Panasonic
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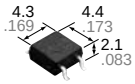
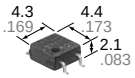
Miniature SOP4-pin with C×R10 40V load voltage

PhotoMOS Relays
RF SOP 1 Form A C×R10
(AQY221○2S)

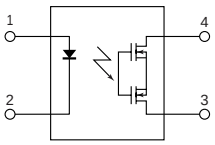


<R type>



<C type>

mm inch



Compliance with RoHS Directive

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 batch contains: 2,000 pcs.	1,000 pcs.
	Low capacitance (C type)	40V	120mA		AQY221N2S	AQY221N2SX	AQY221N2SZ		

* 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)

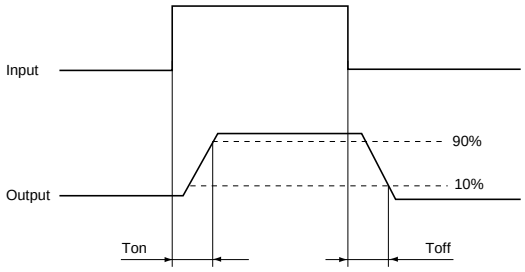
Item		Symbol	AQY221R2S (R type)	AQY221N2S (C type)	Remarks
Input	LED forward current	I_F	50mA		
	LED reverse voltage	V_R	5V		
	Peak forward current	I_{FP}	1A		f=100 Hz, Duty factor=0.1%
	Power dissipation	P_{in}	75mW		
Output	Load voltage (peak AC)	V_L	40V		
	Continuous load current	I_L	0.25A	0.12A	Peak AC, DC
	Peak load current	I_{peak}	0.75A	0.30A	100 ms (1 shot), V_L= DC
	Power dissipation	P_{out}	300mW		
Total power dissipation		P_T	350mW		
I/O isolation voltage		V_{iso}	500V AC	1,500V 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 1 Form A C×R10 (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_{Fon}	0.5 mA	0.9 mA	I_L = 250 mA (R type) I_L = 80 mA (C type)
		Maximum		3.0 mA		
	LED turn off current	Minimum	I_{Foff}	0.1 mA	0.2 mA	I_L = 250 mA (R type) I_L = 80 mA (C type)
		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 = 250 mA (R type), I_L = 80 mA (C type) Within 1 s on time
		Maximum		1.25Ω	12.5Ω	
	Output capacitance	Typical	C_{out}	13 pF	1.0 pF	I_F = 0 mA V_B = 0 V f = 1 MHz
		Maximum		18 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 = 40Ω (R type), 125Ω (C type)
		Maximum		0.5ms		
	Turn off time*	Typical	T_{off}	0.06 ms	0.03 ms	I_F = 5 mA V_L = 10V R_L = 40Ω (R type), 125Ω (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}	1,000MΩ		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_F	5	mA

■ For Dimensions

■ For Schematic and Wiring Diagrams

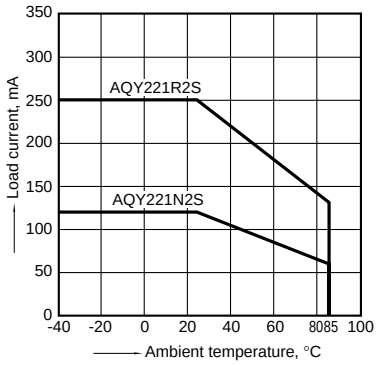
■ For Cautions for Use

■ 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

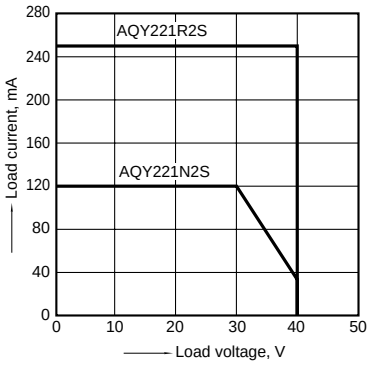
1. Load current vs. ambient temperature characteristics

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



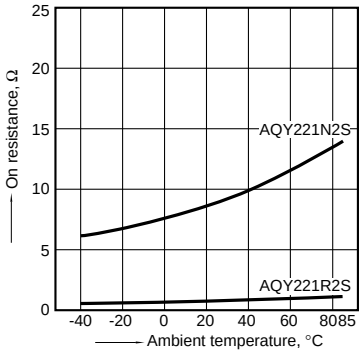
2. Load current vs. Load voltage characteristics

Ambient temperature: 25°C 77°F



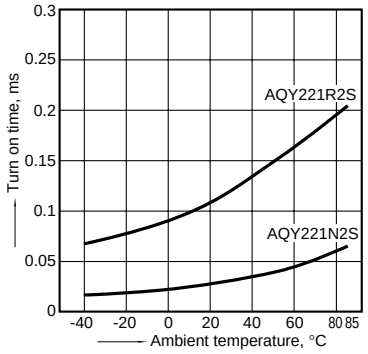
3. On resistance vs. ambient temperature characteristics

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]



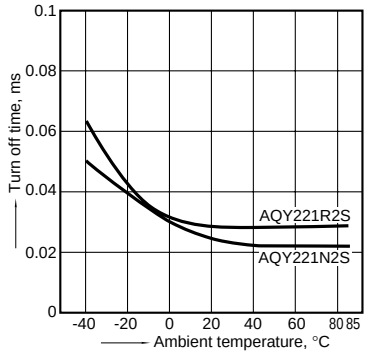
4. Turn on time vs. ambient temperature characteristics

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]



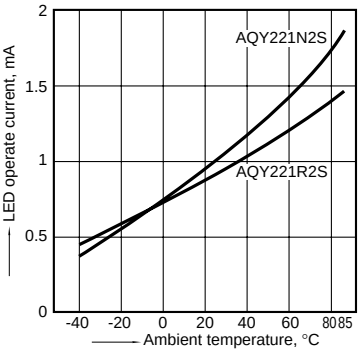
5. Turn off time vs. ambient temperature characteristics

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



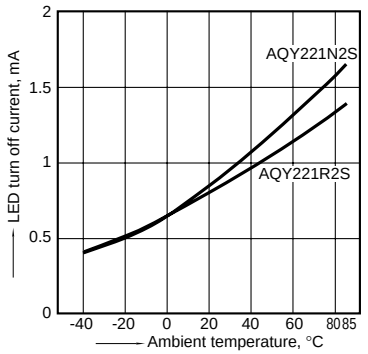
6. LED operate current vs. ambient temperature characteristics

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



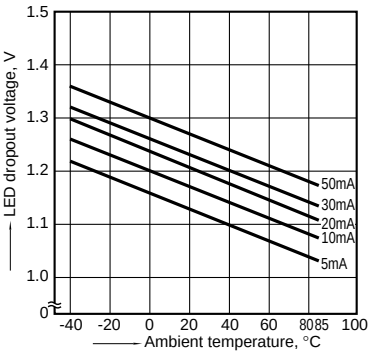
7. LED turn off current vs. ambient temperature characteristics

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



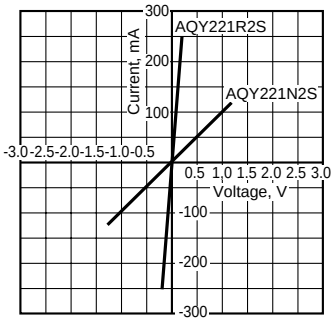
8. LED dropout voltage vs. ambient temperature characteristics

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°C 77°F



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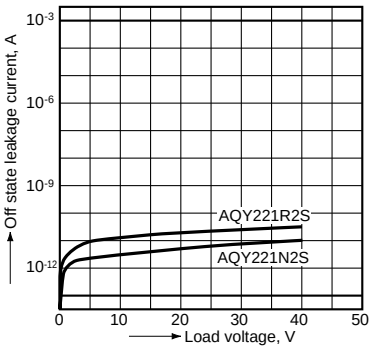
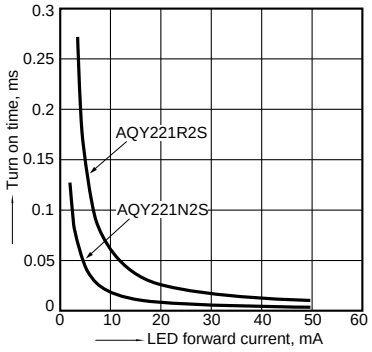
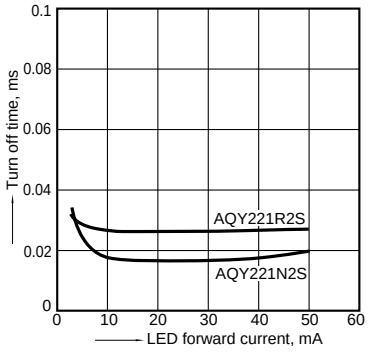
10. Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 3 and 4
Ambient temperature: 25°C 77°F



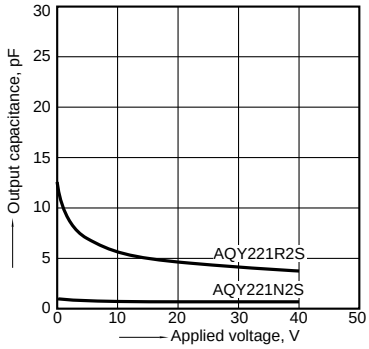
11. Turn on time vs. LED forward current characteristics
Measured portion: between terminals 3 and 4
Load voltage: 10V (DC); Continuous load current: 250mA (DC) [R type], 80mA (DC) [C type];
Ambient temperature: 25°C 77°F



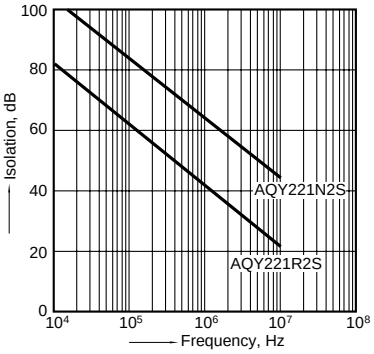
12. Turn off time vs. LED forward current characteristics
Measured portion: between terminals 3 and 4
Load voltage: 10V (DC); Continuous load current: 250mA (DC) [R type], 80mA (DC) [C type];
Ambient temperature: 25°C 77°F



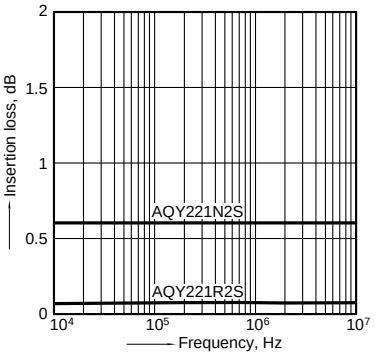
13. Output capacitance vs. applied voltage characteristics
Measured portion: between terminals 3 and 4
Frequency: 1 MHz, 30m Vrms; Ambient temperature: 25°C 77°F



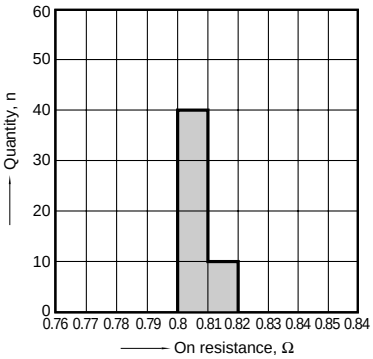
14. Isolation vs. frequency characteristics (50Ω impedance)
Measured portion: between terminals 3 and 4
Ambient temperature: 25°C 77°F



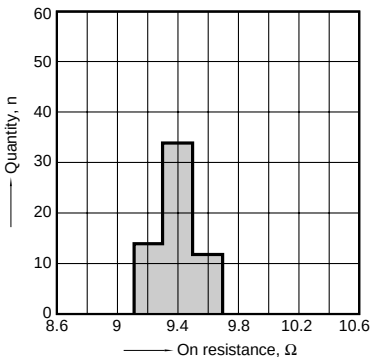
15. Insertion loss vs. frequency characteristics (50Ω impedance)
Measured portion: between terminals 3 and 4
Ambient temperature: 25°C 77°F



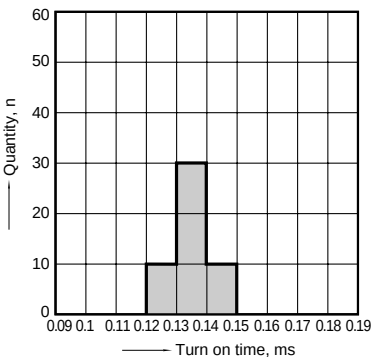
16-(1). On resistance distribution (R type)
Measured portion: between terminals 3 and 4
Continuous load current: 250mA (DC)
Ambient temperature: 25°C 77°F



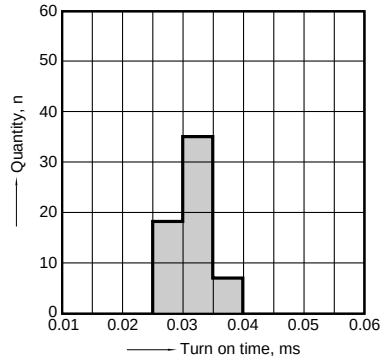
16-(2). On resistance distribution (C type)
Measured portion: between terminals 3 and 4
Continuous load current: 80mA (DC)
Ambient temperature: 25°C 77°F



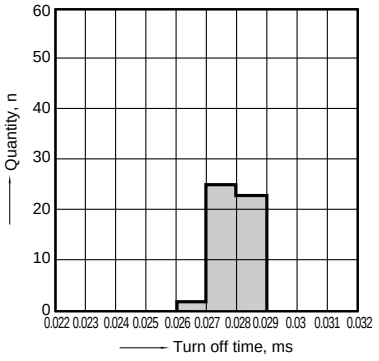
17-(1). Turn on time distribution (R type)
Load voltage: 10V (DC)
Continuous load current: 250mA (DC)
Ambient temperature: 25°C 77°F



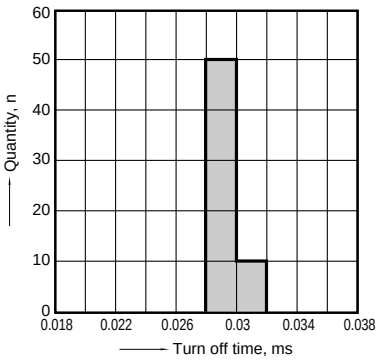
17-(2). Turn on time distribution (C type)
Load voltage: 10V (DC)
Continuous load current: 80mA (DC)
Ambient temperature: 25°C 77°F



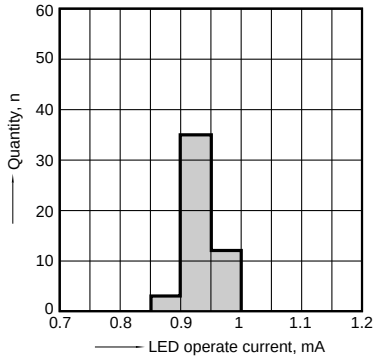
18-(1). Turn off time distribution (R type)
Load voltage: 10V (DC)
Continuous load current: 250mA (DC)
Ambient temperature: 25°C 77°F



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