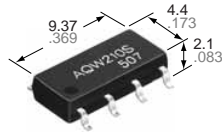


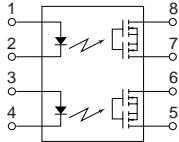
## Miniature SOP8-pin type of 60V/350V/400V load voltage

## PhotoMOS Relays

# GU SOP 2 Form A (AQW210S)



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: 50 pcs. 1 batch contains: 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)

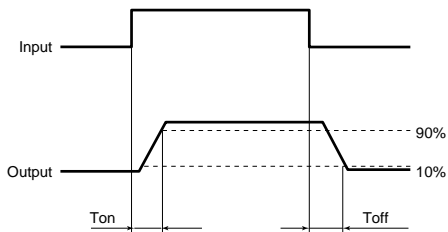
Item		Symbol	AQW212S	AQW210S	AQW214S	Remarks
Input	LED forward current	I <sub>F</sub>	50 mA			
	LED reverse voltage	V <sub>R</sub>	5 V			
	Peak forward current	I <sub>FP</sub>	1 A			f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>	75 mW			
Output	Load voltage (peak AC)	V <sub>L</sub>	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 ( ): 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	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 I <sub>L</sub> = Max. Within 1 s on time
		Maximum	2.5 Ω	35 Ω	50 Ω	
	Off state leakage current	Maximum	1 μA			I <sub>F</sub> = 0 mA 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 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 I <sub>L</sub> = Max.
		Maximum	0.2 ms			
	I/O capacitance	Typical	0.8 pF			f = 1 MHz 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 Electric Works technical representative.

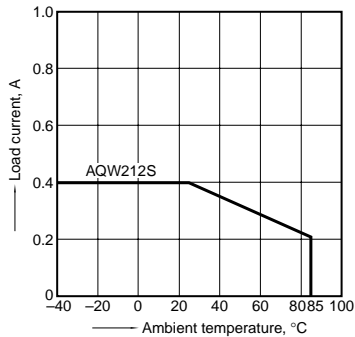
Please refer to our information on [PhotoMOS Relays for Automotive Applications](#).

## REFERENCE DATA

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

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

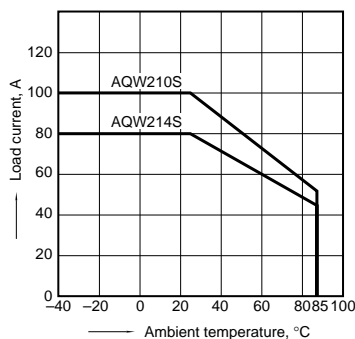
When using 2 channels



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

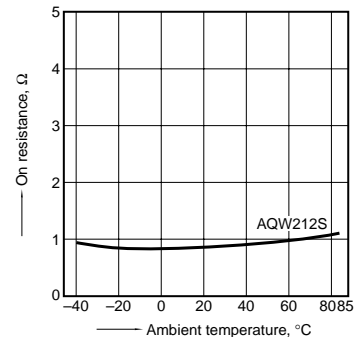
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F

When using 2 channels



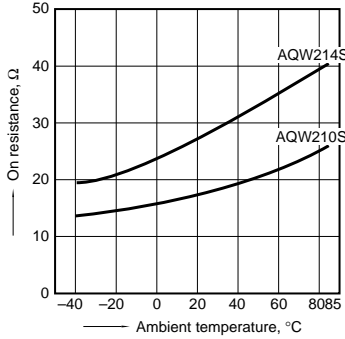
2.-(1) On resistance vs. ambient temperature characteristics

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



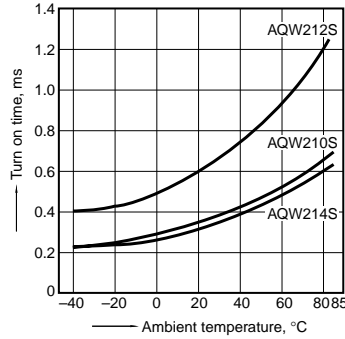
**2.-(2) On resistance vs. ambient temperature characteristics**

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



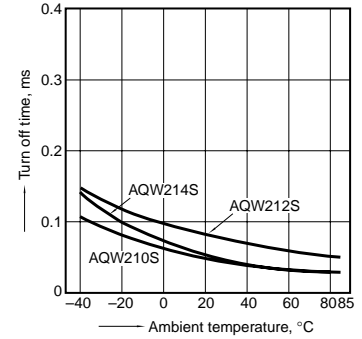
**3. Turn on time vs. ambient temperature characteristics**

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



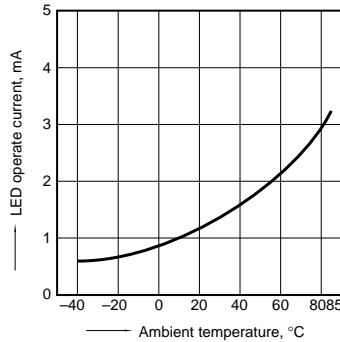
**4. Turn off time vs. ambient temperature characteristics**

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



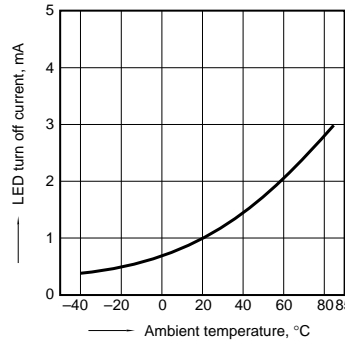
**5. LED operate current vs. ambient temperature characteristics**

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



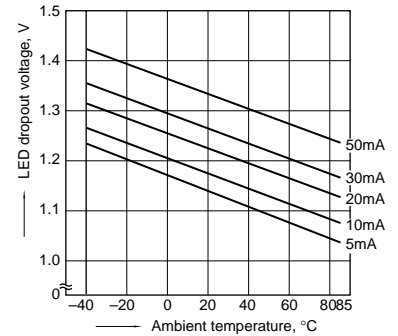
**6. LED turn off current vs. ambient temperature characteristics**

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



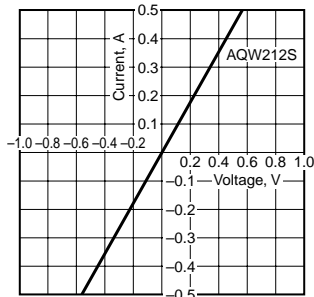
**7. LED dropout voltage vs. ambient temperature characteristics**

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



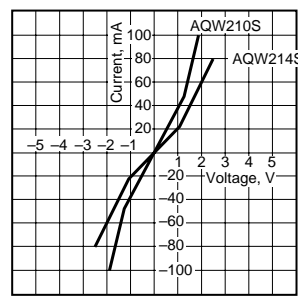
**8.-(1) Current vs. voltage characteristics of output at MOS portion**

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



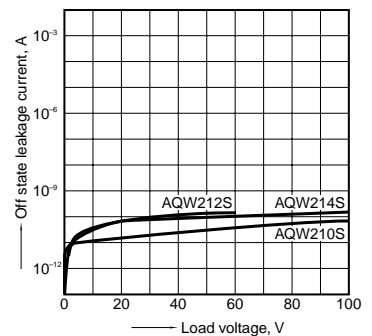
**8.-(2) Current vs. voltage characteristics of output at MOS portion**

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



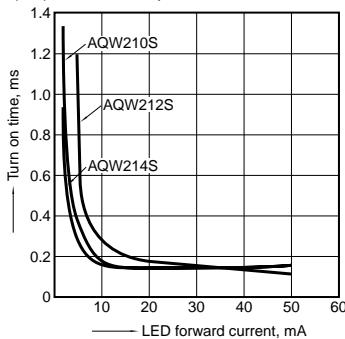
**9. Off state leakage current vs. load voltage characteristics**

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



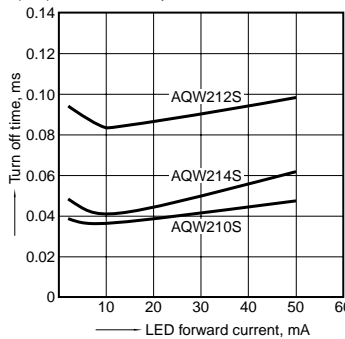
**10. Turn on time vs. LED forward current characteristics**

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

