NEC

AUTOMOTIVE RELAYS
EP2S/EP1S SERIES

LOW SOUND PRESSURE

DESCRIPTION

The NEC EP2S / EP1S 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.

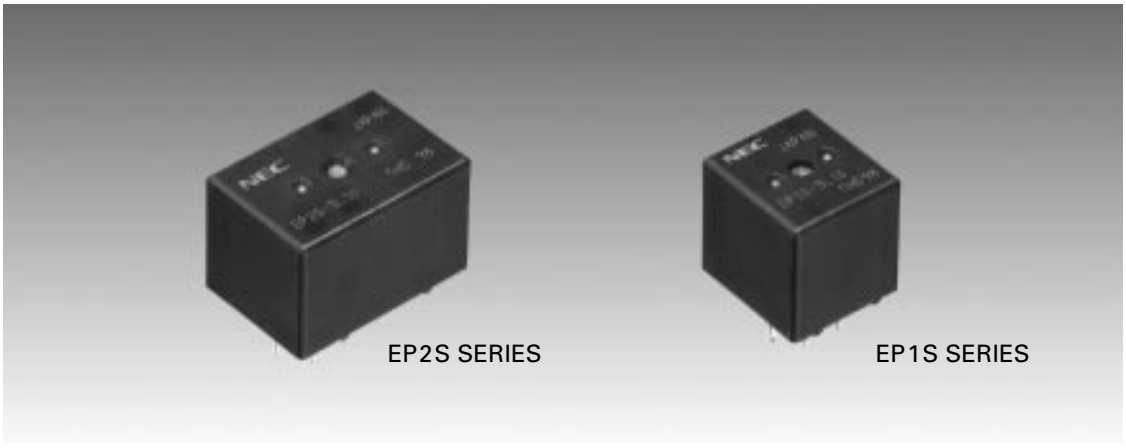
The sound pressure level of EP2S / EP1S series is 57 dBA nominal when the relay operates, and 49 dBA nominal when the relay releases.

FEATURES

- Less sound pressure (–10 dB at “operate” and –3 dB at “release” compared with EP2 / EP1)
- For motor and solenoid reversible control
- High performance and productivity by unique structure
- Flux tight housing

APPLICATION

- Power window control
- Electrical door lock
- Wiper system



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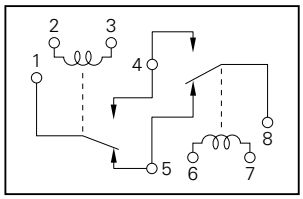
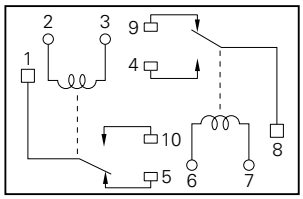
SCHEMATIC (BOTTOM VIEW)

EP2S SERIES



[Unit A] [Unit B]

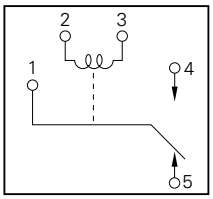
[H Bridge Type]



[Unit A] [Unit B]

[Separate Type]

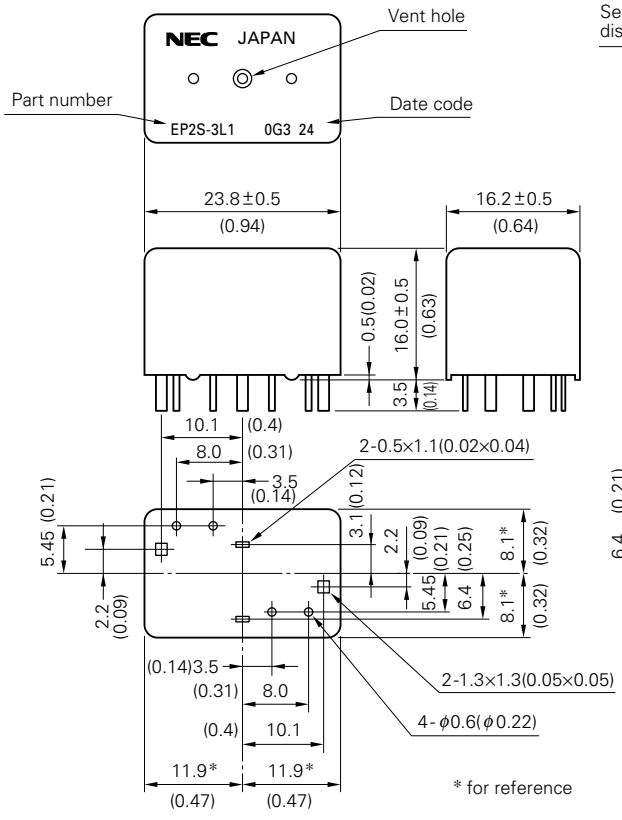
EP1S SERIES



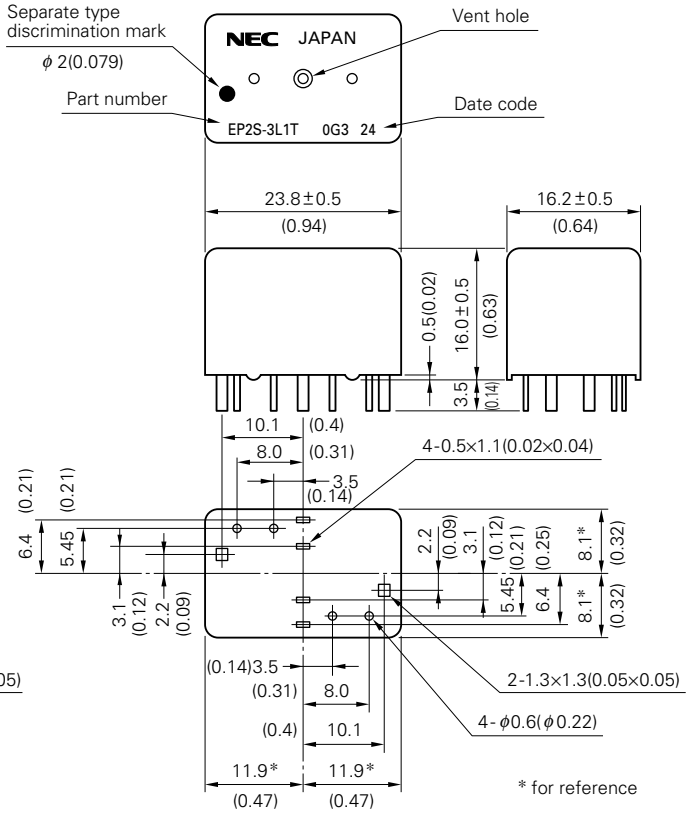
DIMENSIONS mm (inch)

EP2S SERIES

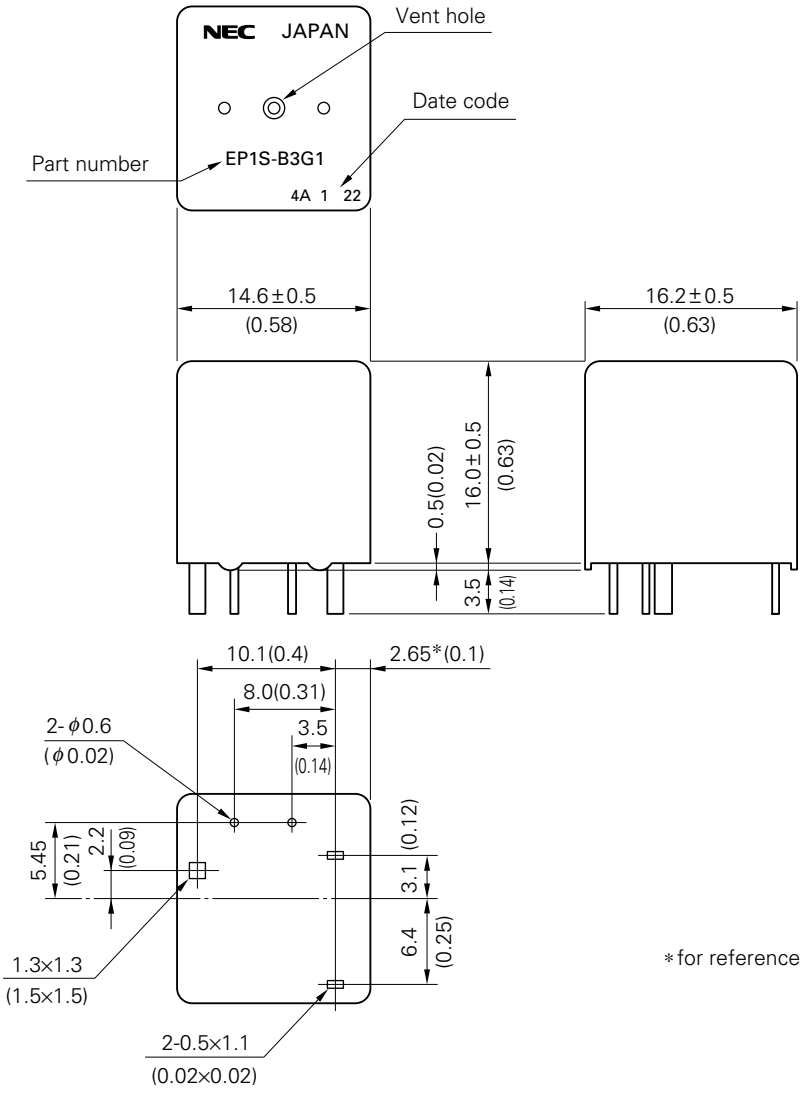
H Bridge Type



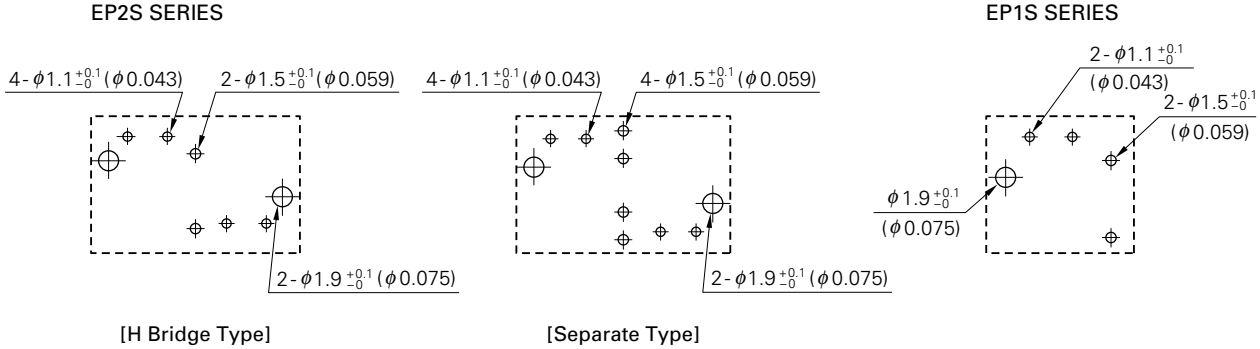
Separate Type



EP1S SERIES



PCB PAD LAYOUT mm (inch) (BOTTOM VIEW)



SPECIFICATIONS

at 25 ˚C (77 ˚F)

Items			EP2S	EP1S
Contact Form			1 form C×2 (H bridge type and separate type)	1 form C
Contact Material			Silver oxide complex alloy	
Contact Resistance			50 mΩ max. (measured at 7 A) initial	
Contact Switching Voltage			16 Vdc max.	
Contact Switching Current			25 A max.	
Contact Carrying Current			20 A / regular type (2 minutes max. 12 Vdc at 85˚C) 25 A / high carrying current type (2 minutes max. 12 Vdc at 85˚C)	25 A / regular type (2 minutes max. 12 Vdc at 85˚C) 30 A / high carrying current type (2 minutes max. 12 Vdc at 85˚C)
Operate Time			Approx. 5 ms (at 12 Vdc excluding bounce) initial	
Release Time			Approx. 2 ms (at 12 Vdc excluding bounce) initial	
Normal Operate Power			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 [Approx. 10 G] min. (misoperating)	
Vibration Resistance			10 to 300 Hz, 43 m / s^2 [Approx. 4.4 G] min. (misoperating)	
Ambient Temperature			–40˚C to +85˚C (–40 ˚F to +185˚F)	
Coil Temperature Rise			50 ˚C / W (without contact carrying current)	
Life Expectancy	Mechanical		1×10^6 operations	
	Electrical	Contact G	1×10^5 operations (at 14 Vdc, Motor Load 25 A / 7 A)	
		Contact L or N	1×10^5 operations (at 14 Vdc, Motor Load 20 A / 3 A)	
Weight			Approx. 15 gr	Approx. 8 gr

SOUND PRESSURE LEVEL (for reference)

	Sound Pressure level Fast (F) *
Operate (at 12 Vdc drive with diode)	57 dBA nominal
Relese (at 12 Vdc drive with diode)	49 dBA nominal

* Refer to the measuring condition in the figure of sound pressure level distribution on page 7.

COIL RATING

EP2S SERIES

at 25 ˚C (77 ˚F)

Part Number		Nominal Voltage (Vdc)	Coil Resistance (Ω±10 %)	Must Operate Voltage (Vdc max.)	Must Release Voltage (Vdc min.)	Nominal Operate Power (W)
H Bridge Type	Separate Type					
EP2S-3L1	EP2S-3L1T	12	225	6.5	0.9	0.64
EP2S-3L2	EP2S-3L2T	12	225	7.0	0.9	0.64
EP2S-3L3	EP2S-3L3T	12	225	7.5	0.9	0.64
EP2S-4L3	EP2S-4L3T	12	300	7.5	0.9	0.48
EP2S-4L4	EP2S-4L4T	12	300	8.0	0.9	0.48
EP2S-4L5	EP2S-4L5T	12	300	8.5	0.9	0.48

* High carrying current type available

EP1S SERIES

Part Number		Nominal Voltage (Vdc)	Coil Resistance (Ω±10 %)	Must Operate Voltage (Vdc max.)	Must Release Voltage (Vdc min.)	Nominal Operate Power (W)
Regular Type	High Carrying Current Type					
EP1S-3L1	EP1S-B3G1	12	225	6.5	0.9	0.64
EP1S-3L2	EP1S-B3G2	12	225	7.0	0.9	0.64
EP1S-3L3	EP1S-B3G3	12	225	7.5	0.9	0.64
EP1S-4L3	EP1S-B4G3	12	300	7.5	0.9	0.48
EP1S-4L4	EP1S-B4G4	12	300	8.0	0.9	0.48
EP1S-4L5	EP1S-B4G5	12	300	8.5	0.9	0.48

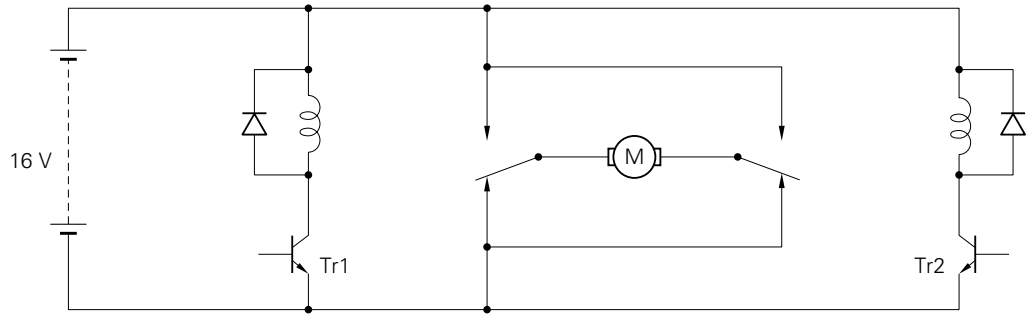
NUMBERING SYSTEM

EP2S – B 3 L 1 S T

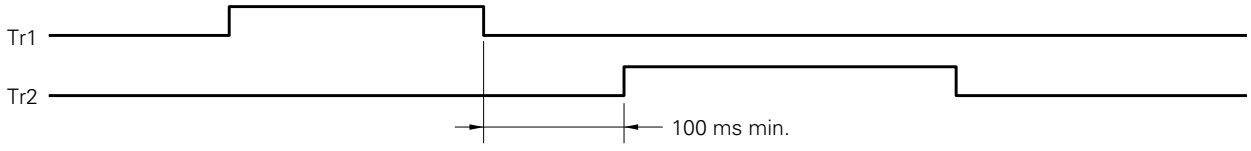
- Wiring: Nil : H Bridge Type; T : Separate Type
- Enclosure: Nil : Unsealed (Standard type); T : Sealed
- Operate Voltage (at 25˚C): 1 : 6.5 V max.; 2 : 7.0 V max.; 3 : 7.5 V max.; 4 : 8.0 V max.; 5 : 8.5 V max.
- Contact Material: L : Silver oxide complex alloy, Type I; N : Silver oxide complex alloy, Type II; G : Silver oxide complex alloy, Type III
- Coil Resistance: 3 : 225 Ω±10%; 4 : 300 Ω±10%
- Carrying Current: Nil : Regular type; B : high carrying current type
- Type: EP2S; EP1S

TYPICAL APPLICATION (H Bridge Type)

MOTOR



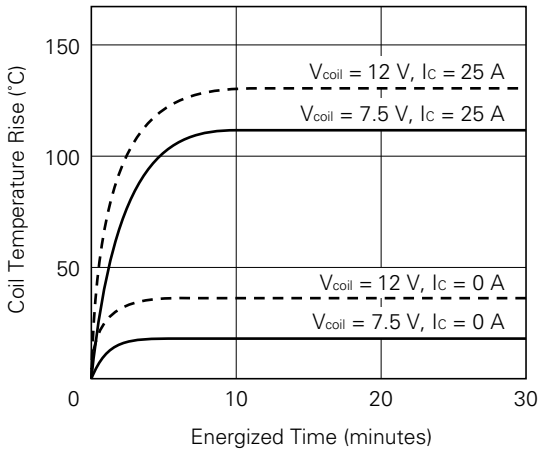
	Tr1	Tr2
STOP	off	off
FORWARD	on	off
REVERSE	off	on

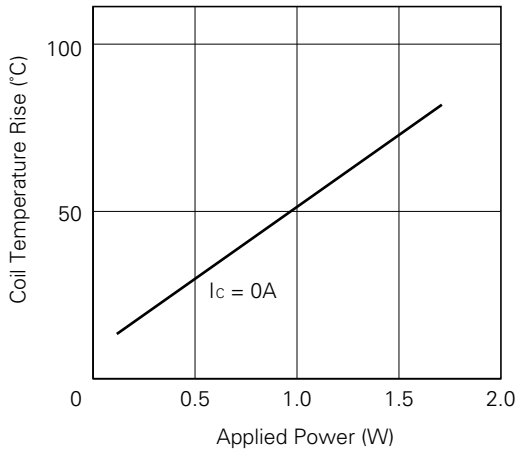


It is necessary to take more than 100 msec intervals for on / off timing between driving Tr1 and Tr2. If the interval is less than 100 msec, an excessive current happen to flow to the relay contacts.

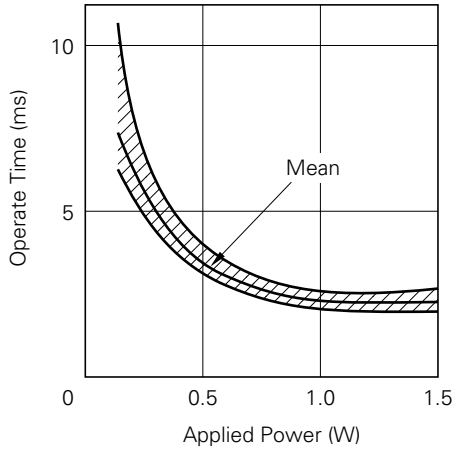
TECHNICAL DATA

Coil Temperature (EP2S-3L1)

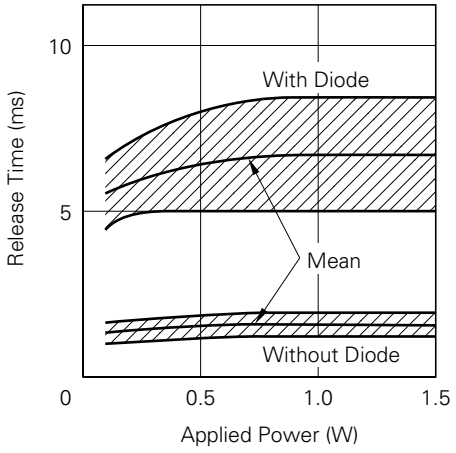




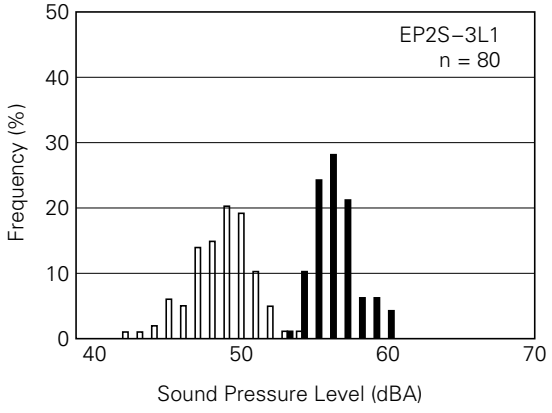
Operate Time (EP2S-3L1)

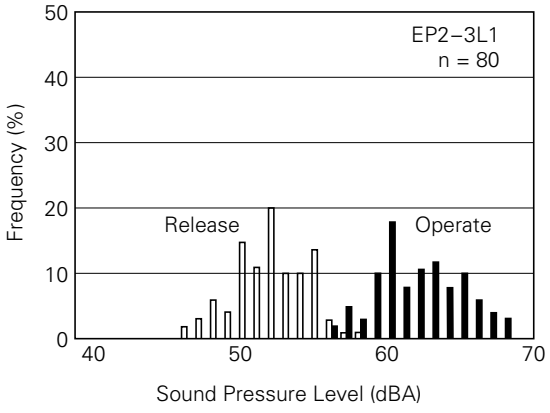


Release time (EP2S-3L1)



Distribution of Sound Pressure Level (for reference)





Measuring Condition

Measuring Equipment : Precision Sound Meter
Detector-indicator Characteristic : Fast (F) specified in IEC 651
Relay Drive : 12 Vdc (Diode clamped)
Distance between Microphone and Sample : 50 mm
Background Noise : less than 35 dB (A)
(A) : Frequency Weighting Characteristic specified in IEC 651