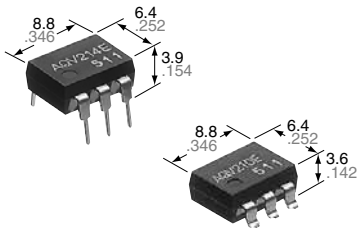
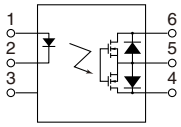
Standard type: cULus / Reinforced type: cULus BSI

DIP6-pin type, reinforced insulation available

PhotoMOS® GE 1 Form A
(AQV21○E, AQV21○EH)



mm inch



RoHS compliant

FEATURES

1. Reinforced insulation of I/O isolation voltage 5,000V (Reinforced insulation type)

2. Controls low-level analog signals

PhotoMOS 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				
		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 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 device.

RATING

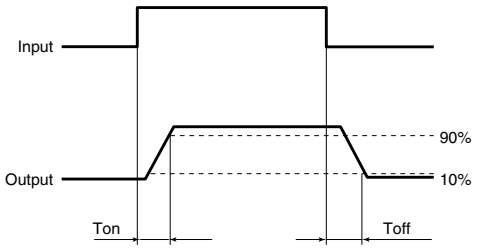
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

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				

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	
	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 = 5 mA I_L = Max.
		Maximum			2.0 ms				
	Turn off time*	Typical	T_{off}	—	0.05 ms				I_F = 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 device operation and resetting.

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

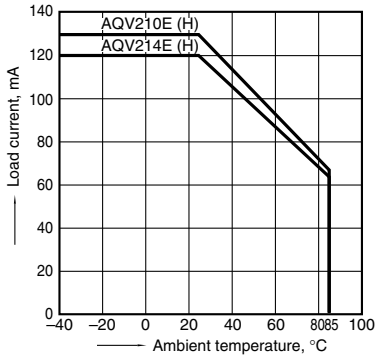
■ **These products are not designed for automotive use.**
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

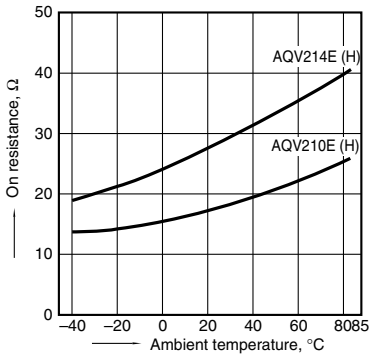
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F

Type of connection:A



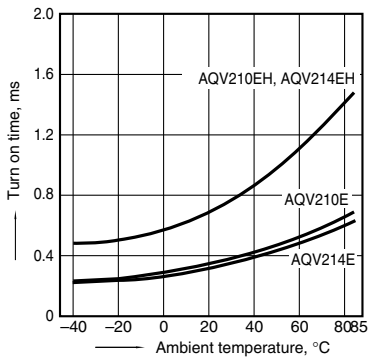
2. On-resistance vs. ambient temperature characteristics

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



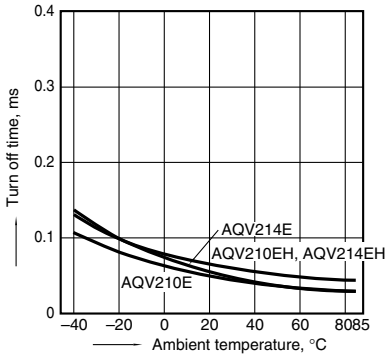
3. Turn on time vs. ambient temperature characteristics

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



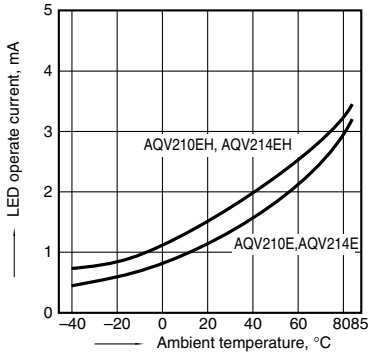
4. Turn off time vs. ambient temperature characteristics

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



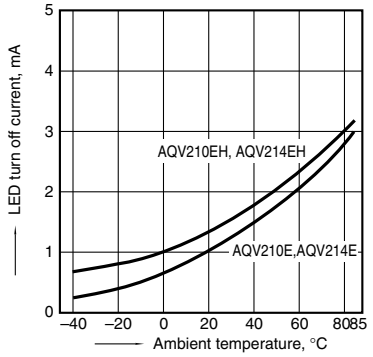
5. LED operate current vs. ambient temperature characteristics

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



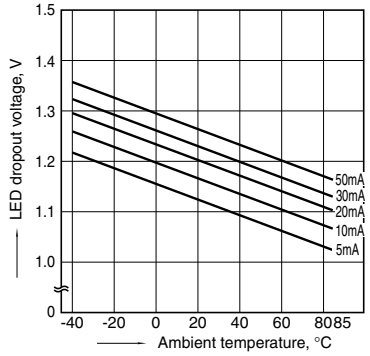
6. LED turn off current vs. ambient temperature characteristics

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



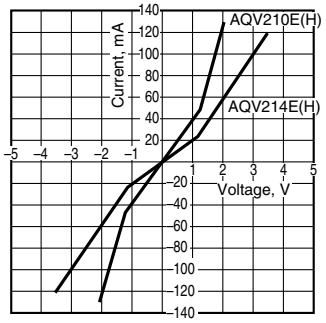
7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types
LED current: 5 to 50 mA



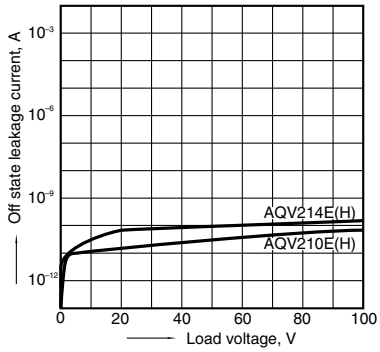
8. Current vs. voltage characteristics of output at MOS portion

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



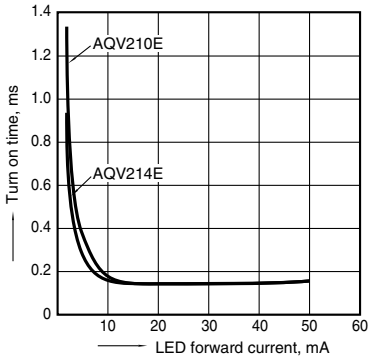
9. Off state leakage current vs. load voltage characteristics

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



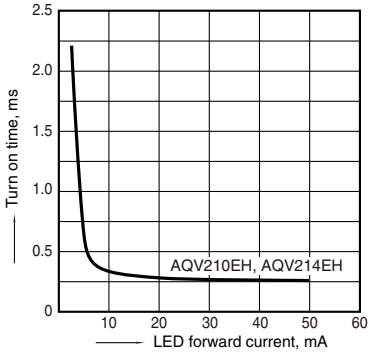
10-(1). Turn on time vs. LED forward current characteristics

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



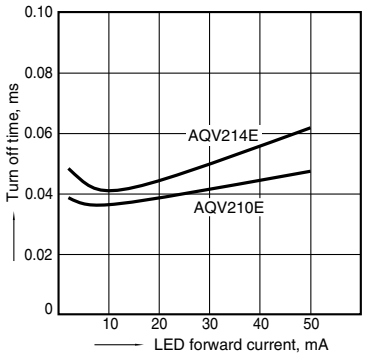
10-(2). Turn on time vs. LED forward current characteristics

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



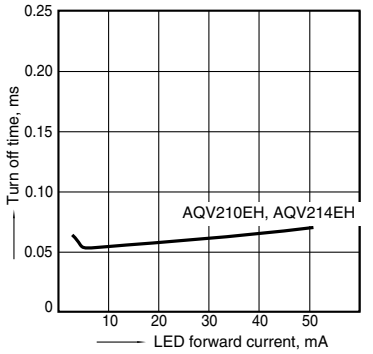
11-(1). Turn off time vs. LED forward current characteristics

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