



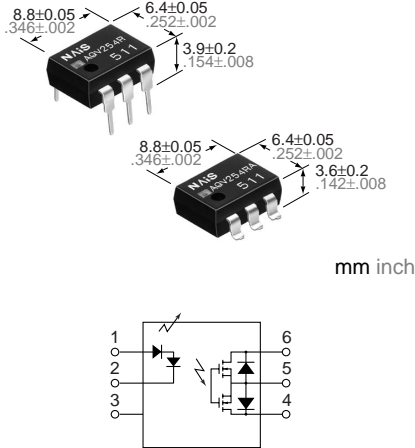
# THE DATASHEET OF AQV254RA



# NAIS

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

# PhotoMOS RELAYS

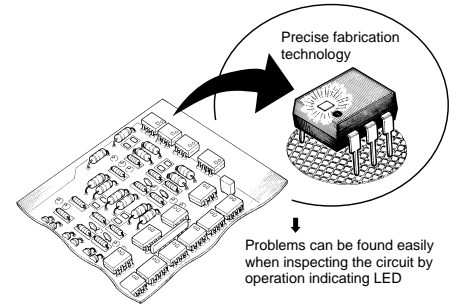


mm inch

### 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.
- **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.



### 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	$I_F$		25 mA	f = 100 Hz, Duty factor = 0.1%	
	LED reverse voltage	$V_R$		3 V		
	Peak forward current	$I_{FP}$		60 mA		
	Power dissipation	$P_{in}$		90 mW		
Output	Load voltage (peak AC)	$V_L$		400 V	A connection: Peak AC, DC B, C connection: DC	
	Continuous load current	$I_L$		A		0.15 A
				B		0.18 A
				C		0.25 A
	Peak load current	$I_{peak}$				0.5 A
Power dissipation	$P_{out}$		360 mW			
Total power dissipation		$P_T$		410 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		

# AQV254R

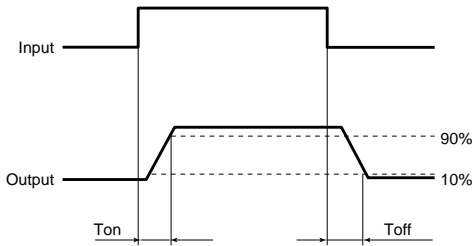
## 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item			Symbol	Type of connection	AQV254R(A)	Remarks	
Input	LED operate current	Typical	$I_{Fon}$	—	1.0 mA	$I_L = \text{Max.}$	
		Maximum			3.0 mA		
	LED turn off current	Minimum	$I_{Foff}$	—	0.4 mA	$I_L = \text{Max.}$	
		Typical			0.9 mA		
	LED dropout voltage	Typical	$V_F$	—	2.8 V	$I_F = 5 \text{ mA}$	
		Maximum			3.5 V		
Output	On resistance	Typical	$R_{on}$	A	12.4 $\Omega$	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time	
		Maximum			16 $\Omega$		
		Typical	$R_{on}$	B	6.2 $\Omega$	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time	
		Maximum			8 $\Omega$		
		Typical	$R_{on}$	C	3.1 $\Omega$	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time	
		Maximum			4 $\Omega$		
	Off state leakage current	Maximum	$I_{Leak}$	—	1 $\mu\text{A}$	$I_F = 0$ $V_L = \text{Max.}$	
	Transfer characteristics	Switching speed	Turn on time*	$T_{on}$	—	0.8 ms	$I_F = 5 \text{ mA}$
						Maximum	2 ms
Turn off time*			$T_{off}$	—	0.05 ms	$I_F = 5 \text{ mA}$	
					Maximum	0.2 ms	$I_L = \text{Max.}$
I/O capacitance		Typical	$C_{iso}$	—	1.3 pF	$f = 1 \text{ MHz}$	
		Maximum			3 pF	$V_B = 0$	
Initial I/O isolation resistance	Minimum	$R_{iso}$	—	1,000 M $\Omega$	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

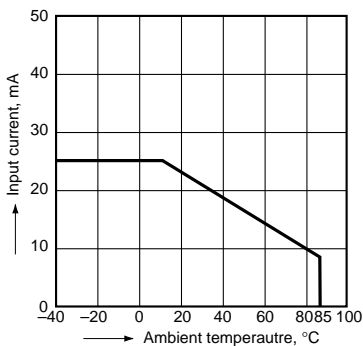


## REFERENCE DATA

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

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

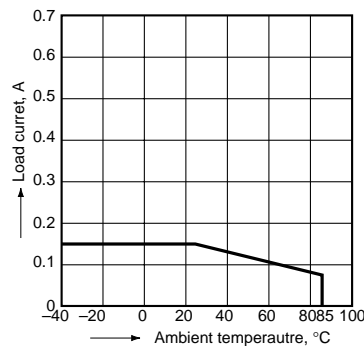
Type of connection: A



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

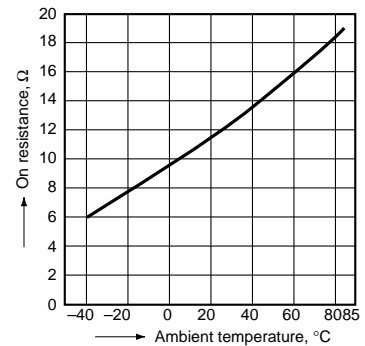
Allowable ambient temperature:  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$   
 $-40^\circ\text{F}$  to  $+185^\circ\text{F}$ ;

Type of connection: A



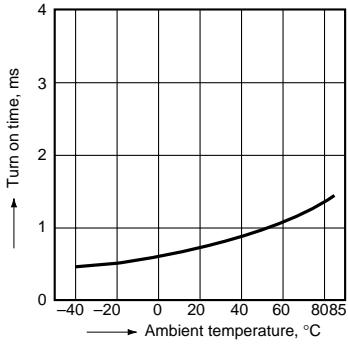
### 3. On resistance vs. ambient temperature characteristics

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



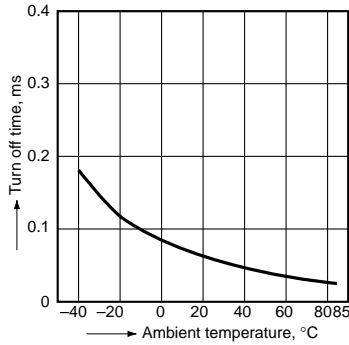
4. Turn on time vs. ambient temperature characteristics

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



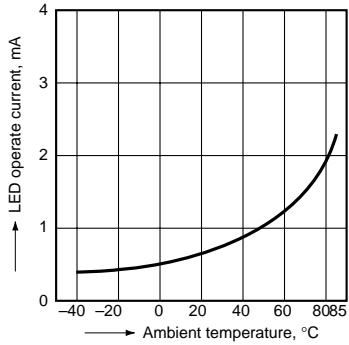
5. Turn off time vs. ambient temperature characteristics

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



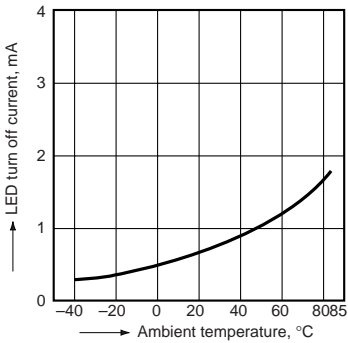
6. LED operate vs. ambient temperature characteristics

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



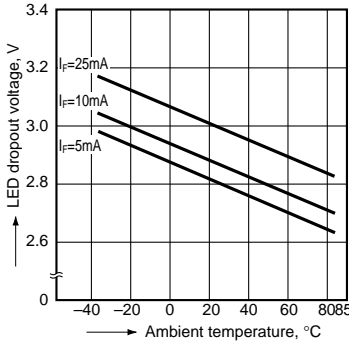
7. LED turn off current vs. ambient temperature characteristics

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



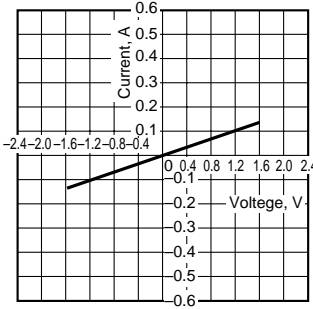
8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 25 mA



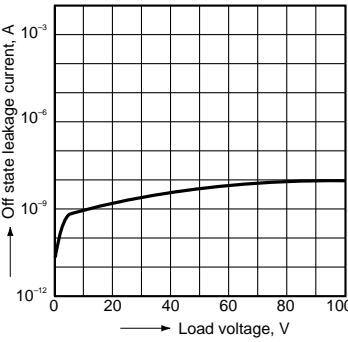
9. Voltage vs. current characteristics of output at MOS portion

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



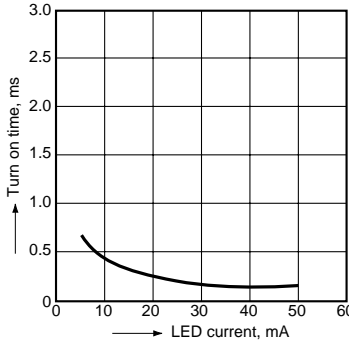
10. Off state leakage current

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



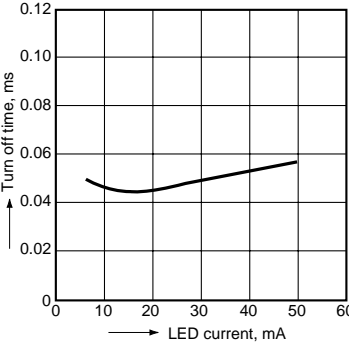
11. LED forward current vs. turn on time characteristics

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



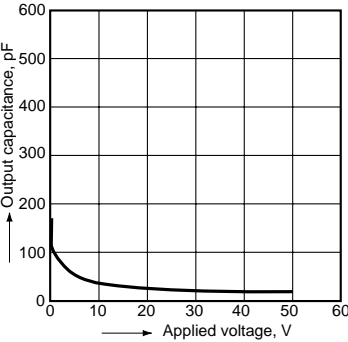
12. LED forward current vs. turn off time characteristics

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



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