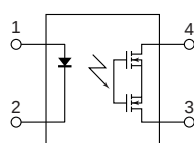
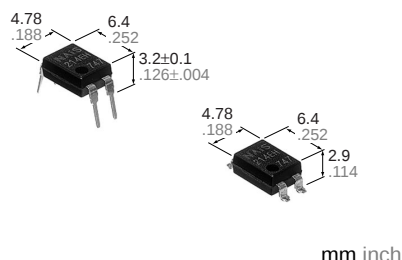


# NAIS

## GU (General Use)-E Type 1-Channel (Form A) 4-pin Type

# PhotoMOS RELAYS



## FEATURES

### 1. Reinforced insulation 5,000 V type

More than 0.4 mm internal insulation distance between inputs and outputs. Conforms to EN41003, EN60950 (reinforced insulation).

### 2. Compact 4-pin DIP size

The device comes in a compact (W)6.4×(L)4.78×(H)3.2mm (W).252×(L).188×(H).126inch, 4-pin DIP size.

### 3. Controls low-level analog signals

PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

### 4. High sensitivity, low ON resistance

Can control a maximum 0.13 A load current with a 5 mA input current. Low ON re-

sistance of 25Ω (AQY210EH). Stable operation because there are no metallic contact parts.

### 5. Low-level off state leakage current

The SSR has an off state leakage current of several milliamperes, whereas the PhotoMOS relay has only 100 pA even with the rated load voltage of 350 V (AQY210EH).

## TYPICAL APPLICATIONS

- Modem
- Telephone equipment
- Security equipment
- Sensors

## TYPES

| Type       | I/O isolation voltage | Output rating* |              | Part No.              |                        |                              |                              | Packing quantity                                        |               |
|------------|-----------------------|----------------|--------------|-----------------------|------------------------|------------------------------|------------------------------|---------------------------------------------------------|---------------|
|            |                       |                |              | Through hole terminal | Surface-mount terminal |                              |                              |                                                         |               |
|            |                       | Load voltage   | Load current | Tube packing style    |                        | Tape and reel packing style  |                              | Tube                                                    | Tape and reel |
|            |                       |                |              |                       |                        | Picked from the 1/2-pin side | Picked from the 3/4-pin side |                                                         |               |
| AC/DC type | Reinforced 5,000 V    | 350 V          | 130 mA       | AQY210EH              | AQY210EHA              | AQY210EHAX                   | AQY210EHAZ                   | 1 tube contains 100 pcs.<br>1 batch contains 1,000 pcs. | 1,000 pcs.    |
|            |                       | 400 V          | 120 mA       | AQY214EH              | AQY214EHA              | AQY214EHAX                   | AQY214EHAZ                   |                                                         |               |

\*Indicate the peak AC and DC values.

Note: For space reasons, the initial letters of the product number "AQY", 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                    |                         | Sym-<br>bol       | AQY210EH (A)                    | AQY214EH (A) | Remarks                              |
|-------------------------|-------------------------|-------------------|---------------------------------|--------------|--------------------------------------|
| Input                   | LED forward current     | I <sub>F</sub>    | 50mA                            |              |                                      |
|                         | LED reverse voltage     | V <sub>R</sub>    | 3V                              |              |                                      |
|                         | Peak forward current    | I <sub>FP</sub>   | 1A                              |              | f =100 Hz, Duty factor = 0.1%        |
|                         | Power dissipation       | P <sub>in</sub>   | 75mW                            |              |                                      |
| Output                  | Load voltage (peak AC)  | V <sub>L</sub>    | 350 V                           | 400 V        |                                      |
|                         | Continuous load current | I <sub>L</sub>    | 0.13 A                          | 0.12 A       |                                      |
|                         | Peak load current       | I <sub>peak</sub> | 0.4 A                           | 0.3 A        | 100 ms (1 shot), V <sub>L</sub> = DC |
|                         | Power dissipation       | P <sub>out</sub>  | 500mW                           |              |                                      |
| Total power dissipation |                         | P <sub>T</sub>    | 550mW                           |              |                                      |
| I/O isolation voltage   |                         | V <sub>iso</sub>  | 5,000 V AC                      |              |                                      |
| Temperature limits      | Operating               | T <sub>opr</sub>  | -40°C to +85°C -40°F to +185°F  |              | Non-condensing at low temperatures   |
|                         | Storage                 | T <sub>stg</sub>  | -40°C to +100°C -40°F to +212°F |              |                                      |

# AQY210EH

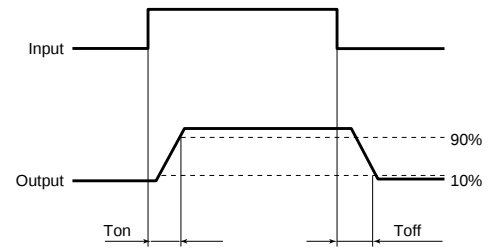
## 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

| Item                      |                                   |         | Symbol            | AQY210EH (A)                          | AQY214EH (A) | Condition                                                         |
|---------------------------|-----------------------------------|---------|-------------------|---------------------------------------|--------------|-------------------------------------------------------------------|
| Input                     | LED operate current               | Typical | I <sub>Fon</sub>  | 1.2mA                                 |              | I <sub>L</sub> =Max.                                              |
|                           |                                   | Maximum |                   | 3.0mA                                 |              |                                                                   |
|                           | LED turn off current              | Minimum | I <sub>Foff</sub> | 0.4mA                                 |              | I <sub>L</sub> =Max.                                              |
|                           |                                   | Typical |                   | 1.1mA                                 |              |                                                                   |
|                           | LED dropout voltage               | Typical | V <sub>F</sub>    | 1.14 (1.25 V at I <sub>F</sub> =50mA) |              | I <sub>F</sub> =5mA                                               |
|                           |                                   | Maximum |                   | 1.5V                                  |              |                                                                   |
| Output                    | On resistance                     | Typical | R <sub>on</sub>   | 18Ω                                   | 26Ω          | I <sub>F</sub> =5mA<br>I <sub>L</sub> =Max.<br>Within 1 s on time |
|                           |                                   | Maximum |                   | 25Ω                                   | 35Ω          |                                                                   |
|                           | Off state leak-age current        | Maximum | I <sub>Leak</sub> | 1μA                                   |              | I <sub>F</sub> =0<br>V <sub>L</sub> =Max.                         |
| Transfer char-acteristics | Turn on time*                     | Typical | T <sub>on</sub>   | 0.5ms                                 |              | I <sub>F</sub> =5mA                                               |
|                           |                                   | Maximum |                   | 2.0ms                                 |              | I <sub>L</sub> =Max.                                              |
|                           | Turn off time*                    | Typical | T <sub>off</sub>  | 0.08ms                                |              | I <sub>F</sub> =5mA                                               |
|                           |                                   | Maximum |                   | 1.0ms                                 |              | I <sub>L</sub> =Max.                                              |
|                           | I/O capacitance                   | Typical | C <sub>iso</sub>  | 0.8pF                                 |              | f =1MHz<br>V <sub>B</sub> =0                                      |
|                           |                                   | Maximum |                   | 1.5pF                                 |              |                                                                   |
|                           | Initial I/O isola-tion resistance | Minimum | R <sub>iso</sub>  | 1,000MΩ                               |              | 500V DC                                                           |

Note: Recommendable LED forward current I<sub>F</sub>=5 to 10mA.

For type of connection, see page 31.

\*Turn on/Turn off time

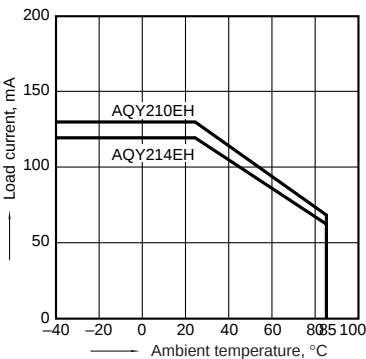


- For Dimensions, see Page 27.
- For Schematic and Wiring Diagrams, see Page 31.
- For Cautions for Use, see Page 36.

## REFERENCE DATA

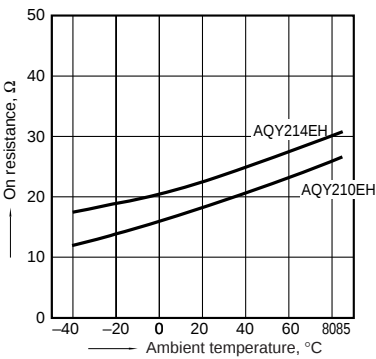
### 1. Load current vs. ambient temperature characteristics

Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F



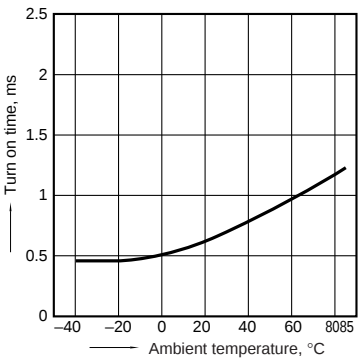
### 2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4;  
LED current: 5 mA; Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



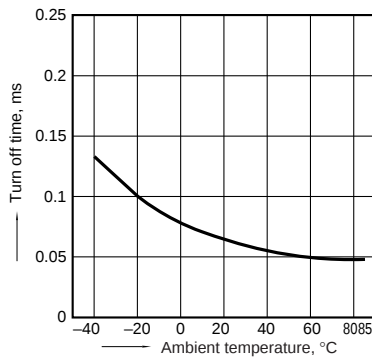
### 3. Turn on time vs. ambient temperature characteristics

Sample: All types  
LED current: 5 mA; Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



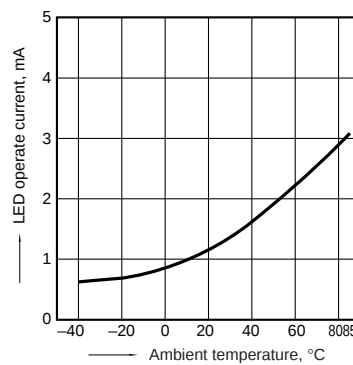
## 4. Turn off time vs. ambient temperature characteristics

Sample: All types; LED current: 5 mA; Load voltage: Max. (DC); Continuous load current: Max. (DC)



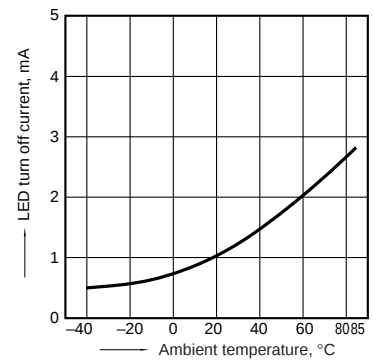
## 5. LED operate current vs. ambient temperature characteristics

Sample: All types; Load voltage: Max. (DC); Continuous load current: Max. (DC)



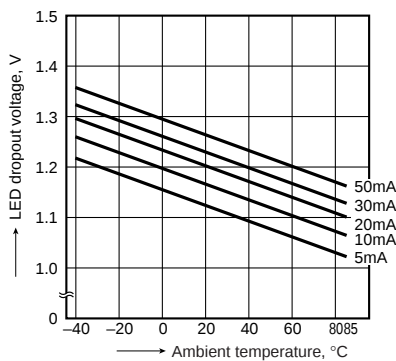
## 6. LED turn off current vs. ambient temperature characteristics

Sample: All types; Load voltage: Max. (DC); Continuous load current: Max. (DC)



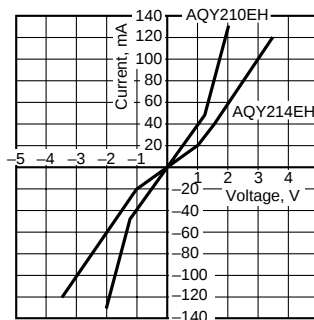
## 7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types; LED current: 5 to 50 mA



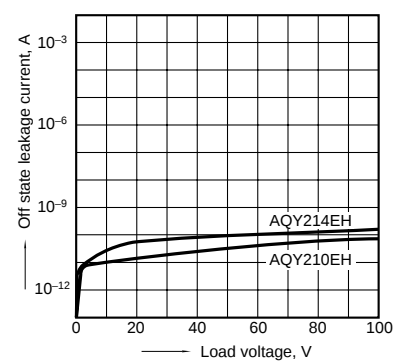
## 8. Voltage vs. current characteristics of output at MOS portion

Measured portion: between terminals 3 and 4; Ambient temperature: 25°C 77°F



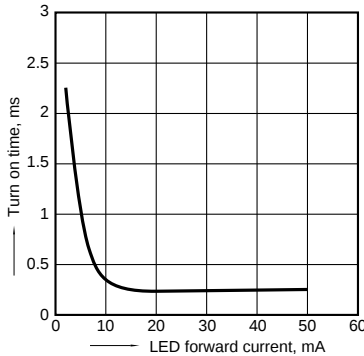
## 9. Off state leakage current

Measured portion: between terminals 3 and 4; Ambient temperature: 25°C 77°F



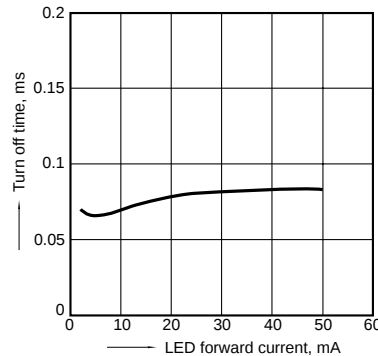
## 10. LED forward current vs. turn on time characteristics

Sample: All types  
Measured portion: between terminals 3 and 4;  
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



## 11. LED forward current vs. turn off time characteristics

Sample: All types  
Measured portion: between terminals 3 and 4;  
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



## 12. Applied voltage vs. output capacitance characteristics

Sample: All types  
Measured portion: between terminals 3 and 4;  
Frequency: 1 MHz; Ambient temperature: 25°C 77°F

