

NAiS

HE (High-function Economy) Type [2-Channel (Form B) Type]

PhotoMOS RELAYS

FEATURES

1. Compact 8-pin DIP size

The device comes in a compact (W) 6.4×(L) 9.78×(H) 3.9 mm (W) .252×(L) .385×(H) .154 inch, 8-pin DIP size (through hole terminal type).

2. Applicable for 2 Form B use as well as two independent 1 Form B use.

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.

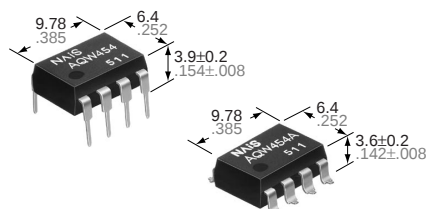
4. High sensitivity, low ON resistance

Can control a maximum 0.16 A (AQW454) load current with a 5 mA input current. Low ON resistance of 16 Ω (AQW454). Stable operation because there are no metallic contact parts.

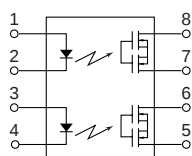
5. Low-level off state leakage current

The SSR has an off state leakage current of several milliamperes, whereas the PhotoMOS relay has only 100 pA even with the rated load voltage of 400 V (AQW454).

6. Low thermal electromotive force (Approx. 1 μ V)



mm inch



TYPICAL APPLICATIONS

- Security equipment
- High-speed inspection machine
- Measuring equipment
- Telecommunication equipment
- Sensors

TYPES

Type	Output rating*		Part No.				Packing quantity	
			Through hole terminal	Surface-mount terminal				
	Load voltage	Load current	Tube packing style		Tape and reel packing style		Tube	Tape and reel
					Picked from the 1/2/3/4-pin side	Picked from the 5/6/7/8-pin side		
AC/DC	400 V	120 mA	AQW454	AQW454A	AQW454AX	AQW454AZ	1 tube contains 40 pcs. 1 batch contains 400 pcs.	1,000 pcs

*Indicate the peak AC and DC values.

Note: For space reasons, the package type indicator "X" and "Z" are omitted from the seal.

RATING

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

Item		Symbol	AQW454(A)	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	400 V	
	Continuous load current	I_L	0.12 A (0.16 A)	A connection: Peak AC, DC (): for one 1b-circuit
	Peak load current	I_{peak}	0.36 A	A connection: 100 ms (1 shot), $V_L = DC$
	Power dissipation	P_{out}	800 mW	
Total power dissipation		P_T	850 mW	
I/O isolation voltage		V_{iso}	1,500 V AC	Between input and output/between contact sets
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	

AQW454

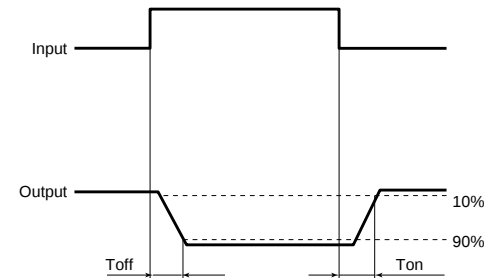
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item			Symbol	AQW454(A)	Condition
Input	LED operate (OFF) current	Typical	I _{Foff}	0.9 mA	I _L = 120 mA
		Maximum		3 mA	
	LED reverse (ON) current	Minimum	I _{Fon}	0.4 mA	I _L = 120 mA
		Typical		0.8 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}	11 Ω	I _F = 0 mA
		Maximum		16 Ω	I _L = 120 mA Within 1 s on time
	Off state leakage current	Maximum	I _{Leak}	1 μA	I _F = 5 mA V _L = 400 V
Transfer char- acteristics	Switching speed	Operate (OFF) time*	T _{off}	1.2 ms	I _F = 0 mA → 5 mA
				2 ms	I _L = 120 mA
		Reverse (ON) time*	T _{on}	0.36 ms	I _F = 5 mA → 0 mA
				1 ms	I _L = 120 mA
	I/O capacitance	Typical	C _{iso}	0.8 pF	f = 1 MHz
		Maximum		1.5 pF	V _B = 0
	Initial I/O isolation resistance	Minimum	R _{iso}	1,000 MΩ	500 V DC

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

For type of connection, see page 33.

*Operate/Reverse time

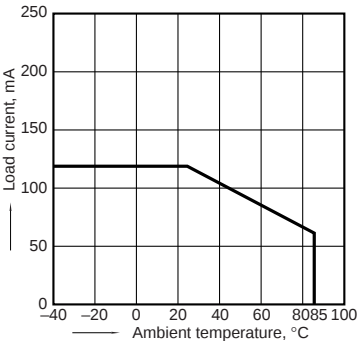


- For Dimensions, see Page 27.
- For Schematic and Wiring Diagrams, see Page 33.
- For Cautions for Use, see Page 36.

REFERENCE DATA

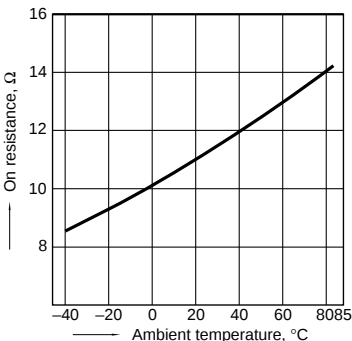
1. Load current vs. ambient temperature characteristics

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



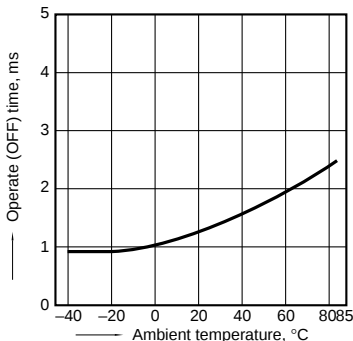
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8; LED current: 0 mA; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC)



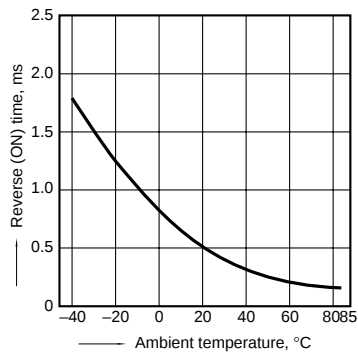
3. Operate (OFF) time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC)



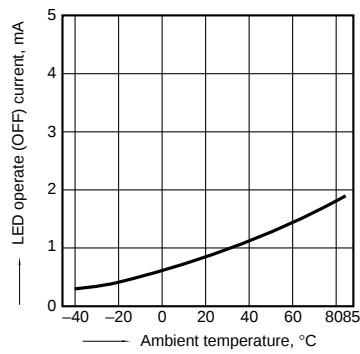
4. Reverse (ON) time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 400 V (DC);
Continuous load current: 120 mA (DC)



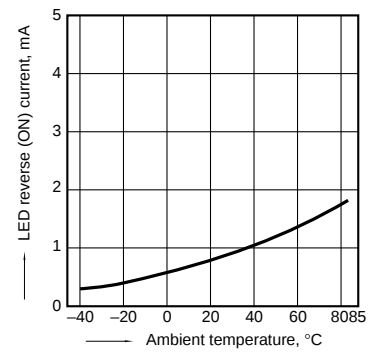
5. LED operate (OFF) current vs. ambient temperature characteristics

Load voltage: 400 V (DC);
Continuous load current: 120 mA (DC)



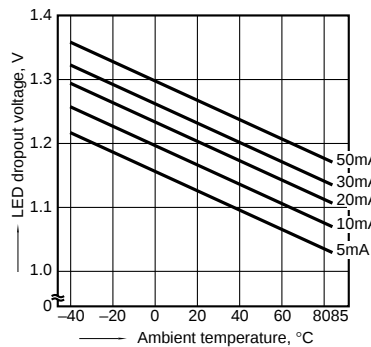
6. LED reverse (ON) current vs. ambient temperature characteristics

Load voltage: 400 V (DC);
Continuous load current: 120 mA (DC)



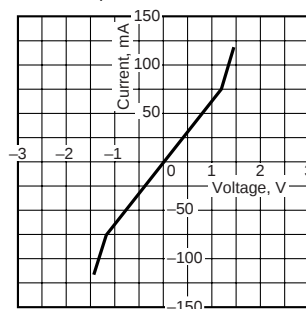
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



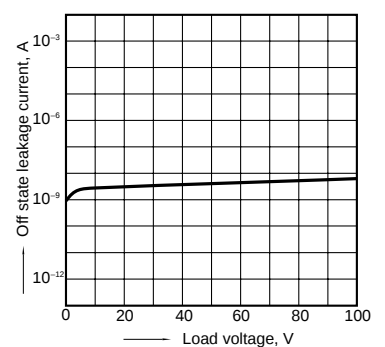
8. Voltage vs. current characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8; Ambient temperature: 25°C 77°F



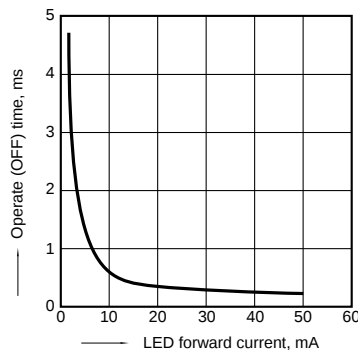
9. Off state leakage current

Measured portion: between terminals 5 and 6, 7 and 8; Ambient temperature: 25°C 77°F



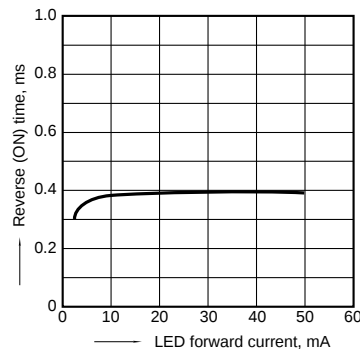
10. LED forward current vs. operate (OFF) time characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC); Ambient temperature: 25°C 77°F



11. LED forward current vs. reverse (ON) time characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC); Ambient temperature: 25°C 77°F



12. Applied voltage vs. output capacitance characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Frequency: 1 MHz; Ambient temperature: 25°C 77°F

