NAiS
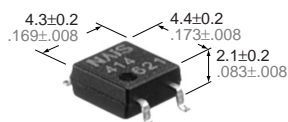
**GU (General Use) Type
SOP Series
1- Channel (Form B)
4-Pin Type**

PhotoMOS RELAYS

4.3±0.2 .169±.008
4.4±0.2 .173±.008
2.1±0.2 .083±.008

mm inch

3. 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
PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

5. Low-level off state leakage current
In contrast to the SSR with an off state leakage current of several milliamps, the PhotoMOS relay features a very small off state leakage current of 1nA even with the rated load voltage of 350 V (AQY410S).

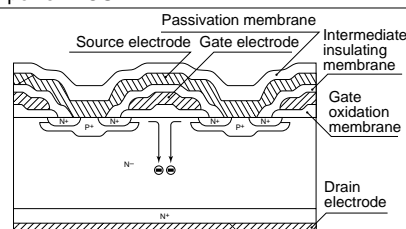(6-pin)   (4-pin)   Approx. 70%

Volume

Approx. 70%

Footprint

2. Low on resistance for normally-closed type
This has been realized thanks to the built-in MOSFET processed by our proprietary method, DSD (Double-diffused and Selective Doping) method.

FEATURES

1. 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.

Cross section of the normally-closed type of power MOS

Passivation membrane
Source electrode   Gate electrode
Intermediate insulating membrane
Gate oxidation membrane
Drain electrode

TYPICAL APPLICATIONS

• Telecommunications (PC, Electoronic Notepad)
• Measuring and Testing equipment
• Factory Automation Equipment
• Security equipment
• High speed inspection machines

TYPES

AC/DC 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	
350 V	120 mA	AQY410SX	AQY410SZ	1,000 pcs.
400 V	100 mA	AQY414SX	AQY414SZ	

* 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 top two 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 AQY414S is 414).

RATING

AC/DC type

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

| Item		Symbol	AQY410S	AQY414S	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 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}	75 mW		
Output	Load voltage (peak AC)	V_L	350 V	400 V	
	Continuous load current (peak AC)	I_L	0.12 A	0.1 A	
	Peak load current	I_{peak}	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		
Temperture 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		

AQY41◯S

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

Item			Symbol	AQY410S	AQY414S	Remarks
Input	LED operate (OFF) current	Typical	I_{Fon}	0.9 mA		I_L = Max.
		Maximum		3 mA		
	LED reverse (ON) current	Minimum	I_{Foff}	0.4 mA		I_L = Max.
		Typical		0.85 mA		
	LED dropout voltage	Typical	V_F	1.14 V (1.25 V at I_F = 50 mA)		I_F = 5 mA
		Maximum		1.5 V		
Output	On resistance	Typical	R_{on}	18 Ω	26 Ω	I_F = 0 mA I_L = Max. Within 1 s on time
		Maximum		25 Ω	35 Ω	
	Off state leakage current	Maximum	I_{Leak}	1 μA		I_F = 5 mA V_L = Max.
Transfer characteristics	Operate (OFF) time*	Typical	T_{on}	0.52 ms	0.47 ms	I_F = 0 mA-->5 mA I_L = Max.
		Maximum		1 ms		
	Reverse (ON) time*	Typical	T_{off}	0.23 ms	0.28 ms	I_F = 5 mA-->0 mA I_L = Max.
		Maximum		1 ms		
	I/O capacitance	Typical	C_{iso}	0.8 pF		f = 1 MHz V_B = 0
		Maximum		1.5 pF		
	Initial I/O isolation resistance	Minimum	R_{iso}	1,000 MΩ		500 V DC

Note: Recommendable LED forward current I_F = 5mA.

For type of connection, see page 32.
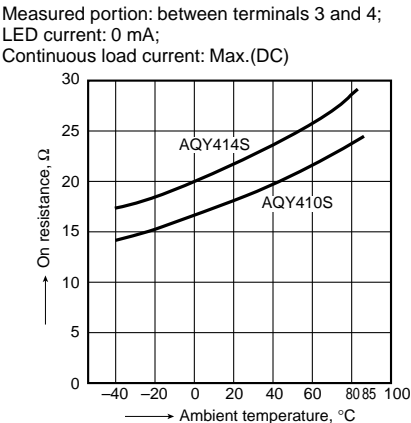
*Operate/Reverse time
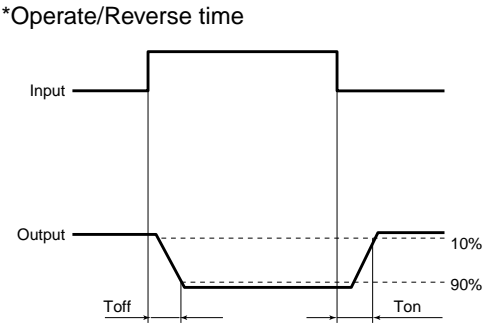
■ **For Dimensions, see Page 28.**
■ **For Schematic and Wiring Diagrams, see Page 32.**
■ **For Cautions for Use, see Page 36.**
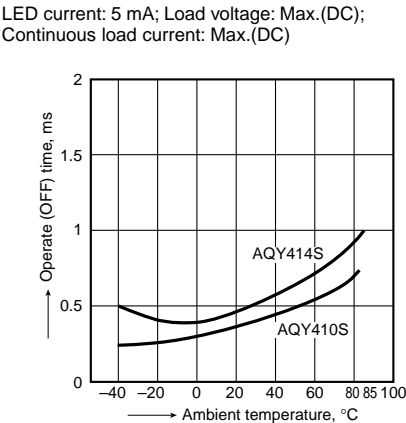
REFERENCE DATA

1. Load current vs. ambient temperature characteristics
Allowable ambient temperature:
–40°C to +85°C
–40°F to +185°F
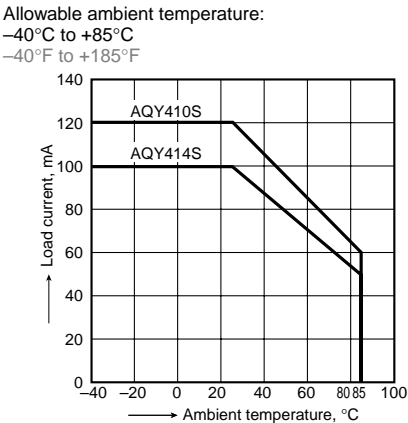
2. On resistance vs. ambient temperature characteristics
Measured portion: between terminals 3 and 4;
LED current: 0 mA;
Continuous load current: Max.(DC)

3. Operate (OFF) time vs. ambient temperature characteristics
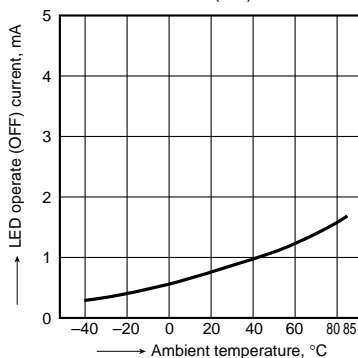LED current: 5 mA; Load voltage: Max.(DC);
Continuous load current: Max.(DC)

4. Reverse (ON) time vs. ambient temperature characteristics
LED current: 5 mA; Load voltage: Max.(DC);
Continuous load current: Max.(DC)

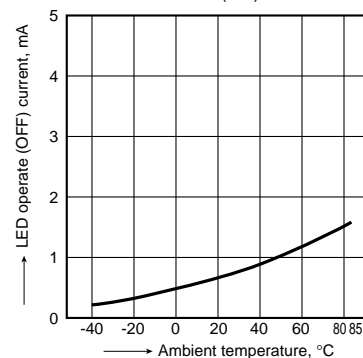Reverse (ON) time, ms vs. Ambient temperature, °C

AQY414S
AQY410S
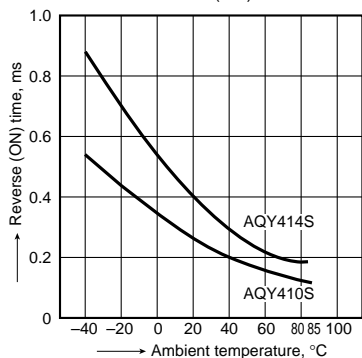
5. LED operate (OFF) current vs. ambient temperature characteristics
Load voltage: Max.(DC);
Continuous load current: Max.(DC)
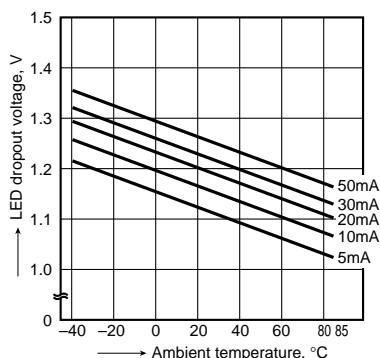
LED operate (OFF) current, mA vs. Ambient temperature, °C

6. LED reverse (ON) current vs. ambient temperature characteristics
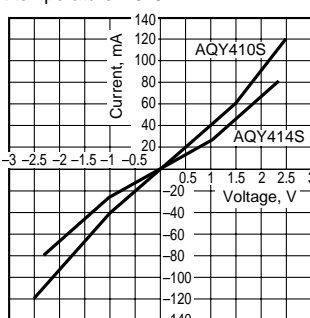Load voltage: Max.(DC);
Continuous load current: Max.(DC)

LED operate (OFF) current, mA vs. Ambient temperature, °C

7. LED dropout voltage vs. ambient temperature characteristics
LED current: 5 to 50 mA

LED dropout voltage, V vs. Ambient temperature, °C

50mA
30mA
20mA
10mA
5mA

8. Voltage vs. current characteristics of output at MOS portion
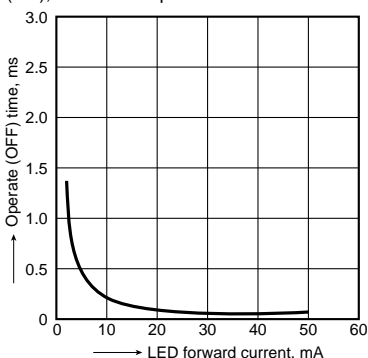Measured portion: between terminals 3 and 4;
Ambient temperature: 25°C 77°F

Current, mA vs. Voltage, V

AQY410S
AQY414S

9. Off state leakage current
Measured portion: between terminals 3 and 4;
LED current: 5 mA;
Ambient temperature: 25°C 77°F

Off state leakage current, A vs. Load voltage, V
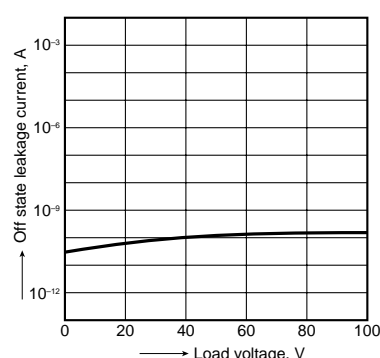
10. LED forward current vs. operate (OFF) time characteristics
Measured portion: between terminals 3 and 4;
Load voltage: Max.(DC); Continuous load current:
Max.(DC); Ambient temperature: 25°C 77°F

Operate (OFF) time, ms vs. LED forward current, mA

11. LED forward current vs. reverse (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

Reverse (ON) time, ms vs. LED forward current, mA
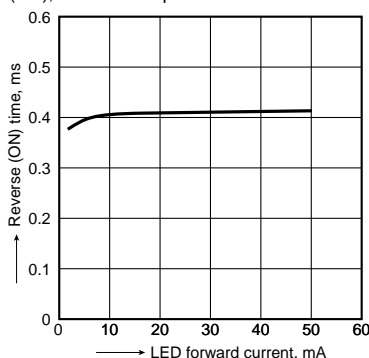
12. Applied voltage vs. output capacitance characteristics
Measured portion: between terminals 3 and 4;
Frequency: 1 MHz;
Ambient temperature: 25°C 77°F

Output capacitance, pF vs. Applied voltage, V