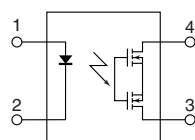




mm inch



RoHS compliant

## FEATURES

- 1. Controls low-level analog signals**  
PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.
- 2. Small SOP4-Pin package**  
The device comes in a miniature SOP4-pin type measuring (W)4.3 × (L)4.4 × (H)2.1 mm (W).169 × (L).173 × (H).083 inch
- 3. Low-level off state leakage current of max. 1 μA**
- 4. Load voltage 60V, 350V and 400V types available**

## TYPICAL APPLICATIONS

- Telecommunication (PC, electronic notepad)
- Measuring and testing equipment
- Factory automation equipment
- Security equipment
- High speed inspection machines

## TYPES

|                | Output rating* |              | Package  | Part No.           |                              |                              | Packing quantity                                                |               |
|----------------|----------------|--------------|----------|--------------------|------------------------------|------------------------------|-----------------------------------------------------------------|---------------|
|                | 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 dual use | 60V            | 500mA        | SOP4-pin | AQY212S            | AQY212SX                     | AQY212SZ                     | 1 tube contains:<br>100 pcs.<br>1 batch contains:<br>2,000 pcs. | 1,000 pcs.    |
|                | 350V           | 120mA        |          | AQY210S            | AQY210SX                     | AQY210SZ                     |                                                                 |               |
|                | 400V           | 100mA        |          | AQY214S            | AQY214SX                     | AQY214SZ                     |                                                                 |               |

\* Indicate the peak AC and DC values.

Note: For space reasons, the three initial letters of the part number "AQY", the surface mount terminal indicator "S" and the packing style indicator "X" or "Z" are not marked on the device. (Ex. the label for product number AQY210SX is 210.)

## RATING

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

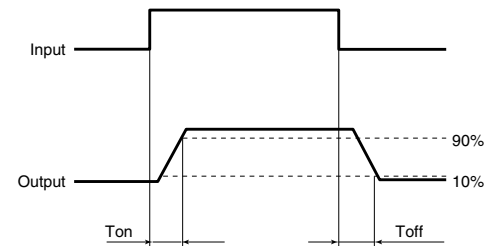
| Item                    |                         | Symbol            | AQY212S                         | AQY210S | AQY214S | Remarks                             |
|-------------------------|-------------------------|-------------------|---------------------------------|---------|---------|-------------------------------------|
| Input                   | LED forward current     | I <sub>F</sub>    | 50 mA                           |         |         |                                     |
|                         | LED reverse voltage     | V <sub>R</sub>    | 5 V                             |         |         |                                     |
|                         | Peak forward current    | I <sub>FP</sub>   | 1 A                             |         |         | f = 100 Hz, Duty factor = 0.1%      |
|                         | Power dissipation       | P <sub>in</sub>   | 75 mW                           |         |         |                                     |
| Output                  | Load voltage (peak AC)  | V <sub>L</sub>    | 60 V                            | 350 V   | 400 V   |                                     |
|                         | Continuous load current | I <sub>L</sub>    | 0.5 A                           | 0.12 A  | 0.1 A   | Peak AC, DC                         |
|                         | Peak load current       | I <sub>peak</sub> | 1.5 A                           | 0.3 A   | 0.24 A  | 100ms (1 shot), V <sub>L</sub> = DC |
|                         | Power dissipation       | P <sub>out</sub>  | 300 mW                          |         |         |                                     |
| Total power dissipation |                         | P <sub>T</sub>    | 350 mW                          |         |         |                                     |
| I/O isolation voltage   |                         | V <sub>iso</sub>  | 1,500 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 SOP 1 Form A (AQY210S)

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

| Item                             |                           |               | Symbol            | AQY212S                                  | AQY210S | AQY214S | Remarks                                                              |
|----------------------------------|---------------------------|---------------|-------------------|------------------------------------------|---------|---------|----------------------------------------------------------------------|
| Input                            | LED operate current       | Typical       | I <sub>Fon</sub>  | 0.9 mA                                   |         |         | I <sub>L</sub> = Max.                                                |
|                                  |                           | Maximum       |                   | 3 mA                                     |         |         |                                                                      |
|                                  | LED turn off current      | Minimum       | I <sub>Foff</sub> | 0.4 mA                                   |         |         | I <sub>L</sub> = Max.                                                |
|                                  |                           | Typical       |                   | 0.85 mA                                  |         |         |                                                                      |
|                                  | LED dropout voltage       | Typical       | V <sub>F</sub>    | 1.25 V (1.14 V at I <sub>F</sub> = 5 mA) |         |         | I <sub>F</sub> = 50 mA                                               |
|                                  |                           | Maximum       |                   | 1.5 V                                    |         |         |                                                                      |
| Output                           | On resistance             | Typical       | R <sub>on</sub>   | 0.83 Ω                                   | 17 Ω    | 25 Ω    | I <sub>F</sub> = 5 mA<br>I <sub>L</sub> = Max.<br>Within 1 s on time |
|                                  |                           | Maximum       |                   | 2.5 Ω                                    | 25 Ω    | 35 Ω    |                                                                      |
|                                  | Off state leakage current | Maximum       | I <sub>Leak</sub> | 1 μA                                     |         |         | I <sub>F</sub> = 0 mA<br>V <sub>L</sub> = Max.                       |
|                                  | Transfer characteristics  | Turn on time* | Typical           | T <sub>on</sub>                          | 0.65 ms | 0.23 ms | 0.21 ms                                                              |
| Maximum                          |                           |               | 2 ms              |                                          | 0.5 ms  | 0.5 ms  |                                                                      |
| Turn off time*                   |                           | Typical       | T <sub>off</sub>  | 0.08 ms                                  | 0.04 ms |         | I <sub>F</sub> = 5 mA<br>I <sub>L</sub> = Max.                       |
|                                  |                           | Maximum       |                   | 0.2 ms                                   |         |         |                                                                      |
| I/O capacitance                  |                           | Maximum       | C <sub>iso</sub>  | 1.5 pF                                   |         |         | f = 1 MHz<br>V <sub>B</sub> = 0 V                                    |
| Initial I/O isolation resistance |                           | Minimum       | R <sub>iso</sub>  | 1,000 MΩ                                 |         |         | 500 V DC                                                             |

\*Turn on/Turn off time



## RECOMMENDED OPERATING CONDITIONS

Please obey the following conditions to ensure proper device operation and resetting.

| Item              | Symbol         | Recommended value | Unit |
|-------------------|----------------|-------------------|------|
| Input LED current | I <sub>F</sub> | 5                 | mA   |

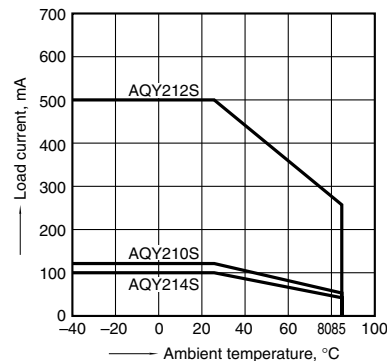
■ These products are not designed for automotive use.

If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

## REFERENCE DATA

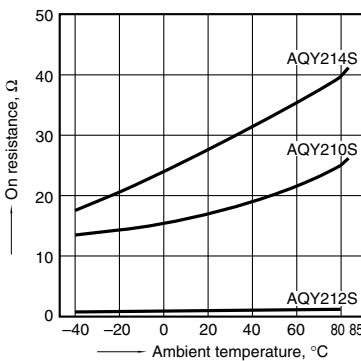
### 1. Load current vs. ambient temperature characteristics

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



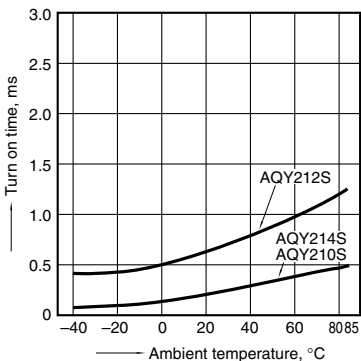
### 2. On resistance vs. ambient temperature characteristics

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



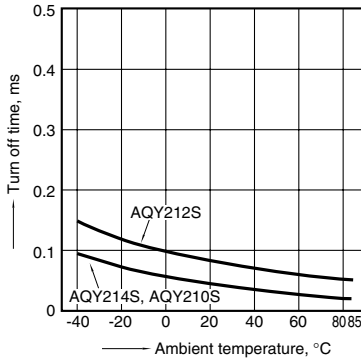
### 3. Turn on time vs. ambient temperature characteristics

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



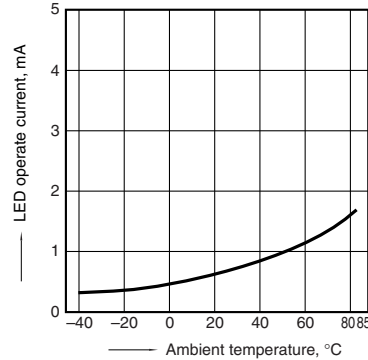
## 4. Turn off time vs. ambient temperature characteristics

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



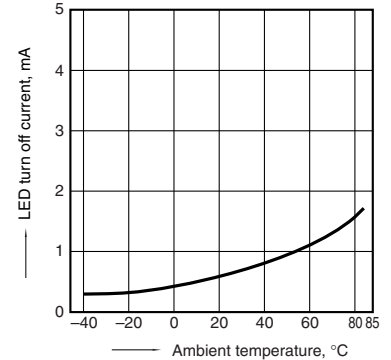
## 5. LED operate current vs. ambient temperature characteristics

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



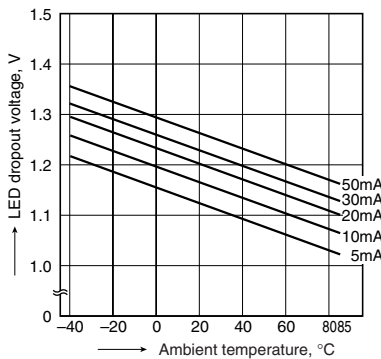
## 6. LED turn off current vs. ambient temperature characteristics

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



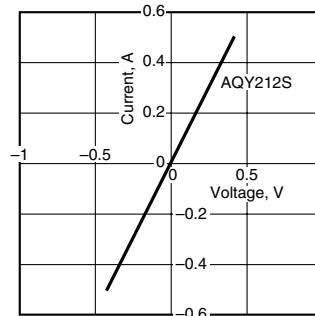
## 7. LED dropout voltage vs. ambient temperature characteristics

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



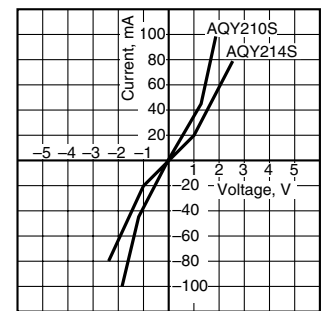
## 8-(1). Current vs. voltage characteristics of output at MOS portion

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



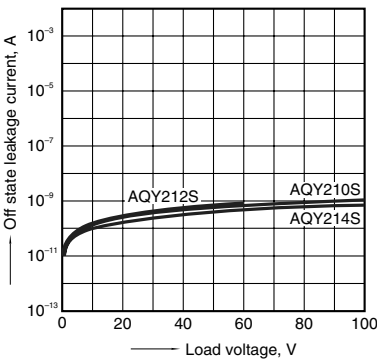
## 8-(2). Current vs. voltage characteristics of output at MOS portion

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



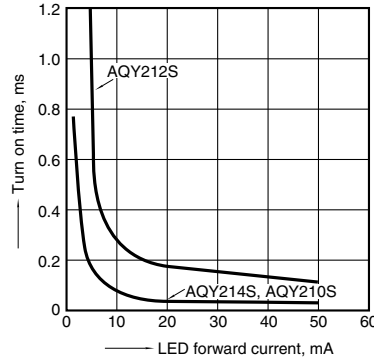
## 9. Off state leakage current vs. load voltage characteristics

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



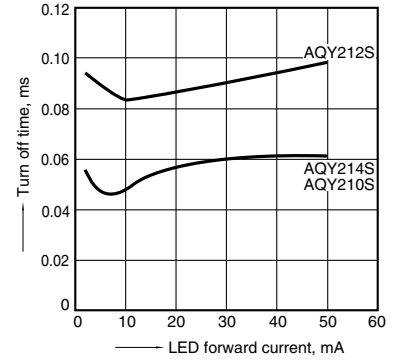
## 10. Turn on time vs. LED forward current characteristics

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



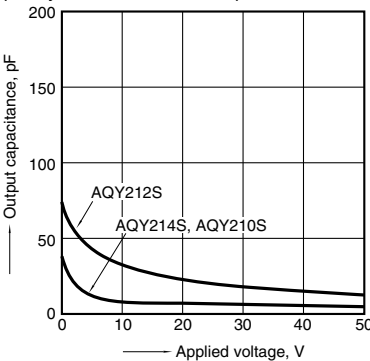
## 11. Turn off time vs. LED forward current characteristics

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



## 12. Output capacitance vs. applied voltage characteristics

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



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QQ 800077892

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➤ Customer Service :

Email [service@ameya360.com](mailto:service@ameya360.com)

➤ Partnership :

Tel +86 (21) 64016692-8333

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