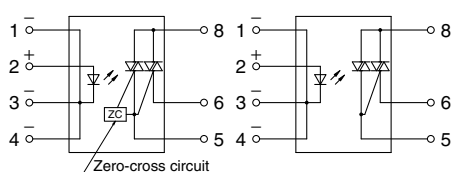


**Compact DIP type SSR**  
**Ideal for AC load control**

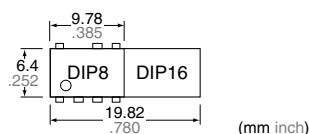
# AQ-H RELAYS



**RoHS compliant**

### FEATURES

1. Supports 0.3 A, 0.6 A, 0.9 A and 1.2 A ON-state RMS currents.
2. The 1.2 A type saves space with a DIP 8-pin package.



3. Handles both 100 and 200 Vrms loads

This relay handles both voltages in a single product. It is not necessary for users that use both types to manage separate part numbers.

4. High dielectric strength: 5,000 Vrms (between input and output)
5. Two types available: Zero-cross type and Random type

### TYPICAL APPLICATIONS

1. Home appliances (air conditioner, microwave oven, washing machine, personal hygiene system, refrigerator, fan heater, inductive heating cooker, rice cooker and humidifier, etc.)
2. Industrial equipment

### ORDERING INFORMATION

|                                   |                      |                                |                      |                      |                      |                      |
|-----------------------------------|----------------------|--------------------------------|----------------------|----------------------|----------------------|----------------------|
| <b>AQH</b>                        | <input type="text"/> | <input type="text" value="2"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| ON-state RMS current              |                      |                                |                      |                      |                      |                      |
| 0: 0.3 A                          |                      |                                |                      |                      |                      |                      |
| 1: 0.6 A                          |                      |                                |                      |                      |                      |                      |
| 2: 0.9 A                          |                      |                                |                      |                      |                      |                      |
| 3: 1.2 A                          |                      |                                |                      |                      |                      |                      |
| Repetitive peak OFF-state voltage |                      |                                |                      |                      |                      |                      |
| 2: 600 V                          |                      |                                |                      |                      |                      |                      |
| Type                              |                      |                                |                      |                      |                      |                      |
| 1: Zero-cross                     |                      |                                |                      |                      |                      |                      |
| 2: Random                         |                      |                                |                      |                      |                      |                      |
| Number of pin                     |                      |                                |                      |                      |                      |                      |
| 3: 8 pins                         |                      |                                |                      |                      |                      |                      |
| Package                           |                      |                                |                      |                      |                      |                      |
| Nil: DIP                          |                      |                                |                      |                      |                      |                      |
| S: SOP                            |                      |                                |                      |                      |                      |                      |
| A: SMD                            |                      |                                |                      |                      |                      |                      |
| Packing                           |                      |                                |                      |                      |                      |                      |
| Nil: Tube                         |                      |                                |                      |                      |                      |                      |
| X: Tape and reel packing X        |                      |                                |                      |                      |                      |                      |
| Z: Tape and reel packing Z        |                      |                                |                      |                      |                      |                      |

## TYPES

| Type    | Output rating*                    |                      | Type       | Part No.                         |                                |                             |           | Packing quantity                                     |               |
|---------|-----------------------------------|----------------------|------------|----------------------------------|--------------------------------|-----------------------------|-----------|------------------------------------------------------|---------------|
|         |                                   |                      |            | Through hole terminal            | Surface-mount terminal         |                             |           |                                                      |               |
|         | Repetitive peak OFF-state voltage | ON-state RMS current |            | Tube packing style               | Tube packing style             | Tape and reel packing style |           | Tube                                                 | Tape and reel |
|         |                                   |                      |            | Picked from the 1/2/3/4-pin side | Picked from the 5/6/8-pin side |                             |           |                                                      |               |
| AC type | 600 V                             | 0.3 A                | Zero-cross | AQH0213                          | AQH0213A                       | AQH0213AX                   | AQH0213AZ | 1 tube contains 50 pcs.<br>1 batch contains 500 pcs. | 1,000 pcs.    |
|         |                                   | 0.6 A                |            | AQH1213                          | AQH1213A                       | AQH1213AX                   | AQH1213AZ |                                                      |               |
|         |                                   | 0.9 A                |            | AQH2213                          | AQH2213A                       | AQH2213AX                   | AQH2213AZ |                                                      |               |
|         |                                   | 1.2 A                |            | AQH3213                          | AQH3213A                       | AQH3213AX                   | AQH3213AZ |                                                      |               |
|         |                                   | 0.3 A                | Random     | AQH0223                          | AQH0223A                       | AQH0223AX                   | AQH0223AZ |                                                      |               |
|         |                                   | 0.6 A                |            | AQH1223                          | AQH1223A                       | AQH1223AX                   | AQH1223AZ |                                                      |               |
|         |                                   | 0.9 A                |            | AQH2223                          | AQH2223A                       | AQH2223AX                   | AQH2223AZ |                                                      |               |
|         |                                   | 1.2 A                |            | AQH3223                          | AQH3223A                       | AQH3223AX                   | AQH3223AZ |                                                      |               |

\* Indicate the repetitive peak OFF-state voltage and ON-state RMS current: peak AC.

Note: For space reasons, the SMD terminal shape indicator "A" and the package type indicator "X" and "Z" are omitted from the seal.

## RATING

## 1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

| Item                  |                                   | Symbol               | AQH0213, AQH0223            | AQH1213, AQH1223 | AQH2213, AQH2223 | AQH3213, AQH3223 | Remarks                            |
|-----------------------|-----------------------------------|----------------------|-----------------------------|------------------|------------------|------------------|------------------------------------|
| Input                 | LED forward current               | I <sub>F</sub>       | 50 mA                       |                  |                  |                  |                                    |
|                       | LED reverse voltage               | V <sub>R</sub>       | 6 V                         |                  |                  |                  |                                    |
|                       | Peak forward current              | I <sub>FP</sub>      | 1 A                         |                  |                  |                  | f = 100 Hz,<br>Duty Ratio = 0.1%   |
| Output                | Repetitive peak OFF-state voltage | V <sub>DRM</sub>     | 600 V                       |                  |                  |                  |                                    |
|                       | ON-state RMS current              | I <sub>T (RMS)</sub> | 0.3 A                       | 0.6 A            | 0.9 A            | 1.2 A            |                                    |
|                       | Non-repetitive surge current      | I <sub>TSM</sub>     | 3 A                         | 6 A              | 9 A              | 12 A             | 60 Hz, 1 cycle                     |
| I/O isolation voltage |                                   | V <sub>iso</sub>     | 5,000 Vrms                  |                  |                  |                  |                                    |
| Operating temperature |                                   | T <sub>opr</sub>     | -30 to +85°C -22 to +185°F  |                  |                  |                  | Non-condensing at low temperatures |
| Storage temperature   |                                   | T <sub>stg</sub>     | -40 to +125°C -40 to +257°F |                  |                  |                  |                                    |

Note: "A", "AX" and "AZ" at the end of the part numbers have been omitted.

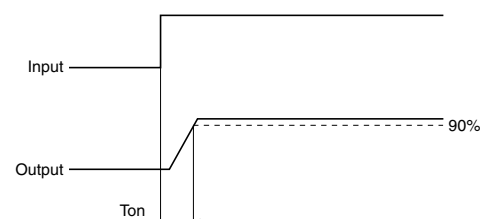
## 2. Characteristics (Ambient temperature: 25°C 77°F)

| Item                     |                                            |         | Symbol           | AQH0213, AQH1213, AQH2213, AQH3213 | AQH0223, AQH1223, AQH2223, AQH3223 | Remarks                                                                  |
|--------------------------|--------------------------------------------|---------|------------------|------------------------------------|------------------------------------|--------------------------------------------------------------------------|
| Input                    | LED dropout voltage                        | Typical | V <sub>F</sub>   | 1.21 V                             |                                    | I <sub>F</sub> = 20 mA                                                   |
|                          |                                            | Maximum |                  | 1.3 V                              |                                    |                                                                          |
|                          | LED reverse current                        | Typical | I <sub>R</sub>   | —                                  |                                    | V <sub>R</sub> = 6 V                                                     |
|                          |                                            | Maximum |                  | 10 μA                              |                                    |                                                                          |
| Output                   | Peak OFF-state current                     | Typical | I <sub>DRM</sub> | —                                  |                                    | I <sub>F</sub> = 0 mA<br>V <sub>DRM</sub> = 600 V                        |
|                          |                                            | Maximum |                  | 100 μA                             |                                    |                                                                          |
|                          | Peak ON-state voltage                      | Typical | V <sub>TM</sub>  | —                                  |                                    | I <sub>F</sub> = 10 mA<br>I <sub>TM</sub> = Max.                         |
|                          |                                            | Maximum |                  | 2.5 V                              |                                    |                                                                          |
|                          | Holding current                            | Typical | I <sub>H</sub>   | —                                  |                                    |                                                                          |
|                          |                                            | Maximum |                  | 25 mA                              |                                    |                                                                          |
|                          | Critical rate of rise of OFF-state voltage | Minimum | dv/dt            | 200 V/μs                           |                                    | V <sub>DRM</sub> = 600 V ×1/√2                                           |
| Transfer characteristics | Trigger LED current                        | Maximum | I <sub>FT</sub>  | 10 mA                              |                                    | V <sub>D</sub> = 6 V<br>R <sub>L</sub> = 100 Ω                           |
|                          | Zero-cross voltage                         | Maximum | V <sub>ZC</sub>  | 50 V                               | —                                  | I <sub>F</sub> = 10 mA                                                   |
|                          | Turn on time*1                             | Maximum | T <sub>ON</sub>  | 100 μs                             |                                    | I <sub>F</sub> = 20 mA<br>V <sub>D</sub> = 6 V<br>R <sub>L</sub> = 100 Ω |
|                          | I/O isolation resistance                   | Minimum | R <sub>Iso</sub> | 50 GΩ                              |                                    | 500 V DC                                                                 |

Notes: 1. For type of connection, see "SCHEMATIC AND WIRING DIAGRAMS".

2. "A", "AX" and "AZ" at the end of the part numbers have been omitted.

## \*1 Turn on time



## RECOMMENDED OPERATING CONDITIONS

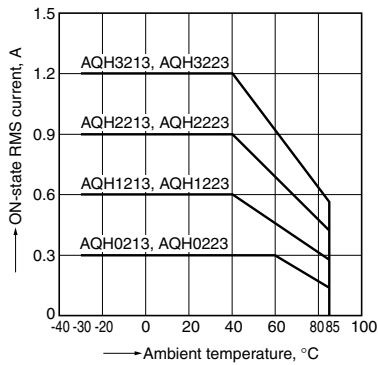
Please use under recommended operating conditions to obtain expected characteristics.

| Item              | Symbol         | Min. | Max. | Unit |
|-------------------|----------------|------|------|------|
| Input LED current | I <sub>F</sub> | 15   | 25   | mA   |

## REFERENCE DATA

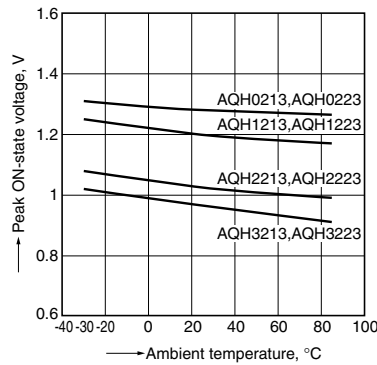
### 1. ON-state RMS current vs. Ambient temperature characteristics

Allowable ambient temperature:  
-30 to +85°C -22 to +185°F



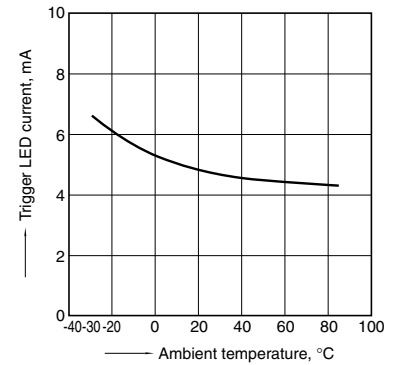
### 2. Peak ON-state voltage vs. Ambient temperature characteristics

LED current: 10 mA; ON current: Max.  
Measured portion: between terminals 6 and 8



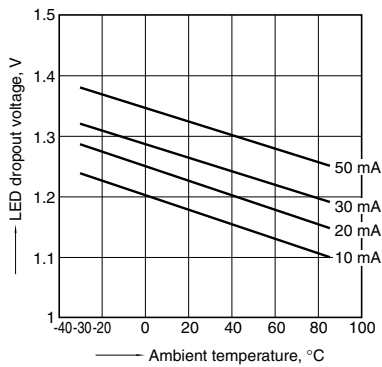
### 3. Trigger LED current vs. Ambient temperature characteristics

Load voltage: 6 V DC;  
Load resistance: 100 Ω



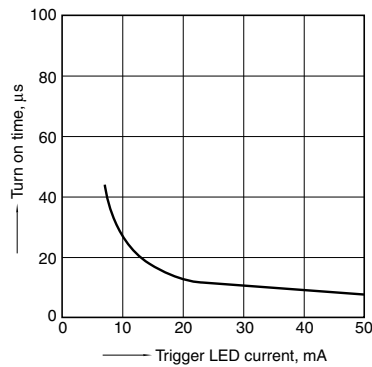
### 4. LED dropout voltage vs. Ambient temperature characteristics

LED current: 10 to 50 mA



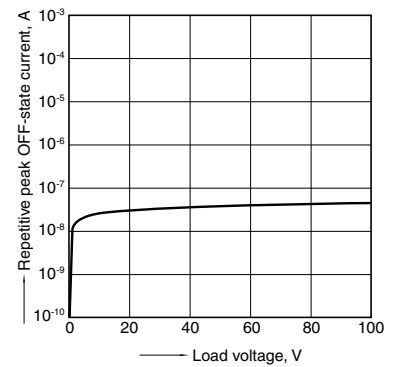
### 5. Turn on time vs. LED current characteristics

Load voltage: 6 V DC; Load resistance: 100 Ω  
Measured portion: between terminals 6 and 8

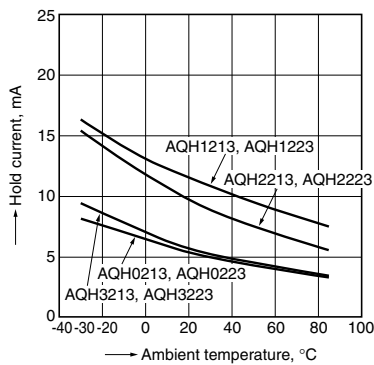


### 6. Repetitive peak OFF-state current vs. Load voltage characteristics

Ambient temperature: 25°C 77°F; Measured portion: between terminals 6 and 8; LED current: 0 mA

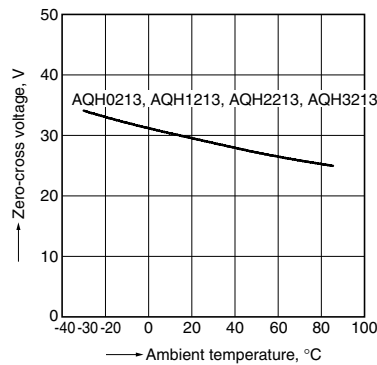


### 7. Hold current vs. Ambient temperature characteristics



### 8. Zero-cross voltage vs. Ambient temperature characteristics

LED current: 10 mA



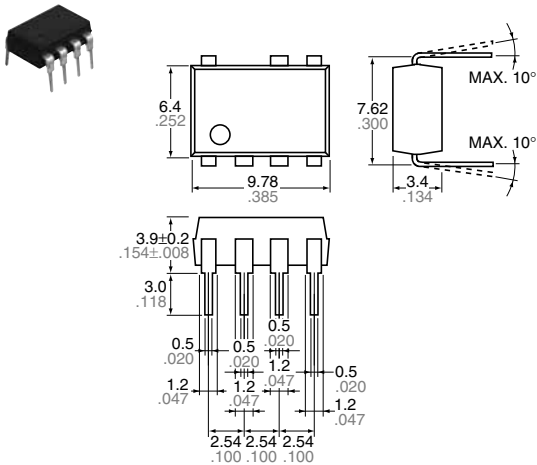
DIMENSIONS (mm inch)

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

Through hole terminal type

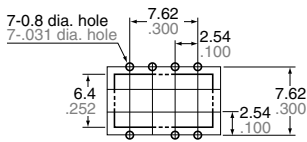
**CAD**

External dimensions



Terminal thickness: 0.25 .010  
General tolerance: ±0.1 ±.004

PC board pattern (BOTTOM VIEW)

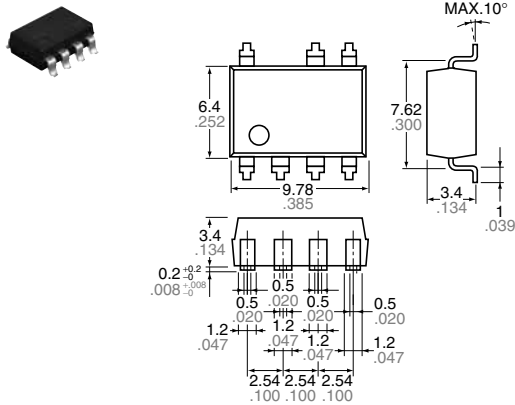


Tolerance: ±0.1 ±.004

Surface mount terminal type

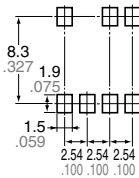
**CAD**

External dimensions



Terminal thickness: 0.25 .010  
General tolerance: ±0.1 ±.004

Recommended mounting pad (TOP VIEW)



Tolerance: ±0.1 ±.004

SCHEMATIC AND WIRING DIAGRAMS

| Schematic | Output configuration | Load | Wiring diagram |
|-----------|----------------------|------|----------------|
|           | 1 Form A             | AC   |                |
|           | 1 Form A             | AC   |                |

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Please contact .....

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