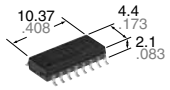
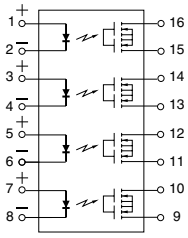
Panasonic
ideas for life

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

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



mm inch



Compliance with RoHS Directive

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: Picked from the 1/2/3/4/5/6/7/8-pin side	Tape and reel packing style: Picked from the 9/10/11/12/13/14/15/16-pin side	Tube	Tape and reel
AC/DC dual use	New 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 relay.

RATING

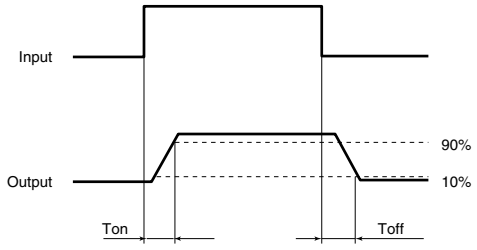
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

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		

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

Item			Symbol	AQS221R2S (R type)	AQS221N2S (C type)	Condition
Input	LED operate current	Typical	I_{Fon}	0.5 mA	0.9 mA	I_L = Max.
		Maximum		3.0 mA		
	LED turn off current	Minimum	I_{Foff}	0.1 mA		I_L = Max.
		Typical		0.4 mA	0.85 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}	0.8Ω	9.5Ω	I_F = 5 mA I_L = Max. Within 1 s on time
		Maximum		1.25Ω	12.5Ω	
	Output capacitance	Typical	C_{out}	13.0 pF	1.0 pF	I_F = 0 mA V_B = 0 V f = 1 MHz
		Maximum		18.0 pF	1.5 pF	
	Off state leakage current	Typical	I_{Leak}	0.03 nA	0.01 nA	I_F = 0 mA V_L = Max.
		Maximum		10 nA		
Transfer characteristics	Turn on time*	Typical	T_{on}	0.1 ms	0.03 ms	I_F = 5 mA V_L = 10V R_L = 62.5Ω (R type), R_L = 500Ω (C type)
		Maximum		0.5 ms	0.2 ms	
	Turn off time*	Typical	T_{off}	0.06 ms	0.03 ms	I_F = 5 mA V_L = 10V R_L = 62.5Ω (R type), R_L = 500Ω (C type)
		Maximum		0.2 ms		
	I/O capacitance	Typical	C_{iso}	0.8 pF		f = 1 MHz V_B = 0 V
		Maximum		1.5 pF		
	Initial I/O isolation resistance	Minimum	R_{iso}	1,000 MΩ		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_F	5	mA

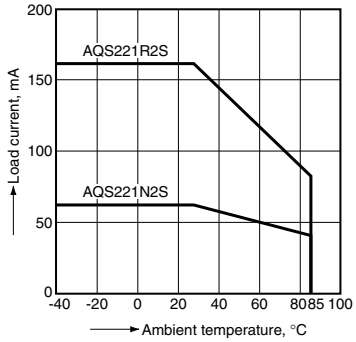
■ For Dimensions.
■ For Schematic and Wiring Diagrams.
■ For Cautions for Use.

■ 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.
For more information.

REFERENCE DATA

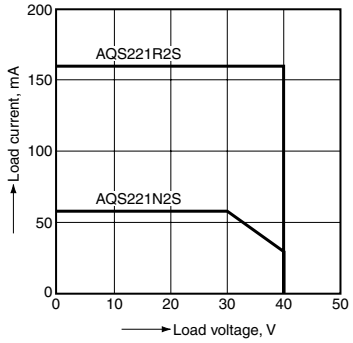
1. Load current vs. ambient temperature characteristics

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



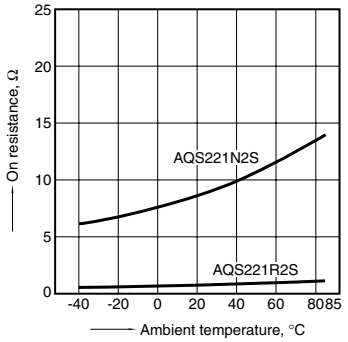
2. Load current vs. load voltage characteristics

Ambient temperature: 25°C 47°F



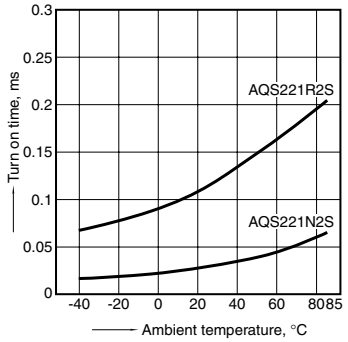
3. On resistance vs. ambient temperature characteristics

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



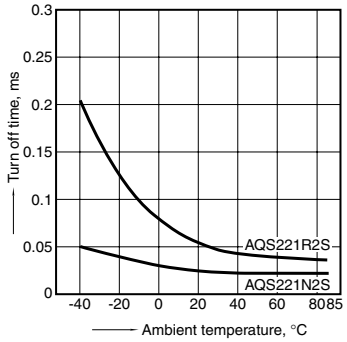
4. Turn on time vs. ambient temperature characteristics

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



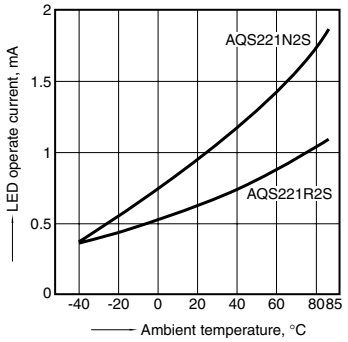
5. Turn off time vs. ambient temperature characteristics

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



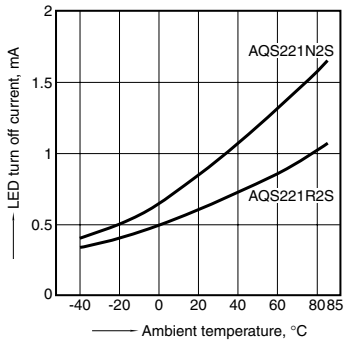
6. LED operate current vs. ambient temperature characteristics

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



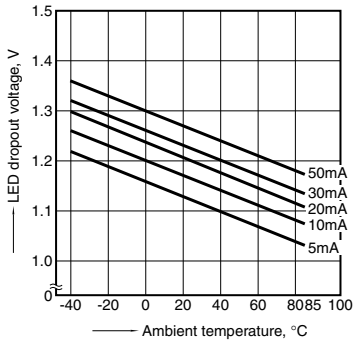
7. LED turn off current vs. ambient temperature characteristics

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



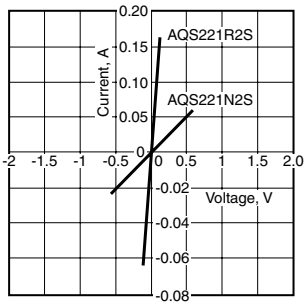
8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



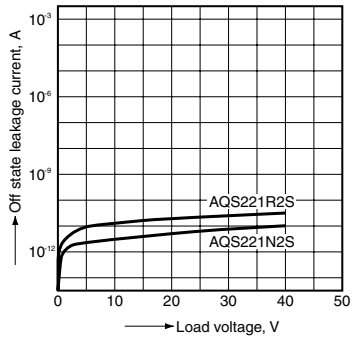
9. Current vs. voltage characteristics of output at MOS portion

Ambient temperature: 25°C 77°F



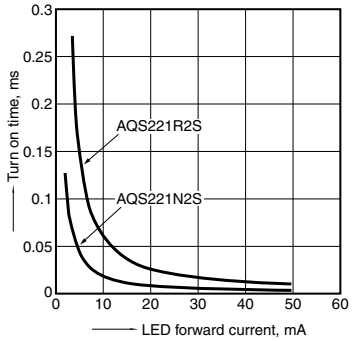
10. Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



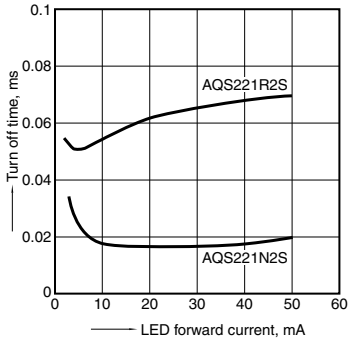
11. Turn on time vs. LED forward current characteristics

Load voltage: 10 V (DC);
Continuous load current: 160 mA (DC) R type/
20 mA (DC) C type
Ambient temperature: 25°C 77°F



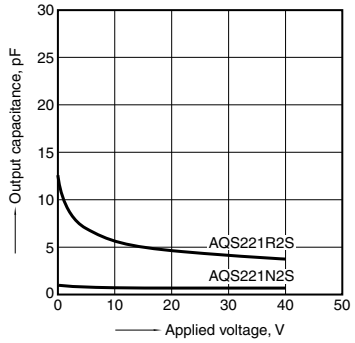
12. Turn off time vs. LED forward current characteristics

Load voltage: 10 V (DC);
Continuous load current: 160 mA (DC) R type/
20 mA (DC) C type
Ambient temperature: 25°C 77°F



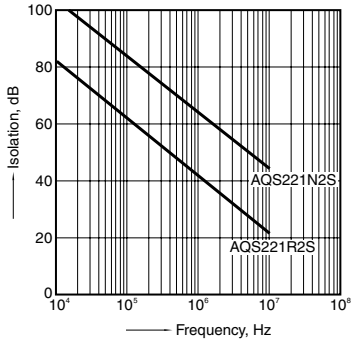
13. Output capacitance vs. applied voltage characteristics

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