

NAIS

GU (General Use) Type 1-Channel (Form A) Current Limit Function 4-Pin Type

PhotoMOS RELAYS

FEATURES

1. Current Limit Function

To control an over current from flowing, the current limit function has been realized. It keeps an output current at a constant value when the current reaches a specified current limit value.

2. Enhancing the capability of surge resistance between output terminals

The current limit function controls the ON time surge current to enhance the capability of surge resistance between output terminals.

3. Reinforced insulation 5,000 V type

More than 0.4 mm internal insulation distance between inputs and outputs. Conforms to EN41003, EN60950 (reinforced insulation).

4. Compact 4-pin DIP size

The device comes in a compact (W)6.4 × (L)4.78 × (H) 3.2mm (W).252 × (L).188 × (H).126inch, 4-pin DIP size

5. Controls low-level analog signals

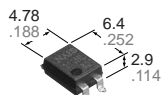
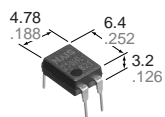
PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

6. High sensitivity, low ON resistance

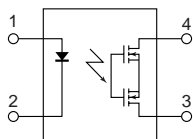
7. Low-level off state leakage current

TYPICAL APPLICATIONS

- Telephone equipment
- Modem



mm inch



TYPES

Type	I/O isolation voltage	Output rating*		Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal				
					Load voltage	Load current	Tube packing style	Tape and reel packing style	
Picked from the 1/2-pin side	Picked from the 3/4-pin side								
AC/DC type	Reinforced 5,000 V	350 V	120 mA	AQY210HL	AQY210HLA	AQY210HLAX	AQY210HLAZ	1 tube contains 100 pcs. 1 batch contains 1,000 pcs.	1,000 pcs.

*Indicate the peak AC and DC values.

Note: For space reasons, the initial letters of the product number "AQY", the SMD terminal shape indicator "A" and the package type indicator "X" and "Z" are omitted from the seal.

RATING

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

Item		Symbol	AQY210HL(A)	Remarks
Input	LED forward current	I _F	50 mA	
	LED reverse voltage	V _R	3 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	
	Power dissipation	P _{out}	500 mW	
Total power dissipation		P _T	550 mW	
I/O isolation voltage		V _{iso}	5,000 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	

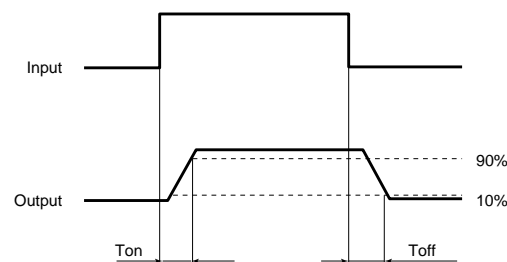
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item		Symbol	AQY210HL(A)	Condition	
Input	LED operate current	Typical	1.2 mA	$I_L = \text{Max.}$	
		Maximum	3.0 mA		
	LED turn off current	Minimum	0.4 mA	$I_L = \text{Max.}$	
		Typical	1.1 mA		
LED dropout voltage	Minimum	1.14 (1.25 V at $I_F = 50\text{mA}$)		$I_F = 5 \text{ mA}$	
	Typical	1.5 V			
Output	On resistance	Typical	20Ω	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time	
		Maximum	25Ω		
	Off state leakage current	Maximum	I_{Leak}	1μA	$I_F = 0$ $V_L = \text{Max.}$
Current limit	Typical	—	0.18 A	$I_F = 5 \text{ mA}$	
Transfer characteristics	Turn on time*	Typical	0.5 ms	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$	
		Maximum	2.0 ms		
	Turn off time*	Typical	0.08 ms	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$	
		Maximum	1.0 ms		
	I/O capacitance	Typical	C_{iso}	0.8 pF	$f = 1 \text{ MHz}$ $V_B = 0$
		Maximum	C_{iso}	1.5 pF	
Initial I/O isolation resistance	Minimum	R_{iso}	1,000 MΩ	500 V DC	

Note: Recommendable LED forward current $I_F = 5$ to 10 mA.

For type of connection, see page 31.

*Turn on/Turn off time

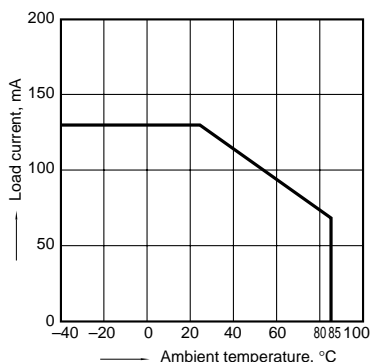


- For Dimensions, see Page 27.
- For Schematic and Wiring Diagrams, see Page 31.
- For Cautions for Use, see Page 36.

REFERENCE DATA

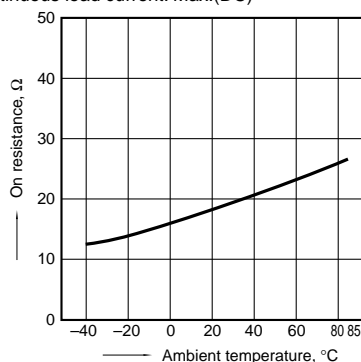
1. Load current vs. ambient temperature characteristics

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



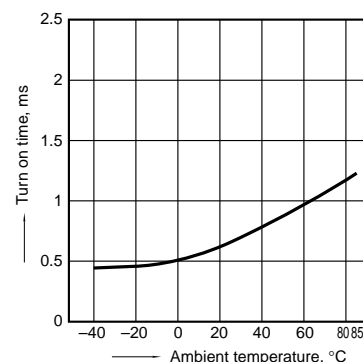
2. On resistance vs. ambient temperature characteristics

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

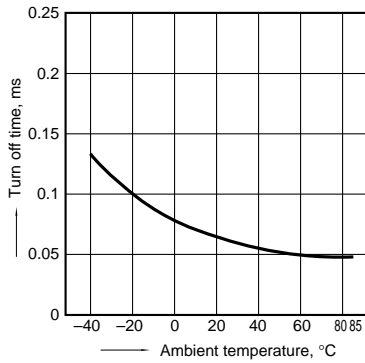
LED current: 5 mA; Load voltage: Max.(DC);
Continuous load current: Max.(DC)



AQY210HL

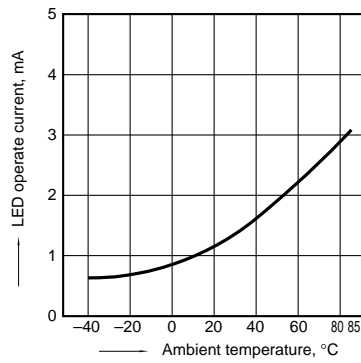
4. Turn off time vs. ambient temperature characteristics

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



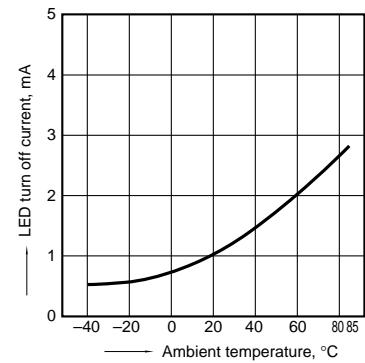
5. LED operate current vs. ambient temperature characteristics

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



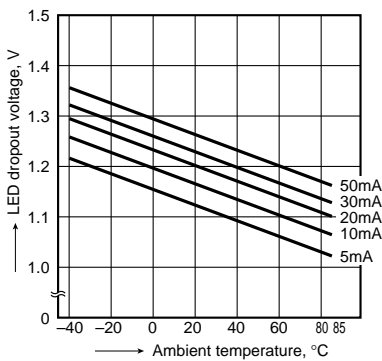
6. LED turn off current vs. ambient temperature characteristics

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



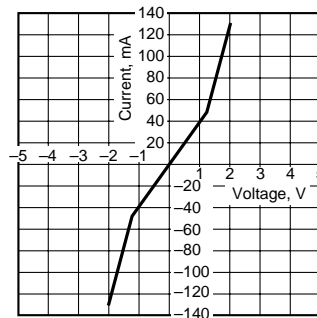
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



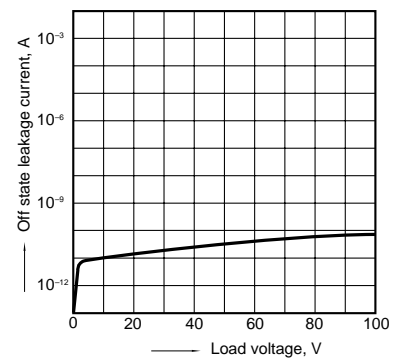
8. Voltage vs. current characteristics of output at MOS portion

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



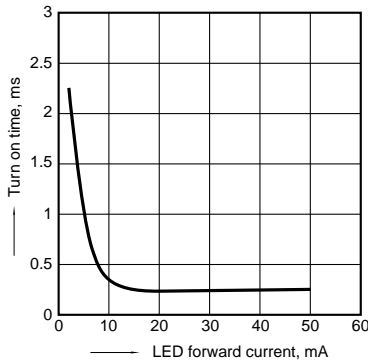
9. Off state leakage current

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



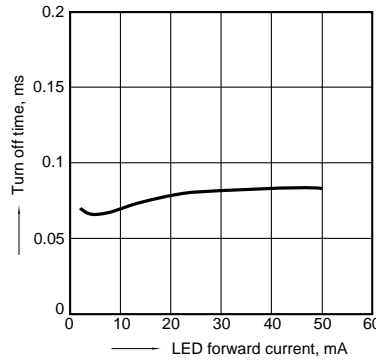
10. LED forward current vs. turn on time characteristics

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



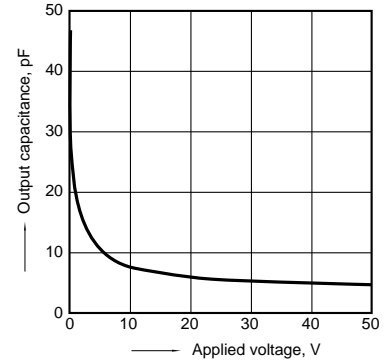
11. LED forward current vs. turn off time characteristics

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



12. Applied voltage vs. output capacitance characteristics

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



What is current limit

When a load current reaches the specified output control current, a current limit function works against the load current to keep the current a constant value.

The current limit circuit built into the PhotoMOS relay thus controls the instantaneous load current to effectively ensure circuit safety.

This safety feature protects circuits down-

stream of the PhotoMOS relay against over-current.

But, if the current-limiting feature is used longer than the specified time, the PhotoMOS relay can be destroyed. Therefore, set the output loss to the max. rate or less.

- Comparison of output voltage and output current characteristics

V-I Characteristics

