

NAiS

RF (Radio Frequency) Type Low C and R

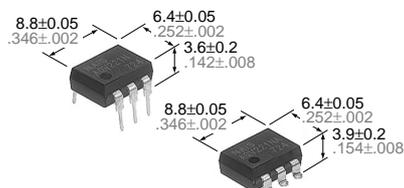
PhotoMOS RELAYS

FEATURES

- 1. Low output capacitance between output terminals and low ON-resistance**
- 2. High speed switching (Turn on time: typ. 200µs)**
- 3. High sensitivity**
Control loads up to 250mA with input current 5mA
- 4. Low-level off state leakage current**
The SSR has an off state leakage current of several milliamperes, where as this PhotoMOS relay has only 20pA (typical) even with the rated load voltage
- 5. Controls low-level analog signals**
PhotoMOS relays features extremely low-closed-circuit offset voltage to enable control of low-level analog signals without distortion
- 6. Low thermal electromotive force (Approx. 1 µV)**

TYPICAL APPLICATIONS

- Measuring and testing equipment**
- Testing equipment for semiconductor performance
IC tester, Liquid crystal driver tester, semiconductor performance tester
 - Board tester
Bear board tester, In-circuit tester, function tester
 - Medical equipment
Ultrasonic wave diagnostic machine
 - Multi-point recorder
(warping, thermo couple)



mm inch

TYPES

Type	Output rating*		Part No.				Packing quantity	
			Through hole terminal	Surface-mount terminal		Tube		
	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	40 V	150 mA	AQV221N	AQV221NA	AQV221NAX	AQV221NAZ	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	AQV221N(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	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}		0.45 A		A connection: 100 ms (1 shot), V _L = DC
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		

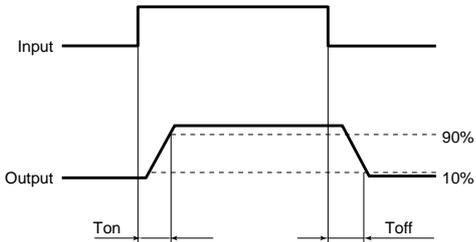
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item			Symbol	Type of connection**	AQV221N(A)	Remarks		
Input	LED operate current	Typical	I _{Fon}	—	0.90 mA	I _L = Max.		
		Maximum			3.0 mA			
	LED turn off current	Minimum	I _{Foff}	—	0.4 mA	I _L = Max.		
		Typical			0.85 mA			
	LED dropout voltage	Typical	V _F	—	1.14 V (1.25 V at I _F = 50 mA)		I _F = 5 mA	
Maximum		1.5 V						
Output	On resistance #	Typical	R _{on}	A	9.8 Ω	I _F = 0 mA I _L = Max. Within 1 s on time		
		Maximum			15 Ω			
		Typical	R _{on}	B	5 Ω			
		Maximum			7.5 Ω			
	Output capacitance #	Typical	C _{out}	A	3.9 pF	I _F = 0 V _B = 0V f = 1 MHz		
		Maximum			5 pF			
	Off state leakage current	Typical	I _{Leak}	—	20 pA	I _F = 0 V _L = Max.		
		Maximum			10 nA			
	Transfer characteristics	Switching speed	Turn on time*	Typical	T _{on}	—	0.2 ms	I _F = 5 mA I _L = Max.
				Maximum			0.5 ms	
Turn off time*			Typical	T _{off}	—	0.08 ms	I _F = 5 mA I _L = Max.	
			Maximum			0.2 ms		
I/O capacitance		Typical	C _{iso}	—	0.8 pF	f = 1 MHz V _B = 0		
		Maximum			1.5 pF			
Initial I/O isolation resistance	Minimum	R _{iso}	—	1,000 MΩ	500 V DC			

Note: Recommendable LED forward current I_F = 5mA

**For type of connection, see Page 444.

*Turn on/Turn off time



Other types of products than the C_{out} (typ. 3.9pF) and R_{on} (A connection typ. 9.8 ohm) combinations carried in this catalog are also available. (There is a trade-off between R_{on} and C_{out} both cannot be reduced at the same time.) For more information, please contact our sales office in your area.

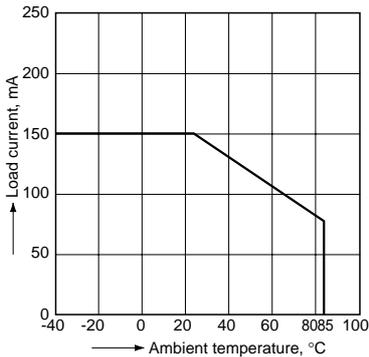
- For Dimensions, see Page 440.
- For Schematic and Wiring Diagrams, see Page 444.
- For Cautions for Use, see Page 449.

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

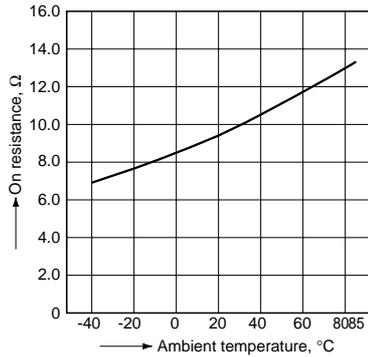
Allowable ambient temperature: -40°C to +85°C
-40°F to +185°F

Type of connection: A



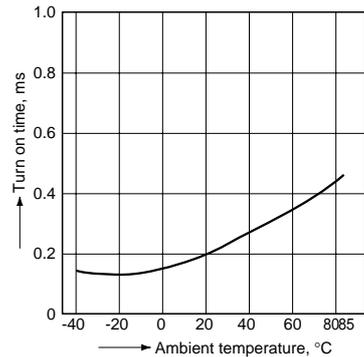
2. On resistance vs. ambient temperature characteristics

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

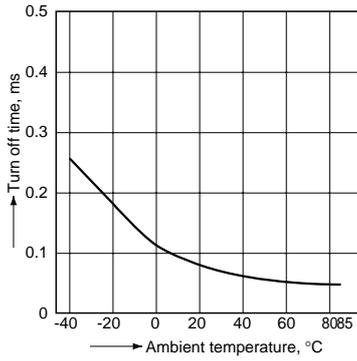
LED current: 5 mA;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



AQV221N

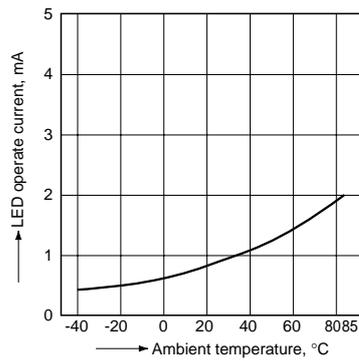
4. Turn off time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



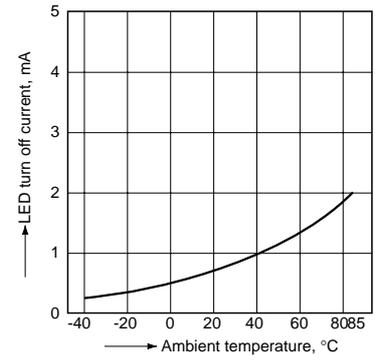
5. LED operate current vs. ambient temperature characteristics

Load voltage: Max. (DC);
Continuous load current: Max. (DC)



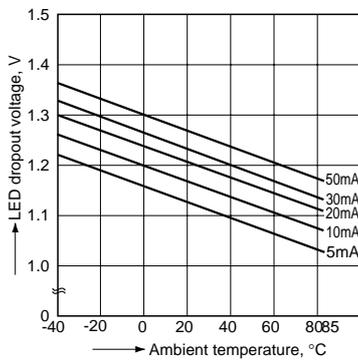
6. LED turn off current vs. ambient temperature characteristics

Load voltage: Max. (DC);
Continuous load current: Max. (DC)



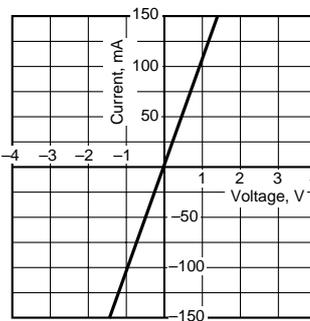
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



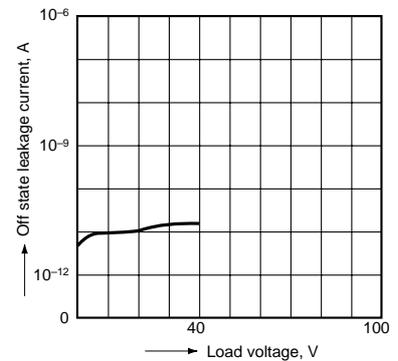
8. Voltage vs. current characteristics of output at MOS portion

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



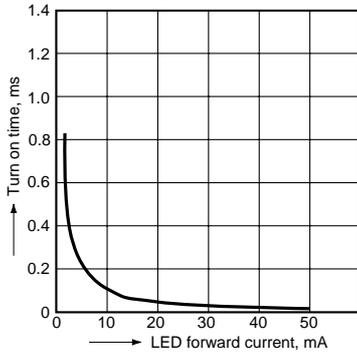
9. Off state leakage current

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



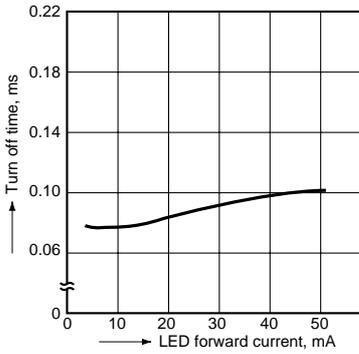
10. LED forward current vs. turn on time characteristics

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



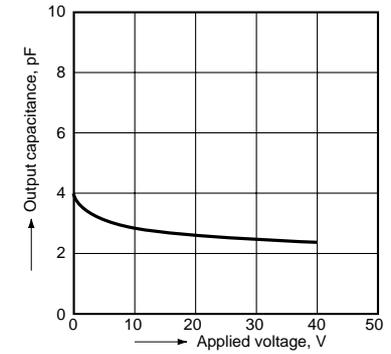
11. LED forward current vs. turn off time characteristics

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



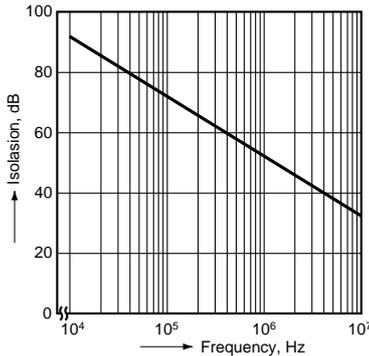
12. Applied voltage vs. output capacitance characteristics

Measured portion: between terminals 4 and 6;
Frequency: 1 MHz, 30 mVrms;
Ambient temperature: 25°C 77°F



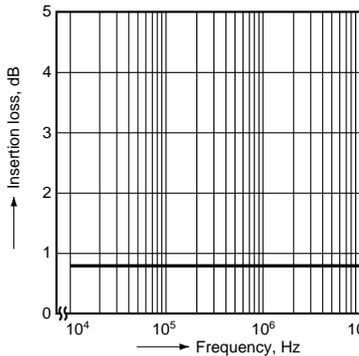
13. Isolation characteristics (50 Ω impedance)

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



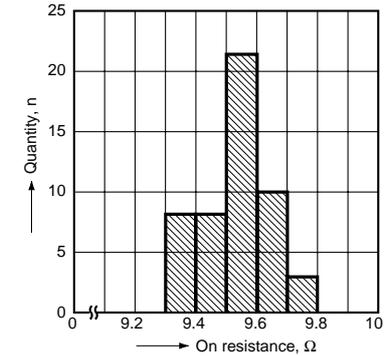
14. Insertion loss characteristics (50 Ω impedance)

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



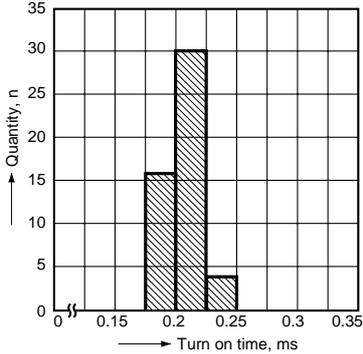
15. On resistance distribution

Measured portion: between terminals 4 and 6
Continuous load current: 150mA(DC)
Quantity, n=50; Ambient temperature: 25°C 77°F



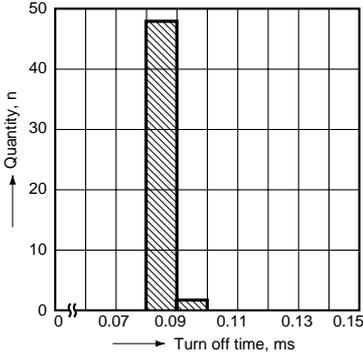
16. Turn on time distribution

Load voltage: 40V(DC)
Continuous load current: 150mA(DC)
Quantity, n=50; Ambient temperature: 25°C 77°F



17. Turn off time distribution

Load voltage: 40V(DC)
Continuous load current: 150mA(DC)
Quantity, n=50; Ambient temperature: 25°C 77°F



18. LED operate current distribution

Load voltage: 40V(DC)
Continuous load current: 150mA(DC)
Quantity, n=50; Ambient temperature: 25°C 77°F

