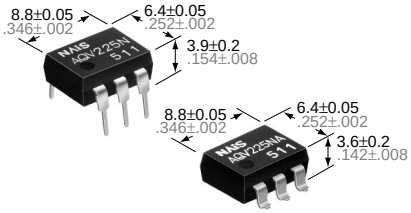
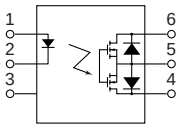
NAiS

RF (Radio Frequency) Type [1-Channel (Form A) Type] —Low On resistance—

PhotoMOS RELAYS



mm inch



FEATURES

1. PhotoMOS relay with high response speed, low leakage current and low On resistance

2. Low capacitance between output terminals ensures high response speed:
The capacitance between output terminals is small, typically 10 pF. This enables for a fast operation speed of 200 μs.

3. High sensitivity and low On resistance
Maximum 0.3 A of load current can be controlled with input current of 5 mA. The 10 Ω (AQV225N) On resistance is less than our conventional models. With no metallic contacts, the PhotoMOS relay has stable switching characteristics.

4. Low-level off state leakage current
The SSR has an off state leakage current of several milliamperes, whereas the PhotoMOS relay has only 30 pA even with the rated load voltage of 80 V (AQV225N).

5. Controls low-level analog signals
PhotoMOS relay features extremely low closed-circuit offset voltages to enable control of small analog signals without distortion.

6. Low terminals electromotive force
(approx. 1 μV)

TYPICAL APPLICATIONS

- Measuring devices
- Scanner, IC checker, Board tester

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	80 V	150 mA	AQV225N	AQV225NA	AQV225NAX	AQV225NAZ	1 tube contains 50 pcs. 1 batch contains 500 pcs.	1,000 pcs.
	200 V	70 mA	AQV227N	AQV227NA	AQV227NAX	AQV227NAZ		
	400 V	50 mA	AQV224N	AQV224NA	AQV224NAX	AQV224NAZ		

*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)

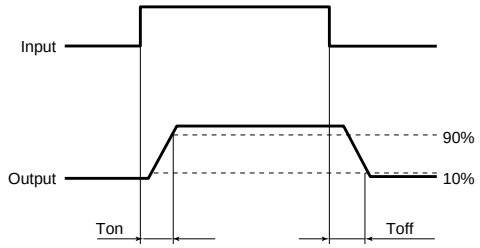
Item		Symbol	Type of connection	AQV225N(A)	AQV227N(A)	AQV224N(A)	Remarks
Input	LED forward current	I_F		50 mA			
	LED reverse voltage	V_R		3 V			
	Peak forward current	I_{FP}		1 A			f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}		75 mW			
Output	Load voltage (peak AC)	V_L		80 V	200 V	400 V	
	Continuous load current	I_L	A	0.15 A	0.07 A	0.05 A	A connection: Peak AC, DC B, C connection: DC
			B	0.20 A	0.08 A	0.06 A	
			C	0.30 A	0.10 A	0.08 A	
	Peak load current	I_{peak}		0.45 A	0.21 A	0.15 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	AQV225N(A)	AQV227N(A)	AQV224N(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	7.0 Ω	30 Ω	70 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
			Maximum			10 Ω	50 Ω	100 Ω	
			Typical	R_{on}	B	3.5 Ω	16 Ω	55 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
			Maximum			5 Ω	25 Ω	70 Ω	
			Typical	R_{on}	C	1.8 Ω	8 Ω	28 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
			Maximum			2.5 Ω	12.5 Ω	35 Ω	
	Output capacitance		Typical	C_{out}	—	10 pF			I_F = 0 V_B = 0 f = 1 MHz
			Maximum			15 pF			
	Off state leakage current		Typical	I_{Leak}	—	30 pA	30 pA	90 pA	I_F = 0 V_L = Max.
			Maximum			10 nA			
Transfer characteristics	Switching speed	Turn on time*	Typical	T_{on}	—	0.20 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 31.

*Turn on/Turn off time

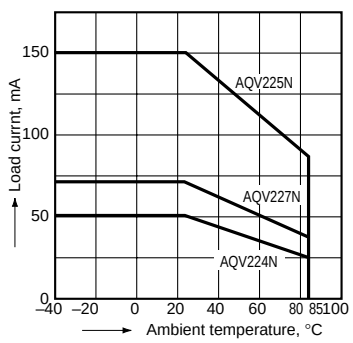


REFERENCE DATA

1. Load current vs. ambient temperature characteristics

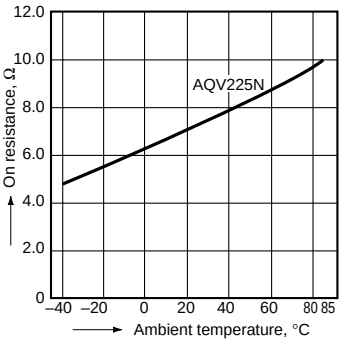
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F

Type of connection: A



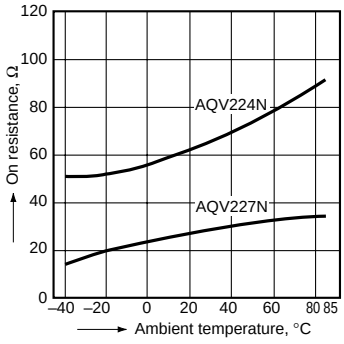
2.-(1) On resistance vs. ambient temperature characteristics

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



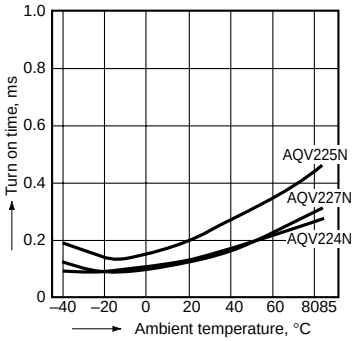
2.-(2) On resistance vs. ambient temperature characteristics

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



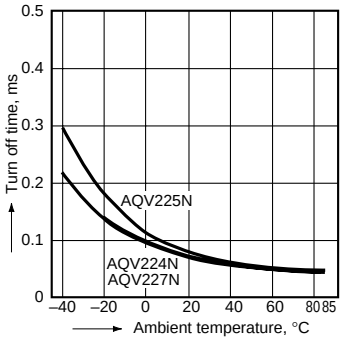
3. Turn on time vs. ambient temperature characteristics

Sample: AQV225N, AQV227N, AQV224N;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



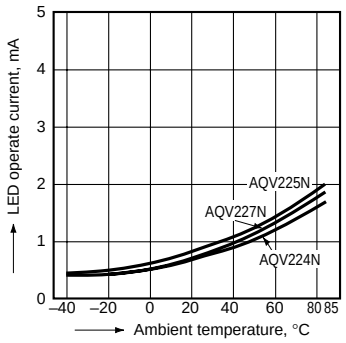
4. Turn off time vs. ambient temperature characteristics

Sample: AQV225N, AQV227N, AQV224N;
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



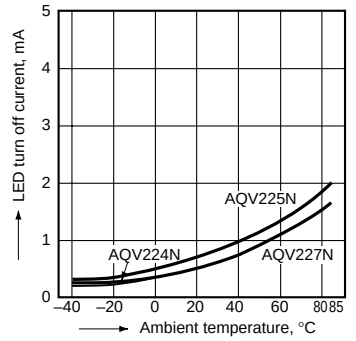
5. LED operate current vs. ambient temperature characteristics

Sample: AQV225N, AQV227N, AQV224N;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



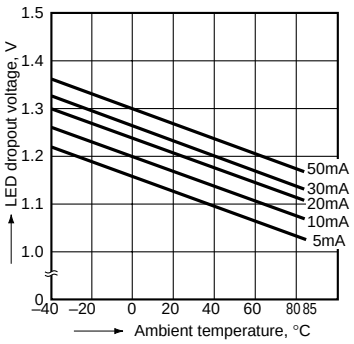
6. LED turn off current vs. ambient temperature characteristics

Sample: AQV225N, AQV227N, AQV224N;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



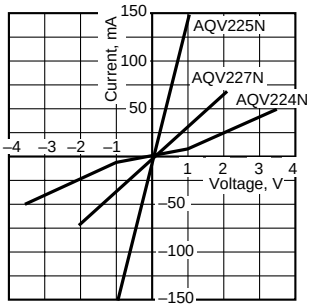
7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types;
LED current: 5 to 50 mA



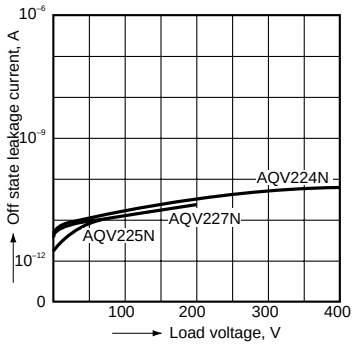
8. Voltage vs. current characteristics of output at MOS portion

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



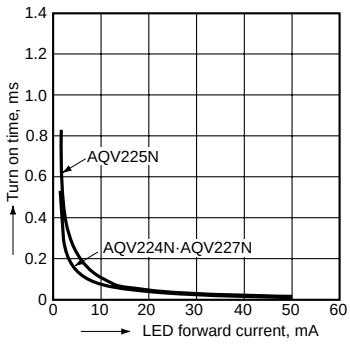
9. Off state leakage current

Sample: AQV225N, AQV227N, AQV224N;
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



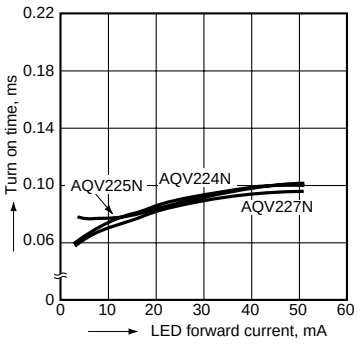
10. LED forward current vs. turn on time characteristics

Sample: AQV225N, AQV227N, AQV224N;
Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC);
Continuous load current: Max. (DC);
Ambient temperature: 25°C 77°F



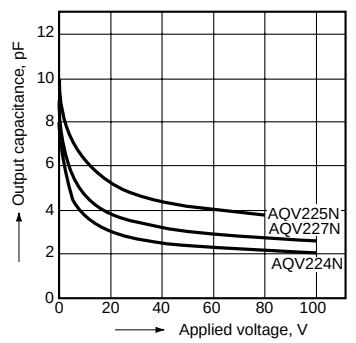
11. LED forward current vs. turn off time characteristics

Sample: AQV225N, AQV227N, AQV224N;
Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC);
Continuous load current: Max. (DC);
Ambient temperature: 25°C 77°F



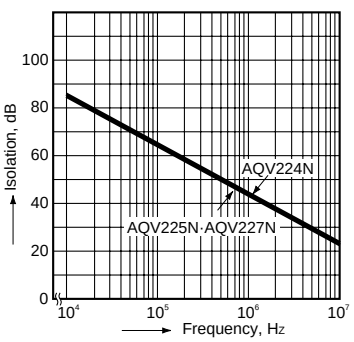
12. Applied voltage vs. output capacitance characteristics

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



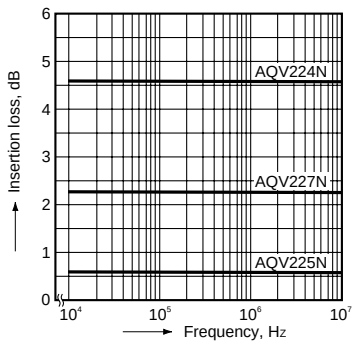
13. Isolation characteristics (50 Ω impedance)

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



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