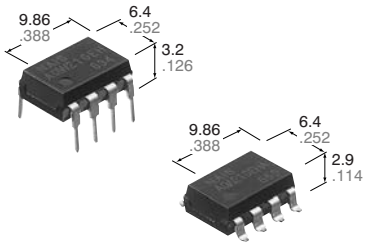
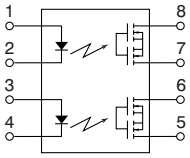
Panasonic
ideas for life

General use and economy type. DIP (2 Form A) 8-pin type. Reinforced insulation 5,000V type.

GU-E PhotoMOS (AQW21❍EH)



mm inch



FEATURES

1. Reinforced insulation 5,000 V type
More than 0.4 mm internal insulation distance between inputs and outputs. Con-forms to EN41003, EN60950 (reinforced insulation).

2. Compact 8-pin DIP size
The device comes in a compact (W)6.4×(L)9.86×(H)3.2 mm (W).252×(L).388×(H).126 inch, 8-pin DIP size (through hole terminal type).

3. Applicable for 2 Form A use as well as two independent 1 Form A use

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, high speed response.
Can control a maximum 0.14 A load current with a 5 mA input current. Fast operation speed of 0.5 ms (typical). (AQW210EH)

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 1/2/3/4-pin side	Picked from the 5/6/7/8-pin side		
AC/DC type	Reinforced 5,000 V	60 V	500 mA	AQW212EH	AQW212EHA	AQW212EHAX	AQW212EHAZ	1 tube contains 40 pcs. 1 batch contains 400 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: For space reasons, 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	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 (peak AC)	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	0.15 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 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				

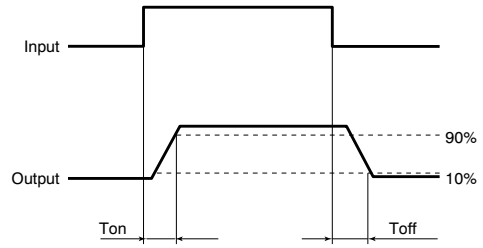
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

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 on time
		Maximum		2.5Ω	25Ω	35Ω	120Ω	
	Off state leakage current	Maximum	I_{Leak}	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				500V DC

Note: Recommendable LED forward current I_F= 5 to 10mA.

For type of connection, see page 57.

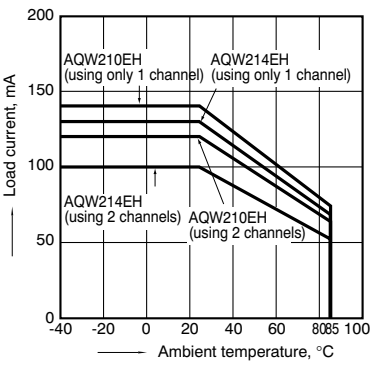
*Turn on/Turn off time



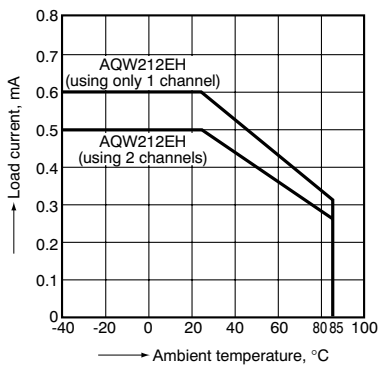
■ For Dimensions, see page 53.
■ For Schematic and Wiring Diagrams, see page 57.
■ For Cautions for Use, see page 63.

REFERENCE DATA

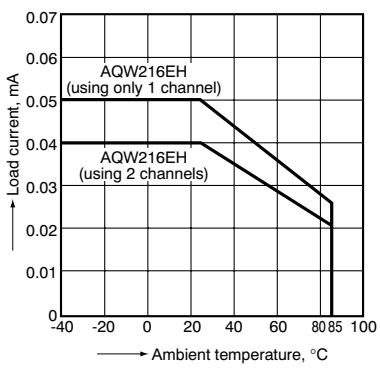
1-(1). Load current vs. ambient temperature characteristics
Allowable ambient temperature: –20°C to +85°C
–4°F to +185°F



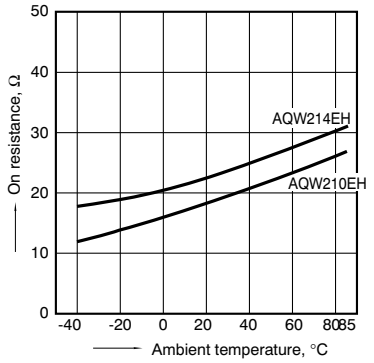
1-(2). Load current vs. ambient temperature characteristics
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F



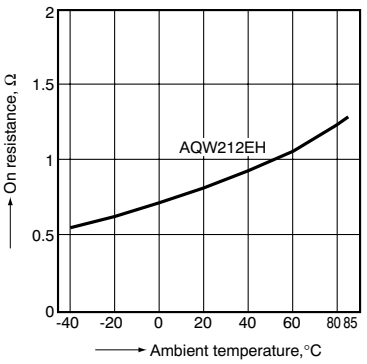
1-(3). Load current vs. ambient temperature characteristics
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F



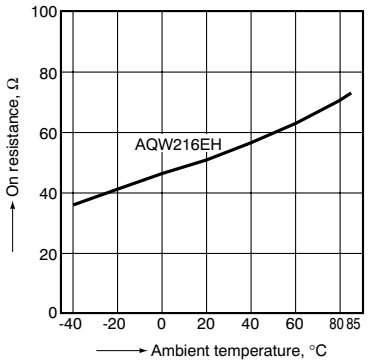
2-(1). On resistance vs. ambient temperature characteristics
Measured portion: between terminals 5 and 6, 7 and 8;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



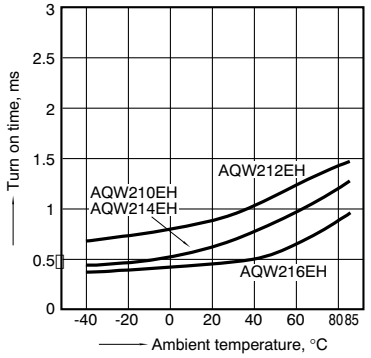
2-(2). On resistance vs. ambient temperature characteristics
Measured portion: between terminals 5 and 6, 7 and 8;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



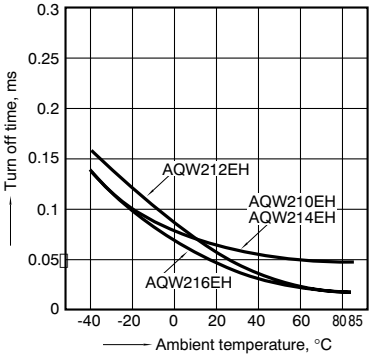
2-(3). On resistance vs. ambient temperature characteristics
Measured portion: between terminals 5 and 6, 7 and 8;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



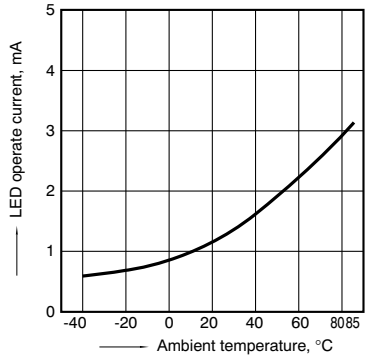
3. Turn on time vs. ambient temperature characteristics
Sample: All types
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



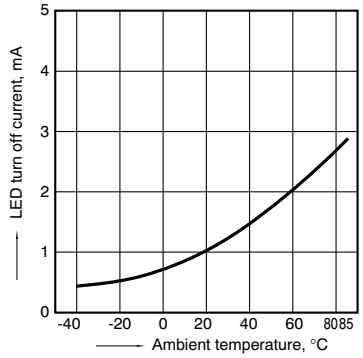
4. Turn off time vs. ambient temperature characteristics
Sample: All types
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



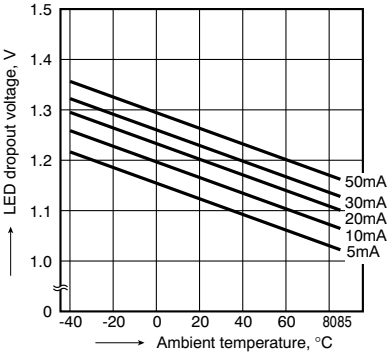
5. LED operate current vs. ambient temperature characteristics
Sample: All types; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



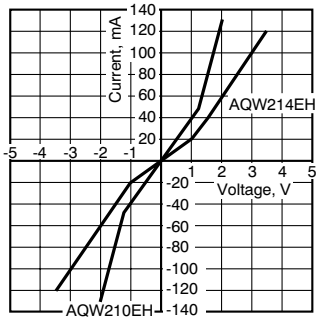
6. LED turn off current vs. ambient temperature characteristics
Sample: All types; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



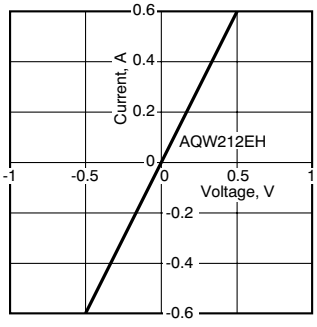
7. LED dropout voltage vs. ambient temperature characteristics
Sample: All types; LED current: 5 to 50 mA



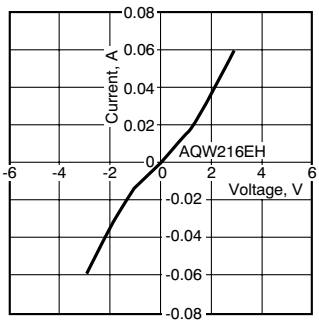
8-(1). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



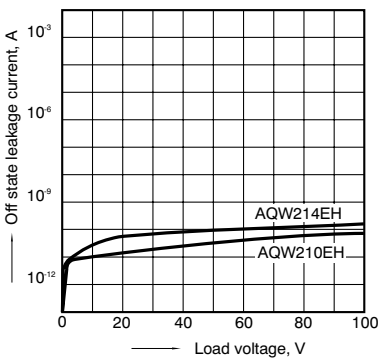
8-(2). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



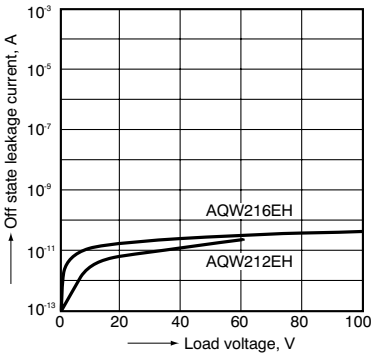
8-(3). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



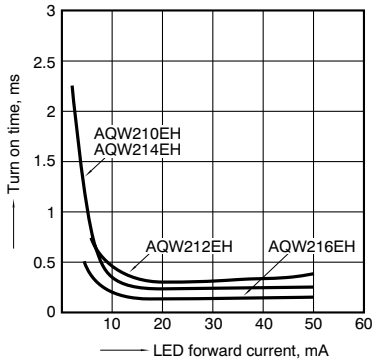
9-(1). Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



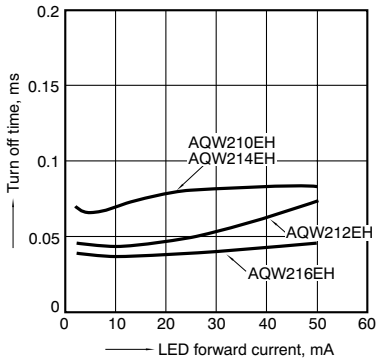
9-(2). Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



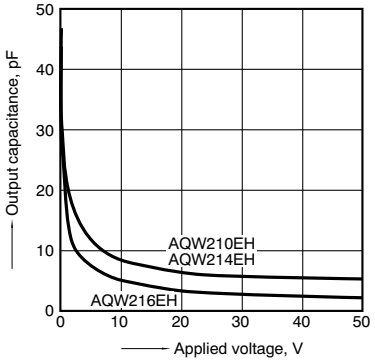
10. Turn on time vs. LED forward current characteristics
Sample: All types
Measured portion: between terminals 5 and 6, 7 and 8;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



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