

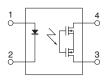


Normally closed **SOP4-pin type** of 60V/350V/400V load voltage

PhotoMOS Relays GU SOP 1 Form B (AQY41OS)



mm inch



FEATURES

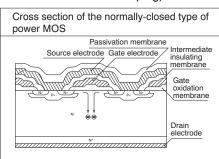
1. Small SOP4-pin package

The device comes in a super-miniature SO package 4-pin type measuring (W) $4.3\times(L)$ $4.4\times(H)$ 2.1 mm (W) $.169\times(L)$.173×(H) .083 inch

2. Low on-resistance

The AQO4 series (normally closed type) has a low on-resistance.

This has been achieved thanks to the built-in MOSFET processed by our proprietary method, DSD (Doublediffused and Selective Doping) method.



3. Controls low-level analog signals

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

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

TYPICAL APPLICATIONS

- Power supply
- · Measuring instruments
- Security equipment
- Telephone equipment
- Sensing equipment

TYPES

	Output rating*			Part No.			Packing quantity	
	Load Load voltage current		Package	Tube packing style	Tape and reel packing style			
					Picked from the 1/2-pin side	Picked from the 3/4-pin side	Tube	Tape and reel
AC/DC dual use	60V	500mA	SOP4-pin	AQY412S	AQY412SX	AQY412SZ	1 tube contains:	
	350V	120mA		AQY410S	AQY410SX	AQY410SZ	100 pcs. 1 batch contains:	1,000 pcs.
	400V	100mA		AQY414S	AQY414SX	AQY414SZ	2,000 pcs.	

* Indicate the peak AC and DC values.

Note: For space reasons, the three initial letters of the part number "AQY", the surface mount terminal shape indicator "S" and the packing style indicator "X" or "Z" are not marked on the relay. (Ex. the label for product number AQY412SX is 412)

RATING

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

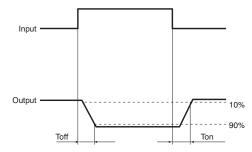
Item		Symbol	AQY412S	AQY410S	AQY414S	Remarks
	LED forward current	lF	50 mA			
Input	LED reverse voltage	VR	5 V			
	Peak forward current	IFP	1 A			f = 100 Hz, Duty factor = 0.1%
	Power dissipation	Pin	75 mW			
Output	Load voltage (peak AC)	VL	60 V	350 V	400 V	
	Continuous load current	lι	0.5 A	0.12 A	0.1 A	Peak AC, DC
	Peak load current	Ipeak	1.5 A	0.3 A	0.24 A	100ms (1 shot), V _L = DC
	Power dissipation	Pout	300 mW			
Total power dissipation		P⊤	350 mW			
I/O isolation voltage		Viso	1,500 V AC			
Temperture limits	Operating	Topr	-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 +		

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

	Item	Symbol	AQY412S	AQY410S	AQY414S	Remarks	
Input	LED operate (OFF) current	Typical	Foff	0.9 mA			I∟ = Max.
	LED operate (OFF) current	Maximum	II-off				
	LED reverse (ON) current	Minimum		0.4 mA			I∟ = Max.
	LED reverse (ON) current	Typical		0.85 mA			
	LED dropout voltage	Typical	VF	1.25 V (1.14 V at I _F = 5 mA)			I _F = 50 mA
	LED dropout voltage	Maximum	V F		1.5 V		
Output	0	Typical	Ron	1 Ω	18 Ω	26Ω	IF = 0 mA
	On resistance	Maximum	Kon	2.5 Ω	25 Ω	35 Ω	I∟ = Max. Within 1 s on time
	Off state leakage current Maximu		Leak	1 μΑ			I _F = 5 mA V _L = Max.
Transfer characteristics	On a rate (OFF) time*	Typical	Toff	0.9 ms	0.52 ms	0.47 ms	I _F = 0 mA → 5 mA I _L = Max.
	Operate (OFF) time*	Maximum	l off	3 ms	1 r	ns	
	Deverse (ON) time*	Typical	Ton	0.21 ms	0.23 ms	0.28 ms	$I_F = 5 \text{ mA} \rightarrow 0 \text{ mA}$
	Reverse (ON) time*	Maximum	I on	1 ms	1 ms		I∟ = Max.
	I/O conscitores	Typical		0.8 pF			f = 1 MHz V _B = 0 V
	I/O capacitance	Maximum	Ciso	1.5 pF			
	Initial I/O isolation resistance Minimu		Riso	1,000 ΜΩ			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	lF	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

 Load current vs. ambient temperature characteristics

Allowable ambient temperature: –40°C to +85°C

700
600
AQY412S
AQY412S
200
AQY410S
100
AQY414S

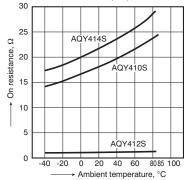
20 40 60

Ambient temperature, °C

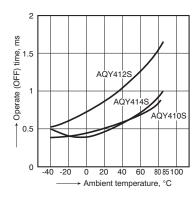
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4; LED current: 0 mA;

Continuous load current: Max.(DC)



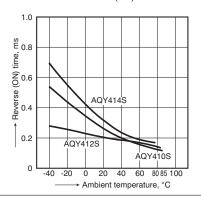
Operate (OFF) time vs. ambient temperature characteristics
 LED current: 5 mA; Load voltage: Max.(DC); Continuous load current: Max.(DC)



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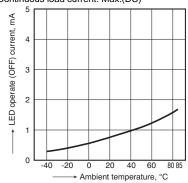
 Reverse (ON) time vs. ambient temperature characteristics

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



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

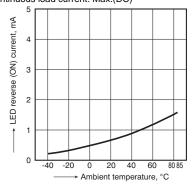
Sample: All types; Load voltage: Max.(DC); Continuous load current: Max.(DC)



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

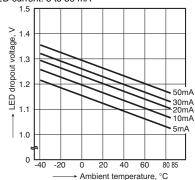
Sample: All types; Load voltage: Max.(DC);

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



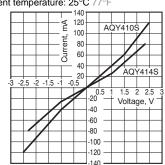
LED dropout voltage vs. ambient temperature characteristics Sample: All types;

LED current: 5 to 50 mA



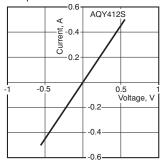
8-(1). Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 3 and 4; Ambient temperature: 25°C 77°F



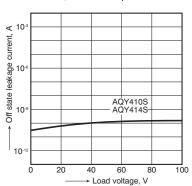
8-(2). Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 3 and 4; Ambient temperature: 25°C 77°F



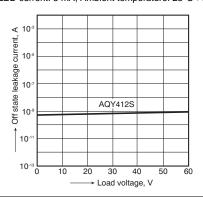
9-(1). Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 3 and 4; LED current: 5 mA; Ambient temperature: 25°C 77°F



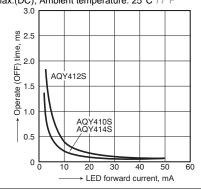
9-(2). Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 3 and 4; LED current: 5 mA; Ambient temperature: 25°C 77° F



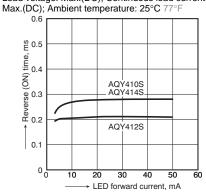
10.Operate (OFF) time vs. LED forward current characteristics

Measured portion: between terminals 3 and 4; Load voltage: Max.(DC); Continuous load current: Max.(DC); Ambient temperature: 25°C 77°F



11.Reverse (ON) time vs. LED forward current characteristics

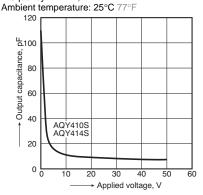
Measured portion: between terminals 3 and 4; Load voltage: Max.(DC); Continuous load current:



12-(1). Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 3 and 4;

Frequency: 1 MHz;



12-(2). Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 3 and 4; Frequency: 1 MHz;

Ambient temperature: 25°C 77°F

