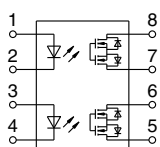
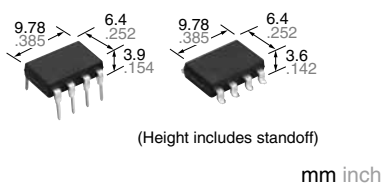




**DIP8-pin type featuring  
low on-resistance  
200V/400V load voltage**

**PhotoMOS<sup>®</sup>  
RF 2 Form A**  
Low on-resistance (AQW22○N)



**RoHS compliant**

### FEATURES

- 1. 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. Low capacitance between output terminals ensures high response speed:**  
The capacitance between output terminals is small; Typ. 10 pF. This enables for a fast operation speed of Typ. 0.2 ms.
- 4. High sensitivity and low on-resistance:**  
Max. 0.07 A of load current can be controlled with input current of 5 mA. The on-resistance is less than our conventional models.
- 5. Low-level off state leakage current**

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

### TYPICAL APPLICATIONS

- **Measuring instruments**  
Scanner, IC checker, Board tester, etc.
- Telephones
- Computer input machines
- Industrial robots

### TYPES

	Output rating*		Package	Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal		Tube	Tape and reel	
	Load voltage	Load current			Tube packing style	Tape and reel packing style			
				Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side				
AC/DC dual use	200 V	50 mA	DIP8-pin	AQW227N	AQW227NA	AQW227NAX	AQW227NAZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.
	400 V	40 mA		AQW224N	AQW224NA	AQW224NAX	AQW224NAZ		

\*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 device.

### 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		$f = 100 \text{ Hz}$ , 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	100 ms (1 shot), $V_L = \text{DC}$
	Power dissipation	$P_{out}$	800 mW		
Total power dissipation	$P_T$	850 mW			
I/O isolation voltage	$V_{iso}$	1,500 Vrms			
Ambient temperature	Operating	$T_{opr}$	-40 to +85°C -40 to +185°F		(Non-icing at low temperatures)
	Storage	$T_{stg}$	-40 to +100°C -40 to +212°F		

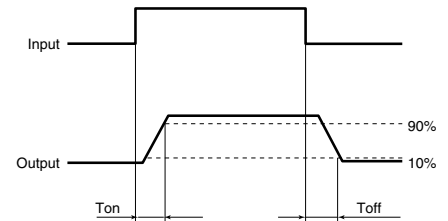
# RF 2 Form A Low on-resistance (AQW220N)

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

Item		Symbol	AQW227N(A)	AQW224N(A)	Condition
Input	LED operate current	Typical	0.9 mA		I <sub>L</sub> = Max.
		Maximum	3.0 mA		
	LED turn off current	Minimum	0.4 mA		I <sub>L</sub> = Max.
		Typical	0.8 mA		
LED dropout voltage	Typical	1.25 V (1.14 V at I <sub>F</sub> = 5 mA)		I <sub>F</sub> = 50 mA	
	Maximum	1.5 V			
Output	On resistance	Typical	30 Ω	70 Ω	I <sub>F</sub> = 5 mA I <sub>L</sub> = Max. Within 1 s
		Maximum	50 Ω	100 Ω	
	Output capacitance	Typical	10 pF		I <sub>F</sub> = 0 V <sub>B</sub> = 0 f = 1 MHz
		Maximum	15 pF		
Off state leakage current	Maximum	I <sub>Leak</sub>	*10 nA		I <sub>F</sub> = 0 V <sub>L</sub> = Max.
Transfer characteristics	Turn on time**	Typical	0.2 ms		I <sub>F</sub> = 5 mA I <sub>L</sub> = Max.
		Maximum	0.5 ms		
	Turn off time**	Typical	0.08 ms		I <sub>F</sub> = 5 mA I <sub>L</sub> = Max.
		Maximum	0.2 ms		
	I/O capacitance	Typical	0.8 pF		f = 1 MHz V <sub>B</sub> = 0
Maximum		1.5 pF			
Initial I/O isolation resistance	Minimum	R <sub>iso</sub>	1,000 MΩ		500 V DC

\*Available as custom orders (1 nA or less)

\*\*Turn on/Turn off time



## 3. Recommended operating conditions (Ambient temperature: 25°C 77°F)

Please use under recommended operating conditions to obtain expected characteristics.

Item	Symbol	Number of used channels	Min.	Max.	Unit
LED current	I <sub>F</sub>		5	30	mA
Load voltage (Peak AC)	V <sub>L</sub>		—	160	V
AQW227N(A)	Continuous load current	1ch	—	0.07	A
		2ch	—	0.05	A
AQW224N(A)	Load voltage (Peak AC)		—	320	V
		Continuous load current	1ch	—	0.05
		2ch	—	0.04	A

■ These products are not designed for automotive use.

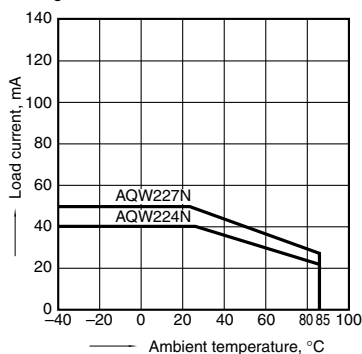
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

## REFERENCE DATA

### 1. Load current vs. ambient temperature characteristics

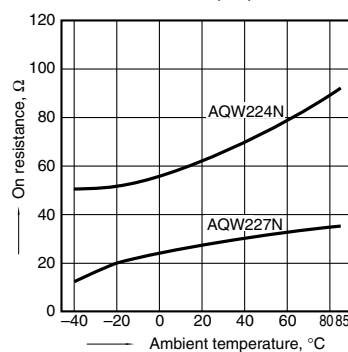
Allowable ambient temperature: -40 to +85°C  
-40 to +185°F

When using 2 channels



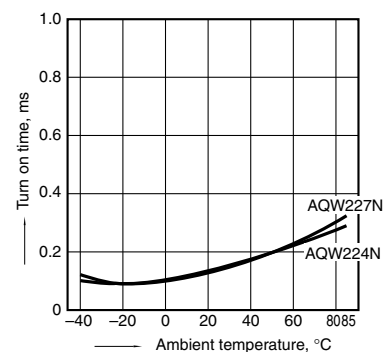
### 2. On resistance vs. ambient temperature characteristics

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



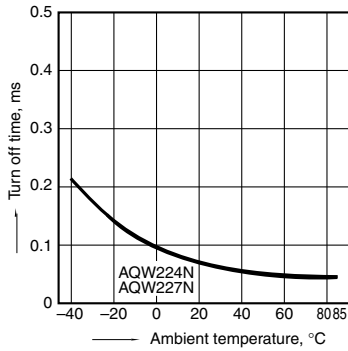
### 3. Turn on time vs. ambient temperature characteristics

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



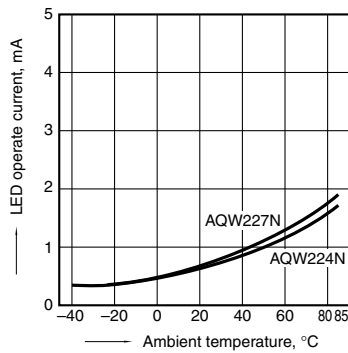
### 4. Turn off time vs. ambient temperature characteristics

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



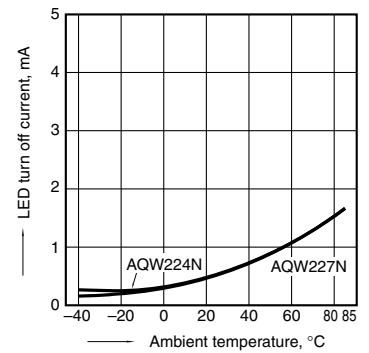
### 5. LED operate current vs. ambient temperature characteristics

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



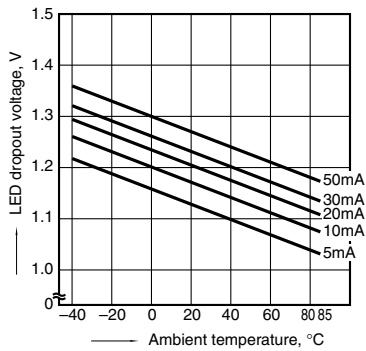
### 6. LED turn off current vs. ambient temperature characteristics

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



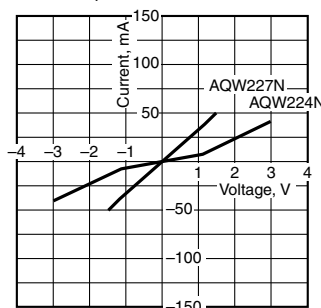
### 7. LED dropout voltage vs. ambient temperature characteristics

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



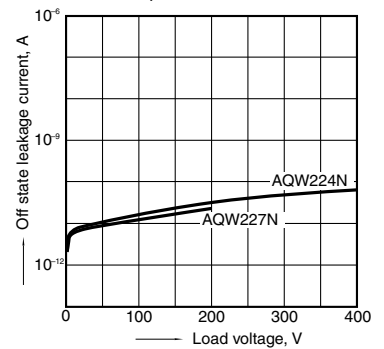
### 8. Current vs. voltage characteristics of output at MOS portion

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



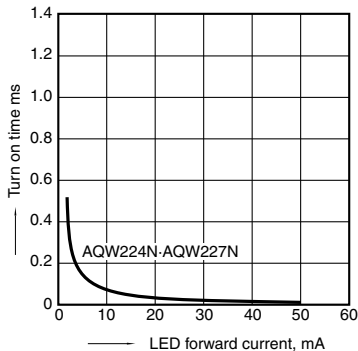
### 9. Off state leakage current vs. load voltage characteristics

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



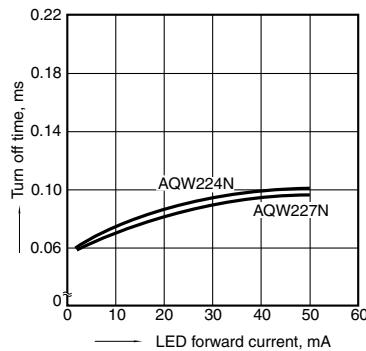
### 10. Turn on time vs. LED forward current characteristics

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



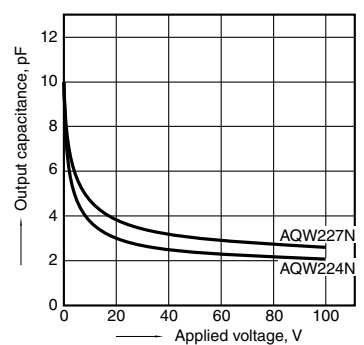
### 11. Turn off time vs. LED forward current characteristics

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



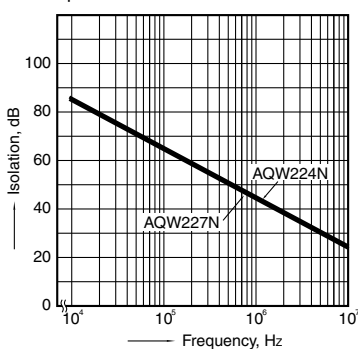
### 12. Output capacitance vs. applied voltage characteristics

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



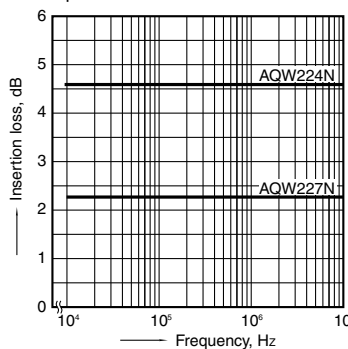
### 13. Isolation vs. frequency characteristics (50 Ω impedance)

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



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

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



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