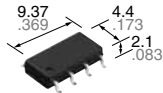
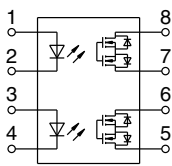




|  |  |
|--|--|
| <b>Miniature SOP8-pin type<br/>of 60V/350V/400V<br/>load voltage</b> | <b>PhotoMOS®<br/>GU SOP 2 Form A<br/>(AQW210S)</b> |
|--|--|



mm inch



**RoHS compliant**

### FEATURES

**1. 2 channels in miniature SOP8-pin design**

The device comes in a super-miniature SO package measuring (W) 4.4 × (L) 9.37 × (H) 2.1 mm (W) .173 × (L) .369 × (H) .083 inch —approx. 38% of the volume and 66% of the footprint size of DIP8-pin type.

**2. Controls low-level analog signals**

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

**3. Low-level off state leakage current of max. 1 μA**

### TYPICAL APPLICATIONS

- Measuring instruments
- Data communications
- Computers
- Industrial robots

### 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 1/2/3/4-pin side | Picked from the 5/6/7/8-pin side |  |               |
| AC/DC dual use | 60V            | 400mA        | SOP8-pin | AQW212S            | AQW212SX                         | AQW212SZ                         | 1 tube contains:<br>50 pcs.<br>1 batch contains:<br>1,000 pcs. | 1,000 pcs.    |
|                | 350V           | 100mA        |          | AQW210S            | AQW210SX                         | AQW210SZ                         |  |               |
|                | 400V           | 80mA         |          | AQW214S            | AQW214SX                         | AQW214SZ                         |  |               |

\* Indicate the peak AC and DC values.  
Note: The packing style indicator "X" or "Z" are not marked on the device.

### RATING

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

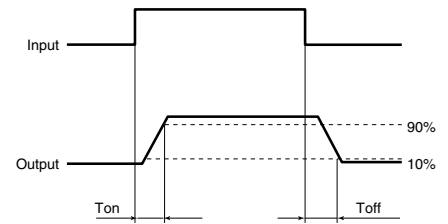
| Item                    |                         | Symbol            | AQW212S                     | AQW210S        | AQW214S        | Remarks   |
|-------------------------|-------------------------|-------------------|-----------------------------|----------------|----------------|---|
| Input                   | 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>    | 0.4 A (0.5 A)               | 0.1 A (0.13 A) | 0.08 A (0.1 A) | Peak AC, DC<br>( ): in case of using only 1 channel |
|                         | Peak load current       | I <sub>peak</sub> | 1.5 A                       | 0.3 A          | 0.24 A         | A connection: 100 ms (1 shot), V <sub>L</sub> = DC  |
|                         | Power dissipation       | P <sub>out</sub>  | 600 mW                      |                |                |   |
| Total power dissipation |                         | P <sub>T</sub>    | 650 mW                      |                |                |   |
| I/O isolation voltage   |                         | V <sub>iso</sub>  | 1,500 Vrms                  |                |                |   |
| Ambient temperature     | Operating               | T <sub>opr</sub>  | -40 to +85°C -40 to +185°F  |                |                | (Non-icing at low temperatures)                     |
|                         | Storage                 | T <sub>stg</sub>  | -40 to +100°C -40 to +212°F |                |                |   |

# GU SOP 2 Form A (AQW210S)

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

| Item                             |                           | Symbol                                   | AQW212S | AQW210S | AQW214S                | Condition  |
|----------------------------------|---------------------------|--|---------|---------|------------------------|--|
| Input                            | LED operate current       | Typical                                  | 0.9 mA  |         |                        | I <sub>L</sub> = Max.  |
|                                  |                           | Maximum                                  | 3 mA    |         |                        |  |
|                                  | LED turn off current      | Minimum                                  | 0.4 mA  |         |                        | I <sub>L</sub> = Max.  |
|                                  |                           | Typical                                  | 0.8 mA  |         |                        |  |
| LED dropout voltage              | Typical                   | 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                                  | 0.83 Ω  | 16 Ω    | 30 Ω                   | I <sub>F</sub> = 5 mA<br>I <sub>L</sub> = Max.<br>Within 1 s |
|                                  |                           | Maximum                                  | 2.5 Ω   | 35 Ω    | 50 Ω                   |  |
|                                  | Off state leakage current | Maximum                                  | 1 μA    |         |                        | I <sub>F</sub> = 0 mA<br>V <sub>L</sub> = Max.               |
| Transfer characteristics         | Turn on time*             | Typical                                  | 0.65 ms | 0.23 ms | 0.21 ms                | I <sub>F</sub> = 5 mA<br>I <sub>L</sub> = Max.               |
|                                  |                           | Maximum                                  | 2 ms    | 0.5 ms  |                        |  |
|                                  | Turn off time*            | Typical                                  | 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           | Typical                                  | 0.8 pF  |         |                        | f = 1 MHz<br>V <sub>B</sub> = 0 V                            |
| Maximum                          |                           | 1.5 pF                                   |         |         |                        |  |
| Initial I/O isolation resistance | Minimum                   | 1,000 MΩ                                 |         |         | 500 V DC               |  |

\*Turn on/Turn off time



## 3. Recommended operating conditions (Ambient temperature: 25°C 77°F)

Please use under recommended operating conditions to obtain expected characteristics.

| Item                   | Symbol                  | Number of used channels | Min. | Max. | Unit |
|------------------------|-------------------------|-------------------------|------|------|------|
| LED current            | I <sub>F</sub>          |                         | 5    | 30   | mA   |
| Load voltage (Peak AC) | V <sub>L</sub>          |                         | —    | 48   | V    |
| AQW212S                | Continuous load current | 1ch                     | —    | 0.5  | A    |
|                        |                         | 2ch                     | —    | 0.4  |      |
| AQW210S                | Load voltage (Peak AC)  |                         | —    | 280  | V    |
|                        |                         | Continuous load current | 1ch  | —    |      |
|                        |                         | 2ch                     | —    | 0.1  |      |
| AQW214S                | Load voltage (Peak AC)  |                         | —    | 320  | V    |
|                        |                         | Continuous load current | 1ch  | —    |      |
|                        |                         | 2ch                     | —    | 0.08 |      |

■ These products are not designed for automotive use.

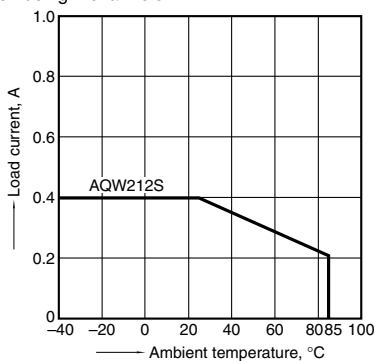
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

## REFERENCE DATA

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

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

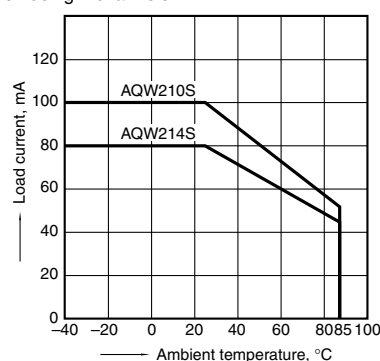
When using 2 channels



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

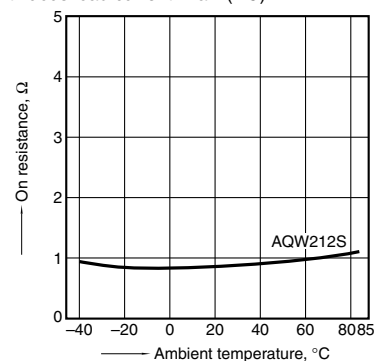
Allowable ambient temperature: -40 to +85°C  
-40 to +185°F

When using 2 channels



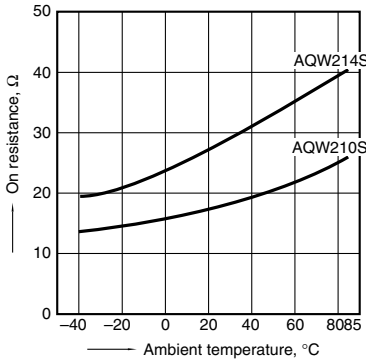
2.-(1) On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8;  
LED current: 5 mA; Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



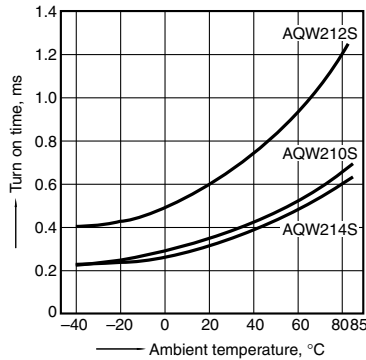
2.-(2) On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8;  
LED current: 5 mA; Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



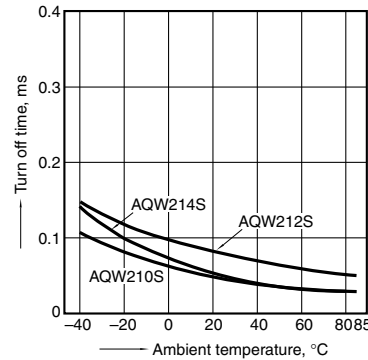
3. Turn on time vs. ambient temperature characteristics

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



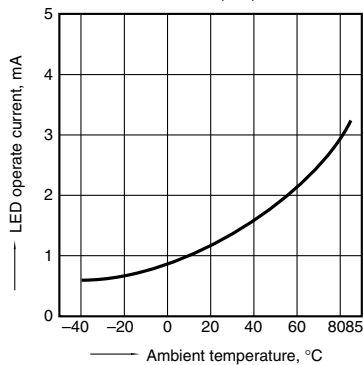
4. Turn off time vs. ambient temperature characteristics

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



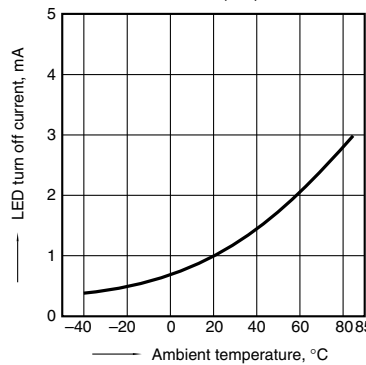
5. LED operate current vs. ambient temperature characteristics

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



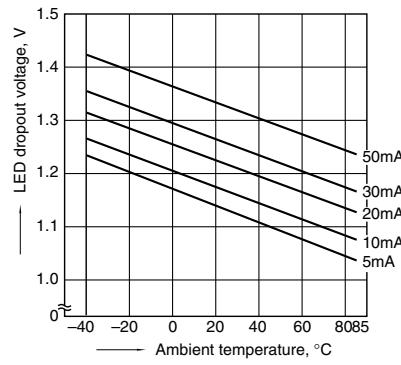
6. LED turn off current vs. ambient temperature characteristics

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



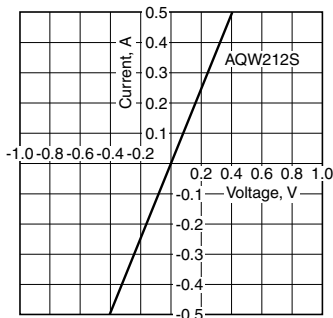
7. LED dropout voltage vs. ambient temperature characteristics

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



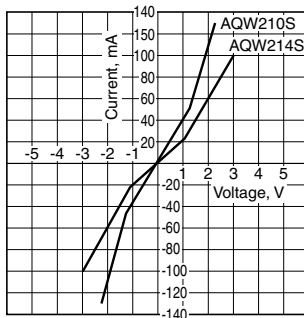
8.-(1) Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8;  
Ambient temperature: 25°C 77°F



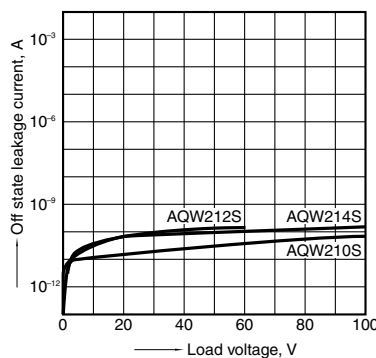
8.-(2) Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8;  
Ambient temperature: 25°C 77°F



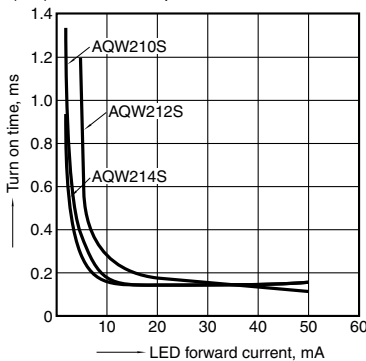
9. Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 5 and 6, 7 and 8;  
Ambient temperature: 25°C 77°F



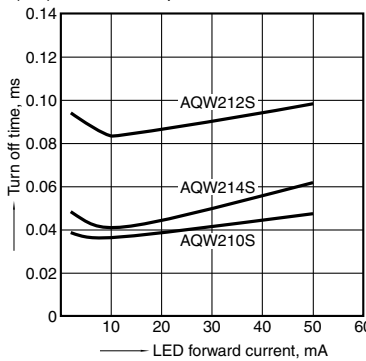
10. Turn on time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8;  
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



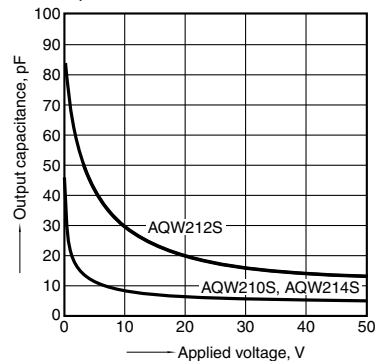
11. Turn off time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8;  
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 5 and 6, 7 and 8;  
Frequency: 1 MHz;  
Ambient temperature: 25°C 77°F



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Please contact .....

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