

### FEATURES

#### 1. High frequency characteristics with low capacitance between output terminals

Low capacitance: Typ. 5 pF (between output terminals)

Isolation loss: 40 dB or more (at 1 MHz)

#### 2. High sensitivity, high speed response

Controls load current of 0.12 A (max.), with input current of 5 mA.

Operate time is 100 μs (Typical)

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

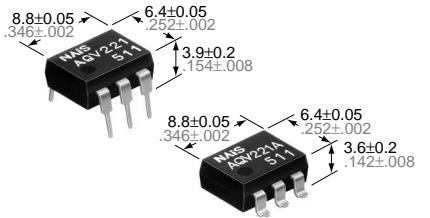
PhotoMOS AQV22○ types exhibit an OFF state leakage current in the order of 100 picoamperes at a load voltage of 80 V compared with several milliamperes in solid-state relay.

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

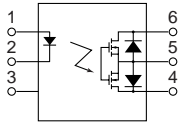
PhotoMOS relay features extremely low closed-circuit offset voltages to enable control of small analog signals without distortion.

#### 5. Low terminal electromotive force (Approx. 1 mV)

#### 6. Small LED voltage drop on input side (Max. 1.5 V)



mm inch



### TYPICAL APPLICATIONS

- Measuring devices  
Scanner, IC checker, Board tester
- Audio visual equipment  
CD, VCR

### TYPES

Type	Output rating*		Part No.				Packing quantity	
	Load voltage	Load current	Through hole terminal	Surface-mount terminal			Tube	Tape and reel
			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	40 V	80 mA	AQV221	AQV221A	AQV221AX	AQV221AZ	1 tube contains 50 pcs. 1 batch contains 500 pcs.	1,000 pcs
	80 V	50 mA	AQV225	AQV225A	AQV225AX	AQV225AZ		

\*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	AQV221(A)	AQV225(A)	Remarks	
Input	LED forward current	$I_F$		50 mA		f = 100 Hz, Duty factor = 0.1%	
	LED reverse voltage	$V_R$		3 V			
	Peak forward current	$I_{FP}$		1 A			
	Power dissipation	$P_{in}$		75 mW			
Output	Load voltage (Peak AC)	$V_L$		40 V	80 V	A connection: Peak AC, DC B, C connection: DC	
	Continuous load current	$I_L$		A	0.08 A		0.05 A
				B	0.09 A		0.06 A
				C	0.12 A		0.075 A
	Peak load current	$I_{peak}$			0.18 A		0.15 A
Power dissipation	$P_{out}$		230 mW				
Total power dissipation		$P_T$		280 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			

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

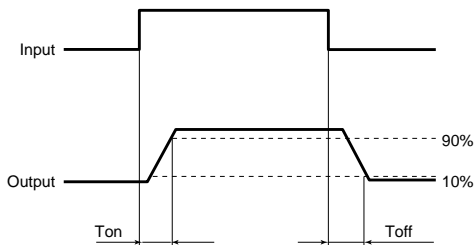
Item			Symbol	Type of connection	AQV221(A)	AQV225(A)	Remarks	
Input	LED operate current	Typical	I <sub>Fon</sub>	—	0.9 mA		I <sub>L</sub> = Max.	
		Maximum			3 mA			
	LED turn off current	Minimum	I <sub>Foff</sub>	—	0.4 mA		I <sub>L</sub> = Max.	
		Typical			0.85 mA			
	LED dropout voltage	Typical	V <sub>F</sub>	—	1.14 V**		I <sub>F</sub> = 5 mA	
		Maximum			1.5 V			
Output	On resistance	Typical	R <sub>on</sub>	A	22 Ω	36 Ω	I <sub>F</sub> = 5 mA I <sub>L</sub> = Max. Within 1 s on time	
		Maximum			35 Ω	50 Ω		
		Typical	R <sub>on</sub>	B	13 Ω	21 Ω	I <sub>F</sub> = 5 mA I <sub>L</sub> = Max. Within 1 s on time	
		Maximum			18 Ω	25 Ω		
		Typical	R <sub>on</sub>	C	6.5 Ω	10.5 Ω	I <sub>F</sub> = 5 mA I <sub>L</sub> = Max. Within 1 s on time	
		Maximum			9 Ω	12.5 Ω		
	Output capacitance	Typical	C <sub>out</sub>	—	5.6 pF	4.8 pF	I <sub>F</sub> = 0 V <sub>B</sub> = 0 f = 1 MHz	
		Maximum			8 pF			
	Off state leakage current	Typical	I <sub>Leak</sub>	—	30 pA		I <sub>F</sub> = 0 V <sub>L</sub> = Max.	
		Maximum			10 nA			
Transfer characteristics	Switching speed	Turn on time*	Typical	T <sub>on</sub>	—	0.10 ms		I <sub>F</sub> = 5 mA I <sub>L</sub> = Max.
			Maximum			0.3 ms		
		Turn off time*	Typical	T <sub>off</sub>	—	0.03 ms		I <sub>F</sub> = 5 mA I <sub>L</sub> = Max.
			Maximum			0.1 ms		
	I/O capacitance	Typical	C <sub>iso</sub>	—	0.8 pF		f = 1 MHz V <sub>B</sub> = 0	
		Maximum			1.5 pF			
	Initial I/O isolation resistance		Minimum	R <sub>iso</sub>	—	1,000 MΩ		500 V DC

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

For type of connection, see Page 31.

\*Turn on/Turn off time

\*\*1.25 V at I<sub>F</sub> = 50 mA



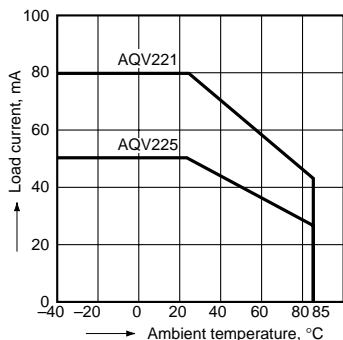
- For Dimensions, see Page 27.
- For Schematic and Wiring Diagrams, see Page 31.
- For Cautions for Use, see Page 36.

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

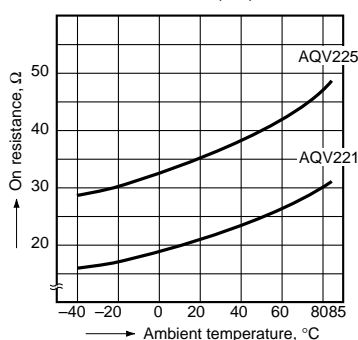
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F

Type of connection: A



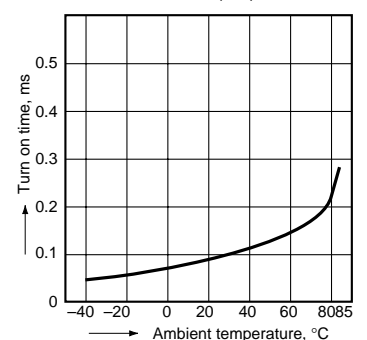
2. On resistance vs. ambient temperature characteristics

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



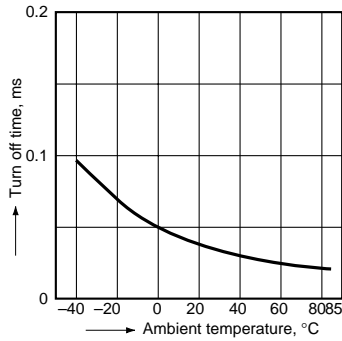
3. Turn on time vs. ambient temperature characteristics

Sample: AQV221, AQV225; LED current: 5 mA;  
Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



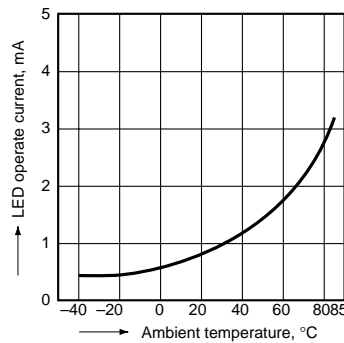
## 4. Turn off time vs. ambient temperature characteristics

Sample: AQV221, AQV225; LED current: 5 mA;  
Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



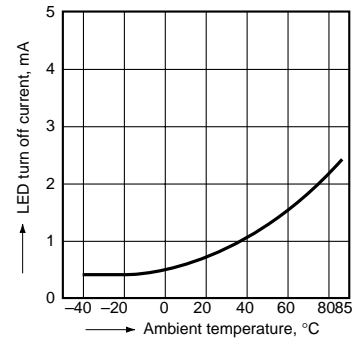
## 5. LED operate current vs. ambient temperature characteristics

Sample: AQV221, AQV225;  
Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



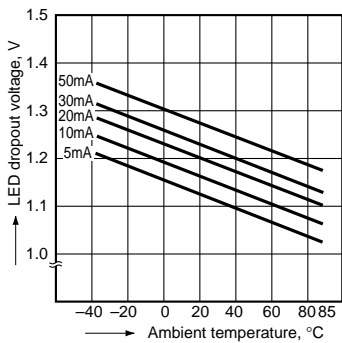
## 6. LED turn off current vs. ambient temperature characteristics

Sample: AQV221, AQV225;  
Load voltage: Max. (DC);  
Continuous load current: Max. (DC)



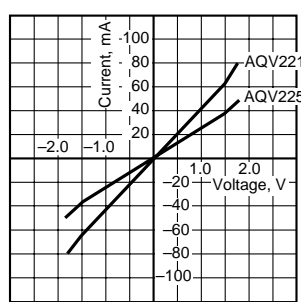
## 7. LED dropout voltage vs. ambient temperature characteristics

Sample: AQV221, AQV225;  
LED current: 5 to 50 mA



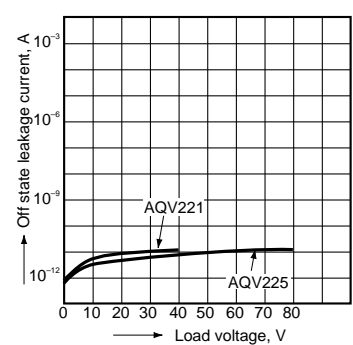
## 8. Voltage vs. current characteristics of output at MOS portion

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



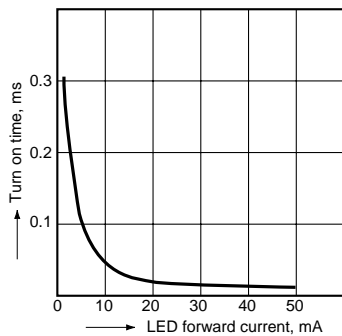
## 9. Off state leakage current

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



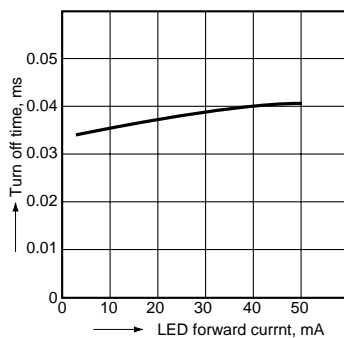
## 10. LED forward current vs. turn on time characteristics

Sample: AQV221, AQV225;  
Measured portion: between terminals 4 and 6;  
Load voltage: Max. (DC);  
Continuous load current: Max. (DC);  
Ambient temperature: 25°C 77°F



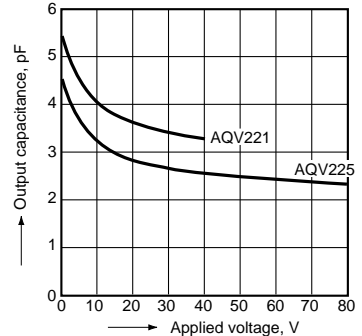
## 11. LED forward current vs. turn off time characteristics

Sample: AQV221, AQV225;  
Measured portion: between terminals 4 and 6;  
Load voltage: Max. (DC);  
Continuous load current: Max. (DC);  
Ambient temperature: 25°C 77°F



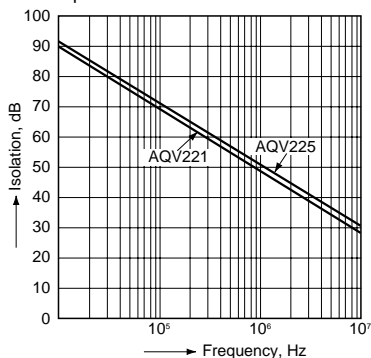
## 12. Applied voltage vs. output capacitance characteristics

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



## 13. Isolation characteristics (50Ω impedance)

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



## 14. Insertion loss characteristics (50Ω impedance)

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

