

# DISCONTINUED

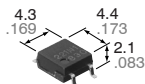


# Panasonic

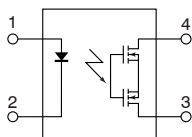
ideas for life

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*		Package size	Part No.			Packing quantity	
	Load voltage	Load current		Tube packing style	Tape and reel packing style		Tube	Tape and reel
AC/DC type	40V	120mA	SOP4pin	AQY221N1S	AQY221N1SX (Picked from the 1/2-pin side)	AQY221N1SZ (Picked from the 3/4-pin side)	1 tube contains: 100 pcs. 1 batch contains: 2,000 pcs.	1,000 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	AQY221N1S	Remarks
Input	LED forward current	I <sub>F</sub>	50mA	
	LED reverse voltage	V <sub>R</sub>	5V	
	Peak forward current	I <sub>FP</sub>	1A	f=100 Hz, Duty factor=0.1%
	Power dissipation	P <sub>in</sub>	75mW	
Output	Load voltage (peak AC)	V <sub>L</sub>	40V	
	Continuous load current	I <sub>L</sub>	0.12A	Peak AC,DC
	Peak load current	I <sub>peak</sub>	0.30A	100 ms (1 shot), V <sub>L</sub> = DC
	Power dissipation	P <sub>out</sub>	300mW	
Total power dissipation		P <sub>T</sub>	350mW	
I/O isolation voltage		V <sub>iso</sub>	1,500V AC	
Temperature limits	Operating	T <sub>opr</sub>	-40°C to +85°C -40°F to +185°F	Non-condensing at low temperatures
	Storage	T <sub>stg</sub>	-40°C to +100°C -40°F to +212°F	

# RF PhotoMOS (AQY221N1S)

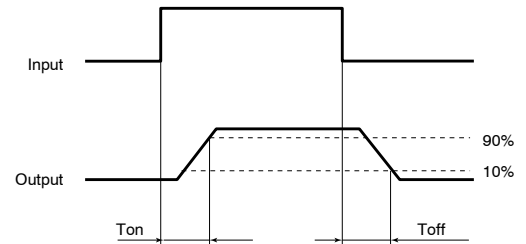
## 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

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

Note: Recommendable LED forward current  $I_F = 5\text{mA}$ .

Type of connection

\*Turn on/Turn off time



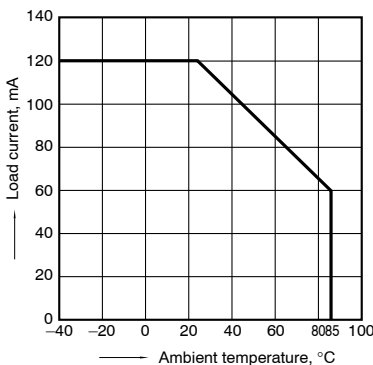
# Other types of products than the  $C_{out}$  (typ. 2.0pF) and  $R_{on}$  (A connection typ. 9.8 ohm) combinations carried in this catalog are also available. (There is a trade-off between  $R_{on}$  and  $C_{out}$  both cannot be reduced at the same time.) For more information, please contact our sales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

- Dimensions
- Schematic and Wiring Diagrams
- Cautions for Use

## REFERENCE DATA

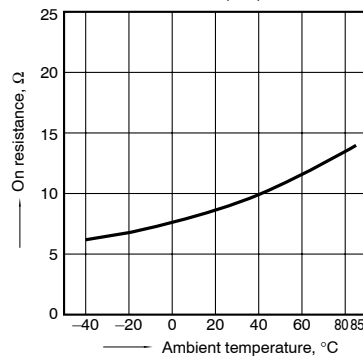
### 1. Load current vs. ambient temperature characteristics

Allowable ambient temperature:  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$   
 $-40^\circ\text{F}$  to  $+185^\circ\text{F}$



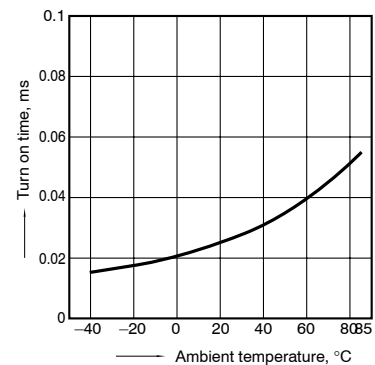
### 2. On resistance vs. ambient temperature characteristics

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



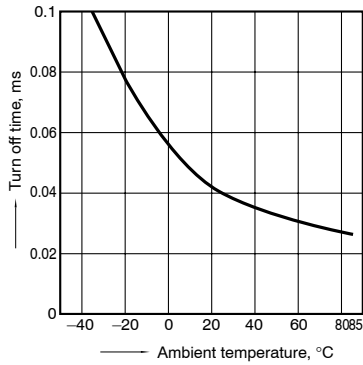
### 3. Turn on time vs. ambient temperature characteristics

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



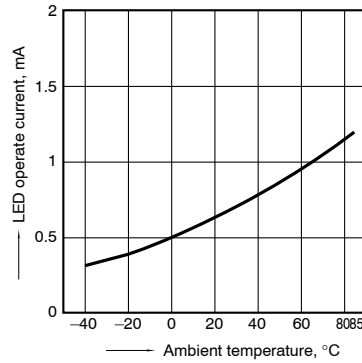
## 4. Turn off time vs. ambient temperature characteristics

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



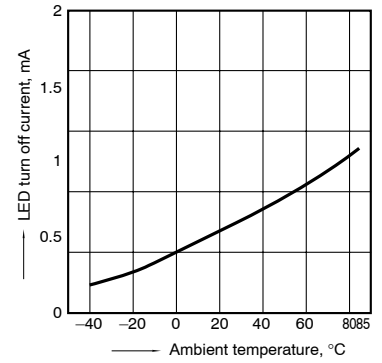
## 5. LED operate current vs. ambient temperature characteristics

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



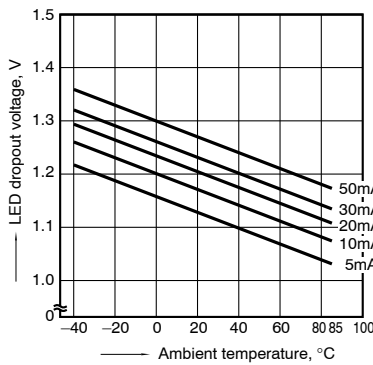
## 6. LED turn off current vs. ambient temperature characteristics

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



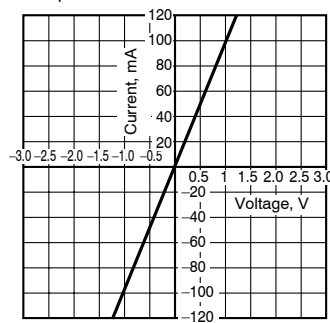
## 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



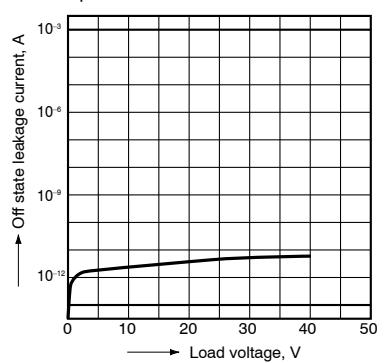
## 8. Current vs. voltage characteristics of output at MOS portion

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



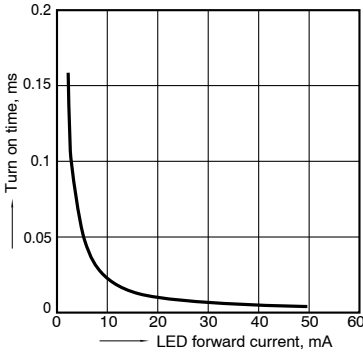
## 9. Off state leakage current vs. load voltage characteristics

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



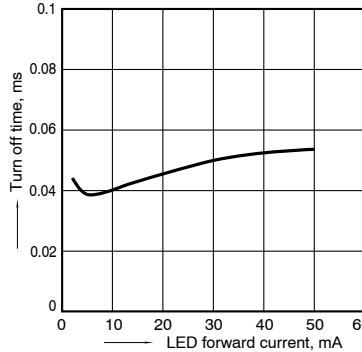
## 10. Turn on time vs. LED forward current characteristics

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



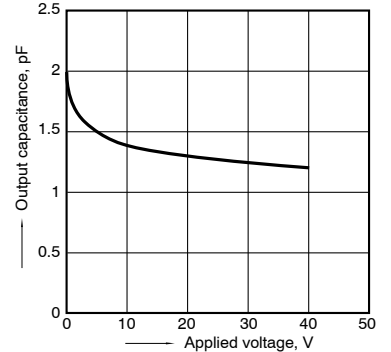
## 11. Turn off time vs. LED forward current characteristics

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



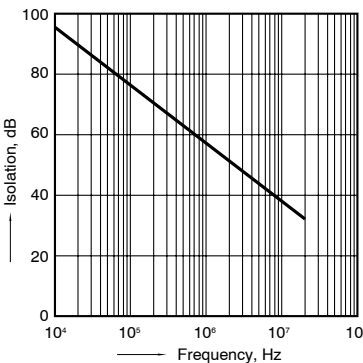
## 12. Output capacitance vs. applied voltage characteristics

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



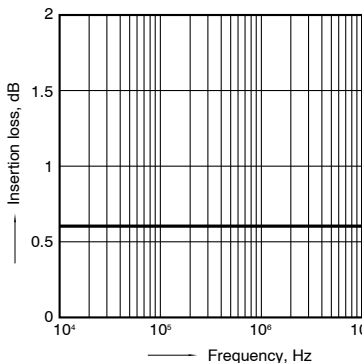
## 13. Isolation vs. frequency characteristics (50Ω impedance)

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



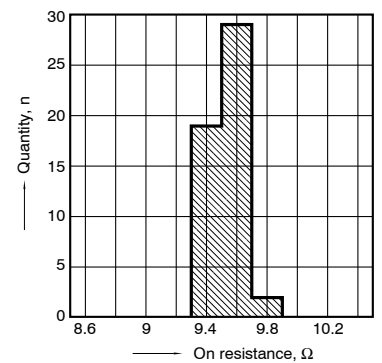
## 14. Insertion loss vs. frequency characteristics (50Ω impedance)

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



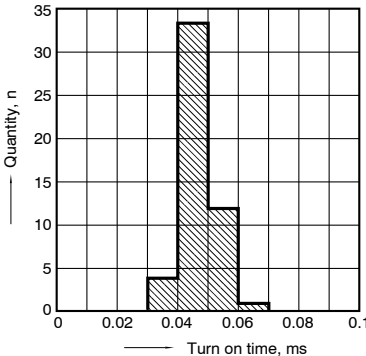
## 15. On resistance distribution

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

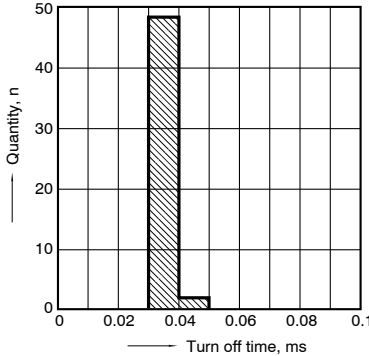


# RF PhotoMOS (AQY221N1S)

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

