

### FEATURES

**1. Both low on-resistance (R type) and low capacitance (C type) available at excellent characteristics of C×R10**

	AQY221R2S (R type)	AQY221N2S (C type)
Low on resistance: R	0.8Ω	9.5Ω
Low output capacitance: C	13pF	1pF

**2. High speed switching**

Turn on time: 0.03ms (typ.)

Turn off time: 0.03ms (typ.)

(AQY221N2S)

**3. Small profile of miniature SOP4-pin**

**4. Low-level off state leakage current of typ. 0.01nA (AQY221N2S)**

### TYPICAL APPLICATIONS

**1. Measuring and testing equipment**

IC tester, Liquid crystal driver tester, Semiconductor performance tester, Bare board tester, In-circuit tester, Function tester, etc.

**2. Telecommunication and broadcasting equipment**

**3. Medical equipment**

Ultrasonic wave diagnostic machine

**4. Multi-point recorder**

Warping, Thermo couple, etc.

### TYPES

	Type	Output rating*		Package	Part No.			Packing quantity	
		Load voltage	Load current		Tube packing style	Tape and reel packing style		Tube	Tape and reel
						Picked from the 1/2-pin side	Picked from the 3/4-pin side		
AC/DC dual use	Low on resistance (R type)	40V	250mA	SOP4-pin	AQY221R2S	AQY221R2SX	AQY221R2SZ	1 tube contains: 100 pcs.	1,000 pcs.
	Low capacitance (C type)	40V	120mA		AQY221N2S	AQY221N2SX	AQY221N2SZ	1 batch contains: 2,000 pcs.	

\* Indicate the peak AC and DC values.

Note: For space reasons, the initial letters of the part number "AQY", the package (SOP) indicator "S" and the packing style indicator "X" or "Z" are not marked on the relay. (Ex. the label for product number AQY221R2SX is 221R2)

### RATING

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

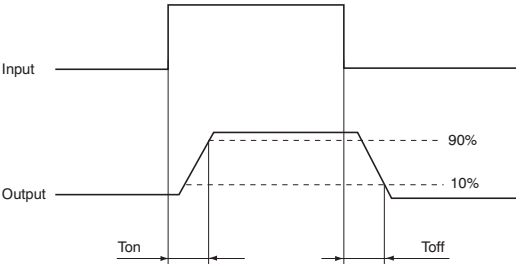
Item		Symbol	AQY221R2S (R type)	AQY221N2S (C type)	Remarks
Input	LED forward current	I <sub>F</sub>	50mA		
	LED reverse voltage	V <sub>R</sub>	5V		
	Peak forward current	I <sub>FP</sub>	1A		f=100 Hz, Duty factor=0.1%
	Power dissipation	P <sub>in</sub>	75mW		
Output	Load voltage (peak AC)	V <sub>L</sub>	40V		
	Continuous load current	I <sub>L</sub>	0.25A	0.12A	Peak AC, DC
	Peak load current	I <sub>peak</sub>	0.75A	0.30A	100 ms (1 shot), V <sub>L</sub> = DC
	Power dissipation	P <sub>out</sub>	300mW		
Total power dissipation		P <sub>T</sub>	350mW		
I/O isolation voltage		V <sub>iso</sub>	500V AC	1,500V AC	
Temperature limits	Operating	T <sub>opr</sub>	-40°C to +85°C -40°F to +185°F		Non-condensing at low temperatures
	Storage	T <sub>stg</sub>	-40°C to +100°C -40°F to +212°F		

# RF SOP 1 Form A CxR10 (AQY221○2S)

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

Item			Symbol	AQY221R2S (R type)	AQY221N2S (C type)	Condition
Input	LED operate current	Typical	I <sub>Fon</sub>	0.5 mA	0.9 mA	I <sub>L</sub> = 250 mA (R type)
		Maximum		3.0 mA		I <sub>L</sub> = 80 mA (C type)
	LED turn off current	Minimum	I <sub>Foff</sub>	0.1 mA	0.2 mA	I <sub>L</sub> = 250 mA (R type)
		Typical		0.4 mA	0.85 mA	I <sub>L</sub> = 80 mA (C type)
	LED dropout voltage	Typical	V <sub>F</sub>	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	R <sub>on</sub>	0.8Ω	9.5Ω	I <sub>F</sub> = 5 mA
		Maximum		1.25Ω	12.5Ω	I <sub>L</sub> = 250 mA (R type), I <sub>L</sub> = 80 mA (C type) Within 1 s on time
	Output capacitance	Typical	C <sub>out</sub>	13 pF	1.0 pF	I <sub>F</sub> = 0 mA
		Maximum		18 pF	1.5 pF	V <sub>B</sub> = 0 V f = 1 MHz
	Off state leakage current	Typical	I <sub>Leak</sub>	0.03 nA	0.01 nA	I <sub>F</sub> = 0 mA
		Maximum		10 nA		V <sub>L</sub> = Max.
Transfer characteristics	Turn on time*	Typical	T <sub>on</sub>	0.1 ms	0.03 ms	I <sub>F</sub> = 5 mA V <sub>L</sub> = 10V
		Maximum		0.5ms		R <sub>L</sub> = 40Ω (R type), 125Ω (C type)
	Turn off time*	Typical	T <sub>off</sub>	0.06 ms	0.03 ms	I <sub>F</sub> = 5 mA V <sub>L</sub> = 10V
		Maximum		0.2 ms		R <sub>L</sub> = 40Ω (R type), 125Ω (C type)
	I/O capacitance	Typical	C <sub>iso</sub>	0.8 pF		f = 1 MHz
		Maximum		1.5 pF		V <sub>B</sub> = 0 V
	Initial I/O isolation resistance	Minimum	R <sub>iso</sub>	1,000MΩ		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 <sub>F</sub>	5	mA

- Dimensions
- Schematic and Wiring Diagrams
- Cautions for Use

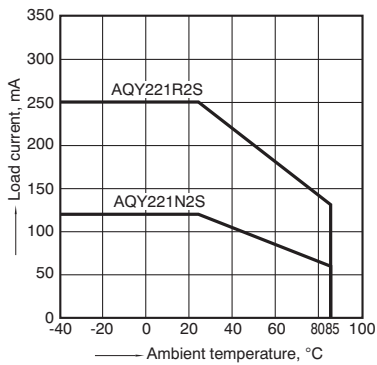
■ These products are not designed for automotive use.

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

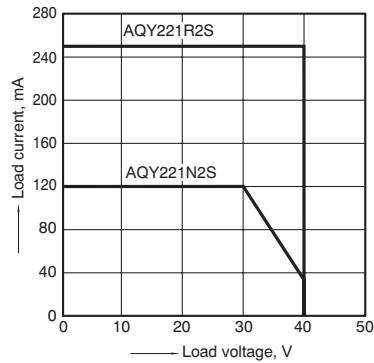
Please refer to our information on [PhotoMOS Relays for Automotive Applications](#).

**REFERENCE DATA****1. Load current vs. ambient temperature characteristics**

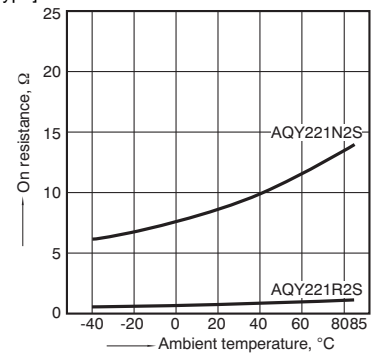
Allowable ambient temperature:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
 $-40^{\circ}\text{F}$  to  $+185^{\circ}\text{F}$

**2. Load current vs. Load voltage characteristics**

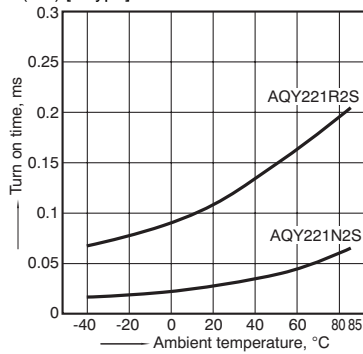
Ambient temperature:  $25^{\circ}\text{C}$   $77^{\circ}\text{F}$

**3. On resistance vs. ambient temperature characteristics**

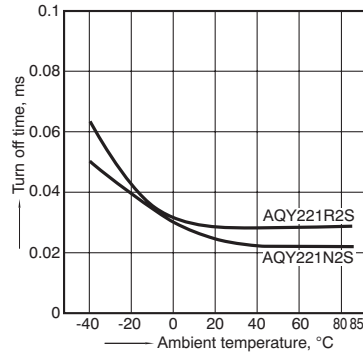
Measured portion: between terminals 3 and 4  
 LED current: 5 mA; Load voltage: Max. (DC);  
 Load current: 250mA (DC) [R type], 80mA (DC) [C type]

**4. Turn on time vs. ambient temperature characteristics**

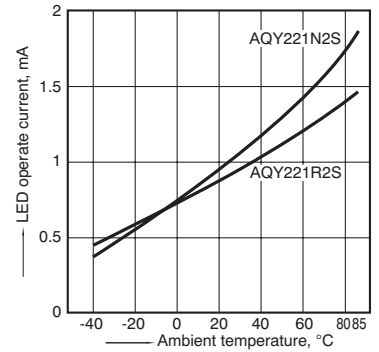
Measured portion: between terminals 3 and 4  
 LED current: 5 mA; Load voltage: 10V (DC);  
 Continuous load current: 250mA (DC) [R type],  
 80mA (DC) [C type]

**5. Turn off time vs. ambient temperature characteristics**

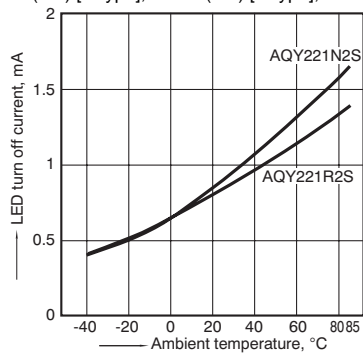
LED current: 5 mA; Load voltage: 10V (DC);  
 Continuous load current: 250mA (DC) [R type],  
 80mA (DC) [C type]

**6. LED operate current vs. ambient temperature characteristics**

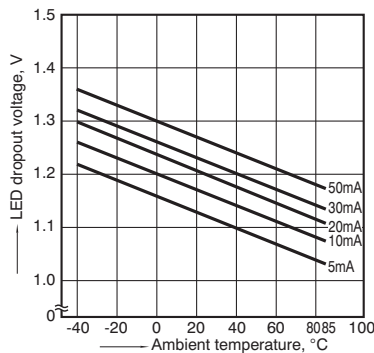
Load voltage: Max. (DC);  
 Continuous load current: 250mA (DC) [R type],  
 80mA (DC) [C type]

**7. LED turn off current vs. ambient temperature characteristics**

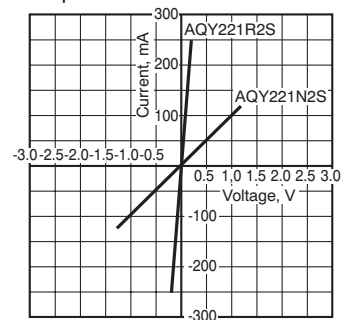
Load voltage: Max. (DC); Continuous load current:  
 250mA (DC) [R type], 80mA (DC) [C type];

**8. LED dropout voltage vs. ambient temperature characteristics**

LED current: 5 to 50 mA

**9. Current vs. voltage characteristics of output at MOS portion**

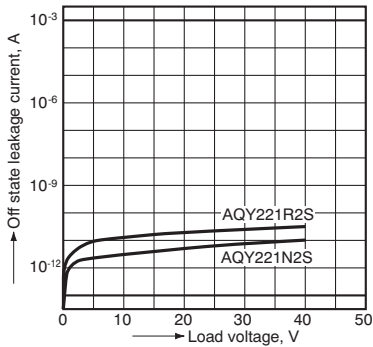
Measured portion: between terminals 3 and 4  
 Ambient temperature:  $25^{\circ}\text{C}$   $77^{\circ}\text{F}$



# RF SOP 1 Form A CxR10 (AQY221○2S)

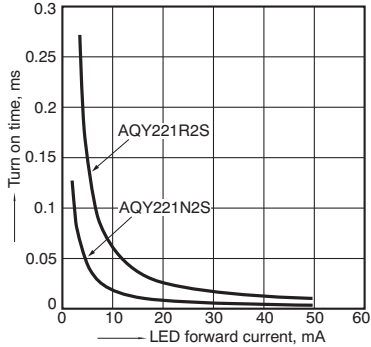
## 10.Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 3 and 4  
Ambient temperature: 25°C 77°F



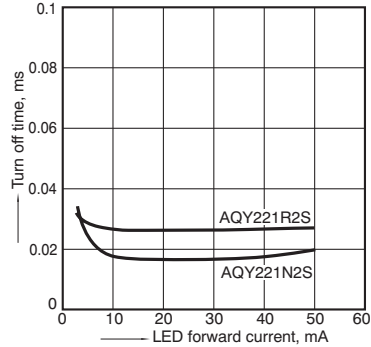
## 11.Turn on time vs. LED forward current characteristics

Measured portion: between terminals 3 and 4  
Load voltage: 10V (DC); Continuous load current: 250mA (DC) [R type], 80mA (DC) [C type];  
Ambient temperature: 25°C 77°F



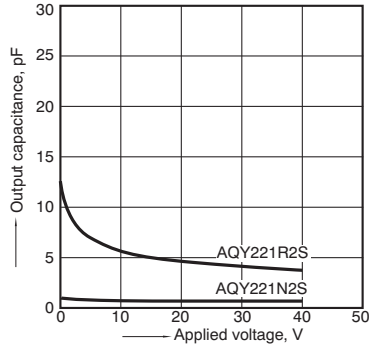
## 12.Turn off time vs. LED forward current characteristics

Measured portion: between terminals 3 and 4  
Load voltage: 10V (DC); Continuous load current: 250mA (DC) [R type], 80mA (DC) [C type];  
Ambient temperature: 25°C 77°F



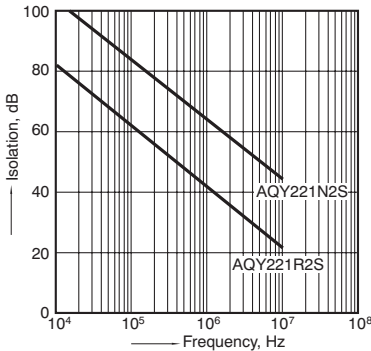
## 13.Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 3 and 4  
Frequency: 1 MHz, 30m Vrms; Ambient temperature: 25°C 77°F



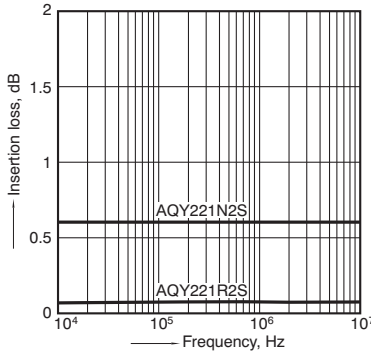
## 14.Isolation vs. frequency characteristics (50Ω impedance)

Measured portion: between terminals 3 and 4  
Ambient temperature: 25°C 77°F



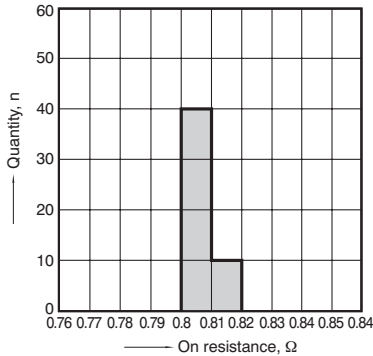
## 15.Insertion loss vs. frequency characteristics (50Ω impedance)

Measured portion: between terminals 3 and 4  
Ambient temperature: 25°C 77°F



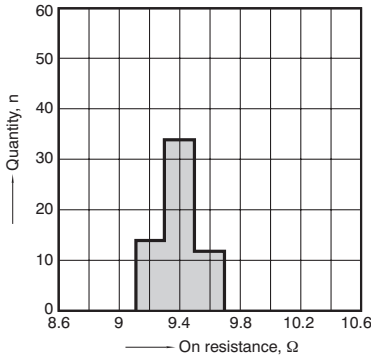
## 16-(1). On resistance distribution (R type)

Measured portion: between terminals 3 and 4  
Continuous load current: 250mA (DC)  
Ambient temperature: 25°C 77°F



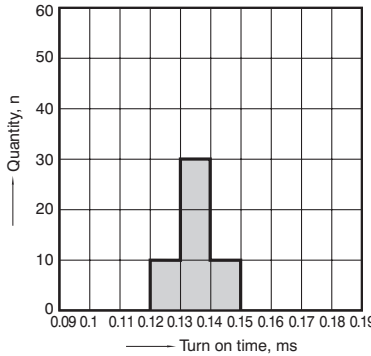
## 16-(2). On resistance distribution (C type)

Measured portion: between terminals 3 and 4  
Continuous load current: 80mA (DC)  
Ambient temperature: 25°C 77°F



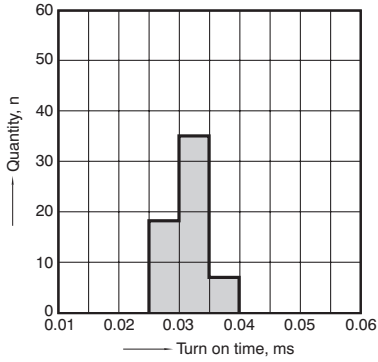
## 17-(1). Turn on time distribution (R type)

Load voltage: 10V (DC)  
Continuous load current: 250mA (DC)  
Ambient temperature: 25°C 77°F



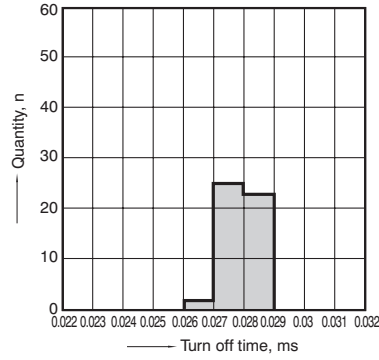
## 17-(2). Turn on time distribution (C type)

Load voltage: 10V (DC)  
Continuous load current: 80mA (DC)  
Ambient temperature: 25°C 77°F



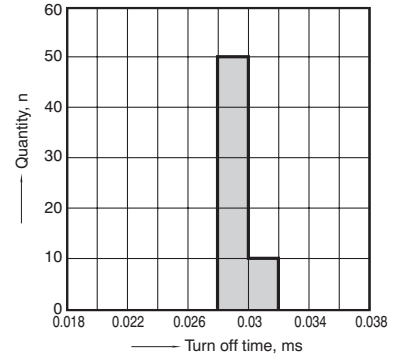
## 18-(1). Turn off time distribution (R type)

Load voltage: 10V (DC)  
Continuous load current: 250mA (DC)  
Ambient temperature: 25°C 77°F



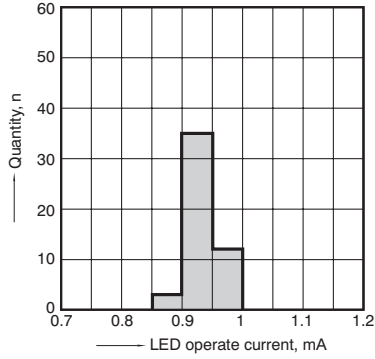
## 18-(2). Turn off time distribution (C type)

Load voltage: 10V (DC)  
Continuous load current: 80mA (DC)  
Ambient temperature: 25°C 77°F



## 19-(1). LED operate current distribution (R type)

Load voltage: 10V (DC)  
Continuous load current: 250mA (DC)  
Ambient temperature: 25°C 77°F



## 19-(2). LED operate current distribution (C type)

Load voltage: 10V (DC)  
Continuous load current: 80mA (DC)  
Ambient temperature: 25°C 77°F

