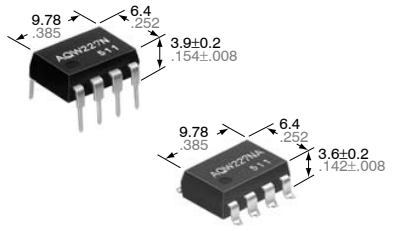
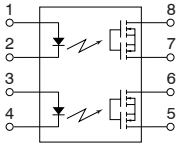
Panasonic
ideas for life

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

RF PhotoMOS (AQW22○N)



mm inch



FEATURES

1. PhotoMOS relay 2-channels (Form A) type with high response speed, low leakage current and low On resistance.
2. Applicable for 2 Form A use as well as two independent 1 Form A use
3. Compact 8-pin DIP size
The device comes in a compact (W) 6.4×(L) 9.78×(H) 3.9 mm (W) .252×(L) .385×(H) .154 inch , 8-pin DIP size (through hole terminal type).
4. 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.
5. High sensitivity and low On resistance:
Maximum 0.07 A of load current can be controlled with input current of 5 mA. The On resistance is less than our conventional models. With no metallic contacts, the PhotoMOS relay has stable switching characteristics.
6. 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 200 V (AQW227N).
7. Controls low-level analog signals:
PhotoMOS relay features extremely low closed-circuit offset voltages to enable control of small analog signals without distortion.
8. Low terminals electromotive force:
(approx. 1 μV)

TYPICAL APPLICATIONS

- Measuring equipment
- 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	200 V	50 mA	AQW227N	AQW227NA	AQW227NAX	AQW227NAZ	1 tube contains 40 pcs. 1 batch contains 400 pcs.	1,000 pcs.
	400 V	40 mA	AQW224N	AQW224NA	AQW224NAX	AQW224NAZ		

*Indicate the peak AC and DC values.
Note: For space reasons, the package style indicator “X” or “Z” are not marked on the relay.

RATING

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

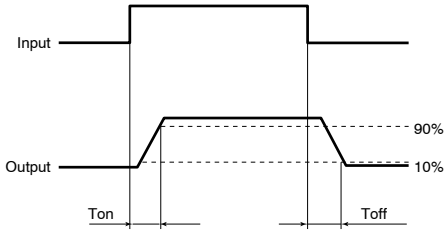
Item		Symbol	AQW227N(A)	AQW224N(A)	Remarks
Input	LED forward current	I_F	50 mA		
	LED reverse voltage	V_R	5 V		
	Peak forward current	I_{FP}	1 A		f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}	75 mW		
Output	Load voltage (peak AC)	V_L	200 V	400 V	
	Continuous load current	I_L	0.05 A (0.07 A)	0.04 A (0.05 A)	Peak AC, DC ( ): in case of using only 1 channel
	Peak load current	I_{peak}	0.15 A	0.12 A	A connection: 100 ms (1 shot), V_L = DC
	Power dissipation	P_{out}	800 mW		
Total power dissipation		P_T	850 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	AQW227N(A)	AQW224N(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		0.8 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}	30 Ω	70 Ω	I_F = 5 mA I_L = Max. Within 1 s on time
			Maximum		50 Ω	100 Ω	
	Output capacitance		Typical	C_{out}	10 pF		I_F = 0 V_B = 0 f = 1 MHz
			Maximum		15 pF		
	Off state leakage current		Maximum	I_{leak}	10 nA		I_F = 0 V_L = Max.
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. Type of connection

*Turn on/Turn off time

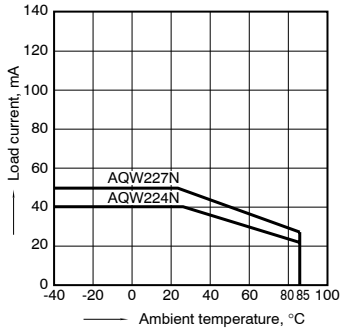


■ Dimensions
■ Schematic and Wiring Diagrams
■ Cautions for Use

REFERENCE DATA

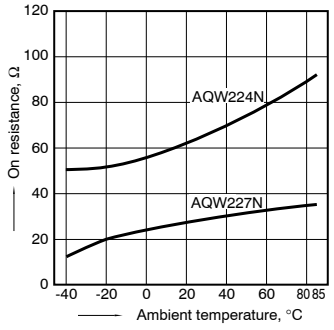
1. Load current vs. ambient temperature characteristics

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



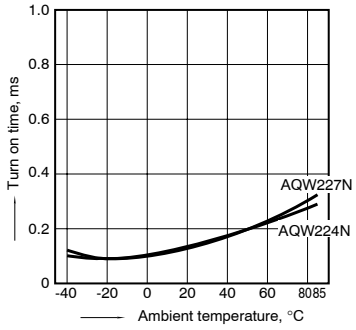
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8; LED current: 5 mA; Load voltage: Max. (DC); Continuous load current: Max. (DC)



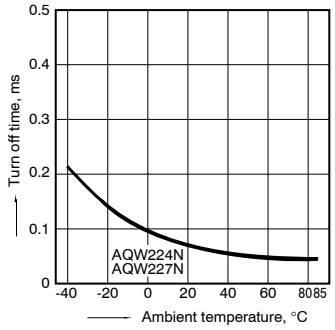
3. Turn on time vs. ambient temperature characteristics

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



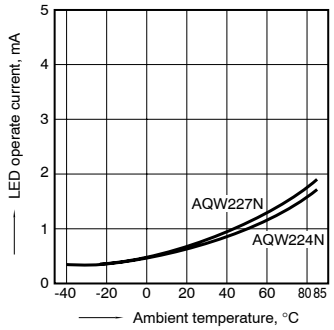
4. Turn off time vs. ambient temperature characteristics

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



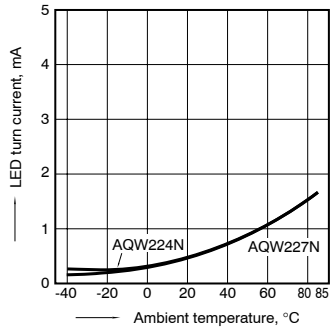
5. LED operate current vs. ambient temperature characteristics

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



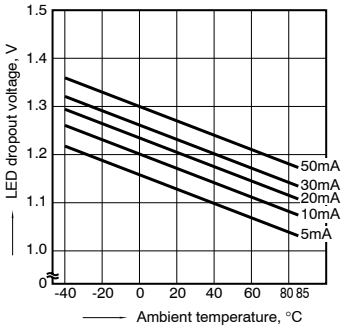
6. LED turn off current vs. ambient temperature characteristics

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



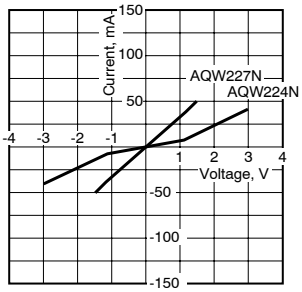
7. LED dropout voltage vs. ambient temperature characteristics

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



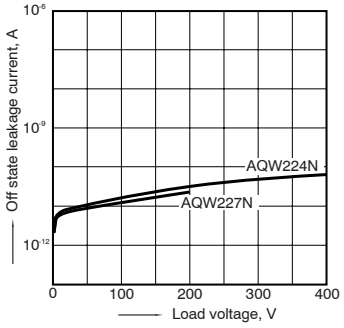
8. Voltage vs. current characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8; Ambient temperature: 25°C 77°F



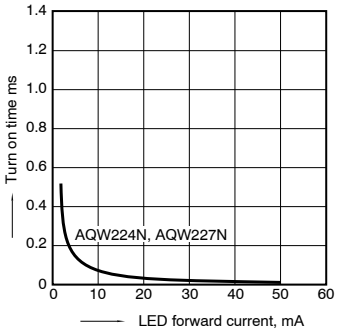
9. Off state leakage current

Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



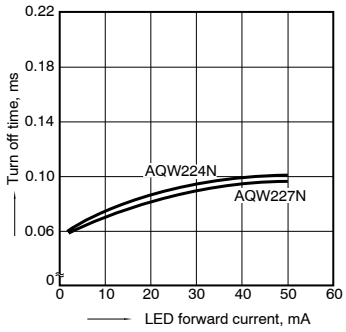
10. LED forward current vs. turn on time characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Load voltage: Max. (DC);
Continuous load current: Max. (DC);
Ambient temperature: 25°C 77°F



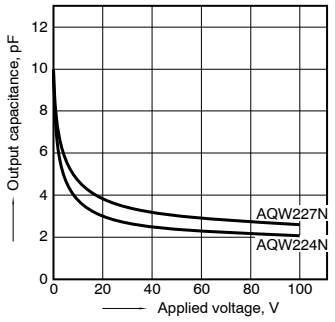
11. LED forward current vs. turn off time characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Load voltage: Max. (DC);
Continuous load current: Max. (DC);
Ambient temperature: 25°C 77°F



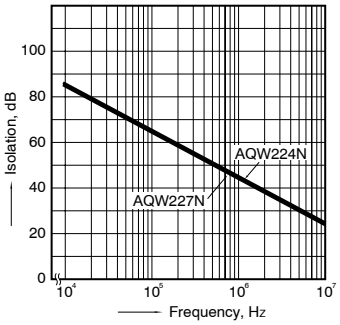
12. Applied voltage vs. output capacitance characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Frequency: 1 MHz, 30 mVrms;
Ambient temperature: 25°C 77°F



13. Isolation characteristics (50 Ω impedance)

Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



14. Insertion loss characteristics (50 Ω impedance)

Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F