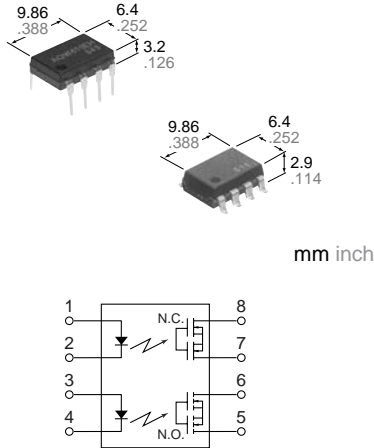


# Panasonic

ideas for life

Both NO and NC contacts incorporated in a compact DIP8-pin Reinforced insulation

PhotoMOS Relays  
**GU-E Form A & B**  
 (AQW610EH)



Compliance with RoHS Directive

## FEATURES

- 60V type couples high capacity (0.5A) with low on-resistance (typ. 1Ω).**
- Reinforced insulation 5,000 V**  
 More than 0.4 mm internal insulation distance between inputs and outputs. Conforms to EN41003, EN60950 (reinforced insulation).
- Approx. 1/2 the space compared with the mounting area of a set of 1 Form A and 1 Form B PhotoMOS relays**
- Applicable for 1 Form A 1 Form B use as well as two independent 1 Form A and 1 Form B use**
- 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 and high speed response

Can control max. 0.14 A load current with 5 mA input current. Fast operation speed of typ. 0.5 ms [N.O.] (AQW610EH).

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

## TYPICAL APPLICATIONS

- Power supply
- Measuring instruments
- Security equipment
- Modem
- Telephone equipment
- Electricity, plant equipment
- Sensing equipment

## 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	60 V	500 mA	DIP8-pin	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: 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)

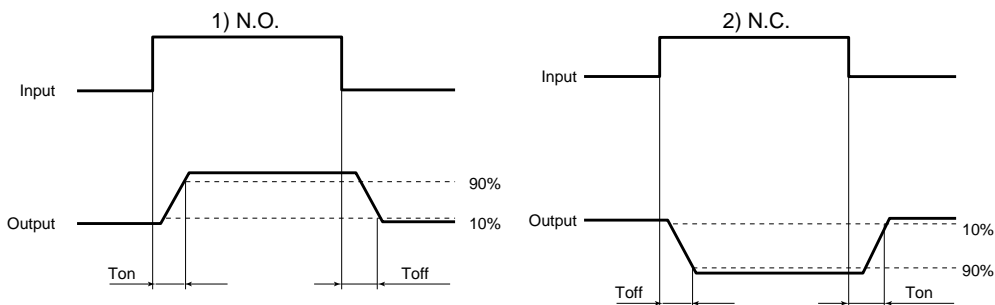
Item		Symbol	AQW612EH(A)	AQW610EH(A)	AQW614EH(A)	Remarks
Input	LED forward current	$I_F$	50 mA			
	LED reverse voltage	$V_R$	5 V			
	Peak forward current	$I_{FP}$	1 A			$f = 100 \text{ Hz}$ , Duty factor = 0.1%
	Power dissipation	$P_{in}$	75 mW			
Output	Load voltage (peak AC)	$V_L$	60 V	350 V	400 V	
	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			

# GU-E Form A & B (AQW610EH)

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

Item		Symbol	AQW612EH(A)	AQW610EH(A)	AQW614EH(A)	Condition
Input	LED operate current	Typical	1.3 mA			I <sub>L</sub> =Max.
		Maximum	3.0 mA			
	LED reverse current	Minimum	0.4 mA			I <sub>L</sub> =Max.
		Typical	1.3 mA			
LED dropout voltage	Typical	1.25 (1.14 V at I <sub>F</sub> = 5 mA)			I <sub>F</sub> =50 mA	
	Maximum	1.5 V				
Output	On resistance	Typical	1Ω	18Ω	26Ω	I <sub>F</sub> =5mA (N.O.) I <sub>F</sub> = 0mA (N.C.) I <sub>L</sub> = Max. Within 1 s on time
	Maximum	R <sub>on</sub>	2.5Ω	25Ω	35Ω	
	Off state leakage current	Maximum	1μA (N.O.), 10μA (N.C.)			I <sub>F</sub> =0 mA (N.O.) I <sub>F</sub> = 5 mA (N.C.) V <sub>L</sub> = Max.
Transfer characteristics	Operate time*	Typical	T <sub>on</sub> (N.O.) 1.0 ms (N.O.) 3.0 ms (N.C.)	0.5 ms (N.O.) 1.0 ms (N.C.)	0.5 ms (N.O.) 0.8 ms (N.C.)	I <sub>F</sub> = 0 mA → 5 mA I <sub>L</sub> = Max.
		Maximum	3.0 ms			
	Reverse time*	Typical	T <sub>off</sub> (N.O.) 0.05ms (N.O.), 0.2ms (N.C.)	0.08ms (N.O.), 0.3ms (N.C.)	0.08ms (N.O.), 0.2ms (N.C.)	I <sub>F</sub> = 5 mA → 0 mA I <sub>L</sub> = Max.
		Maximum	1.0ms			
I/O capacitance	Typical	0.8 pF			f = 1MHz V <sub>B</sub> = 0 V	
	Maximum	1.5 pF				
	Initial I/O isolation resistance	Minimum	1,000MΩ			500 V DC

\*Operate/Reverse 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 <sub>F</sub>	5 to 10	mA

### ■ For Dimensions

### ■ For Schematic and Wiring Diagrams

### ■ For Cautions for Use

■ These products are not designed for automotive use.

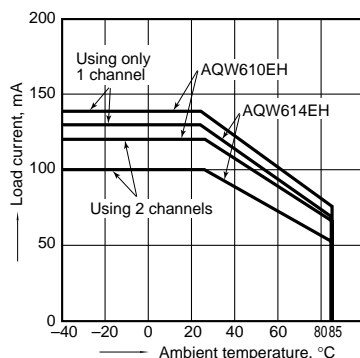
If you are considering to use these products for automotive applications, please contact your local Panasonic Electric Works technical representative.

For more information

## REFERENCE DATA

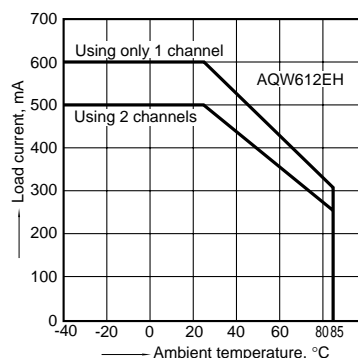
1-(1). Load current vs. ambient temperature characteristics

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



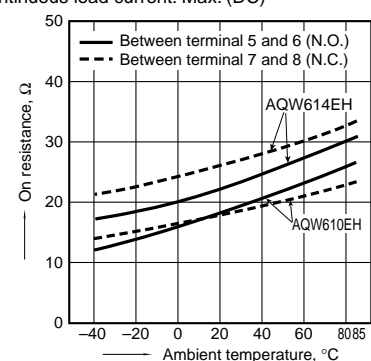
1-(2). Load current vs. ambient temperature characteristics

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



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

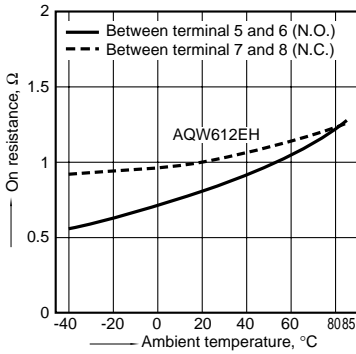
Measured portion: between terminals 5 and 6, 7 and 8;  
LED current: 5 mA; Load voltage: Max. (DC)  
Continuous load current: Max. (DC)



# GU-E Form A & B (AQW610EH)

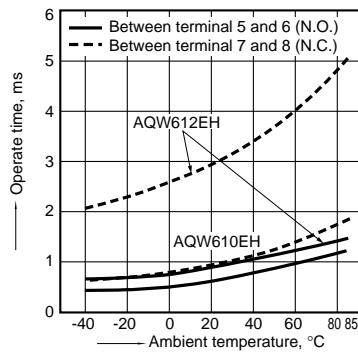
## 2-(2). On resistance vs. ambient temperature characteristics

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



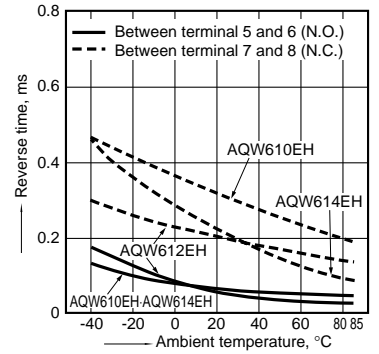
## 3. Operate time vs. ambient temperature characteristics

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



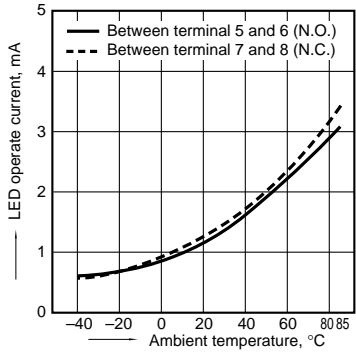
## 4. Reverse time vs. ambient temperature characteristics

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



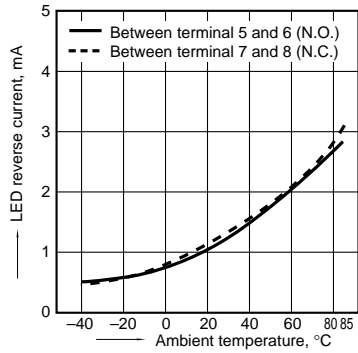
## 5. LED operate current vs. ambient temperature characteristics

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



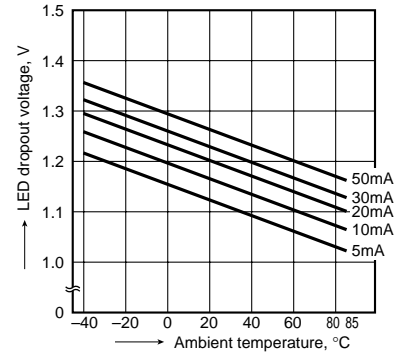
## 6. LED reverse current vs. ambient temperature characteristics

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



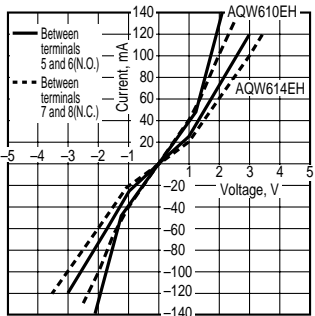
## 7. LED dropout voltage vs. ambient temperature characteristics

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



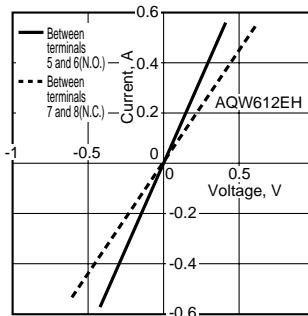
## 8-(1). Current vs. voltage characteristics of output at MOS portion

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



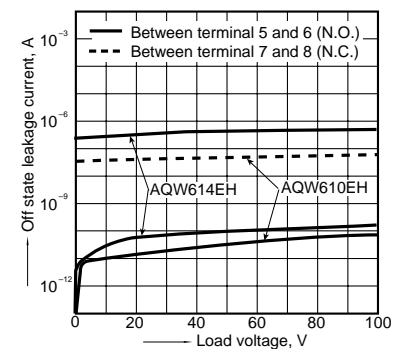
## 8-(2). Current vs. voltage characteristics of output at MOS portion

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



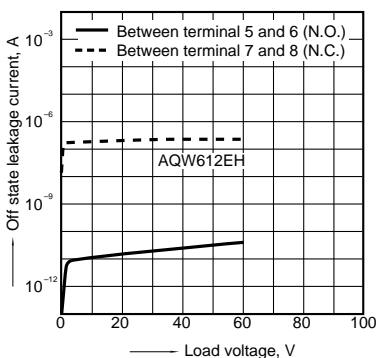
## 9-(1). Off state leakage current vs. load voltage characteristics

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



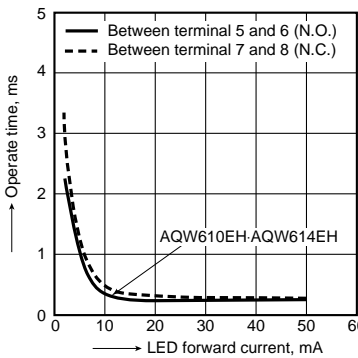
## 9-(2). Off state leakage current vs. load voltage characteristics

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



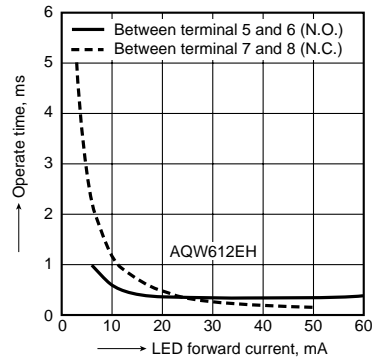
## 10-(1). Operate time vs. LED forward current characteristics

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

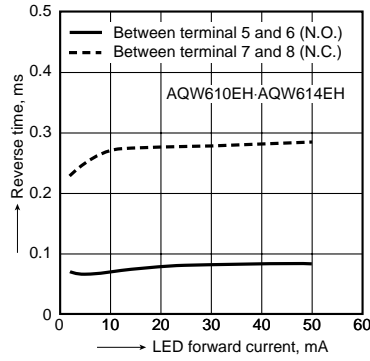
Measured portion: between terminals 5 and 6, 7 and 8;  
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



# GU-E Form A & B (AQW61○EH)

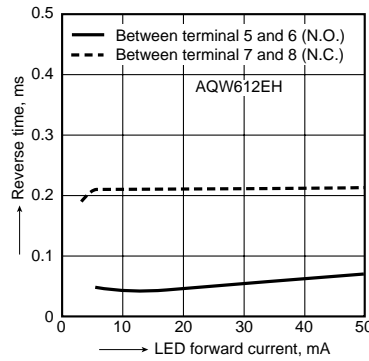
## 11-(1). Reverse time vs. LED forward current characteristics

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



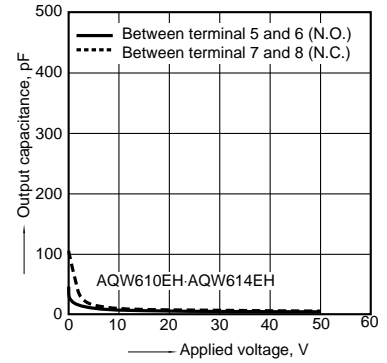
## 11-(2). Reverse time vs. LED forward current characteristics

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

