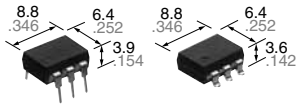
(Standard type) (Reinforced type)

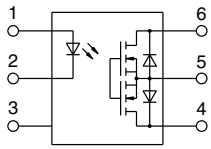
6-pin type for switching low-level analog signal

PhotoMOS® GU 1 Form A
(AQV21❍, AQV214H)



(Height includes standoff)

mm inch



RoHS compliant

FEATURES

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

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

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

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

5. Stable on-resistance

6. Low-level off state leakage current of max. 1 μA

7. Reinforced insulation type of I/O voltage 5,000Vrms also available

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 Vrms	60V	550 mA	DIP6-pin	AQV212	AQV212A	AQV212AX	AQV212AZ	1 tube contains 50 pcs. 1 batch contains 500 pcs.	1,000 pcs.
		100 V	320 mA		AQV215	AQV215A	AQV215AX	AQV215AZ		
		200 V	180 mA		AQV217	AQV217A	AQV217AX	AQV217AZ		
		350 V	130 mA		AQV210	AQV210A	AQV210AX	AQV210AZ		
		400 V	120 mA		AQV214	AQV214A	AQV214AX	AQV214AZ		
		600 V	50 mA		AQV216	AQV216A	AQV216AX	AQV216AZ		
	Reinforced 5,000 Vrms	400 V	120 mA		AQV214H	AQV214HA	AQV214HAX	AQV214HAZ		

*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

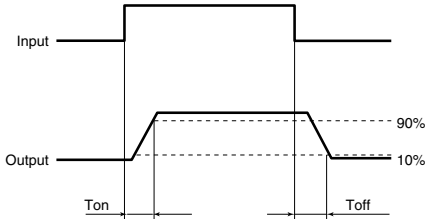
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

	Item		Sym-bol	Type of connec-tion	AQV212(A)	AQV215(A)	AQV217(A)	AQV210(A)	AQV214(A)	AQV216(A)	AQV214H(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		60 V	100 V	200 V	350 V	400 V	600 V	400 V	
	Continuous load current		I_L	A	0.55 A	0.32 A	0.18 A	0.13 A	0.12 A	0.05 A	0.12 A	A connection: Peak AC, DC B, C connection: DC
				B	0.65 A	0.42 A	0.22 A	0.15 A	0.13 A	0.06 A	0.13 A	
				C	0.80 A	0.60 A	0.30 A	0.17 A	0.15 A	0.08 A	0.15 A	
	Peak load current		I_{peak}		1.5 A	0.96 A	0.54 A	0.4 A	0.3 A	0.15 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 Vrms						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							

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

	Item		Symbol	Type of connection**	AQV212(A)	AQV215(A)	AQV217(A)	AQV210(A)	AQV214(A)	AQV216(A)	AQV214H(A)	Condition
Input	LED operate current	Typical	I_{Fon}	—	1 mA						1.3 mA	I_L = Max.
		Maximum			3 mA							
	LED turn off current	Minimum	I_{Foff}	—	0.4 mA							I_L = Max.
		Typical			0.79 mA						1.2 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	0.83 Ω	2.3 Ω	11.0 Ω	23 Ω	30 Ω	70 Ω	30 Ω	I_F = 5 mA I_L = Max. Within 1 s
		Maximum			2.5 Ω	4.0 Ω	15.0 Ω	35 Ω	50 Ω	120 Ω	50 Ω	
		Typical	R_{on}	B	0.44 Ω	1.15 Ω	5.5 Ω	11.5 Ω	22.5 Ω	55 Ω	22.5 Ω	I_F = 5 mA I_L = Max. Within 1 s
		Maximum			1.25 Ω	2.0 Ω	7.5 Ω	17.5 Ω	25 Ω	100 Ω	25 Ω	
		Typical	R_{on}	C	0.25 Ω	0.6 Ω	2.8 Ω	6.0 Ω	11.3 Ω	28 Ω	11.3 Ω	I_F = 5 mA I_L = Max. Within 1 s
		Maximum			0.63 Ω	1.0 Ω	3.8 Ω	8.8 Ω	12.5 Ω	50 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}	—	0.65 ms	0.6 ms	0.25 ms		0.21 ms	0.28 ms	0.6 ms	I_F= 5 mA I_L=Max.
		Maximum			2 ms		1.0 ms	0.5 ms			0.8 ms	
	Turn off time*	Typical	T_{off}	—	0.08 ms	0.06 ms	0.05 ms			0.04 ms	0.05 ms	I_F = 5 mA I_L = Max.
		Maximum			0.2 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



3. Recommended operating conditions (Ambient temperature: 25°C 77°F)

Please use under recommended operating conditions to obtain expected characteristics.

Item		Symbol	Min.	Max.	Unit
LED current		I_F	5	30	mA
AQV212(A)	Load voltage (Peak AC)	V_L	—	48	V
	Continuous load current (A connection)	I_L	—	0.5	A
AQV215(A)	Load voltage (Peak AC)	V_L	—	80	V
	Continuous load current (A connection)	I_L	—	0.3	A
AQV217(A)	Load voltage (Peak AC)	V_L	—	160	V
	Continuous load current (A connection)	I_L	—	0.18	A
AQV210(A)	Load voltage (Peak AC)	V_L	—	280	V
	Continuous load current (A connection)	I_L	—	0.13	A
AQV214(A)	Load voltage (Peak AC)	V_L	—	320	V
	Continuous load current (A connection)	I_L	—	0.12	A
AQV216(A)	Load voltage (Peak AC)	V_L	—	480	V
	Continuous load current (A connection)	I_L	—	0.05	A
AQV214H(A)	Load voltage (Peak AC)	V_L	—	320	V
	Continuous load current (A connection)	I_L	—	0.12	A

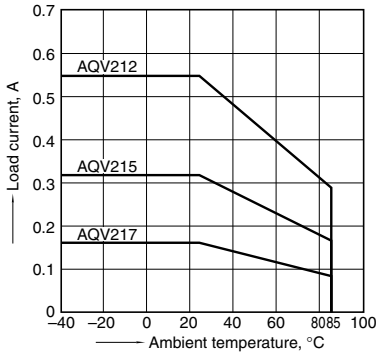
■ **These products are not designed for automotive use.**
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

REFERENCE DATA

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

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

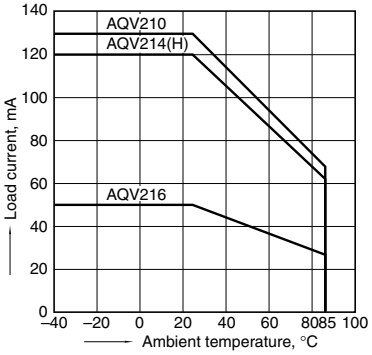
Type of connection: A



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

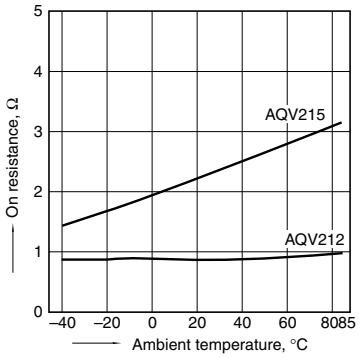
Allowable ambient temperature: –40 to +85°C
–40 to +185°F

Type of connection: A



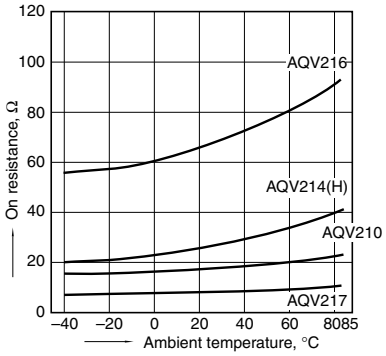
2-(1). On resistance vs. ambient temperature characteristics

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



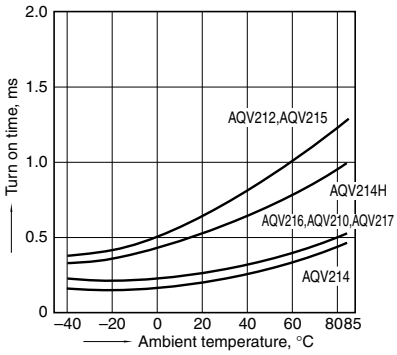
2-(2). On resistance vs. ambient temperature characteristics

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



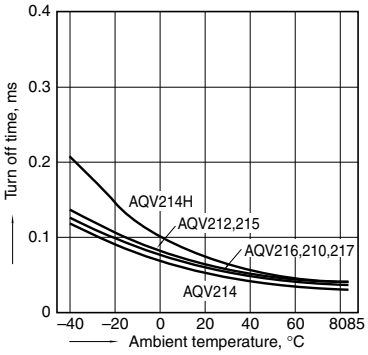
3. Turn on time vs. ambient temperature characteristics

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



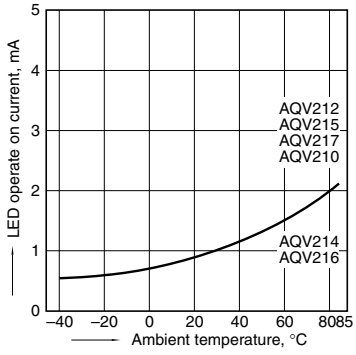
4. Turn off time vs. ambient temperature characteristics

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



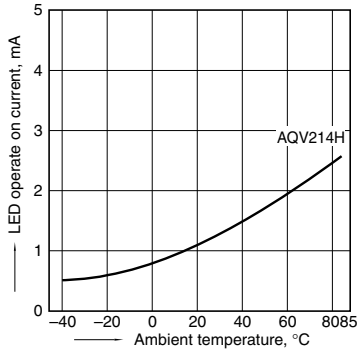
5-(1). LED operate current vs.ambient temperature characteristics

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



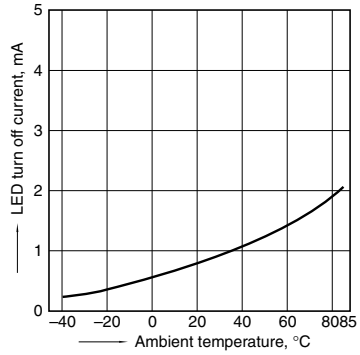
5-(2). LED operate current vs.ambient temperature characteristics

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



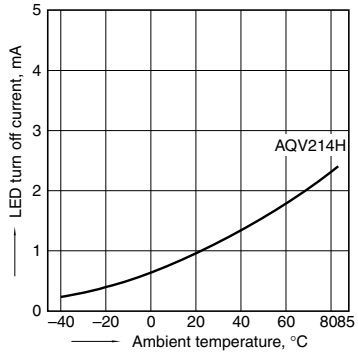
6-(1). LED turn off current vs. ambient temperature characteristics

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



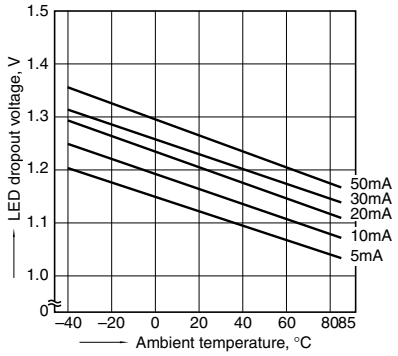
6-(2). LED turn off current vs. ambient temperature characteristics

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



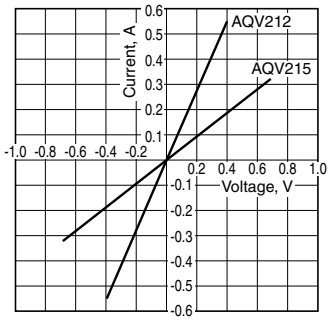
7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types
LED current: 5 to 50 mA



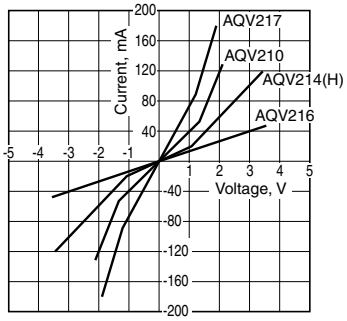
8-(1). Current vs. voltage characteristics of output at MOS portion

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



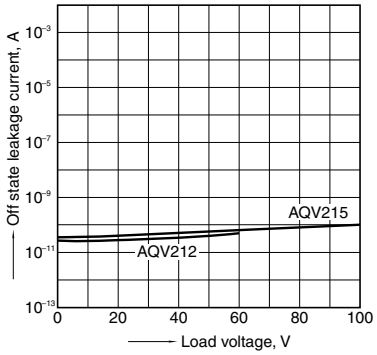
8-(2). Current vs. voltage characteristics of output at MOS portion

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



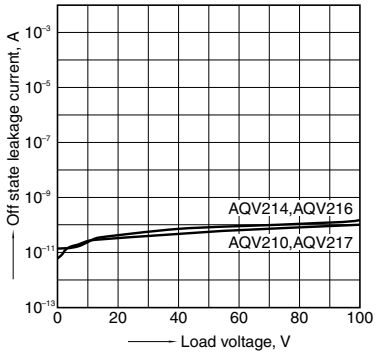
9-(1). Off state leakage current vs. load voltage characteristics

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



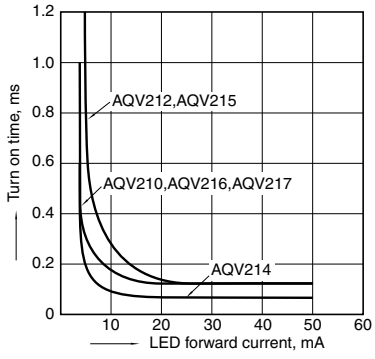
9-(2). Off state leakage current vs. load voltage characteristics

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



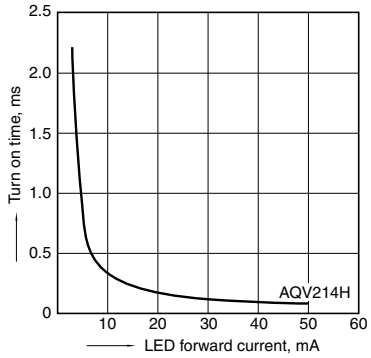
10-(1). Turn on time vs. LED forward current characteristics

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



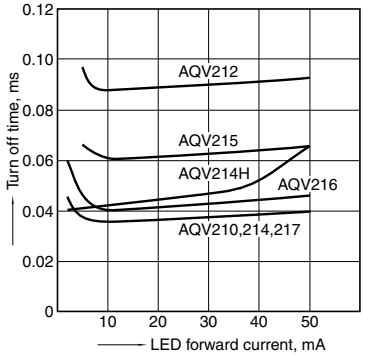
10-(2). Turn on time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6;
Load voltage: 400 V (DC); Continuous load current: 120 mA (DC); Ambient temperature: 25°C 77°F



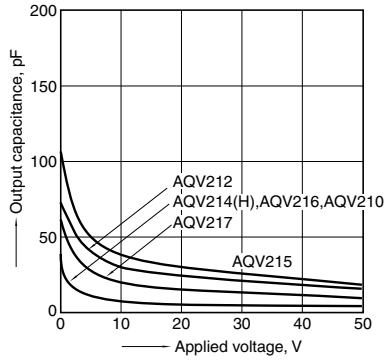
11. Turn off time vs. LED forward current characteristics

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



Please contact .....

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