



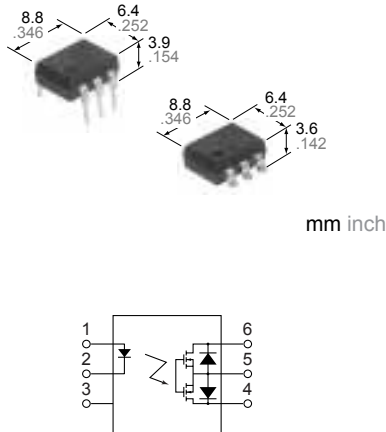
THE DATASHEET OF AQV221NAX



Panasonic
ideas for life

**Lower output capacitance
and on resistance.
High speed switching.
(Turn on time: 0.2ms,
Turn off time: 0.08ms).**

**RF PhotoMOS
(AQV221N)**



FEATURES

- 1. Low output capacitance between output terminals and low ON-resistance**
- 2. High speed switching (Turn on time: typ. 200 μ s)**
- 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 typ. 20pA 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 μ V)**

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)

TYPES

Type	Output rating*		Part No.				Packing quantity	
			Through hole terminal	Surface-mount terminal				
	Load voltage	Load current	Tube packing style	Tape and reel packing style		Tube	Tape and reel	
AC/DC type	40 V	150 mA	AQV221N	AQV221NA	Picked from the 1/2/3-pin side			Picked from the 4/5/6-pin side

*Indicate the peak AC and DC values.

Note: For space reasons, the SMD terminal shape indicator "A" and 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		
	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		
	Continuous load current	I_L		A	0.15 A	A connection: Peak AC, DC B, C connection: DC
				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		

RF PhotoMOS (AQV221N)

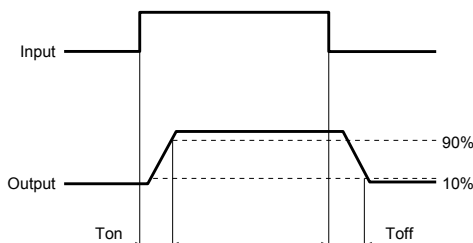
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item		Symbol	Type of connection**	AQV221N(A)	Remarks	
Input	LED operate current	Typical	I _{Fon}	—	0.90 mA	
		Maximum			3.0 mA	
	LED turn off current	Minimum	I _{Foff}	—	0.4 mA	
		Typical			0.85 mA	
	LED dropout voltage	Typical	V _F	—	1.25 V (1.14 V at I _F = 5 mA)	
Maximum		1.5 V				
Output	On resistance #	Typical	R _{on}	A	9.8 Ω	
		Maximum			15 Ω	
		Typical	R _{on}	B	5 Ω	
		Maximum			7.5 Ω	
	Typical	R _{on}	C	2.5 Ω		
	Maximum			3.8 Ω		
	Output capacitance #	Typical	C _{out}	A	3.9 pF	
		Maximum			5 pF	
	Off state leakage current	Typical	I _{Leak}	—	20 pA	
		Maximum			10 nA	
Transfer characteristics	Switching speed	Turn on time*	Typical	T _{on}	—	0.2 ms
			Maximum			0.5 ms
		Turn off time*	Typical	T _{off}	—	0.08 ms
			Maximum			0.2 ms
	I/O capacitance	Typical	C _{iso}	—	0.8 pF	
		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 = 5 mA

**For type of connection

*Turn on/Turn off time



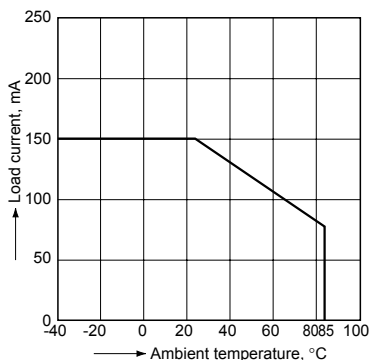
Other types of products than the C_{out} (typ. 3.9pF) and R_{on} (A connection typ. 9.8Ω) combinations carried in this catalog are also available.
(There is a trade-off between R_{on} and C_{out} both cannot be reduced at the same time.)
For more information, please contact our sales of ce in y our area.

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

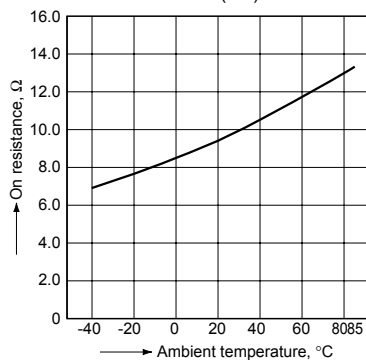
Allowable ambient temperature: -40°C to +85°C
-40°F to +185°F

Type of connection: A



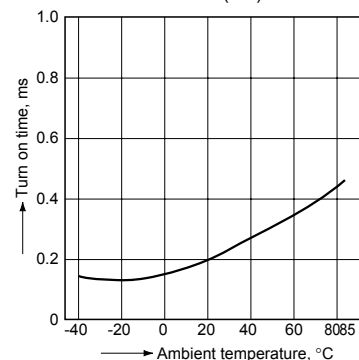
2. On resistance vs. ambient temperature characteristics

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



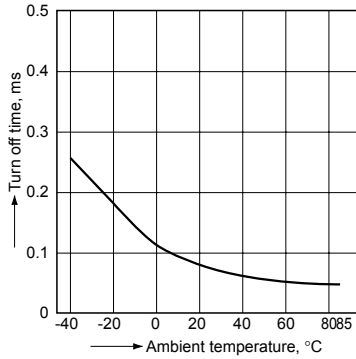
3. Turn on time vs. ambient temperature characteristics

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



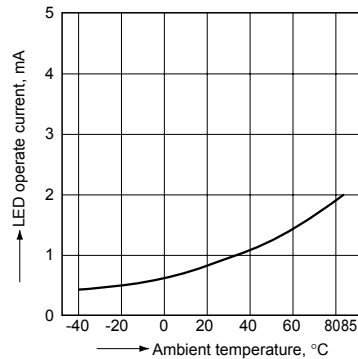
4. Turn off time vs. ambient temperature characteristics

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



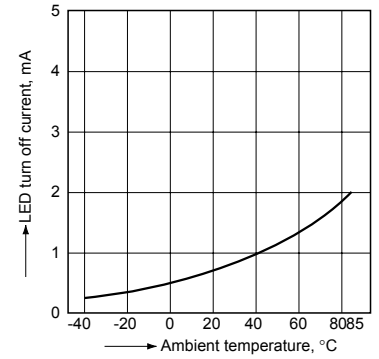
5. LED operate current vs. ambient temperature characteristics

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



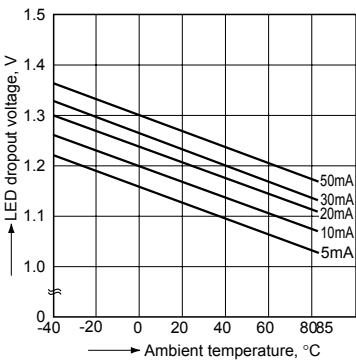
6. LED turn off current vs. ambient temperature characteristics

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



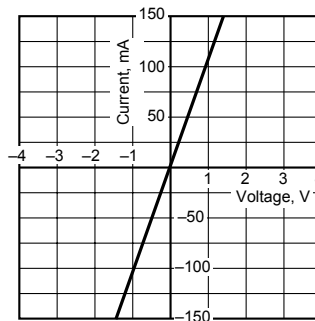
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



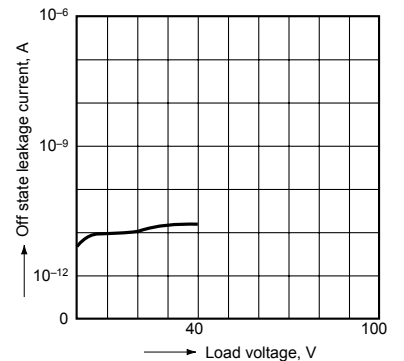
8. Current vs. voltage characteristics of output at MOS portion

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



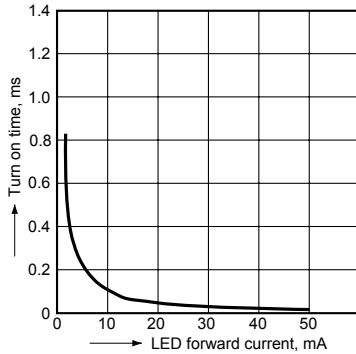
9. Off state leakage current vs. load voltage characteristics

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



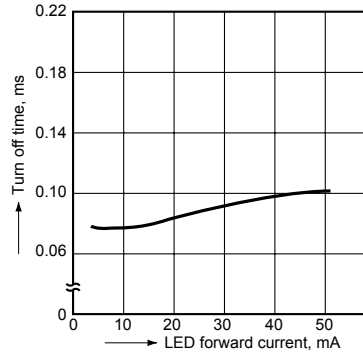
10. Turn on time vs. LED forward current characteristics

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



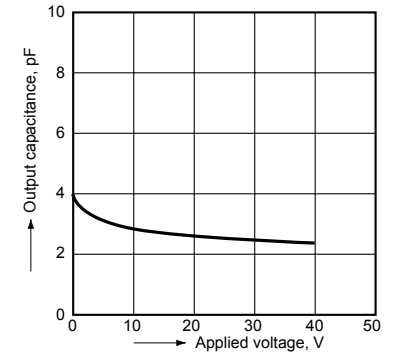
11. Turn off time vs. LED forward current characteristics

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



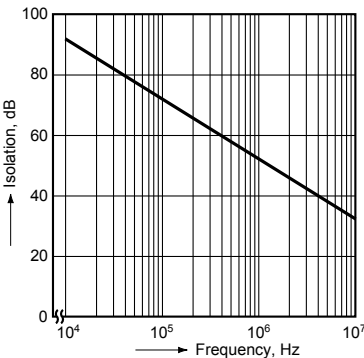
12. Output capacitance vs. applied voltage characteristics

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



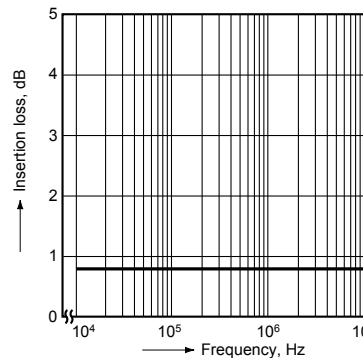
13. Isolation vs. frequency characteristics (50 Ω impedance)

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



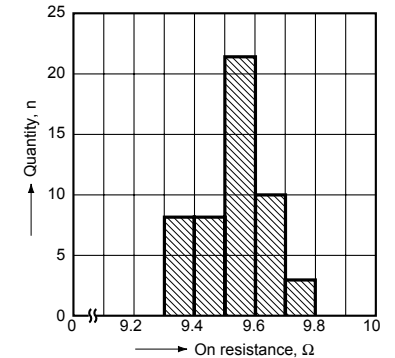
14. Insertion loss vs. frequency characteristics (50 Ω impedance)

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



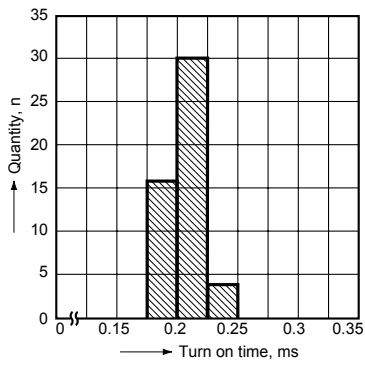
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16. Turn on time distribution

Load voltage: 40V(DC)

Continuous load current: 150mA(DC)

Quantity, n=50; Ambient temperature: 25°C 77°F

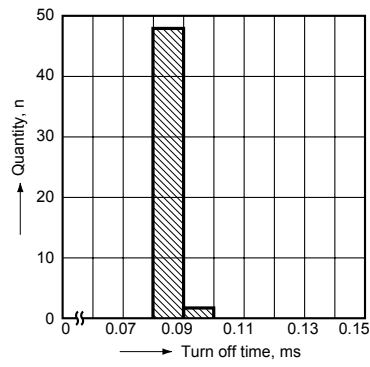


17. Turn off time distribution

Load voltage: 40V(DC)

Continuous load current: 150mA(DC)

Quantity, n=50; Ambient temperature: 25°C 77°F

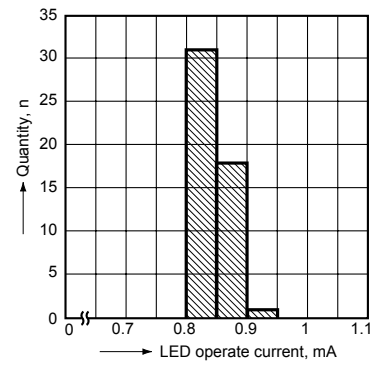


18. LED operate current distribution

Load voltage: 40V(DC)

Continuous load current: 150mA(DC)

Quantity, n=50; Ambient temperature: 25°C 77°F



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