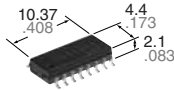
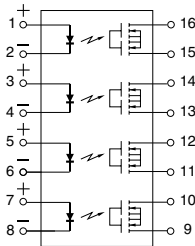


Lower output capacitance and on resistance. (CXR10)  
High speed switching. (Turn on time: 0.03ms, Turn off time: 0.03ms).

## RF PhotoMOS (AQS221N2S)



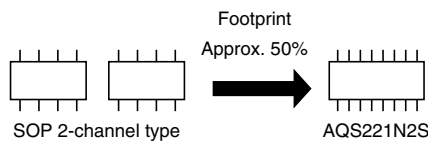
mm inch



### FEATURES

1. This is a CXR10 type that achieves very lower output capacitance.
2. 4-channel (4 Form A) of RF PhotoMOS Relays
3. SO package 16-pin type in super miniature design

The device comes in a super-miniature SO package measuring (W)10.37 × (L)4.4 × (H)2.1mm (W) .408×(L).173× (H).083inch— approx. 50% of the footprint size of 8-pin(2-channel) type.



4. Applicable for 4 Form A use, as well as 4 independent 1 Form A
5. High speed switching  
Turn on time: 30μs  
Turn off time: 30μs
6. Low-level off state leakage current

The SSR has an off state leakage current of several milliamperes, whereas this PhotoMOS relay has typ. 10pA even with the rated load voltage

7. Controls low-level analog signals  
PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion

### 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

RoHS Directive compatibility information  
<http://www.mew.co.jp/ac/e/environment/>

### 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	60mA	SOP 16pin	AQS221N2S	AQS221N2SX (Picked from the 1/2/3/4/5/6/7/8-pin side)	AQS221N2SZ (Picked from the 9/10/11/12/13/14/15/16-pin side)	1 tube contains: 50 pcs. 1 batch contains: 1,000 pcs.	1,000 pcs.

\* Indicate the peak AC and DC values.

Note: For space reasons, the package style indicator "X" or "Z" are not marked on the relay.

### RATING

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

Item		Symbol	AQS221N2S	Remarks
Input	LED forward current	I <sub>F</sub>	50 mA	
	LED reverse voltage	V <sub>R</sub>	5 V	
	Peak forward current	I <sub>FP</sub>	1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>	75 mW	
Output	Load voltage	V <sub>L</sub>	40 V	
	Continuous load current	I <sub>L</sub>	0.06 A	
	Peak load current	I <sub>peak</sub>	0.12 A	100 ms (1 shot), V <sub>L</sub> = DC
	Power dissipation	P <sub>out</sub>	600 mW	
Total power dissipation		P <sub>T</sub>	650 mW	
I/O isolation voltage		V <sub>iso</sub>	500 V 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 (AQS221N2S)

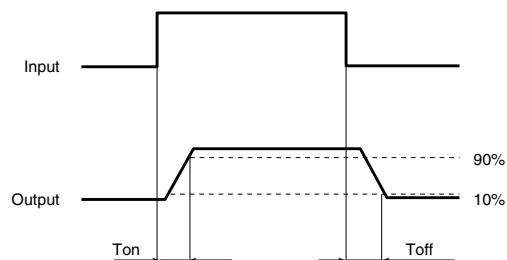
## 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item		Symbol	AQS221N2S	Condition	
Input	LED operate current	Typical	0.9 mA	$I_L = \text{Max.}$	
		Maximum	3.0 mA		
	LED turn off current	Minimum	0.1 mA	$I_L = \text{Max.}$	
		Typical	0.85 mA		
LED dropout voltage	Typical	$V_F$	1.25 V (1.14 V at $I_F = 5 \text{ mA}$ )	$I_F = 50 \text{ mA}$	
	Maximum		1.5 V		
Output	On resistance	Typical	9.5Ω	$I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time	
		Maximum	12.5Ω		
	Output capacitance	Typical	1.0 pF	$I_F = 0 \text{ mA}$ $V_B = 0 \text{ V}$ $f = 1 \text{ MHz}$	
		Maximum	1.5 pF		
Off state leakage current	Typical	$I_{\text{Leak}}$	0.01 nA	$I_F = 0 \text{ mA}$ $V_L = \text{Max.}$	
	Maximum		10 nA		
Transfer characteristics	Turn on time*	Typical	0.03 ms	$I_F = 5 \text{ mA}$ $V_L = 10 \text{ V}$ $R_L = 500\Omega$	
		Maximum	0.2 ms		
	Turn off time*	Typical	0.03 ms	$I_F = 5 \text{ mA}$ $V_L = 10 \text{ V}$ $R_L = 500\Omega$	
		Maximum	0.2 ms		
	I/O capacitance	Typical	$C_{\text{iso}}$	0.8 pF	$f = 1 \text{ MHz}$ $V_B = 0 \text{ V}$
		Maximum		1.5 pF	
Initial I/O isolation resistance	Minimum	$R_{\text{iso}}$	1,000 MΩ	500 V DC	

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

For type of connection.

\*Turn on/Turn off time

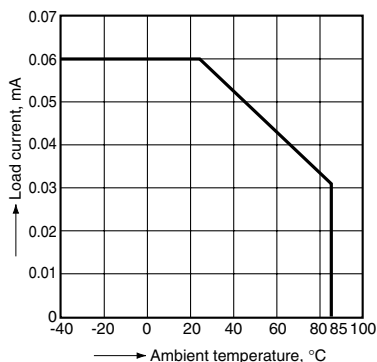


- For Dimensions.
- For Schematic and Wiring Diagrams.
- For Cautions for Use.

## REFERENCE DATA

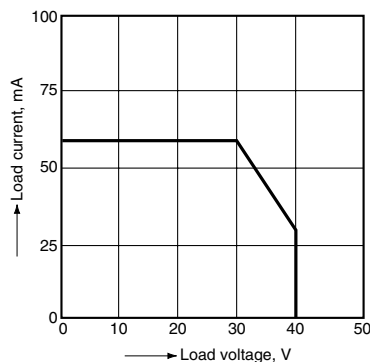
### 1. Load current vs. ambient temperature characteristics

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



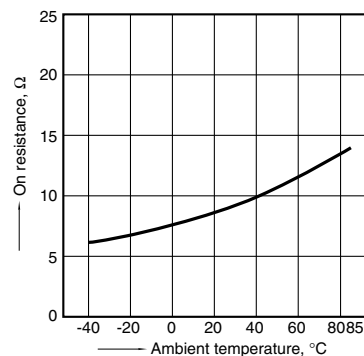
### 2. Load current vs. load voltage characteristics

Ambient temperature:  $25^\circ\text{C}$   $47^\circ\text{F}$



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

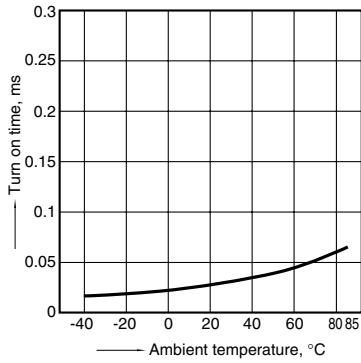
LED current: 5 mA; Load voltage: Max. (DC);  
Load current: Max. (DC)



# RF PhotoMOS (AQS221N2S)

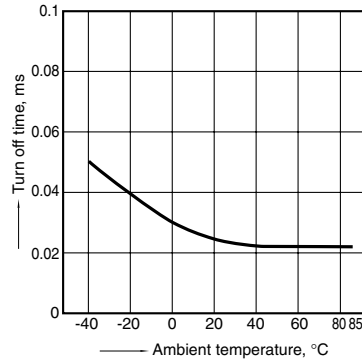
## 4. Turn on time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 10 V (DC);  
Continuous load current: 20 mA (DC)



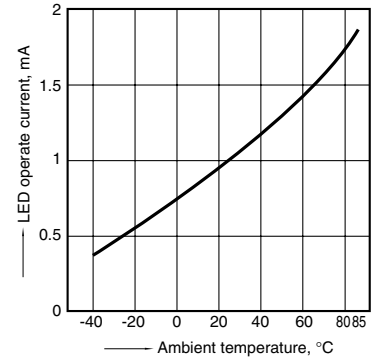
## 5. Turn off time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 10 V (DC);  
Continuous load current: 20 mA (DC)



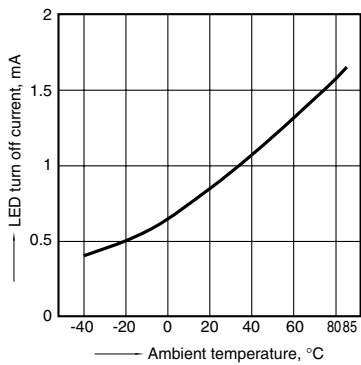
## 6. LED operate current vs. ambient temperature characteristics

Load voltage: 10 V (DC);  
Continuous load current: 60 mA (DC)



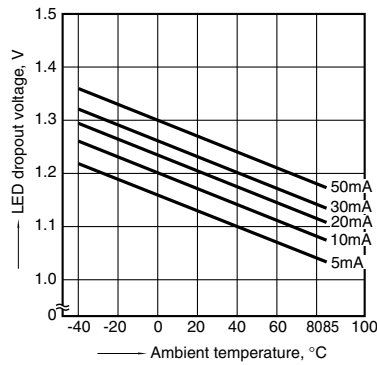
## 7. LED turn off current vs. ambient temperature characteristics

Load voltage: 10 V (DC);  
Continuous load current: 60 mA (DC)



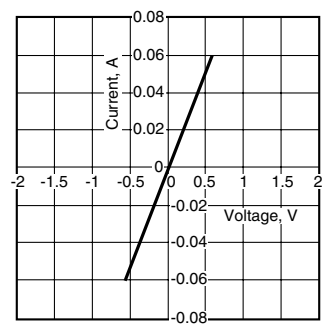
## 8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



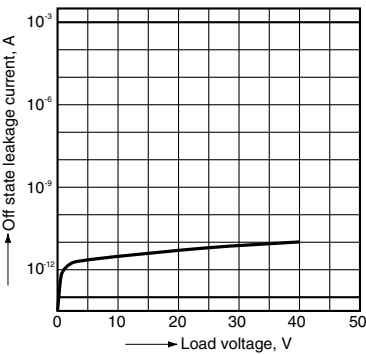
## 9. Current vs. voltage characteristics of output at MOS portion

Ambient temperature: 25°C 77°F



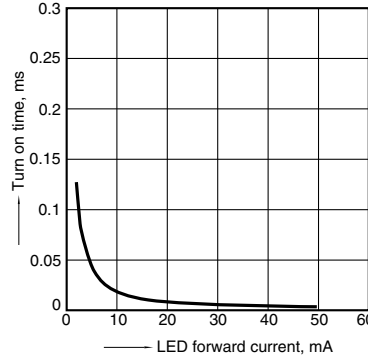
## 10. Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



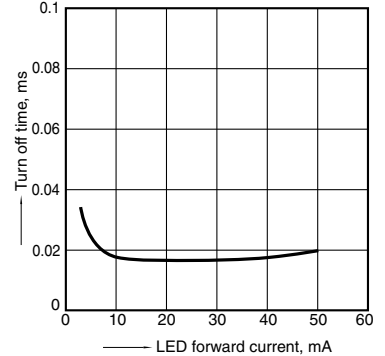
## 11. Turn on time vs. LED forward current characteristics

Load voltage: 10 V (DC); Continuous load current: 20 mA (DC); Ambient temperature: 25°C 77°F



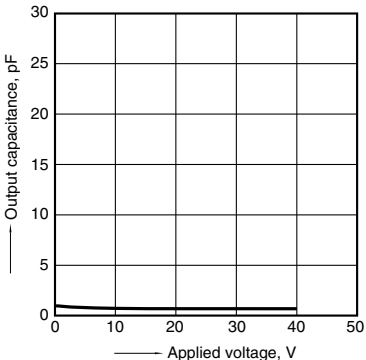
## 12. Turn off time vs. LED forward current characteristics

Load voltage: 10 V (DC); Continuous load current: 20 mA (DC); Ambient temperature: 25°C 77°F



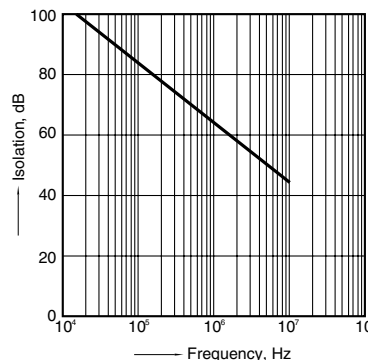
## 13. Output capacitance vs. applied voltage characteristics

Frequency: 1 MHz, 30 mVrms;  
Ambient temperature: 25°C 77°F



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

Ambient temperature: 25°C 77°F



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

Ambient temperature: 25°C 77°F

