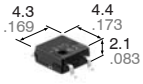
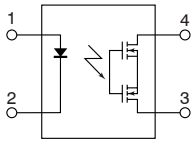
Panasonic
ideas for life

Super miniature design, SOP(1 Form A) 4-pin type Controls load voltage 60V, 350V, 400V

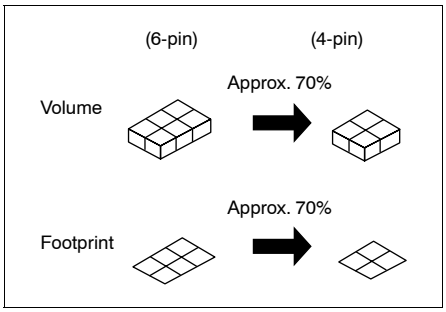
GU PhotoMOS (AQY21○S)



mm inch



The device comes in a super-miniature SO package 4-Pin type measuring (W)4.3 × (L)4.4 × (H)2.1 mm (W).169 × (L).173 × (H).083 inch —approx. 70% of the volume and 70% of the footprint size of SO package 6-pin type PhotoMOS Relays.



FEATURES

1. SO package 4-Pin type in super miniature design

2. Tape and reel
The device comes standard in a tape and reel (1,000 pcs./reel) to facilitate automatic insertion machines.

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
In contrast to the SSR with an off state leakage current of several milliamperes, the PhotoMOS relay features a very small off state leakage current of typ. 100 pA (AQY214S) even with the rated load voltage of 400 V.

TYPICAL APPLICATIONS

- Telecommunications (PC, Electronic Notepad)
- Measuring and Testing equipment
- Factory Automation Equipment
- Security equipment
- High speed inspection machines

TYPES

Type	Output rating*		Package size	Part No.			Packing quantity	
	Load voltage	Load current		Tube packing style	Tape and reel packing style		Tube	Tape and reel
AC/DC type	60V	500mA	SOP4pin	AQY212S	AQY212SX (Picked from the 1/2-pin side)	AQY212SZ (Picked from the 3/4-pin side)	1 tube contains: 100 pcs. 1 batch contains: 2,000 pcs.	1,000 pcs.
	350V	120mA		AQY210S	AQY210SX (Picked from the 1/2-pin side)	AQY210SZ (Picked from the 3/4-pin side)		
	400V	100mA		AQY214S	AQY214SX (Picked from the 1/2-pin side)	AQY214SZ (Picked from the 3/4-pin side)		

* Indicate the peak AC and DC values.

Note: For space reasons, the initial letters of the part number “AQY”, the SMD terminal shape indicator “S” and the packaging style indicator “X” or “Z” are not marked on the relay. (Ex. the label for product number AQY210S is 210)

RATING

AC/DC type

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

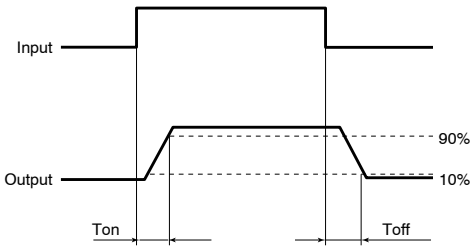
Item		Symbol	AQY212S	AQY210S	AQY214S	Remarks
Input	LED forward current	I_F	50 mA			
	LED reverse voltage	V_R	5 V			
	Peak forward current	I_{FP}	1 A			f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}	75 mW			
Output	Load voltage (peak AC)	V_L	60 V	350 V	400 V	
	Continuous load current (peak AC)	I_L	0.5 A	0.12 A	0.1 A	
	Peak load current	I_{peak}	1.5 A	0.3 A	0.24 A	100ms (1 shot), V_L = DC
	Power dissipation	P_{out}	300 mW			
Total power dissipation		P_T	350 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			

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

Item			Symbol	AQY212S	AQY210S	AQY214S	Remarks
Input	LED operate current	Typical	I_{Fon}	0.9 mA			I_L = Max.
		Maximum		3 mA			
	LED turn off current	Minimum	I_{Foff}	0.4 mA			I_L = Max.
		Typical		0.85 mA			
	LED dropout voltage	Typical	V_F	1.25 V (1.14 V at I_F = 5 mA)			I_F = 50 mA
		Maximum		1.5 V			
Output	On resistance	Typical	R_{on}	0.83 Ω	17 Ω	25 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
		Maximum		2.5 Ω	25 Ω	35 Ω	
	Off state leakage current	Maximum	I_{Leak}	1 μA			I_F = 0 mA V_L = Max.
Transfer characteristics	Turn on time*	Typical	T_{on}	0.65 ms	0.23 ms	0.21 ms	I_F = 5 mA I_L = Max.
		Maximum		2 ms	0.5 ms	0.5 ms	
	Turn off time*	Typical	T_{off}	0.04 ms			I_F = 5 mA I_L = Max.
		Maximum		0.2 ms			
	I/O capacitance	Maximum	C_{iso}	1.5 pF			f = 1 MHz V_B = 0 V
	Initial I/O isolation resistance	Minimum	R_{iso}	1,000 MΩ			500 V DC

Note: Recommendable LED forward current I_F = 5mA. Type of connection

*Turn on/Turn off time

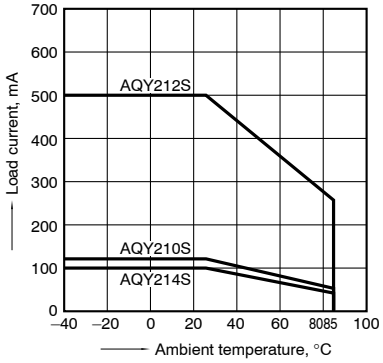


■ Dimensions
■ Schematic and Wiring Diagrams
■ Cautions for Use

REFERENCE DATA

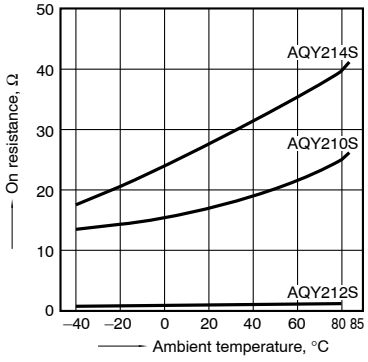
1. Load current vs. ambient temperature characteristics

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



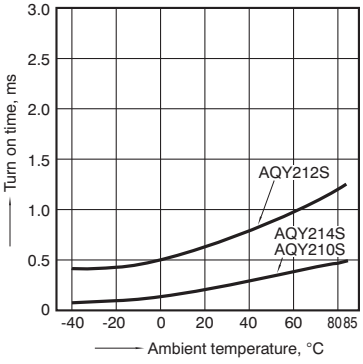
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



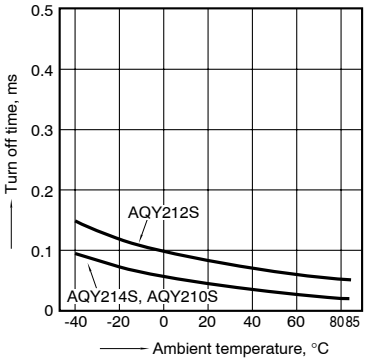
3. Turn on time vs. ambient temperature characteristics

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



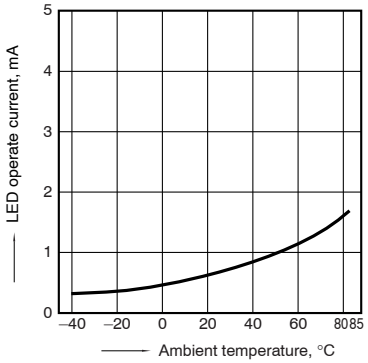
4. Turn off time vs. ambient temperature characteristics

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



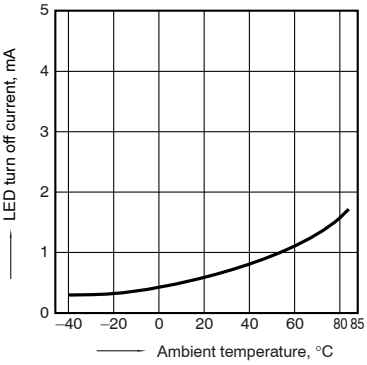
5. LED operate current vs. ambient temperature characteristics

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



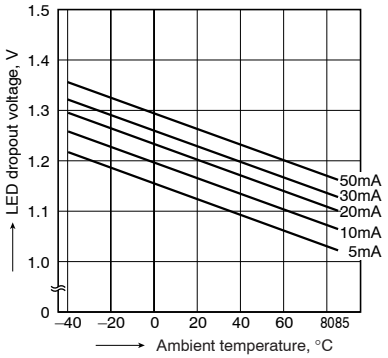
6. LED turn off current vs. ambient temperature characteristics

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



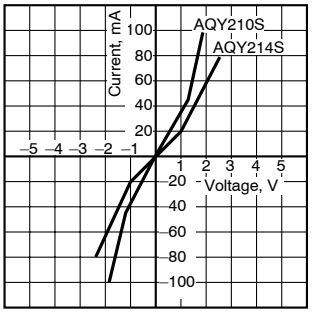
7. LED dropout voltage vs. ambient temperature characteristics

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



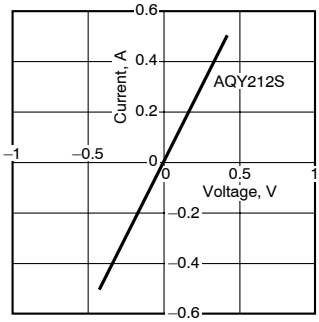
8-(1). Current vs. voltage characteristics of output at MOS portion

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



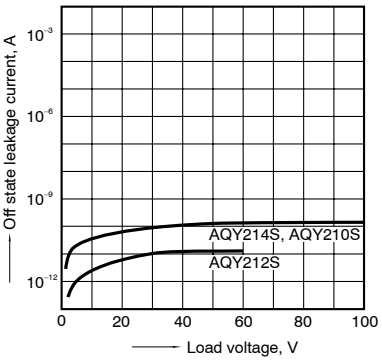
8-(2). Current vs. voltage characteristics of output at MOS portion

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



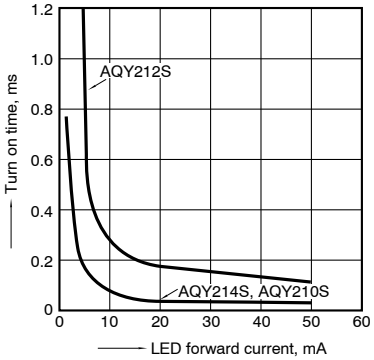
9. Off state leakage current vs. load voltage characteristics

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



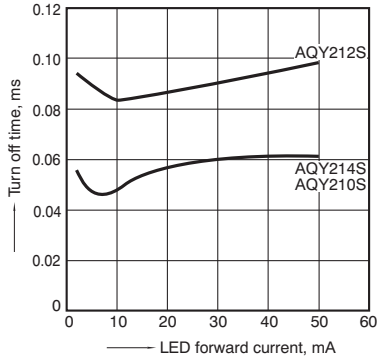
10. Turn on time vs. LED forward current characteristics

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



11. Turn 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



12. Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 3 and 4; Frequency: 1 MHz; Ambient temperature: 25°C 77°F