



**DIP4-pin type with reinforced insulation**

**PhotoMOS®**  
**GE 1 Form A**  
**(AQY210EH)**



**RoHS compliant**

### 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 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 (AQY210EH).
- 4. Low-level off state leakage current of max. 1 μA**

### TYPICAL APPLICATIONS

- Modem
- Telephone equipment
- Electricity, plant equipment
- Security equipment
- Sensing equipment

### TYPES

	I/O isolation voltage	Output rating**		Package	Part No.				Packing quantity	
					Through hole terminal	Surface-mount terminal			Tube	Tape and reel
						Tube packing style		Tape and reel packing style		
		Load voltage	Load current		Picked from the 1/2-pin side	Picked from the 3/4-pin side				
AC/DC dual use	Reinforced 5,000 Vrms	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 device. (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 <sub>F</sub>	50mA					
	LED reverse voltage	V <sub>R</sub>	5 V					
	Peak forward current	I <sub>FP</sub>	1 A					f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>	75mW					
Output	Load voltage (peak AC)	V <sub>L</sub>	30 V	60 V	350 V	400 V	600 V	Peak AC, DC
	Continuous load current	I <sub>L</sub>	1 A	0.55 A	0.13 A	0.12 A	0.05 A	100 ms (1 shot), V <sub>L</sub> = DC
	Peak load current	I <sub>peak</sub>	3 A	1.5 A	0.4 A	0.3 A	0.15 A	
	Power dissipation	P <sub>out</sub>	500mW					
Total power dissipation		P <sub>T</sub>	550mW					
I/O isolation voltage		V <sub>iso</sub>	5,000 Vrms					
Ambient temperature	Operating	T <sub>opr</sub>	-40 to +85°C -40 to +185°F					(Non-icing at low temperatures)
	Storage	T <sub>stg</sub>	-40 to +100°C -40 to +212°F					

# GE 1 Form A (AQY210EH)

## 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	1.2mA					I <sub>L</sub> =Max.
		Maximum	3.0mA					
	LED turn off current	Minimum	0.4mA					I <sub>L</sub> =Max.
		Typical	1.1mA					
LED dropout voltage	Typical	1.25 (1.14 V at I <sub>F</sub> =5mA)					I <sub>F</sub> =50mA	
	Maximum	1.5V						
Output	On resistance	Typical	0.25Ω	0.85Ω	18Ω	26Ω	52Ω	I <sub>F</sub> =5mA I <sub>L</sub> =Max. Within 1 s
		Maximum	0.5Ω	2.5Ω	25Ω	35Ω	120Ω	
	Off state leakage current	Maximum	1μA					I <sub>F</sub> =0mA V <sub>L</sub> =Max.
Transfer characteristics	Turn on time*	Typical	1.5ms	1ms	0.5ms		I <sub>F</sub> =5mA I <sub>L</sub> =Max.	
		Maximum	5ms	4ms	2.0ms			
	Turn off time*	Typical	0.1ms	0.05ms	0.08ms	0.04ms	I <sub>F</sub> =5mA I <sub>L</sub> =Max.	
		Maximum	1.0ms					
	I/O capacitance	Typical	0.8pF					f = 1MHz V <sub>B</sub> = 0V
		Maximum	1.5pF					
Initial I/O isolation resistance	Minimum	1,000MΩ					500V DC	

\*Turn on/Turn off time



## 3. Recommended operating conditions (Ambient temperature: 25°C 77°F)

Please use under recommended operating conditions to obtain expected characteristics.

Item		Symbol	Min.	Max.	Unit
LED current		I <sub>F</sub>	5	30	mA
AQY211EH(A)	Load voltage (Peak AC)	V <sub>L</sub>	—	24	V
	Continuous load current	I <sub>L</sub>	—	1	A
AQY212EH(A)	Load voltage (Peak AC)	V <sub>L</sub>	—	48	V
	Continuous load current	I <sub>L</sub>	—	0.55	A
AQY210EH(A)	Load voltage (Peak AC)	V <sub>L</sub>	—	280	V
	Continuous load current	I <sub>L</sub>	—	0.13	A
AQY214EH(A)	Load voltage (Peak AC)	V <sub>L</sub>	—	320	V
	Continuous load current	I <sub>L</sub>	—	0.12	A
AQY216EH(A)	Load voltage (Peak AC)	V <sub>L</sub>	—	480	V
	Continuous load current	I <sub>L</sub>	—	0.05	A

■ These products are not designed for automotive use.

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

## REFERENCE DATA

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

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



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

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



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

Allowable ambient temperature: -40 to +85°C  
-40 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)



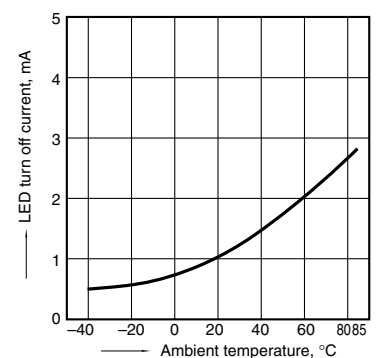
5. LED operate current vs. ambient temperature characteristics

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)



# GE 1 Form A (AQY210EH)

## 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



## 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



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