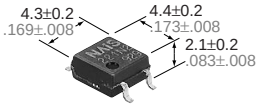
UL pending CSA pending

NAiS

RF (Radio Frequency)
C × R 10 Type
(by)

PhotoMOS RELAYS



mm inch

FEATURES

1. In addition to lower output capacitance between terminals than ever before, the PhotoMOS relay achieves low ON-resistance.
Output capacitance(C): 1.0pF (typ.)
ON resistance(R): 9.5Ω (typ.)
2. High speed switching
Turn on time: 30μs
Turn off time: 30μs
3. SO package 4-pin type in super miniature design
4. Low-level off state leakage current
The SSR has an off state leakage current of several milliamperes, where as this PhotoMOS relay has only 10pA (typical) even with the rated load voltage
5. Controls low-level analog signals
6. Low thermal electromotive force (Approx. 1 μV)

TYPICAL APPLICATIONS

Measuring and testing equipment
1. Testing equipment for semiconductor performance
   IC tester, Liquid crystal driver tester, semiconductor performance tester
2. Board tester
   Bear board tester, In-circuit tester, function tester
3. Medical equipment
   Ultrasonic wave diagnostic machine
4. Multi-point recorder
   Warping, thermo couple

TYPES

Circuit arrangement	Type	Output rating*		Tape and reel packing style		Packing quantity in tape and reel
		Load voltage	Load current	Picked from the 1/2-pin side	Picked from the 3/4-pin side	
1 Form A	AC/DC	40 V	120 mA	AQY221N2SX	AQY221N2SZ	1,000 pcs.

* Indicate the peak AC and DC values.
Notes: (1) Tape package is the standard packing style. Also available in tube.
(Part No. suffix "X" or "Z" is not needed when ordering; Tube: 100 pcs.; Case: 2,000 pcs.)
(2) For space reasons, the initial letters of the product number "AQY and S", the package type indicator "X" and "Z" are omitted from the seal.

RATING

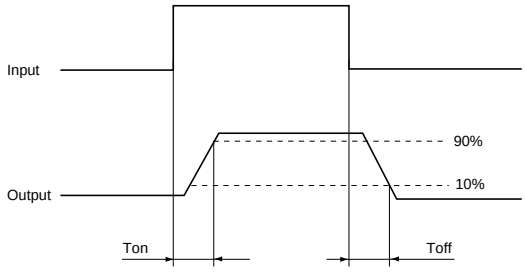
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item		Symbol	AQY221N2S	Remarks
Input	LED forward current	I_F	50mA	
	LED reverse voltage	V_R	3V	
	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	0.12A	Peak AC,DC
	Peak load current	I_{peak}	0.30A	100 ms (1 shot), VL= DC
	Power dissipation	P_{out}	300mW	
Total power dissipation		P_T	350mW	
I/O isolation voltage		V_{iso}	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	

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

Item				Symbol	AQY221N2S	Condition
Input	LED operate current		Minimum Typical Maximum	I_{Fon}	0.9 mA 3.0mA	I_L = 80 mA
	LED turn off current		Minimum Typical Maximum	I_{Foff}	0.2 mA 0.85mA	I_L = 80 mA
	LED dropout voltage		Minimum Typical Maximum	V_F	1.14V (1.25 V at I_F = 50mA) 1.5 V	I_F = 5mA
Output	On resistance		Minimum Typical Maximum	R_{on}	9.5Ω 12.5Ω	I_F = 5mA I_L = 80 mA Within 1 s on time
	Output capacitance		Minimum Typical Maximum	C_{out}	1.0 pF 1.5 pF	I_F = 0 V_B = 0 V f = 1 MHz
	Off state leakage current		Minimum Typical Maximum	I_{Leak}	0.01 nA 10 nA	I_F = 0 V_L = Max.
Transfer characteristics	Switching speed	Turn on time*	Minimum Typical Maximum	T_{on}	0.03 ms 0.5 ms	I_F = 5mA V_L = 10V R_L = 125Ω
		Turn off time*	Minimum Typical Maximum	T_{off}	0.03ms 0.2 ms	I_F = 5mA V_L = 10V R_L = 125Ω
	I/O capacitance		Minimum Typical Maximum	C_{iso}	0.8 pF 1.5pF	f = 1MHz V_B = 0
	Initial I/O isolation resistance		Minimum Typical Maximum	R_{iso}	1,000MΩ	500V DC

*Turn on/Turn off time

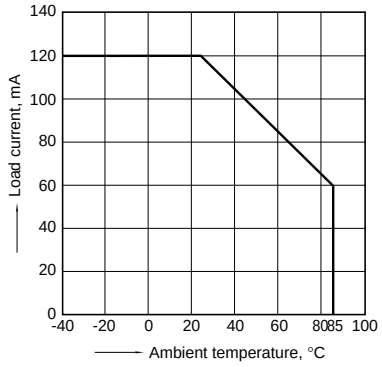


■ **For Dimensions, see Page 441.**
■ **For Schematic and Wiring Diagrams, see Page 444.**
■ **For Cautions for Use, see Page 449.**

REFERENCE DATA

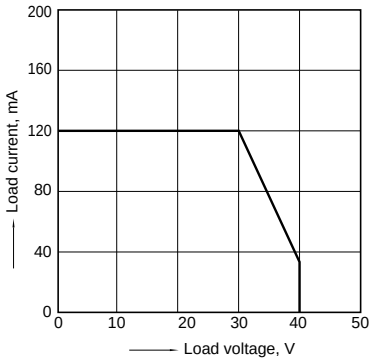
1. Load current vs. ambient temperature characteristics

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



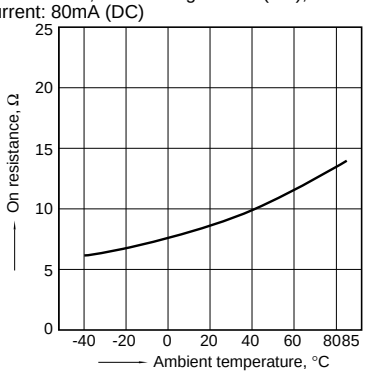
2. Load current vs. Load voltage characteristics

Ambient temperature: 25°C 77°F



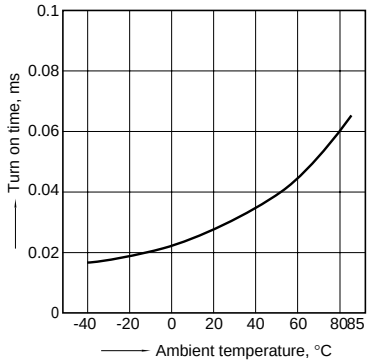
3. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4
LED current: 5 mA; Load voltage: Max. (DC);
Load current: 80mA (DC)



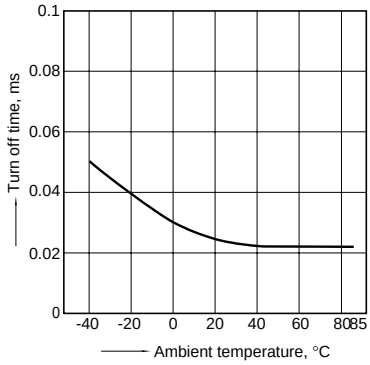
4. Turn on time vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4
LED current: 5 mA; Load voltage: 10V (DC);
Continuous load current: 80mA (DC)



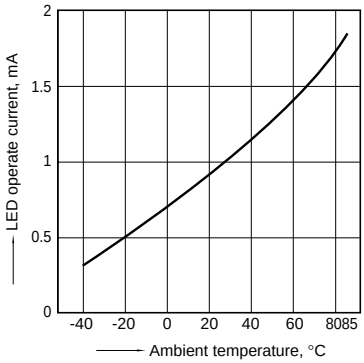
5. Turn off time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 10V (DC);
Continuous load current: 80mA (DC)



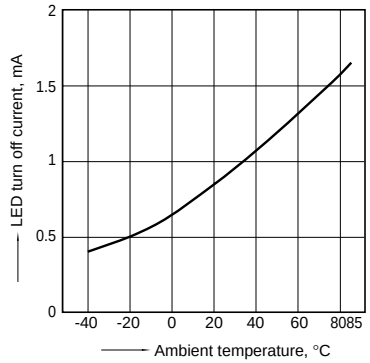
6. LED operate current vs. ambient temperature characteristics

Load voltage: Max. (DC); Continuous load current: 80mA (DC)



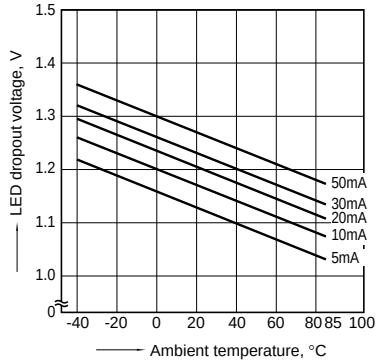
7. LED turn off current vs. ambient temperature characteristics

Load voltage: Max. (DC); Continuous load current: 80mA (DC)



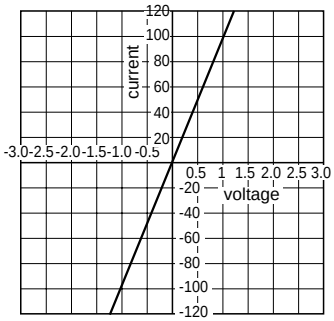
8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



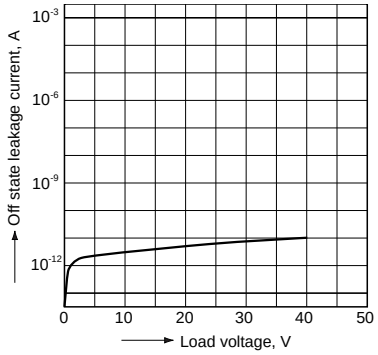
9. Voltage vs. current characteristics of output at MOS portion

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



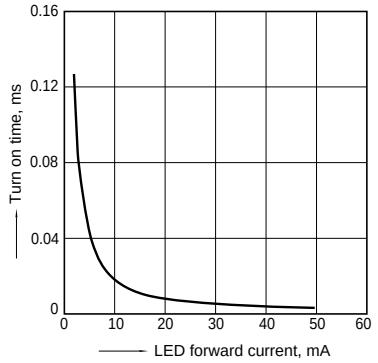
10. Off state leakage current

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



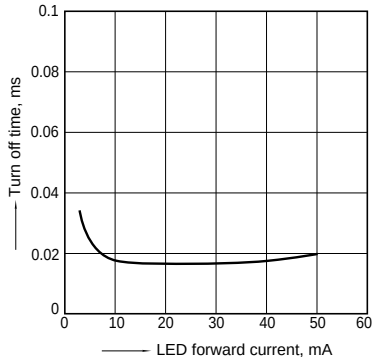
11. LED forward current vs. turn on time characteristics

Measured portion: between terminals 3 and 4
Load voltage: 10V (DC); Continuous load current: 80mA (DC);
Ambient temperature: 25°C 77°F



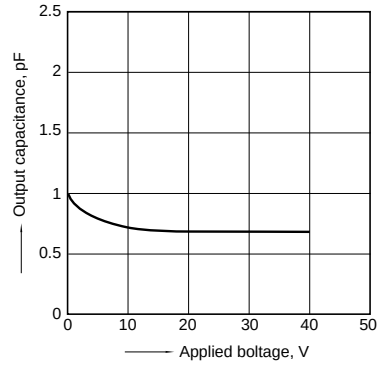
12. LED forward current vs. turn off time characteristics

Measured portion: between terminals 3 and 4
Load voltage: 10V (DC);
Continuous load current: 80mA (DC);
Ambient temperature: 25°C 77°F



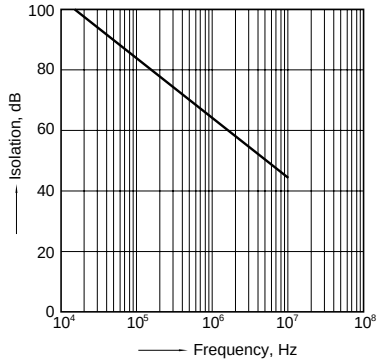
13. Applied voltage vs. output capacitance characteristics

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



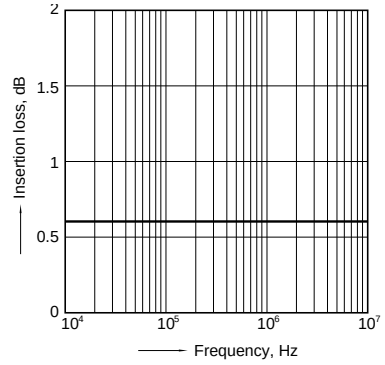
14. Isolation characteristics (50Ω impedance)

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



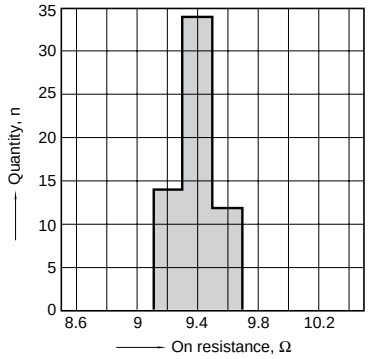
15. Insertion loss characteristics (50Ω impedance)

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



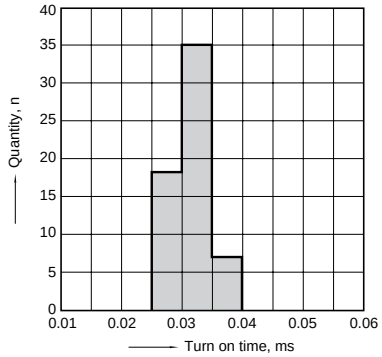
16. On resistance distribution

Measured portion: between terminals 3 and 4
Continuous load current: 80mA(DC)
Quantity, n=60; Ambient temperature: 25°C 77°F



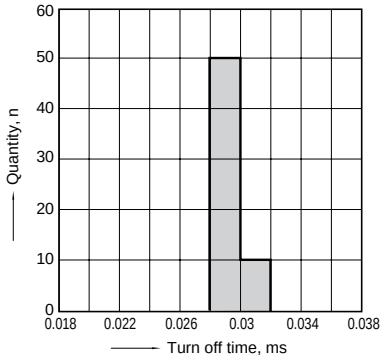
17. Turn on time distribution

Load voltage: 10V(DC);
Continuous load current: 80mA(DC)
Quantity, n=60; Ambient temperature: 25°C 77°F



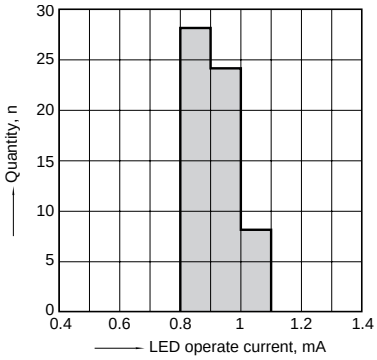
18. Turn off time distribution

Load voltage: 10V(DC);
Continuous load current: 80mA(DC)
Quantity, n=60; Ambient temperature: 25°C 77°F



19. LED operate current distribution

Load voltage: 10V(DC);
Continuous load current: 80mA(DC)
Quantity, n=60; Ambient temperature: 25°C 77°F



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