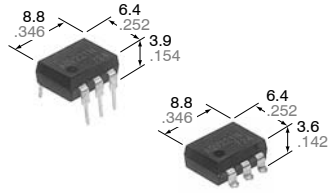
DISCONTINUED

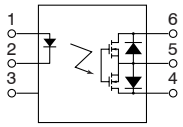
Panasonic
ideas for life

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

RF PhotoMOS (AQV221N)



mm inch



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

1. Testing equipment for semiconductor performance
   IC tester, Liquid crystal driver tester, semiconductor performance tester
2. Board tester
   Bare board tester, In-circuit tester, function tester
3. Medical equipment
   Ultrasonic wave diagnostic machine
4. 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 style indicator “X” or “Z” are not marked on the relay.

RATING

1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

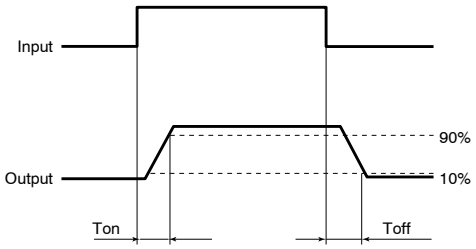
Item		Symbol	Type of connection	AQV221N(A)	Remarks
Input	LED forward current	I_F		50 mA	
	LED reverse voltage	V_R		5 V	
	Peak forward current	I_{FP}		1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}		75 mW	
Output	Load voltage (peak AC)	V_L		40 V	
	Continuous load current	I_L	A	0.15 A	A connection: 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	

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

Item				Symbol	Type of connec-tion**	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*	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 V
			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 **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 office in your area.

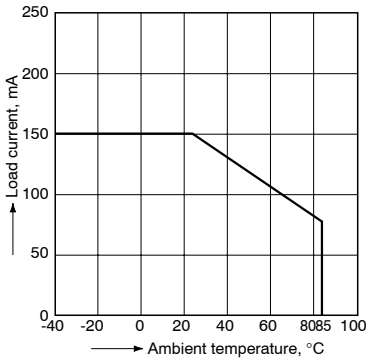
■ Dimensions
■ Schematic and Wiring Diagrams
■ Cautions for Use

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

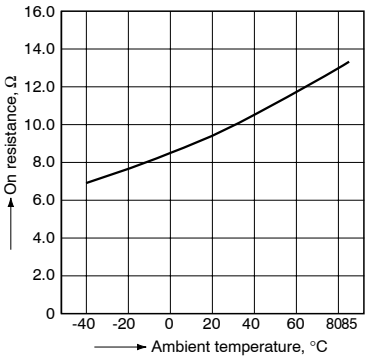
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F

Type of connection: A



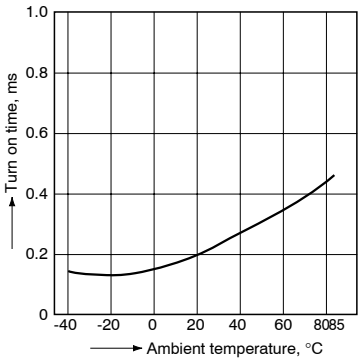
2. On resistance vs. ambient temperature characteristics

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



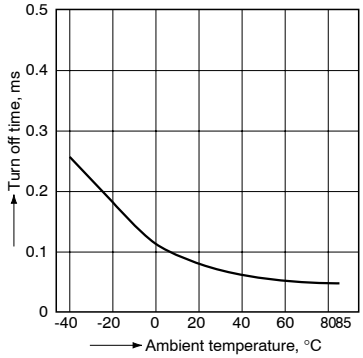
3. Turn on time vs. ambient temperature characteristics

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



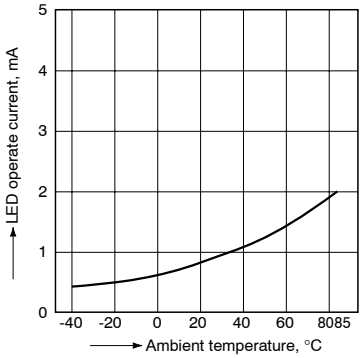
4. Turn off time vs. ambient temperature characteristics

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



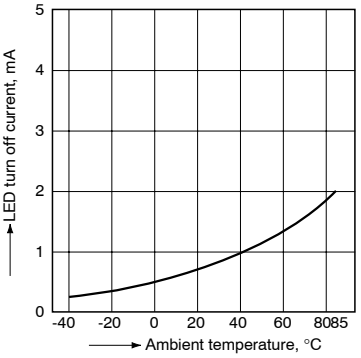
5. LED operate current vs. ambient temperature characteristics

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



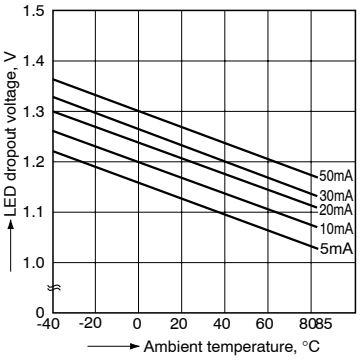
6. LED turn off current vs. ambient temperature characteristics

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



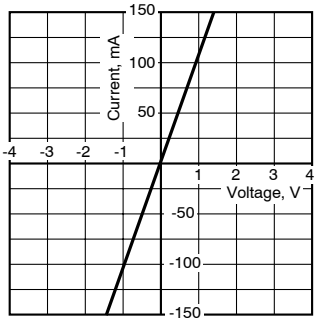
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



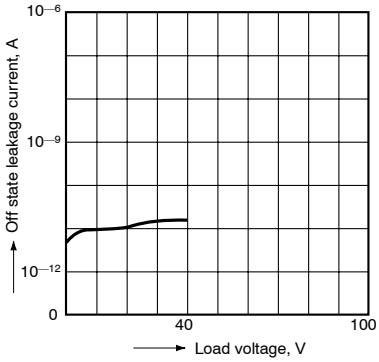
8. Current vs. voltage characteristics of output at MOS portion

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



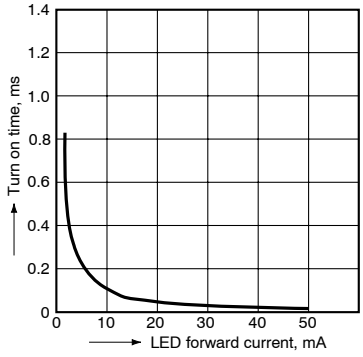
9. Off state leakage current vs. load voltage characteristics

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



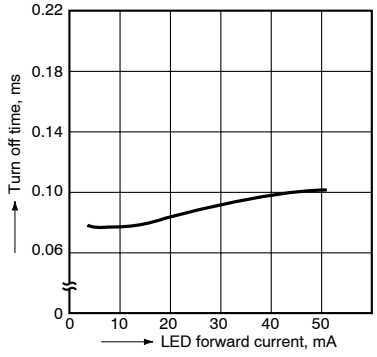
10. Turn on time vs. LED forward current characteristics

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



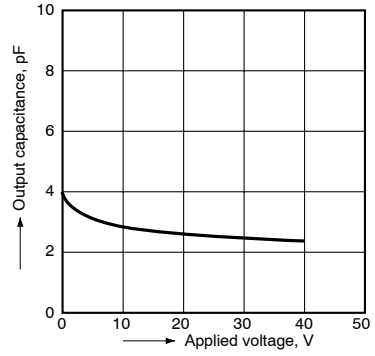
11. Turn off time vs. LED forward current characteristics

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



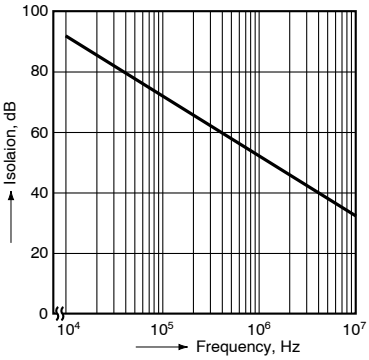
12. Output capacitance vs. applied voltage characteristics

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



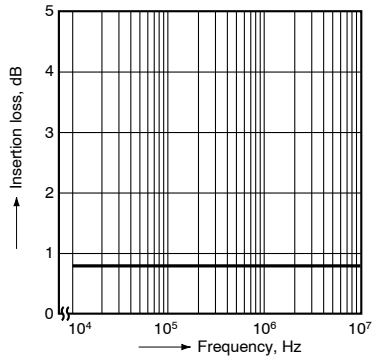
13. Isolation vs. frequency characteristics (50 Ω impedance)

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



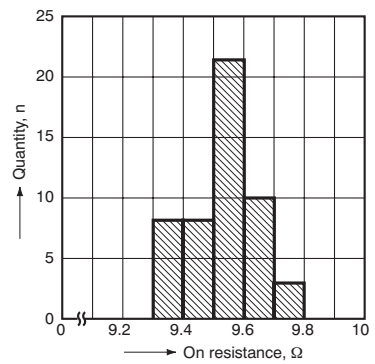
14. Insertion loss vs. frequency characteristics (50 Ω impedance)

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



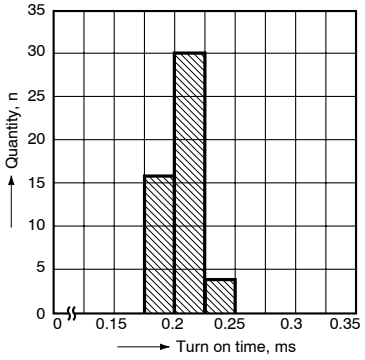
15. On resistance distribution

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



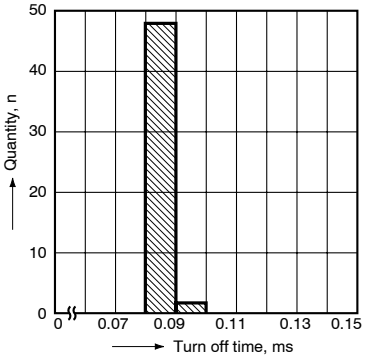
16. Turn on time distribution

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