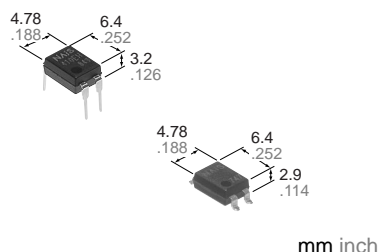


# NAiS

## GU (General Use)-E Type 1-Channel (Form B) 4-pin Type

# PhotoMOS RELAYS

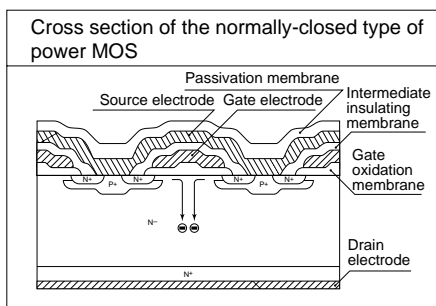


## FEATURES

### 1. Low on resistance for normally-closed type

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



### 2. Reinforced insulation 5,000 V type

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

### 3. Compact 4-pin DIP size

The device comes in a compact (W)6.4×(L)4.78×(H)3.2mm (W).252×(L).188×(H).126inch, 4-pin DIP size

### 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, low ON resistance

Can control a maximum 0.13 A load current with a 5 mA input current. Low ON resistance of 18Ω (AQY410EH). Stable operation because there are no metallic contact parts.

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

## TYPICAL APPLICATIONS

- Modem
- Telephone equipment
- Security equipment
- Sensors

## TYPES

Type	I/O isolation voltage	Output rating*		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 type	Reinforced 5,000 V	350 V	130 mA	AQY410EH	AQY410EHA	AQY410EHAX	AQY410EHAZ	1 tube contains 100 pcs. 1 batch contains 1,000 pcs.	1,000 pcs.
		400 V	120 mA	AQY414EH	AQY414EHA	AQY414EHAX	AQY414EHAZ		

\*Indicate the peak AC and DC values.

Note: For space reasons, the initial letters of the product number "AQY", 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	AQY410EH (A)	AQY414EH (A)	Remarks
Input	LED forward current	I <sub>F</sub>	50 mA		
	LED reverse voltage	V <sub>R</sub>	3 V		
	Peak forward current	I <sub>FP</sub>	1 A		f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>	75 mW		
Output	Load voltage (peak AC)	V <sub>L</sub>	350 V	400 V	
	Continuous load current	I <sub>L</sub>	0.13 A	0.12 A	
	Peak load current	I <sub>peak</sub>	0.4 A	0.3 A	100 ms (1 shot), V <sub>L</sub> = DC
	Power dissipation	P <sub>out</sub>	500 mW		
Total power dissipation		P <sub>T</sub>	550 mW		
I/O isolation voltage		V <sub>iso</sub>	5,000 V AC		
Temperature limits	Operating	T <sub>opr</sub>	-40°C to +85°C -40°F to +185°F		Non-condensing at low temperatures
	Storage	T <sub>stg</sub>	-40°C to +100°C -40°F to +212°F		

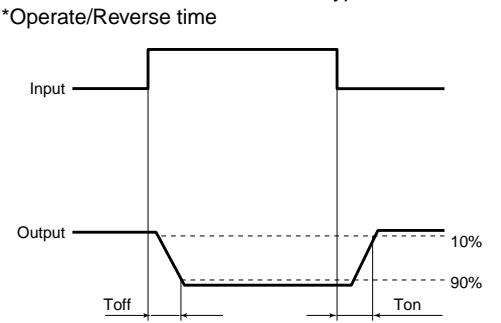
AQY410EH

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

Item			Symbol	AQY410EH (A)	AQY414EH (A)	Condition
Input	LED operate (OFF) current	Typical	I <sub>Foff</sub>	1.4 mA	1.3 mA	I <sub>L</sub> =Max.
		Maximum		3.0 mA		
	LED reverse (ON) current	Minimum	I <sub>Fon</sub>	0.4 mA		I <sub>L</sub> =Max.
		Typical		1.3 mA	1.2 mA	
	LED dropout voltage	Typical	V <sub>F</sub>	1.14 (1.25 V at I <sub>F</sub> = 50 mA)		I <sub>F</sub> = 5 mA
		Maximum		1.5 V		
Output	On resistance	Typical	R <sub>On</sub>	18Ω	26Ω	I <sub>F</sub> = 0 mA I <sub>L</sub> = Max. Within 1 s on time
		Maximum		25Ω	35Ω	
	Off state leakage current	Maximum	I <sub>Leak</sub>	10μA		I <sub>F</sub> = 5 mA V <sub>L</sub> = Max.
Transfer char- acteristics	Operate (OFF) time*	Typical	T <sub>off</sub>	1.0 ms	0.8 ms	I <sub>F</sub> = 0 mA-->5 mA I <sub>L</sub> = Max.
		Maximum		3.0 ms		
	Reverse (ON) time*	Typical	T <sub>on</sub>	0.3 ms	0.2 ms	I <sub>F</sub> = 5 mA-->0 mA I <sub>L</sub> = Max.
		Maximum		1.0 ms		
	I/O capacitance	Typical	C <sub>iso</sub>	0.8 pF		f =1MHz V <sub>B</sub> =0
		Maximum		1.5 pF		
	Initial I/O isolation resistance	Minimum	R <sub>iso</sub>	1,000MΩ		500 V DC

Note: Recommendable LED forward current I<sub>F</sub> = 5 to 10mA.

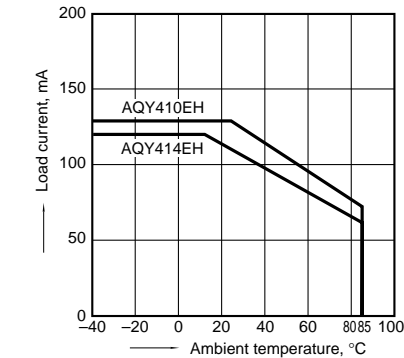
For type of connection



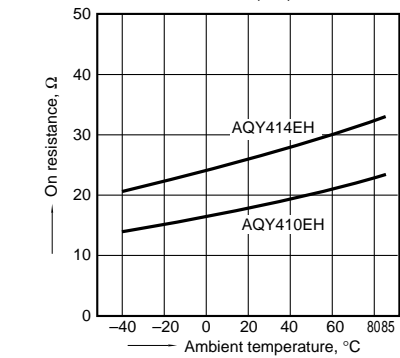
- For Dimensions, see Page 440.
- For Schematic and Wiring Diagrams, see Page 445.
- For Cautions for Use, see Page 449.

REFERENCE DATA

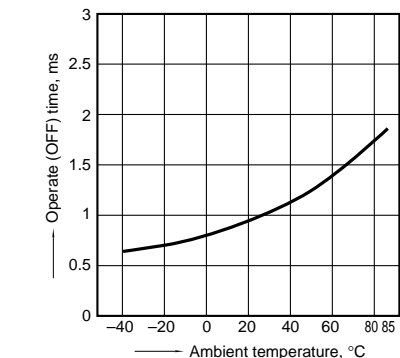
1. Load current vs. ambient temperature characteristics  
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F



2. On resistance vs. ambient temperature characteristics  
Measured portion: between terminals 3 and 4;  
LED current: 0 mA; Load voltage: Max.(DC);  
Continuous load current: Max. (DC)

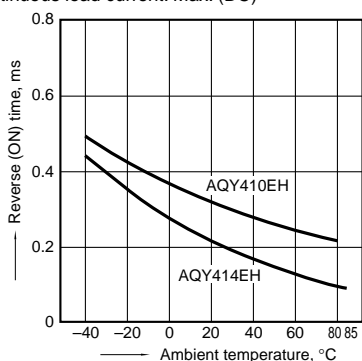


3. Operate (OFF) time vs. ambient temperature characteristics  
LED current: 5 mA; Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



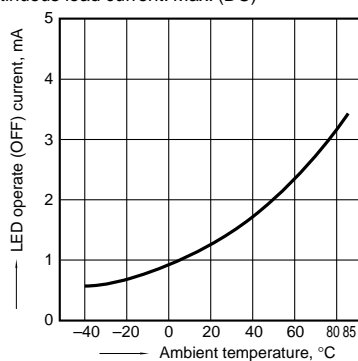
## 4. Reverse (ON) time vs. ambient temperature characteristics

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



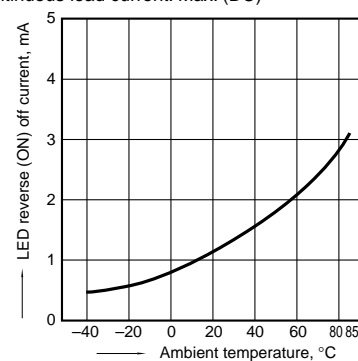
## 5. LED operate (OFF) current vs. ambient temperature characteristics

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



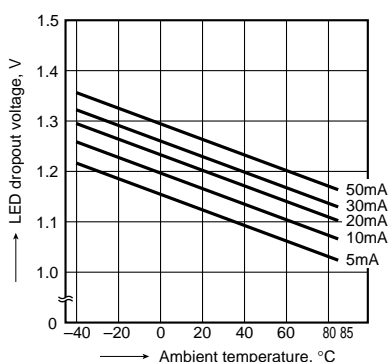
## 6. LED reverse (ON) current vs. ambient temperature characteristics

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



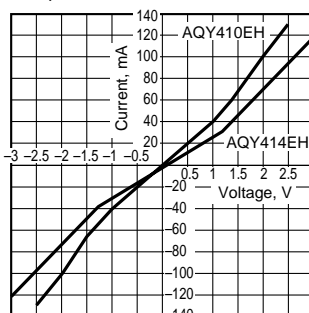
## 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



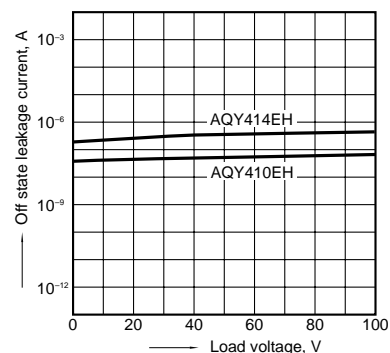
## 8. Voltage vs. current characteristics of out-put at MOS portion

Measured portion: between terminals 3 and 4;  
Ambient temperature: 25°C 77°F



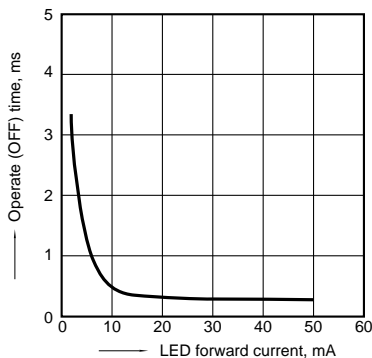
## 9. Off state leakage current

Measured portion: between terminals 3 and 4;  
Ambient temperature: 25°C 77°F



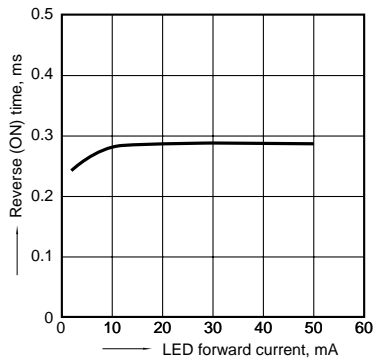
## 10. LED forward current vs. Operate (OFF) time characteristics

Measured portion: between terminals 3 and 4;  
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



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

Measured portion: between terminals 3 and 4;  
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



## 12. Applied voltage vs. output capacitance characteristics

Measured portion: between terminals 3 and 4;  
Frequency: 1 MHz; Ambient temperature: 25°C 77°F

