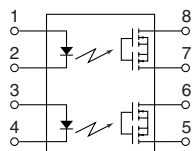


mm inch



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 (.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
- 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 device.

## RATING

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

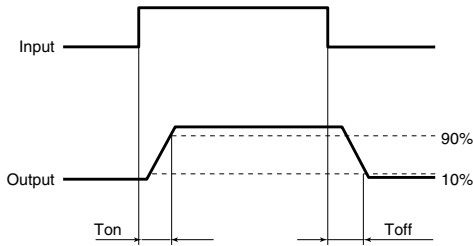
Item		Symbol	AQW212S	AQW210S	AQW214S	Remarks
Input	LED forward current	$I_F$	50 mA			
	LED reverse voltage	$V_R$	5 V			
	Peak forward current	$I_{FP}$	1 A			$f = 100 \text{ Hz}$ , Duty factor = 0.1%
	Power dissipation	$P_{in}$	75 mW			
Output	Load voltage (peak AC)	$V_L$	60 V	350 V	400 V	
	Continuous load current	$I_L$	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	$I_{peak}$	1.5 A	0.3 A	0.24 A	A connection: 100 ms (1 shot), $V_L = \text{DC}$
	Power dissipation	$P_{out}$	600 mW			
Total power dissipation		$P_T$	650 mW			
I/O isolation voltage		$V_{iso}$	1,500 V AC			
Temperature limits	Operating	$T_{opr}$	-40°C to +85°C -40°F to +185°F			Non-condensing at low temperatures
	Storage	$T_{stg}$	-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 I <sub>L</sub> = Max. 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 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 I <sub>L</sub> = Max.
		Maximum		2 ms			
	Turn off time*	Typical	T <sub>off</sub>	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	C <sub>iso</sub>	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 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.

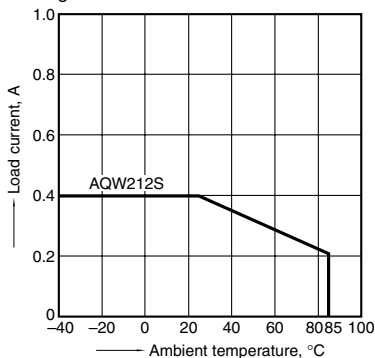
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

## REFERENCE DATA

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

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

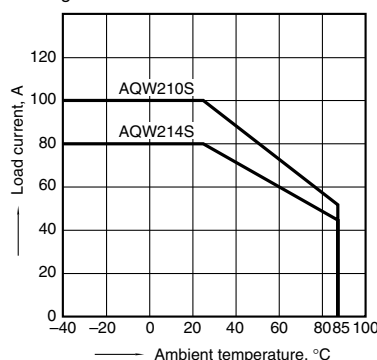
When using 2 channels



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

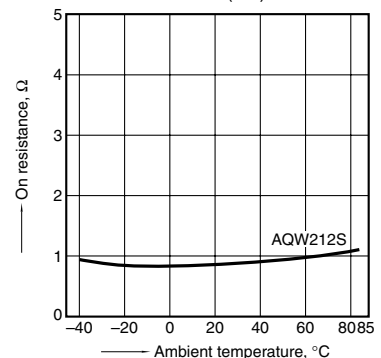
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F

When using 2 channels



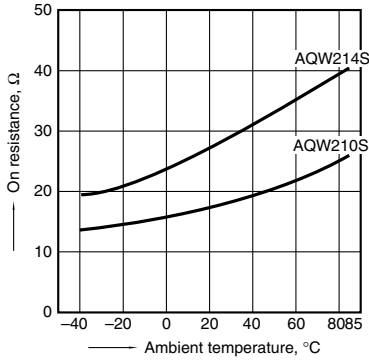
2.-(1) On resistance vs. ambient temperature characteristics

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



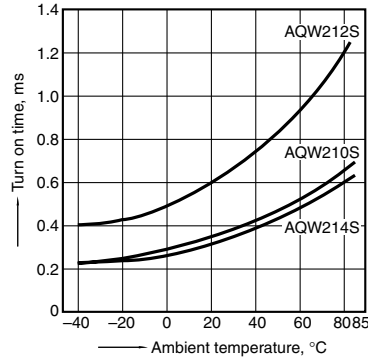
## 2.-(2) On resistance vs. ambient temperature characteristics

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



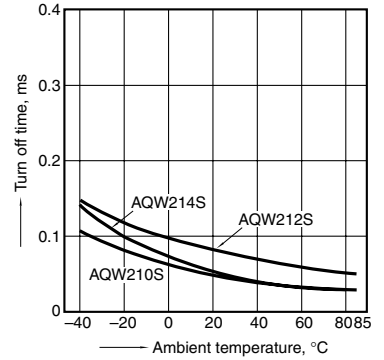
## 3. Turn on time vs. ambient temperature characteristics

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



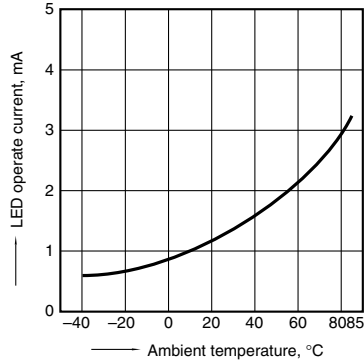
## 4. Turn off time vs. ambient temperature characteristics

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



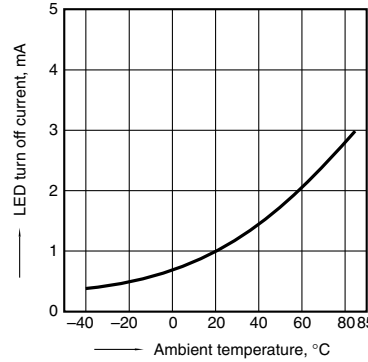
## 5. LED operate current vs. ambient temperature characteristics

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



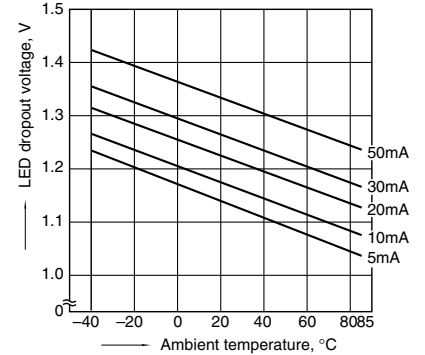
## 6. LED turn off current vs. ambient temperature characteristics

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



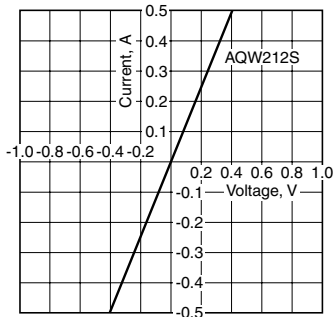
## 7. LED dropout voltage vs. ambient temperature characteristics

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



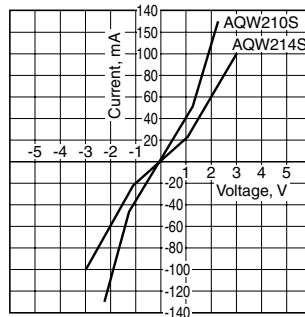
## 8.-(1) Current vs. voltage characteristics of output at MOS portion

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



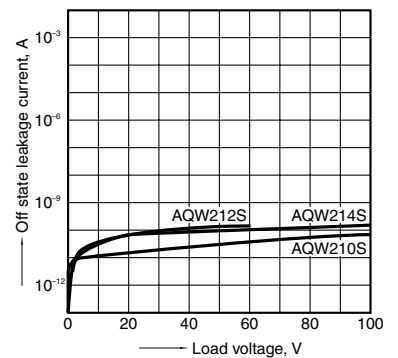
## 8.-(2) Current vs. voltage characteristics of output at MOS portion

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



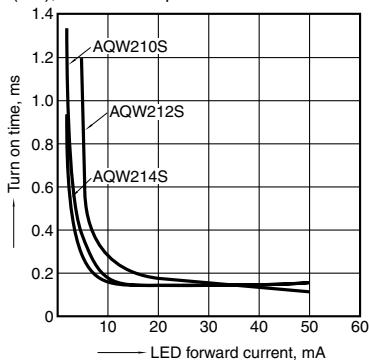
## 9. Off state leakage current vs. load voltage characteristics

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



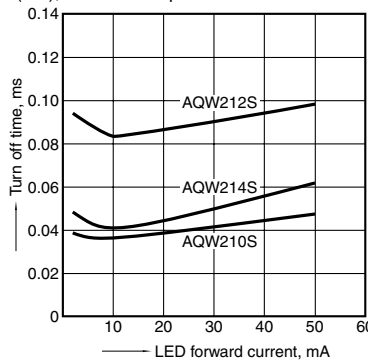
## 10. Turn on time vs. LED forward current characteristics

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

