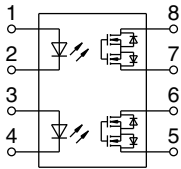
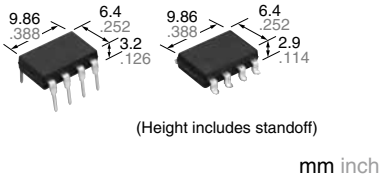




DIP8-pin type with reinforced insulation

PhotoMOS®
GE 2 Form A
(AQW21○EH)



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 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								
		Load voltage	Load current						Tube packing style		Tape and reel packing style		Tube	Tape and reel
											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)

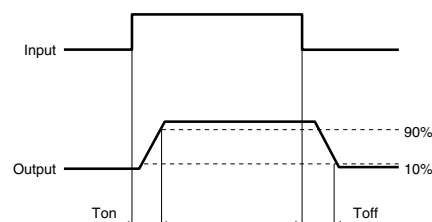
Item		Symbol	AQW212EH(A)	AQW210EH(A)	AQW214EH(A)	AQW216EH(A)	Remarks
Input	LED forward current	I _F	50mA				
	LED reverse voltage	V _R	5V				
	Peak forward current	I _{FP}	1A				f =100 Hz, Duty factor = 0.1%
	Power dissipation	P _{in}	75mW				
Output	Load voltage (peak AC)	V _L	60 V	350 V	400 V	600 V	
	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	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 V (1.14 V at I _F =5mA)				I _F =50mA
		Maximum		1.5V				
Output	On resistance	Typical	R _{on}	0.83Ω	18Ω	26Ω	52Ω	I _F =5mA I _L =Max. Within 1 s
		Maximum		2.5Ω	25Ω	35Ω	120Ω	
	Off state leakage current	Maximum	I _{LLeak}	1μA				I _F =0mA V _L =Max.
Transfer characteristics	Turn on time*	Typical	T _{on}	1ms	0.5ms			I _F =5mA I _L =Max.
		Maximum		4ms	2.0ms			
	Turn off time*	Typical	T _{off}	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			

*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_F		5	30	mA
AQW212EH(A)	Load voltage (Peak AC)	V_L		—	48	V
	Continuous load current	I_L	1ch 2ch	—	0.6 0.5	A
AQW210EH(A)	Load voltage (Peak AC)	V_L		—	280	V
	Continuous load current	I_L	1ch 2ch	—	0.14 0.12	A
AQW214EH(A)	Load voltage (Peak AC)	V_L		—	320	V
	Continuous load current	I_L	1ch 2ch	—	0.13 0.1	A
AQW216EH(A)	Load voltage (Peak AC)	V_L		—	480	V
	Continuous load current	I_L	1ch 2ch	—	0.05 0.04	A

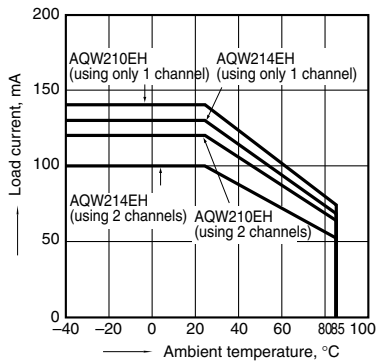
■ These products are not designed for automotive use.

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

REFERENCE DATA

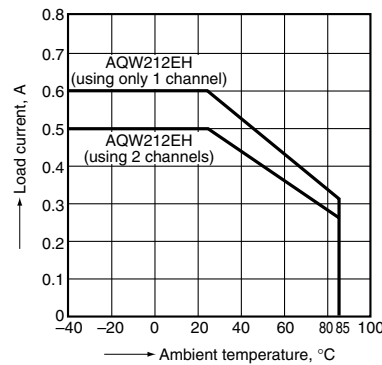
1-(1). Load current vs. ambient temperature characteristics

Allowable ambient temperature: -40 to $+85^{\circ}\text{C}$
 -40 to $+185^{\circ}\text{F}$



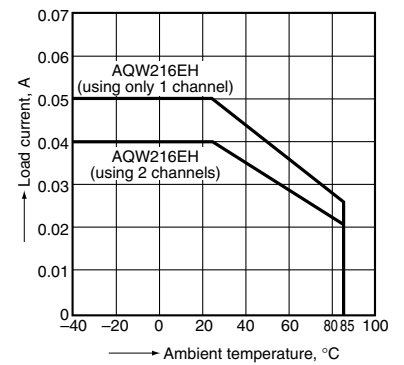
1-(2). Load current vs. ambient temperature characteristics

Allowable ambient temperature: -40 to $+85^{\circ}\text{C}$
 -40 to $+185^{\circ}\text{F}$



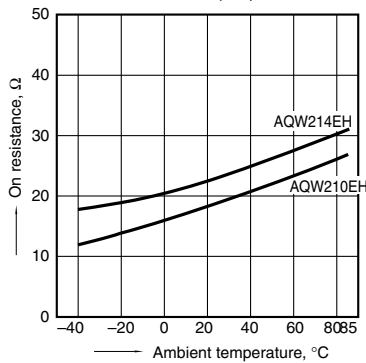
1-(3). Load current vs. ambient temperature characteristics

Allowable ambient temperature: -40 to $+85^{\circ}\text{C}$
 -40 to $+185^{\circ}\text{F}$



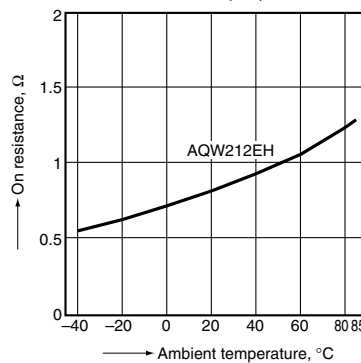
2-(1). On resistance vs. ambient temperature characteristics

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



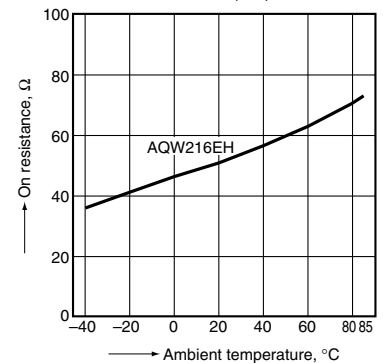
2-(2). On resistance vs. ambient temperature characteristics

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



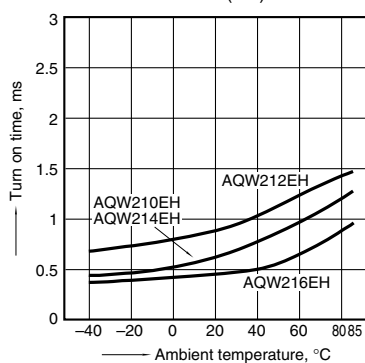
2-(3). On resistance vs. ambient temperature characteristics

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



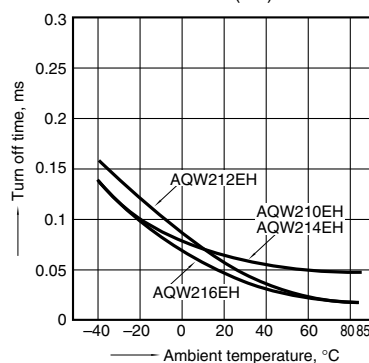
3. Turn on time vs. ambient temperature characteristics

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



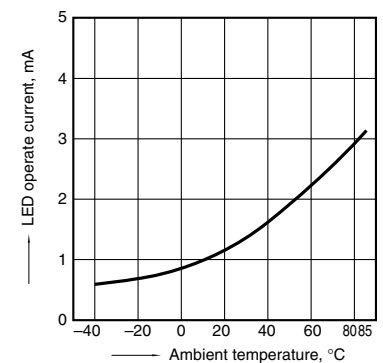
4. Turn off time vs. ambient temperature characteristics

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



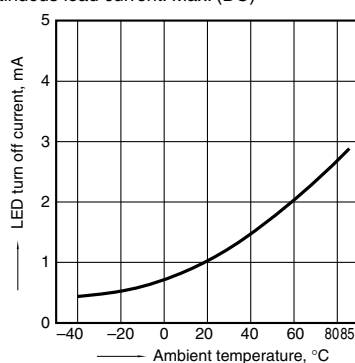
5. LED operate current vs. ambient temperature characteristics

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



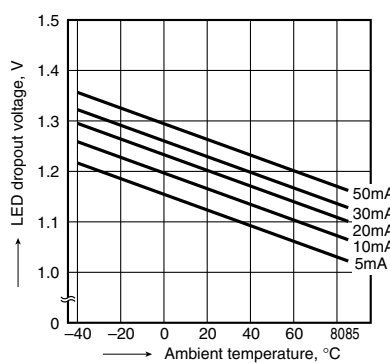
6. LED turn off current vs. ambient temperature characteristics

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



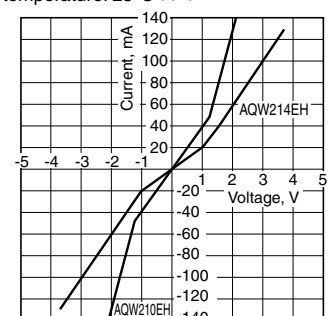
7. LED dropout voltage vs. ambient temperature characteristics

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



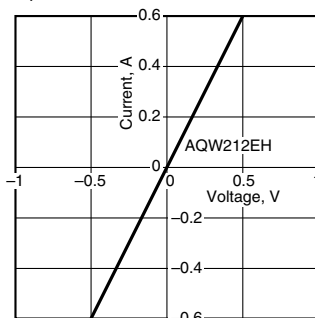
8-(1). Current vs. voltage characteristics of output at MOS portion

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



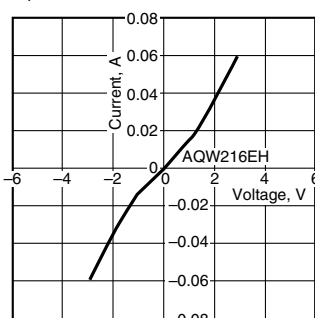
8-(2). Current vs. voltage characteristics of output at MOS portion

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



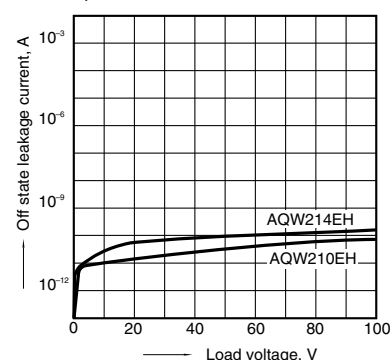
8-(3). Current vs. voltage characteristics of output at MOS portion

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



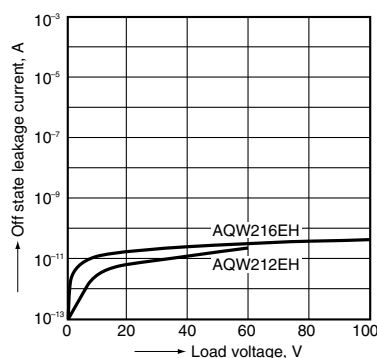
9-(1). Off state leakage current vs. load voltage characteristics

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

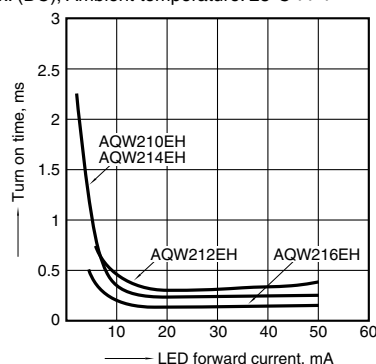
Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



10. Turn on time vs. LED forward current characteristics

Sample: All types

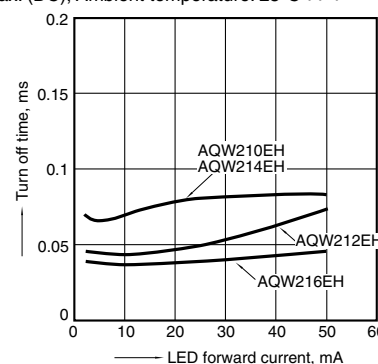
Measured portion: between terminals 5 and 6, 7 and 8;
Load voltage: Max. (DC); Continuous load current:
Max. (DC); Ambient temperature: 25°C 77°F



11. Turn off time vs. LED forward current characteristics

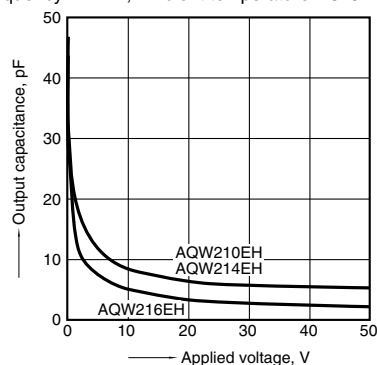
Sample: All types

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



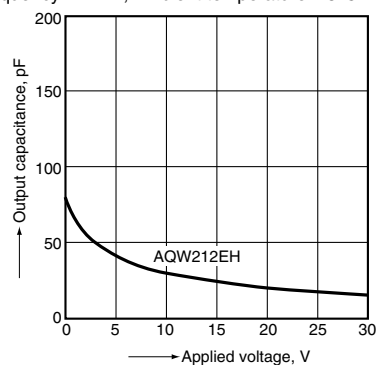
12-(1). Output capacitance vs. applied voltage characteristics

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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