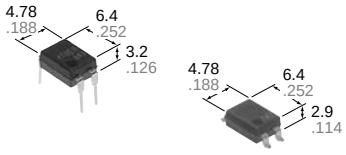
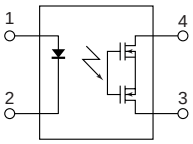
Panasonic
ideas for life

Normally closed DIP4-pin economic type with reinforced insulation

PhotoMOS Relays
GU-E 1 Form B
(AQY41○EH)



mm inch



Compliance with RoHS Directive

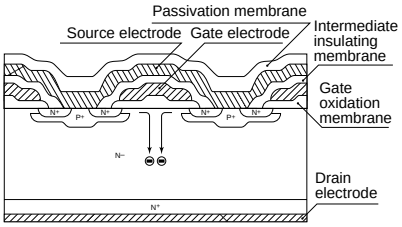
FEATURES

1. High cost-performance type of PhotoMOS relay 1 Form B output

2. Low on-resistance

This has been realized thanks to the built-in MOSFET processed by our proprietary method, DSD (Double-diffused and Selective Doping) method.

Cross section of the normally-closed type of power MOS



3. Reinforced insulation of 5,000 V

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

4. Controls low-level analog signals

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

5. High sensitivity and low on-resistance

Can control max. 0.55 A load current with 5 mA input current.
Low on-resistance of typ.1Ω (AQY412EH).

6. Low-level off-state leakage current

TYPICAL APPLICATIONS

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

TYPES

Type	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	60 V	550 mA	DIP4-pin	AQY412EH	AQY412EHA	AQY412EHAX	AQY412EHAZ	1 tube contains: 100 pcs. 1 batch contains: 1,000 pcs.	1,000 pcs.
		350 V	130 mA		AQY410EH	AQY410EHA	AQY410EHAX	AQY410EHAZ		
		400 V	120 mA		AQY414EH	AQY414EHA	AQY414EHAX	AQY414EHAZ		

*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 AQY412EHAX is 412EH.)

RATING

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

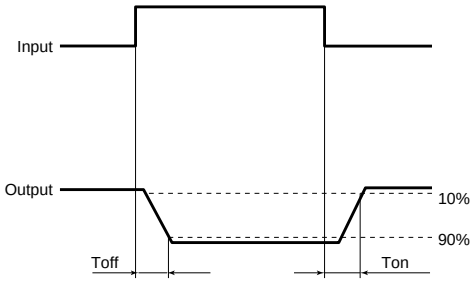
Item		Symbol	AQY412EH(A)	AQY410EH(A)	AQY414EH(A)	Remarks
Input	LED forward current	I_F	50 mA			
	LED reverse voltage	V_R	5 V			
	Peak forward current	I_{FP}	1 A			f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}	75 mW			
Output	Load voltage (peak AC)	V_L	60 V	350 V	400 V	
	Continuous load current	I_L	0.55 A	0.13 A	0.12 A	Peak AC, DC
	Peak load current	I_{peak}	1.5 A	0.4 A	0.3 A	100 ms (1 shot), V_L= DC
	Power dissipation	P_{out}	500 mW			
Total power dissipation		P_T	550 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 1 Form B (AQY41❍EH)

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

Item			Symbol	AQY412EH(A)	AQY410EH(A)	AQY414EH(A)	Condition
Input	LED operate (OFF) current	Typical	I_{Foff}	1.4 mA			I_L=Max.
		Maximum		3.0 mA			
	LED reverse (ON) current	Minimum	I_{Fon}	0.4 mA			I_L=Max.
		Typical		1.3 mA			
	LED dropout voltage	Typical	V_F	1.25 (1.14 V at I_F = 5 mA)			I_F = 50 mA
		Maximum		1.5 V			
Output	On resistance	Typical	R_{on}	1Ω	18Ω	26Ω	I_F = 0 mA I_L = Max. Within 1 s on time
		Maximum		2.5Ω	25Ω	35Ω	
	Off state leakage current	Maximum	I_{Leak}	10μA			I_F = 5 mA V_L = Max.
Transfer characteristics	Operate (OFF) time*	Typical	T_{off}	3.0 ms	1.0 ms	0.8 ms	I_F = 0 mA → 5 mA I_L = Max.
		Maximum		10.0 ms	3.0 ms		
	Reverse (ON) time*	Typical	T_{on}	0.2 ms	0.3 ms	0.2 ms	I_F = 5 mA → 0 mA I_L = Max.
		Maximum		1.0 ms			
	I/O capacitance	Typical	C_{iso}	0.8 pF			f =1MHz V_B = 0 V
		Maximum		1.5 pF			
	Initial I/O isolation resistance	Minimum	R_{iso}	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_F	5 to 10	mA

■ For Dimensions

■ For Schematic and Wiring Diagrams

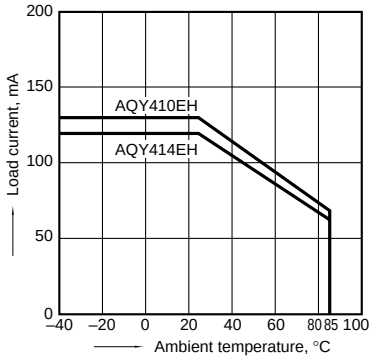
■ For Cautions for Use

■ 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

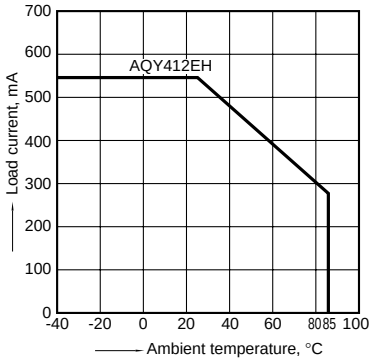
1-(1). Load current vs. ambient temperature characteristics

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



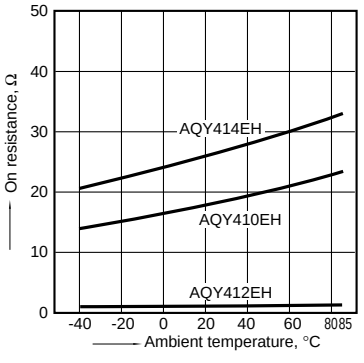
1-(2). Load current vs. ambient temperature characteristics

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

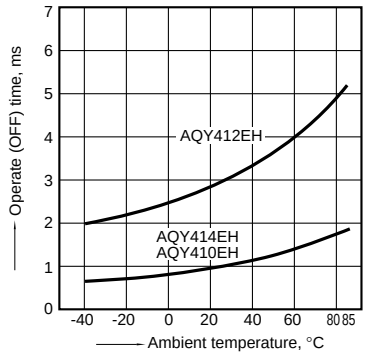


2. On resistance vs. ambient temperature characteristics

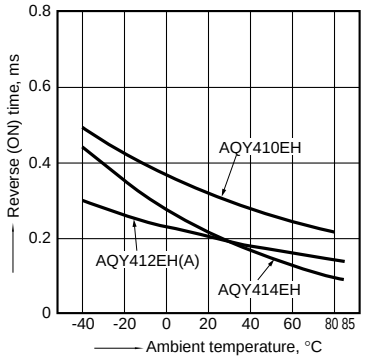
Measured portion: between terminals 3 and 4;
LED current: 0 mA; Load voltage: Max.(DC);
Continuous load current: Max. (DC)



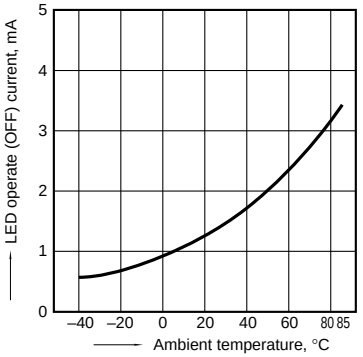
3. Operate (OFF) time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



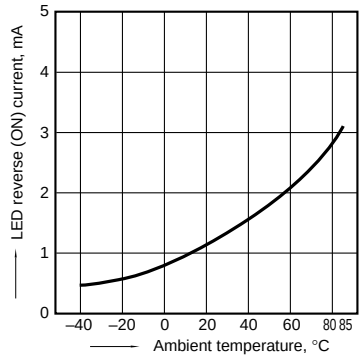
4. Reverse (ON) time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



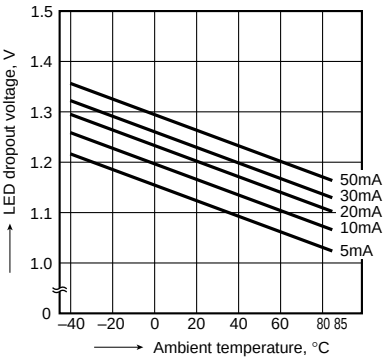
5. LED operate (OFF) current vs. ambient temperature characteristics
Sample: All types;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



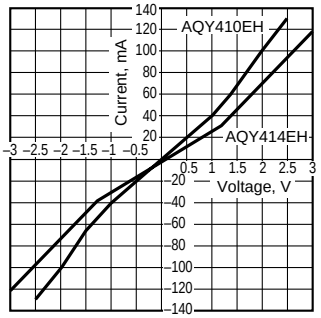
6. LED reverse (ON) current vs. ambient temperature characteristics
Sample: All types;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



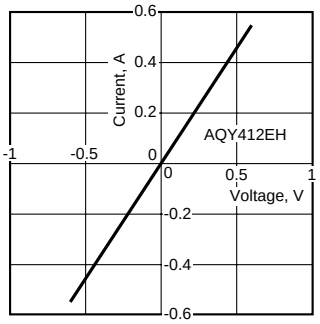
7. LED dropout voltage vs. ambient temperature characteristics
LED current: 5 to 50 mA



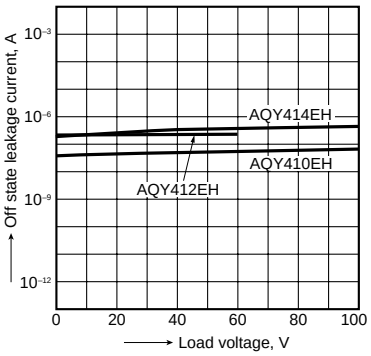
8-(1). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



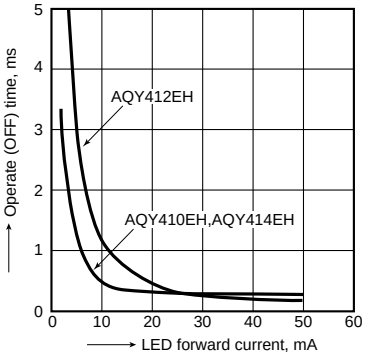
8-(2). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



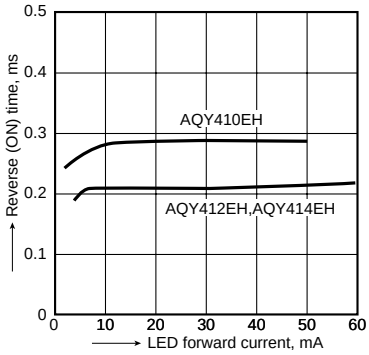
9. Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



10. Operate (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. Reverse (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



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