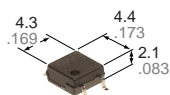


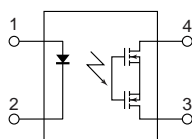
# NAIS

## GU (General Use) Type SOP Series 1-Channel (Form A) Current Limit Function 4-Pin Type

# PhotoMOS RELAYS



mm inch



### FEATURES

#### 1. Current Limit Function

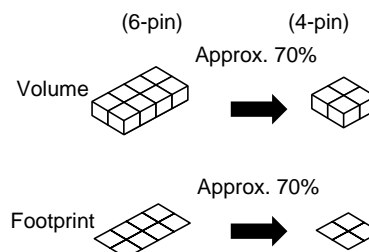
To control an over current from flowing, the current limit function has been realized. It keeps an output current at a constant value when the current reaches a specified current limit value.

#### 2. Enhancing the capability of surge resistance between output terminals

The current limit function controls the ON time surge current to enhance the capability of surge resistance between output terminals.

#### 3. SO package 4-Pin type in super miniature design

The device comes in a super-miniature SO package 4-Pin type measuring (W) 4.3×(L) 4.4×(H) 2.1 mm (W) .169×(L) .173×(H) .083 inch—approx. 70% of the volume and 70% of the footprint size of SO package 6-pin type PhotoMOS Relays.



#### 4. Tape and reel

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

#### 4. Controls low-level analog signals

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

### TYPICAL APPLICATIONS

- Telephone equipment
- Modem

### TYPES

Type	Output rating*		Part No.		Packing quantity in tape and reel
	Load voltage	Load current	Picked from the 1/2-pin side	Picked from the 3/4-pin side	
AC/DC type	350 V	120 mA	1 Form A AQY210LSX	1 Form A AQY210LSZ	1,000 pcs.

\* Indicate the peak AC and DC values.

Notes: (1) Tape package is the standard packing style. Also available in tube. (Part No. suffix "X" or "Z" is not needed when ordering; Tube: 100 pcs.; Case: 2,000 pcs.)

(2) For space reasons, the initial letters of the product number "AQY" and "S" are omitted on the product seal. The package type indicator "X" and "Z" are omitted from the seal. (Ex. the label for product number AQY210LS is 210L).

### RATING

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

Item		Symbol	AQY210LS	Remarks
Input	LED forward current	$I_F$	50 mA	
	LED reverse voltage	$V_R$	3 V	
	Peak forward current	$I_{FP}$	1 A	$f = 100 \text{ Hz}$ , Duty factor = 0.1%
	Power dissipation	$P_{in}$	75 mW	
Output	Load voltage (peak AC)	$V_L$	350 V	
	Continuous load current	$I_L$	0.12 A	
	Power dissipation	$P_{out}$	350 mW	
Total power dissipation		$P_T$	400 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	

# AQY210LS

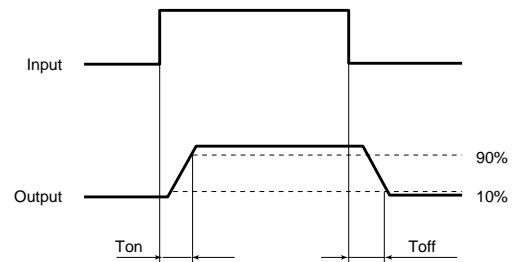
## 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item		Symbol	AQY210LS	Condition	
Input	LED operate current	Typical	0.9 mA	$I_L = \text{Max.}$	
		Maximum	3 mA		
	LED turn off current	Minimum	0.4 mA	$I_L = \text{Max.}$	
		Typical	0.85 mA		
LED dropout voltage	Minimum	1.14 (1.25 V at $I_F = 50\text{mA}$ )		$I_F = 5 \text{ mA}$	
	Typical	1.5 V			
Output	On resistance	Typical	20Ω	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time	
		Maximum	25Ω		
	Off state leakage current	Maximum	$I_{\text{Leak}}$	1μA	$I_F = 0$ $V_L = \text{Max.}$
Current limit	Typical	—	0.18 A	$I_F = 5 \text{ mA}$	
Transfer characteristics	Turn on time*	Typical	0.3 ms	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$	
		Maximum	2.0 ms		
	Turn off time*	Typical	0.05 ms	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$	
		Maximum	1.0 ms		
	I/O capacitance	Typical	$C_{\text{iso}}$	0.8 pF	$f = 1 \text{ MHz}$ $V_B = 0$
		Maximum		1.5 pF	
Initial I/O isolation resistance	Minimum	$R_{\text{iso}}$	1,000 MΩ	500 V DC	

Note: Recommendable LED forward current  $I_F = 5 \text{ mA}$ .

For type of connection, see page 31.

\*Turn on/Turn off time

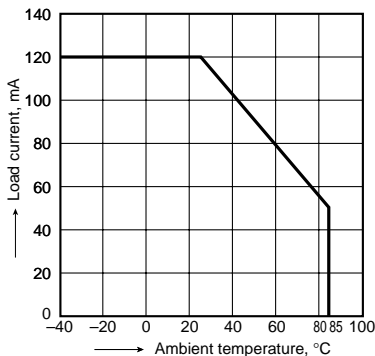


- For Dimensions, see Page 28.
- For Schematic and Wiring Diagrams, see Page 31.
- For Cautions for Use, see Page 36.

## REFERENCE DATA

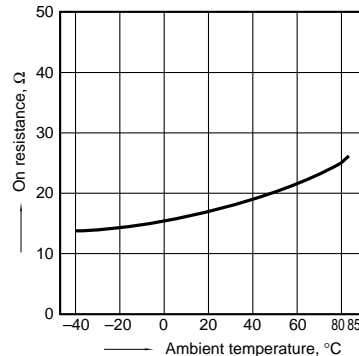
### 1. Load current vs. ambient temperature characteristics

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



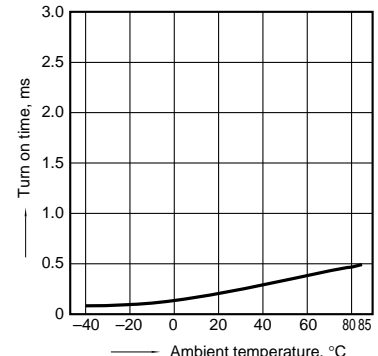
### 2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4;  
LED current: 5 mA; Load voltage: Max. (DC)  
Continuous load current: Max. (DC)



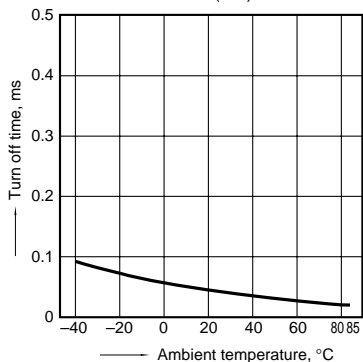
### 3. Turn on time vs. ambient temperature characteristics

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



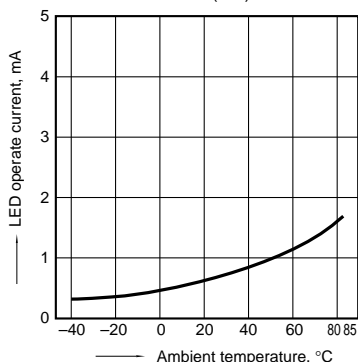
### 4. Turn off time vs. ambient temperature characteristics

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



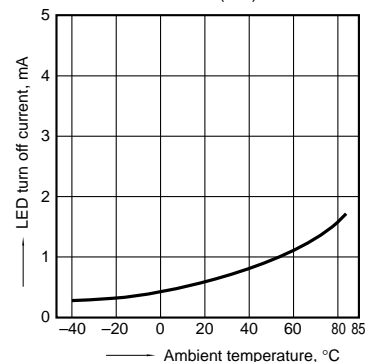
### 5. LED operate current vs. ambient temperature characteristics

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



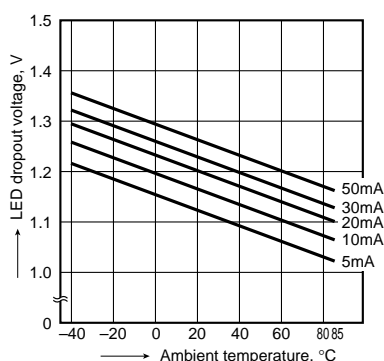
### 6. LED turn off current vs. ambient temperature characteristics

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



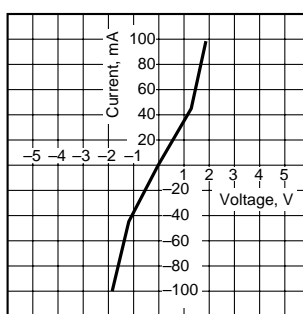
### 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



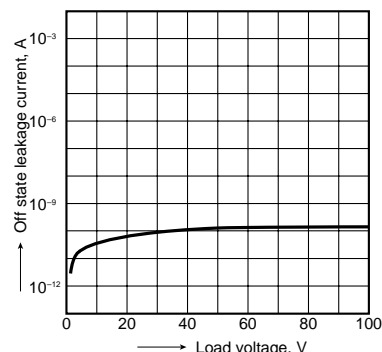
### 8. Voltage vs. current characteristics of output at MOS portion

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



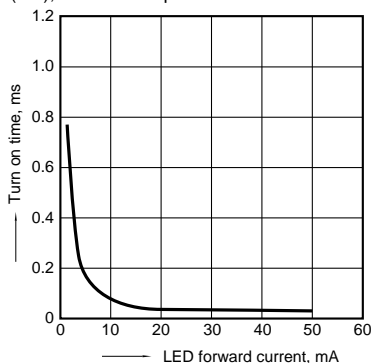
### 9. Off state leakage current

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



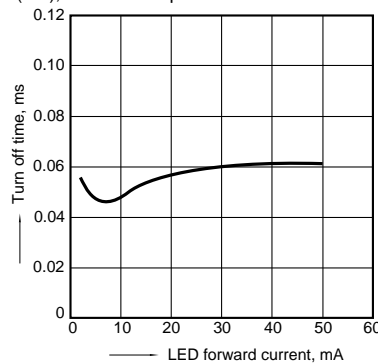
### 10. LED forward current vs. turn on time characteristics

Measured portion: between terminals 3 and 4; Load voltage: Max.(DC); Continuous load current: Max.(DC); Ambient temperature: 25°C 77°F



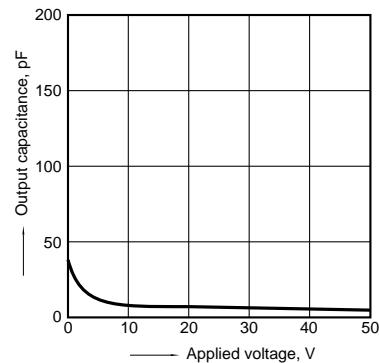
### 11. LED forward current vs. turn off time characteristics

Measured portion: between terminals 3 and 4; Load voltage: Max.(DC); Continuous load current: Max.(DC); Ambient temperature: 25°C 77°F



### 12. Applied voltage vs. output capacitance characteristics

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



## What is current limit

When a load current reaches the specified output control current, a current limit function works against the load current to keep the current a constant value.

The current limit circuit built into the PhotoMOS relay thus controls the instantaneous load current to effectively ensure circuit safety.

This safety feature protects circuits down-

stream of the PhotoMOS relay against over-current.

But, if the current-limiting feature is used longer than the specified time, the PhotoMOS relay can be destroyed. Therefore, set the output loss to the max. rate or less.

- Comparison of output voltage and output current characteristics

### V-I Characteristics

