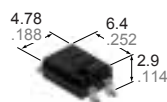
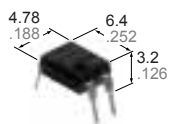


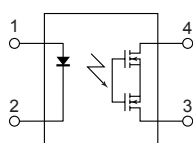
**Panasonic**  
ideas for life

**General use and economy type.  
DIP (1 Form A) 4-pin type.  
Reinforced insulation  
5,000V type.**

**GU-E PhotoMOS  
(AQY210EH)**



mm inch



## FEATURES

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

More than 0.4 mm internal insulation distance between inputs and outputs. Con-forms 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 resistance 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 typ. 100 pA even with the rated 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 |                             | Tube       | Tape and reel   |            |
|              |                       |                |                              |                              | Tube packing style     | Tape and reel packing style |            |   |            |
| Load voltage | Load current          |                | Picked from the 1/2-pin side | Picked from the 3/4-pin side |                        |                             |            |   |            |
| AC/DC type   | Reinforced 5,000 V    | 30 V           | 1,000 mA                     | AQY211EH                     | AQY211EHA              | AQY211EHAX                  | AQY211EHAZ | 1 tube contains 100 pcs.<br>1 batch contains 1,000 pcs. | 1,000 pcs. |
|              |                       | 60 V           | 550 mA                       | AQY212EH                     | AQY212EHA              | AQY212EHAX                  | AQY212EHAZ |   |            |
|              |                       | 350 V          | 130 mA                       | AQY210EH                     | AQY210EHA              | AQY210EHAX                  | AQY210EHAZ |   |            |
|              |                       | 400 V          | 120 mA                       | AQY214EH                     | AQY214EHA              | AQY214EHAX                  | AQY214EHAZ |   |            |
|              |                       | 600 V          | 50 mA                        | AQY216EH                     | AQY216EHA              | AQY216EHAX                  | AQY216EHAZ |   |            |

\*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                    |                         | Symbol            | AQY211EH(A)                     | AQY212EH(A) | AQY210EH(A) | AQY214EH(A) | AQY216EH(A) | Remarks                                 |
|-------------------------|-------------------------|-------------------|---------------------------------|-------------|-------------|-------------|-------------|---|
| Input                   | LED forward current     | I <sub>F</sub>    | 50mA                            |             |             |             |             |   |
|                         | LED reverse voltage     | V <sub>R</sub>    | 5 V                             |             |             |             |             |   |
|                         | Peak forward current    | I <sub>FP</sub>   | 1 A                             |             |             |             |             | f = 100 Hz,<br>Duty factor = 0.1%       |
|                         | Power dissipation       | P <sub>in</sub>   | 75mW                            |             |             |             |             |   |
| Output                  | Load voltage (peak AC)  | V <sub>L</sub>    | 30 V                            | 60 V        | 350 V       | 400 V       | 600 V       |   |
|                         | Continuous load current | I <sub>L</sub>    | 1 A                             | 0.55 A      | 0.13 A      | 0.12 A      | 0.05 A      |   |
|                         | Peak load current       | I <sub>peak</sub> | 3 A                             | 1.5 A       | 0.4 A       | 0.3 A       | 0.15 A      | 100 ms (1 shot),<br>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 |             |             |             |             |   |

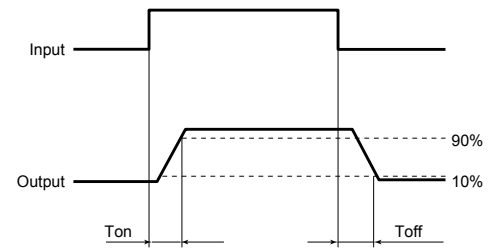
# GU-E PhotoMOS (AQY210EH)

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

| Item                             |                           | Symbol                               | AQY211EH(A) | AQY212EH(A) | AQY210EH(A) | AQY214EH(A) | AQY216EH(A)                               | Condition   |
|----------------------------------|---------------------------|--------------------------------------|-------------|-------------|-------------|-------------|---|---|
| Input                            | LED operate current       | Typical                              | 1.2mA       |             |             |             |   | $I_L = \text{Max.}$   |
|                                  |                           | Maximum                              | 3.0mA       |             |             |             |   |   |
|                                  | LED turn off current      | Minimum                              | 0.4mA       |             |             |             |   | $I_L = \text{Max.}$   |
|                                  |                           | Typical                              | 1.1mA       |             |             |             |   |   |
| LED dropout voltage              | Typical                   | 1.25 (1.14 V at $I_F = 5\text{mA}$ ) |             |             |             |             | $I_F = 50\text{mA}$                       |   |
|                                  | Maximum                   | 1.5V                                 |             |             |             |             |   |   |
| Output                           | On resistance             | Typical                              | 0.25Ω       | 0.85Ω       | 18Ω         | 26Ω         | 52Ω                                       | $I_F = 5\text{mA}$<br>$I_L = \text{Max.}$<br>Within 1 s on time |
|                                  |                           | Maximum                              | 0.5Ω        | 2.5Ω        | 25Ω         | 35Ω         | 120Ω                                      |   |
|                                  | Off state leakage current | Maximum                              | 1μA         |             |             |             |   | $I_F = 0\text{mA}$<br>$V_L = \text{Max.}$                       |
| Transfer characteristics         | Turn on time*             | Typical                              | 1.5ms       | 1ms         | 0.5ms       |             | $I_F = 5\text{mA}$<br>$I_L = \text{Max.}$ |   |
|                                  |                           | Maximum                              | 5ms         | 4ms         | 2.0ms       |             |   |   |
|                                  | Turn off time*            | Typical                              | 0.1ms       | 0.05ms      | 0.08ms      | 0.04ms      | $I_F = 5\text{mA}$<br>$I_L = \text{Max.}$ |   |
|                                  |                           | Maximum                              | 1.0ms       |             |             |             |   |   |
|                                  | I/O capacitance           | Typical                              | 0.8pF       |             |             |             |   | $f = 1\text{MHz}$<br>$V_B = 0\text{V}$                          |
| Maximum                          |                           | 1.5pF                                |             |             |             |             |   |   |
| Initial I/O isolation resistance | Minimum                   | 1,000MΩ                              |             |             |             |             | 500V DC                                   |   |

Note: Recommendable LED forward current  $I_F = 5$  to 10mA.

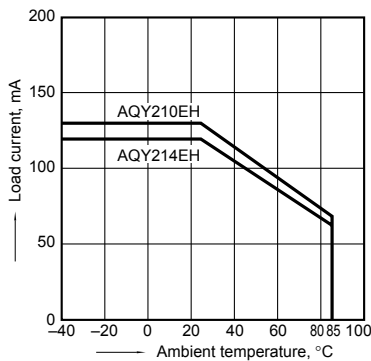
\*Turn on/Turn off time



## REFERENCE DATA

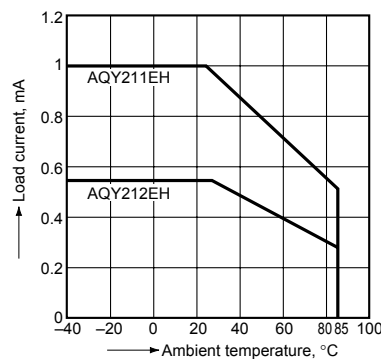
1-(1). Load current vs. ambient temperature characteristics

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



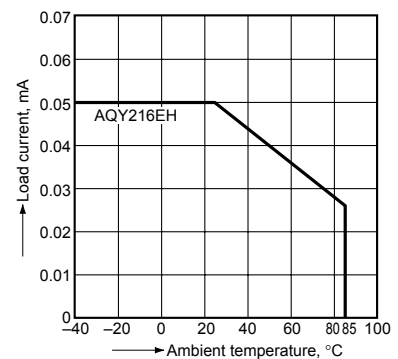
1-(2). Load current vs. ambient temperature characteristics

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



1-(3). Load current vs. ambient temperature characteristics

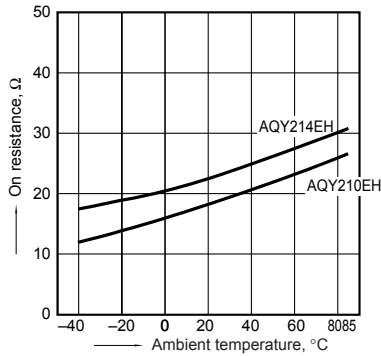
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F



# GU-E PhotoMOS (AQY21○EH)

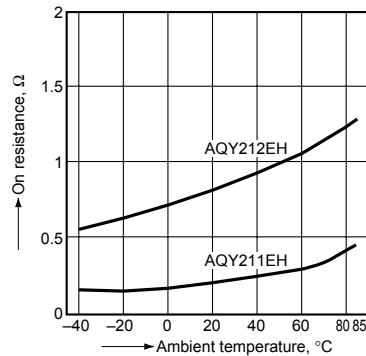
2-(1). On resistance vs. ambient temperature characteristics

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



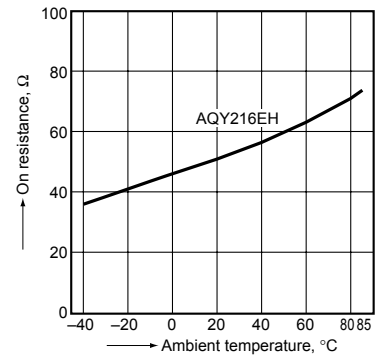
2-(2). On resistance vs. ambient temperature characteristics

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



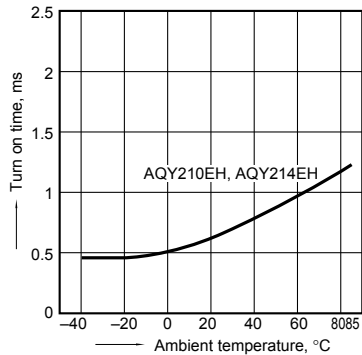
2-(3). On resistance vs. ambient temperature characteristics

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



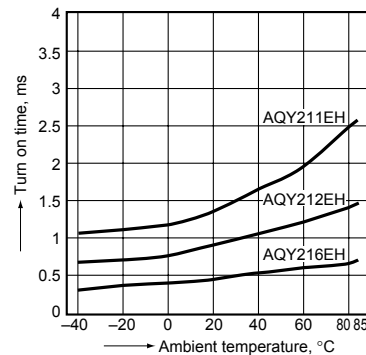
3-(1). Turn on time vs. ambient temperature characteristics

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



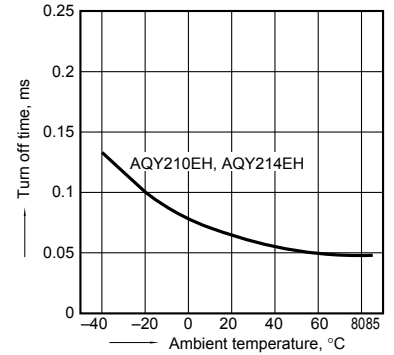
3-(2). Turn on time vs. ambient temperature characteristics

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



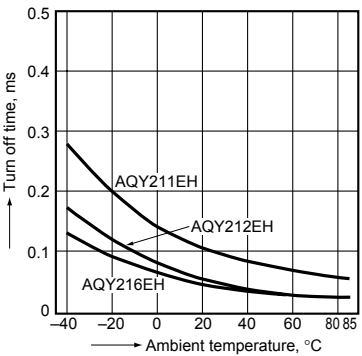
4-(1). Turn off time vs. ambient temperature characteristics

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



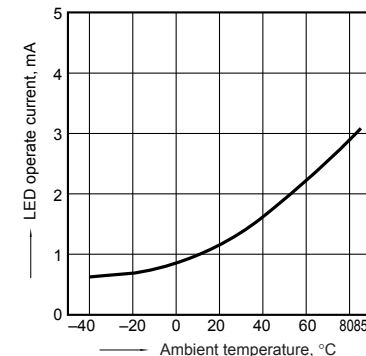
4-(2). Turn off time vs. ambient temperature characteristics

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



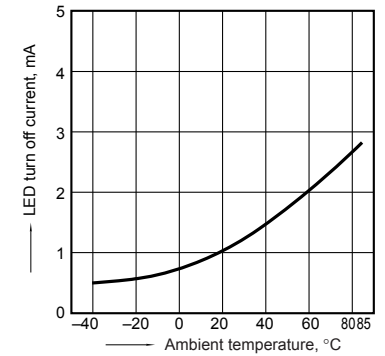
5. LED operate current vs. ambient temperature characteristics

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



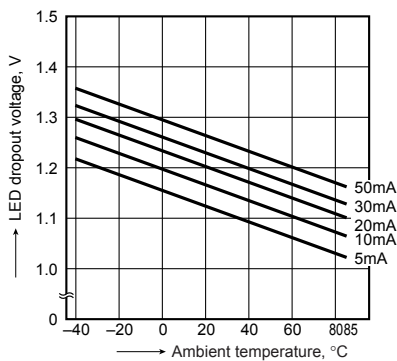
6. LED turn off current vs. ambient temperature characteristics

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



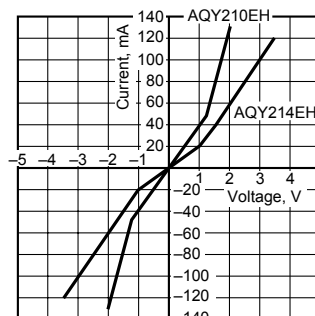
7. LED dropout voltage vs. ambient temperature characteristics

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



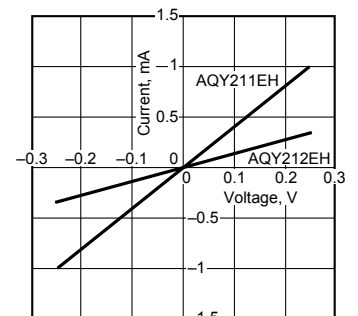
8-(1). Current vs. voltage characteristics of output at MOS portion

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



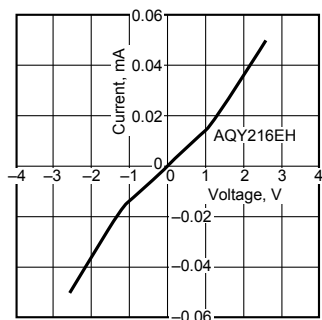
8-(2). Current vs. voltage characteristics of output at MOS portion

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

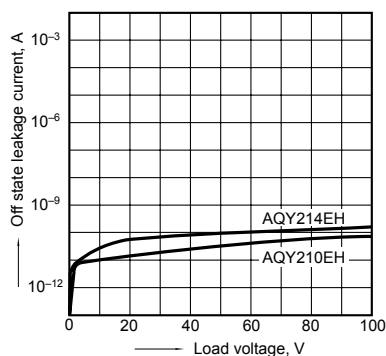


# GU-E PhotoMOS (AQY210EH)

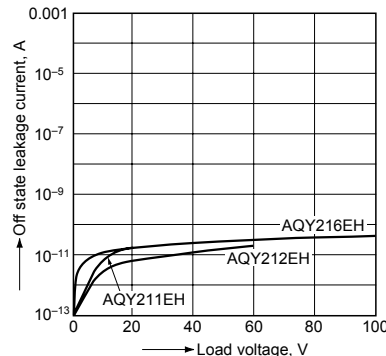
8-(3). Current vs. voltage characteristics of output at MOS portion  
 Measured portion: between terminals 3 and 4;  
 Ambient temperature: 25°C 77°F



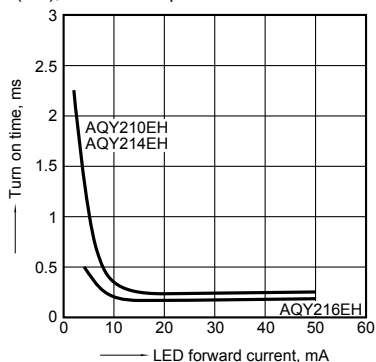
9-(1). Off state leakage current vs. load voltage characteristics  
 Measured portion: between terminals 3 and 4;  
 Ambient temperature: 25°C 77°F



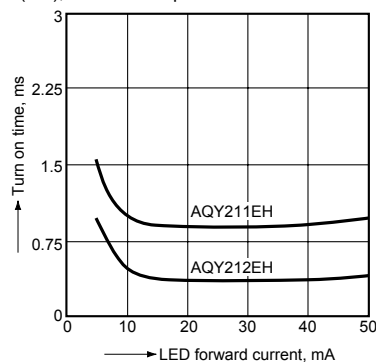
9-(2). Off state leakage current vs. load voltage characteristics  
 Measured portion: between terminals 3 and 4;  
 Ambient temperature: 25°C 77°F



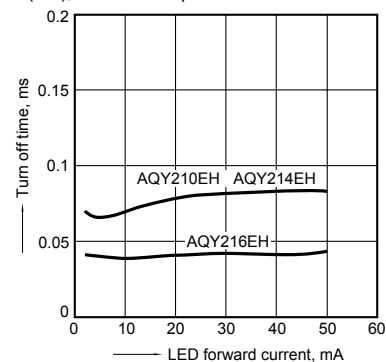
10-(1). Turn on time vs. LED forward current characteristics  
 Measured portion: between terminals 3 and 4;  
 Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



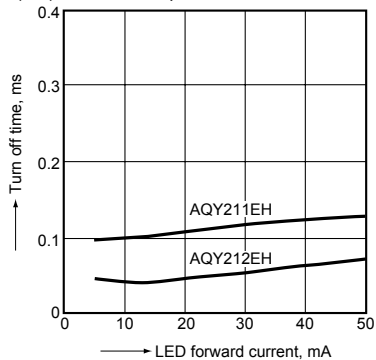
10-(2). Turn on time vs. LED forward current characteristics  
 Measured portion: between terminals 3 and 4;  
 Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



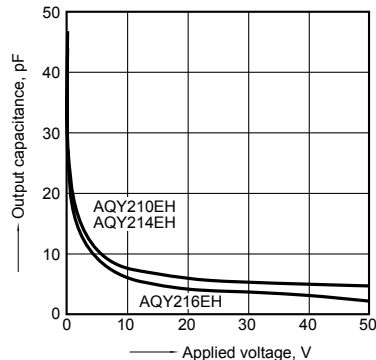
11-(1). Turn off time vs. LED forward current characteristics  
 Measured portion: between terminals 3 and 4;  
 Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



11-(2). Turn off time vs. LED forward current characteristics  
 Measured portion: between terminals 3 and 4;  
 Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



12-(1). Output capacitance vs. applied voltage characteristics  
 Measured portion: between terminals 3 and 4;  
 Frequency: 1 MHz; Ambient temperature: 25°C 77°F



12-(2). Output capacitance vs. applied voltage characteristics  
 Measured portion: between terminals 3 and 4;  
 Frequency: 1 MHz; Ambient temperature: 25°C 77°F

