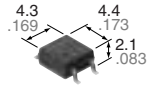
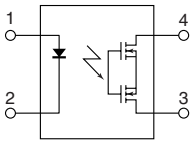
Panasonic
ideas for life

Lower output capacitance and on resistance. (C × R20) High speed switching. (Turn on time: 0.04ms, Turn off time: 0.06ms).

RF PhotoMOS (AQY221N1S)



mm inch



FEATURES

1. Low output capacitance between output terminals and low ON-resistance
Output capacitance(C): 2.0pF (typ.)
ON resistance(R): 9.8Ω (typ.)

2. High speed switching
Turn on time: 40ms
Turn off time: 60ms

3. SO package 4-pin type in super miniature design
Size: (W)4.3 × (L)4.4 × (H)2.1 mm
(W).169 × (L).173 × (H).083 inch

4. Low-level off state leakage current
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

5. Controls low-level analog signals

6. Low thermal electromotive force (Approx. 1 mV)

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

Type	Output rating*		Tape and reel packing style		Packing quantity	
	Load voltage	Load current	Picked from the 1/2-pin side	Picked from the 3/4-pin side	Tube	Tape and reel
AC/DC type	40V	120mA	AQY221N1SX	AQY221N1SZ	1,000 pcs	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	AQY221N1S	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	0.12A	Peak AC,DC
	Peak load current		I_{peak}	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}	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 PhotoMOS (AQY221N1S)

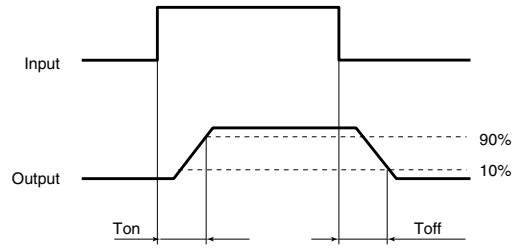
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item				Symbol	AQY221N1S	Condition
Input	LED operate current		Typical	I_{Fon}	0.9mA	I_L=100 mA
			Maximum		3.0mA	
	LED turn off current		Minimum	I_{Foff}	0.4mA	I_L=100 mA
			Typical		0.85mA	
	LED dropout voltage		Typical	V_F	1.25V (1.14V at I_F=5mA)	I_F=50mA
			Maximum		1.5V	
Output	On resistance #		Typical	R_{on}	9.8Ω	I_F=5mA I_L=100 mA Within 1 s on time
			Maximum		12.5Ω	
	Output capacitance #		Typical	C_{out}	2.2pF	I_F=0mA V_B=0V f=1 MHz
			Maximum		2.5pF	
	Off state leakage current		Typical	I_{Leak}	0.01nA	I_F=0mA V_L=Max.
			Maximum		10nA	
Transfer characteristics	Switching speed	Turn on time*	Typical	T_{on}	0.04ms	I_F=5mA V_L=10V R_L=100Ω
			Maximum		0.5ms	
		Turn off time*	Typical	T_{off}	0.06ms	I_F=5mA V_L=10V R_L=100Ω
			Maximum		0.2ms	
	I/O capacitance		Typical	C_{iso}	0.8pF	f=1MHz V_B=0V
			Maximum		1.5pF	
	Initial I/O isolation resistance		Minimum	R_{iso}	1,000MΩ	500V DC

Note: Recommendable LED forward current I_F = 5mA.

For type of connection

*Turn on/Turn off time



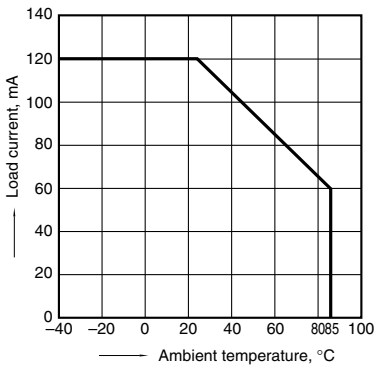
Other types of products than the C_{out} (typ. 2.0pF) and R_{on} (A connection typ. 9.8 ohm) combinations carried in this catalog are also available. (There is a trade-off between R_{on} and C_{out} both cannot be reduced at the same time.) For more information, please contact our sales office in your area.

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

REFERENCE DATA

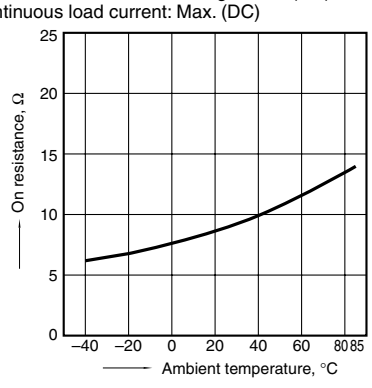
1. Load current vs. ambient temperature characteristics

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



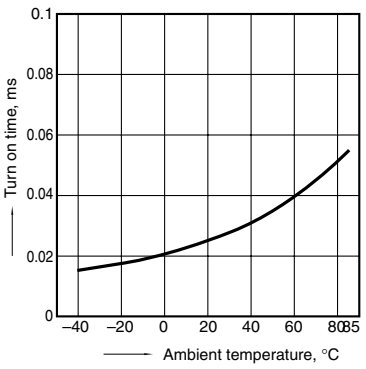
2. On resistance vs. ambient temperature characteristics

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



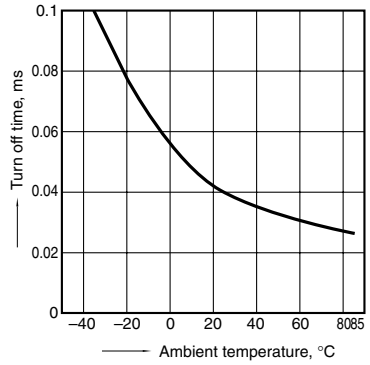
3. Turn on time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



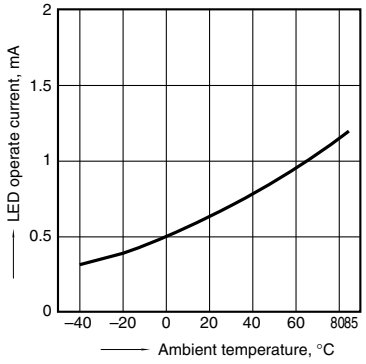
4. Turn off time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



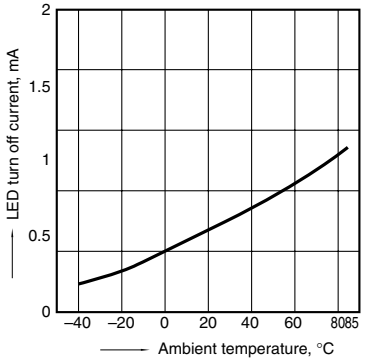
5. LED operate current vs. ambient temperature characteristics

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



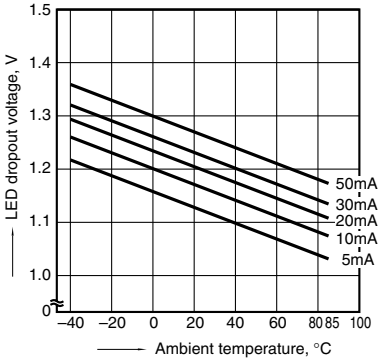
6. LED turn off current vs. ambient temperature characteristics

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



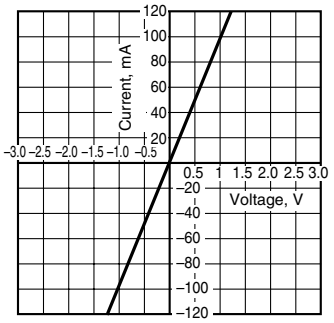
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



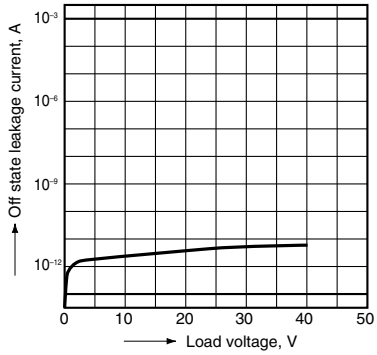
8. Current vs. voltage characteristics of output at MOS portion

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



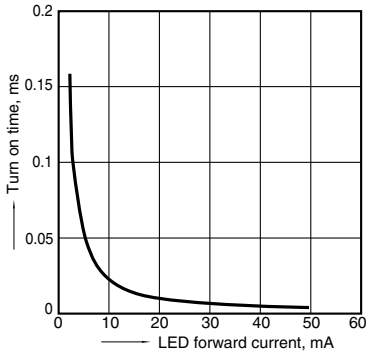
9. Off state leakage current vs. load voltage characteristics

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



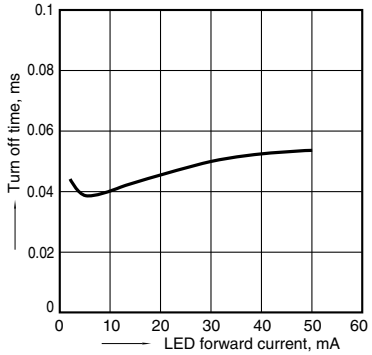
10. Turn on time vs. LED forward current characteristics

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



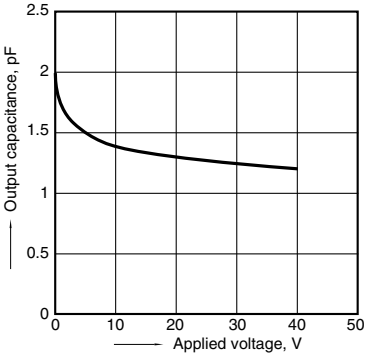
11. Turn off time vs. LED forward current characteristics

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



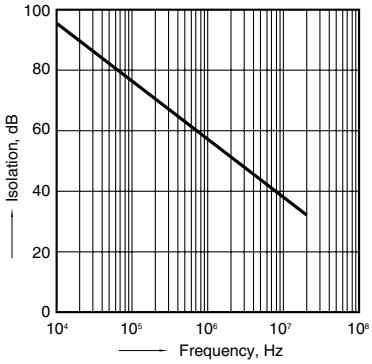
12. Output capacitance vs. applied voltage characteristics

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



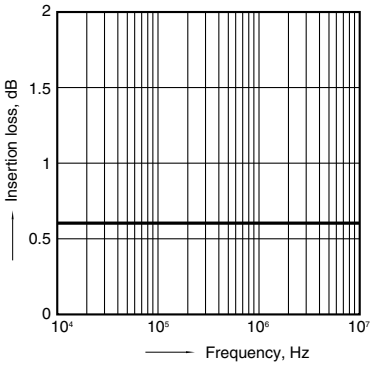
13. Isolation vs. frequency characteristics (50Ω impedance)

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



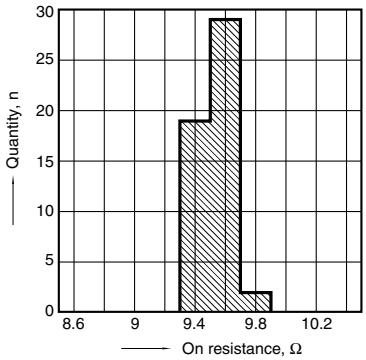
14. Insertion loss vs. frequency characteristics (50Ω impedance)

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



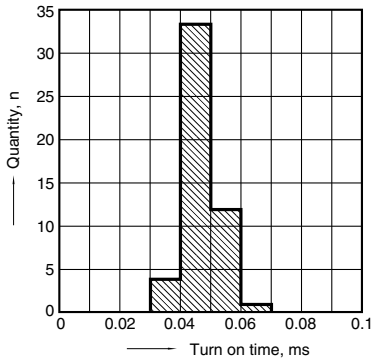
15. On resistance distribution

Measured portion: between terminals 3 and 4
Continuous load current: 120mA(DC)
Quantity, n=50; Ambient temperature: 25°C 77°F



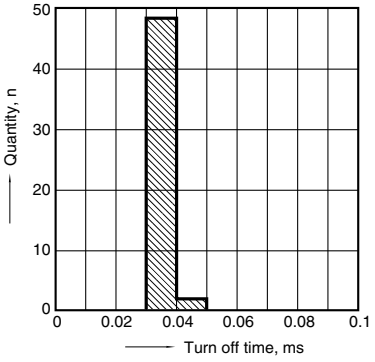
16. Turn on time distribution

Load voltage: 40V(DC)
Continuous load current: 120mA(DC)
Quantity, n=50; Ambient temperature: 25°C 77°F



17. Turn off time distribution

Load voltage: 40V(DC)
Continuous load current: 120mA(DC)
Quantity, n=50; Ambient temperature: 25°C 77°F



18. LED operate current distribution

Load voltage: 40V(DC)
Continuous load current: 120mA(DC)
Quantity, n=50; Ambient temperature: 25°C 77°F