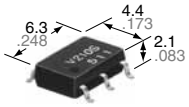
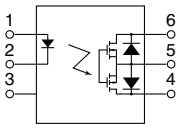
Miniature SOP6-pin type of 60 to 400V load voltage

PhotoMOS®
GU SOP 1 Form A
(AQV21○S)



mm inch

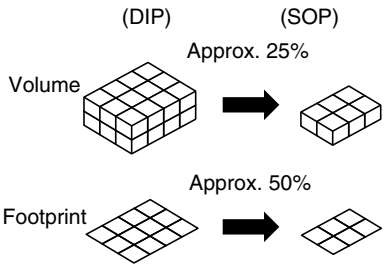


RoHS compliant

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. Small SOP6-Pin package
The device comes in a miniature SOP measuring (W) 4.4 × (L) 6.3 ×(H) 2.1 mm (W) .173× (L) .248×(H) .083 inch approx. 25% of the volume and 50% of the footprint size of DIP type



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

4. Wide variation of load voltage 60V to 600V

TYPICAL APPLICATIONS

- Telephones
- Measuring instruments
- Computers
- Industrial robots
- High-speed inspection machines

TYPES

	Output rating*		Package	Part No.			Packing quantity	
	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	60V	500mA	SOP6-pin	AQV212S	AQV212SX	AQV212SZ	1 tube contains: 75 pcs. 1 batch contains: 1,500 pcs.	1,000 pcs.
	100V	300mA		AQV215S	AQV215SX	AQV215SZ		
	200V	160mA		AQV217S	AQV217SX	AQV217SZ		
	350V	120mA		AQV210S	AQV210SX	AQV210SZ		
	400V	100mA		AQV214S	AQV214SX	AQV214SZ		
	600V	40mA		AQV216S	AQV216SX	AQV216SZ		

* Indicate the peak AC and DC values.
Note: For space reasons, the two initial letters of the part number "AQ" and the packing style indicator "X" or "Z" are not marked on the device.
(Ex. the label for product number AQV212SX is V212S.)

RATING

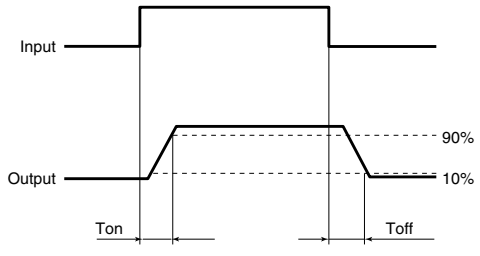
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item		Symbol	Type of connection	AQV212S	AQV215S	AQV217S	AQV210S	AQV214S	AQV216S	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	
	Continuous load current	I_L	A	0.50 A	0.30 A	0.16 A	0.12 A	0.10 A	0.04 A	A connection: Peak AC, DC B, C connection: DC
			B	0.65 A	0.40 A	0.20 A	0.13 A	0.11 A	0.05 A	
			C	0.80 A	0.56 A	0.28 A	0.15 A	0.12 A	0.06 A	
	Peak load current	I_{peak}		1.5A	0.90A	0.48A	0.3 A	0.3 A	0.12 A	A connection: 100 ms (1 shot) V_L= DC
	Power dissipation	P_{out}		450 mW						
Total power dissipation		P_T		500 mW						
I/O isolation voltage		V_{iso}		1,500 V AC						
Temperature limits	Operating	T_{opr}		–40°C to +85°C –40°F to +185°F						Non-condensing at low temperatures
	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	AQV212S	AQV215S	AQV217S	AQV210S	AQV214S	AQV216S	Remarks
Input	LED operate current	Typical	I_{Fon}	—	0.7 mA						I_L = Max.
		Maximum			3 mA						
	LED turn off current	Minimum	I_{Foff}	—	0.4 mA						I_L = Max.
		Typical			0.65 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 Ω	23 Ω	30 Ω	70 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
		Maximum			2.5 Ω	4.0 Ω	15 Ω	35 Ω	50 Ω	120 Ω	
		Typical	R_{on}	B	0.44 Ω	1.15 Ω	5.5 Ω	11.5 Ω	22.5 Ω	55 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
		Maximum			1.25 Ω	2.0 Ω	7.5 Ω	17.5 Ω	25 Ω	100 Ω	
		Typical	R_{on}	C	0.25 Ω	0.6 Ω	2.8 Ω	6.0 Ω	11.3 Ω	28 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
		Maximum			0.63 Ω	1.0 Ω	3.8 Ω	8.8 Ω	12.5 Ω	50 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	0.60 ms	0.25 ms	0.25 ms	0.25 ms	0.28 ms	I_F = 5 mA V_L = Max.
		Maximum			2.0 ms	2.0 ms	1.0 ms	0.5 ms	0.5 ms	0.5 ms	
	Turn off time	Typical	T_{off}	—	0.08 ms	0.06 ms	0.05 ms	0.05 ms	0.05 ms	0.04 ms	I_F = 5 mA V_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/C 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	5	mA

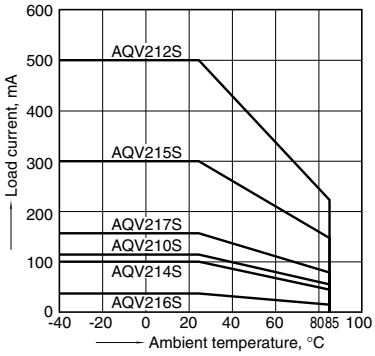
■ **These products are not designed for automotive use.**
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

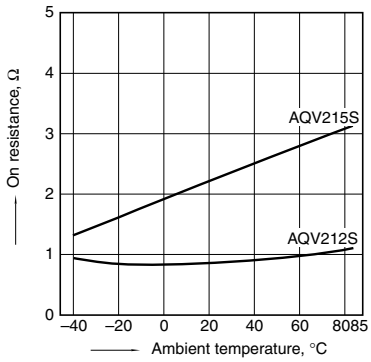
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F

Type of connection: A



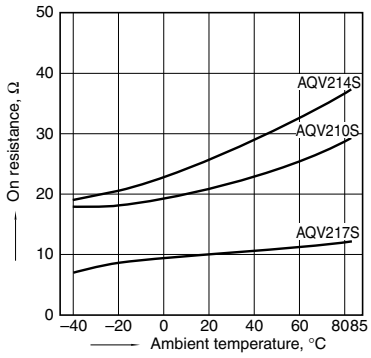
2.-(1) On resistance vs. ambient temperature characteristics

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



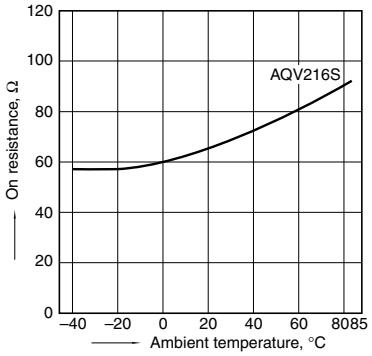
2.-(2) On resistance vs. ambient temperature characteristics

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



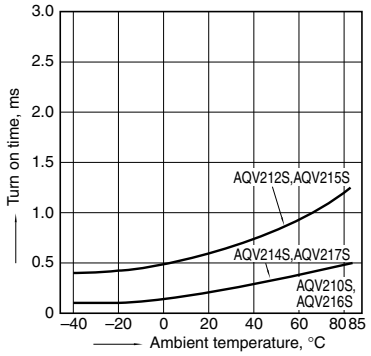
2.-(3) On resistance vs. ambient temperature characteristics

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



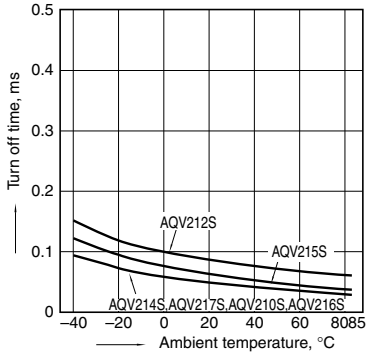
3. Turn on time vs. ambient temperature characteristics

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



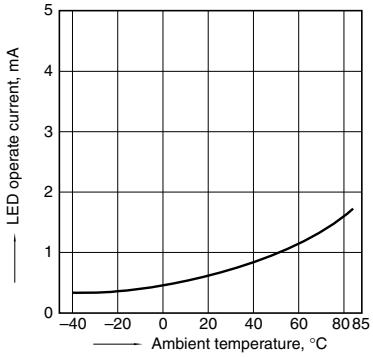
4. Turn off time vs. ambient temperature characteristics

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



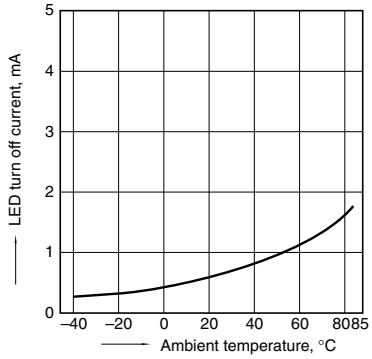
5. LED operate current vs. ambient temperature characteristics

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



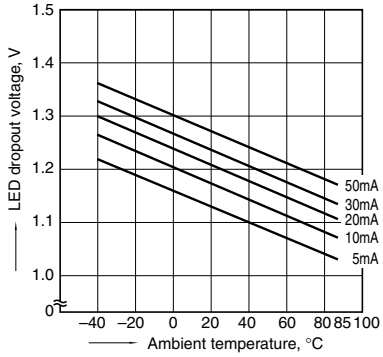
6. LED turn off current vs. ambient temperature characteristics

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

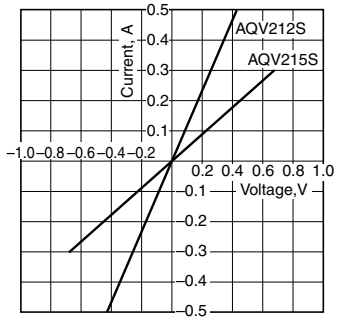


7. LED dropout voltage vs. ambient temperature characteristics

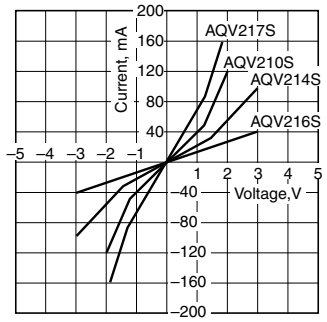
Sample: All types;
LED current: 5 to 50 mA



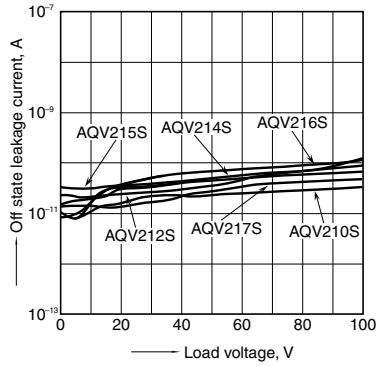
8.-(1). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



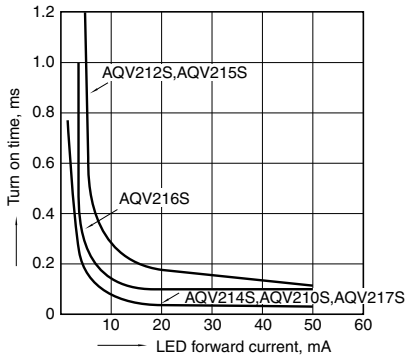
8.-(2). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



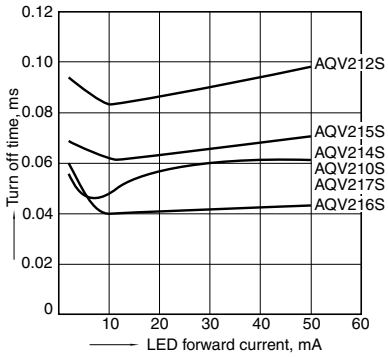
9. Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



10. 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. 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