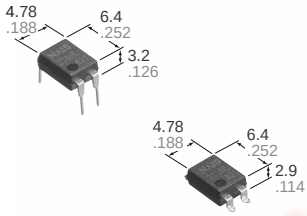
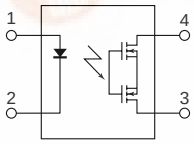
NAiS

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

PhotoMOS RELAYS



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				
		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 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 isolatiom 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	

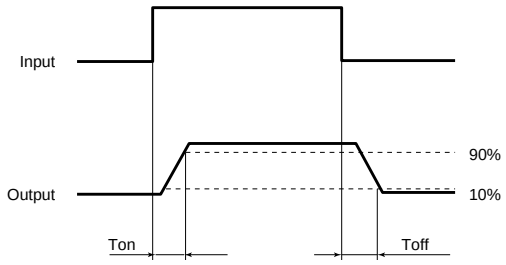
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

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

For type of connection, see page 31.

*Turn on/Turn off time

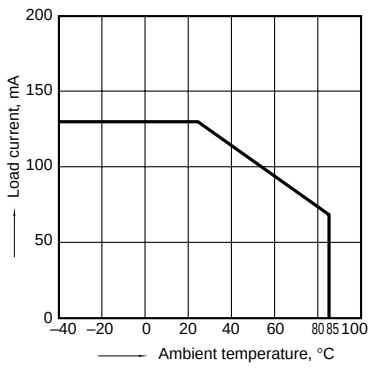


■ **For Dimensions, see Page 27.**
■ **For Schematic and Wiring Diagrams, see Page 31.**
■ **For Cautions for Use, see Page 36.**

REFERENCE DATA

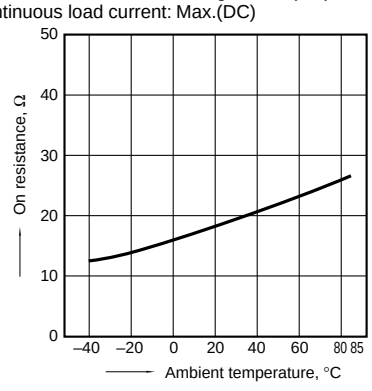
1. Load current vs. ambient temperature characteristics

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



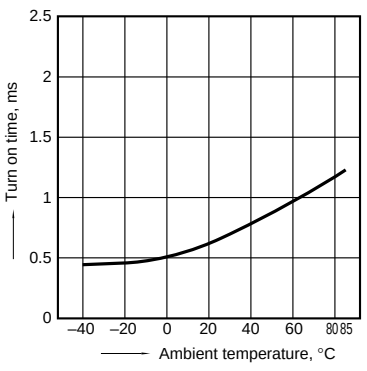
2. On resistance vs. ambient temperature characteristics

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



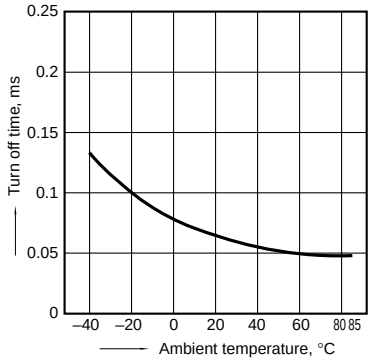
3. Turn on time vs. ambient temperature characteristics

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



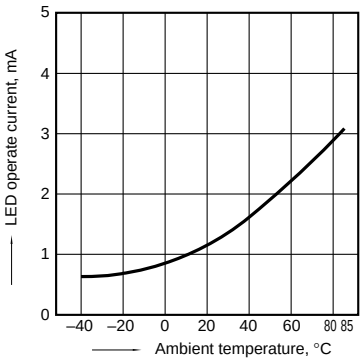
4. Turn off time vs. ambient temperature characteristics

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



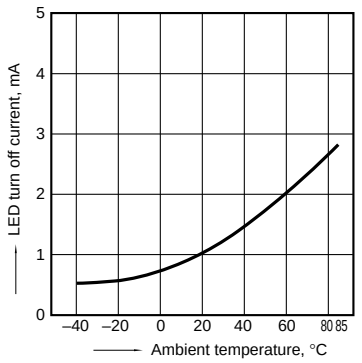
5. LED operate current vs. ambient temperature characteristics

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



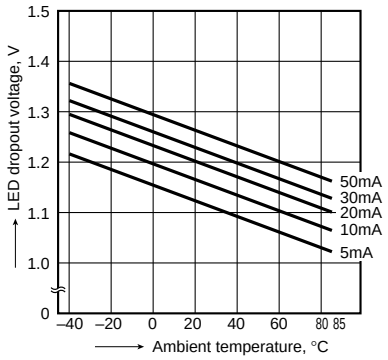
6. LED turn off current vs. ambient temperature characteristics

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



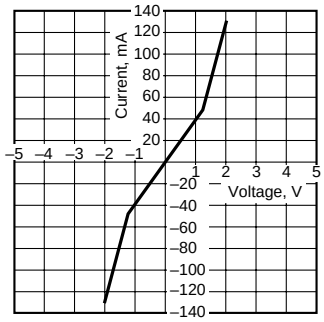
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



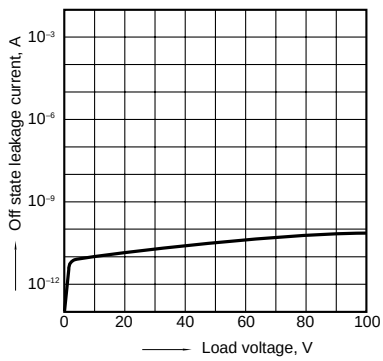
8. Voltage vs. current characteristics of output at MOS portion

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



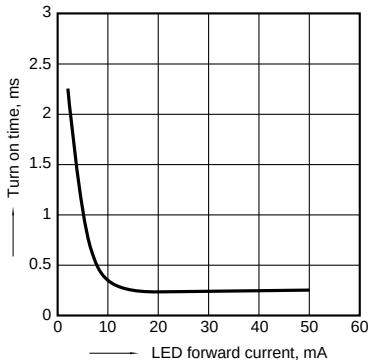
9. Off state leakage current

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



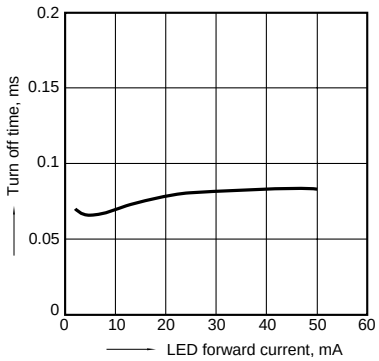
10. LED forward current vs. turn on time characteristics

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



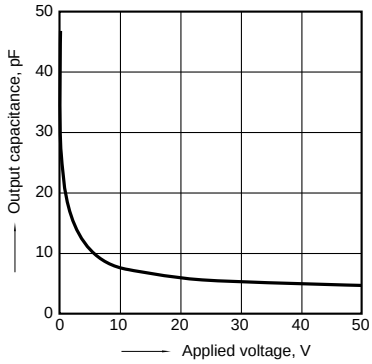
11. LED forward current vs. turn off time characteristics

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 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