Panasonic
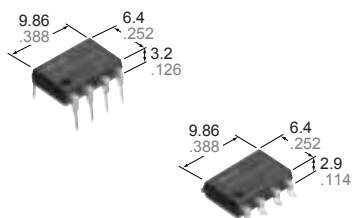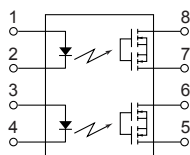*ideas for life*

**Current Limit Function.
DIP (2 Form A) 8-pin type.
Reinforced insulation
5,000V type.**

GU PhotoMOS (AQW210HL)

FEATURES

1. Current Limit Function
To control an over current from o wing, the current limit function has been realized. It keeps an output current at a constant value when the current reaches a speci ed current limit v alue.

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. Con-forms to EN41003, EN60950 (reinforced insulation).

4. Compact 8-pin DIP size
The device comes in a compact (W)6.4 × (L)9.86 × (H) 3.2mm (W).252× (L).388 × (H).126inch, 8-pin DIP size (through hole terminal type)

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

6. Controls low-level analog signals

7. High sensitivity, high speed response.
Can control a maximum 0.12 A load current with a 5 mA input current. Fast operation speed of 0.5ms (typ.)

8. Low-level off state leakage current

TYPICAL APPLICATIONS
• Telephone equipment
• Modem

9.86 .388 6.4 .252 3.2 .126

9.86 .388 6.4 .252 2.9 .114

mm inch

TYPES

Type	I/O isolation voltage	Output rating*		Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal				
						Tape and reel packing style			
		Load voltage	Load current	Tube packing style		Picked from the 1/2/3/4-pin side	Picked from the 5/6/7/8-pin side	Tube	Tape and reel
AC/DC type	Reinforced 5,000 V AC	350 V	120 mA	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: For space reasons, 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	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 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)	( ): in case of using only 1 channel Peak AC, DC
	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	

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 = 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	1.25 (1.14 V at I_F = 5 mA)	I_F = 50 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 mA 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 V
		Maximum		1.5 pF	
	Initial I/O isolation resistance	Minimum	R_{iso}	1,000 MΩ	500 V DC

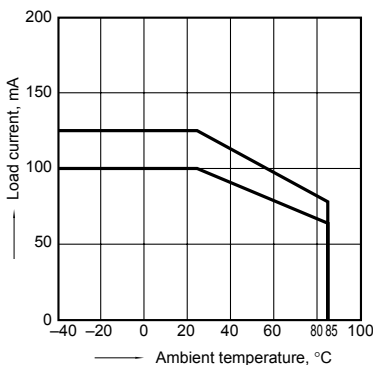Note: Recommendable LED forward current I_F= 5 to 10 mA.
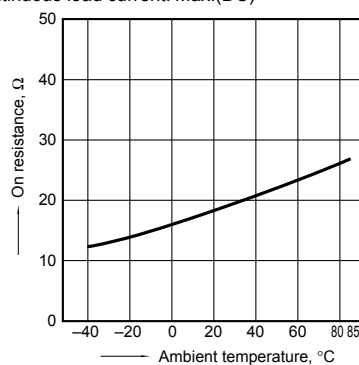
*Turn on/Turn off time
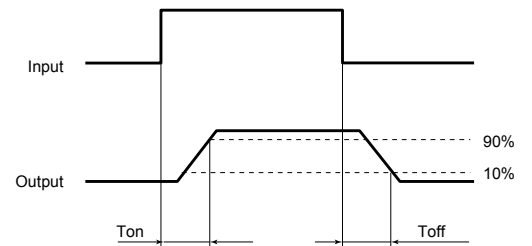
REFERENCE DATA

1. Load current vs. ambient temperature characteristics
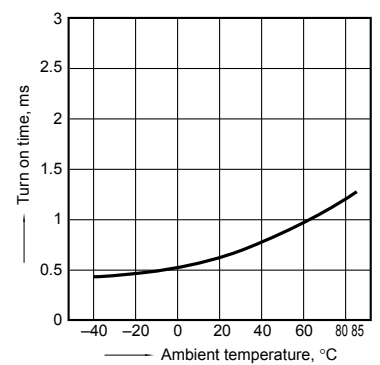Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F

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)

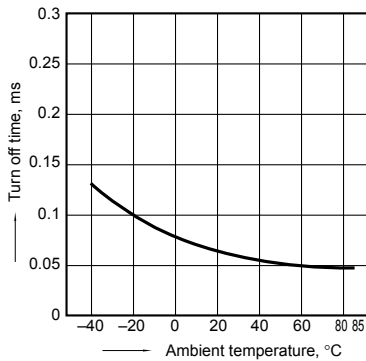### 3. Turn on time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max.(DC);
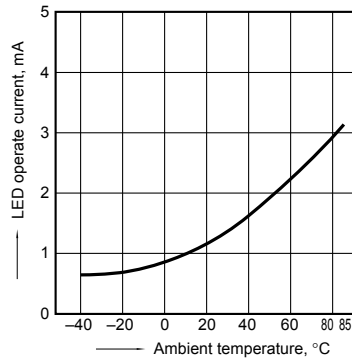Continuous load current: Max.(DC)

GU PhotoMOS (AQW210HL)

4. Turn off time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max.(DC);
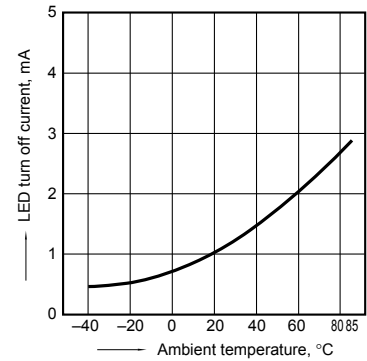Continuous load current: Max.(DC)

5. LED operate current vs. ambient temperature characteristics
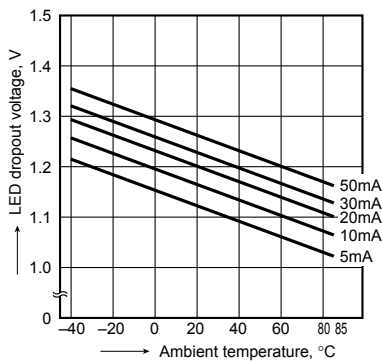Load voltage: Max.(DC);
Continuous load current: Max.(DC)

6. LED turn off current vs. ambient temperature characteristics
Load voltage: Max.(DC);
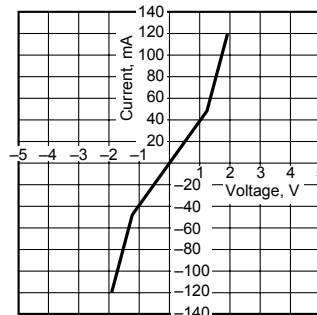Continuous load current: Max.(DC)

7. LED dropout voltage vs. ambient temperature characteristics
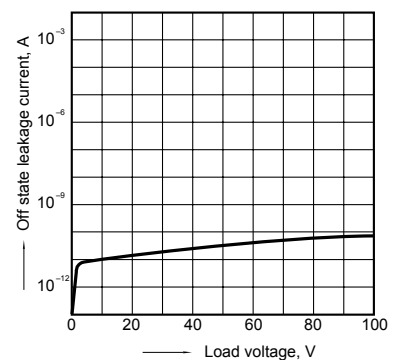LED current: 5 to 50 mA

8. Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 5 and 6, 7 and 8;
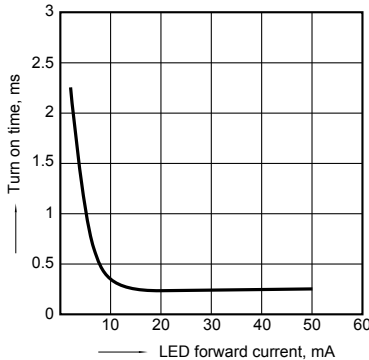Ambient temperature: 25°C 77°F

9. Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 5 and 6, 7 and 8;
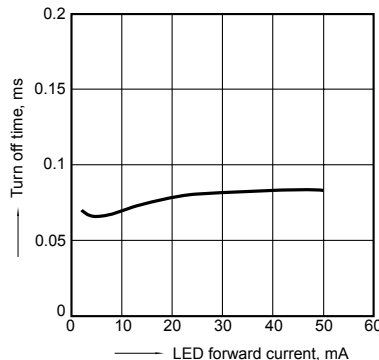Ambient temperature: 25°C 77°F

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
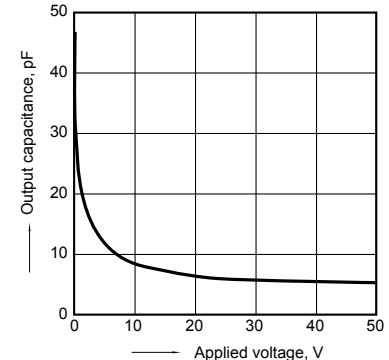
What is current limit

When a load current reaches the speci ed 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 speci ed 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