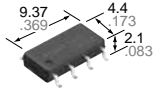


**Panasonic**  
ideas for life

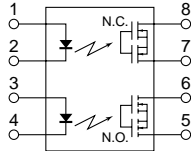
Normally closed  
SOP8-pin type  
of 400V load voltage

PhotoMOS<sup>®</sup> Relays  
GU SOP 2 Form B  
(AQW414S)

New



mm inch



**FEATURES**

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

The device comes in a super-miniature SO package measuring —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. I/O isolation voltage of 1,500V AC**

**TYPICAL APPLICATIONS**

- Power supply
- Measuring instruments
- Security equipment
- Industrial robots
- Sensing equipment

Compliance with RoHS Directive

**TYPES**

	Output rating*		Package	Part No.			Packing quantity	
	Load voltage	Load current		Through hole terminal	Surface-mount terminal		Tube	Tape and reel
				Tube packing style	Tape and reel packing style			
				Picked from the 1/2/3/4-pin side	Picked from the 5/6/7/8-pin side			
AC/DC dual use	400 V	80 mA	SOP8-pin	AQW414S	AQW414SX	AQW414SZ	1 tube contains: 50 pcs. 1 batch contains: 1,000 pcs.	1,000 pcs

\*Indicate the peak AC and DC values.

Note: The packing style indicator "X" or "Z" are not marked on the relay.

**RATING**

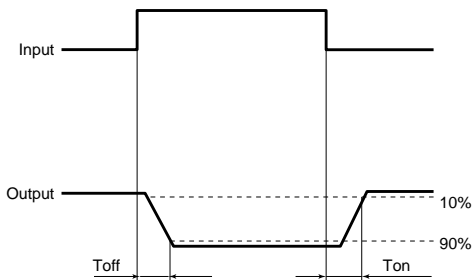
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item	Symbol	AQW414S	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>	400 V	
	Continuous load current	I <sub>L</sub>	0.08 A (0.1 A)	Peak AC, DC ( ): in case of using only 1 channel
	Peak load current	I <sub>peak</sub>	0.24 A	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>stag</sub>	-40°C to +100°C -40°F to +212°F	

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

Item			Symbol	AQW414S	Condition
Input	LED operate (OFF) current	Typical	$I_{Foff}$	0.9 mA	$I_L = \text{Max.}$
		Maximum		3 mA	
	LED reverse (ON) current	Minimum	$I_{Fon}$	0.4 mA	$I_L = \text{Max.}$
		Typical		0.8 mA	
LED dropout voltage	Typical	$V_F$	1.25 V (1.14 V at $I_F = 5 \text{ mA}$ )		$I_F = 50 \text{ mA}$
	Maximum		1.5 V		
Output	On resistance	Typical	$R_{on}$	26 $\Omega$	$I_F = 0 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time
		Maximum		50 $\Omega$	
	Off state leakage current	Maximum	$I_{Leak}$	1 $\mu\text{A}$	$I_F = 5 \text{ mA}$ $V_L = \text{Max.}$
Transfer characteristics	Operate (OFF) time*	Typical	$T_{off}$	0.43 ms	$I_F = 0 \text{ mA} \rightarrow 5 \text{ mA}$ $I_L = \text{Max.}$
		Maximum		1 ms	
	Reverse (ON) time*	Typical	$T_{on}$	0.3 ms	$I_F = 5 \text{ mA} \rightarrow 0 \text{ mA}$ $I_L = \text{Max.}$
		Maximum		1 ms	
	I/O capacitance	Typical	$C_{iso}$	0.8 pF	$f = 1 \text{ MHz}$ $V_B = 0 \text{ V}$
Maximum		1.5 pF			
Initial I/O isolation resistance	Minimum	$R_{iso}$	1,000 M $\Omega$	500 V DC	

\*Operate/Reverse time



## RECOMMENDED OPERATING CONDITIONS

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

Item	Symbol	Recommended value	Unit
Input LED current	$I_F$	5	mA

■ For **Dimensions**.

■ For **Schematic and Wiring Diagrams**.

■ For **Cautions for Use**.

■ These products are not designed for automotive use.

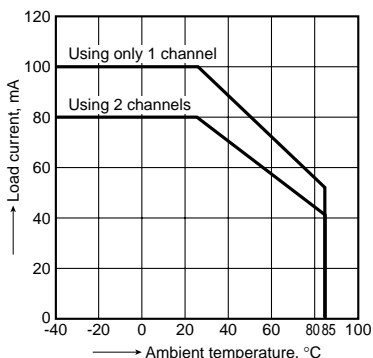
If you are considering to use these products for automotive applications, please contact your local Panasonic Electric Works technical representative.

**For more information.**

## REFERENCE DATA

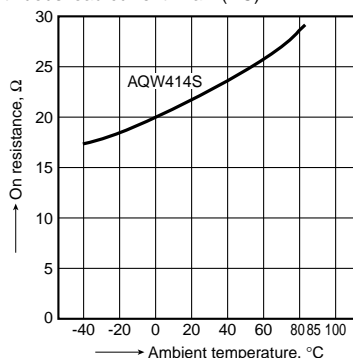
1. Load current vs. ambient temperature characteristics

Allowable ambient temperature:  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$   
 $-40^\circ\text{F}$  to  $+185^\circ\text{F}$



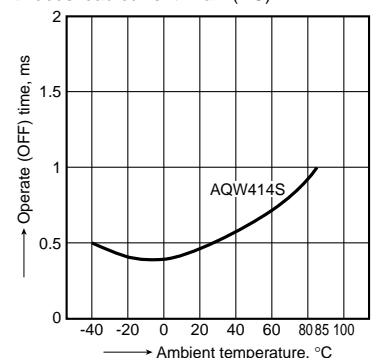
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4;  
LED current: 0 mA; Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



3. Operate (OFF) time vs. ambient temperature characteristics

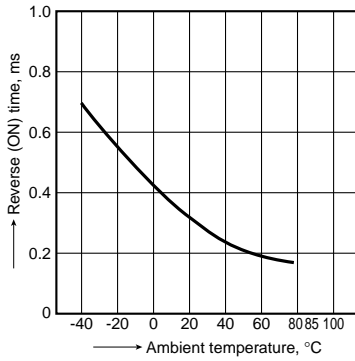
LED current: 5 mA;  
Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



# GU SOP 2 Form B (AQW414S)

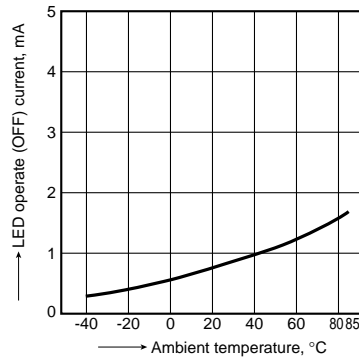
## 4. Reverse (ON) time vs. ambient temperature characteristics

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



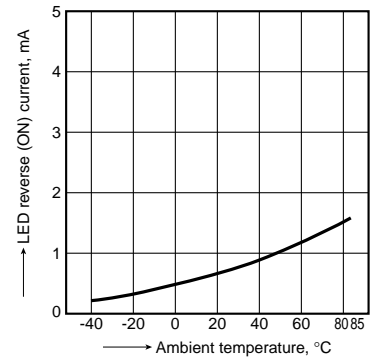
## 5. LED operate (OFF) current vs. ambient temperature characteristics

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



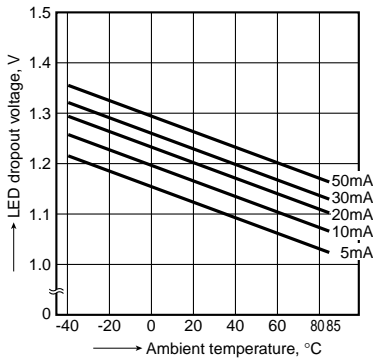
## 6. LED reverse (ON) current vs. ambient temperature characteristics

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



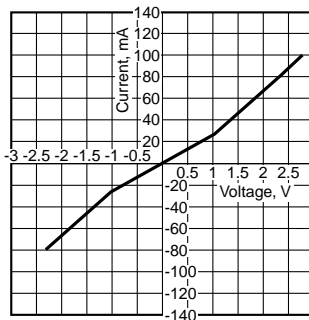
## 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



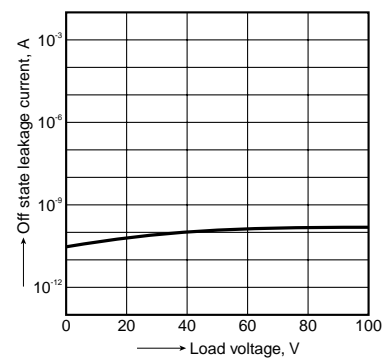
## 8. Current vs. voltage characteristics of output at MOS portion

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



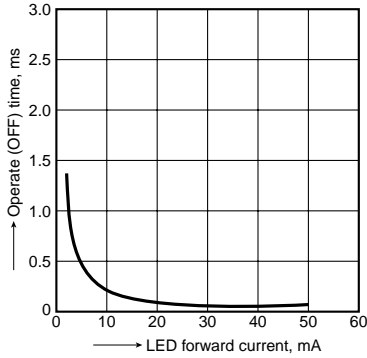
## 9. Off state leakage current vs. load voltage characteristics

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



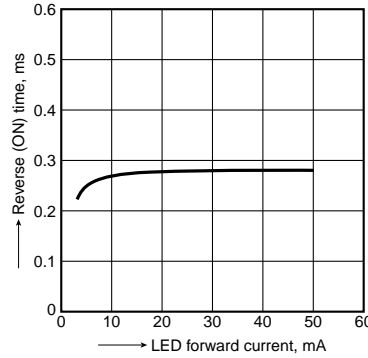
## 10. Operate (OFF) time vs. LED forward current characteristics

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



## 11. Reverse (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



## 12. Output capacitance vs. applied voltage characteristics

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

