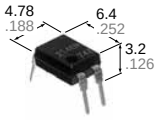
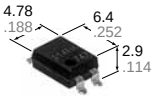
Panasonic
ideas for life

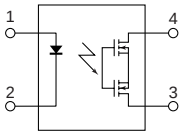
High cost-performance DIP4-pin type with reinforced insulation

PhotoMOS Relays
GU-E 1 Form A
(AQY21○EH)





mm inch



FEATURES

1. 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).

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

3. High sensitivity and low on-resistance
Can control max. 0.13 A load current with 5 mA input current.
Low on-resistance of typ. 25Ω (AQY211EH).

4. Low-level off state leakage current of max. 1 μA

TYPICAL APPLICATIONS

- Modem
- Telephone equipment
- Security equipment
- Sensing equipment

TYPES

	I/O isolation voltage	Output rating*		Package	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 dual use	Reinforced 5,000 V	30 V	1,000 mA	DIP4-pin	AQY211EH	AQY211EHA	AQY211EHAX	AQY211EHAZ	1 tube contains: 100 pcs. 1 batch contains: 1,000 pcs.	1,000 pcs.
		60 V	550 mA		AQY212EH	AQY212EHA	AQY212EHAX	AQY212EHAZ		
		350 V	130 mA		AQY210EH	AQY210EHA	AQY210EHAX	AQY210EHAZ		
		400 V	120 mA		AQY214EH	AQY214EHA	AQY214EHAX	AQY214EHAZ		
		600 V	50 mA		AQY216EH	AQY216EHA	AQY216EHAX	AQY216EHAZ		

*Indicate the peak AC and DC values.
Note: For space reasons, the initial letters of the part number "AQY", the surface mount terminal shape indicator "A" and the packing style indicator "X" or "Z" are not marked on the relay. (Ex. the label for product number AQY211EHAX is 211EH)

RATING

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

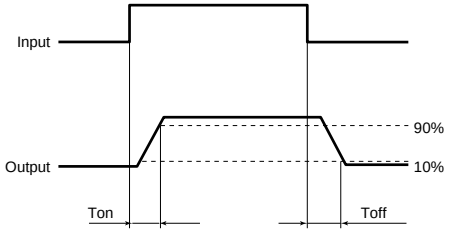
Item		Symbol	AQY211EH(A)	AQY212EH(A)	AQY210EH(A)	AQY214EH(A)	AQY216EH(A)	Remarks
Input	LED forward current	I_F	50mA					
	LED reverse voltage	V_R	5 V					
	Peak forward current	I_{FP}	1 A					f =100 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}	75mW					
Output	Load voltage (peak AC)	V_L	30 V	60 V	350 V	400 V	600 V	
	Continuous load current	I_L	1 A	0.55 A	0.13 A	0.12 A	0.05 A	Peak AC, DC
	Peak load current	I_{peak}	3 A	1.5 A	0.4 A	0.3 A	0.15 A	100 ms (1 shot), V_L= DC
	Power dissipation	P_{out}	500mW					
Total power dissipation		P_T	550mW					
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 1 Form A (AQY21❍EH)

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

Item			Symbol	AQY211EH(A)	AQY212EH(A)	AQY210EH(A)	AQY214EH(A)	AQY216EH(A)	Condition
Input	LED operate current	Typical	I_{Fon}	1.2mA					I_L=Max.
		Maximum		3.0mA					
	LED turn off current	Minimum	I_{Foff}	0.4mA					I_L=Max.
		Typical		1.1mA					
	LED dropout voltage	Typical	V_F	1.25 (1.14 V at I_F=5mA)					I_F=50mA
		Maximum		1.5V					
Output	On resistance	Typical	R_{on}	0.25Ω	0.85Ω	18Ω	26Ω	52Ω	I_F=5mA I_L=Max. Within 1 s on time
		Maximum		0.5Ω	2.5Ω	25Ω	35Ω	120Ω	
	Off state leakage current	Maximum	I_{Leak}	1μA					I_F=0mA V_L=Max.
Transfer characteristics	Turn on time*	Typical	T_{on}	1.5ms	1ms	0.5ms			I_F=5mA I_L=Max.
		Maximum		5ms	4ms	2.0ms			
	Turn off time*	Typical	T_{off}	0.1ms	0.05ms	0.08ms		0.04ms	I_F=5mA I_L=Max.
		Maximum		1.0ms					
	I/O capacitance	Typical	C_{iso}	0.8pF					f =1MHz V_B =0V
		Maximum		1.5pF					
	Initial I/O isolation resistance	Minimum	R_{iso}	1,000MΩ					500V 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

■ Dimensions

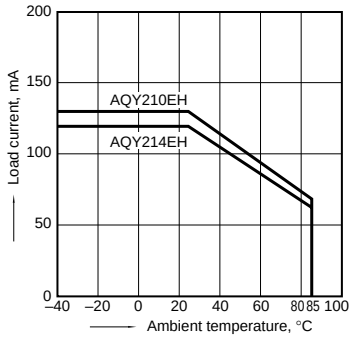
■ Schematic and Wiring Diagrams

■ Cautions for Use

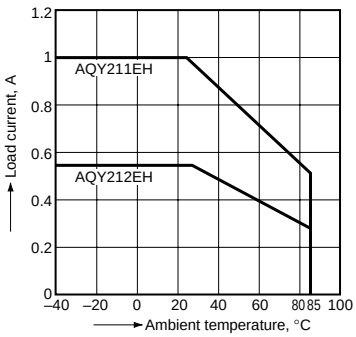
■ These products are not designed for automotive use.
If you are considering to use these products for automotive applications, please contact your local Panasonic Electric Works technical representative.
Please refer to our information on PhotoMOS Relays for Automotive Applications.

REFERENCE DATA

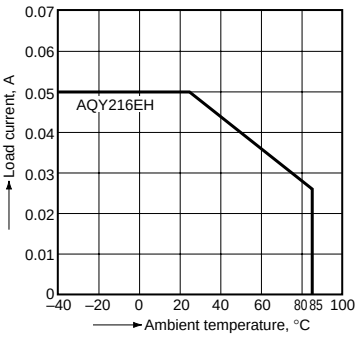
1-(1). Load current vs. ambient temperature characteristics
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F



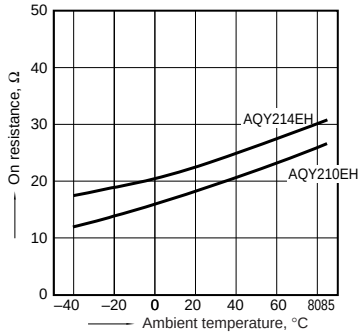
1-(2). Load current vs. ambient temperature characteristics
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F



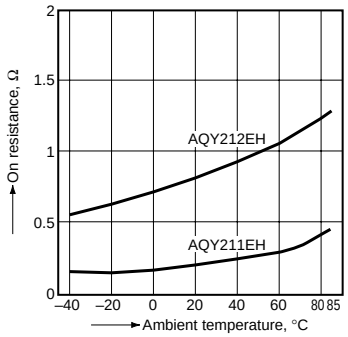
1-(3). Load current vs. ambient temperature characteristics
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F



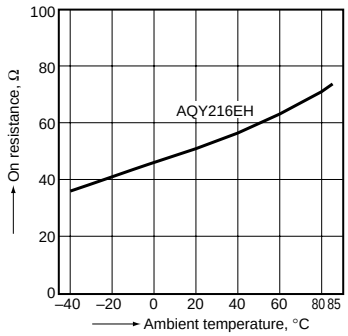
2-(1). On resistance vs. ambient temperature characteristics
Measured portion: between terminals 3 and 4;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



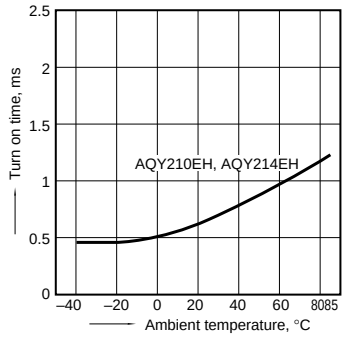
2-(2). On resistance vs. ambient temperature characteristics
Measured portion: between terminals 3 and 4;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



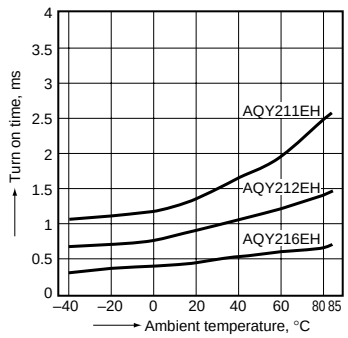
2-(3). On resistance vs. ambient temperature characteristics
Measured portion: between terminals 3 and 4;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



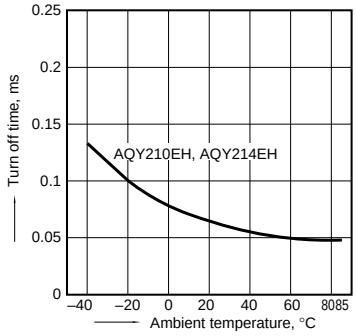
3-(1). Turn on time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



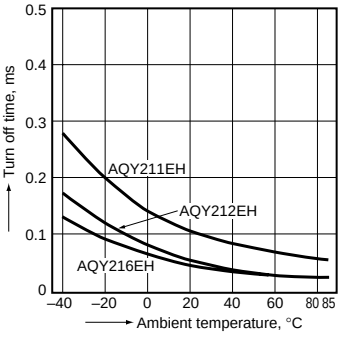
3-(2). Turn on time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



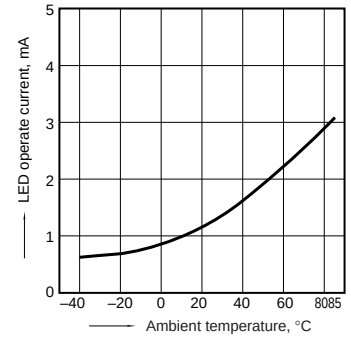
4-(1). Turn off time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



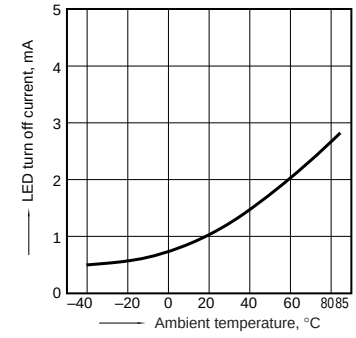
4-(2). Turn off time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



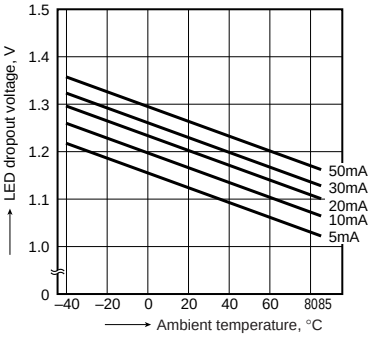
5. LED operate current vs. ambient temperature characteristics
Sample: All types; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



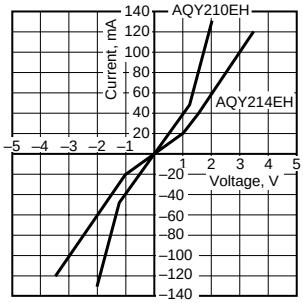
6. LED turn off current vs. ambient temperature characteristics
Sample: All types; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



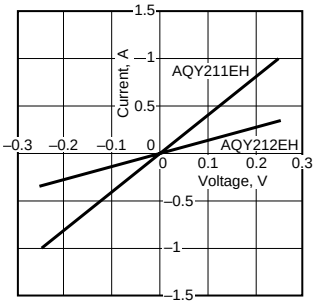
7. LED dropout voltage vs. ambient temperature characteristics
Sample: All types; LED current: 5 to 50 mA



8-(1). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F

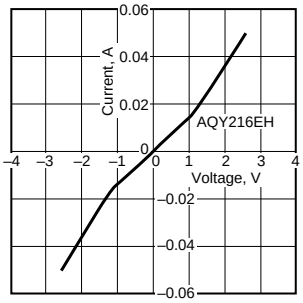


8-(2). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F

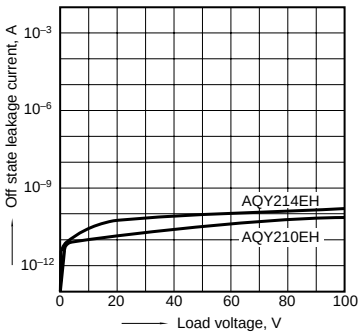


GU-E 1 Form A (AQY21❍EH)

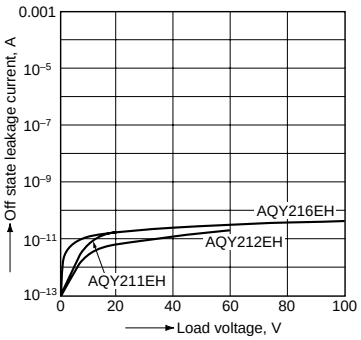
8-(3). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



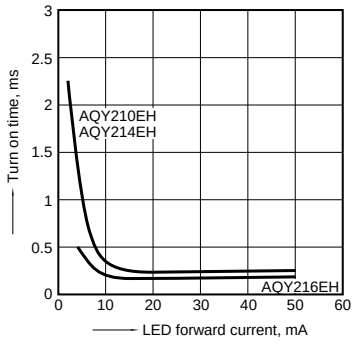
9-(1). Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



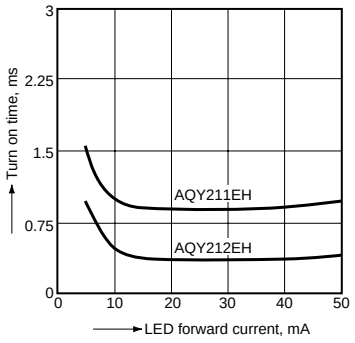
9-(2). Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



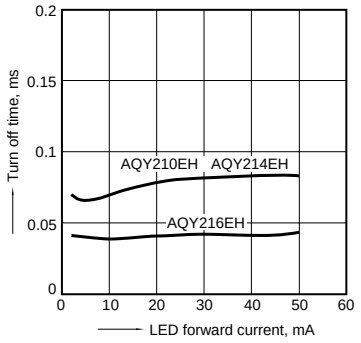
10-(1). Turn on time vs. LED forward current characteristics
Measured portion: between terminals 3 and 4;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



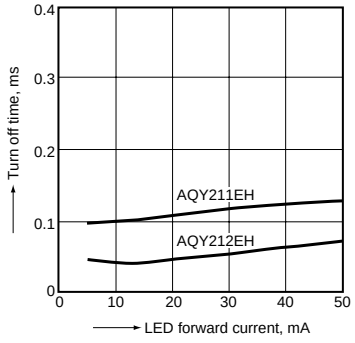
10-(2). Turn on time vs. LED forward current characteristics
Measured portion: between terminals 3 and 4;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



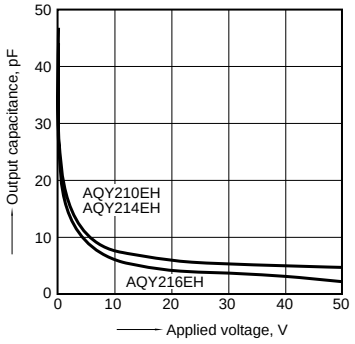
11-(1). Turn off time vs. LED forward current characteristics
Measured portion: between terminals 3 and 4;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



11-(2). Turn off time vs. LED forward current characteristics
Measured portion: between terminals 3 and 4;
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 3 and 4;
Frequency: 1 MHz; Ambient temperature: 25°C 77°F



12-(2). Output capacitance vs. applied voltage characteristics
Measured portion: between terminals 3 and 4;
Frequency: 1 MHz; Ambient temperature: 25°C 77°F