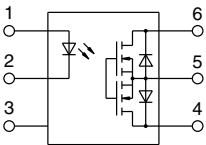
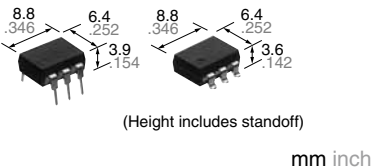


US (Standard type) US (Reinforced type)

6-pin type for switching
low-level analog signal

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



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				
		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 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)

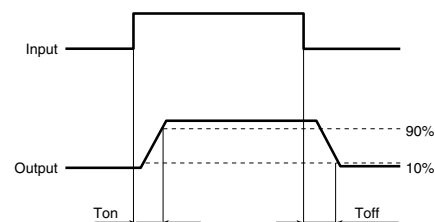
Item		Symbol	Type of connection	AQV212(A)	AQV215(A)	AQV217(A)	AQV210(A)	AQV214(A)	AQV216(A)	AQV214H(A)	Remarks
Input	LED forward current	I _F		50 mA							
	LED reverse voltage	V _R		5 V							
	Peak forward current	I _{FP}		1 A							f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P _{in}		75 mW							
Output	Load voltage (peak AC)	V _L	A	60 V	100 V	200 V	350 V	400 V	600 V	400 V	
	Continuous load current	I _L		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
				0.65 A	0.42 A	0.22 A	0.15 A	0.13 A	0.06 A	0.13 A	
	Peak load current	I _{peak}	C	0.80 A	0.60 A	0.30 A	0.17 A	0.15 A	0.08 A	0.15 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 Storage	T _{opr} T _{stg}	-40 to +85°C -40 to +185°F							(Non-icing at low temperatures)
				-40 to +100°C -40 to +212°F							

GU 1 Form A (AQV21○, AQV214H)

2. Electrical characteristics (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)	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						1.2 mA	I _L = Max.
		Typical			0.79 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 _{ton}	A	0.83 Ω	2.3 Ω	11.0 Ω	23 Ω	30 Ω	70 Ω	30 Ω	I _F = 5 mA
		Maximum			2.5 Ω	4.0 Ω	15.0 Ω	35 Ω	50 Ω	120 Ω	50 Ω	I _L = Max. Within 1 s
		Typical	R _{ton}	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
		Maximum			1.25 Ω	2.0 Ω	7.5 Ω	17.5 Ω	25 Ω	100 Ω	25 Ω	I _L = Max. Within 1 s
		Typical	R _{ton}	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
		Maximum			0.63 Ω	1.0 Ω	3.8 Ω	8.8 Ω	12.5 Ω	50 Ω	12.5 Ω	I _L = Max. Within 1 s
	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
Maximum			2 ms			1.0 ms	0.5 ms		0.8 ms	I _L =Max.		
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	
		Maximum			0.2 ms						I _L = Max.	
I/O capacitance		Typical	C _{iso}	—	0.8 pF						f = 1 MHz	
		Maximum			1.5 pF						V _B = 0 V	
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.

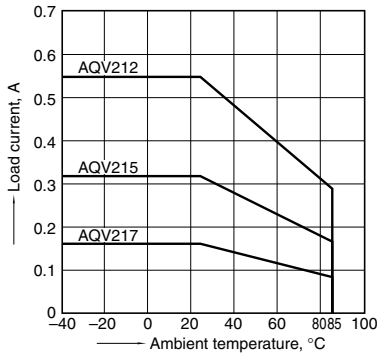
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

REFERENCE DATA

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

Allowable ambient temperature: -40 to $+85^{\circ}\text{C}$
 -40 to $+185^{\circ}\text{F}$

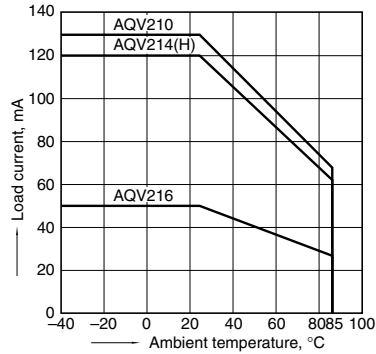
Type of connection: A



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

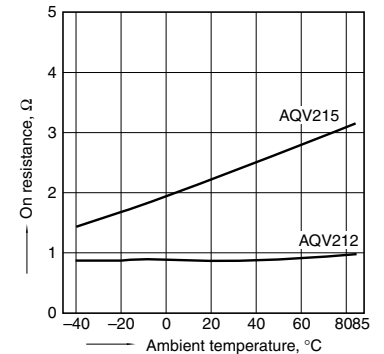
Allowable ambient temperature: -40 to $+85^{\circ}\text{C}$
 -40 to $+185^{\circ}\text{F}$

Type of connection: A



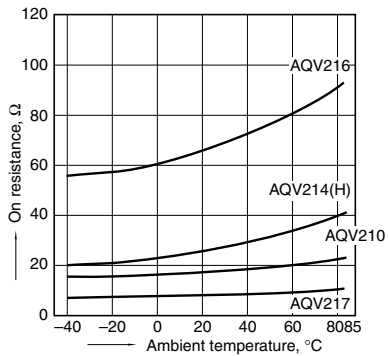
2-(1). On resistance vs. ambient temperature characteristics

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



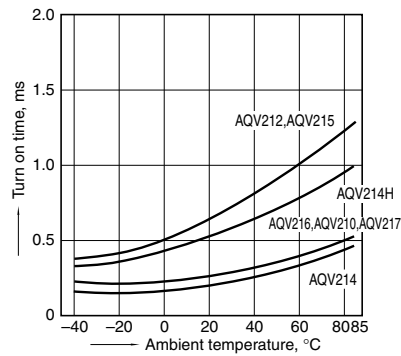
2-(2). On resistance vs. ambient temperature characteristics

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



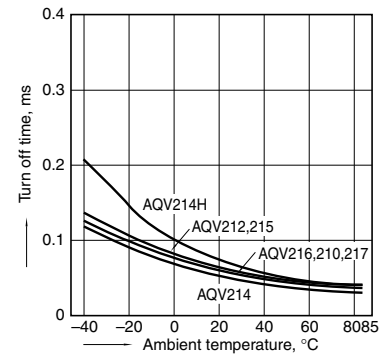
3. Turn on time vs. ambient temperature characteristics

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



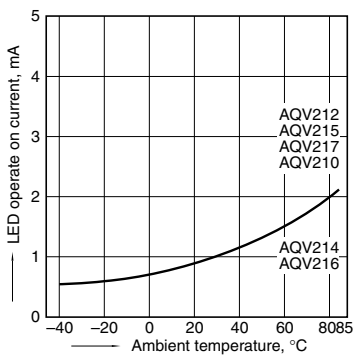
4. Turn off time vs. ambient temperature characteristics

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



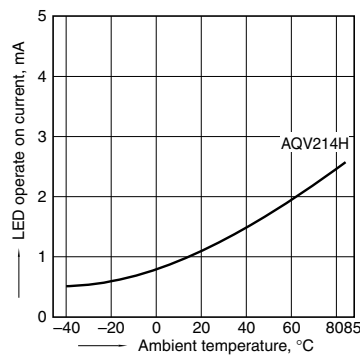
5-(1). LED operate current vs. ambient temperature characteristics

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



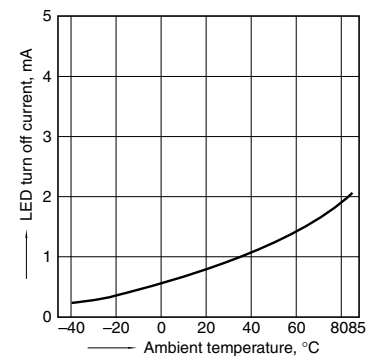
5-(2). LED operate current vs. ambient temperature characteristics

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



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

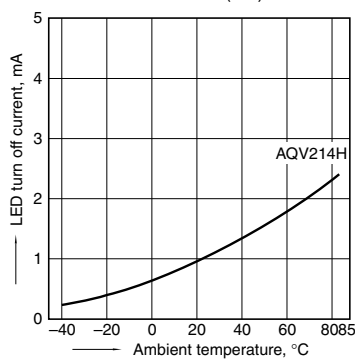
Load voltage: Max. (DC);
 Continuous load current: Max. (DC)



GU 1 Form A (AQV21○, AQV214H)

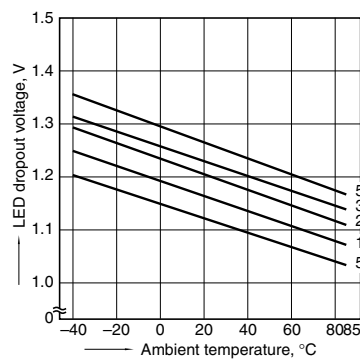
6-(2). LED turn off current vs. ambient temperature characteristics

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



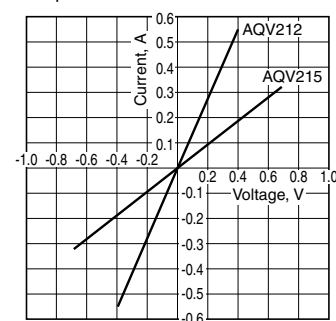
7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types
LED current: 5 to 50 mA



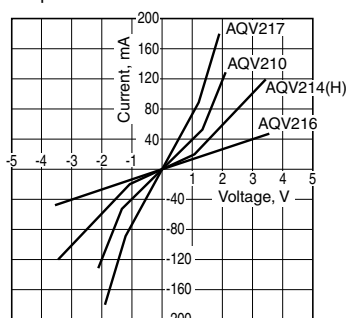
8-(1). Current vs. voltage characteristics of output at MOS portion

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



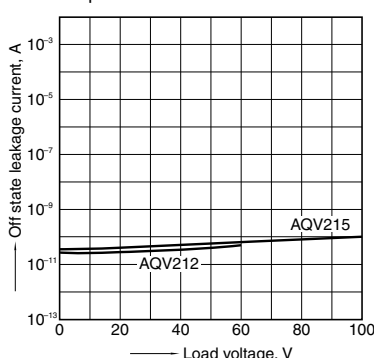
8-(2). Current vs. voltage characteristics of output at MOS portion

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



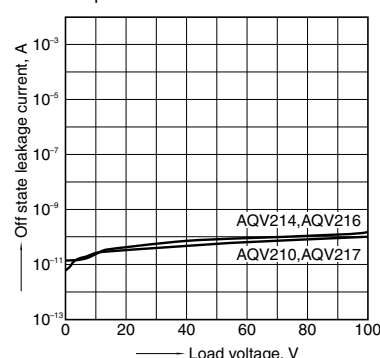
9-(1). Off state leakage current vs. load voltage characteristics

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



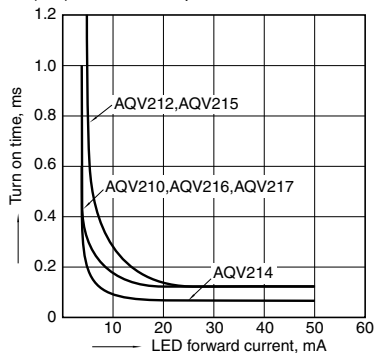
9-(2). Off state leakage current vs. load voltage characteristics

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



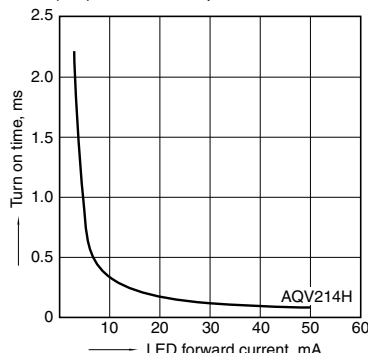
10-(1). Turn on time vs. LED forward current characteristics

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



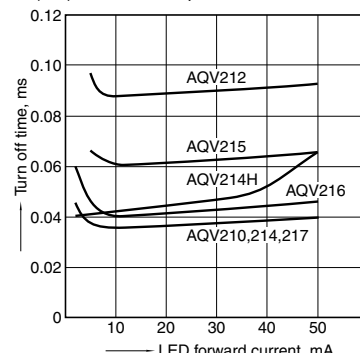
10-(2). Turn on time vs. LED forward current characteristics

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



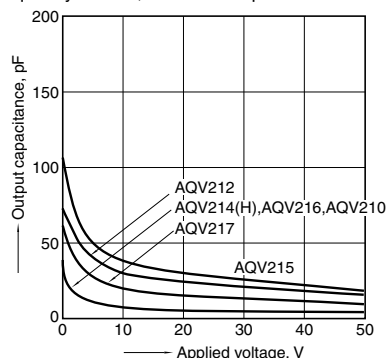
11. Turn off time vs. LED forward current characteristics

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



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