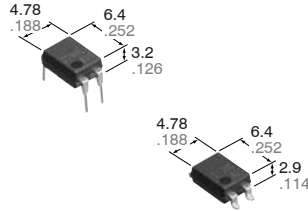
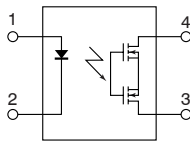


**Current Limit Function.  
DIP(1 Form A) 4-pin type.  
Reinforced insulation  
5,000V type.**

# GU PhotoMOS (AQY210HL)



mm inch



## 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

## TYPES

Type	I/O isolation voltage	Output rating*		Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal		Tube	Tape and reel	
					Tube packing style				Tape and reel packing style
Load voltage	Load current	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 part number "AQY", the SMD terminal shape indicator "A" and the package style indicator "X" or "Z" are not marked on the relay.

## 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	$V_R$	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	
	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	

# GU PhotoMOS (AQY210HL)

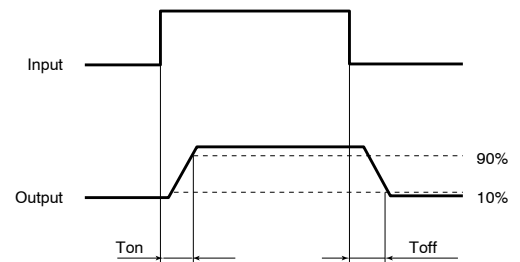
## 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

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	1.25 (1.14 V at $I_F = 5 \text{ mA}$ )	$I_F = 50 \text{ mA}$	
	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	1μA	$I_F = 0 \text{ mA}$ $V_L = \text{Max.}$
	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	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	

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

Type of connection

\*Turn on/Turn off time

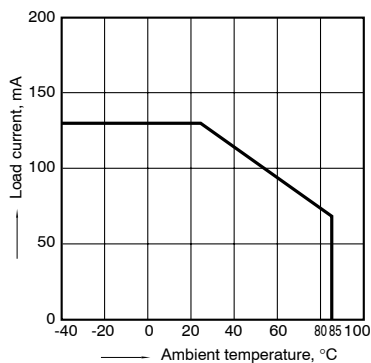


- Dimensions
- Schematic and Wiring Diagrams
- Cautions for Use

## REFERENCE DATA

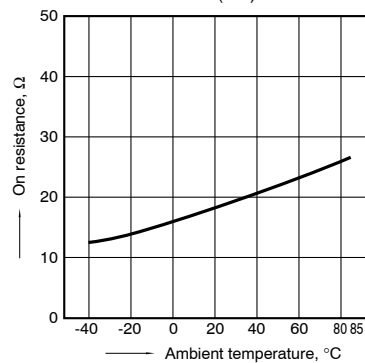
### 1. Load current vs. ambient temperature characteristics

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



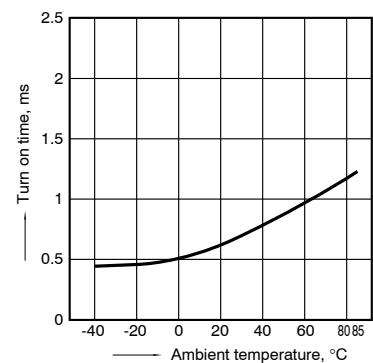
### 2. On resistance vs. ambient temperature characteristics

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



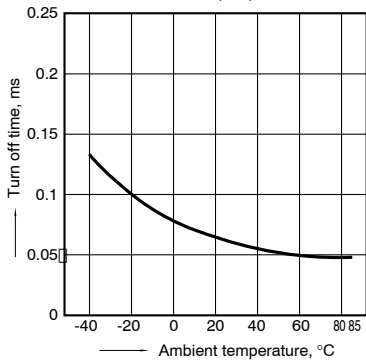
### 3. Turn on time vs. ambient temperature characteristics

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



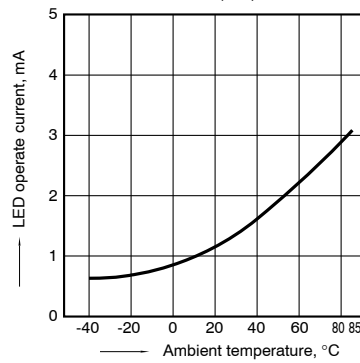
## 4. Turn off time vs. ambient temperature characteristics

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



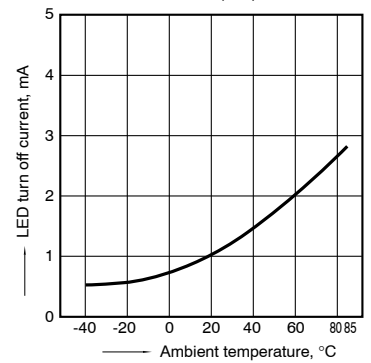
## 5. LED operate current vs. ambient temperature characteristics

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



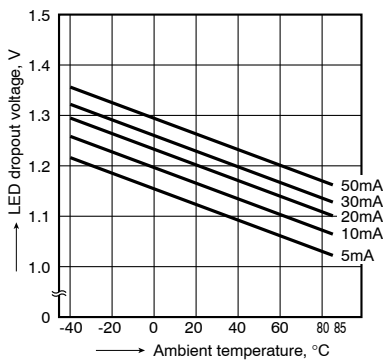
## 6. LED turn off current vs. ambient temperature characteristics

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



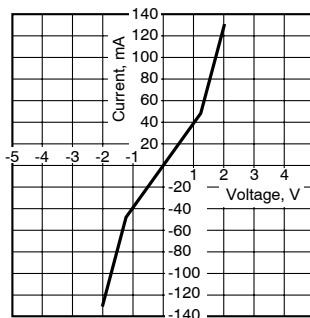
## 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



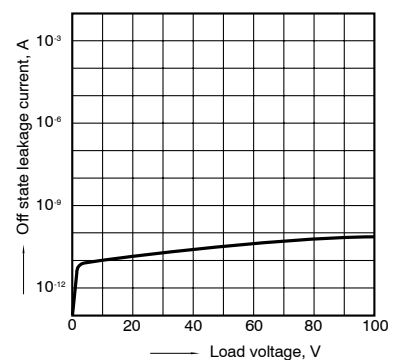
## 8. Current vs. voltage characteristics of output at MOS portion

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



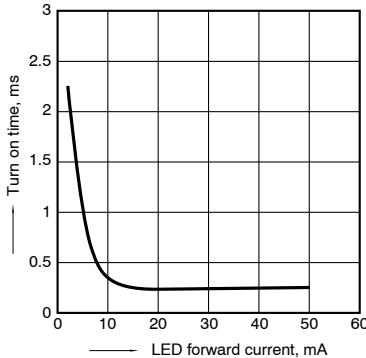
## 9. Off state leakage current vs. load voltage characteristics

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



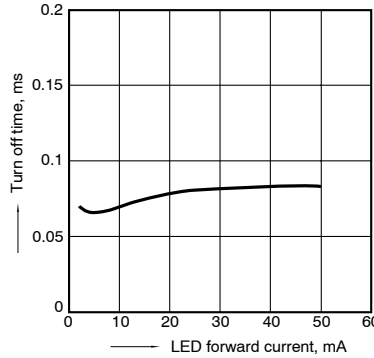
## 10. Turn on time vs. LED forward current characteristics

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



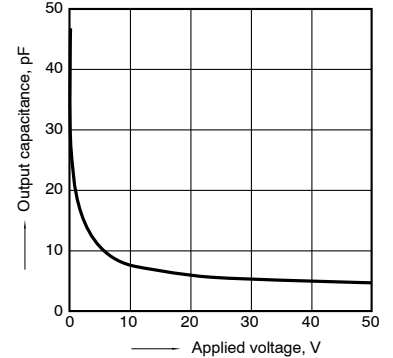
## 11. Turn off time vs. LED forward current characteristics

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



## 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 downstream 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

