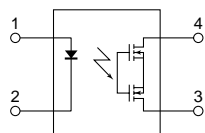


**New**



mm inch



**Compliance with RoHS Directive**

## FEATURES

### 1. Super miniature SON\* package contributes to space savings and high density mounting.

The SON type is a new PhotoMOS relay with approximately 43% the volume ratio of existing SSOP type. The super miniature leadless construction reduces the mounting area and enables high density mounting.

### \*Small Outline No-lead package

Reduced to approximately 43% volume ratio

### 2. Lower output capacitance and on-resistance

Output capacitance (C<sub>out</sub>): 1.1pF (typ.)  
 On resistance (R<sub>on</sub>): 5.5Ω (typ.)

### 3. High speed switching

Turn on time: 0.02ms (typ.)  
 Turn off time: 0.02ms (typ.)

## TYPICAL APPLICATIONS

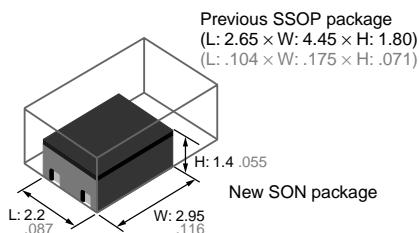
### Measuring and testing equipment

#### 1. Testing equipment

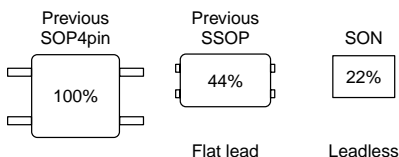
IC tester, Semiconductor performance tester, Probe cards, etc.

#### 2. Board tester

Bare board tester, In-circuit tester, Function tester, etc.



Area comparison (including leads)



## TYPES

	Output rating*1		Package	Tape and reel packing style*2		Packing quantity in tape and reel
	Load voltage	Load current		Picked from the 1 and 4-pin side	Picked from the 2 and 3-pin side	
AC/DC dual use	25 V	150 mA	SON	AQY221N3MY	AQY221N3MW	3,500 pcs.

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

\*2 Only tape and reel package is available.

For space reasons, only "1N3" is marked on the product as the part number.

## RATING

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

Item		Symbol	AQY221N3M	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>	25V	
	Continuous load current	I <sub>L</sub>	0.15A	Peak AC, DC
	Power dissipation	P <sub>out</sub>	250mW	
Total power dissipation		P <sub>T</sub>	300mW	
I/O isolation voltage		V <sub>iso</sub>	200V AC	
Operating temperature		T <sub>opr</sub>	-40°C to +85°C -40°F to +185°F	Non-condensing at low temperatures
Storage temperature		T <sub>stg</sub>	-40°C to +100°C -40°F to +212°F	

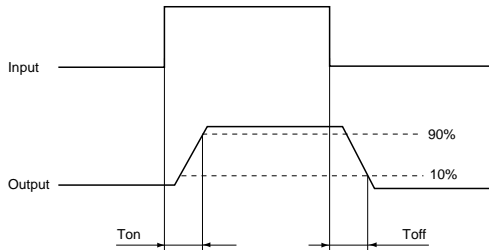
# RF SON 1 Form A C×R5 (AQY221N3M)

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

Item		Symbol	AQY221N3M	Condition
Input	LED operate current	Typical	1.0 mA	$I_L = 80 \text{ mA}$
		Maximum	3.0 mA	
	LED turn off current	Minimum	0.2 mA	$I_L = 80 \text{ mA}$
		Typical	0.9 mA	
LED dropout voltage	Typical	$V_F$	1.35 V (1.14 V at $I_F = 5 \text{ mA}$ )	
	Maximum		1.5 V	
Output	On resistance	Typical	5.5Ω	$I_F = 5 \text{ mA}$ $I_L = 80 \text{ mA}$ Within 1 s on time
		Maximum	7.5Ω	
	Output capacitance	Typical	1.1 pF	$I_F = 0 \text{ mA}$ $V_B = 0 \text{ V}$ $f = 1 \text{ MHz}$
		Maximum	1.5 pF	
	Off state leakage current	Typical	0.01 nA	$I_F = 0 \text{ mA}$ $V_L = \text{Max.}$
		Maximum	10 nA	
Transfer characteristics	Turn on time*	Typical	0.02 ms	$I_F = 5 \text{ mA}$ $V_L = 10 \text{ V}$ $R_L = 125\Omega$
		Maximum	0.2 ms	
	Turn off time*	Typical	0.02 ms	$I_F = 5 \text{ mA}$ $V_L = 10 \text{ V}$ $R_L = 125\Omega$
		Maximum	0.2 ms	
	I/O capacitance	Typical	0.8 pF	$f = 1 \text{ MHz}$ $V_B = 0 \text{ V}$
		Maximum	1.5 pF	

Note: Variation possible through combinations of output capacitance and on resistance. For more information, please contact our sales office in your area.

\*Turn on/Turn off time



## RECOMMENDED OPERATING CONDITIONS

Please obey the following conditions to ensure proper relay operation and resetting.

Item	Symbol	Recommended value	Unit
Input LED current	$I_F$	5	mA

### ■ For Dimensions

### ■ For Schematic and Wiring Diagrams

### ■ For Cautions for Use

■ These products are not designed for automotive use.

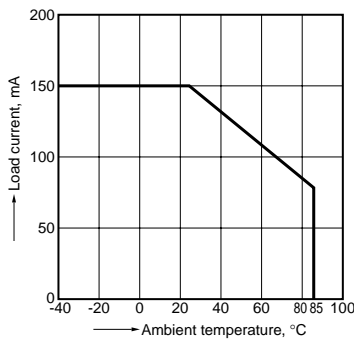
If you are considering to use these products for automotive applications, please contact your local Panasonic Electric Works technical representative.

For more information

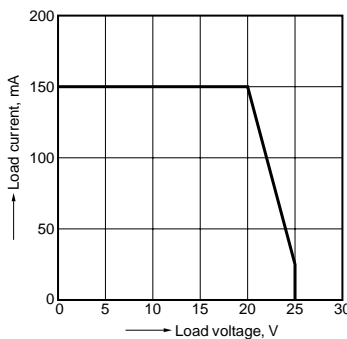
## REFERENCE DATA

1. Load current vs. ambient temperature characteristics

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

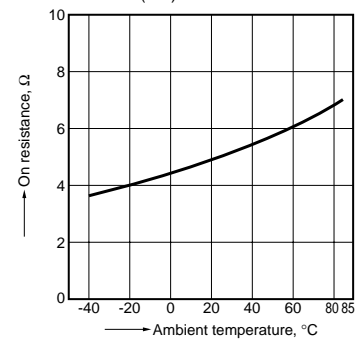


2. Load current vs. Load voltage characteristics  
Ambient temperature: 25°C 77°F



3. On resistance vs. ambient temperature characteristics

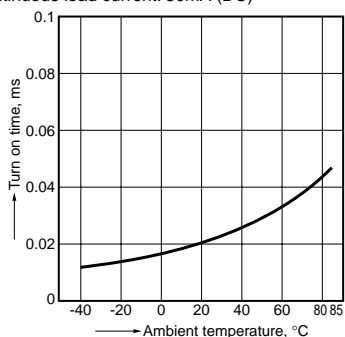
Measured portion: between terminals 3 and 4  
LED current: 5 mA; Load voltage: 10V (DC);  
Load current: 80mA (DC)



# RF SON 1 Form A C×R5 (AQY221N3M)

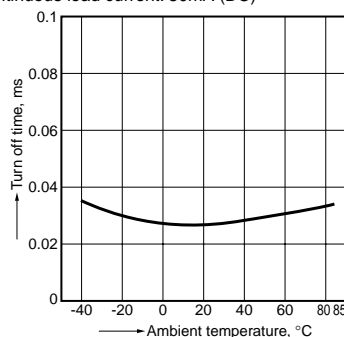
## 4. Turn on time vs. ambient temperature characteristics

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



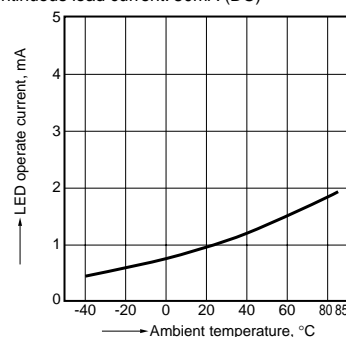
## 5. Turn off time vs. ambient temperature characteristics

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



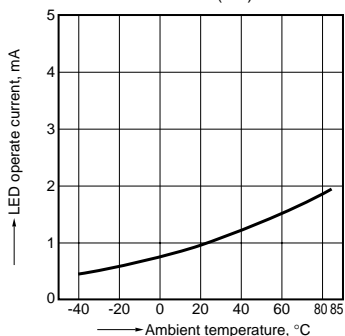
## 6. LED operate current vs. ambient temperature characteristics

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



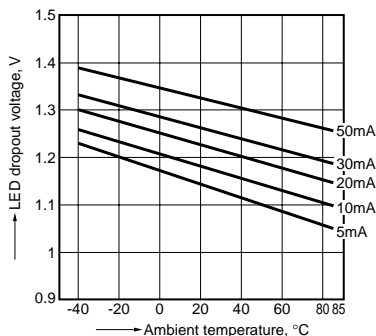
## 7. LED turn off current vs. ambient temperature characteristics

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



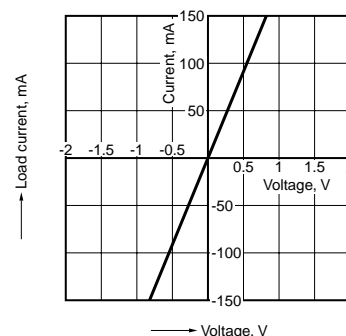
## 8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



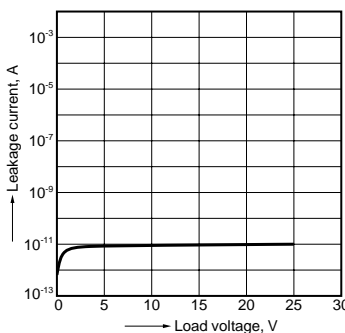
## 9. Current vs. voltage characteristics of output at MOS portion

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



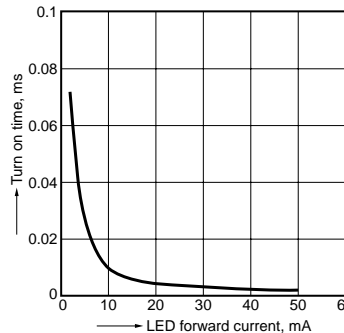
## 10. Off state leakage current vs. load voltage characteristics

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



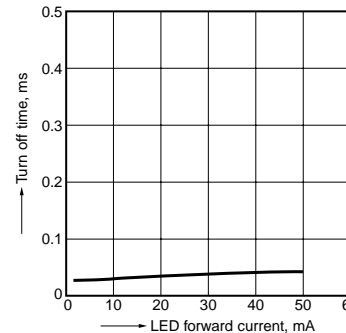
## 11. Turn on time vs. LED forward current characteristics

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



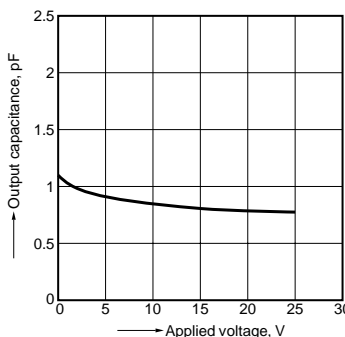
## 12. Turn off time vs. LED forward current characteristics

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



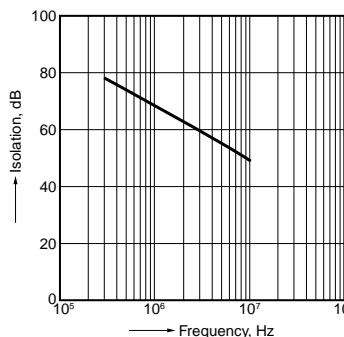
## 13. Output capacitance vs. applied voltage characteristics

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



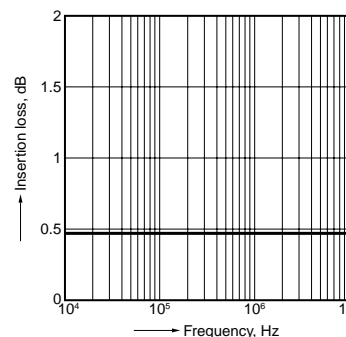
## 14. Isolation vs. frequency characteristics (50Ω impedance)

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



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

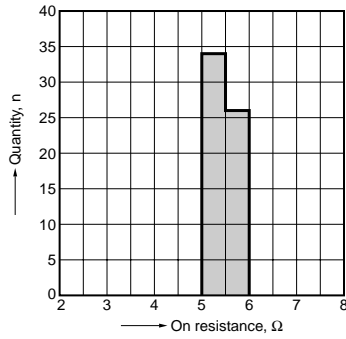
Measured portion: between terminals 3 and 4  
Ambient temperature: 25°C 77°F



# RF SON 1 Form A C×R5 (AQY221N3M)

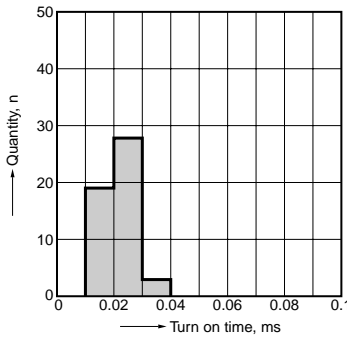
## 16. On resistance distribution

Measured portion: between terminals 3 and 4  
 Continuous load current: 80mA (DC), n: 50pcs.  
 Ambient temperature: 25°C 77°F



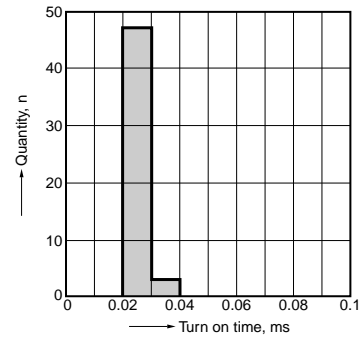
## 17. Turn on time distribution

Load voltage: 10V (DC)  
 Continuous load current: 80mA (DC), n: 50pcs.  
 Ambient temperature: 25°C 77°F



## 18. Turn off time distribution

Load voltage: 10V (DC)  
 Continuous load current: 80mA (DC), n: 50pcs.  
 Ambient temperature: 25°C 77°F



## 19. LED operate current distribution

Load voltage: 10V (DC)  
 Continuous load current: 80mA (DC), n: 50pcs.  
 Ambient temperature: 25°C 77°F

