# Not Recommended for New Design: RE Series Relays

NRFND.PGA0001.12.26.2018

12.26.2018

| | |
|---|---|
| **About This Notice:** | The RE Series Relays have changed status to Not Recommended For New Design due to possible plans for discontinuation in the future. |
| **Features:** | |
| **Effective Date:** | Immediate |
| **Affected Parts and/or Replacements:** | See attached.<br>The closest substitute would be the RS Series Relay which is not a drop-in replacement. |
| **Datasheet(s):** | See attached. |
| **Notes:** | |

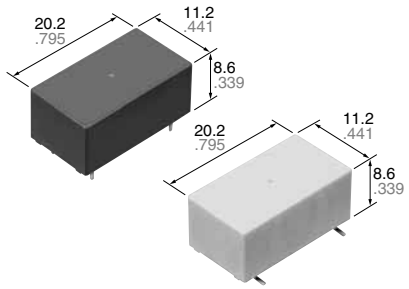
# Panasonic NRFND.PGA0001.12.26.2018 RE Series Relays

**Affected Parts**

ARE1003
ARE1006
ARE1009
ARE1012
ARE1024
ARE104H
ARE10A03
ARE10A06
ARE10A09
ARE10A12
ARE10A12Z
ARE10A24
ARE10A4H
ARE10A4HZ
ARE1303
ARE1306
ARE1309
ARE1312
ARE1324
ARE134H
ARE13A03
ARE13A03Z
ARE13A12
ARE13A12Z
ARE13A24
ARE13A4H
ARE13A4HZ

**2.6 GHz capable, 10 W carrying power (at 2.6 GHz), 50Ω/75Ω impedance and 1 Form C relays**

# RE RELAYS (ARE)




mm inch

**RoHS compliant**

## FEATURES

- **Excellent high frequency characteristics (to 2.6GHz)**
- **Surface-mount type also available**
- **Compact and slim size**
  Size: 20.2(L) × 11.2(W) × 8.9(H)* mm
  .795(L) × .441(W) × .350(H) inch
  *The height of Surface-mount type is 9.6 mm .378 inch size.

## TYPICAL APPLICATIONS

**1. Broadcasting and video markets.**
- Digital broadcasting equipment
- STB/tuner

**2. Communications market**
- Antennae switching
- All types of wireless devices

If you consider using applications with low level loads or with high frequency switching, please consult us.

Protective construction: Sealed type

## ORDERING INFORMATION

**ARE** **1** □ □ □ □ □

RE relays

Contact arrangement
1: 1 Form C

Operating function
0: Single side stable type (Impedance 50Ω)
3: Single side stable type (Impedance 75Ω)

Terminal shape
Nil: Standard PC board terminal
A: Surface-mount terminal

Coil voltage (DC)
03: 3V, 4H: 4.5V, 06: 6V, 09: 9V, 12: 12V, 24: 24V
(H=0.5)

Packing style
Nil: Carton packing (Standard PC board terminal only)
Tube packing (Surface-mount terminal only)
Z: Tape and reel packing (picked from 14 pin side)
(Surface-mount terminal only)

# TYPES

### 1. Standard PC board terminal

| Rated voltage | Part No. | | Standard packing | |
|---|---|---|---|---|
| | Single side stable type (Impedance 50Ω) | Single side stable type (Impedance 75Ω) | Carton | Case |
| 3 V DC | ARE1003 | ARE1303 | 50 pcs. | 500 pcs. |
| 4.5 V DC | ARE104H | ARE134H | | |
| 6 V DC | ARE1006 | ARE1306 | | |
| 9 V DC | ARE1009 | ARE1309 | | |
| 12 V DC | ARE1012 | ARE1312 | | |
| 24 V DC | ARE1024 | ARE1324 | | |

### 2. Surface-mount terminal

1) Tube package

| Rated voltage | Part No. | | Standard packing | |
|---|---|---|---|---|
| | Single side stable type (Impedance 50Ω) | Single side stable type (Impedance 75Ω) | Tube | Case |
| 3 V DC | ARE10A03 | ARE13A03 | 25 pcs. | 200 pcs. |
| 4.5 V DC | ARE10A4H | ARE13A4H | | |
| 6 V DC | ARE10A06 | ARE13A06 | | |
| 9 V DC | ARE10A09 | ARE13A09 | | |
| 12 V DC | ARE10A12 | ARE13A12 | | |
| 24 V DC | ARE10A24 | ARE13A24 | | |

2) Tape and reel package

| Rated voltage | Part No. | | Standard packing | |
|---|---|---|---|---|
| | Single side stable type (Impedance 50Ω) | Single side stable type (Impedance 75Ω) | Tape and reel | Case |
| 3 V DC | ARE10A03Z | ARE13A03Z | 400 pcs. | 800 pcs. |
| 4.5 V DC | ARE10A4HZ | ARE13A4HZ | | |
| 6 V DC | ARE10A06Z | ARE13A06Z | | |
| 9 V DC | ARE10A09Z | ARE13A09Z | | |
| 12 V DC | ARE10A12Z | ARE13A12Z | | |
| 24 V DC | ARE10A24Z | ARE13A24Z | | |

# RATING

### 1. Coil data

| Rated voltage | Pick-up voltage* (at 20°C 68°F) | Drop-out voltage* (at 20°C 68°F) | Rated operating current [±10%] (at 20°C 68°F) | Coil resistance [±10%] (at 20°C 68°F) | Rated operating power | Max. allowable voltage |
|---|---|---|---|---|---|---|
| 3 V DC | 75%V or less of rated voltage (Initial) | 10%V or more of rated voltage (Initial) | 66.7 mA | 45 Ω | 200 mW | 110%V (at 60°C 140°F) 150%V (at 20°C 68°F) of rated voltage |
| 4.5 V DC | | | 44.4 mA | 101 Ω | | |
| 6 V DC | | | 33.3 mA | 180 Ω | | |
| 9 V DC | | | 22.2 mA | 405 Ω | | |
| 12 V DC | | | 16.7 mA | 720 Ω | | |
| 24 V DC | | | 8.3 mA | 2,880 Ω | | |

* Square, pulse drive (JIS C5442)

### 2. Specifications

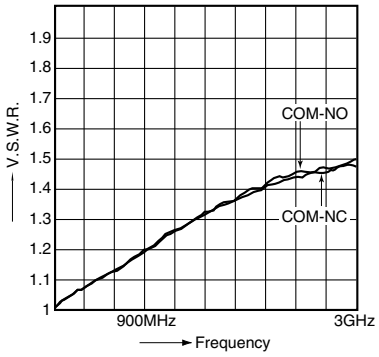
| Characteristics | Item | | Specifications |
|---|---|---|---|
| Contact data | Arrangement | | 1 Form C |
| | Contact resistance (initial) | | Max. 100mΩ (By voltage drop 10V AC 10mA) |
| | Contact material | | Gold plating |
| | Contact rating (resistive) | | 1W (at 2.6 GHz [Impedance 50Ω, V.S.W.R. Max.1.7] [Impedance 75Ω;, V.S.W.R. Max.1.5]) 10mA 24V DC |
| | Contact input power | | 10W (at 2.6GHz [Impedance 50Ω, V.S.W.R. Max.1.7] [Impedance 75Ω, V.S.W.R. Max.1.5]) |
| | Max. switching voltage | | 30V DC |
| | Max. switching current | | 0.5A DC |
| High frequency characteristics (Initial) (Impedance 50Ω) | V.S.W.R. | | Max. 1.3 (to 900MHz), Max. 1.7 (to 2.6GHz) |
| | Insertion loss | | Max. 0.2dB (to 900MHz), Max. 0.7dB (to 2.6GHz) |
| | Isolation | | Min. 60dB (to 900MHz), Min. 30dB (to 2.6GHz) |
| High frequency characteristics (Initial) (Impedance 75Ω) | V.S.W.R. | | Max. 1.2 (to 900MHz), Max. 1.5 (to 2.6GHz) |
| | Insertion loss | | Max. 0.2dB (to 900MHz), Max. 0.5dB (to 2.6GHz) |
| | Isolation | | Min. 60dB (to 900MHz), Min. 30dB (to 2.6GHz) |
| Insulation resistance (Initial) | | | Min. 100MΩ (at 500V DC, Measured portion is the same as the case of dielectric voltage.) |
| Breakdown voltage (Initial) | Between open contacts | | 500 Vrms for 1min. (detection current: 10mA) |
| | Between contact and coil | | 1,000 Vrms for 1min. (detection current: 10mA) |
| | Between contact and earth terminal | | 500 Vrms for 1min. (detection current: 10mA) |
| Time characteristics | Operate time (initial) | | Max. 10ms (at 20°C 68°F, at rated voltage, without bounce) |
| | Release time (initial) | | Max. 5ms (at 20°C 68°F, at rated voltage, without bounce, without diode) |
| Mechanical characteristics | Shock resistance | Functional | Min. 500 m/s² (half-sine shock pulse: 11ms; detection time: 10μs) |
| | | Destructive | Min. 1,000m/s² (half-sine shock pulse: 6ms) |
| | Vibration resistance | Functional | 10 to 55 Hz at double amplitude of 3mm (detection time: 10μs) |
| | | Destructive | 10 to 55 Hz at double amplitude of 5mm |
| Expected life | Mechanical | | Min. $10^6$ (at 180 times/min.) |
| | Electrical | | Min. $3\times10^5$ (1W, 2.6GHz, [Impedance 50Ω, V.S.W.R. ≦ 1.7] [Impedance 75Ω, V.S.W.R. ≦ 1.5]) Min. $3\times10^5$ (10mA 24V DC (resistive) (at 20 times/min.)) |
| Conditions | Conditions for operation, transport and storage* | | Ambient temperature: –40 to +70°C –40 to +158°F Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature) |
| Unit weight | | | Approx. 5 g .18 oz |

Note: * The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Refer to [6] AMBIENT ENVIRONMENT in GENERAL APPLICATION GUIDELINES.

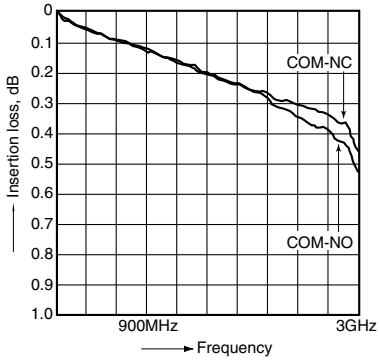
## REFERENCE DATA

1-(1). High frequency characteristics (Impedance 50Ω) (Standard PC board terminal)

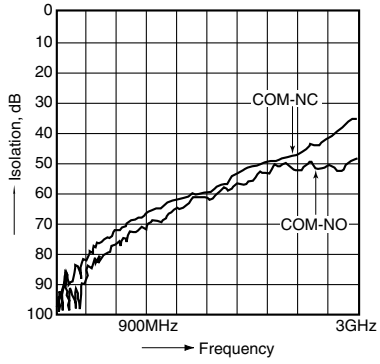
• V.S.W.R. characteristics




• Insertion loss characteristics

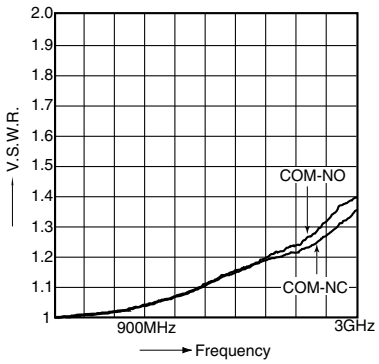



• Isolation characteristics

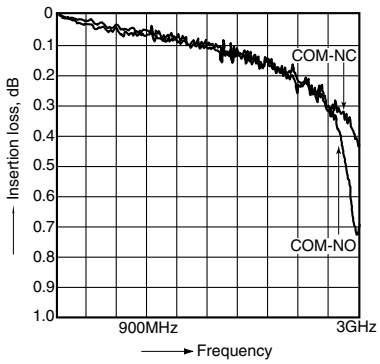



1-(2). High frequency characteristics (Impedance 75Ω) (Standard PC board terminal)

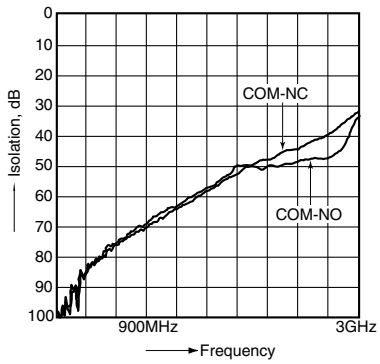
• V.S.W.R. characteristics




• Insertion loss characteristics




• Isolation characteristics

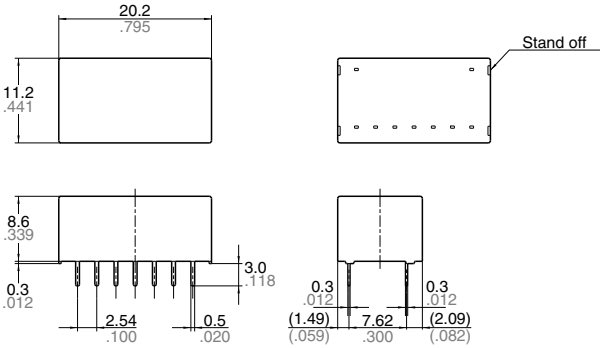


# DIMENSIONS (mm inch)

The CAD data of the products with a CAD mark can be downloaded from: http://industrial.panasonic.com/ac/e/

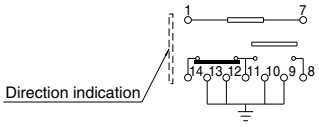
### 1. Standard PC board terminal (50Ω, 75Ω type)

CAD



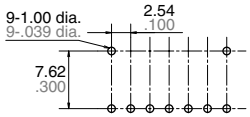

Tolerance: ±0.3 ±.012

Schematic (Bottom view)




(Deenergized condition)

PC board pattern

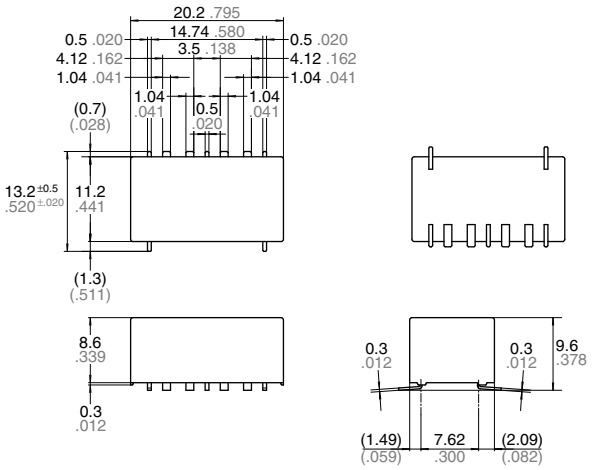



Tolerance: ±0.1 ±.004

### 2. Surface mount terminal

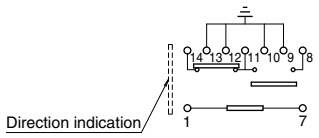
**• 50Ω type**

CAD



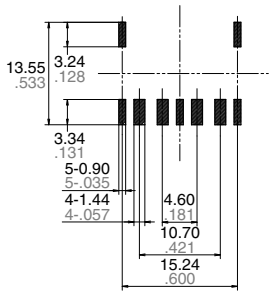

Tolerance: ±0.3 ±.012

Schematic (Top view)




(Deenergized condition)

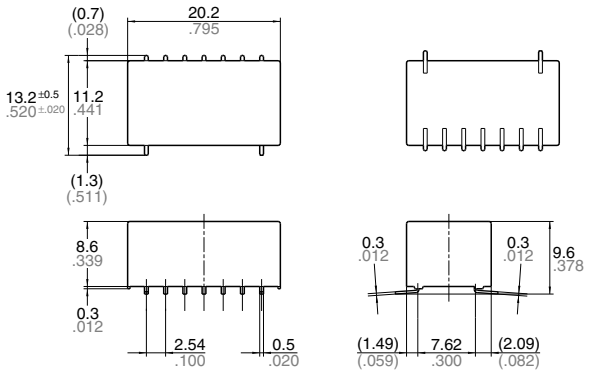
PC board pattern




Tolerance: ±0.1 ±.004

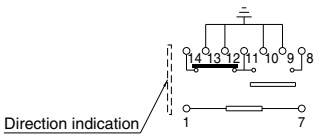
**• 75Ω type**

CAD



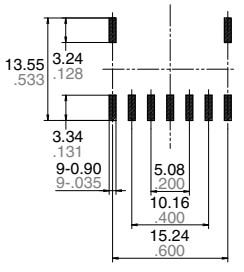

Tolerance: ±0.3 ±.012

Schematic (Top view)




(Deenergized condition)

PC board pattern




Tolerance: ±0.1 ±.004

# NOTES

**1. Coil operating power**

Pure DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%.
However, check it with the actual circuit since the characteristics may be slightly different.

**2. Cleaning**

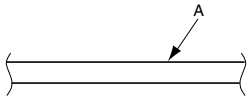
For automatic cleaning, the boiling method is recommended.
Avoid ultrasonic cleaning which subjects the relays to high frequency vibrations, which may cause the contacts to stick.
It is recommended that alcoholic solvents be used.

**3. Soldering**

(Standard PC board terminal)
1) The manual soldering shall be performed under following condition.
Max. 260°C 500°F 10s
Max. 350°C 662°F 3s
The affect of the PCB on the relay will differ depending on the type of PCB used. Please verify the type of PCB to be used.
Preheat according to the following conditions.

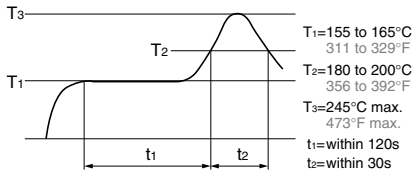
| | |
|---|---|
| Temperature | 120°C 248°F or less |
| Time | Within 2 minute |

Soldering should be done at 260±5°C 500±9°F within 6 s.
2) In case of automatic soldering, the following conditions should be observed (Surface-mount terminal)
(1) Position of measuring temperature




A: Surface of PC board where relay is mounted.

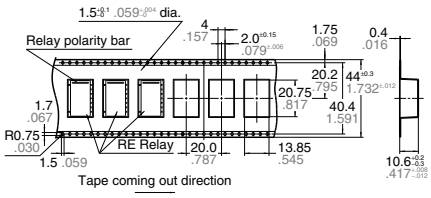
(2) IR (infrared reflow) soldering method



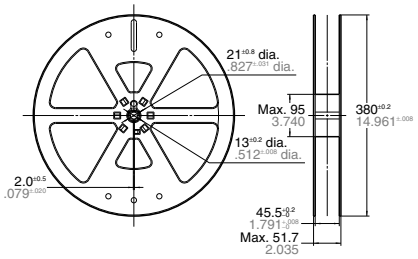

Temperature rise of relay itself may vary according to the mounting level or the heating method of reflow equipment. Therefore, please set the temperature of soldering portion of relay terminal and the top surface of the relay case not to exceed the above mentioned soldering condition.
It is recommended to check the temperature rise of each portion under actual mounting condition before use.

**4. Packing style**

1) Tape dimensions

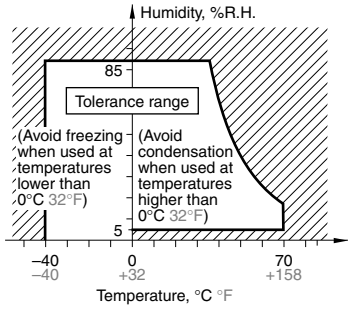



2) Dimensions of plastic reel




**5. Conditions for operation, transport and storage conditions**

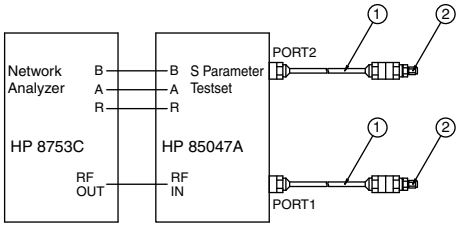
1) Ambient temperature, humidity, and atmospheric pressure during usage, transport, and storage of the relay:
(1) Temperature:
–40 to +70°C –40 to +158°F
(2) Humidity: 5 to 85% RH
(Avoid freezing and condensation.)
The humidity range varies with the temperature. Use within the range indicated in the graph below.
(3) Atmospheric pressure: 86 to 106 kPa Temperature and humidity range for usage, transport, and storage:




2) Condensation
Condensation forms when there is a sudden change in temperature under high temperature and high humidity conditions. Condensation will cause deterioration of the relay insulation.
3) Freezing
Condensation or other moisture may freeze on the relay when the temperature is lower than 0°C 32°F. This causes problems such as sticking of movable parts or operational time lags.
4) Low temperature, low humidity environments
The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

**6. Measuring method**

1) 50Ω type

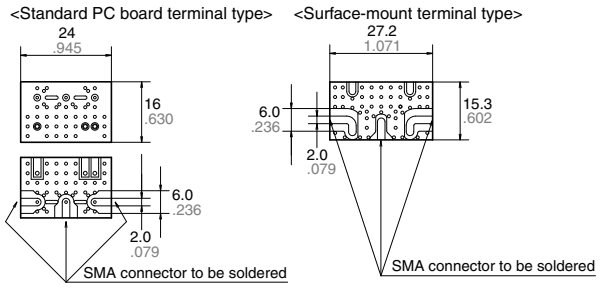



Connect connectors 1 and 2 respectively to PORT1 and PORT2. Perform calibration using the 3.5 mm .138 inch calibration kit (50Ω).

| No. | Part number | Description |
|---|---|---|
| 1 | HP 11857D | 7mm .276inch Test port, Extension cable. (APC7 connector) |
| 2 | HP 11533A | Adapter APC7-SMA (Male) |

After calibration, connect the D.U.T board and measure.

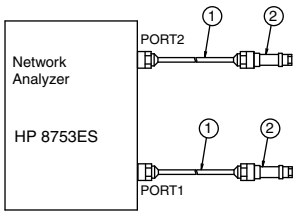
D.U.T board
Dimension (mm inch)




Material: Glass PTFE (Double sided, Through hole)
R-4737 (Panasonic Corporation)
Thickness: t = 0.8mm .031inch
Copper thickness: 18μm

Connector (SMA)
Product name: R125 510 (RADIALL)

2) 75Ω type

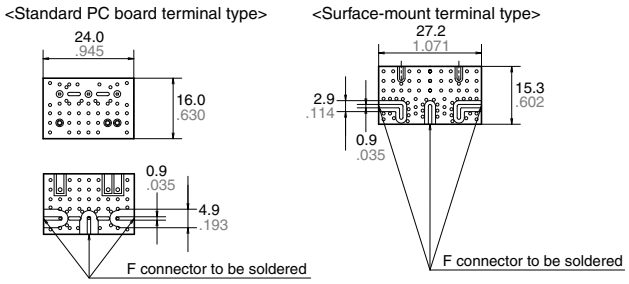



Connect connectors 1 and 2 respectively to PORT1 and PORT2. Perform calibration using the 3.5 mm .138 inch calibration kit (70Ω).

| No. | Part number | Description |
|---|---|---|
| 1 | HP 11857B | 75ΩF Test port, Return cable |
| 2 | 85039-60011 | Adapter 75ΩN (Female) – 75ΩF (Male) |

After calibration, connect the D.U.T board and measure.

D.U.T board
Dimension (mm inch)




Material: Glass PTFE (Double sided, Through hole)
R-4737 (Panasonic Corporation)
Thickness: t = 0.8mm .031inch
Copper thickness: 18μm

Connector (F)
Product name: C05-0236 (KOMINE MUSEN DENKI)

**For general cautions for use, please refer to the "General Application Guidelines".**

Please contact .....

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