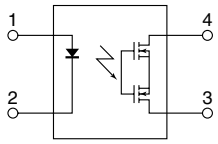
Panasonic
ideas for life

Recommended LED forward current 2 mA, High Sensitivity (Low current-consumption), Miniature SOP4-pin Type

PhotoMOS®
HS SOP 1 Form A

New

mm inch



RoHS compliant

FEATURES

1. High sensitivity (Low current-consumption)
HS type PhotoMOS need less than half LED forward current of other types. This contributes to energy-saving working of equipment and longer operating life for battery.

Sensitivity comparison between HS type and GU type

In case of load voltage 60V type, SOP4-pin

		HS type (AQY232S)	GU type (AQY212S)
LED operate current	Typical	**0.35 mA**	0.9 mA
	Maximum	**0.5 mA**	3 mA
Recommended LED forward current		**2 mA**	5 mA

2. Small package (SOP4-pin)
3. 60 V, 350 V and 400 V load voltage types available

TYPICAL APPLICATIONS

Ideal for battery-powered devices that need to lengthen operating life.
Also recommended for power-economizing of testing equipment that uses many relays.

1. Security equipment
• Crime-preventing system: Surveillance camera, burglar alarm
• Disaster-preventing system: Fire alarm, heat/smoke sensor
2. Measuring instruments
3. Meters (watt-hour, gas, etc.)
4. Telecommunication equipment
5. Industrial equipment

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-pin side	Picked from the 3/4-pin side		
AC/DC dual use	60V	500mA	SOP4-pin	AQY232S	AQY232SX	AQY232SZ	1 tube contains: 100 pcs. 1 batch contains: 2,000 pcs.	1,000 pcs.
	350V	120mA		AQY230S	AQY230SX	AQY230SZ		
	400V	100mA		AQY234S	AQY234SX	AQY234SZ		

Note: For space reasons, the three initial letters of the part number "AQY", the surface mount terminal indicator "S" and the packing style indicator "X" or "Z" are not marked on the device. (Ex. the label for product number AQY232SX is 232.)
* Indicate the peak AC and DC values.

Ratings and packages other than those given above are available by special order. Please contact our sales office in your area.

RATING

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

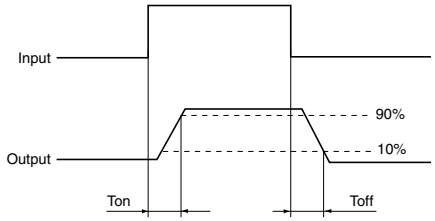
Item		Symbol	AQY232S	AQY230S	AQY234S	Remarks
Input	LED forward current	I_F	50 mA			
	LED reverse voltage	V_R	5 V			
	Peak forward current	I_{FP}	1 A			f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}	75 mW			
Output	Load voltage (peak AC)	V_L	60 V	350 V	400 V	
	Continuous load current	I_L	0.5 A	0.12 A	0.1 A	Peak AC, DC
	Peak load current	I_{peak}	1.5 A	0.3 A	0.24 A	100ms (1 shot), V_L = DC
	Power dissipation	P_{out}	300 mW			
Total power dissipation		P_T	350 mW			
I/O isolation voltage		V_{iso}	1,500 V AC			
Operating temperature		T_{opr}	–40°C to +85°C –40°F to +185°F			Non-condensing at low temperatures
Storage temperature		T_{stg}	–40°C to +100°C –40°F to +212°F			

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

Item			Symbol	AQY232S	AQY230S	AQY234S	Remarks
Input	LED operate current	Typical	I_{Fon}	0.35 mA			$\Delta I_F/\Delta t \geqq$ Min. 100 μA/s I_L = Max.
		Maximum		0.5 mA			
	LED turn off current	Minimum	I_{Foff}	0.1 mA			$\Delta I_F/\Delta t \geqq$ Min. 100 μA/s I_L = Max.
		Typical		0.3 mA			
	LED dropout voltage	Typical	V_F	1.25 V (1.1 V at I_F = 2 mA)			I_F = 50 mA
		Maximum		1.5 V			
Output	On resistance	Typical	R_{on}	0.85 Ω	19 Ω	27 Ω	I_F = 2 mA I_L = Max. Within 1 s on time
		Maximum		2.5 Ω	25 Ω	35 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}	1.5 ms	1.2 ms	0.8 ms	I_F = 2 mA I_L = Max.
		Maximum		5 ms			
	Turn off time*	Typical	T_{off}	0.15 ms	0.1 ms	0.1 ms	I_F = 2 mA I_L = Max.
		Maximum		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

Note: Please refer to the schematic and wiring diagram for connection method.

*Turn on/Turn off time



RECOMMENDED OPERATING CONDITIONS

Please obey the following conditions to ensure proper device operation (turn on) and resetting (turn off).

Item	Symbol	Recommended value	Unit
Input LED current	I_F	2	mA

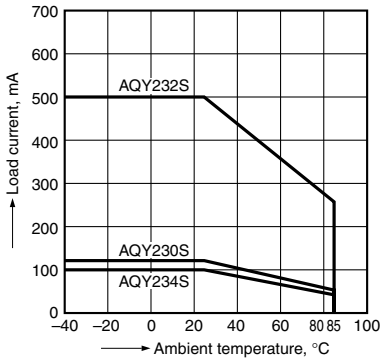
■ For Dimensions
■ For Schematic and Wiring Diagrams.
■ For Cautions for Use.

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

REFERENCE DATA

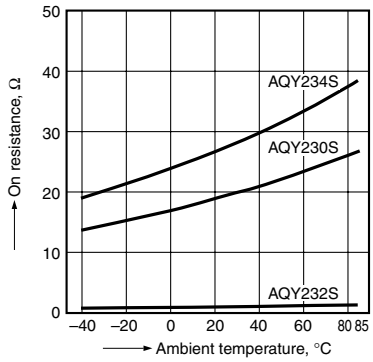
1. Load current vs. ambient temperature characteristics

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



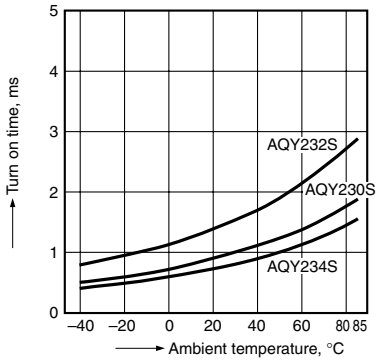
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4;
LED current: 2 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



3. Turn on time vs. ambient temperature characteristics

LED current: 2 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



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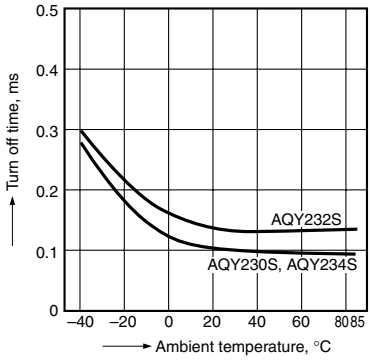
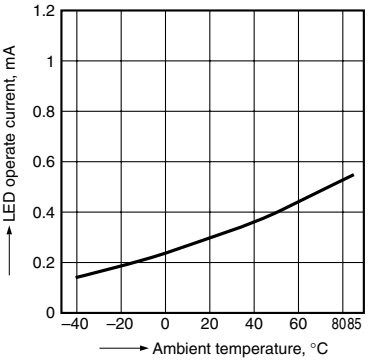
4. Turn off time vs. ambient temperature characteristics

LED current: 2 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



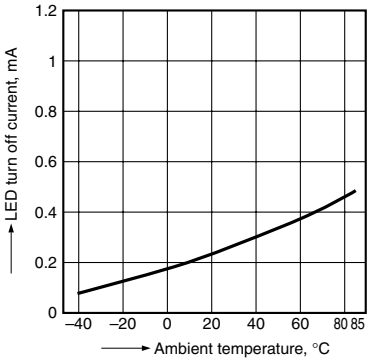
5. LED operate current vs. ambient temperature characteristics

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



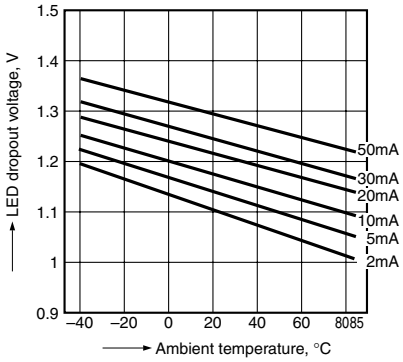
6. LED turn off current vs. ambient temperature characteristics

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



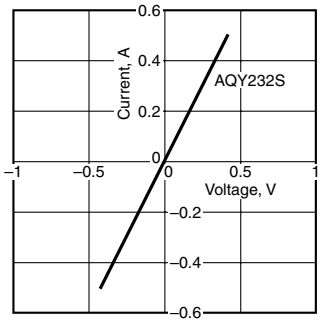
7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types; LED current: 2 to 50 mA



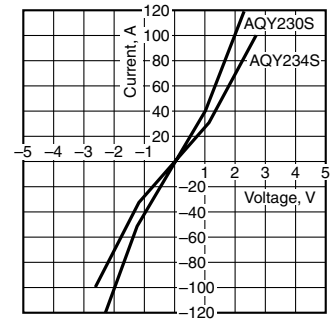
8-(1). Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



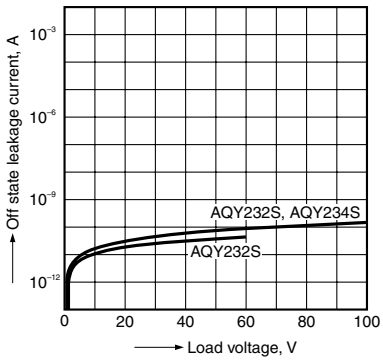
8-(2). Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



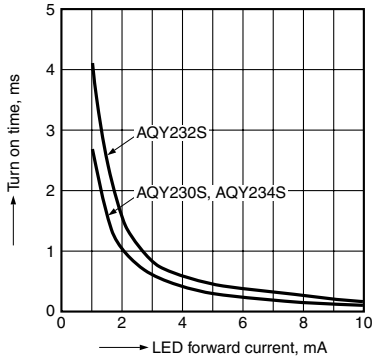
9. Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F



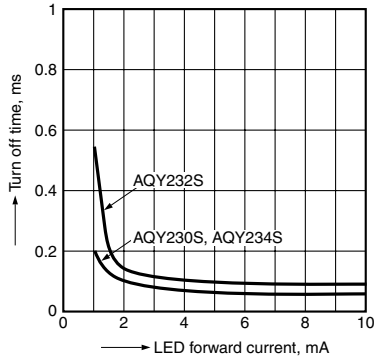
10. Turn on time vs. LED forward current characteristics

Measured portion: between terminals 3 and 4;
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 3 and 4;
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 3 and 4;
Frequency: 1 MHz (30 mVrms);
Ambient temperature: 25°C 77°F