

### 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

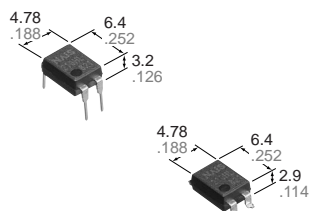
PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

#### 6. High sensitivity, low ON resistance

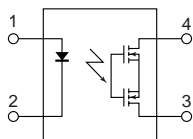
#### 7. Low-level off state leakage current

### 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
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 <sub>F</sub>	50 mA	
	LED reverse voltage	V <sub>R</sub>	3 V	
	Peak forward current	I <sub>FP</sub>	1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>	75 mW	
Output	Load voltage (peak AC)	V <sub>L</sub>	350 V	
	Continuous load current	I <sub>L</sub>	0.12 A	
	Power dissipation	P <sub>out</sub>	500 mW	
Total power dissipation		P <sub>T</sub>	550 mW	
I/O isolation voltage		V <sub>iso</sub>	5,000 V AC	
Temperature limits	Operating	T <sub>opr</sub>	-40°C to +85°C -40°F to +185°F	Non-condensing at low temperatures
	Storage	T <sub>stg</sub>	-40°C to +100°C -40°F to +212°F	

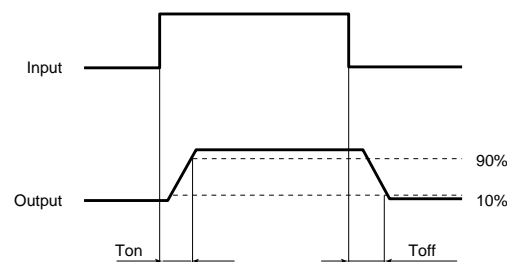
## 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

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	$I_{\text{Leak}}$	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	$C_{\text{iso}}$	0.8 pF	$f = 1 \text{ MHz}$ $V_B = 0$
		Maximum	$C_{\text{iso}}$	1.5 pF	
Initial I/O isolation resistance	Minimum	$R_{\text{iso}}$	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

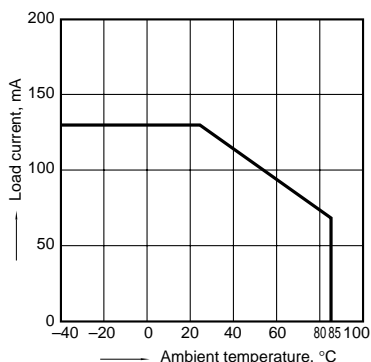


- For Dimensions, see Page 27.
- For Schematic and Wiring Diagrams, see Page 31.
- For Cautions for Use, see Page 36.

## REFERENCE DATA

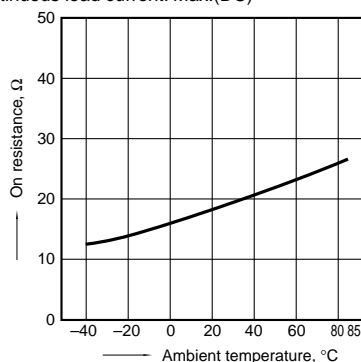
### 1. Load current vs. ambient temperature characteristics

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



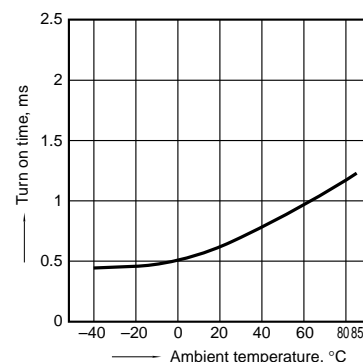
### 2. On resistance vs. ambient temperature characteristics

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

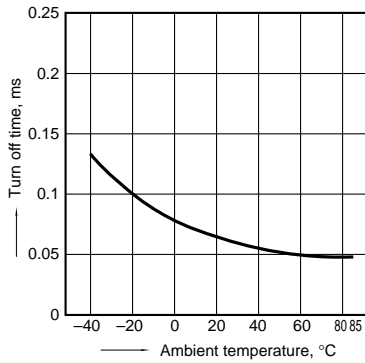
LED current: 5 mA; Load voltage: Max.(DC);  
Continuous load current: Max.(DC)



# AQY210HL

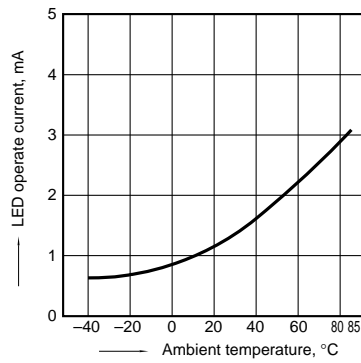
## 4. Turn off time vs. ambient temperature characteristics

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



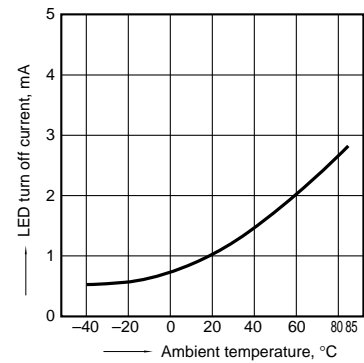
## 5. LED operate current vs. ambient temperature characteristics

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



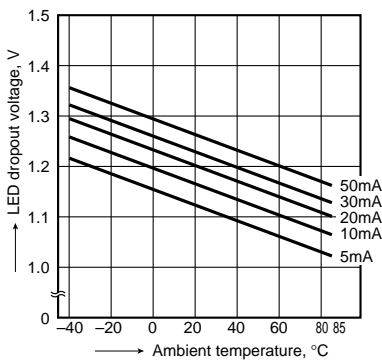
## 6. LED turn off current vs. ambient temperature characteristics

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



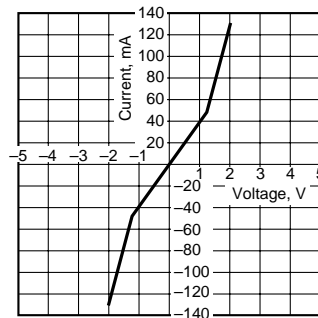
## 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



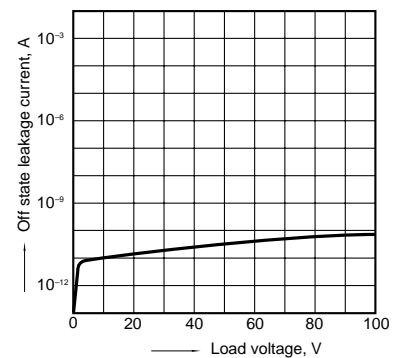
## 8. Voltage vs. current characteristics of output at MOS portion

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



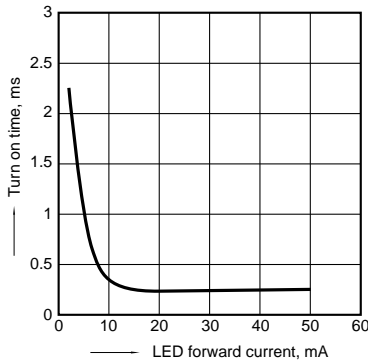
## 9. Off state leakage current

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



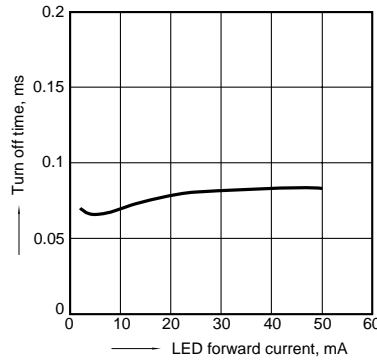
## 10. LED forward current vs. turn on time characteristics

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



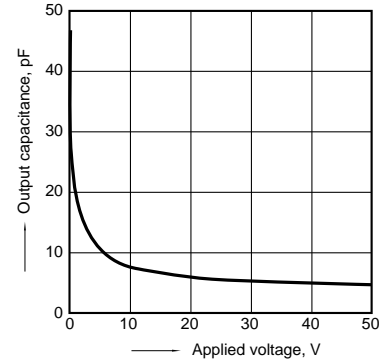
## 11. LED forward current vs. turn off time characteristics

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

