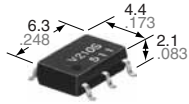
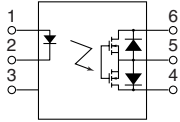


**Super miniature design,  
SOP(1 Form A) 6-pin type.  
Controls load voltage  
60V to 400V**

# GU PhotoMOS (AQV210S)



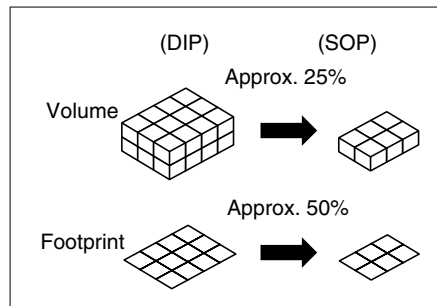
mm inch



## FEATURES

### 1. 1 channel (Form A) in super miniature design

The device comes in a super-miniature SO package 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 PhotoMOS Relays.



### 2. Tape and reel

The device comes standard in a tape and reel (1,000 pcs./reel) to facilitate automatic insertion machines.

### 3. Controls low-level analog signals

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

### 4. Low-level off state leakage current

In contrast to the SSR with an off state leakage current of several milliamperes, the PhotoMOS relay features a very small off state leakage current of typ. 100 pA even at the rated load voltage of 400 V (AQV214S).

## TYPICAL APPLICATIONS

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

**RoHS Directive compatibility information**  
<http://www.nais-e.com/>

## TYPES

Type	Output rating*		Package size	Part No.			Packing quantity	
	Load voltage	Load current		Tube packing style	Tape and reel packing style		Tube	Tape and reel
AC/DC type	60V	500mA	SOP6pin	AQV212S	AQV212SX (Picked from the 1/2/3-pin side)	AQV212SZ (Picked from the 4/5/6-pin side)	1 tube contains: 75 pcs. 1 batch contains: 1,500 pcs.	1,000 pcs.
	100V	300mA		AQV215S	AQV215SX (Picked from the 1/2/3-pin side)	AQV215SZ (Picked from the 4/5/6-pin side)		
	200V	160mA		AQV217S	AQV217SX (Picked from the 1/2/3-pin side)	AQV217SZ (Picked from the 4/5/6-pin side)		
	350V	120mA		AQV210S	AQV210SX (Picked from the 1/2/3-pin side)	AQV210SZ (Picked from the 4/5/6-pin side)		
	400V	100mA		AQV214S	AQV214SX (Picked from the 1/2/3-pin side)	AQV214SZ (Picked from the 4/5/6-pin side)		
	600V	40mA		AQV216S	AQV216SX (Picked from the 1/2/3-pin side)	AQV216SZ (Picked from the 4/5/6-pin side)		

\* Indicate the peak AC and DC values.

Note: For space reasons, the initial letters of the product number "AQ" are omitted on the product seal.

The package type indicator "X" and "Z" are omitted from the seal (Ex. the label for product number AQV214S is V214S).

## 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						f = 100 Hz, Duty factor = 0.1%
	LED reverse voltage	$V_R$		5 V						
	Peak forward current	$I_{FP}$		1 A						
	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	$I_{peak}$		1.0A	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						

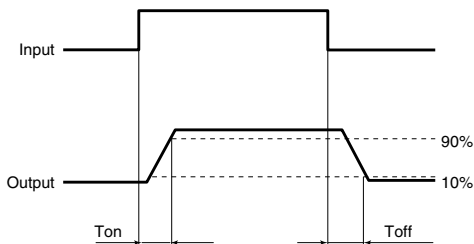
### 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

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	0.25 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	0.05 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	

Note: Recommendable LED forward current  $I_F = 5mA$ .

For type of connection

\*Turn on/Turn off time



- For Dimensions
- For Schematic and Wiring Diagrams
- For Cautions for Use

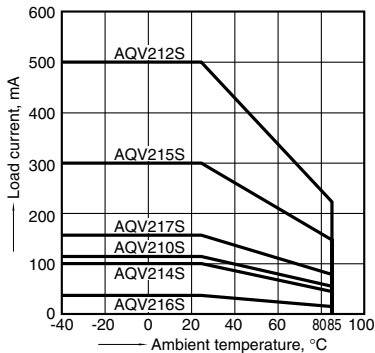
# GU PhotoMOS (AQV21○S)

## REFERENCE DATA

### 1. Load current vs. ambient temperature characteristics

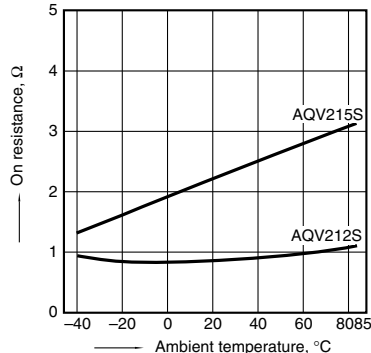
Allowable ambient temperature:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
 $-40^{\circ}\text{F}$  to  $+185^{\circ}\text{F}$

Type of connection: A



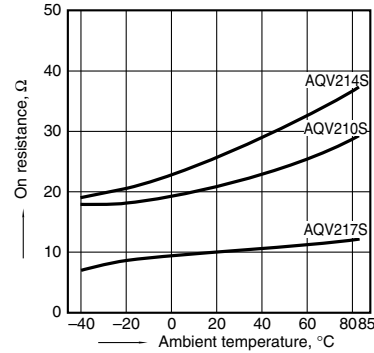
### 2.-(1) On resistance vs. ambient temperature characteristics

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



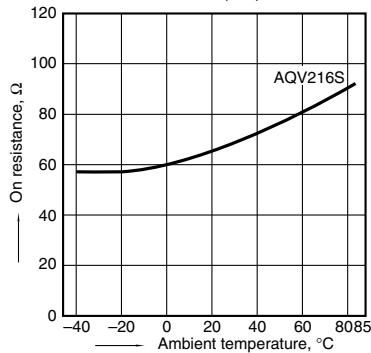
### 2.-(2) On resistance vs. ambient temperature characteristics

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



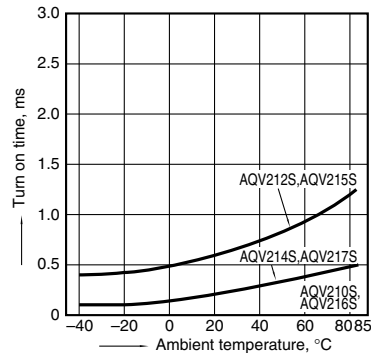
### 2.-(3) On resistance vs. ambient temperature characteristics

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



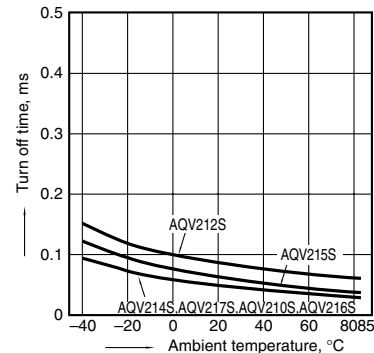
### 3. Turn on time vs. ambient temperature characteristics

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



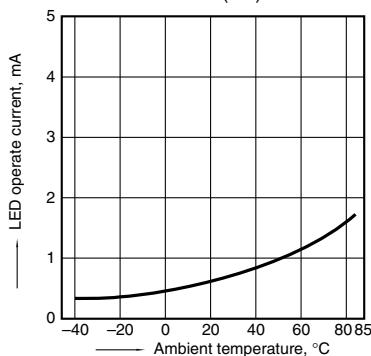
### 4. Turn off time vs. ambient temperature characteristics

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



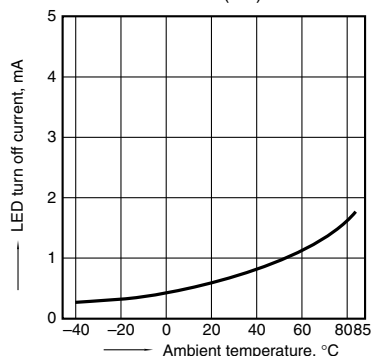
### 5. LED operate current vs. ambient temperature characteristics

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



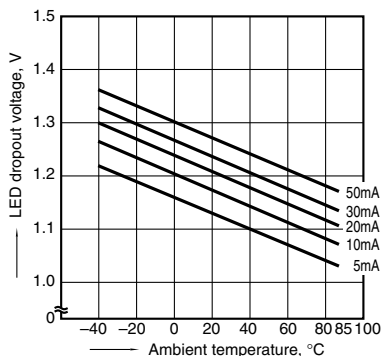
### 6. LED turn off current vs. ambient temperature characteristics

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



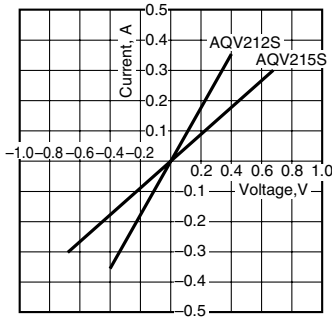
### 7. LED dropout voltage vs. ambient temperature characteristics

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

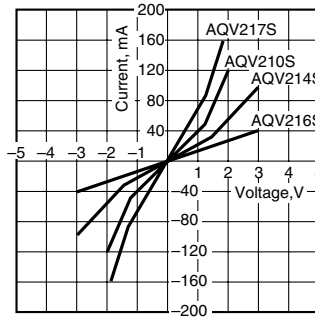


# GU PhotoMOS (AQV210S)

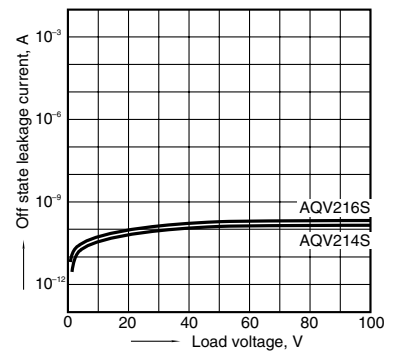
8.-(1). Current vs. voltage characteristics of output at MOS portion  
 Measured portion: between terminals 4 and 6;  
 Ambient temperature: 25°C 77°F



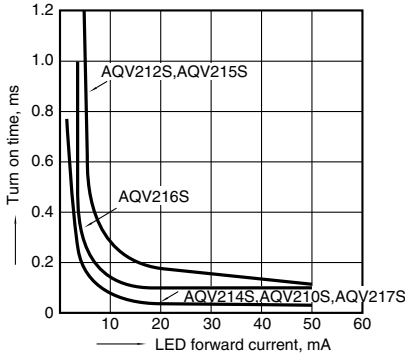
8.-(2). Current vs. voltage characteristics of output at MOS portion  
 Measured portion: between terminals 4 and 6;  
 Ambient temperature: 25°C 77°F



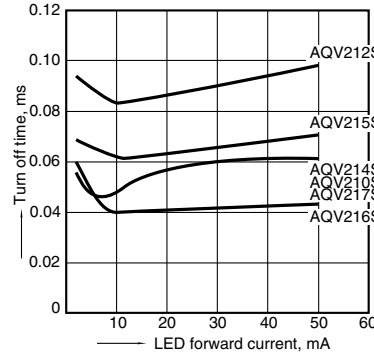
9. Off state leakage current vs. load voltage characteristics  
 Measured portion: between terminals 4 and 6;  
 Ambient temperature: 25°C 77°F



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

