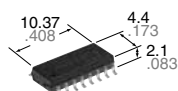
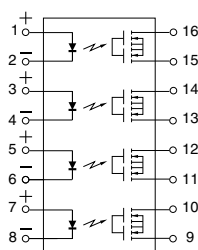


**Space-saving low C×R type  
with 4 channels in  
a SOP16-pin package**

**PhotoMOS®  
RF SOP 4 Form A C×R10  
(AQS221○2S)**



mm inch



**RoHS compliant**

### FEATURES

#### 1. 4-channel (4 Form A) in a small SOP16-pin package

The device comes in a miniature SOP measuring (W)10.37 × (L)4.4 × (H)2.1mm (W).408×(L).173×(H).083inch

This contributes to space-saving of PC board.

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

- R type: On resistance 0.8Ω (typ.)  
Output capacitance 13pF (typ.)

- C type: On resistance 9.7Ω (typ.)  
Output capacitance 1.0pF (typ.)

#### 3. High-speed switching of 0.03ms (C type, typical turn on time)

#### 4. Applicable for 4 Form A use, as well as 4 independent 1 Form A

### 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*1		Package	Part No.*2			Packing quantity	
		Load voltage	Load current		Tube packing style	Tape and reel packing style		Tube	Tape and reel
						Picked from the 1/2/3/4/5/6/7/8-pin side	Picked from the 9/10/11/12/13/14/15/16-pin side		
AC/DC dual use	Low on-resistance (R type)	40V	0.16A	SOP16-pin	AQS221R2S	AQS221R2SX	AQS221R2SZ	1 tube contains: 50 pcs. 1 batch contains: 1,000 pcs.	1,000 pcs.
	Low capacitance (C type)	40V	0.06A		AQS221N2S	AQS221N2SX	AQS221N2SZ		

Notes: \*1 Indicate the peak AC and DC values.

\*2 The packing style indicator "X" or "Z" is not marked on the device.

### RATING

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

Item		Symbol	AQS221R2S (R type)	AQS221N2S (C type)	Remarks
Input	LED forward current	I <sub>F</sub>	50 mA		
	LED reverse voltage	V <sub>R</sub>	5 V		
	Peak forward current	I <sub>FP</sub>	1 A		f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>	75 mW		
Output	Load voltage (peak AC)	V <sub>L</sub>	40 V		
	Continuous load current	I <sub>L</sub>	0.16 A	0.06 A	Peak AC, DC
	Peak load current	I <sub>peak</sub>	0.2 A	0.12 A	100 ms (1 shot), V <sub>L</sub> = DC
	Power dissipation	P <sub>out</sub>	600 mW		
Total power dissipation		P <sub>T</sub>	650 mW		
I/O isolation voltage		V <sub>iso</sub>	500 V 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		

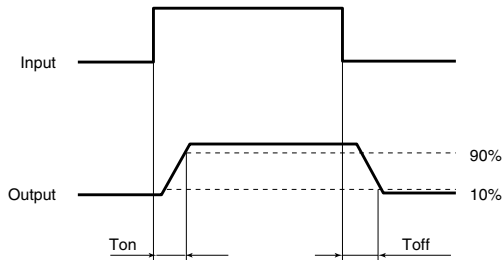
# RF SOP 4 Form A C×R10 (AQS221○2S)

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

Item		Symbol	AQS221R2S (R type)	AQS221N2S (C type)	Condition
Input	LED operate current	Typical	0.5 mA	0.9 mA	$I_L = \text{Max.}$
		Maximum	3.0 mA		
	LED turn off current	Minimum	0.1 mA		$I_L = \text{Max.}$
Typical		0.4 mA	0.85 mA		
LED dropout voltage	Typical	1.25 V (1.14 V at $I_F = 5 \text{ mA}$ )		$I_F = 50 \text{ mA}$	
	Maximum	1.5 V			
Output	On resistance	Typical	0.8Ω	9.5Ω	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time
		Maximum	1.25Ω	12.5Ω	
	Output capacitance	Typical	13.0 pF	1.0 pF	$I_F = 0 \text{ mA}$ $V_B = 0 \text{ V}$ $f = 1 \text{ MHz}$
		Maximum	18.0 pF	1.5 pF	
Off state leakage current	Typical	0.03 nA	0.01 nA	$I_F = 0 \text{ mA}$ $V_L = \text{Max.}$	
	Maximum	10 nA (1 nA or less)*			
Transfer characteristics	Turn on time**	Typical	0.15 ms	0.03 ms	$I_F = 5 \text{ mA}$ $V_L = 10 \text{ V}$ $R_L = 62.5\Omega$ (R type), $R_L = 500\Omega$ (C type)
		Maximum	0.5 ms	0.2 ms	
	Turn off time**	Typical	0.06 ms	0.03 ms	$I_F = 5 \text{ mA}$ $V_L = 10 \text{ V}$ $R_L = 62.5\Omega$ (R type), $R_L = 500\Omega$ (C type)
		Maximum	0.2 ms		
	I/O capacitance	Typical	0.8 pF		$f = 1 \text{ MHz}$ $V_B = 0 \text{ V}$
Maximum		1.5 pF			
Initial I/O isolation resistance	Minimum	$R_{iso}$	1,000 MΩ		500 V DC

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

\*\*Turn on/Turn off time



## RECOMMENDED OPERATING CONDITIONS

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

Item	Symbol	Recommended value	Unit
Input LED current	$I_F$	5	mA

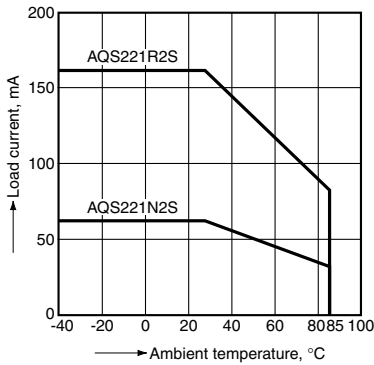
■ These products are not designed for automotive use.

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

## REFERENCE DATA

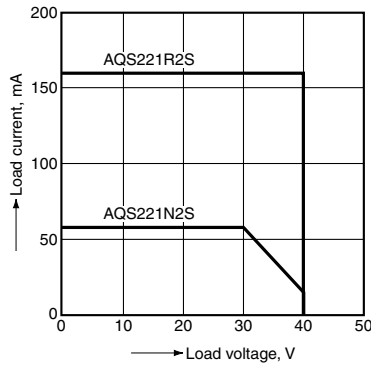
### 1. Load current vs. ambient temperature characteristics

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



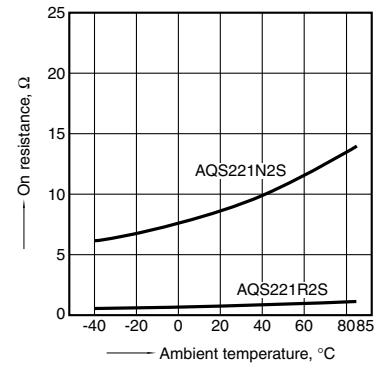
### 2. Load current vs. load voltage characteristics

Ambient temperature: 25°C 47°F



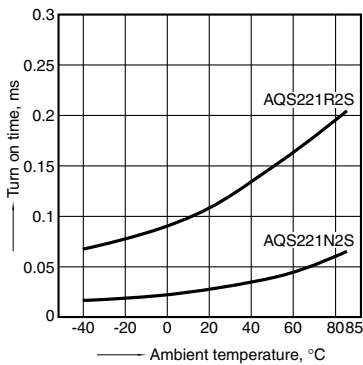
### 3. On resistance vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 10 V (DC);  
Continuous load current: 160 mA (DC) R type/  
60 mA (DC) C type



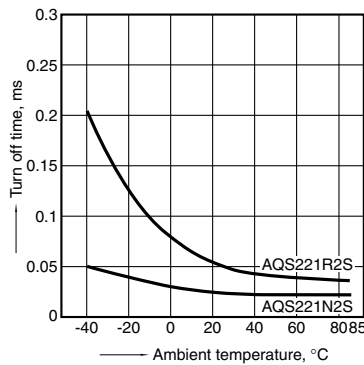
### 4. Turn on time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 10 V (DC);  
Continuous load current: 160 mA (DC) R type/  
20 mA (DC) C type



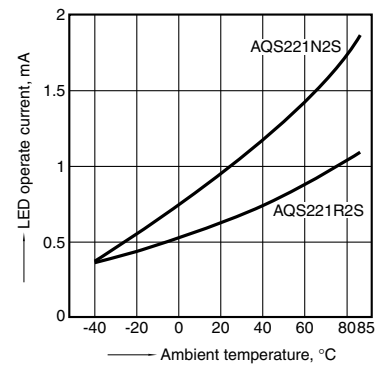
### 5. Turn off time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 10 V (DC);  
Continuous load current: 160 mA (DC) R type/  
20 mA (DC) C type



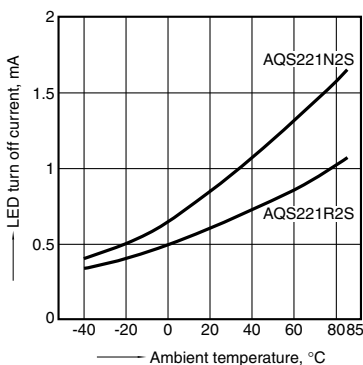
### 6. LED operate current vs. ambient temperature characteristics

Load voltage: 10 V (DC);  
Continuous load current: 160 mA (DC) R type/  
60 mA (DC) C type



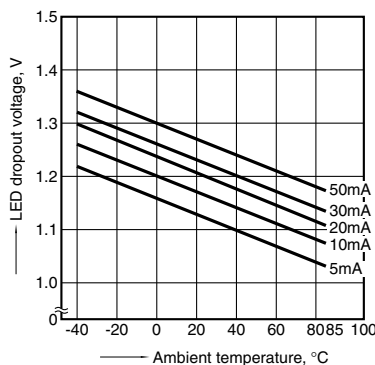
### 7. LED turn off current vs. ambient temperature characteristics

Load voltage: 10 V (DC);  
Continuous load current: 160 mA (DC) R type/  
60 mA (DC) C type



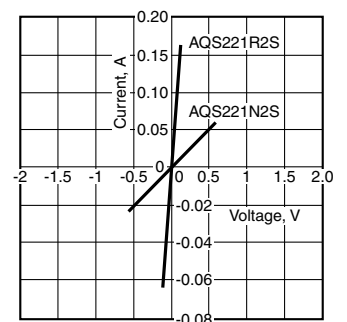
### 8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



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

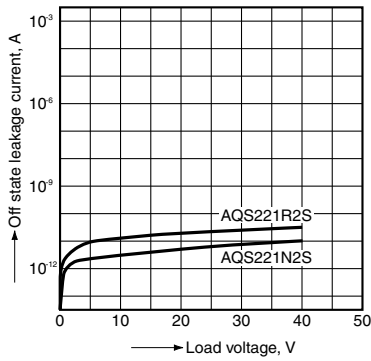
Ambient temperature: 25°C 77°F



# RF SOP 4 Form A C×R10 (AQS221○2S)

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

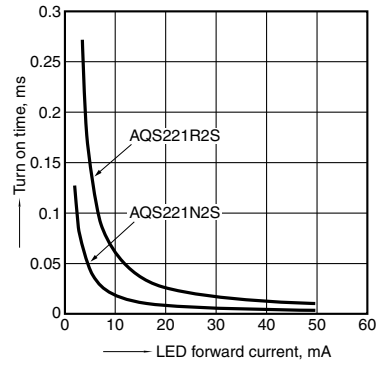
Ambient temperature: 25°C 77°F



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

Load voltage: 10 V (DC);  
Continuous load current: 160 mA (DC) R type/  
20 mA (DC) C type

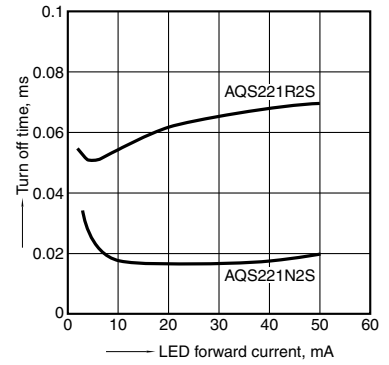
Ambient temperature: 25°C 77°F



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

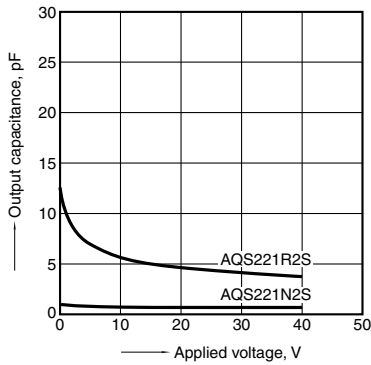
Load voltage: 10 V (DC);  
Continuous load current: 160 mA (DC) R type/  
20 mA (DC) C type

Ambient temperature: 25°C 77°F



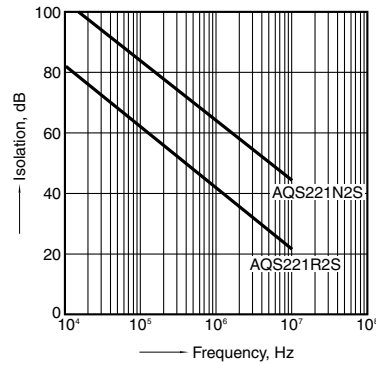
## 13. Output capacitance vs. applied voltage characteristics

Frequency: 1 MHz, 30 mVrms;  
Ambient temperature: 25°C 77°F



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

Ambient temperature: 25°C 77°F



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

Ambient temperature: 25°C 77°F

