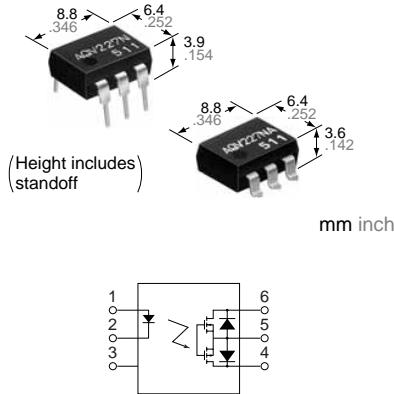


**DIP6-pin type featuring
low on-resistance with
200V/400V load voltage**

PhotoMOS Relays
RF 1 Form A
Low on-resistance (AQV220N)



FEATURES

- 1. Low output capacitance and high response speed**
The capacitance between output terminals is small; typ. 10pF. This enables a fast operation speed of typ. 0.2ms.
- 2. High sensitivity and low on-resistance**
Max. 0.1 A of load current can be controlled with input current of 5 mA. The on resistance is less than our conventional models.
- 3. Low-level off state leakage current of typ. 0.03nA (AQV227N)**
- 4. Controls low-level analog signals**

TYPICAL APPLICATIONS

- Measuring instruments
- Communication equipment
- Computers
- Robots

TYPES

	Output rating*		Package	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	Tube	Tape and reel		
AC/DC dual use	200 V	70 mA	DIP6-pin	AQV227N	AQV227NA	AQV227NAX	AQV227NAZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.
	400 V	50 mA		AQV224N	AQV224NA	AQV224NAX	AQV224NAZ		

*Indicate the peak AC and DC values.

Note: The surface mount terminal indicator "A" and the packing style indicator "X" or "Z" are not marked on the relay.

RATING

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

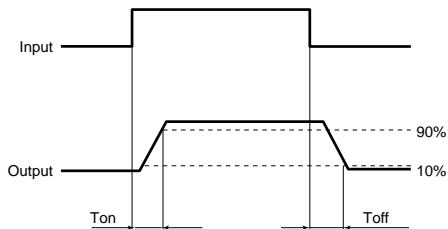
Item	Symbol	Type of connection	AQV227N(A)		AQV224N(A)		Remarks
			A	B, C	A	B, C	
Input	LED forward current	I_F	50 mA				f = 100 Hz, Duty factor = 0.1%
	LED reverse voltage	V_R	5 V				
	Peak forward current	I_{FP}	1 A				
	Power dissipation	P_{in}	75 mW				
Output	Load voltage (peak AC)	V_L	200 V	400 V		A connection: Peak AC, DC B, C connection: DC	
	Continuous load current	I_L	A	0.07 A	0.05 A		
			B	0.08 A	0.06 A		
			C	0.10 A	0.08 A		
	Peak load current	I_{peak}	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				

RF 1 Form A Low on-resistance (AQV220N)

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

Item		Symbol	Type of connection	AQV227N(A)	AQV224N(A)	Remarks	
Input	LED operate current	Typical	I _{Fon}	—	0.9 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	30 Ω	70 Ω	I _F = 5 mA I _L = Max. Within 1 s on time
		Maximum			50 Ω	100 Ω	
		Typical	R _{on}	B	16 Ω	55 Ω	I _F = 5 mA I _L = Max. Within 1 s on time
		Maximum			25 Ω	70 Ω	
		Typical	R _{on}	C	8 Ω	28 Ω	I _F = 5 mA I _L = Max. Within 1 s on time
		Maximum			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}	—	0.03 nA	0.09 nA	I _F = 0 V _L = Max.
		Maximum			10 nA		
Transfer characteristics	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	

*Turn on/Turn off time



RECOMMENDED OPERATING CONDITIONS

Please obey the following conditions to ensure proper relay operation and resetting.

Item	Symbol	Recommended value	Unit
Input LED current	I _F	5	mA

■ Dimensions

■ Schematic and Wiring Diagrams

■ Cautions for Use

■ These products are not designed for automotive use.

If you are considering to use these products for automotive applications, please contact your local Panasonic Electric Works technical representative.

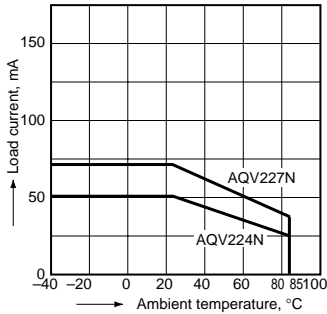
Please refer to our information on [PhotoMOS Relays for Automotive Applications](#).

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

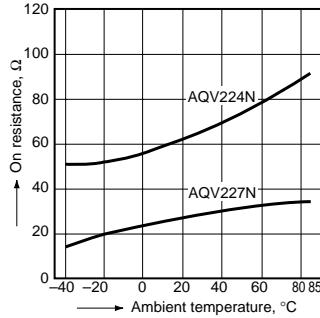
Allowable ambient temperature: -40°C to $+85^{\circ}\text{C}$
 -40°F to $+185^{\circ}\text{F}$

Type of connection: A



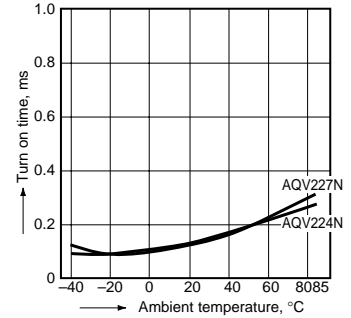
2. On resistance vs. ambient temperature characteristics

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



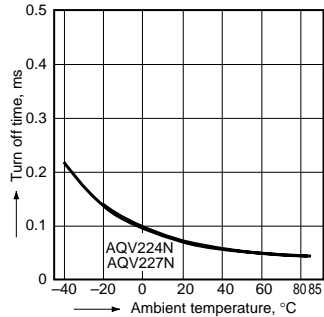
3. Turn on time vs. ambient temperature characteristics

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



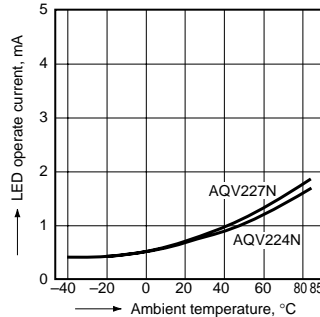
4. Turn off time vs. ambient temperature characteristics

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



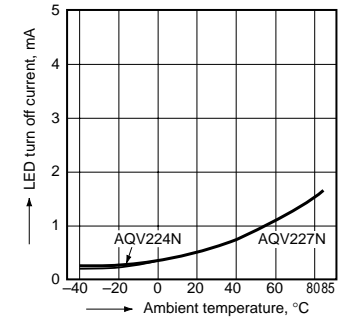
5. LED operate current vs. ambient temperature characteristics

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



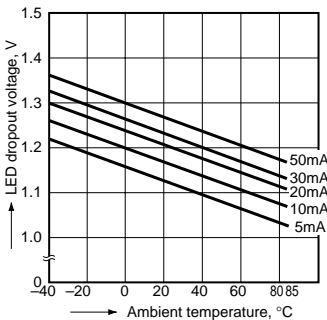
6. LED turn off current vs. ambient temperature characteristics

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



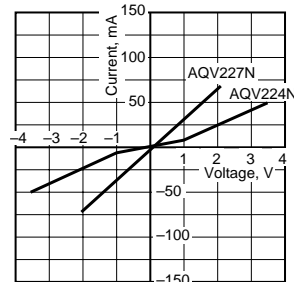
7. LED dropout voltage vs. ambient temperature characteristics

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



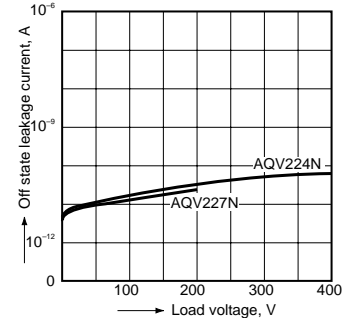
8. Current vs. voltage characteristics of output at MOS portion

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



9. Off state leakage current

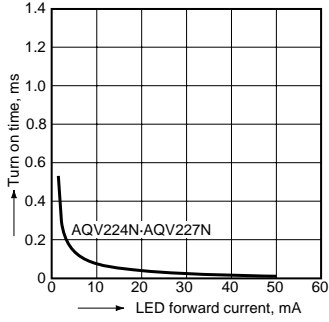
Sample: AQV227N, AQV224N;
 Measured portion: between terminals 4 and 6;
 Ambient temperature: 25°C 77°F



RF 1 Form A Low on-resistance (AQV220N)

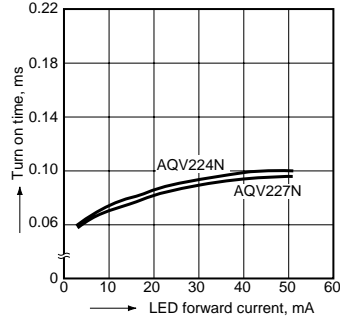
10. Turn on time vs. LED forward current characteristics

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



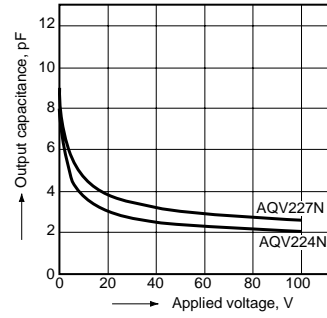
11. Turn off time vs. LED forward current characteristics

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



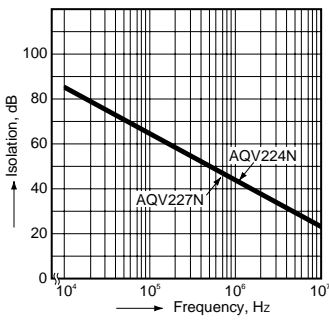
12. Output capacitance vs. applied voltage characteristics

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



13. Isolation 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

