



## GU (General Use)-E Type [1, 2-Channel (Form A) 4, 6-Pin Type]

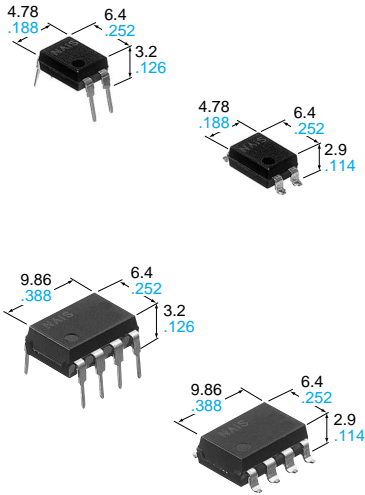
# PhotoMOS RELAYS

### FEATURES

- 1. Low cost type.**
- 2. Reinforced insulation 5,000V type (DIP type)**  
More than 0.4mm internal insulation distance between inputs and outputs.  
Conforms to EN41003, EN60950 (reinforced insulation)
- 3. Various package design (DIP4, SOP4, DIP8, SOP8 packages are available)**
- 4. High sensitivity, Low ON resistance**  
Can control a maximum 0.5A (AQY282EH, AQW282EH) load current with a 5mA input current.  
Low ON resistance of 2.5Ω (AQY282EH, AQW282EH).  
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, where as the PhotoMOS relay has only 100pA even with the rated load voltage of 350V (AQY280EH).

### TYPICAL APPLICATIONS

- Modem
- Telephone equipment
- Security equipment
- Sensors
- Amusement



mm inch

## DIP TYPES

### DIP 4pin

| Type       | I/O isolation voltage | Output rating* |        | Part No.              |                        |            |                              | Packing quantity                                                                                 |                              |
|------------|-----------------------|----------------|--------|-----------------------|------------------------|------------|------------------------------|--------------------------------------------------------------------------------------------------|------------------------------|
|            |                       |                |        | Through hole terminal | Surface-mount terminal |            | Tape and reel packing style  |                                                                                                  |                              |
|            |                       |                |        |                       |                        |            | Picked from the 1/2-pin side |                                                                                                  | Picked from the 3/4-pin side |
| AC/DC type | Reinforced 5,000 V    | 60 V           | 500 mA | AQY282EH              | AQY282EHA              | AQY282EHAX | AQY282EHAZ                   | Tube: 1 tube contains 100 pcs.<br>Tube: 1 batch contains 1,000 pcs.<br>Tape and reel: 1,000 pcs. |                              |
|            |                       | 350 V          | 130 mA | AQY280EH              | AQY280EHA              | AQY280EHAX | AQY280EHAZ                   |                                                                                                  |                              |
|            |                       | 400 V          | 120 mA | AQY284EH              | AQY284EHA              | AQY284EHAX | AQY284EHAZ                   |                                                                                                  |                              |

\*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.

### DIP 8pin

| Type       | I/O isolation voltage | Output rating* |        | Part No.              |                        |            |                                  | Packing quantity                                                                              |                                  |
|------------|-----------------------|----------------|--------|-----------------------|------------------------|------------|----------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------|
|            |                       |                |        | Through hole terminal | Surface-mount terminal |            | Tape and reel packing style      |                                                                                               |                                  |
|            |                       |                |        |                       |                        |            | Picked from the 1/2/3/4-pin side |                                                                                               | Picked from the 5/6/7/8-pin side |
| AC/DC type | Reinforced 5,000 V    | 60 V           | 400 mA | AQW282EH              | AQW282EHA              | AQW282EHAX | AQW282EHAZ                       | Tube: 1 tube contains 40 pcs.<br>Tube: 1 batch contains 400 pcs.<br>Tape and reel: 1,000 pcs. |                                  |
|            |                       | 350 V          | 120 mA | AQW280EH              | AQW280EHA              | AQW280EHAX | AQW280EHAZ                       |                                                                                               |                                  |
|            |                       | 400 V          | 100 mA | AQW284EH              | AQW284EHA              | AQW284EHAX | AQW284EHAZ                       |                                                                                               |                                  |

\*Indicate the peak AC and DC values.

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)

#### DIP 4pin

| Item                    |                                   | Symbol     | AQY282EH                        | AQY280EH | AQY284EH | Remarks                           |
|-------------------------|-----------------------------------|------------|---------------------------------|----------|----------|-----------------------------------|
| Input                   | LED forward current               | $I_F$      | 50 mA                           |          |          |                                   |
|                         | LED reverse voltage               | $V_R$      | 5 V                             |          |          |                                   |
|                         | Peak forward current              | $I_{FP}$   | 1 A                             |          |          | f = 100 Hz,<br>Duty factor = 0.1% |
|                         | Power dissipation                 | $P_{in}$   | 75 mW                           |          |          |                                   |
| Output                  | Load voltage (peak AC)            | $V_L$      | 60 V                            | 350 V    | 400 V    |                                   |
|                         | Continuous load current (peak AC) | $I_L$      | 0.5 A                           | 0.13 A   | 0.12 A   |                                   |
|                         | Peak load current                 | $I_{peak}$ | 1.5 A                           | 0.4 A    | 0.3 A    | 100 ms (1 shot),<br>$V_L = DC$    |
|                         | Power dissipation                 | $P_{out}$  | 500 mW                          |          |          |                                   |
| Total power dissipation |                                   | $P_T$      | 550 mW                          |          |          |                                   |
| I/O isolation voltage   |                                   | $V_{iso}$  | 5,000 V AC                      |          |          |                                   |
| Operating temperature   |                                   | $T_{opr}$  | -40°C to +85°C -40°F to +185°F  |          |          | Non-condensing at low temperature |
| Storage temperature     |                                   | $T_{stg}$  | -40°C to +100°C -40°F to +212°F |          |          |                                   |

#### DIP 8pin

| Item                    |                                   | Symbol     | AQW282EH                        | AQW280EH      | AQW284EH     | Remarks                              |
|-------------------------|-----------------------------------|------------|---------------------------------|---------------|--------------|--------------------------------------|
| Input                   | LED forward current               | $I_F$      | 50 mA                           |               |              |                                      |
|                         | LED reverse voltage               | $V_R$      | 5 V                             |               |              |                                      |
|                         | Peak forward current              | $I_{FP}$   | 1 A                             |               |              | f = 100 Hz,<br>Duty factor = 0.1%    |
|                         | Power dissipation                 | $P_{in}$   | 75 mW                           |               |              |                                      |
| Output                  | Load voltage (peak AC)            | $V_L$      | 60 V                            | 350 V         | 400 V        |                                      |
|                         | Continuous load current (peak AC) | $I_L$      | 0.4 (0.5) A                     | 0.12 (0.14) A | 0.1 (0.13) A | ( ): in case of using only 1 channel |
|                         | Peak load current                 | $I_{peak}$ | 1.2 A                           | 0.36 A        | 0.3 A        | 100 ms (1 shot),<br>$V_L = DC$       |
|                         | Power dissipation                 | $P_{out}$  | 800 mW                          |               |              |                                      |
| Total power dissipation |                                   | $P_T$      | 850 mW                          |               |              |                                      |
| I/O isolation voltage   |                                   | $V_{iso}$  | 5,000 V AC                      |               |              |                                      |
| Operating temperature   |                                   | $T_{opr}$  | -40°C to +85°C -40°F to +185°F  |               |              | Non-condensing at low temperature    |
| Storage temperature     |                                   | $T_{stg}$  | -40°C to +100°C -40°F to +212°F |               |              |                                      |

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

#### DIP4pin

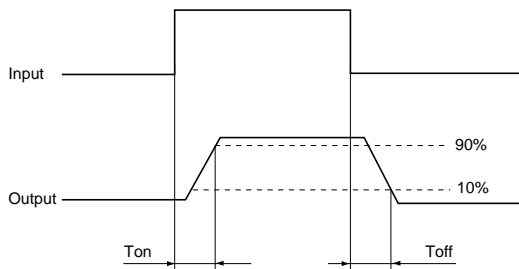
| Item                             |                           | Symbol    | AQY282EH                                | AQY280EH | AQY284EH | Condition                                                         |
|----------------------------------|---------------------------|-----------|-----------------------------------------|----------|----------|-------------------------------------------------------------------|
| Input                            | LED operate current       | Typical   | 1.8 mA                                  |          |          | $I_L = \text{Max.}$                                               |
|                                  |                           | Maximum   | 3.0 mA                                  |          |          |                                                                   |
|                                  | LED turn off current      | Minimum   | 0.2 mA                                  |          |          | $I_L = \text{Max.}$                                               |
|                                  |                           | Typical   | 1.6 mA                                  |          |          |                                                                   |
|                                  | LED dropout voltage       | Typical   | 1.14 V (1.25 V at $I_F = 50\text{mA}$ ) |          |          | $I_F = 5 \text{ mA}$                                              |
| Maximum                          |                           | 1.5 V     |                                         |          |          |                                                                   |
| Output                           | On resistance             | Typical   | 0.85Ω                                   | 20Ω      | 28Ω      | $I_F = 5 \text{ mA}$<br>$I_L = \text{Max.}$<br>Within 1 s on time |
|                                  |                           | Maximum   | 2.5Ω                                    | 25Ω      | 35Ω      |                                                                   |
|                                  | Off state leakage current | Maximum   | $I_{Leak}$                              | 1μA      |          | $I_F = 0 \text{ mA}$<br>$V_L = \text{Max.}$                       |
| Transfer characteristics         | Turn on time*             | Typical   | 1.8 ms                                  | 1.5 ms   |          | $I_F = 5 \text{ mA}$<br>$I_L = \text{Max.}$                       |
|                                  |                           | Maximum   | 5 ms                                    |          |          |                                                                   |
|                                  | Turn off time*            | Typical   | 0.5 ms                                  |          |          | $I_F = 5 \text{ mA}$<br>$I_L = \text{Max.}$                       |
|                                  |                           | Maximum   | 2 ms                                    |          |          |                                                                   |
|                                  | I/O capacitance           | Typical   | 0.8 pF                                  |          |          | f = 1 MHz<br>$V_B = 0\text{V}$                                    |
|                                  |                           | Maximum   | 1.5 pF                                  |          |          |                                                                   |
| Initial I/O isolation resistance | Minimum                   | $R_{iso}$ | 1,000 MΩ                                |          | 500 V DC |                                                                   |

# AQ○28○EH

DIP8pin

| Item                             |                           |           | Symbol                                  | AQW282EH | AQW280EH | AQW284EH             | Condition                                                         |
|----------------------------------|---------------------------|-----------|-----------------------------------------|----------|----------|----------------------|-------------------------------------------------------------------|
| Input                            | LED operate current       | Typical   | $I_{Fon}$                               | 1.8 mA   |          |                      | $I_L = \text{Max.}$                                               |
|                                  |                           | Maximum   |                                         | 3.0 mA   |          |                      |                                                                   |
|                                  | LED turn off current      | Minimum   | $I_{Foff}$                              | 0.2 mA   |          |                      | $I_L = \text{Max.}$                                               |
|                                  |                           | Typical   |                                         | 1.6 mA   |          |                      |                                                                   |
| LED dropout voltage              | Typical                   | $V_F$     | 1.14 V (1.25 V at $I_F = 50\text{mA}$ ) |          |          | $I_F = 5 \text{ mA}$ |                                                                   |
|                                  | Maximum                   |           | 1.5 V                                   |          |          |                      |                                                                   |
| Output                           | On resistance             | Typical   | $R_{on}$                                | 0.85Ω    | 20Ω      | 28Ω                  | $I_F = 5 \text{ mA}$<br>$I_L = \text{Max.}$<br>Within 1 s on time |
|                                  |                           | Maximum   |                                         | 2.5Ω     | 25Ω      | 35Ω                  |                                                                   |
|                                  | Off state leakage current | Maximum   | $I_{Leak}$                              | 1μA      |          |                      | $I_F = 0 \text{ mA}$<br>$V_L = \text{Max.}$                       |
| Transfer characteristics         | Turn on time*             | Typical   | $T_{on}$                                | 1.8 ms   | 1.5 ms   |                      | $I_F = 5 \text{ mA}$<br>$I_L = \text{Max.}$                       |
|                                  |                           | Maximum   |                                         | 5 ms     |          |                      |                                                                   |
|                                  | Turn off time*            | Typical   | $T_{off}$                               | 0.5 ms   |          |                      | $I_F = 5 \text{ mA}$<br>$I_L = \text{Max.}$                       |
|                                  |                           | Maximum   |                                         | 2 ms     |          |                      |                                                                   |
|                                  | I/O capacitance           | Typical   | $C_{iso}$                               | 0.8 pF   |          |                      | $f = 1 \text{ MHz}$<br>$V_B = 0\text{V}$                          |
|                                  |                           | Maximum   |                                         | 1.5 pF   |          |                      |                                                                   |
| Initial I/O isolation resistance | Minimum                   | $R_{iso}$ | 1,000 MΩ                                |          |          | 500 V DC             |                                                                   |

\*Turn on/Turn off time



3-4 the terminal leads receive solder plating or solder dip plating.

## REFERENCE DATA

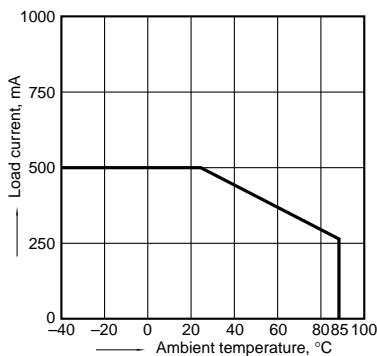
[DIP type]

1. Load current vs. ambient temperature characteristics

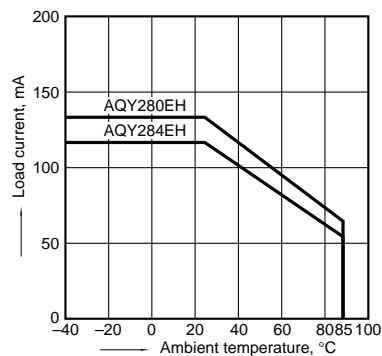
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F

Type of connection: A

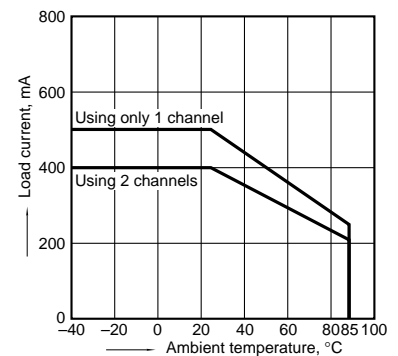
(1) AQY282EH



(2) AQY280EH, AQY284EH

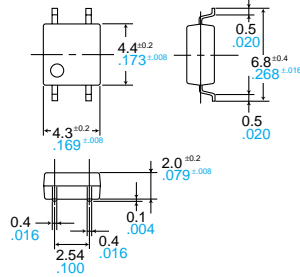


(3) AQW282EH

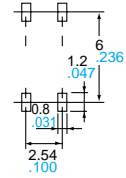


## DIMENSIONS

### AQY28OS



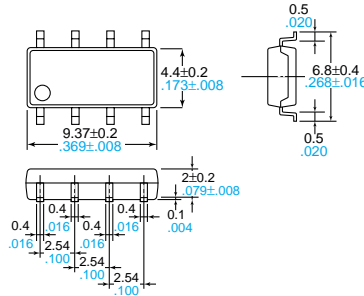
Recommended mounting pad  
(Top view)



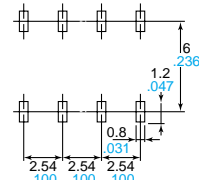
Terminal thickness = 0.15 .006  
General tolerance: ±0.1 ±.004

Tolerance: ±0.1 ±.004

### AQW28OS



Recommended mounting pad  
(Top view)



Terminal thickness = 0.15 .006  
General tolerance: ±0.1 ±.004

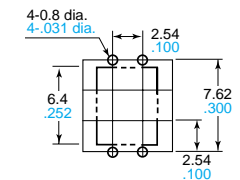
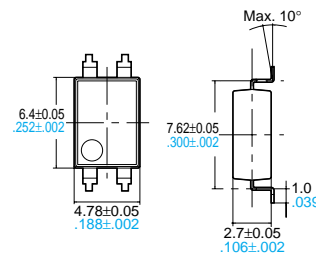
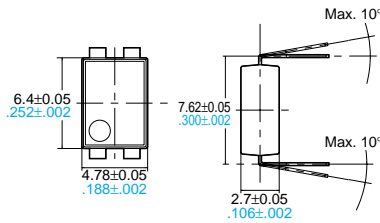
Tolerance: ±0.1 ±.004

### AQY28EH(A)

Through hole terminal type

Surface mount terminal type

PC board pattern (Bottom view)



Terminal thickness = 0.2 .008  
General tolerance: ±0.1 ±.004

Terminal thickness = 0.2 .008  
General tolerance: ±0.1 ±.004

Tolerance: ±0.1 ±.004

Mounting pad (Top view)

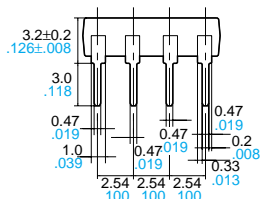
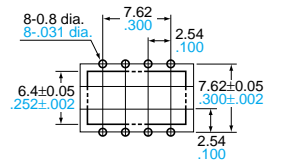
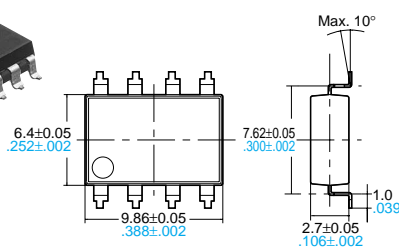
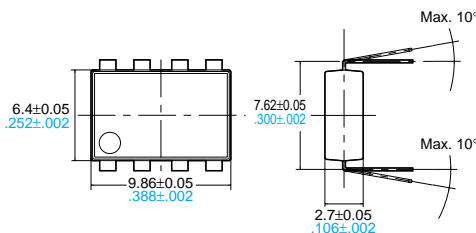
Tolerance: ±0.1 ±.004

### AQW28EH(A)

Through hole terminal type

Surface mount terminal type

PC board pattern  
(Bottom view)



Terminal thickness = 0.2 .008  
General tolerance: ±0.1 ±.004

Terminal thickness = 0.2 .008  
General tolerance: ±0.1 ±.004

Tolerance: ±0.1 ±.004

Mounting pad (Top view)

Tolerance: ±0.1 ±.004