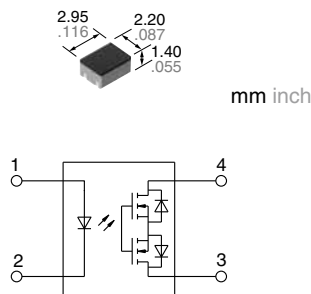


**Micro-miniature SON package**  
**C×R10: 40V load voltage**  
**C×R5: 25V load voltage**

**PhotoMOS®**  
**RF SON 1 Form A C×R10/C×R5**  
**(AQY22○○○M)**



**RoHS compliant**

### FEATURES

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

The SON type is a new PhotoMOS 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. Both low on-resistance (R type) and low capacitance (C type) available at**

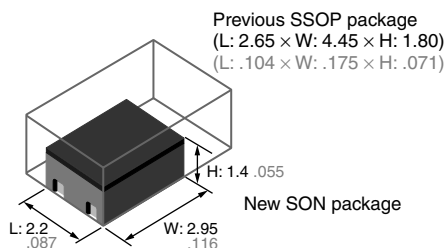
**• C×R10**

R type: Output capacitance Typ. 14pF  
 On resistance Typ. 0.8Ω

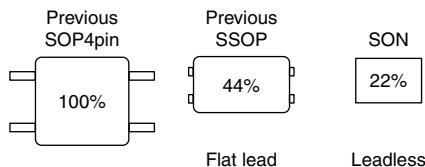
C type: Output capacitance Typ. 1.1pF  
 On resistance Typ. 9.5Ω

**• C×R5**

Output capacitance Typ. 1.1pF  
 On resistance Typ. 5.5Ω



Area comparison (including leads)



### TYPICAL APPLICATIONS

**1. Measuring equipment**

IC tester, Probe cards, board tester and other testing equipment

**2. Telecommunication or broadcasting equipment**

**3. Medical equipment**

### TYPES

Type		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	C×R10	Low on-resistance (R type)	40 V	250 mA	SON	AQY221R2MY	AQY221R2MW	3,500 pcs.
		Low capacitance (C type)	40 V	120 mA		AQY221N2MY	AQY221N2MW	
	C×R5	25 V	150 mA	AQY221N3MY		AQY221N3MW		

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

\*2 Only tape and reel package is available. Packing quantity of 1,000 pieces is possible. Please consult us. For space reasons, only "1R2", "1N2" or "1N3" is marked on the product as the part number.

## RATING

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

Item		Symbol	C×R10 R type	C×R10 C type	C×R5	Remarks
			AQY221R2M	AQY221N2M	AQY221N3M	
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	40V	25V	
	Continuous load current	$I_L$	0.25A	0.12A	0.15A	Peak AC, DC
	Peak load current	$I_{peak}$	0.75A	—	—	100ms (1shot), $V_L=DC$
	Power dissipation	$P_{out}$	250mW			
Total power dissipation		$P_T$	300mW			
I/O isolation voltage		$V_{iso}$	200Vrms			
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			

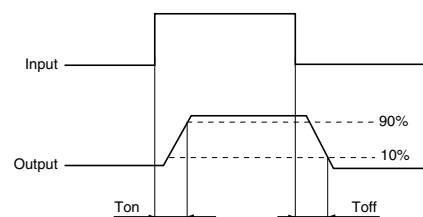
### 2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item			Symbol	C×R10 R type	C×R10 C type	C×R5	Condition	
				AQY221R2M	AQY221N2M	AQY221N3M		
Input	LED operate current	Typical	$I_{Fon}$	0.8 mA	1.0 mA		AQY221R2M: $I_L = 250$ mA AQY221N2M: $I_L = 80$ mA AQY221N3M: $I_L = 80$ mA	
		Maximum		3.0 mA				
	LED turn off current	Minimum	$I_{Foff}$	0.1 mA	0.2 mA			
		Typical		0.7 mA	0.9 mA			
LED dropout voltage	Typical	$V_F$	1.35 V (1.14 V at $I_F = 5$ mA)			$I_F = 50$ mA		
	Maximum		1.5 V					
Output	On resistance	Typical	$R_{on}$	0.8Ω	9.5Ω	5.5Ω	AQY221R2M: $I_F = 5$ mA, $I_L = 250$ mA AQY221N2M: $I_F = 5$ mA, $I_L = 80$ mA AQY221N3M: $I_F = 5$ mA, $I_L = 80$ mA Within 1 s	
		Maximum		1.25Ω	12.5Ω	7.5Ω		
	Output capacitance	Typical	$C_{out}$	14 pF	1.1 pF			$I_F = 0$ mA, $V_B = 0$ V $f = 1$ MHz
		Maximum		18 pF	1.5 pF			
Off state leakage current	Typical	$I_{Leak}$	0.02 nA	0.01 nA		$I_F = 0$ mA $V_L = Max.$		
	Maximum		*10 nA					
Transfer characteristics	Turn on time**	Typical	$T_{on}$	0.2 ms	0.02 ms		AQY221R2M: $I_F = 5$ mA, $V_L = 10$ V, $R_L = 40$ Ω AQY221N2M: $I_F = 5$ mA, $V_L = 10$ V, $R_L = 125$ Ω AQY221N3M: $I_F = 5$ mA, $V_L = 10$ V, $R_L = 125$ Ω	
		Maximum		0.5 ms	0.2 ms			
	Turn off time**	Typical	$T_{off}$	0.04 ms	0.02 ms			
		Maximum		0.2 ms				
I/O capacitance	Typical	$C_{iso}$	0.8 pF			$f = 1$ MHz $V_B = 0$ 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.

\*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
LED current		$I_F$	5	30	mA
AQY221R2M	Load voltage (Peak AC)	$V_L$	—	15	V
	Continuous load current	$I_L$	—	0.25	A
AQY221N2M	Load voltage (Peak AC)	$V_L$	—	15	V
	Continuous load current	$I_L$	—	0.12	A
AQY221N3M	Load voltage (Peak AC)	$V_L$	—	15	V
	Continuous load current	$I_L$	—	0.15	A

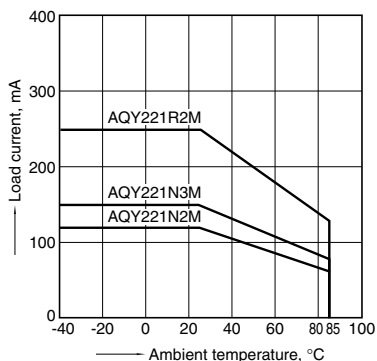
■ These products are not designed for automotive use.

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

## REFERENCE DATA

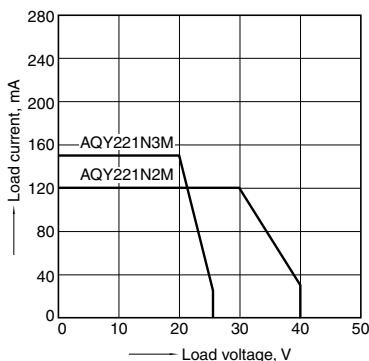
### 1. Load current vs. ambient temperature characteristics

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



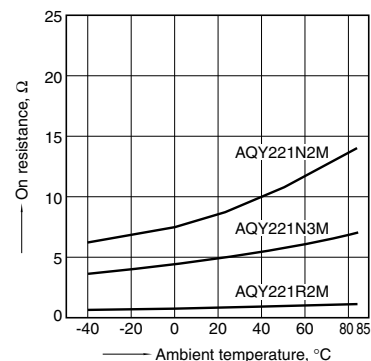
### 2. Load current vs. Load voltage characteristics

Ambient temperature: 25°C 77°F



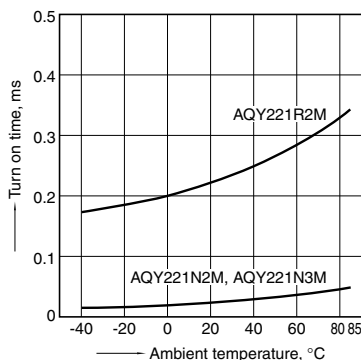
### 3. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4;  
LED current: 5 mA; Load voltage: 10V (DC); Load current: 250mA (DC) AQY221R2M, 80mA (DC) AQY221N2M, AQY221N3M



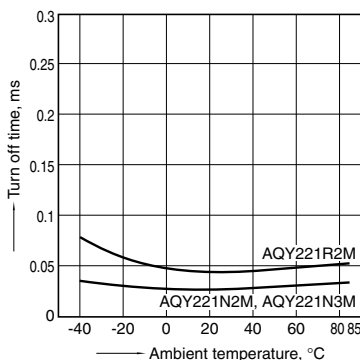
### 4. Turn on time vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4; LED current: 5 mA; Load voltage: 10V (DC); Continuous load current: 250mA (DC) AQY221R2M, 80mA (DC) AQY221N2M, AQY221N3M



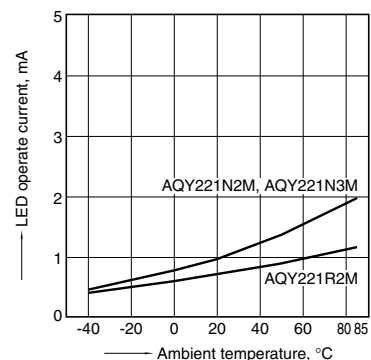
### 5. Turn off time vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4; LED current: 5 mA; Load voltage: 10V (DC); Continuous load current: 250mA (DC) AQY221R2M, 80mA (DC) AQY221N2M, AQY221N3M



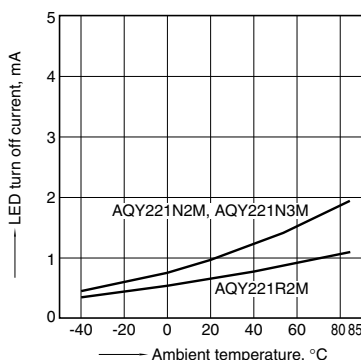
### 6. LED operate current vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4; Load voltage: 10V (DC); Continuous load current: 250mA (DC) AQY221R2M, 80mA (DC) AQY221N2M, AQY221N3M



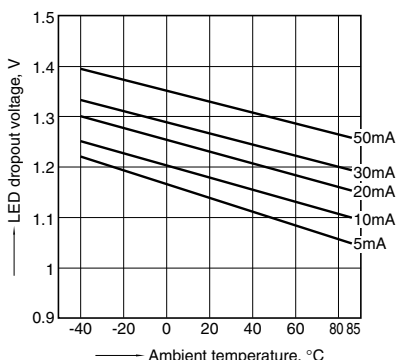
### 7. LED turn off current vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4; Load voltage: 10V (DC); Continuous load current: 250mA (DC) AQY221R2M, 80mA (DC) AQY221N2M, AQY221N3M



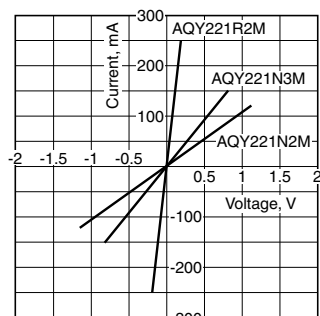
### 8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



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

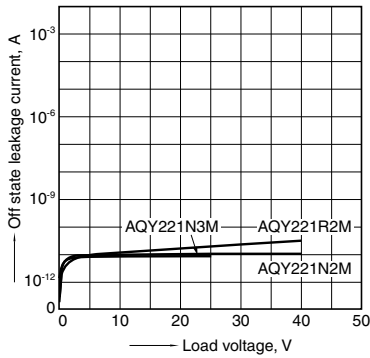
Measured portion: between terminals 3 and 4  
Ambient temperature: 25°C 77°F



# RF SON 1 Form A C×R10/C×R5 (AQY22○○○M)

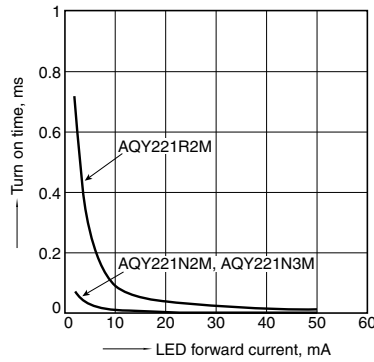
## 10. Off state leakage current vs. load voltage characteristics

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



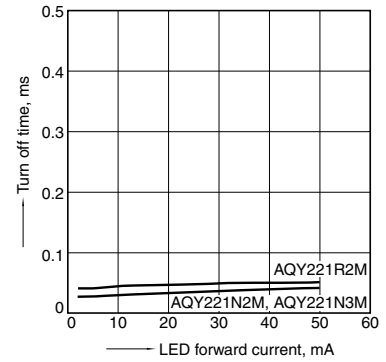
## 11. Turn on time vs. LED forward current characteristics

Measured portion: between terminals 3 and 4; Load voltage: 10V (DC); Continuous load current: 250mA (DC) AQY221R2M, 80mA (DC) AQY221N2M, AQY221N3M; Ambient temperature: 25°C 77°F



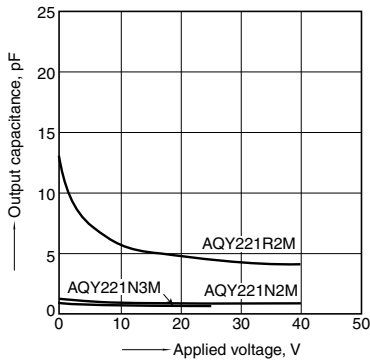
## 12. Turn off time vs. LED forward current characteristics

Measured portion: between terminals 3 and 4; Load voltage: 10V (DC); Continuous load current: 250mA (DC) AQY221R2M, 80mA (DC) AQY221N2M, AQY221N3M; Ambient temperature: 25°C 77°F



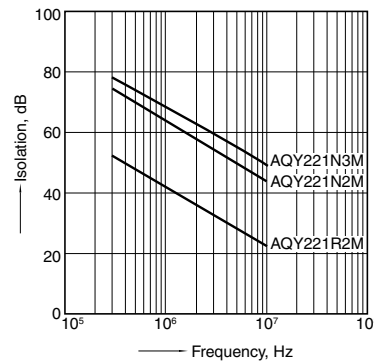
## 13. Output capacitance vs. applied voltage characteristics

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



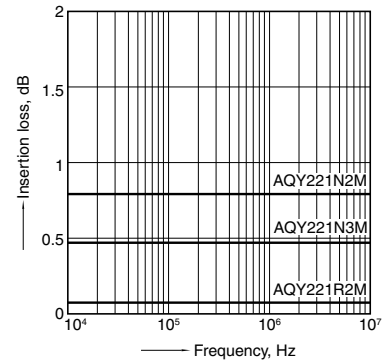
## 14. Isolation vs. frequency characteristics (50Ω impedance)

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



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Please contact .....

**Panasonic Corporation**

Electromechanical Control Business Division

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