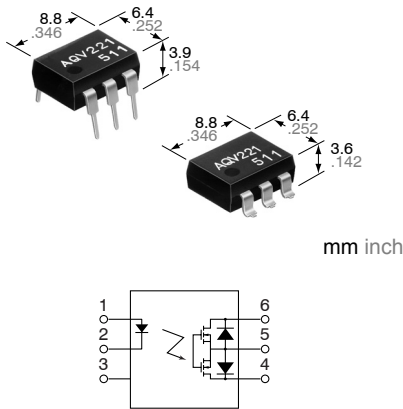


High speed switching.  
(Turn on time: 0.1ms,  
Turn off time: 0.03ms).

## RF PhotoMOS (AQV22○)



### 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)**

### 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 SMD terminal shape indicator "A" and the package style indicator "X" or "Z" are not marked on the relay.

### 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			
	LED reverse voltage	$V_R$		5 V			
	Peak forward current	$I_{FP}$		1 A		f = 100 Hz, Duty factor = 0.1%	
	Power dissipation	$P_{in}$		75 mW			
Output	Load voltage (Peak AC)	$V_L$		40 V	80 V		
	Continuous load current	$I_L$		A	0.08 A	0.05 A	A connection: Peak AC, DC B, C connection: DC
				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	A connection: 100 ms (1 shot), $V_L = DC$
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			

# RF PhotoMOS (AQV22○)

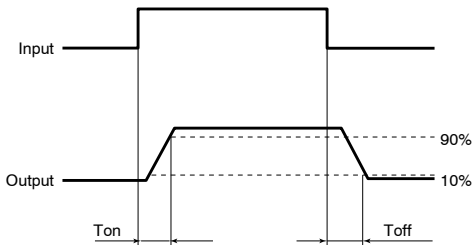
## 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item		Symbol	Type of connection	AQV221(A)	AQV225(A)	Remarks	
Input	LED operate current	Typical	$I_{Fon}$	0.9 mA		$I_L = \text{Max.}$	
		Maximum		3 mA			
	LED turn off current	Minimum	$I_{Foff}$	0.4 mA		$I_L = \text{Max.}$	
		Typical		0.85 mA			
LED dropout voltage	Typical	$V_F$	1.25 V (1.14 V at $I_F = 5 \text{ mA}$ )		$I_F = 50 \text{ mA}$		
	Maximum		1.5 V				
Output	On resistance	Typical	$R_{on}$	A	22 $\Omega$	36 $\Omega$	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time
		Maximum		35 $\Omega$	50 $\Omega$		
		Typical	$R_{on}$	B	13 $\Omega$	21 $\Omega$	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time
		Maximum		18 $\Omega$	25 $\Omega$		
	Typical	$R_{on}$	C	6.5 $\Omega$	10.5 $\Omega$	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time	
	Maximum		9 $\Omega$	12.5 $\Omega$			
	Output capacitance	Typical	$C_{out}$	5.6 pF		$I_F = 0 \text{ mA}$ $V_B = 0 \text{ V}$ $f = 1 \text{ MHz}$	
		Maximum		8 pF			
Off state leakage current	Typical	$I_{Leak}$	30 pA		$I_F = 0 \text{ mA}$ $V_L = \text{Max.}$		
	Maximum		10 nA				
Transfer characteristics	Switching speed	Turn on time*	$T_{on}$	0.10 ms		$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$	
				0.3 ms			
		Turn off time*	$T_{off}$	0.03 ms		$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$	
				0.1 ms			
	I/O capacitance	Typical	$C_{iso}$	0.8 pF		$f = 1 \text{ MHz}$ $V_B = 0 \text{ V}$	
		Maximum		1.5 pF			
Initial I/O isolation resistance	Minimum	$R_{iso}$	1,000 M $\Omega$		500 V DC		

Recommendable LED forward current  $I_F = 5 \text{ mA}$ .

Type of connection

\*Turn on/Turn off time



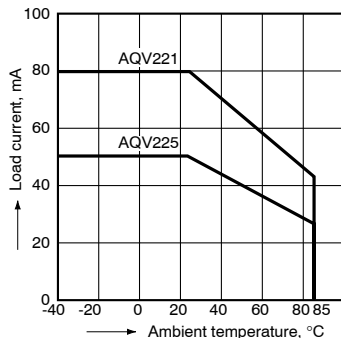
- Dimensions
- Schematic and Wiring Diagrams
- Cautions for Use

## REFERENCE DATA

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

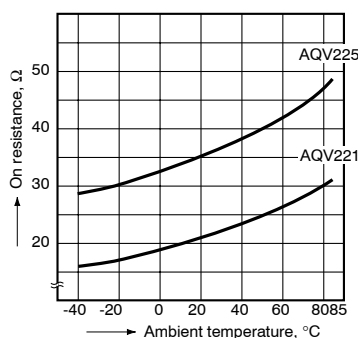
Allowable ambient temperature:  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$   
 $-40^\circ\text{F}$  to  $+185^\circ\text{F}$

Type of connection: A



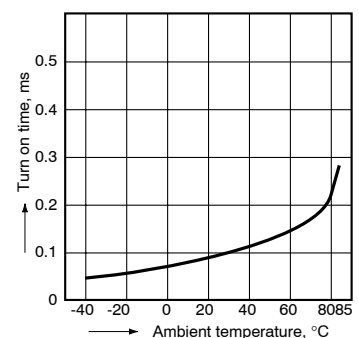
### 2. On resistance vs. ambient temperature characteristics

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



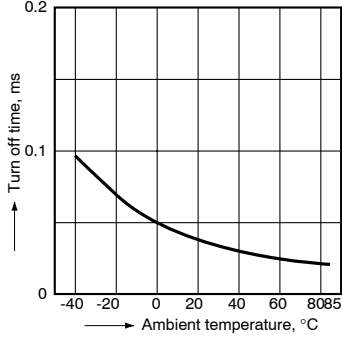
### 3. Turn on time vs. ambient temperature characteristics

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



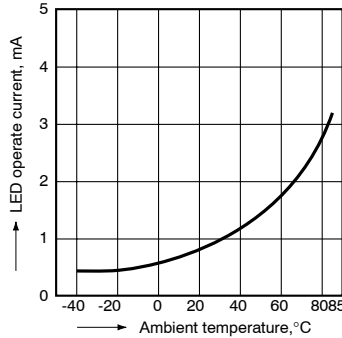
## 4. Turn off time vs. ambient temperature characteristics

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



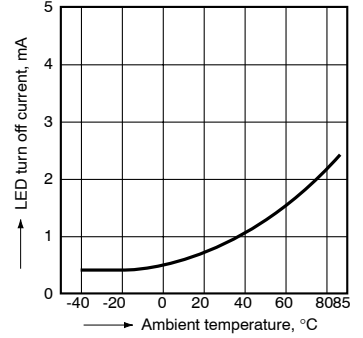
## 5. LED operate current vs. ambient temperature characteristics

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



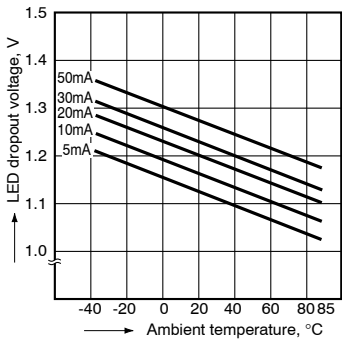
## 6. LED turn off current vs. ambient temperature characteristics

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



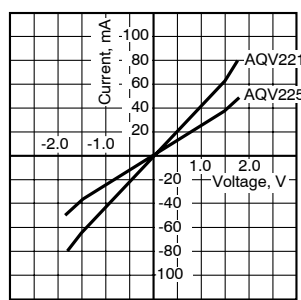
## 7. LED dropout voltage vs. ambient temperature characteristics

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



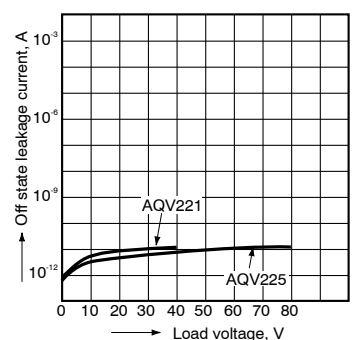
## 8. Current vs. voltage characteristics of output at MOS portion

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



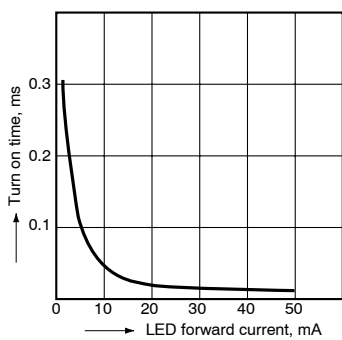
## 9. Off state leakage current vs. load voltage characteristics

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



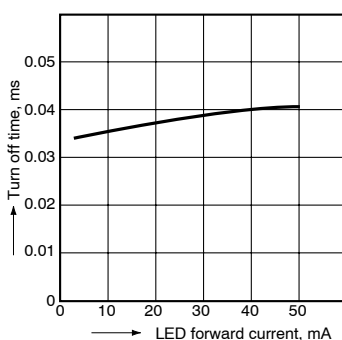
## 10. Turn on time vs. LED forward current characteristics

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



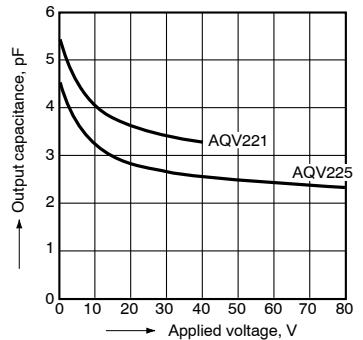
## 11. Turn off time vs. LED forward current characteristics

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



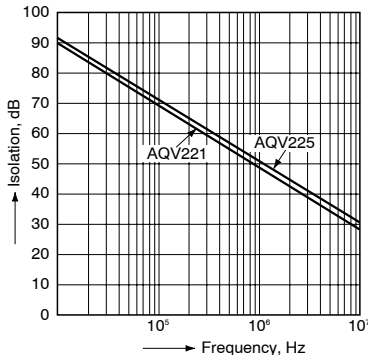
## 12. Output capacitance vs. applied voltage characteristics

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



## 13. Isolation vs. frequency characteristics (50Ω impedance)

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



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

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

