

FEATURES

1. Two option package available.

R type offers greatly reduced on-resistance.

C type offers lower output capacitance.

	AQY221R2S (R type)	AQY221N2S (C type)
Output capacitance: C	13pF	1pF
On resistance: R	0.8Ω	9.5Ω

2. High speed switching

Turn on time: 30μs (AQY221N2S)

Turn off time: 30μs (AQY221N2S)

3. Super miniature design

SOP 4-pin type.

4. Low-level off state leakage current of 10pA

The SSR has an off state leakage current of several milliamperes, where as this PhotoMOS relay has typ. 10pA (typical) even with the rated load voltage (AQY221N2S)

TYPICAL APPLICATIONS

Measuring and testing equipment

1. Testing equipment for semiconductor performance

IC tester, Liquid crystal driver tester, semiconductor performance tester

2. Board tester

Bare board tester, In-circuit tester, function tester

3. Medical equipment

Ultrasonic wave diagnostic machine

4. Multi-point recorder

Warping, thermo couple

TYPES

Type	Output rating*		Package size	Part No.			Packing quantity	
	Load voltage	Load current		Tube packing style	Tape and reel packing style		Tube	Tape and reel
R type	40V	250mA	SOP4pin	AQY221R2S	AQY221R2SX (Picked from the 1/2-pin side)	AQY221R2SZ (Picked from the 3/4-pin side)	1 tube contains: 100 pcs.	1,000 pcs.
C type	40V	120mA		AQY221N2S	AQY221N2SX (Picked from the 1/2-pin side)	AQY221N2SZ (Picked from the 3/4-pin side)	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 SMD terminal shape indicator "S" and the packaging style indicator "X" or "Z" are not marked on the relay.

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 _{sta}	-40°C to +100°C -40°F to +212°F		

RF PhotoMOS (AQY221○2S)

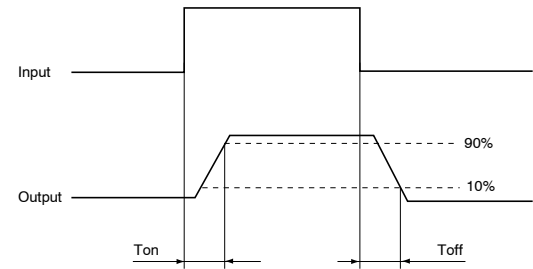
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

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	Switching speed	Turn on time*	T _{on}	0.1 ms	0.03 ms	I _F = 5 mA V _L = 10V R _L = 40Ω (R type), 125Ω (C type)	
				0.5ms			
		Turn off time*	T _{off}	0.06 ms	0.03 ms	I _F = 5 mA V _L = 10V R _L = 40Ω (R type), 125Ω (C type)	
				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

Note: Recommendable LED forward current I_F = 5 mA.

[Type of connection](#)

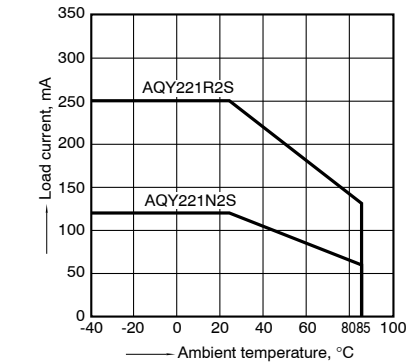
*Turn on/Turn off time



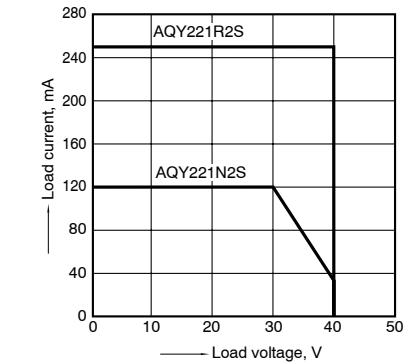
- Dimensions
- Schematic and Wiring Diagrams
- Cautions for Use

REFERENCE DATA

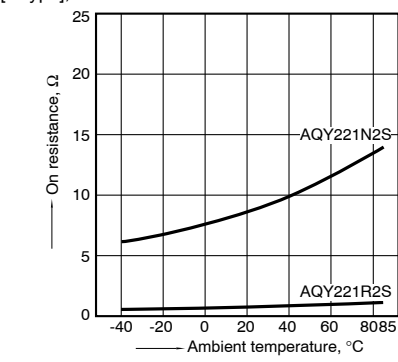
1. Load current vs. ambient temperature characteristics
Allowable ambient temperature: -40°C to +85°C
-40°F to +185°F



2. Load current vs. Load voltage characteristics
Ambient temperature: 25°C 77°F

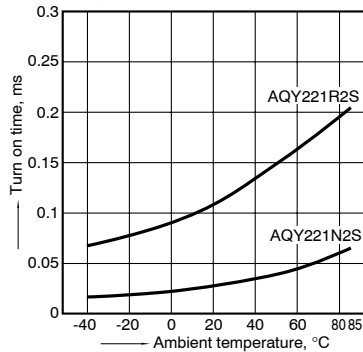


3. On resistance vs. ambient temperature characteristics
Measured portion: between terminals 3 and 4
LED current: 5 mA; Load voltage: Max. (DC);
Load current: 250mA (DC) [R type], 80mA (DC) [C type];



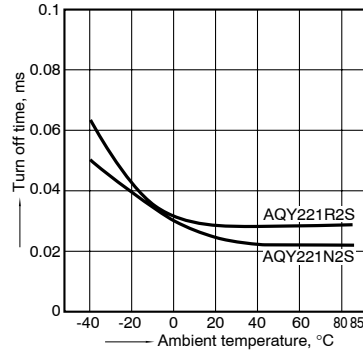
4. Turn on time vs. ambient temperature characteristics

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];



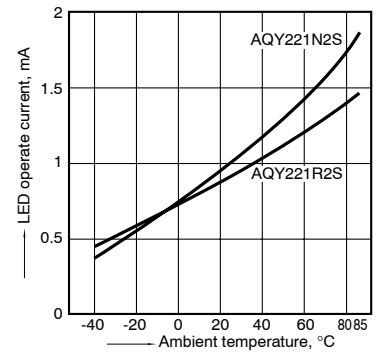
5. Turn off time vs. ambient temperature characteristics

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



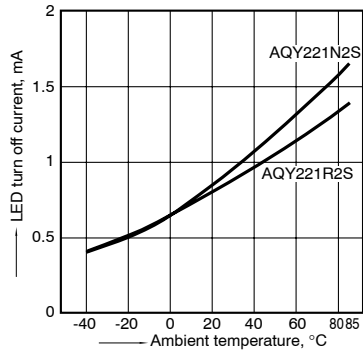
6. LED operate current vs. ambient temperature characteristics

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



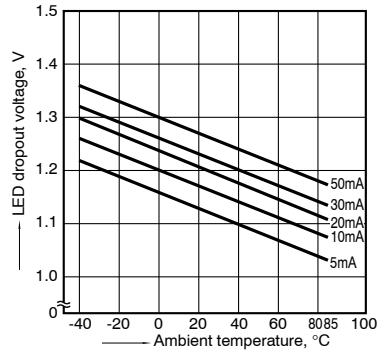
7. LED turn off current vs. ambient temperature characteristics

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



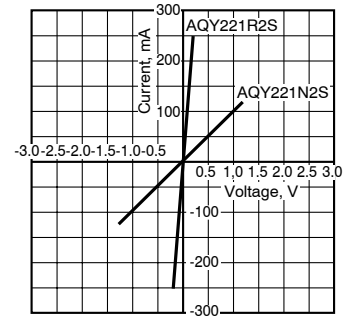
8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



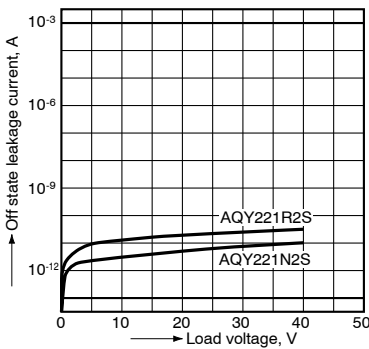
9. Current vs. voltage characteristics of output at MOS portion

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



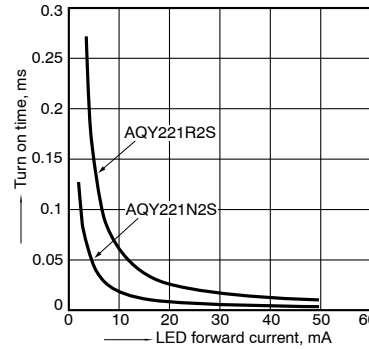
10. Off state leakage current vs. load voltage characteristics

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



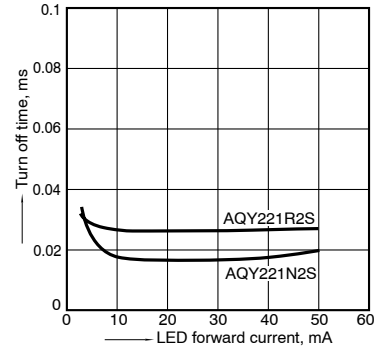
11. Turn on time vs. LED forward current characteristics

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



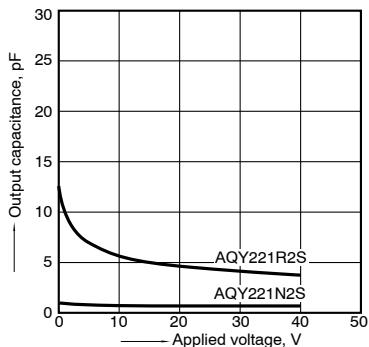
12. Turn off time vs. LED forward current characteristics

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



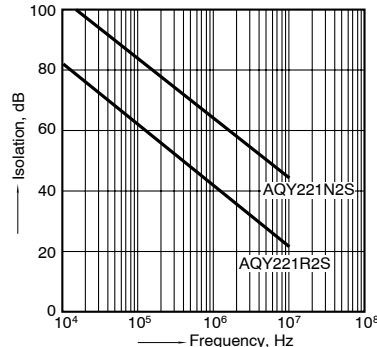
13. Output capacitance vs. applied voltage characteristics

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



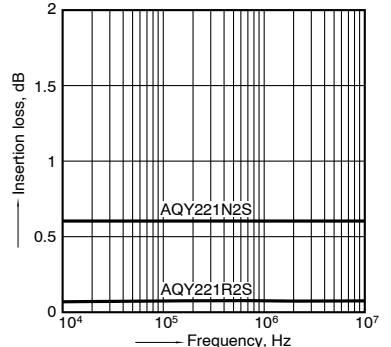
14. Isolation vs. frequency characteristics (50Ω impedance)

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



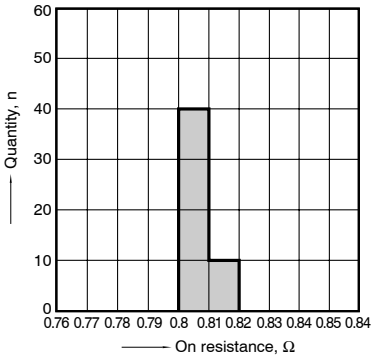
15. Insertion loss vs. frequency characteristics (50Ω impedance)

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

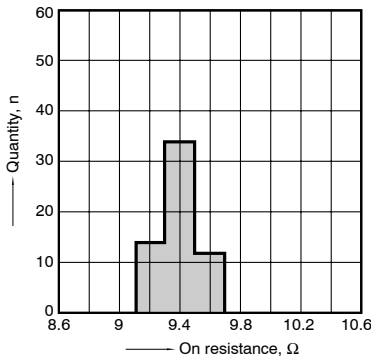


RF PhotoMOS (AQY221○2S)

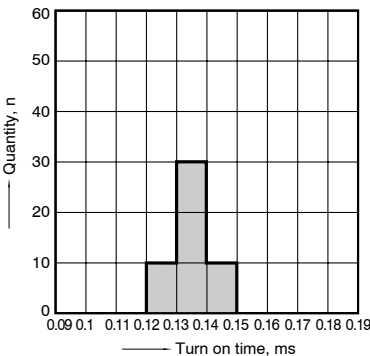
16-(1). On resistance distribution (R type)
Measured portion: between terminals 3 and 4
Continuous load current: 250mA (DC)
Ambient temperature: 25°C 77°F



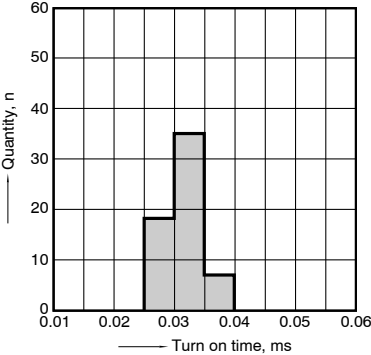
16-(2). On resistance distribution (C type)
Measured portion: between terminals 3 and 4
Continuous load current: 80mA (DC)
Ambient temperature: 25°C 77°F



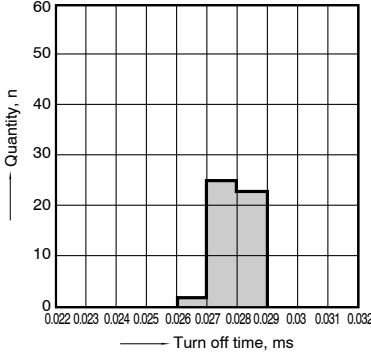
17-(1). Turn on time distribution (R type)
Load voltage: 10V (DC)
Continuous load current: 250mA (DC)
Ambient temperature: 25°C 77°F



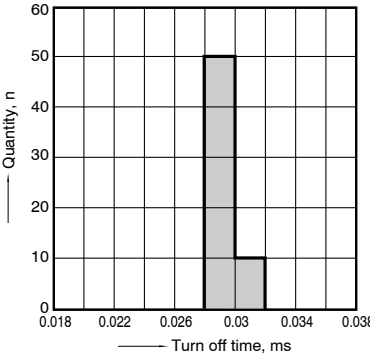
17-(2). Turn on time distribution (C type)
Load voltage: 10V (DC)
Continuous load current: 80mA (DC)
Ambient temperature: 25°C 77°F



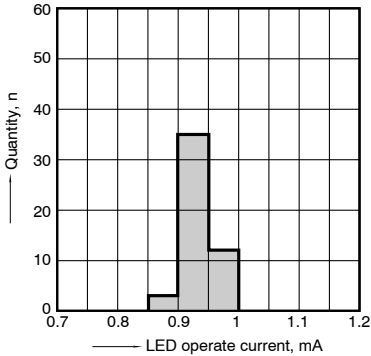
18-(1). Turn off time distribution (R type)
Load voltage: 10V (DC)
Continuous load current: 250mA (DC)
Ambient temperature: 25°C 77°F



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

