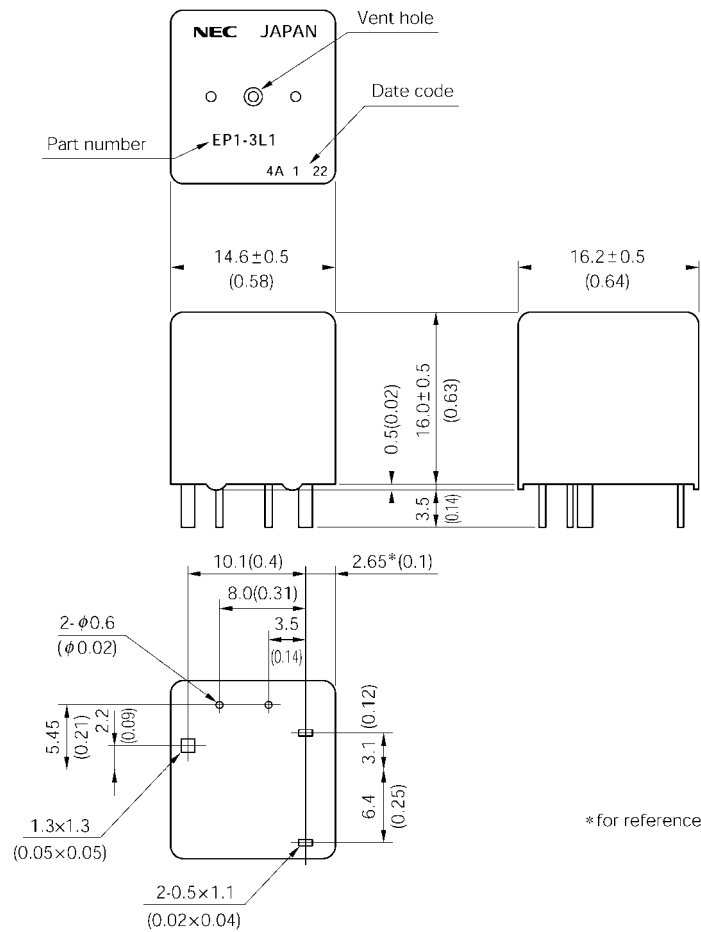
DIMENSIONS mm (inch)

EP2 SERIES

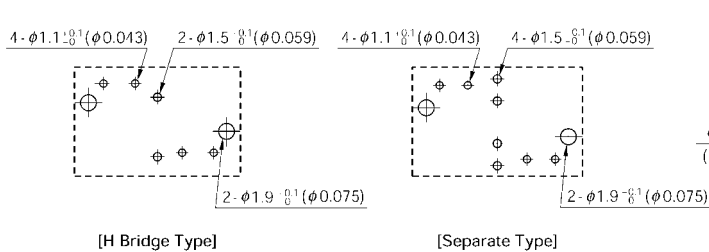


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact NEC Tokin for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

EP1 SERIES



PCB PAD LAYOUT mm (inch) (BOTTOM VIEW)



- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact NEC Tokin for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

## 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 <sup>2</sup> [10 G] min. (misoperating), 980 m / s <sup>2</sup> [100 G] min. (destructive failure)	
Vibration Resistance		10 to 300 Hz, 43 m/s <sup>2</sup> [4.4 G] min. (misoperating) 10 to 500 Hz, 43 m/s <sup>2</sup> , [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 <sup>6</sup> operations	
	Electrical	100 × 10 <sup>3</sup> 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

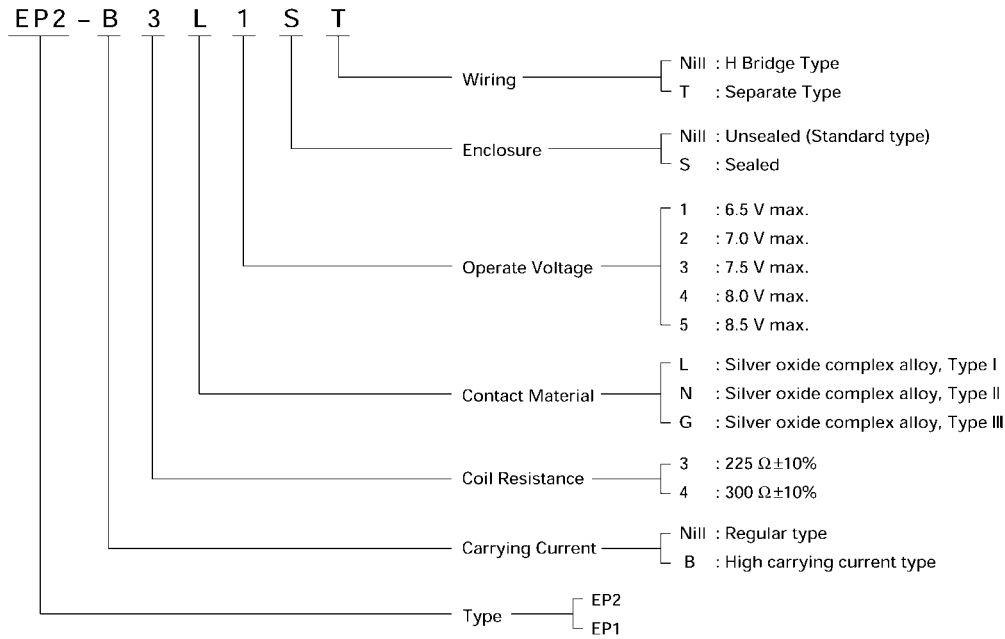
## EP1 SERIES

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

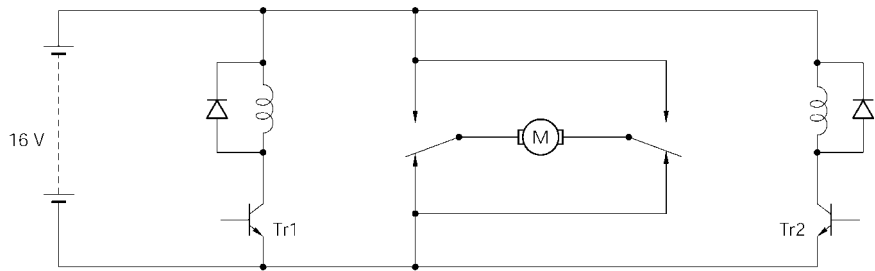


- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact NEC Tokin for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

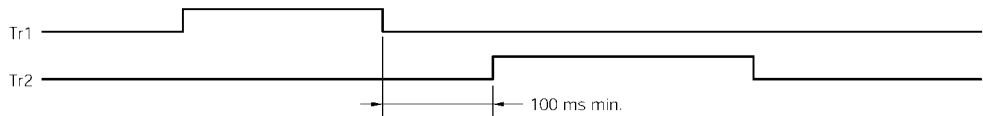
NUMBERING SYSTEM



TYPICAL APPLICATION (H Bridge Type)



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



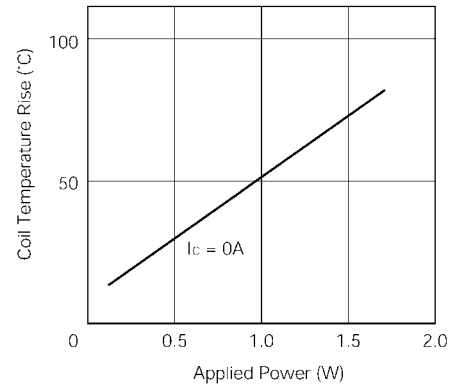
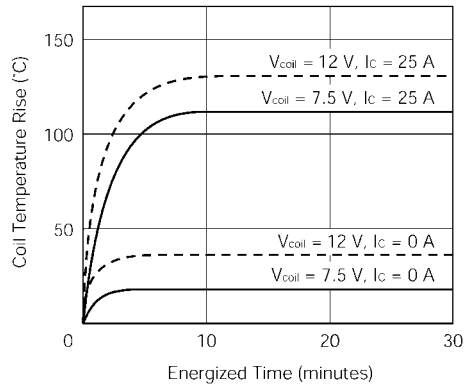
It is necessary to take more than 100 ms intervals for on / off timing between driving Tr1 and Tr2. If the interval is less than 100 ms, an excessive current happen to flow to the relay contacts.



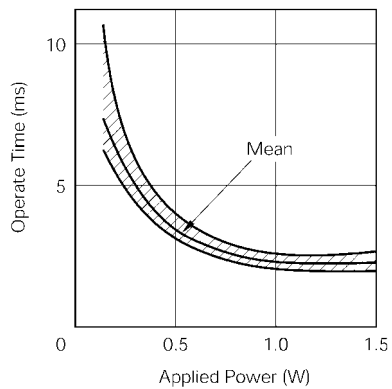
- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact NEC Tokin for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

## TECHNICAL DATA

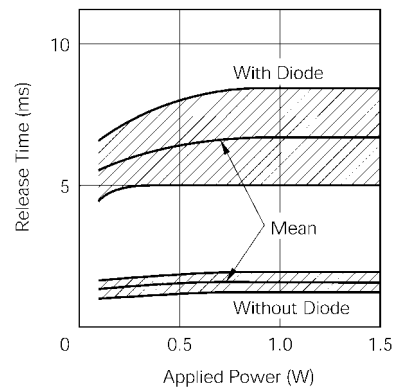
## Coil Temperature Rise (EP2-3L1)



## Operate Time (EP2-3L1)



## Release time (EP2-3L1)



- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact NEC Tokin for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.



- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact NEC Tokin for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.

No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC/TOKIN Corporation. NEC/TOKIN Corporation assumes no responsibility for any errors which may appear in this document.

NEC/TOKIN Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC/TOKIN Corporation or others. While NEC/TOKIN Corporation has been making continuous effort to enhance the reliability of its electronic components, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC/TOKIN electronic component, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features. NEC/TOKIN devices are classified into the following three quality grades:

"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.
- (2) "NEC/TOKIN electronic component products" means any electronic component product developed or manufactured by or for NEC/TOKIN (as defined above).

DE0202

Printed on recycled paper



- All specifications in this catalog and production status of products are subject to change without notice. Prior to the purchase, please contact NEC Tokin for updated product data.
- Please request for a specification sheet for detailed product data prior to the purchase.
- Before using the product in this catalog, please read "Precautions" and other safety precautions listed in the printed version catalog.