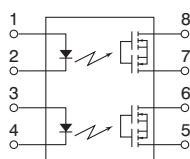


**CAD Data**

mm inch



## 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 relays 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
- 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 1/2/3/4-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 relay.

## RATING

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

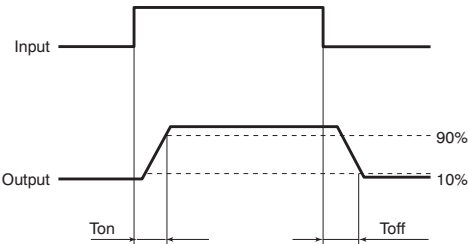
| Item                    |                         | Symbol            | AQW212S                         | AQW210S        | AQW214S        | Remarks                                             |
|-------------------------|-------------------------|-------------------|---------------------------------|----------------|----------------|-----------------------------------------------------|
| 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 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 2 Form A (AQW210S)

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

| Item                             |                           |         | Symbol            | AQW212S                                  | AQW210S | AQW214S | 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 |                   | 0.8 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                                   | 16 Ω    | 30 Ω    | I <sub>F</sub> = 5 mA<br>I <sub>L</sub> = Max.<br>Within 1 s on time |
|                                  |                           | Maximum |                   | 2.5 Ω                                    | 35 Ω    | 50 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 | I <sub>F</sub> = 5 mA<br>I <sub>L</sub> = Max.                       |
|                                  |                           | Maximum |                   | 2 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           | Typical | C <sub>iso</sub>  | 0.8 pF                                   |         |         | f = 1 MHz<br>V <sub>B</sub> = 0 V                                    |
|                                  |                           | Maximum |                   | 1.5 pF                                   |         |         |                                                                      |
| 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 relay operation and resetting.

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

- Dimensions
- Schematic and Wiring Diagrams
- Cautions for Use

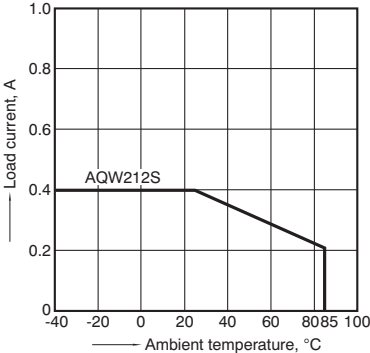
■ These products are not designed for automotive use.  
If you are considering to use these products for automotive applications, please contact your local Panasonic technical representative.  
Please refer to our information on [PhotoMOS Relays for Automotive Applications](#).

REFERENCE DATA

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

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

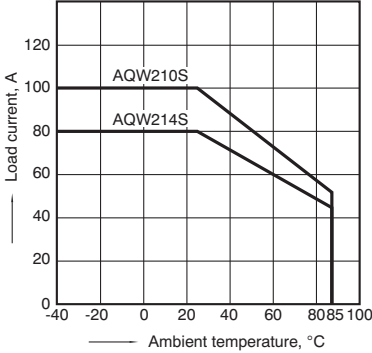
When using 2 channels



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

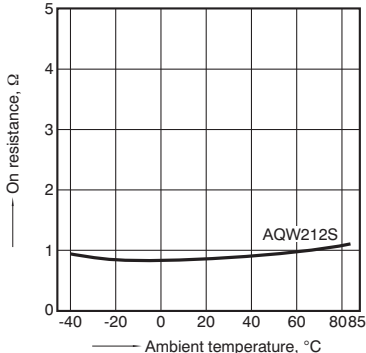
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F

When using 2 channels



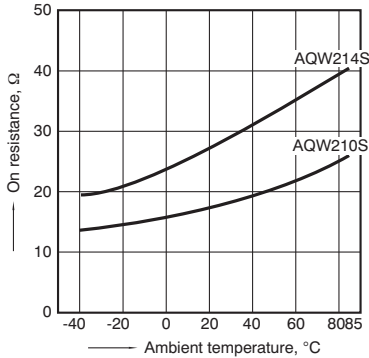
2-(1) On resistance vs. ambient temperature characteristics

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



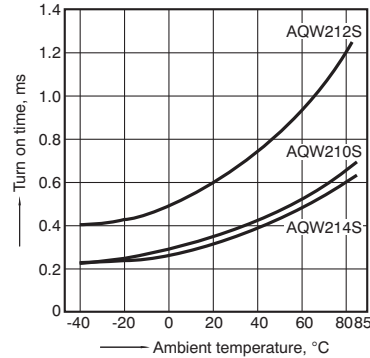
## 2.-(2) On resistance vs. ambient temperature characteristics

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



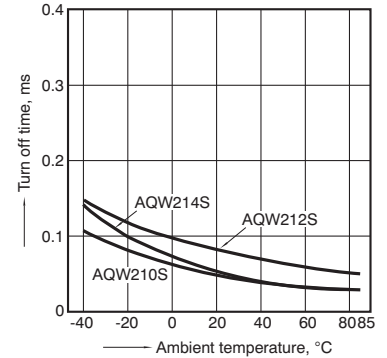
## 3. Turn on time vs. ambient temperature characteristics

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



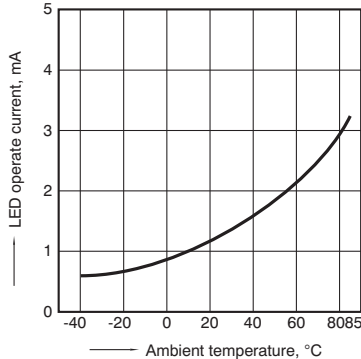
## 4. Turn off time vs. ambient temperature characteristics

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



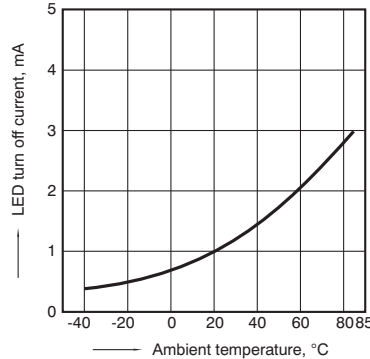
## 5. LED operate current vs. ambient temperature characteristics

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



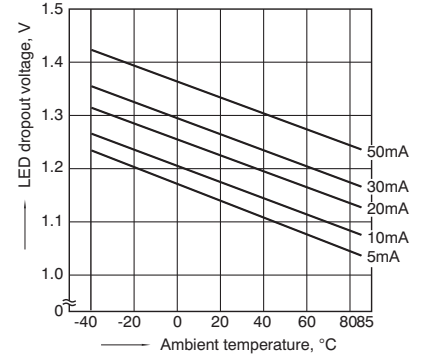
## 6. LED turn off current vs. ambient temperature characteristics

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



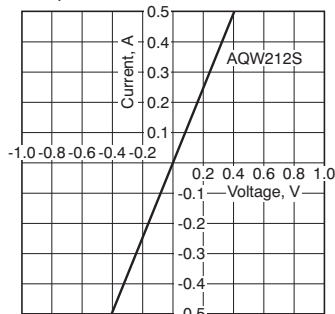
## 7. LED dropout voltage vs. ambient temperature characteristics

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



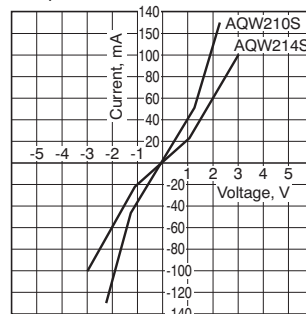
## 8.-(1) Current vs. voltage characteristics of output at MOS portion

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



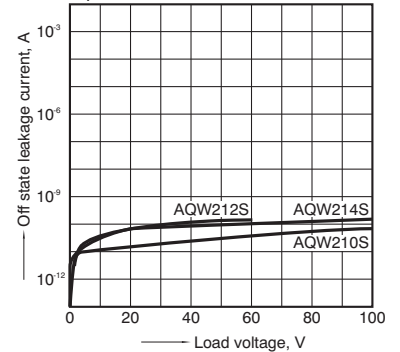
## 8.-(2) Current vs. voltage characteristics of output at MOS portion

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



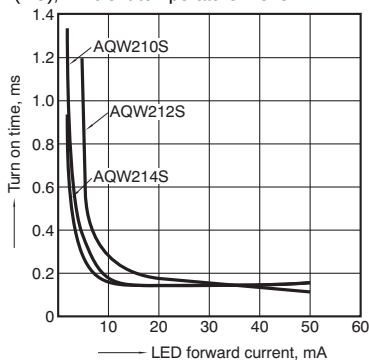
## 9. Off state leakage current vs. load voltage characteristics

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



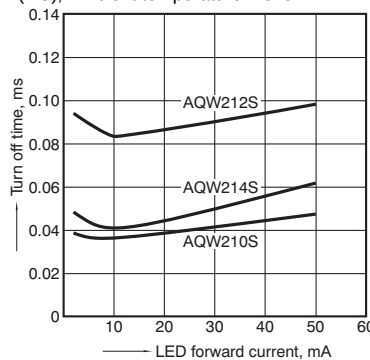
## 10. Turn on time vs. LED forward current characteristics

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

