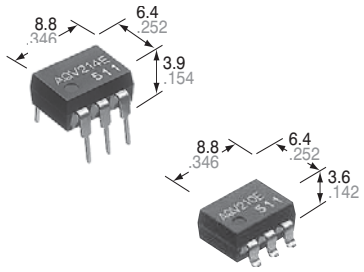
cULus (Standard type) cULus BSI (Reinforced type)

Panasonic
ideas for life

High cost-performance DIP6-pin type, reinforced insulation available

PhotoMOS Relays
GU-E 1 Form A
(AQV21❍E, AQV21❍EH)



CAD Data

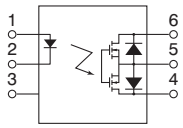
mm inch

FEATURES

1. Reinforced insulation of I/O isolation voltage 5,000V (Reinforced insulation type)
2. Controls low-level analog signals
PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.
3. Stable on-resistance
4. Low-level off state leakage current of max. 1 μA

TYPICAL APPLICATIONS

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



TYPES

	I/O isolation	Output rating*		Package	Part No.				Packing quantity	
					Through hole terminal	Surface-mount terminal				
					Tube packing style		Tape and reel packing style		Tube	Tape and reel
		Load voltage	Load current				Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side		
AC/DC dual use	Standard 1,500 V AC	350 V	130 mA	DIP6-pin	AQV210E	AQV210EA	AQV210EAX	AQV210EAZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.
		400 V	120 mA		AQV214E	AQV214EA	AQV214EAX	AQV214EAZ		
	Reinforced 5,000 V	350 V	130 mA		AQV210EH	AQV210EHA	AQV210EHAX	AQV210EHAZ		
		400 V	120 mA		AQV214EH	AQV214EHA	AQV214EHAX	AQV214EHAZ		

*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 relay.

RATING

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

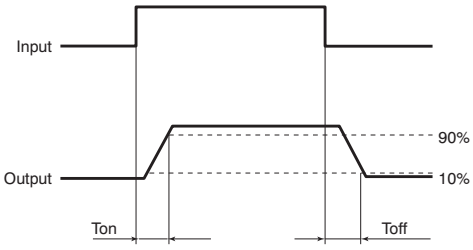
Item			Sym-bol	Type of connec-tion	AQV210E(A)	AQV214E(A)	AQV210EH(A)	AQV214EH(A)	Remarks
Input	LED forward current		I_F		50 mA				
	LED reverse voltage		V_R		5 V				
	Peak forward current		I_{FP}		1 A				f = 100 Hz, Duty factor = 0.1%
	Power dissipation		P_{in}		75 mW				
Output	Load voltage (peak AC)		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 1 Form A (AQV210E, AQV21❍EH)

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

Item			Symbol	Type of connec-tion	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	I_{Leak}	—	1 μA				I_F = 0 mA V_L = Max.
Transfer characteristics	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				I_F = 0 mA → 5 mA I_L = Max.
		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



RECOMMENDED OPERATING CONDITIONS

Please obey the following conditions to ensure proper relay operation and resetting.

Item	Symbol	Recommended value	Unit
Input LED current	I_F	Standard type: 5 Reinforced type: 5 to 10	mA

■ Dimensions

■ Schematic and Wiring Diagrams

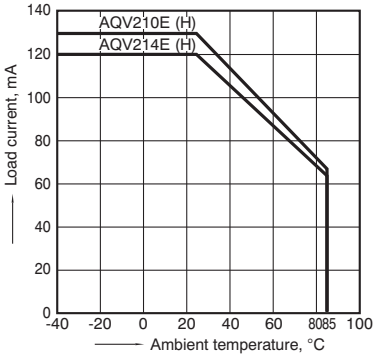
■ Cautions for Use

■ These products are not designed for automotive use.
If you are considering to use these products for automotive applications, please contact your local Panasonic Electric Works technical representative.
Please refer to our information on PhotoMOS Relays for Automotive Applications.

REFERENCE DATA

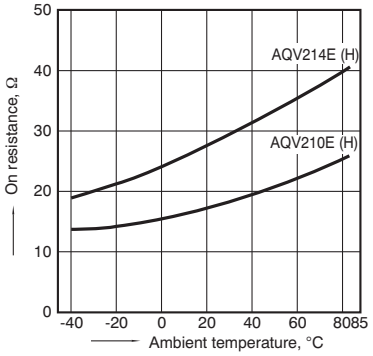
1. Load current vs. ambient temperature characteristics

Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F
Type of connection:A



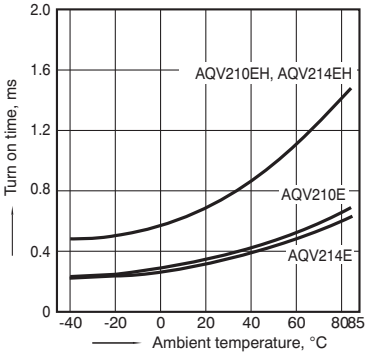
2. On-resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



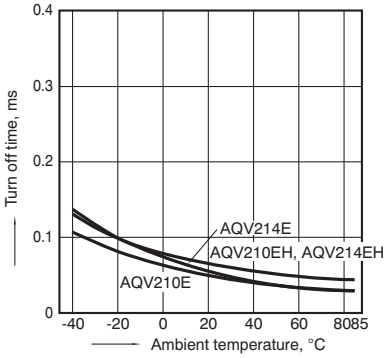
3. Turn on time vs. ambient temperature characteristics

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



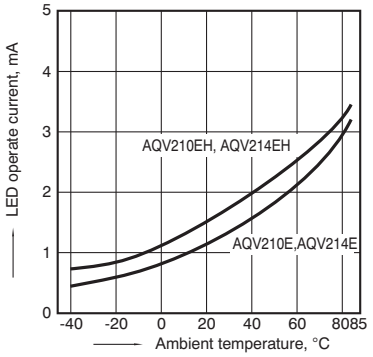
4. Turn off time vs. ambient temperature characteristics

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



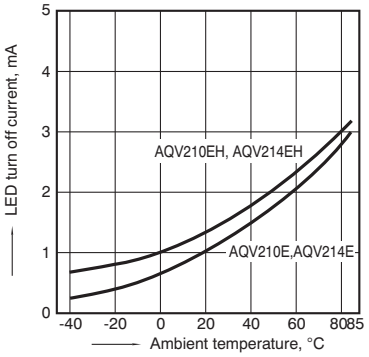
5. LED operate current vs. ambient temperature characteristics

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



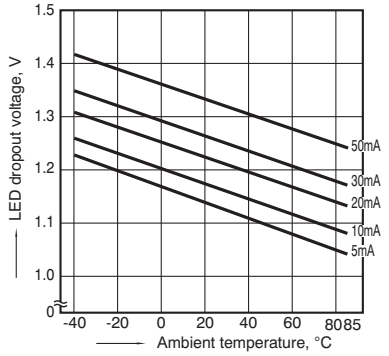
6. LED turn off current vs. ambient temperature characteristics

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



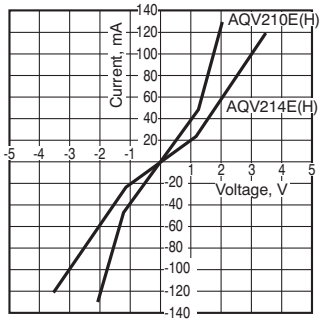
7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types
LED current: 5 to 50 mA



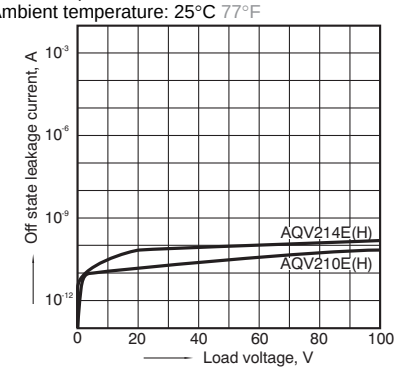
8. Current vs. voltage characteristics of output at MOS portion

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



9. Off state leakage current vs. load voltage characteristics

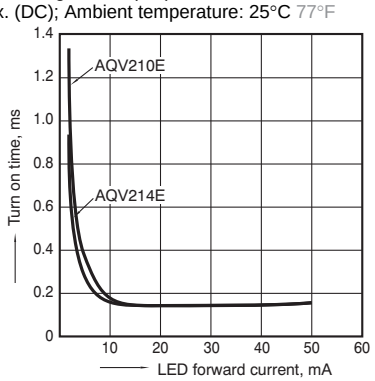
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



GU-E 1 Form A (AQV210E, AQV21❍EH)

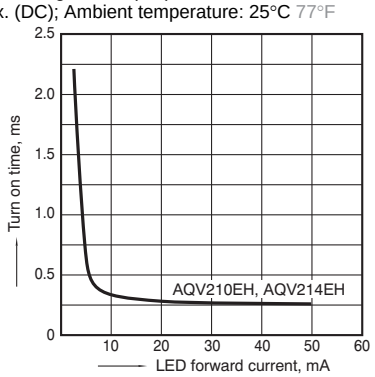
10-(1). Turn on time vs. LED forward current characteristics

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



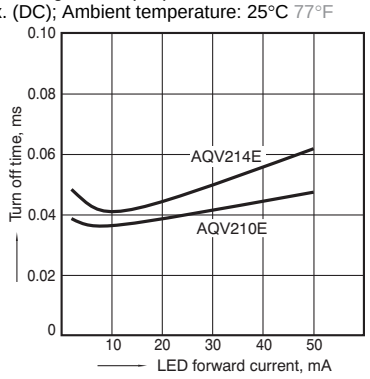
10-(2). Turn on time vs. LED forward current characteristics

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



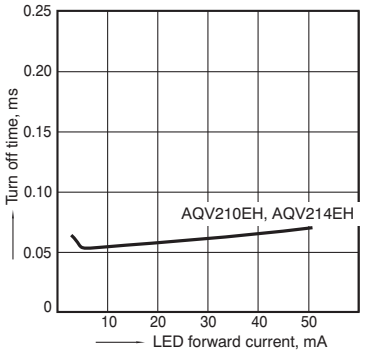
11-(1). Turn off time vs. LED forward current characteristics

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