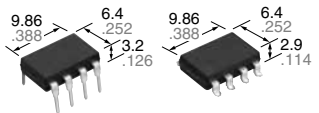




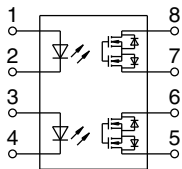
**DIP8-pin type with reinforced insulation**

**PhotoMOS®  
GE 2 Form A  
(AQW210EH)**



(Height includes standoff)

mm inch



**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. Applicable for 2 Form A use as well as two independent 1 Form A use**
- 3. Controls low-level analog signals**  
PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.
- 4. 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 (AQW210EH).
- 5. Low-level off state leakage current of max. 1  $\mu$ A**

### TYPICAL APPLICATIONS

- Modem
- Telephone equipment
- Electricity, plant equipment
- Security 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 Vrms	60 V	500 mA	DIP8-pin	AQW212EH	AQW212EHA	AQW212EHAX	AQW212EHAZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.
		350 V	120 mA		AQW210EH	AQW210EHA	AQW210EHAX	AQW210EHAZ		
		400 V	100 mA		AQW214EH	AQW214EHA	AQW214EHAX	AQW214EHAZ		
		600 V	40 mA		AQW216EH	AQW216EHA	AQW216EHAX	AQW216EHAZ		

\*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 device.

### RATING

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

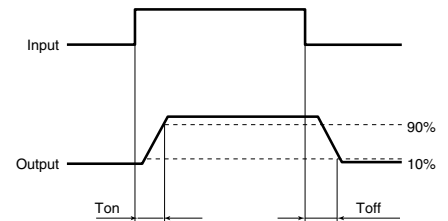
Item		Symbol	AQW212EH(A)	AQW210EH(A)	AQW214EH(A)	AQW216EH(A)	Remarks
Input	LED forward current	$I_F$	50mA				
	LED reverse voltage	$V_R$	5V				
	Peak forward current	$I_{FP}$	1A				f = 100 Hz, Duty factor = 0.1%
	Power dissipation	$P_{in}$	75mW				
Output	Load voltage (peak AC)	$V_L$	60 V	350 V	400 V	600 V	
	Continuous load current	$I_L$	0.5 A (0.6 A)	0.12 A (0.14 A)	0.1 A (0.13 A)	0.04 A (0.05 A)	Peak AC, DC ( ): in case of using only 1 channel
	Peak load current	$I_{peak}$	1.5 A	0.36 A	0.3 A	0.12 A	100 ms (1 shot), $V_L = DC$
	Power dissipation	$P_{out}$	800mW				
Total power dissipation		$P_T$	850mW				
I/O isolation voltage		$V_{iso}$	5,000 Vrms				
Ambient temperature	Operating	$T_{opr}$	-40 to +85°C -40 to +185°F				(Non-icing at low temperatures)
	Storage	$T_{stg}$	-40 to +100°C -40 to +212°F				

# GE 2 Form A (AQW210EH)

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

Item		Symbol	AQW212EH(A)	AQW210EH(A)	AQW214EH(A)	AQW216EH(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 V (1.14 V at I <sub>F</sub> =5mA)				I <sub>F</sub> =50mA	
	Maximum	1.5V					
Output	On resistance	Typical	0.83Ω	18Ω	26Ω	52Ω	I <sub>F</sub> =5mA I <sub>L</sub> =Max. Within 1 s
		Maximum	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	1ms	0.5ms			I <sub>F</sub> =5mA I <sub>L</sub> =Max.
		Maximum	4ms	2.0ms			
	Turn off time*	Typical	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	R <sub>iso</sub>	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	Number of used channels	Min.	Max.	Unit
LED current	I <sub>F</sub>		5	30	mA
AQW212EH(A)	Load voltage (Peak AC)	V <sub>L</sub>	—	48	V
	Continuous load current	I <sub>L</sub>	1ch 2ch	— 0.6 0.5	A
AQW210EH(A)	Load voltage (Peak AC)	V <sub>L</sub>	—	280	V
	Continuous load current	I <sub>L</sub>	1ch 2ch	— 0.14 0.12	A
AQW214EH(A)	Load voltage (Peak AC)	V <sub>L</sub>	—	320	V
	Continuous load current	I <sub>L</sub>	1ch 2ch	— 0.13 0.1	A
AQW216EH(A)	Load voltage (Peak AC)	V <sub>L</sub>	—	480	V
	Continuous load current	I <sub>L</sub>	1ch 2ch	— 0.05 0.04	A

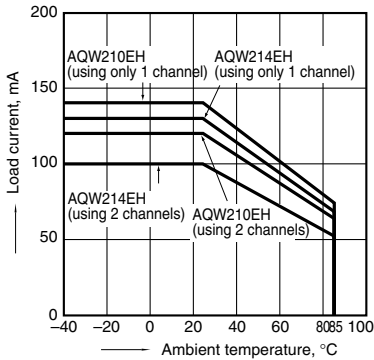
■ These products are not designed for automotive use.

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

## REFERENCE DATA

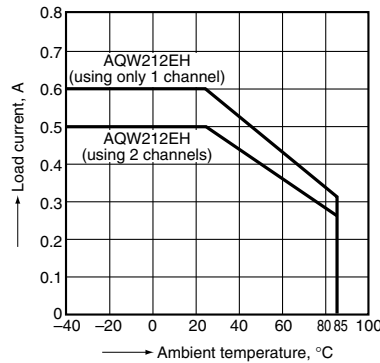
1-(1). Load current vs. ambient temperature characteristics

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



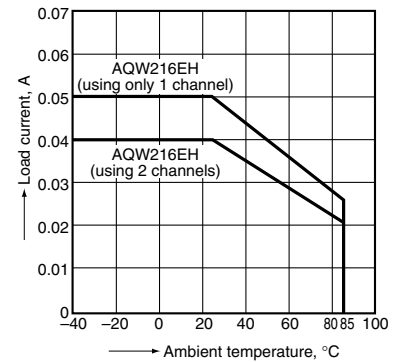
1-(2). Load current vs. ambient temperature characteristics

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



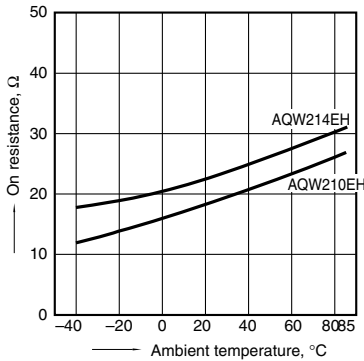
1-(3). Load current vs. ambient temperature characteristics

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



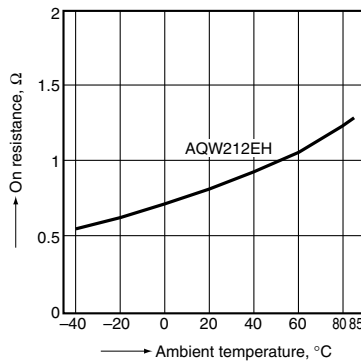
2-(1). On resistance vs. ambient temperature characteristics

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



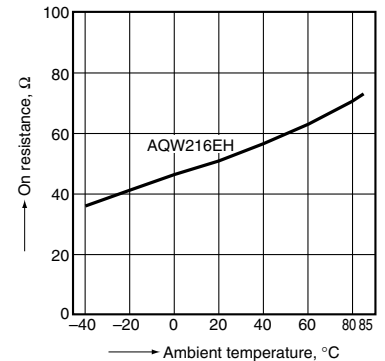
2-(2). On resistance vs. ambient temperature characteristics

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



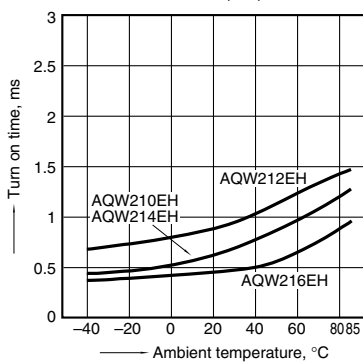
2-(3). On resistance vs. ambient temperature characteristics

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



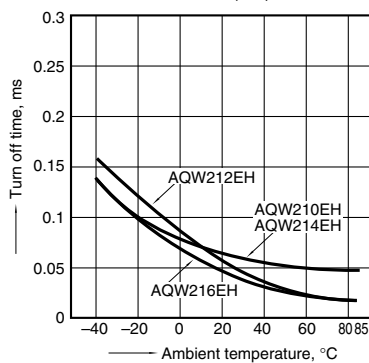
3. Turn on time vs. ambient temperature characteristics

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



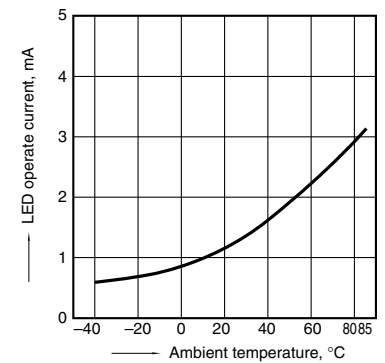
4. Turn off time vs. ambient temperature characteristics

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



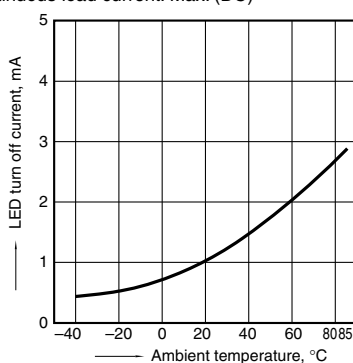
5. LED operate current vs. ambient temperature characteristics

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



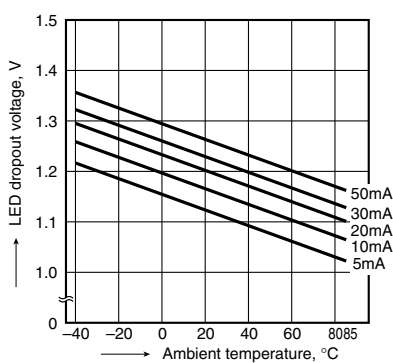
6. LED turn off current vs. ambient temperature characteristics

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



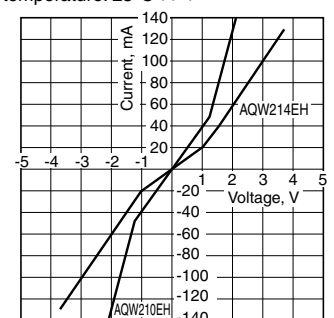
7. LED dropout voltage vs. ambient temperature characteristics

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



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

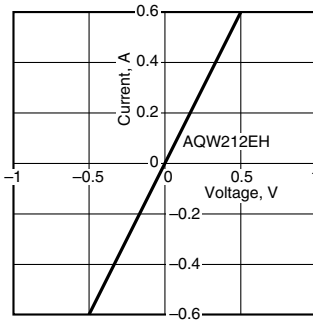
Measured portion: between terminals 5 and 6, 7 and 8;  
Ambient temperature: 25°C 77°F



# GE 2 Form A (AQW210EH)

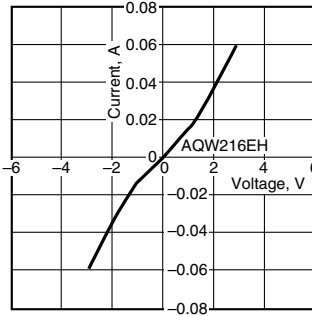
## 8-(2). Current vs. voltage characteristics of output at MOS portion

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



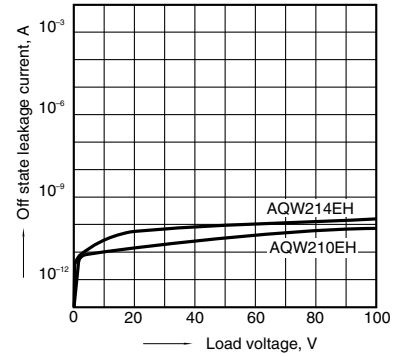
## 8-(3). Current vs. voltage characteristics of output at MOS portion

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



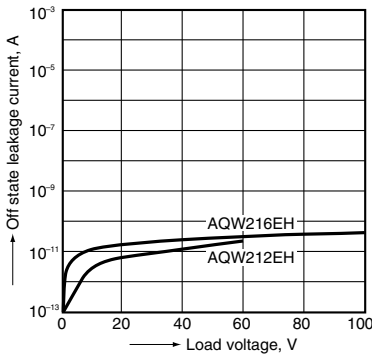
## 9-(1). Off state leakage current vs. load voltage characteristics

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



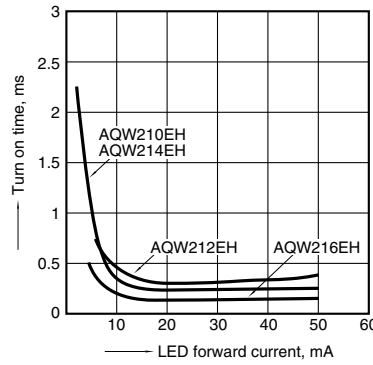
## 9-(2). Off state leakage current vs. load voltage characteristics

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



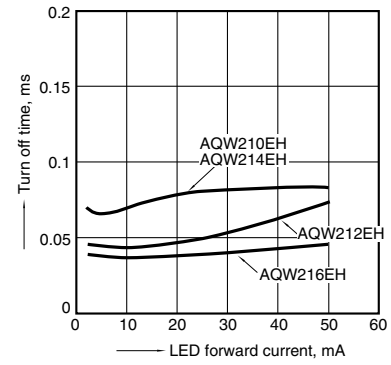
## 10. Turn on time vs. LED forward current characteristics

Sample: All types  
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



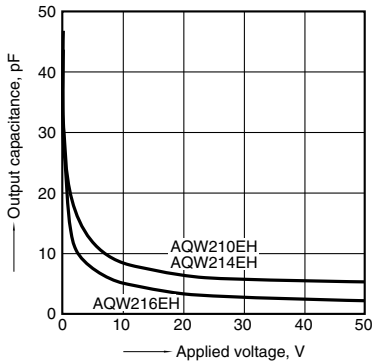
## 11. Turn off time vs. LED forward current characteristics

Sample: All types  
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



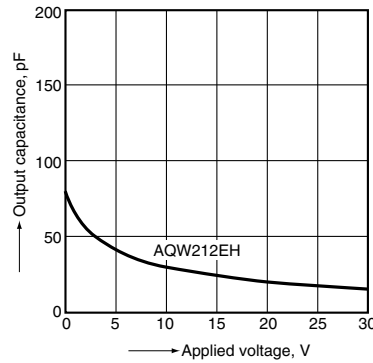
## 12-(1). Output capacitance vs. applied voltage characteristics

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



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