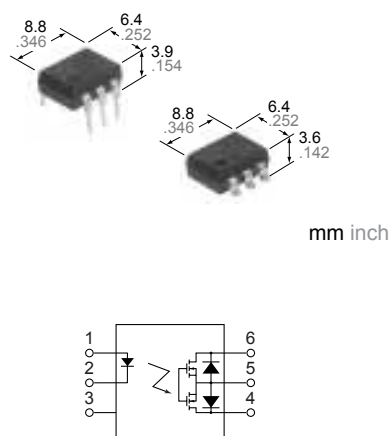


Panasonic
ideas for life

**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. 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 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 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)

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
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 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)

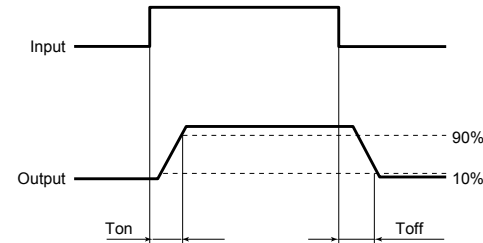
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item			Symbol	Type of connection**	AQV221N(A)	Remarks
Input	LED operate current	Typical	I _{Fon}	—	0.90 mA	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	—	1.25 V (1.14 V at I _F = 5 mA)	I _F = 50 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	I _F = 5 mA I _L = Max. Within 1 s on time
		Maximum			7.5 Ω	
		Typical	R _{on}	C	2.5 Ω	I _F = 5 mA I _L = Max. Within 1 s on time
		Maximum			3.8 Ω	
	Output capacitance #	Typical	C _{out}	A	3.9 pF	I _F = 0 mA V _B = 0V f = 1 MHz
		Maximum			5 pF	
	Off state leakage current	Typical	I _{Leak}	—	20 pA	I _F = 0 mA V _L = Max.
		Maximum			10 nA	
Transfer characteristics	Switching speed	Turn on time*	T _{on}	—	0.2 ms	I _F = 5 mA I _L = Max.
					Maximum	
		Turn off time*	T _{off}	—	0.08 ms	I _F = 5 mA I _L = Max.
					Maximum	
	I/O capacitance	Typical	C _{iso}	—	0.8 pF	f = 1 MHz V _B = 0 V
		Maximum			1.5 pF	
	Initial I/O isolation resistance		Minimum	R _{iso}	—	1,000 MΩ

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

**For type of connection

*Turn on/Turn off time



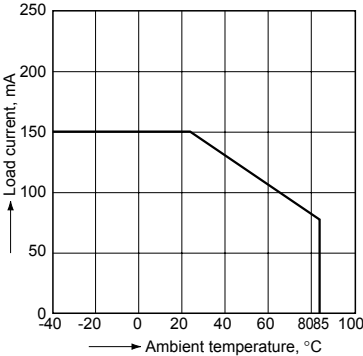
Other types of products than the C_{out} (typ. 3.9pF) and R_{on} (A connection typ. 9.8 Ω) combinations carried in this catalog are also available.
(There is a trade-off between R_{on} and C_{out} both cannot be reduced at the same time.)
For more information, please contact our sales of ce in y our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

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

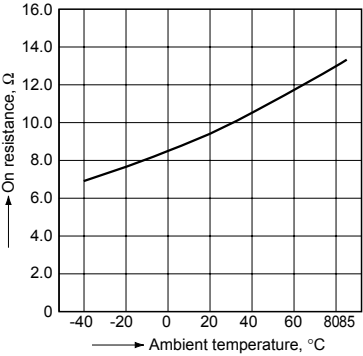
Allowable ambient temperature: -40°C to $+85^{\circ}\text{C}$
 -40°F to $+185^{\circ}\text{F}$

Type of connection: A



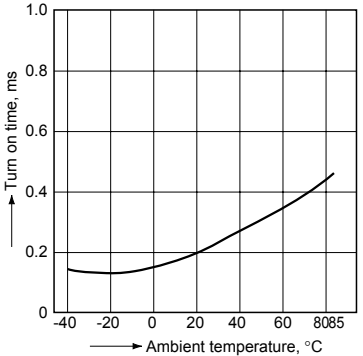
2. On resistance vs. ambient temperature characteristics

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



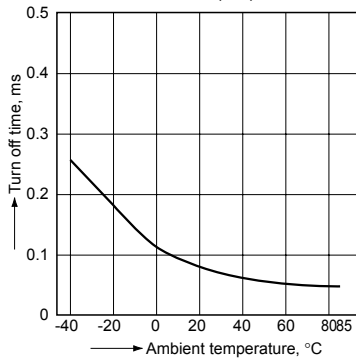
3. Turn on time vs. ambient temperature characteristics

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



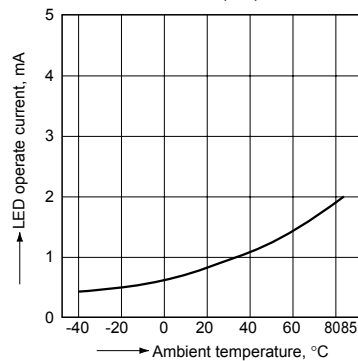
4. Turn off time vs. ambient temperature characteristics

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



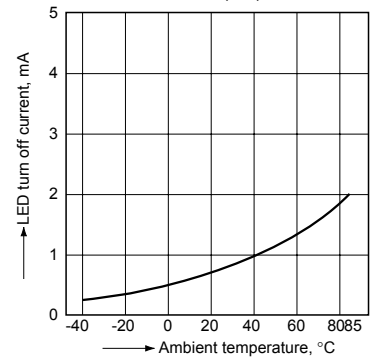
5. LED operate current vs. ambient temperature characteristics

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



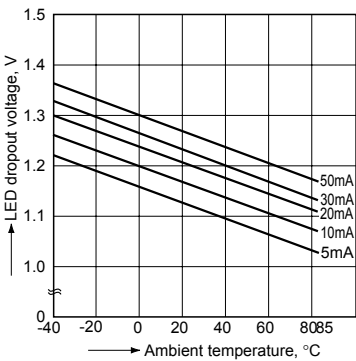
6. LED turn off current vs. ambient temperature characteristics

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



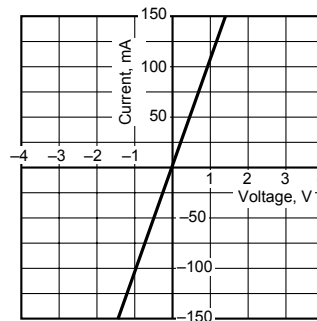
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



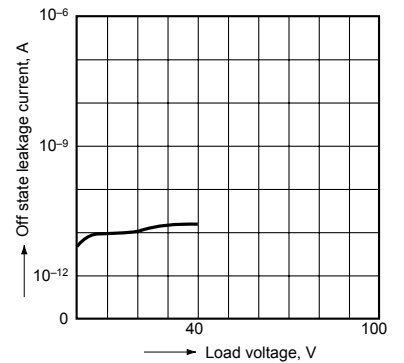
8. Current vs. voltage characteristics of output at MOS portion

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



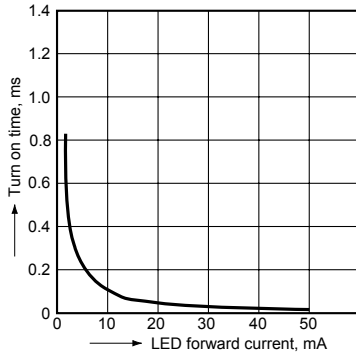
9. Off state leakage current vs. load voltage characteristics

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



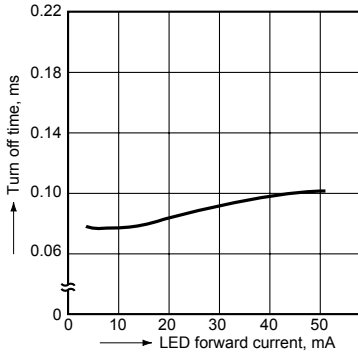
10. Turn on time vs. LED forward current characteristics

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



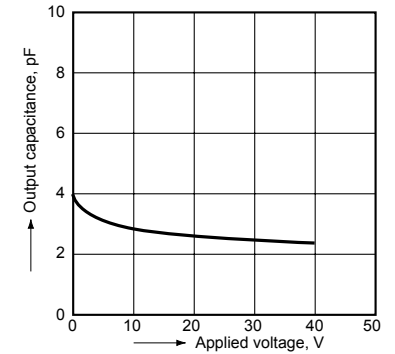
11. Turn off time vs. LED forward current characteristics

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



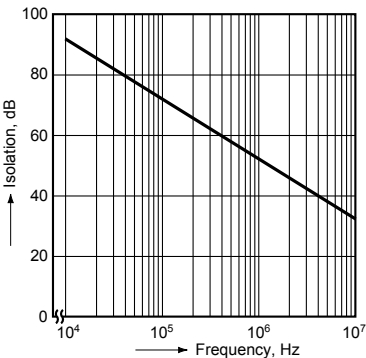
12. Output capacitance vs. applied voltage characteristics

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



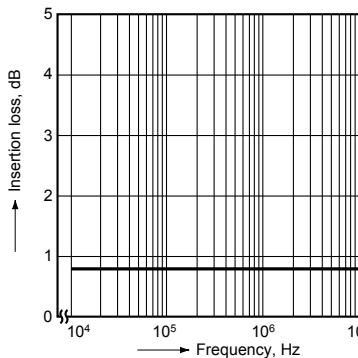
13. Isolation vs. frequency characteristics (50 Ω impedance)

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



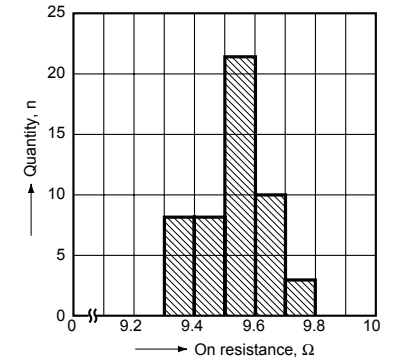
14. Insertion loss vs. frequency characteristics (50 Ω impedance)

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



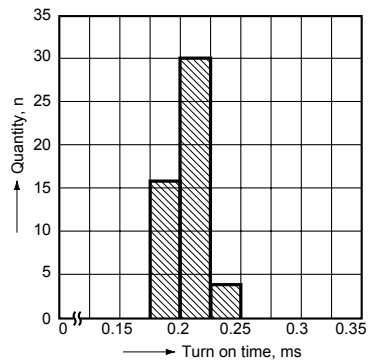
15. On resistance distribution

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

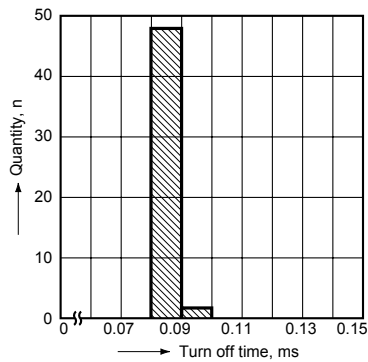


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16. Turn on time distribution
Load voltage: 40V(DC)
Continuous load current: 150mA(DC)
Quantity, n=50; Ambient temperature: 25°C 77°F



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

