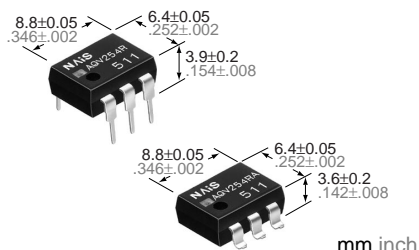




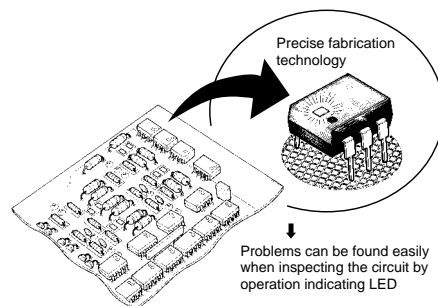
# NAIS

## HE (High-function Economy) Type [1-Channel (Form A) Type] —With LED Display—

# PhotoMOS RELAYS



- **Controls low-level analog signals**  
PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low level voltage signals or analog signals without distortion.
- **High sensitivity and low on resistance**  
A stable relay that has a low on resistance of 16 Ω, no metal contacts, and the ability to control a maximum load current of 0.25 A with an input current of 5 mA.
- **Low-level off state leakage current**  
In contrast to the SSR with its off state leakage current of several milliamps, the PhotoMOS relay features a very small off state leakage current of only 100 pA even at a high load voltage of 400 V.



## FEATURES

- **Low on resistance and LED display**
- **Same compact size of our conventional relays without LED display**  
(W) 6.4×(D) 8.8×(H) 3.9 mm (W) 0.252×(D) 0.346×(H) 0.154 inch.

## TYPICAL APPLICATIONS

- Telephones
- Measuring instruments
- Game machines
- High-speed inspection machines
- Industrial equipment

## TYPES

Type	Output rating*		Part No.				Packing quantity	
			Through hole terminal	Surface-mount terminal			Tube	Tape and reel
	Load voltage	Load current	Tube packing style	Tape and reel packing style				
				Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side			
AC/DC type	400 V	150 mA	AQV254R	AQV254RA	AQV254RAX	AQV254RAZ	1 tube contains 50 pcs. 1 batch contains 500 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)

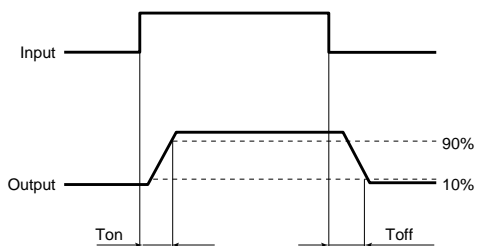
Item	Symbol	Type of connection	AQV254R(A)	Remarks	
Input	LED forward current	I <sub>F</sub>	25 mA	f = 100 Hz, Duty factor = 0.1%	
	LED reverse voltage	V <sub>R</sub>	3 V		
	Peak forward current	I <sub>FP</sub>	60 mA		
	Power dissipation	P <sub>in</sub>	90 mW		
Output	Load voltage (peak AC)	V <sub>L</sub>	400 V	A connection: Peak AC, DC B, C connection: DC	
	Continuous load current	I <sub>L</sub>	A		0.15 A
			B		0.18 A
			C		0.25 A
	Peak load current	I <sub>peak</sub>			0.5 A
Power dissipation	P <sub>out</sub>		360 mW		
Total power dissipation	P <sub>T</sub>		410 mW		
I/O isolation voltage	V <sub>iso</sub>		1,500 V AC		
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	Type of connection	AQV254R(A)	Remarks		
Input	LED operate current	Typical	I <sub>Fon</sub>	—	1.0 mA	I <sub>L</sub> = Max.		
		Maximum			3.0 mA			
	LED turn off current	Minimum	I <sub>Foff</sub>	—	0.4 mA	I <sub>L</sub> = Max.		
		Typical			0.9 mA			
	LED dropout voltage	Typical	V <sub>F</sub>	—	2.8 V	I <sub>F</sub> = 5 mA		
		Maximum			3.5 V			
Output	On resistance	Typical	R <sub>on</sub>	A	12.4 Ω	I <sub>F</sub> = 5 mA I <sub>L</sub> = Max. Within 1 s on time		
		Maximum			16 Ω			
		Typical	R <sub>on</sub>	B	6.2 Ω			
		Maximum			8 Ω			
	Off state leakage current	Maximum	I <sub>Leak</sub>	—	1 μA	I <sub>F</sub> = 0 V <sub>L</sub> = Max.		
		Minimum			4 Ω			
	Transfer characteristics	Switching speed	Turn on time*	Typical	T <sub>on</sub>	—	0.8 ms	I <sub>F</sub> = 5 mA I <sub>L</sub> = Max.
				Maximum			2 ms	
Turn off time*			Typical	T <sub>off</sub>	—	0.05 ms	I <sub>F</sub> = 5 mA I <sub>L</sub> = Max.	
			Maximum			0.2 ms		
I/O capacitance		Typical	C <sub>iso</sub>	—	1.3 pF	f = 1 MHz V <sub>B</sub> = 0		
		Maximum			3 pF			
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 type of connection, see Page 444.



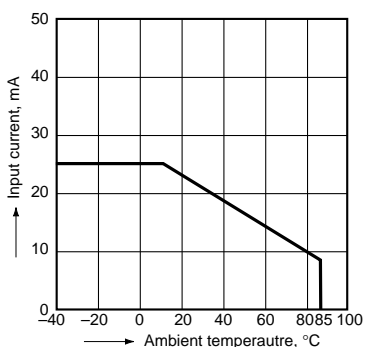
- For Dimensions, see Page 440.
- For Schematic and Wiring Diagrams, see Page 444.
- For Cautions for Use, see Page 449.

**REFERENCE DATA**

1. Input current vs. ambient temperature characteristics

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

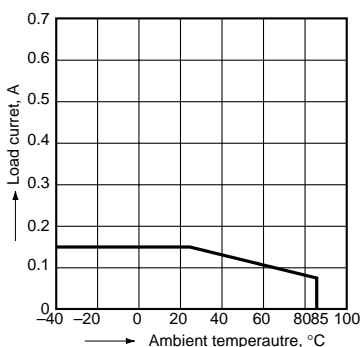
Type of connection: A



2. Load current vs. ambient temperature characteristics

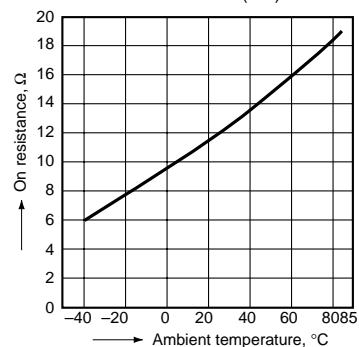
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F;

Type of connection: A



3. On resistance vs. ambient temperature characteristics

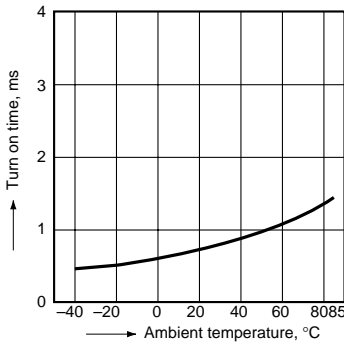
Measured portion: between terminals 4 and 6;  
LED current: 5 mA;  
Load voltage: 400 V (DC);  
Continuous load current: 150 mA (DC)



# AQV254R

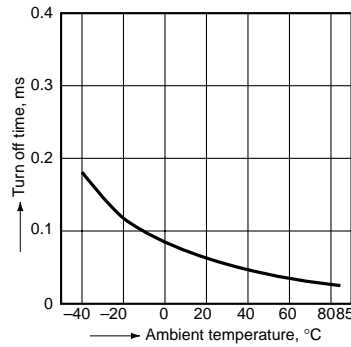
## 4. Turn on time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 400 V (DC);  
Continuous load current: 150 mA (DC)



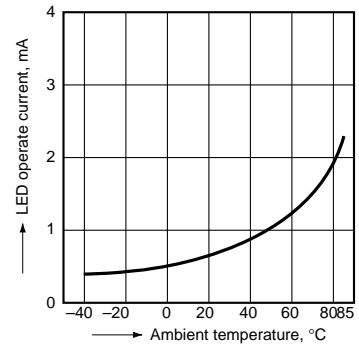
## 5. Turn off time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 400 V (DC);  
Continuous load current: 150 mA (DC)



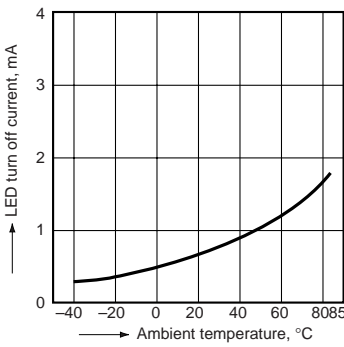
## 6. LED operate vs. ambient temperature characteristics

Load voltage: 400 V (DC);  
Continuous load current: 150 mA (DC)



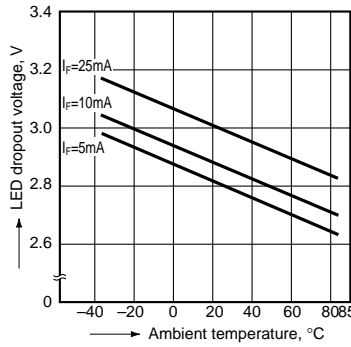
## 7. LED turn off current vs. ambient temperature characteristics

Load voltage: 400 V (DC);  
Continuous load current: 150 mA (DC)



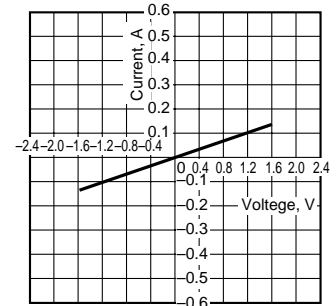
## 8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 25 mA



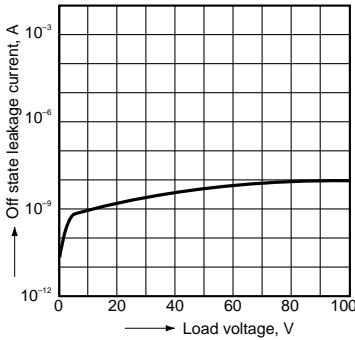
## 9. Voltage vs. current characteristics of output at MOS portion

Measured portion: between terminals 4 and 6;  
Ambient temperature: 25°C 77°F



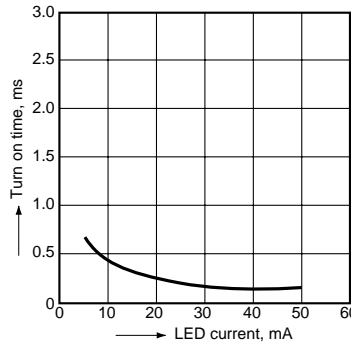
## 10. Off state leakage current

Measured portion: between terminals 4 and 6;  
Ambient temperature: 25°C 77°F



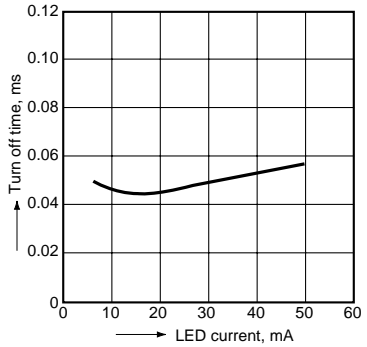
## 11. LED forward current vs. turn on time characteristics

Measured portion: between terminals 4 and 6;  
Load voltage: 400 V (DC);  
Continuous load current: 150 mA (DC);  
Ambient temperature: 25°C 77°F



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

Measured portion: between terminals 4 and 6;  
Load voltage: 400 V (DC);  
Continuous load current: 150 mA (DC);  
Ambient temperature: 25°C 77°F



## 13. Applied voltage vs. output capacitance characteristics

Measured portion: between terminals 4 and 6;  
Frequency: 1 MHz;  
Ambient temperature: 25°C 77°F

