

# NAIS

## HE (High-function Economy) Type [2-Channel (Form A) 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 A use as well as two independent 1 Form A 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.

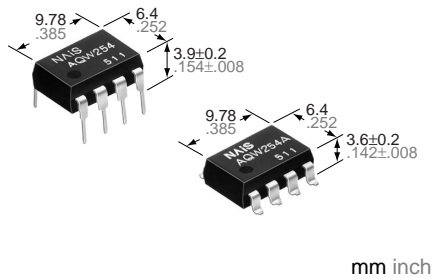
#### 4. High sensitivity, low ON resistance

Can control a maximum 0.16 A (AQW254) load current with a 5 mA input current. Low ON resistance of 16 Ω (AQW254). 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 miliamperes, whereas the PhotoMOS relay has only 100 pA even with the rated load voltage of 400 V (AQW254).

#### 6. Low thermal electromotive force (Approx. 1 μV)



mm inch

### TYPICAL APPLICATIONS

- High-speed inspection machines
- Data communication equipment
- Telephone equipment

### 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	AQW254	AQW254A	AQW254AX	AQW254AZ	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)

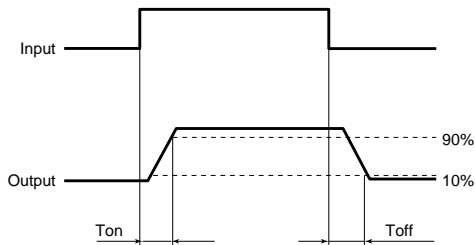
Item	Symbol	AQW254(A)	Remarks	
Input	LED forward current	I <sub>F</sub>	50 mA	
	LED reverse voltage	V <sub>R</sub>	3 V	
	Peak forward current	I <sub>FP</sub>	1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>	75 mW	
Output	Load voltage (peak AC)	V <sub>L</sub>	400 V	
	Continuous load current	I <sub>L</sub>	0.12 A (0.16 A)	A connection: Peak AC, DC ( ): in case of using only 1 channel
	Peak load current	I <sub>peak</sub>	0.36 A	A connection: 100 ms (1 shot), V <sub>L</sub> = DC
	Power dissipation	P <sub>out</sub>	800 mW	
Total power dissipation	P <sub>T</sub>	850 mW		
I/O isolation voltage	V <sub>iso</sub>	1,500 V AC	Between input and output/between contact sets	
Temperature limits	Operating	T <sub>opr</sub>	-40°C to +85°C -40°F to +185°F	Non-condensing at low temperatures
	Storage	T <sub>stg</sub>	-40°C to +100°C -40°F to +212°F	

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

Item		Symbol	AQW254(A)	Condition	
Input	LED operate current	Typical	0.9 mA	I <sub>L</sub> = Max.	
		Maximum	3 mA		
	LED turn off current	Minimum	0.4 mA	I <sub>L</sub> = Max.	
		Typical	0.8 mA		
LED dropout voltage	Typical	1.14 V (1.25 V at I <sub>F</sub> = 50 mA)		I <sub>F</sub> = 5 mA	
	Maximum	1.5 V			
Output	On resistance	Typical	12.4 Ω	I <sub>F</sub> = 5 mA I <sub>L</sub> = Max. Within 1 s on time	
		Maximum	16 Ω		
	Off state leakage current	Maximum	I <sub>Leak</sub>	1 μA	I <sub>F</sub> = 0 mA V <sub>L</sub> = Max.
Transfer characteristics	Switching speed	Turn on time*	Typical	0.8 ms	I <sub>F</sub> = 5 mA
			Maximum	2 ms	I <sub>L</sub> = Max.
		Turn off time*	Typical	0.05 ms	I <sub>F</sub> = 5 mA
			Maximum	0.2 ms	I <sub>L</sub> = Max.
	I/O capacitance	Typical	C <sub>iso</sub>	0.8 pF	f = 1 MHz
		Maximum		1.5 pF	V <sub>B</sub> = 0
Initial I/O isolation resistance	Minimum	R <sub>iso</sub>	1,000 MΩ	500 V DC	

Note: Recommendable LED forward current I<sub>F</sub> = 5 mA.

\*Turn on/Turn off time

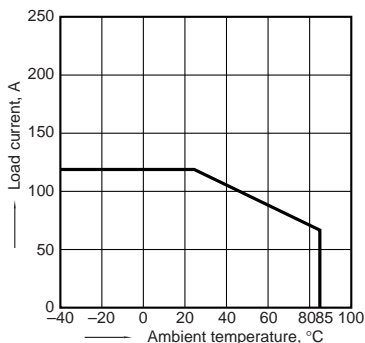


- For Dimensions, see Page 440.
- For Schematic and Wiring Diagrams, see Page 445.
- For Cautions for Use, see Page 449.

**REFERENCE DATA**

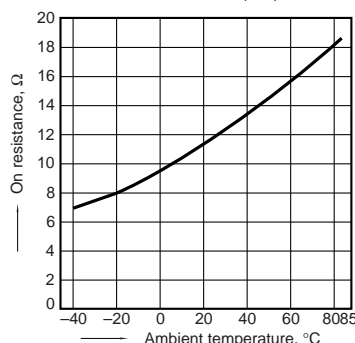
1. Load current vs. ambient temperature characteristics

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



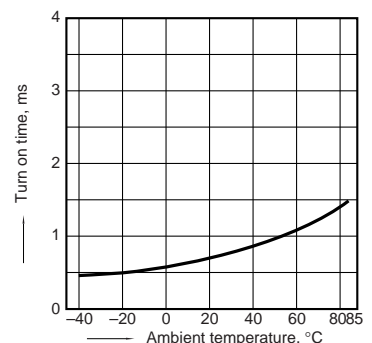
2. On resistance vs. ambient temperature characteristics

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



3. Turn on time vs. ambient temperature characteristics

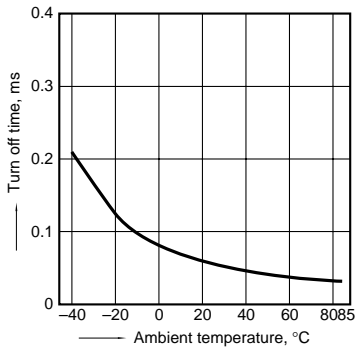
LED current: 5 mA; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC)



# AQW254

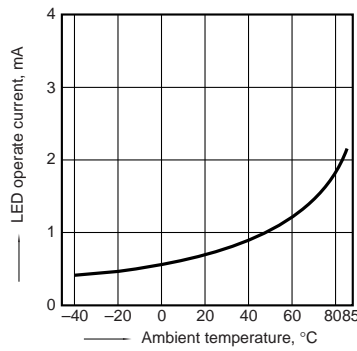
## 4. Turn off time vs. ambient temperature characteristics

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



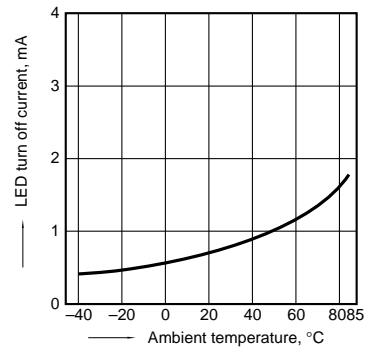
## 5. LED operate current vs. ambient temperature characteristics

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



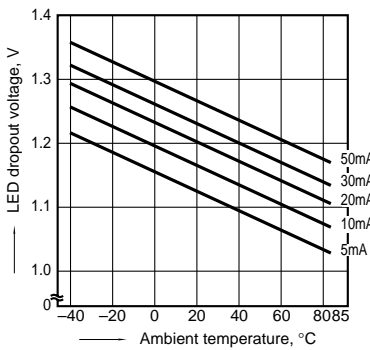
## 6. LED turn off current vs. ambient temperature characteristics

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



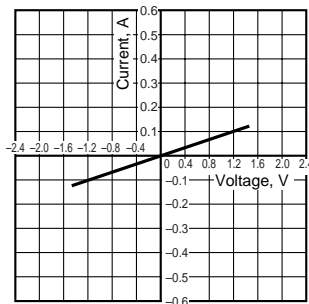
## 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



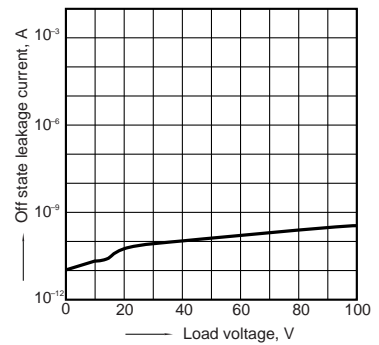
## 8. Voltage vs. current characteristics of output at MOS portion

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



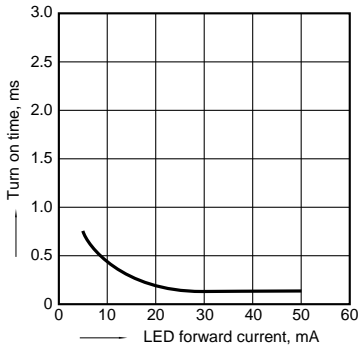
## 9. Off state leakage current

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



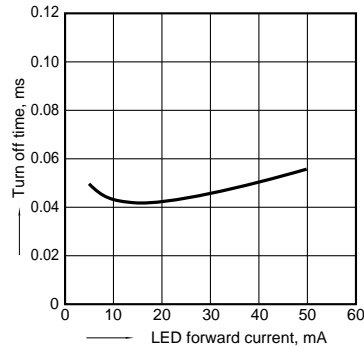
## 10. LED forward current vs. turn on time characteristics

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



## 11. LED forward current vs. turn 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



## 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

