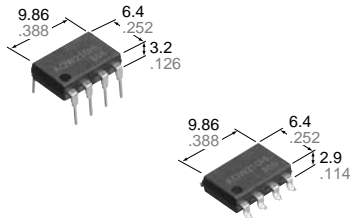
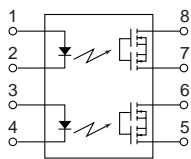


Two output type with current limiting and reinforced insulation

PhotoMOS Relays
GU 2 Form A
 Current Limiting (AQW210HL)



mm inch



FEATURES

1. Current Limiting 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. Enhances 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 of 5,000 V

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

4. Applicable for 2 Form A use as well as two independent 1 Form A use.

5. Controls low-level analog signals

6. High sensitivity and high speed response.

Can control max. 0.12 A load current with 5 mA input current. This enables fast operation speed of typ. 0.5 ms

7. Low-level off state leakage current

TYPICAL APPLICATIONS

- Telephone equipment
- Modem

Compliance with RoHS Directive

TYPES

	I/O isolation voltage	Output rating*		Package	Part No.				Packing quantity	
		Load voltage	Load current		Through hole terminal	Surface-mount terminal		Tube	Tape and reel	
						Tape and reel packing style				
					Tube packing style	Picked from the 1/2/3/4-pin side	Picked from the 5/6/7/8-pin side			
AC/DC dual use	Reinforced 5,000 V AC	350 V	100 mA	DIP8-pin	AQW210HL	AQW210HLA	AQW210HLAX	AQW210HLAZ	1 tube contains: 40 pcs. 1 batch contains: 400 pcs.	1,000 pcs.

*Indicate the peak AC and DC values.

Note: The surface mount terminal shape indicator "A" 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)

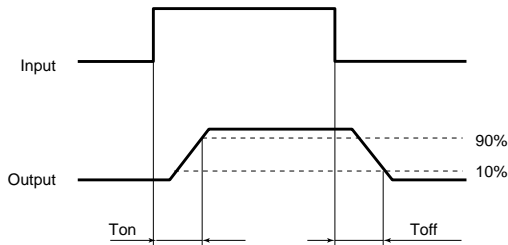
Item		Symbol	AQW210HL(A)	Remarks
Input	LED forward current	I_F	50 mA	
	LED reverse voltage	V_R	5 V	
	Peak forward current	I_{FP}	1 A	$f = 100 \text{ Hz}$, Duty factor = 0.1%
	Power dissipation	P_{in}	75 mW	
Output	Load voltage (peak AC)	V_L	350 V	
	Continuous load current	I_L	0.1 A (0.12 A)	Peak AC, DC (): in case of using only 1 channel
	Power dissipation	P_{out}	800 mW	
Total power dissipation		P_T	850 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 2 Form A Current Limiting (AQW210HL)

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

Item			Symbol	AQW210HL(A)	Condition
Input	LED operate current	Typical	I_{Fon}	1.2 mA	$I_L = \text{Max.}$
		Maximum		3.0 mA	
	LED turn off current	Minimum	I_{Foff}	0.4 mA	$I_L = \text{Max.}$
		Typical		1.1 mA	
LED dropout voltage	Minimum	V_F	1.25 (1.14 V at $I_F = 5 \text{ mA}$)		
	Typical		1.5 V		
Output	On resistance	Typical	R_{on}	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	$I_F = 0 \text{ mA}$ $V_L = \text{Max.}$
Current limit	Typical	—	0.18 A	$I_F = 5 \text{ mA}$	
Transfer characteristics	Turn on time*	Typical	T_{on}	0.5 ms	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$
		Maximum		2.0 ms	
	Turn off time*	Typical	T_{off}	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	$f = 1 \text{ MHz}$ $V_B = 0 \text{ V}$
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 to 10	mA

- For Dimensions
- For Schematic and Wiring Diagrams
- For Cautions for Use

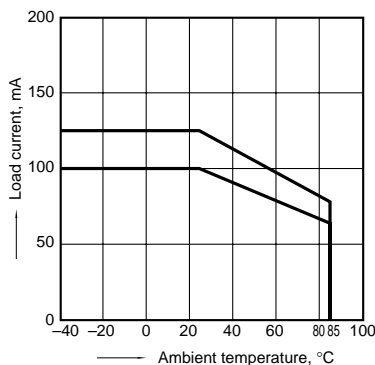
■ These products are not designed for automotive use.

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

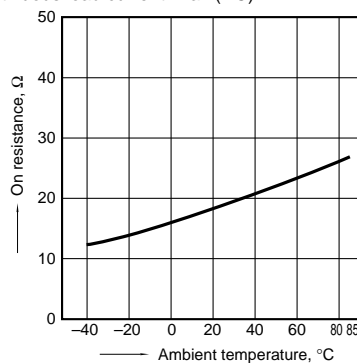
1. Load current vs. ambient temperature characteristics

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



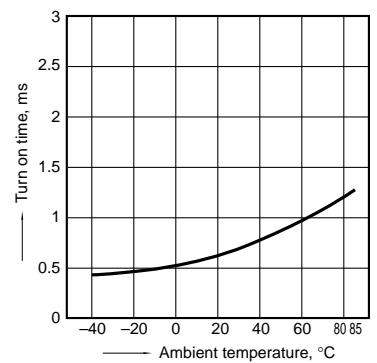
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
LED current: 5 mA; Load voltage: Max. (DC)
Continuous load current: Max. (DC)



3. Turn on time vs. ambient temperature characteristics

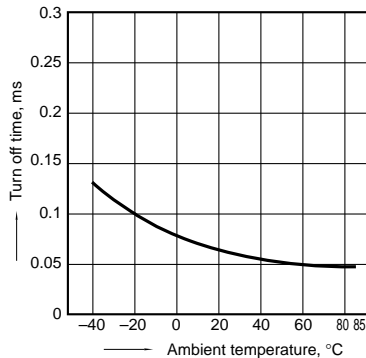
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



GU 2 Form A Current Limiting (AQW210HL)

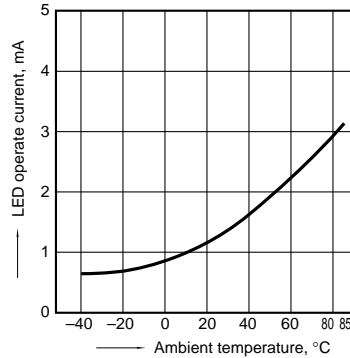
4. Turn off time vs. ambient temperature characteristics

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



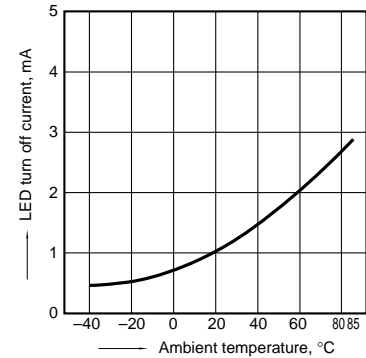
5. LED operate current vs. ambient temperature characteristics

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



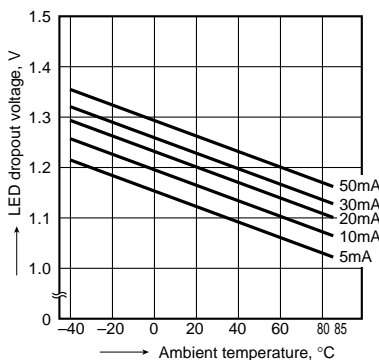
6. LED turn off current vs. ambient temperature characteristics

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



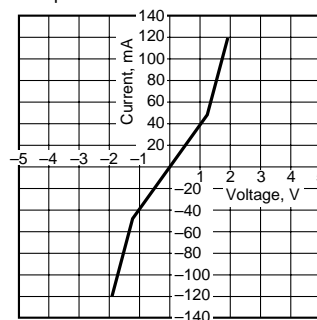
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



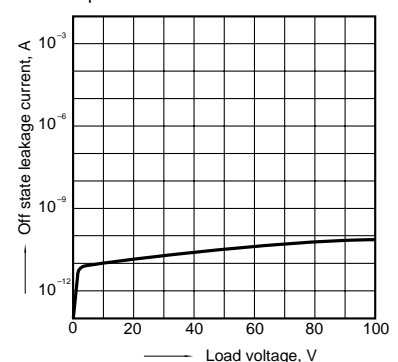
8. Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8; Ambient temperature: 25°C 77°F



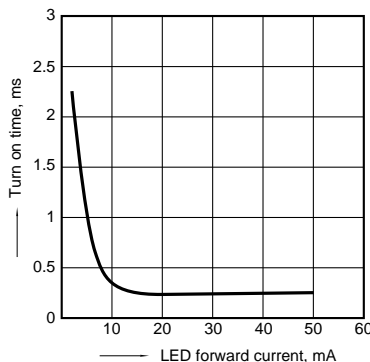
9. Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Ambient temperature: 25°C 77°F



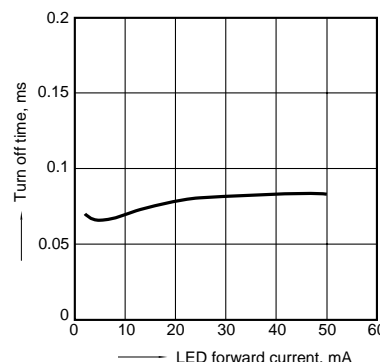
10. Turn on time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Load voltage: Max.(DC); Continuous load current: Max.(DC); Ambient temperature: 25°C 77°F



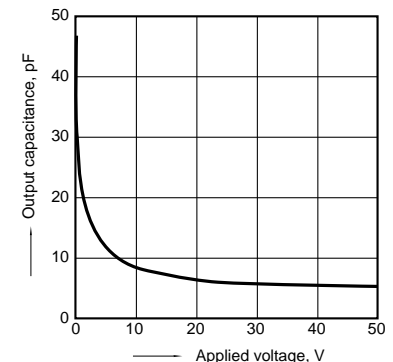
11. Turn off time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8; 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 5 and 6, 7 and 8; 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

