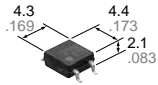
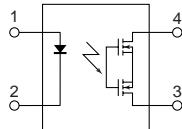


Small SOP4-pin type with short circuit protecting (Latch type)

PhotoMOS Relays
GU SOP 1 Form A
 Short Circuit Protection (AQY210KS)



mm inch



FEATURES

- Short circuit protection (Latch type)**
 When the output current exceeds a fixed amount, it is cut and the off state is maintained. The relay can be restored by turning off the input current and then turning it back on.
- Miniature SOP4-pin package**
- Controls low-level analog signals**
- Low-level off state leakage current**

TYPICAL APPLICATIONS

- Modem and telephone equipment
- Measuring and testing equipment
- Security equipment
- Industrial equipment
- Traffic signal control

Compliance with RoHS Directive

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-pin side)	Picked from the 3/4-pin side		
AC/DC dual use	350V	120mA	SOP4-pin	AQY210KS	AQY210KSX	AQY210KSZ	1 tube contains: 100 pcs. 1 batch contains: 2,000 pcs.	1,000 pcs.

* Indicate the peak AC and DC values.

Note: For space reasons, only "210K" is marked on the product. 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.

RATING

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

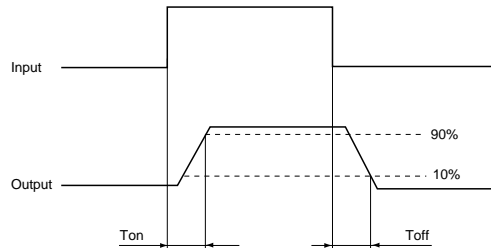
Item	Symbol	AQY210KS	Remarks	
Input	LED forward current	I_F	50 mA	
	LED reverse voltage	V_R	5 V	
	Peak forward current	I_{FP}	1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}	75 mW	
Output	Load voltage (peak AC)	V_L	350 V	
	Continuous load current	I_L	0.12 A	Peak AC, DC
	Power dissipation	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	

GU SOP 1 Form A Short Circuit Protection (AQY210KS)

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

Item		Symbol	AQY210KS	Condition	
Input	LED operate current	Typical	1.1 mA	$I_L = \text{Max.}$	
		Maximum	3.0 mA		
	LED turn off current	Minimum	0.3 mA	$I_L = \text{Max.}$	
		Typical	1.0 mA		
LED dropout voltage	Typical	V_F	1.32 V (1.13 V at $I_F = 5 \text{ mA}$)	$I_F = 50 \text{ mA}$	
	Maximum				1.5 V
Output	On resistance	Typical	23.5Ω	$I_F = 5 \text{ mA}$ $I_L = 120 \text{ mA}$ Within 1 s on time	
		Maximum	35Ω		
	Off state leakage current	Maximum	I_{Leak}	1μA $I_F = 0 \text{ mA}$ $V_L = 350 \text{ V}$	
	Over current protection	Cut off current	Minimum	160 mA	$I_F = 5 \text{ mA}$ Within 20ms on time
			Typical	200 mA	
		Maximum	240 mA		
Detection time	Typical	T_{shut}	50μs $I_F = 5 \text{ mA}$ $V_L = 350 \text{ V DC short circuit}$		
Transfer characteristics	Turn on time*	Typical	0.7 ms	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$	
		Maximum	2 ms		
	Turn off time*	Typical	0.07 ms	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$	
		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 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_F	5	mA

■ For Dimensions

■ For Schematic and Wiring Diagrams

■ For Cautions for Use

■ These products are not designed for automotive use.

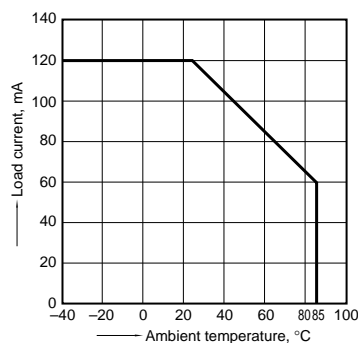
If you are considering to use these products for automotive applications, please contact your local Panasonic Electric Works technical representative.

For more information

REFERENCE DATA

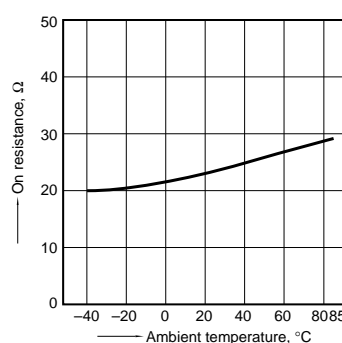
1. Load current vs. ambient temperature characteristics

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



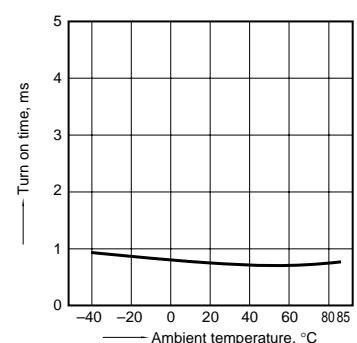
2. On resistance vs. ambient temperature characteristics

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



3. Turn on time vs. ambient temperature characteristics

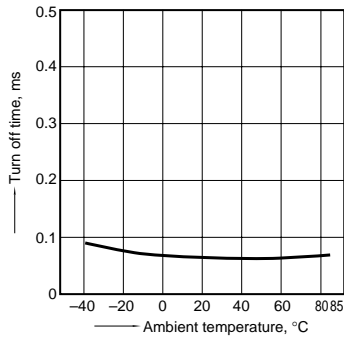
LED current: 5 mA;
Continuous load current: Max.(DC)



GU SOP 1 Form A Short Circuit Protection (AQY210KS)

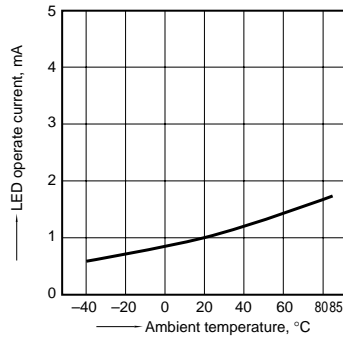
4. Turn off time vs. ambient temperature characteristics

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



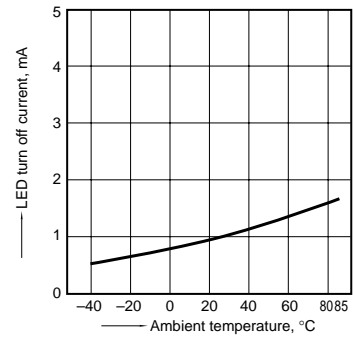
5. LED operate current vs. ambient temperature characteristics

Continuous load current: Max.(DC)



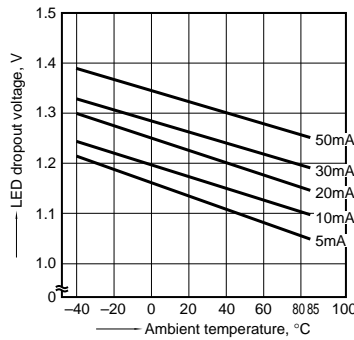
6. LED turn off current vs. ambient temperature characteristics

Continuous load current: Max.(DC)



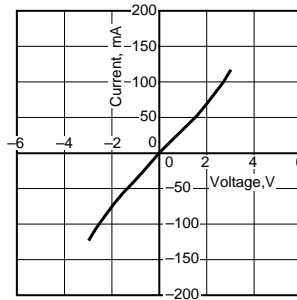
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



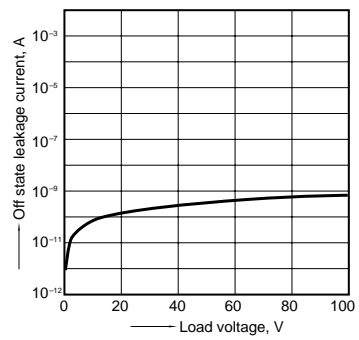
8. Current vs. voltage characteristics of output at MOS portion

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



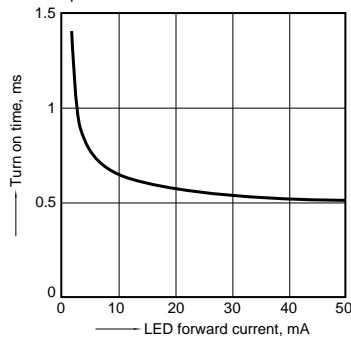
9. Off state leakage current vs. load voltage characteristics

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



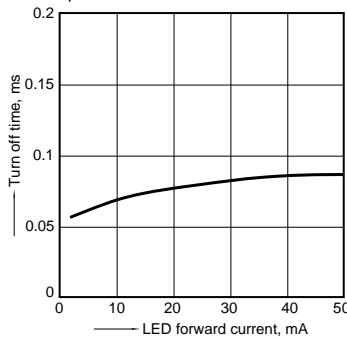
10. Turn on time vs. LED forward current characteristics

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



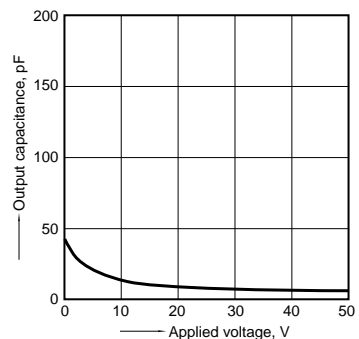
11. Turn off time vs. LED forward current characteristics

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



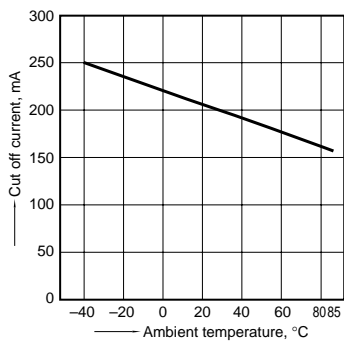
12. Output capacitance vs. applied voltage characteristics

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



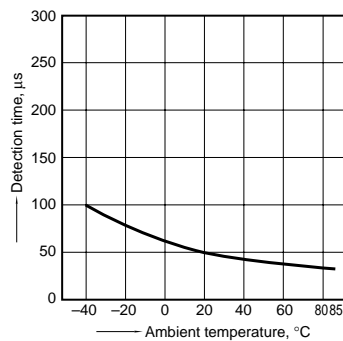
13. Cut off current vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4;
LED current: 5 mA, within 20ms on time



14. Detection time vs. ambient temperature characteristics

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



What is short circuit protection latch type?

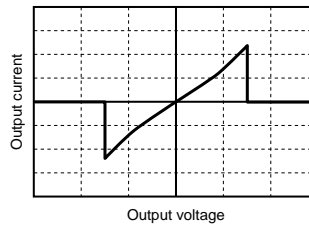
When the load current exceeds specifications, the short circuit protection function kicks in and completely cuts off the load current, thus turning off the relay. The short circuit protection inside the PhotoMOS relay instantaneously (typ. 50 μ s) and completely cuts off the load current.

This protects any circuits that follow the PhotoMOS relay from excess current. There is almost no heating of the PhotoMOS relay, which prevents it from becoming damaged. To restore the function of the relay turn off the input current and then turn it back on.

In order to operate the short circuit protection function, ensure that the input current is at least $I_F = 5$ mA.

Output voltage and output current characteristics

V-I characteristics of PhotoMOS relay with short circuit protection circuit



Operation chart

