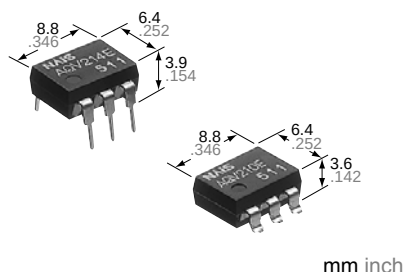


Panasonic
ideas for life

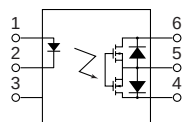
General use and economy type.
DIP (1 Form A) 6-pin type.
Reinforced insulation
5,000V type.

GU-E PhotoMOS
(AQV210E,
AQV210EH)

FEATURES



mm inch



1. Controls low-level analog signals

PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

2. Control with low-level input signals

3. Controls various types of loads such as relays, motors, lamps and solenoids.

4. Optical coupling for extremely high isolation

Unlike mechanical relays, the PhotoMOS relay combines LED and optoelectronic device to transfer signals using light for extremely high isolation.

5. Eliminates the need for a counter electromotive force protection diode in the drive circuits on the input side

6. Stable on resistance

7. Low-level off state leakage current

8. Eliminates the need for a power supply to drive the power MOSFET

A power supply used to drive the power MOSFET is unnecessary because of the built-in optoelectronic device. This results in easy circuit design and small PC board area.

9. Low thermal electromotive force (Approx. 1 μ V)

TYPICAL APPLICATIONS

- High-speed inspection machines
- Telephone equipment
- Data communication equipment
- Computer

TYPES

Type	I/O isolation	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-pin side	Picked from the 4/5/6-pin side						
AC/DC	Standard 1,500 V AC	350 V	130 mA	AQV210E	AQV210EA	AQV210EAX	AQV210EAX	1 tube contains 50 pcs. 1 batch contains 500 pcs.	1,000 pcs.
		400 V	120 mA	AQV214E	AQV214EA	AQV214EAX	AQV214EAX		
	Reinforced 5,000 V	350 V	130 mA	AQV210EH	AQV210EHA	AQV210EHAX	AQV210EHAX		
		400 V	120 mA	AQV214EH	AQV214EHA	AQV214EHAX	AQV214EHAX		

*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		Sym- bol	Type of connec- tion	AQV210E(A)	AQV214E(A)	AQV210EH(A)	AQV214EH(A)	Remarks	
Input	LED forward current	I _F		50 mA					
	LED reverse voltage	V _R		5 V					
	Peak forward current	I _{FP}		1 A				f = 100 Hz, Duty factor = 0.1%	
	Power dissipation	P _{in}		75 mW					
Output	Load voltage (peak AC)	V _L		350 V	400 V	350 V	400 V		
	Continuous load current	I _L		A	0.13 A	0.12 A	0.13 A	0.12 A	A connection: Peak AC, DC; B, C connection: DC
				B	0.15 A	0.13 A	0.15 A	0.13 A	
				C	0.17 A	0.15 A	0.17 A	0.15 A	
	Peak load current	I _{peak}			0.4 A	0.3 A	0.4 A	0.3 A	A connection: 100 ms (1 shot), V _L =DC
Power dissipation	P _{out}	500 mW							
Total power dissipation		P _T		550 mW					
I/O isolation voltage		V _{iso}		1,500 V AC		5,000 V AC			
Temperature limits	Operating	T _{opr}		-40°C to +85°C -40°F to +185°F				Non-condensing at low temp.	
	Storage	T _{stg}		-40°C to +100°C -40°F to +212°F					

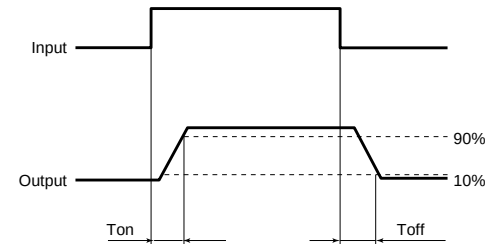
GU-E PhotoMOS (AQV210E, AQV210EH)

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

Item				Symbol	Type of connection	AQV210E(A)	AQV214E(A)	AQV210EH(A)	AQV214EH(A)	Condition
Input	LED operate current	Typical	I _{Fon}	—	1.1 mA		1.6 mA		I _L = Max.	
		Maximum			3 mA					
	LED turn off current	Minimum	I _{Foff}	—	0.3 mA		0.4 mA		I _L = Max.	
		Typical			1.0 mA		1.5 mA			
	LED dropout voltage	Typical	V _F	—	1.25 V (1.14 V at I _F = 5 mA)				I _F = 50 mA	
Maximum		1.5 V								
Output	On resistance	Typical	R _{on}	A	23 Ω	30 Ω	23 Ω	30 Ω	I _F = 5 mA I _L = Max. Within 1 s on time	
		Maximum			35 Ω	50 Ω	35 Ω	50 Ω		
		Typical	R _{on}	B	11.5 Ω	22.5 Ω	11.5 Ω	22.5 Ω	I _F = 5 mA I _L = Max. Within 1 s on time	
		Maximum			17.5 Ω	25 Ω	17.5 Ω	25 Ω		
		Typical	R _{on}	C	6.0 Ω	11.3 Ω	6.0 Ω	11.3 Ω	I _F = 5 mA I _L = Max. Within 1 s on time	
		Maximum			8.8 Ω	12.5 Ω	8.8 Ω	12.5 Ω		
	Output capacitance	Typical	C _{out}	A	45 pF				I _F = 0 mA V _B = 0 V f = 1 MHz	
	Off state leakage current	Maximum	—	—	1 μA				I _F = 0 mA V _L = Max.	
Transfer characteristics	Switching speed	Turn on time*	Typical	T _{on}	—	0.5 ms		0.7 ms		I _F = 0 mA → 5 mA** I _L = Max.
						Maximum	2.0 ms			
		Turn off time*	Typical	T _{off}	—		0.05 ms			
						Maximum	1.0 ms			
	I/O capacitance	Typical	C _{iso}	—	0.8 pF				f = 1 MHz V _B = 0 V	
		Maximum			1.5 pF					
	Initial I/O isolation resistance	Minimum	R _{iso}	—	1,000 MΩ				500 V DC	

*Turn on/Turn off time

For type of connection, see catalog.

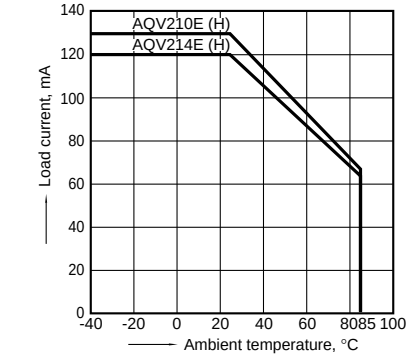


** Recommendable LED forward current
Standard type: 5 mA
Reinforced type: 5 to 10 mA

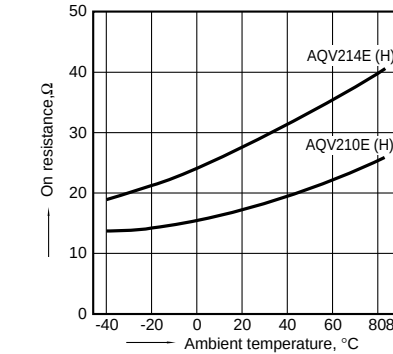
- For Dimensions, see catalog.
- For Schematic and Wiring Diagrams, see catalog.
- For Cautions for Use, see catalog.

REFERENCE DATA

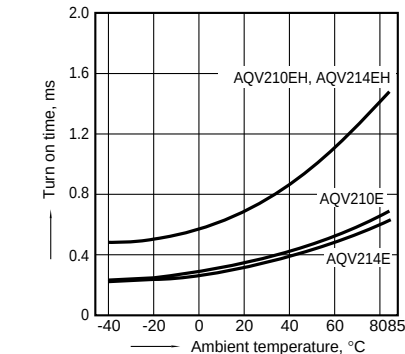
1. Load current vs. ambient temperature characteristics
Allowable ambient temperature: -40°C to +85°C
-40°F to +185°F
Type of connection:A



2. On resistance vs. ambient temperature characteristics
Measured portion: between terminals 4 and 6;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



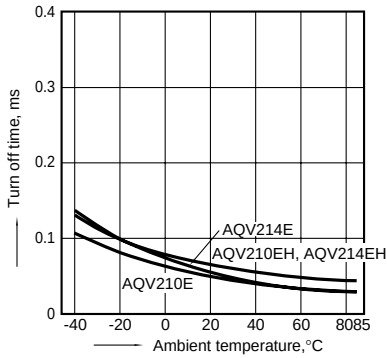
3. Turn on time vs. ambient temperature characteristics
LED current: 5 mA;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



GU-E PhotoMOS (AQV210E, AQV210EH)

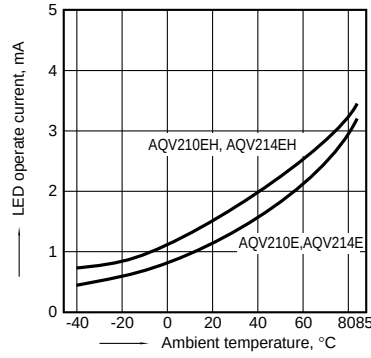
4. Turn off time vs. ambient temperature characteristics

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



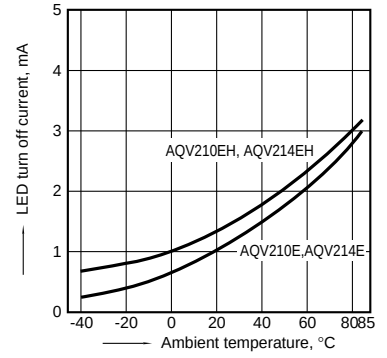
5. LED operate current vs. ambient temperature characteristics

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



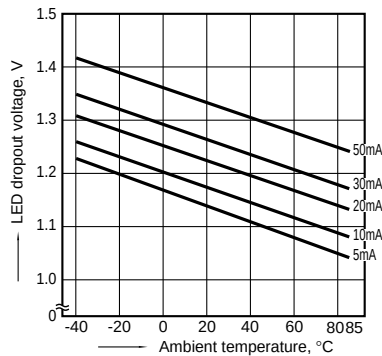
6. LED turn off current vs. ambient temperature characteristics

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



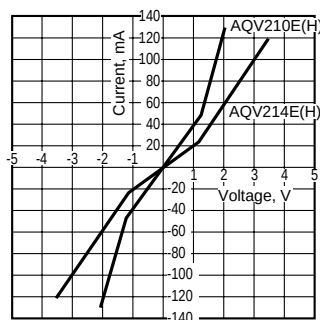
7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types
LED current: 5 to 50 mA



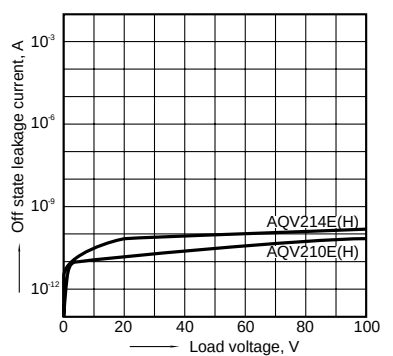
8. Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



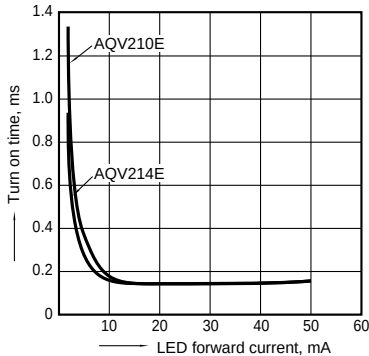
9. Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



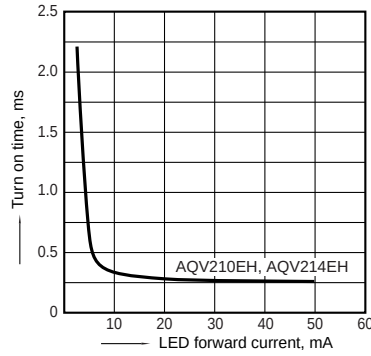
10-(1). Turn on time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



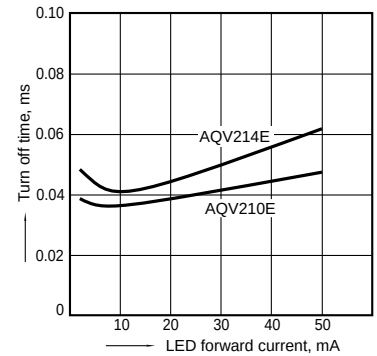
10-(2). Turn on time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



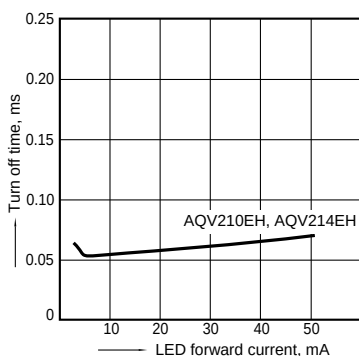
11-(1). Turn off time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6;
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 4 and 6;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



12. Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 4 and 6;
Frequency: 1 MHz;
Ambient temperature: 25°C 77°F

