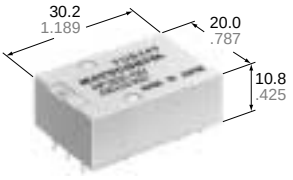
CSA pending

# NAiS FLATPACK RELAY NF-RELAYS




mm inch

## FEATURES

**1. Flatpack**

**2. Long seller**

## SPECIFICATIONS

### Contacts

| | | | |
|---|---|---|---|
| Arrangement[1] | | | 2 Form C, 4 Form C |
| Initial contact resistance (By voltage drop 6 V DC 1 A) | | Max. | 50 mOhm |
| | | Typical | 25 mOhm |
| Contact material | Movable contact | | Gold-clad silver |
| | Stationary contact | | Gold-clad silver |
| Rating, (resistive load) | Max. switching power | | 60 W 100 VA |
| | Max. switching voltage | | 220 V AC, DC |
| | Max. switching current | | 2 A |
| Expected life (min. operations) | Mechanical | | $10^8$ |
| | Electrical (Resistive) | 2 A 30 V DC | $2 \times 10^5$ |
| | | 1 A 30 V DC | $10^6$ |
| | | 0.5 A 30 V DC | $10^7$ |

[1]. MBB types available: 2MBB & 4MBB
(See next page for contact positions.)

### Coil

| | | |
|---|---|---|
| Nominal operating power, at 25∞C | 2C | Approx. 300 mW |
| | 4C | Approx. 480 mW |
| Max. operating power for continuous duty | | Approx. 1 W at 40°C 104°F |

**Remarks**

* Specifications will vary with foreign standards certification ratings.
*1 Measurement at same location as "Initial breakdown voltage" section
*2 Detection current: 10 mA
*3 Excluding contact bounce time
*4 Half-wave pulse of sine wave: 11ms; detection time: 10µs
*5 Half-wave pulse of sine wave: 6ms
*6 Detection time: 10µs
*7 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61).

### Characteristics (at 25°C 77°F, 50% R.H. seal level)

| | | | |
|---|---|---|---|
| Max. operating speed | | | 50 cps |
| Initial insulation resistance*1 | | | 1,000 MOhm at 500 V DC |
| Electrostatic capacitance | Contact/Contact | | Approx. 4 pF |
| | Contact/Coil | | Approx. 7 pF |
| | Contact/Ground | | Approx. 6 pF |
| Initial breakdown voltage*2 | Between open contacts | | 750 Vrms |
| | Between contact sets | | 1,000 Vrms |
| | Between live parts and ground | | 1,000 Vrms |
| | Between contacts and coil | | 1,000 Vrms |
| Operate time*3 (at nominal voltage) | | | Max. 15 ms (Approx. 10 ms) |
| Release time (without diode)*3 (at nominal voltage) | | | Max. 10 ms (Approx. 3 ms) |
| Contact bounce | | | Approx. 1.5 ms |
| Shock resistance | Functional*4 | In de-energized condition | Min. 29.4 m/s² {3 G} (In contact direction) Min. 98 m/s² {10 G} (perpendicular to contact) |
| | | In energized condition | Min. 196 m/s² {20 G} |
| | Destructive*5 | | Min. 980 m/s² {100 G} |
| Vibration resistance | Functional*6 | In de-energized condition | 29.4 m/s² {3 G}, 10 to 55 Hz at double amplitude of 0.5 mm (in contact direction) 98 m/s² {10 G}10 to 55 Hz at double amplitude of 1.6 mm (perpendicular to contact) |
| | | In energized condition | 117.6 m/s² {12 G}10 to 55 Hz at double amplitude of 2 mm |
| | Destructive | | 196 m/s² {20 G}, 10 to 55 Hz at double amplitude of 3.3 mm |
| Conditions for operation, transport and storage*7 (Not freezing and condensing at low temperature) | | Ambient temp. | –40°C to + 65°C –40°F to +149°F |
| | | Humidity | 5 to 85%R.H. |
| Unit weight | | 2C | Approx. 14 g .49 oz |
| | | 4C | Approx. 15.5 g .55 oz |

## TYPICAL APPLICATIONS

NF relays are widely acceptable in applications where small size and high sensitivity are required.
Such applications include: Electronic equipment, Household applications, Alarm systems, Office machines, Communication equipment, Measuring equipment, Remote control systems, General control circuits, Machine tools, Industrial machinery, etc.

# ORDERING INFORMATION

Ex. NF | 4 | EB | 4M | 48V | 1

| Contact arrangement | Type classification | MBB function | Coil voltage (DC) | Contact metarial |
|---|---|---|---|---|
| 2: 2 Form C<br>4: 4 Form C | EB: Standard | Nil: Form C type<br>2M: 2MBB (2 Form D)<br>4M: 4MBB (4 Form D) | 5, 6, 12,<br>24, 48 V | Nil: Gold-clad silver<br>1: Gold-cap over silver palladium |

(Notes) 1. For VDE recognized types, add suffix VDE.
2. For UL/CSA recognized type, add suffix-A, as NF2EB-12V-A whose ground terminal is cut off.
3. Standard packing Carton: 20 pcs.; Case: 200 pcs.

# TYPES AND COIL DATA (at 25°C 77°F)

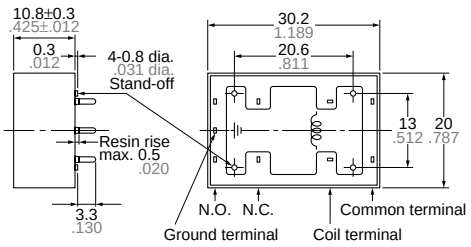
*Less than 1,000 W: ±10%
*More than 1,000 W: ±15%

| Part No. | Nominal voltage, V DC | Pick-up voltage, V DC (max.) | Drop-out voltage, V DC (min.) | Max. allowable voltage, V DC (at 40°C) | Coil resistance,* Ohm | Nominal operating power, mW | Inductance, H | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Armarure | |
| | | | | | | | Open | Close |
| NF2EB-5V | 5 | 4.0 | 0.5 | 8.7 | 90 | 278 | 0.071 | 0.071 |
| NF2EB-6V | 6 | 4.8 | 0.6 | 10.5 | 137 | 260 | 0.093 | 0.094 |
| NF2EB-12V | 12 | 9.6 | 1.2 | 21 | 500 | 290 | 0.338 | 0.344 |
| NF2EB-24V | 24 | 19.2 | 2.4 | 42 | 2,000 | 290 | 1.29 | 1.31 |
| NF2EB-48V | 48 | 38.4 | 4.8 | 84 | 7,000 | 330 | 4.12 | 4.18 |
| NF4EB-5V | 5 | 4.0 | 0.5 | 7 | 53 | 472 | 0.029 | 0.029 |
| NF4EB-6V | 6 | 4.8 | 0.6 | 8.5 | 90 | 400 | 0.070 | 0.071 |
| NF4EB-12V | 12 | 9.6 | 1.2 | 17.0 | 330 | 440 | 0.22 | 0.23 |
| NF4EB-24V | 24 | 19.2 | 2.4 | 34 | 1,200 | 480 | 0.77 | 0.79 |
| NF4EB-48V | 48 | 38.4 | 4.8 | 68 | 4,200 | 550 | 2.22 | 2.25 |

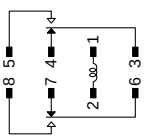
# DIMENSIONS

mm inch

2 Form C



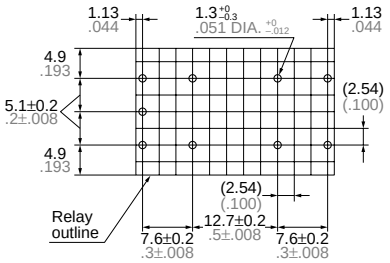

Schematic



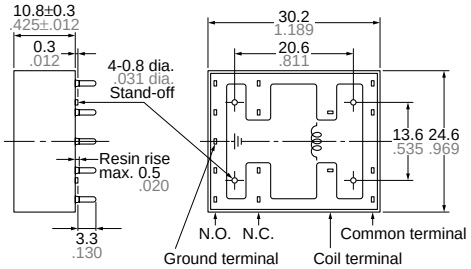

Terminal dimensions (except soldering)
Width: 0.8 .031
Thickness: 0.3 .012

MBB contact position
NF2-2M: terminal 6-7-8, 3-4-5

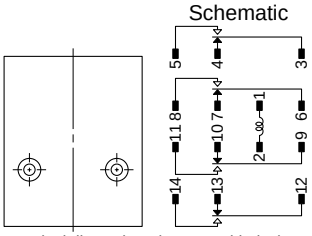
PC board pattern (Copper-side view)




4 Form C



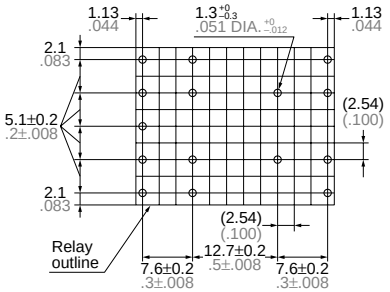

Schematic




Terminal dimensions (except soldering)
Width: 0.8 .031
Thickness: 0.3 .012

MBB contact position
NF4-2M: terminals 6-7-8, 9-10-11
NF4-2M: terminals 6-7-8, 3-4-5, 12-13-14, 9-10-11

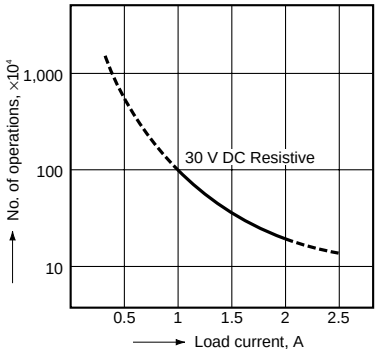
PC board pattern (Copper-side view)



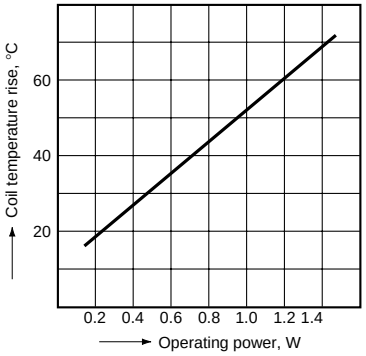

General tolerance: ±0.5 ±.020
(Except for the cover height)

# REFERENCE DATA

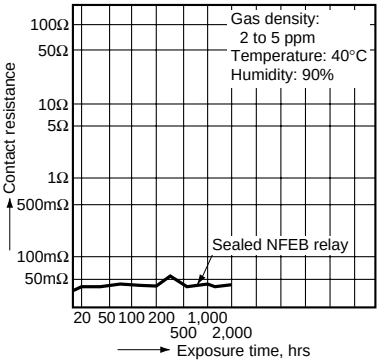
1. Life curve




2. Coil temperature rise (resistance method)



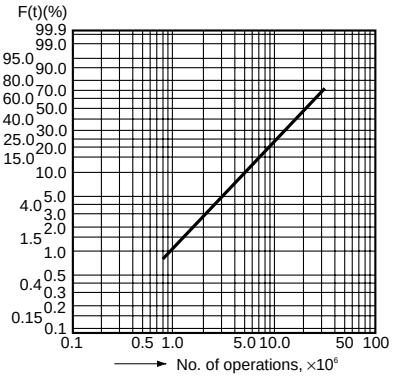

3. $H_2S$ gas test




4. Contact reliability

Test conditions:

1. Contact current/voltage: 10 µA 100 mV 1 kHz
2. Cycle rate 20 cps.
3. Miscontact detection level: 1 mW (= 100 Ohm)
4. Detection method: Observation of all changeover contacts




Test result:

m = 1.5
m = 21.2 x $10^6$
95% confidence level = 3.1 x $10^6$
17 contacts out of 20 achieved 10 million no miscontact operations.

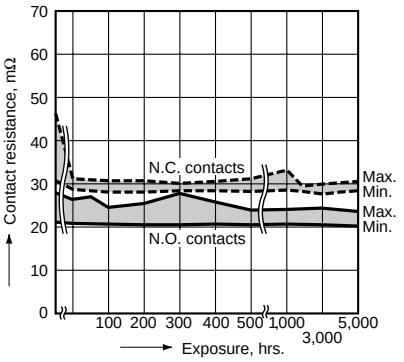
5. High temperature test

Test conditions:

Ambient temperature: 80°C ±2°C

Test method:

1. All contacts were switched for 100 operations on 2 A 30 V DC resistive load.
2. Samples then were exposed to 80°C temperature for 5,000 hours, continuous
3. Contact resistance was measured with Hewlett-Packard testing equipment.



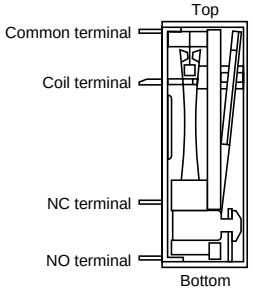

Test result:

Amber relays showed a stable spread of contact resistance within the initially specified 50 mW after 5,000 hours exposure.

# NOTES

**1. Prevention of vibration and shock**

To reduce the likelihood of vibration and shock, we recommend that you install so that the contact action is not in the direction of gravity.






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**For Cautions for Use, see Relay Technical Information.**