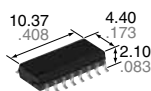
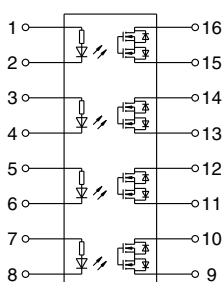


### Space-saving 4-channel type Built-in input resistor

PhotoMOS®  
RF SOP 4 Form A C×R10  
Voltage-sensitive (AQS221F○2S)



mm inch



RoHS compliant

## FEATURES

### 1. Built-in input resistor means less man-hours when mounting

The voltage-sensitive type, which eliminates the need to mount an external input resistor, is now available in a small package. Man-hours spent mounting external input resistors are cut and board designing is simplified.

### 2. Saves space on PC board

Since the small package size remains the same while including a built-in input resistor, space on the PC board is saved. This makes it easier to incorporate space savings when designing miniature devices.

### 3. Both low on-resistance (R type) and low capacitance (C type) available at excellent electrical characteristics of C×R10

- R type: On resistance Typ. 0.75Ω  
Output capacitance Typ. 12.5pF
- C type: On resistance Typ. 9.5Ω  
Output capacitance Typ. 1pF

## TYPICAL APPLICATIONS

For multi-circuit switching;

### 1. Measuring and testing equipment

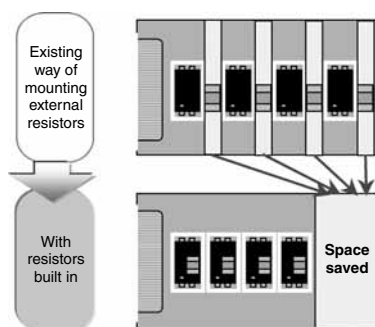
Semiconductor testing equipment, Probe cards, Datalogger, Board tester and other testing equipment

### 2. Telecommunication and broadcasting equipment

### 3. Medical equipment

### 4. Multi-point recorder

Data logger, Warming and Thermocouple, etc.



<Artistic impression of PC board space savings due to built-in resistor>  
In case of SSOP.

## TYPES

	Type	Output rating*1		Package	Part No.*2			Packing quantity	
		Load voltage	Load current		Tube packing style	Tape and reel packing style		Tube	Tape and reel
						Picked from the 1/2/3/4/5/6/7/8-pin side	Picked from the 9/10/11/12/13/14/15/16-pin side		
AC/DC dual use	Low on resistance (R type)	40 V	0.16A	SOP16-pin	AQS221FR2S	AQS221FR2SX	AQS221FR2SZ	1 tube contains: 50 pcs. 1 batch contains: 1,000 pcs.	1,000 pcs.
	Low capacitance (C type)	40 V	0.06A		AQS221FN2S	AQS221FN2SX	AQS221FN2SZ		

Notes: \*1 Indicate the peak AC and DC values.

\*2 The packing style indicator "X" or "Z" is not marked on the device.

## RATING

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

Item		Symbol	AQS221FR2S	AQS221FN2S	Remarks
Input	Input voltage	$V_{IN}$	6V		
	Input reverse voltage	$V_{RIN}$	5V		
	Power dissipation	$P_{in}$	260mW		65mW for 1a
Output	Load voltage (peak AC)	$V_L$	40V	40V	
	Load current	$I_L$	0.16A	0.06A	Peak AC, DC
	Peak load current	$I_{peak}$	0.2A	0.12A	100ms (1shot), $V_L=DC$
	Power dissipation	$P_{out}$	600mW		
Total power dissipation		$P_T$	650mW		
I/O isolation voltage		$V_{iso}$	500Vrms		
Ambient temperature	Operating	$T_{opr}$	-40 to +85°C -40 to +185°F		(Non-icing at low temperatures)
	Storage	$T_{stg}$	-40 to +100°C -40 to +212°F		

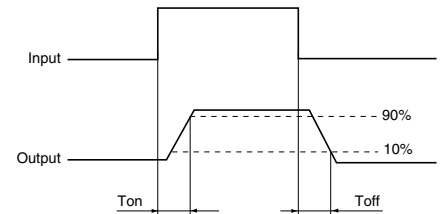
### 2. Electrical characteristics (Condition: ambient temperature 25°C 77°F)

Item		Symbol	AQS221FR2S	AQS221FN2S	Condition	
Input	Operate voltage	Typ.	1.3V		$I_L = \text{Max.}$	
		Max.	4V			
	Turn off voltage	Min.	0.8V			
		Typ.	1.3V			
Input current	Typ.	$I_{IN} = 8.5\text{mA}$		$V_{IN} = 5\text{V}$		
Output	On resistance	Typ.	0.75Ω	9.5Ω	$V_{IN} = 5\text{V}$ $I_L = \text{Max.}$ Within 1 s	
		Max.	1.25Ω	12.5Ω		
	Output capacitance	Typ.	12.5pF	1pF	$V_{IN} = 0\text{V}$ $V_B = 0\text{V}$ $f = 1\text{MHz}$	
		Max.	18pF	1.5pF		
Off state leakage current	Typ.	0.02nA	0.01nA	$V_{IN} = 0\text{V}$ $V_L = \text{Max.}$		
	Max.	*10nA				
Transfer characteristics	Turn on time**	Typ.	0.07ms	0.02ms	AQS221FR2S: $V_{IN} = 5\text{V}, V_L = 10\text{V}, R_L = 80\Omega$ AQS221FN2S: $V_{IN} = 5\text{V}, V_L = 10\text{V}, R_L = 500\Omega$	
		Max.	0.5ms			
	Turn off time**	Typ.	0.07ms	0.02ms		
		Max.	0.2ms			
	I/O capacitance	Typ.	0.8pF			$f = 1\text{MHz}, V_B = 0\text{V}$
		Max.	1.5pF			$f = 1\text{MHz}, V_B = 0\text{V}$
Initial I/O isolation resistance	Min.	1,000MΩ		500V DC		

Note: If you wish to change the input voltage, rating or performance, please inquire with our sales.

\*Available as custom orders (1 nA or less)

\*\*Turn on/Turn off time



### 3. Recommended operating conditions (Ambient temperature: 25°C 77°F)

Please use under recommended operating conditions to obtain expected characteristics.

Item		Symbol	Min.	Max.	Unit
Input voltage		$V_{IN}$	4.5	5.5	V
AQS221FR2S	Load voltage (Peak AC)	$V_L$	—	15	V
	Continuous load current	$I_L$	—	0.16	A
AQS221FN2S	Load voltage (Peak AC)	$V_L$	—	15	V
	Continuous load current	$I_L$	—	0.06	A

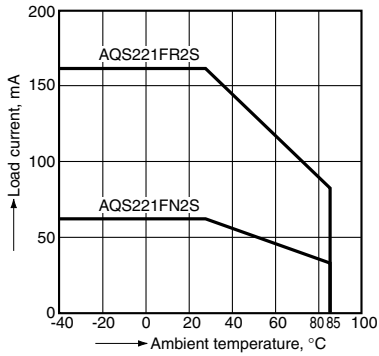
■ These products are not designed for automotive use.

If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.

## REFERENCE DATA

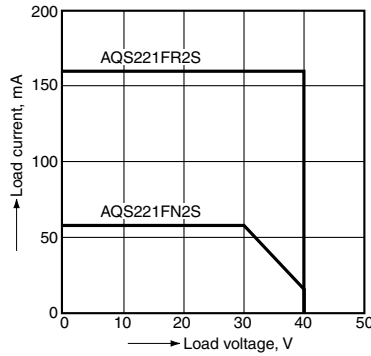
### 1. Load current vs. ambient temperature characteristics

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



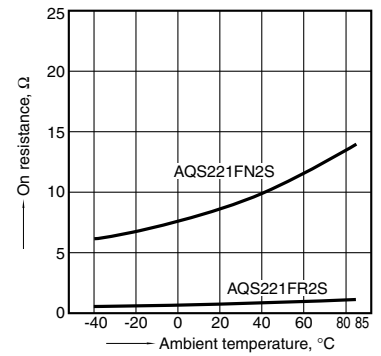
### 2. Load current vs. Load voltage characteristics

Ambient temperature: 25°C 77°F



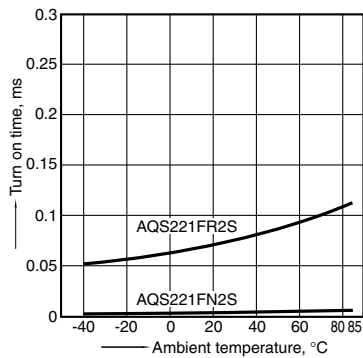
### 3. On resistance vs. ambient temperature characteristics

Input voltage: 5V; Load voltage: 10V (DC);  
Continuous load current: 160mA (DC) R type,  
60mA (DC) C type



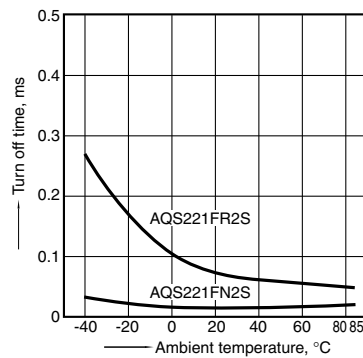
### 4. Turn on time vs. ambient temperature characteristics

Input voltage: 5V; Load voltage: 10V (DC);  
Continuous load current: 125mA (DC) R type,  
20mA (DC) C type



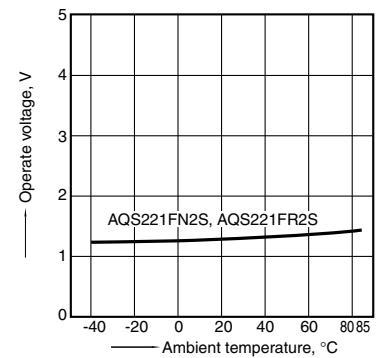
### 5. Turn off time vs. ambient temperature characteristics

Input voltage: 5V; Load voltage: 10V (DC);  
Continuous load current: 125mA (DC) R type,  
20mA (DC) C type



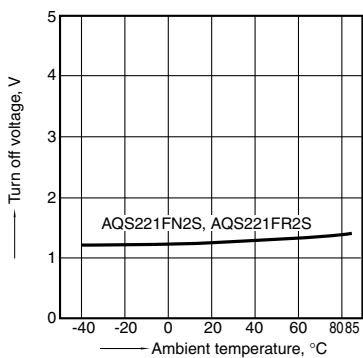
### 6. Operate voltage vs. ambient temperature characteristics

Load voltage: 10V (DC);  
Continuous load current: 160mA (DC) R type,  
60mA (DC) C type



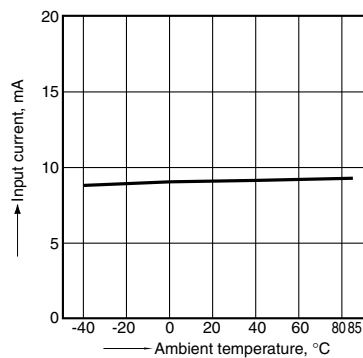
### 7. Turn off voltage vs. ambient temperature characteristics

Load voltage: 10V (DC);  
Continuous load current: 160mA (DC) R type,  
60mA (DC) C type



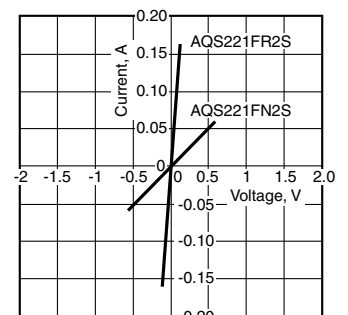
### 8. Input current vs. ambient temperature characteristics

Sample: All types  
Input voltage: 5V



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

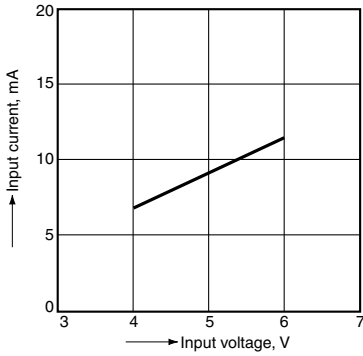
Ambient temperature: 25°C 77°F



# RF SOP 4 Form A C×R10 Voltage-sensitive (AQS221FO2S)

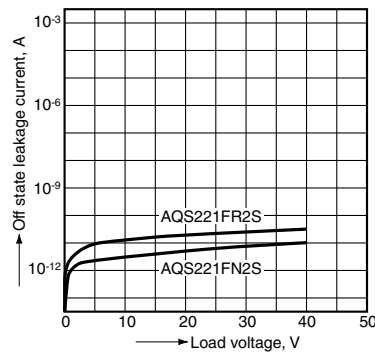
## 10. Input current vs. input voltage characteristics

Sample: All types  
Ambient temperature: 25°C 77°F  
(Recommended input voltage: 5±0.5V)



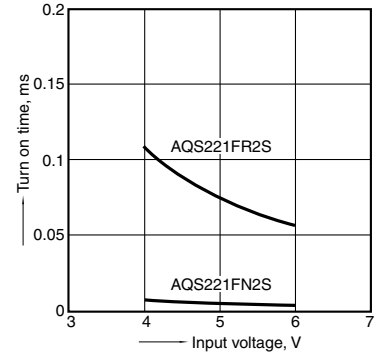
## 11. Off state leakage current vs. load voltage characteristics

Ambient temperature: 25°C 77°F



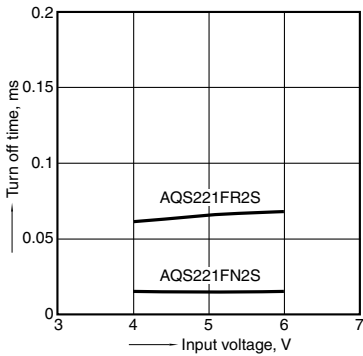
## 12. Turn on time vs. input voltage characteristics

Load voltage: 10V (DC);  
Continuous load current: 125mA (DC) R type,  
20mA (DC) C type; Ambient temperature: 25°C 77°F



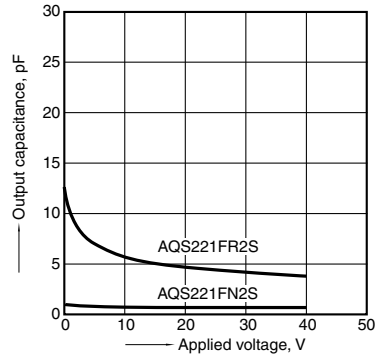
## 13. Turn off time vs. input voltage characteristics

Load voltage: 10V (DC);  
Continuous load current: 125mA (DC) R type,  
20mA (DC) C type; Ambient temperature: 25°C 77°F



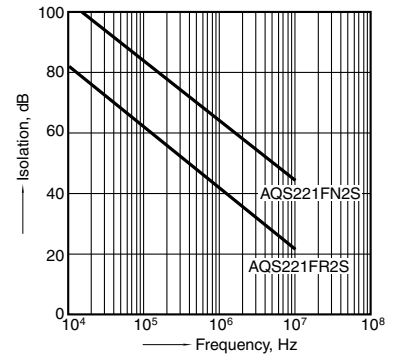
## 14. Output capacitance vs. applied voltage characteristics

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



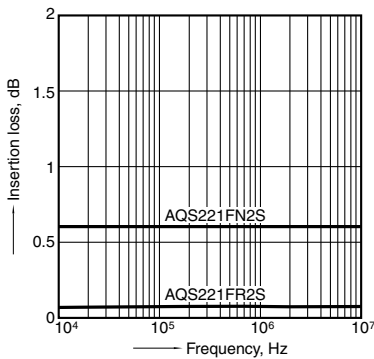
## 15. Isolation vs. frequency characteristics (50Ω impedance)

Ambient temperature: 25°C 77°F



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

Ambient temperature: 25°C 77°F



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