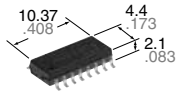
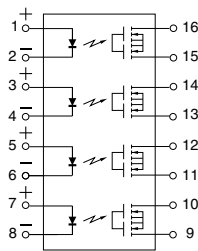


**Space-saving low C×R type
with 4 channels in
a SOP16-pin package**

**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 _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	40 V		
	Continuous load current	I _L	0.16 A	0.06 A	Peak AC, DC
	Peak load current	I _{peak}	0.2 A	0.12 A	100 ms (1 shot), V _L = DC
	Power dissipation	P _{out}	600 mW		
Total power dissipation		P _T	650 mW		
I/O isolation voltage		V _{iso}	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		

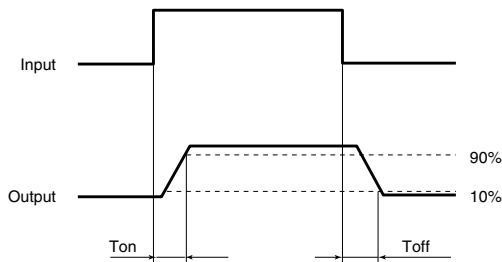
RF SOP 4 Form A C×R10 (AQS221○2S)

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

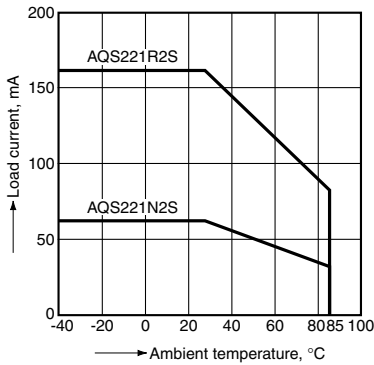
■ These products are not designed for automotive use.

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

REFERENCE DATA

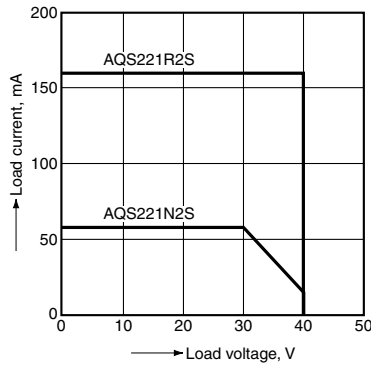
1. Load current vs. ambient temperature characteristics

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



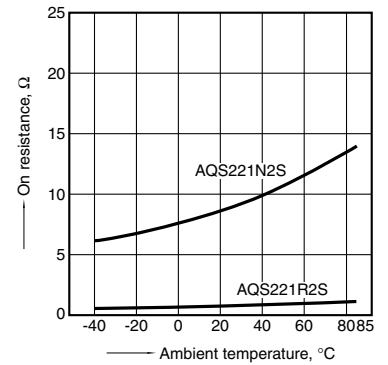
2. Load current vs. load voltage characteristics

Ambient temperature: 25°C 47°F



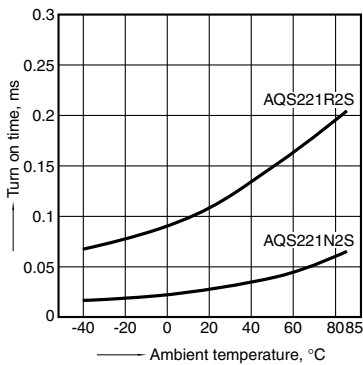
3. On resistance vs. ambient temperature characteristics

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



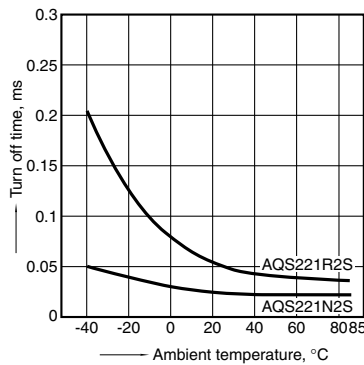
4. Turn on time vs. ambient temperature characteristics

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



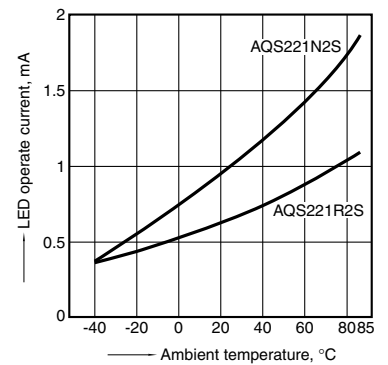
5. Turn off time vs. ambient temperature characteristics

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



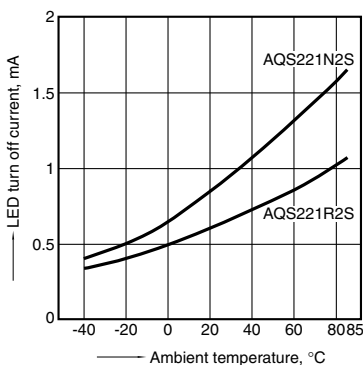
6. LED operate current vs. ambient temperature characteristics

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



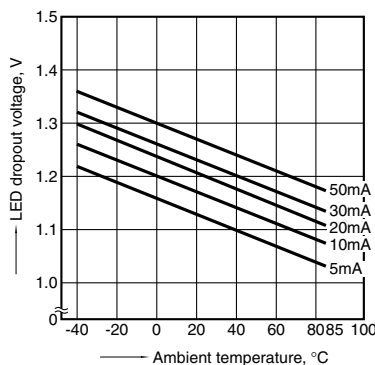
7. LED turn off current vs. ambient temperature characteristics

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



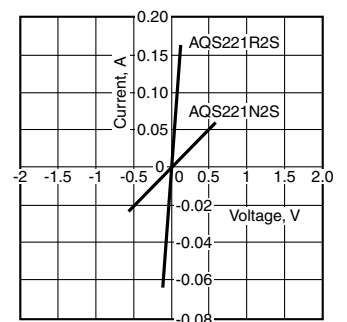
8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



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

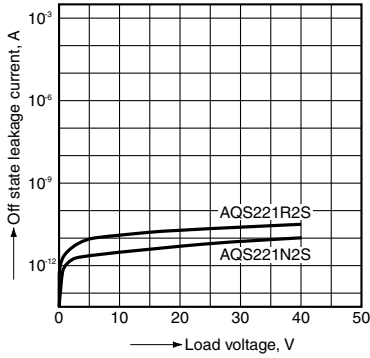
Ambient temperature: 25°C 77°F



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10. Off state leakage current vs. load voltage characteristics

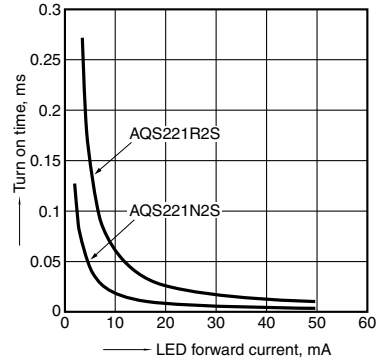
Ambient temperature: 25°C 77°F



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

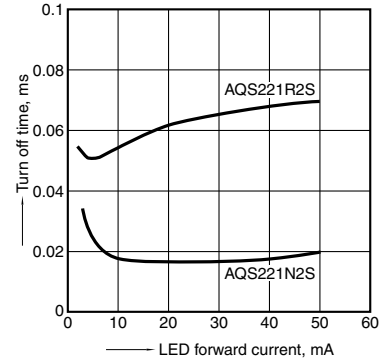
Ambient temperature: 25°C 77°F



12. Turn off time vs. LED forward current characteristics

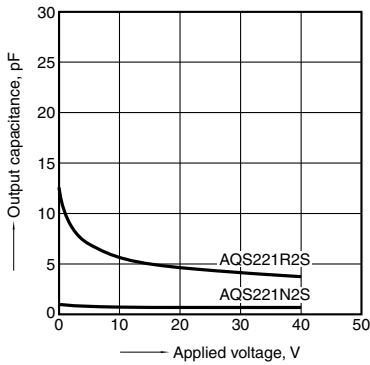
Load voltage: 10 V (DC);
Continuous load current: 160 mA (DC) R type/
20 mA (DC) C type

Ambient temperature: 25°C 77°F



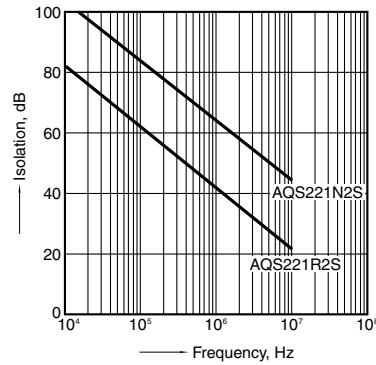
13. Output capacitance vs. applied voltage characteristics

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

