

### FEATURES

**1. 60V type couples high capacity (0.5A) with low on-resistance (1Ω).**

Item	GU-E (1 Form A/1 Form B type)	
	AQW610EH	AQW612EH
Part No.	AQW610EH	AQW612EH
Load voltage	350V	60V
Continuous load current	0.12A	0.5A
ON resistance (typ.)	18Ω	1Ω

**2. This is the PhotoMOS 1 Form A/1 Form B output type relay that has attained a low, economical price.**

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

**5. Applicable for 1 Form A 1 Form B use as well as two independent 1 Form A and 1 Form B use**

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

**7. High sensitivity, high speed response.**  
 Can control a maximum 0.14 A load current with a 5 mA input current. Fast operation speed of 0.5ms (typ.) [N.O.].(AQW610EH)

**8. Low-level off-state leakage current**

### TYPICAL APPLICATIONS

- Power supply
- Measuring equipment
- Security equipment
- Modem
- Telephone equipment
- Electricity, plant equipment
- Sensors

### TYPES

Type	I/O isolation voltage	Output rating*		Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal			Tube	Tape and reel
		Load voltage	Load current		Tube packing style	Tape and reel packing style			
AC/DC type	Reinforced 5,000 V	60 V	500 mA	AQW612EH	AQW612EHA	AQW612EHAX	AQW612EHAZ	1 tube contains 40 pcs. 1 batch contains 400 pcs.	1,000 pcs.
		350 V	120 mA	AQW610EH	AQW610EHA	AQW610EHAX	AQW610EHAZ		
		400 V	100 mA	AQW614EH	AQW614EHA	AQW614EHAX	AQW614EHAZ		

\*Indicate the peak AC and DC values.

Note: For space reasons, the SMD terminal shape indicator "A" and the package style indicator "X" or "Z" are not marked on the relay.

# GU-E PhotoMOS (AQW610EH)

## RATING

### 1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item		Symbol	AQW612EH (A)	AQW610EH (A)	AQW614EH (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)	$V_L$	60 V	350 V	400 V	
	Continuous load current	$I_L$	0.5 A (0.6 A)	0.12 A (0.14 A)	0.1 A (0.13 A)	Peak AC, DC ( ): in case of using only 1a or 1b, 1 channel
	Peak load current	$I_{peak}$	1.5 A	0.36 A	0.3 A	100 ms (1 shot), $V_L = \text{DC}$
	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			

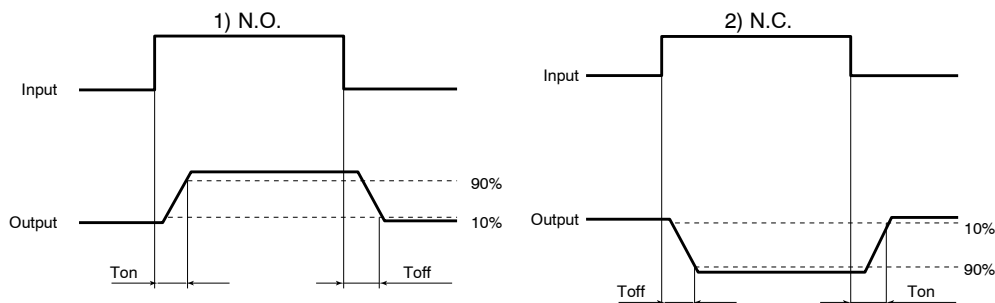
### 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item		Symbol	AQW612EH (A)	AQW610EH (A)	AQW614EH (A)	Condition
Input	LED operate current	Typical	$I_{Fon(N.O.)}$ 1.3 mA			$I_L = \text{Max.}$
		Maximum	$I_{Foff(N.C.)}$ 3.0 mA			
	LED reverse current	Minimum	$I_{Foff(N.O.)}$ 0.4 mA			$I_L = \text{Max.}$
		Typical	$I_{Fon(N.C.)}$ 1.3 mA			
LED dropout voltage	Typical	$V_F$	1.25 (1.14 V at $I_F = 5 \text{ mA}$ )			$I_F = 50 \text{ mA}$
	Maximum		1.5 V			
Output	On resistance	Typical	1Ω	18Ω	26Ω	$I_F = 5 \text{ mA (N.O.)}$ $I_F = 0 \text{ mA (N.C.)}$ $I_L = \text{Max.}$ Within 1 s on time
		Maximum	2.5Ω	25Ω	35Ω	
	Off state leakage current	Maximum	$I_{Leak}$ 1μA (N.O.), 10μA (N.C.)			$I_F = 0 \text{ mA (N.O.)}$ $I_F = 5 \text{ mA (N.C.)}$ $V_L = \text{Max.}$
Transfer characteristics	Operate (OFF) time*	Typical	$T_{on(N.O.)}$ 1.0 ms (N.O.) 3.0 ms (N.C.)	$T_{on(N.O.)}$ 0.5 ms (N.O.) 1.0 ms (N.C.)	$T_{on(N.O.)}$ 0.5 ms (N.O.) 0.8 ms (N.C.)	$I_F = 0 \text{ mA} > 5 \text{ mA}$ $I_L = \text{Max.}$
		Maximum	$T_{off(N.C.)}$ 4.0 ms (N.O.) 10.0 ms (N.C.)	3.0 ms		
	Reverse (ON) time*	Typical	$T_{off(N.O.)}$ 0.05ms (N.O.), 0.2ms (N.C.)	$T_{off(N.O.)}$ 0.08ms (N.O.), 0.3ms (N.C.)	$T_{off(N.O.)}$ 0.08ms (N.O.), 0.2ms (N.C.)	$I_F = 5 \text{ mA} > 0 \text{ mA}$ $I_L = \text{Max.}$
		Maximum	1.0ms			
	I/O capacitance	Typical	$C_{iso}$	0.8 pF		
Maximum		1.5 pF				
	Initial I/O isolation resistance	Minimum	$R_{iso}$ 1,000MΩ			500 V DC

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

Type of connection

\*Operate/Reverse time

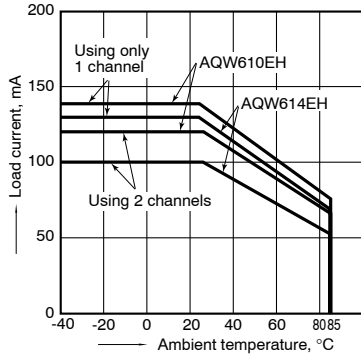


- Dimensions
- Schematic and Wiring Diagrams
- Cautions for Use

## REFERENCE DATA

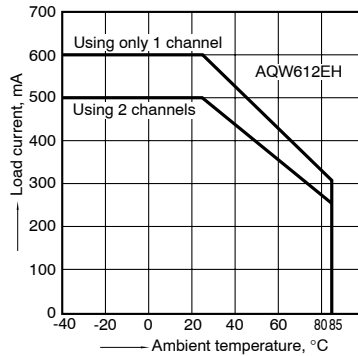
1-(1). Load current vs. ambient temperature characteristics

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



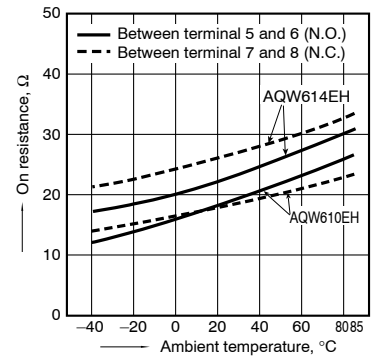
1-(2). Load current vs. ambient temperature characteristics

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



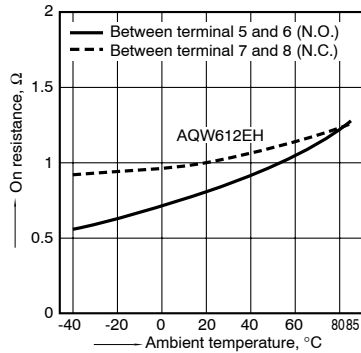
2-(1). On resistance vs. ambient temperature characteristics

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



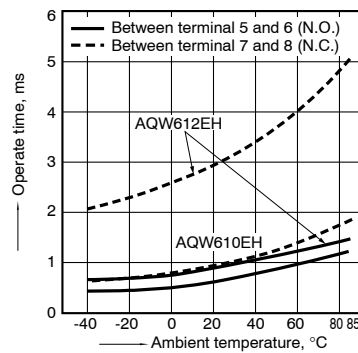
2-(2). On resistance vs. ambient temperature characteristics

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



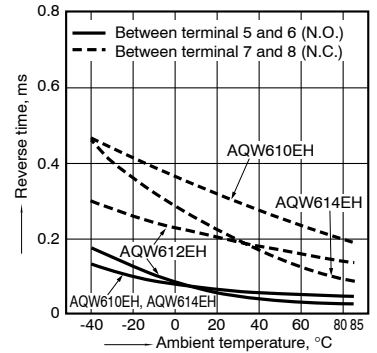
3. Operate time vs. ambient temperature characteristics

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



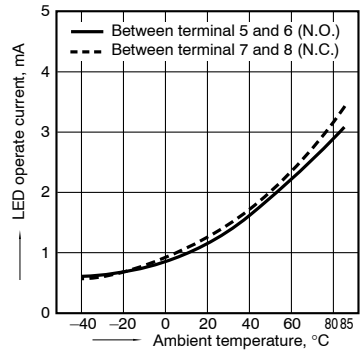
4. Reverse time vs. ambient temperature characteristics

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



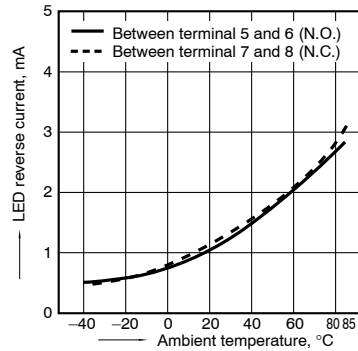
5. LED operate current vs. ambient temperature characteristics

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



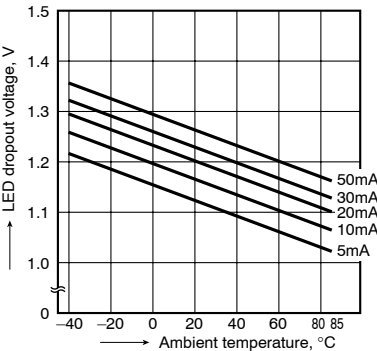
6. LED reverse current vs. ambient temperature characteristics

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



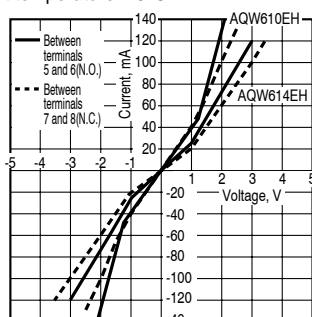
7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types;  
 LED current: 5 to 50 mA



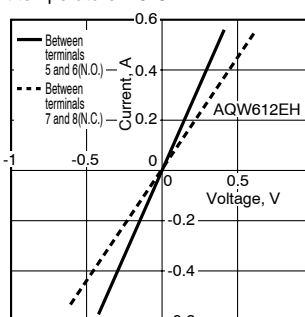
8-(1). Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8;  
 Ambient temperature:  $25^{\circ}\text{C}$   $77^{\circ}\text{F}$



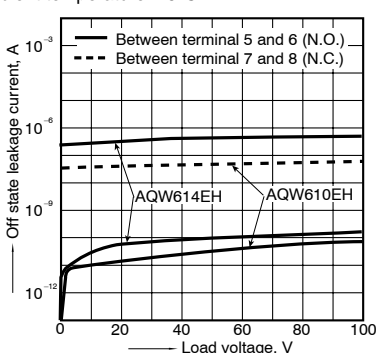
8-(2). Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8;  
 Ambient temperature:  $25^{\circ}\text{C}$   $77^{\circ}\text{F}$



9-(1). Off state leakage current vs. load voltage characteristics

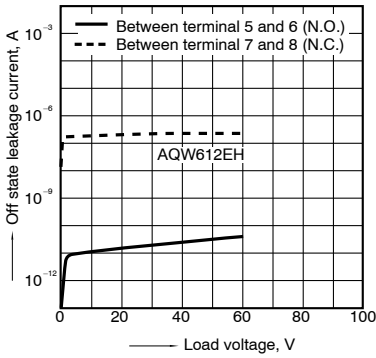
Measured portion: between terminals 5 and 6, 7 and 8;  
 Ambient temperature:  $25^{\circ}\text{C}$   $77^{\circ}\text{F}$



# GU-E PhotoMOS (AQW610EH)

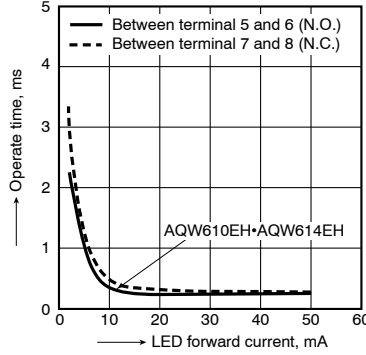
## 9-(2). Off state leakage current vs. load voltage characteristics

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



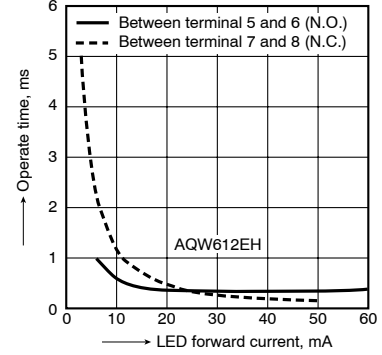
## 10-(1). Operate time vs. LED forward current characteristics

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



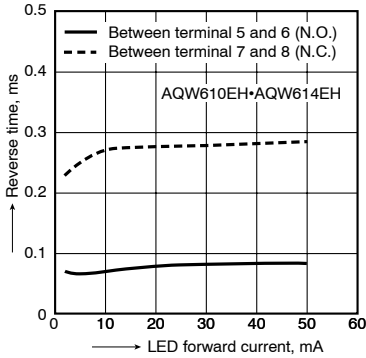
## 10-(2). Operate time vs. LED forward current characteristics

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



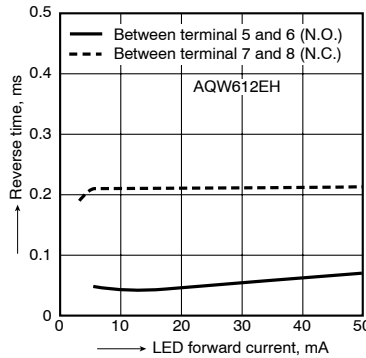
## 11-(1). Reverse time vs. LED forward current characteristics

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



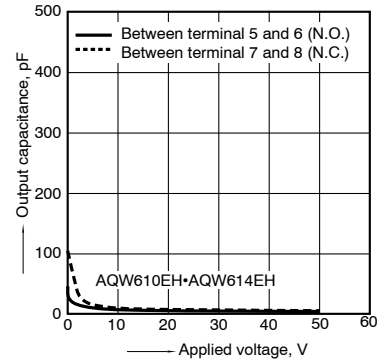
## 11-(2). Reverse time vs. LED forward current characteristics

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-(1). 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



## 12-(2). 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

