

# NAiS

## POWER PhotoMOS RELAYS (High capacity type)

# PhotoMOS RELAYS

### FEATURES

#### 1. High capacity type power photoMOS relay.

Can switch a wide range of currents and voltages. Can control various types of loads, from very small loads to a maximum 6A AC/DC current for sequencers, motors, and lamps.

#### 2. Low ON resistance and high sensitivity.

Low ON resistance of less than 50 mW on a par with mechanical relays (AQZ262). High sensitivity LED operate current of 3 mA (at 25°C 77°F).

#### 3. AC/DC dual use

Bi-directional control is possible. There is no need to differentiate depending on the load as was necessary with the conventional SSR.

#### 4. 4-pin SIL type.

4-pin SIL type of (L) 43.0 mm × (W) 9.0 mm × (H) 32.0 mm (L) 1.693 inch × (W) .354 inch × (H) 1.260 inch.

#### 5. Low-level off state leakage current

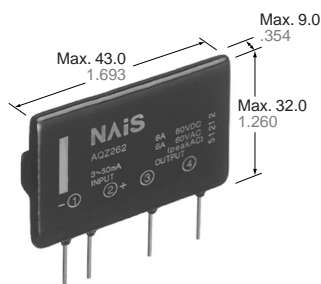
In contrast to the SSR with an off state leakage current of several milliamps, the PhotoMOS relay features a very small off state leakage current of only 10mA even at the rated load voltage.

#### 6. Controls low-level analog signals

The triac, photocoupler, or SSR cannot be used to control signals of less than several hundred mV. The high capacity type power PhotoMOS relay feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

### TYPICAL APPLICATIONS

- Mercury relay replacement
- Railroad, traffic signals
- Compact motors, lamps, heaters
- OA equipment
- Measurement instruments



mm inch

### TYPES

#### AC/DC type

Output rating*		Part No.	Packing quantity	
Load voltage	Load current		Inner carton	Outer carton
60 V	6.0 A	AQZ262	20 pcs	200 pcs
400 V	1.0 A	AQZ264		

\* Indicate the peak AC and DC values.

### RATING

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

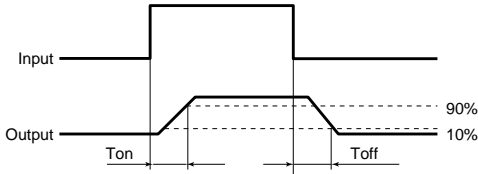
Item		Symbol	AQZ262	AQZ264	Remarks
Input	LED forward current	I <sub>F</sub>	50 mA		
	LED reverse voltage	V <sub>R</sub>	3 V		
	Peak forward current	I <sub>FP</sub>	1 A		f = 100Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>	75 mW		
Output	Load voltage (Peak AC)	V <sub>L</sub>	60 V	400 V	
	Continuous load current (Peak AC)	I <sub>L</sub>	6.0 A	1.0 A	
	Peak load current	I <sub>peak</sub>	10.0 A	3.0 A	100 ms (1shot), V <sub>L</sub> = DC
	Power dissipation	P <sub>out</sub>	3.0 W		
Total power dissipation		P <sub>T</sub>	3.0 W		
I/O isolation voltage		Viso	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	AQZ262	AQZ264	Remarks
Input	LED operate current	Typical	1.0 mA		$I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum	3.0 mA		
	LED turn off current	Minimum	0.4 mA		$I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Typical	0.9 mA		
LED dropout voltage	Typical	1.25 V (1.16 V at $I_F = 10 \text{ mA}$ )		$I_F = 50 \text{ mA}$	
	Maximum	1.5 V			
Output	On resistance	Typical	0.036 $\Omega$	1.0 $\Omega$	$I_F = 10 \text{ mA}$ $I_L = \text{max.}$ Within 1 s on time
		Maximum	0.05 $\Omega$	1.4 $\Omega$	
	Off state leakage current	Maximum	10 $\mu\text{A}$		$I_F = 0$ $V_L = \text{max.}$
Transfer characteristics	Turn on time*	Typical	5 ms	4 ms	$I_F = 10 \text{ mA}$ $I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum	10 ms		
	Turn off time*	Typical	0.32 ms	0.14 ms	$I_F = 10 \text{ mA}$ $I_L = 100 \text{ mA}$ $V_L = 10 \text{ V}$
		Maximum	3.0 ms		
	I/O capacitance	Typical	2.0 pF		$f = 1 \text{ MHz}$ $V_B = 0$
		Maximum	4.0 pF		
	Initial I/O isolation resistance	Minimum	1,000 M $\Omega$		500 V DC
Maximum operating frequency	Maximum	—		$I_F = 10 \text{ mA}$ Duty factor = 50% $I_L = \text{Max.}, V_L = \text{Max.}$	

Note: Recommendable LED forward current  $I_F = 5$  to 10 mA.

\*Turn on/off time

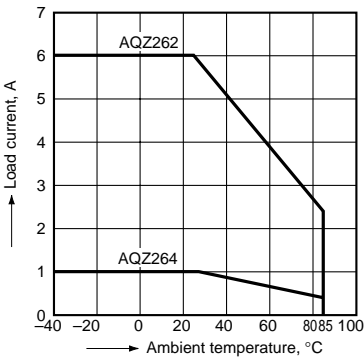


- For Dimensions, see Page 442.
- For Schematic and Wiring Diagrams, see Page 448.
- For Cautions for Use, see Page 453.

REFERENCE DATA

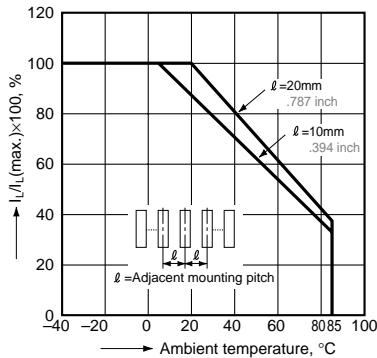
1. Load current vs. ambient temperature characteristics

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



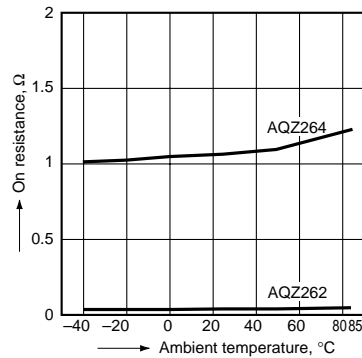
2. Load current vs. ambient temperature characteristics in adjacent mounting

$I_L$ : Load current;  
 $I_L(\text{max.})$ : Maximum continuous load current



3. On resistance vs. ambient temperature characteristics

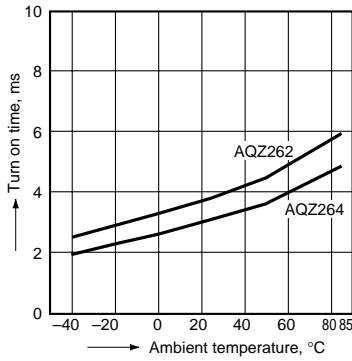
LED current: 10 mA;  
Continuous load current: 6A (DC)(AQZ262)  
1A (DC)(AQZ264)



# AQZ262, 264

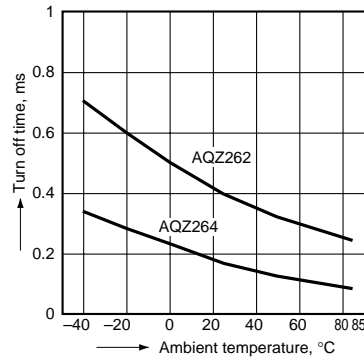
## 4. Turn on time vs. ambient temperature characteristics

LED current: 10 mA; Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC)



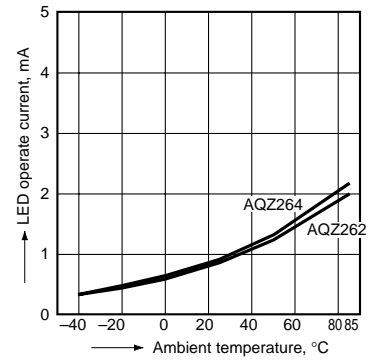
## 5. Turn off time vs. ambient temperature characteristics

LED current: 10 mA; Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC)



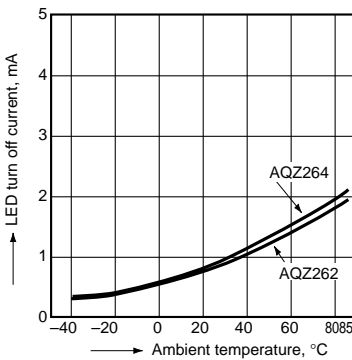
## 6. LED operate vs. ambient temperature characteristics

Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC)



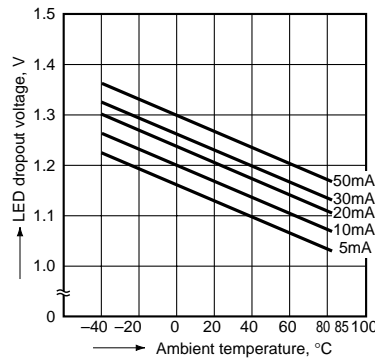
## 7. LED turn off current vs. ambient temperature characteristics

Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC)



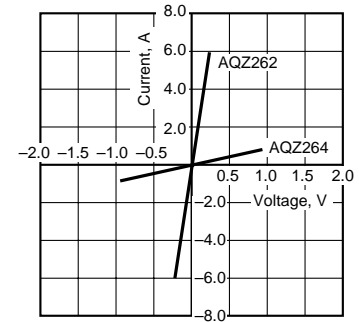
## 8. LED dropout voltage vs. ambient temperature characteristics

Sample: all types; LED current: 5 to 50 mA



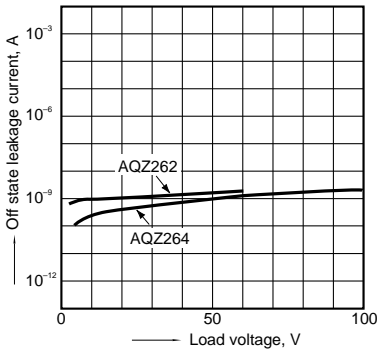
## 9. Voltage vs. current characteristics of output at MOS portion

Ambient temperature: 25°C 77°F



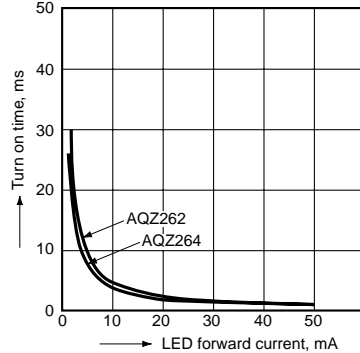
## 10. Off state leakage current

Ambient temperature: 25°C 77°F



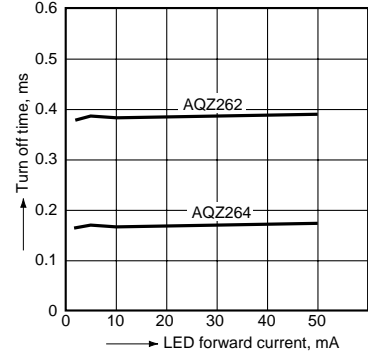
## 11. LED forward current vs. turn on time characteristics

Load voltage: 10 V (DC); Continuous load current: 100 mA (DC); Ambient temperature: 25°C 77°F



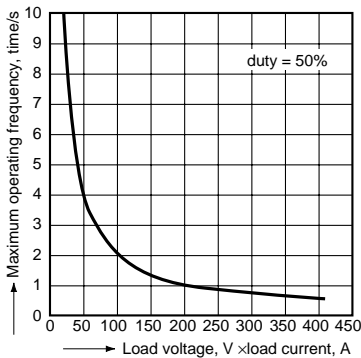
## 12. LED forward current vs. turn off time characteristics

Load voltage: 10 V (DC); Continuous load current: 100 mA (DC); Ambient temperature: 25°C 77°F



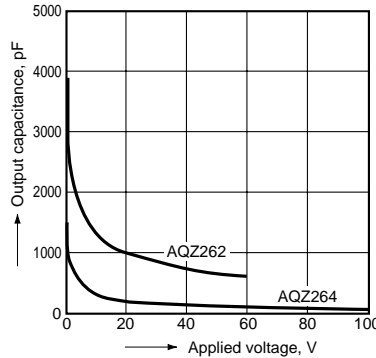
## 13. Maximum operating frequency vs. load voltage/current characteristics

LED current: 10 mA; Ambient temperature: 25°C 77°F



## 14. Applied voltage vs. output capacitance characteristics

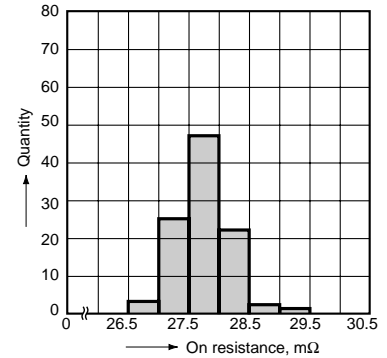
Frequency: 10 KHz; Ambient temperature: 25°C 77°F



## 15.-(1) On resistance distribution

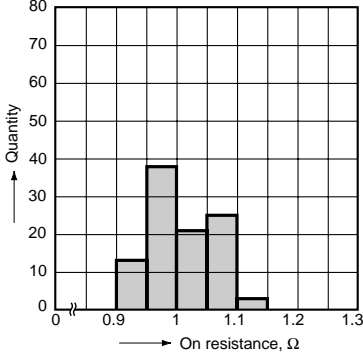
Sample: AQZ262

LED current: 10 mA; Continuous load current: 6 A (DC);  
Quantity: n=100; Ambient temperature: 25°C 77°F



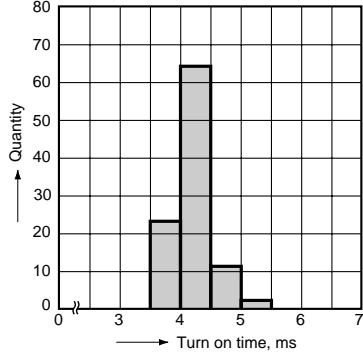
15.-(2) On resistance distribution

Sample: AQZ264  
LED current: 10 mA;  
Continuous load current: 1 A (DC); Quantity, n=100;  
Ambient temperature: 25°C 77°F



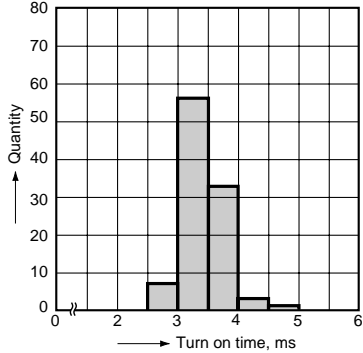
16.-(1) Turn on time distribution

Sample: AQZ262  
Load voltage: 10 V (DC); Continuous load current: 100 mA (DC); Quantity, n=100;  
Ambient temperature: 25°C 77°F



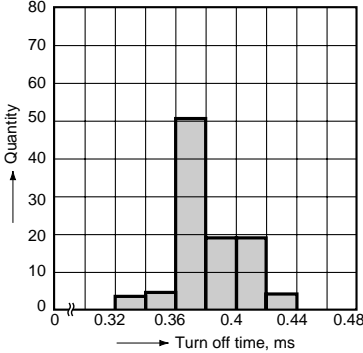
16.-(2) Turn on time distribution

Sample: AQZ264  
Load voltage: 10 V (DC); Continuous load current: 100 mA (DC); Quantity, n=100;  
Ambient temperature: 25°C 77°F



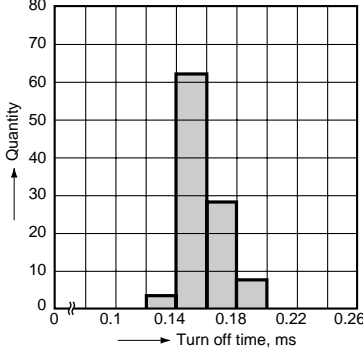
17.-(1) Turn off time distribution

Sample: AQZ262  
Load voltage: 10 V (DC); Continuous load current: 100 mA (DC); Quantity, n=100;  
Ambient temperature: 25°C 77°F



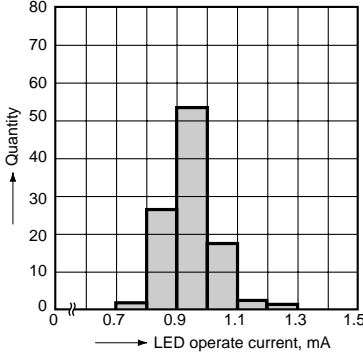
17.-(2) Turn off time distribution

Sample: AQZ264  
Load voltage: 10 V (DC); Continuous load current: 100 mA (DC); Quantity, n=100;  
Ambient temperature: 25°C 77°F



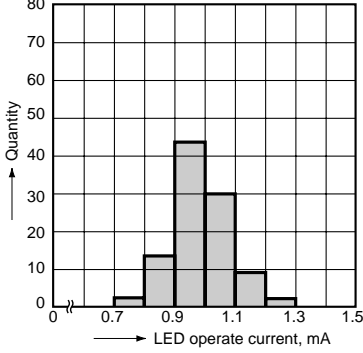
18.-(1) LED operate current distribution

Sample: AQZ262  
Load voltage: 10 V (DC); Continuous load current: 100 mA (DC); Quantity, n=100;  
Ambient temperature: 25°C 77°F



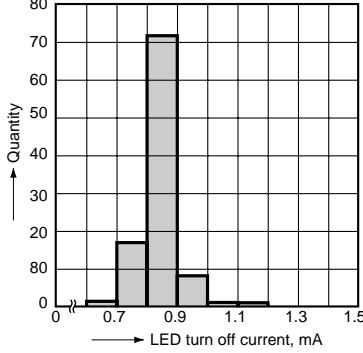
18.-(2) LED operate current distribution

Sample: AQZ264  
Load voltage: 10 V (DC); Continuous load current: 100 mA (DC); Quantity, n=100;  
Ambient temperature: 25°C 77°F



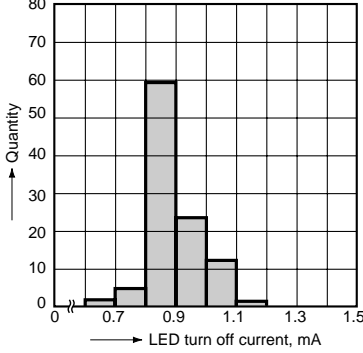
19.-(1) LED turn off current distribution

Sample: AQZ262  
Load voltage: 10 V (DC); Continuous load current: 100 mA (DC); Quantity, n=100;  
Ambient temperature: 25°C 77°F



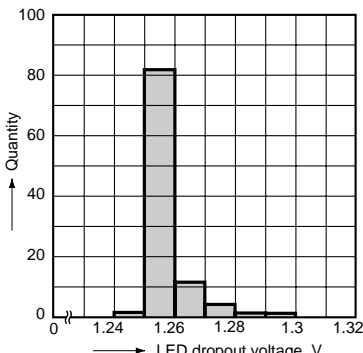
19.-(2) LED turn off current distribution

Sample: AQZ264  
Load voltage: 10 V (DC); Continuous load current: 100 mA (DC); Quantity, n=100;  
Ambient temperature: 25°C 77°F



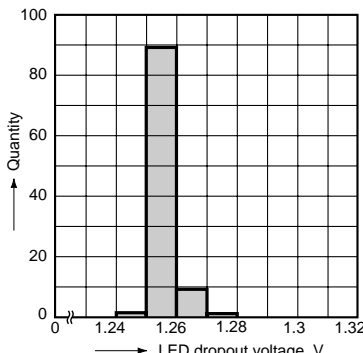
20.-(1) LED dropout voltage distribution

Sample: AQZ262  
LED current: 50 mA; Quantity, n=100;  
Ambient temperature: 25°C 77°F



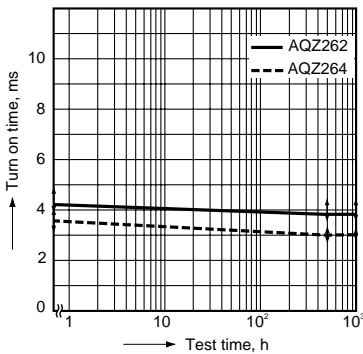
20.-(2) LED dropout voltage distribution

Sample: AQZ264  
LED current: 50 mA; Quantity, n=100;  
Ambient temperature: 25°C 77°F



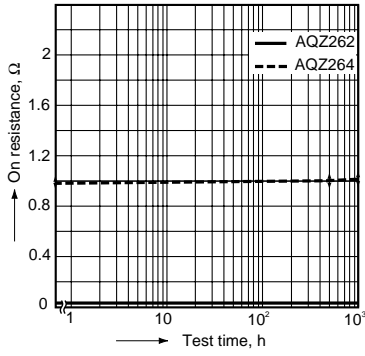
21.-(1) Bias test at high temperature and high humidity (change of turn on time)

Quantity, n=10; Ambient temperature: 85°C 185°F  
Humidity: 85%, VL=Max. x 0.8

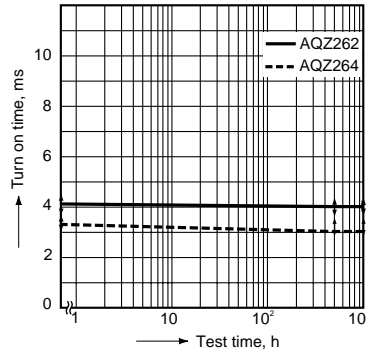


# AQZ262, 264

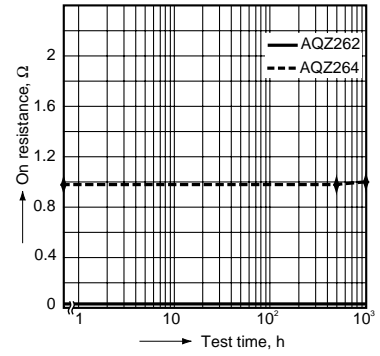
21.-(2) Bias test at high temperature and high humidity (change of on resistance)  
 Quantity, n=10; Ambient temperature: 85 °C 185°F  
 Humidity: 85%, VL=Max. × 0.8



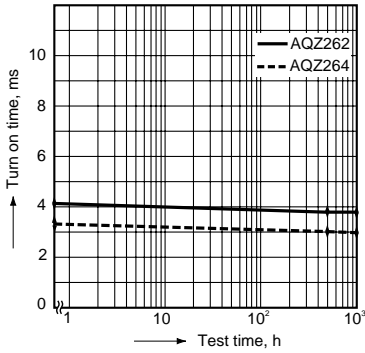
22.-(1) Low temperature storage test (change of turn on time)  
 Quantity, n=10; Ambient temperature: -40°C -40°F



22.-(2) Low temperature storage test (change of on resistance)  
 Quantity, n=10; Ambient temperature: -40°C -40°F



23.-(1) High temperature storage test (change of turn on time)  
 Quantity, n=10; Ambient temperature: 100°C 212°F



23.-(2) High temperature storage test (change of on resistance)  
 Quantity, n=10; Ambient temperature: 100°C 212°F

