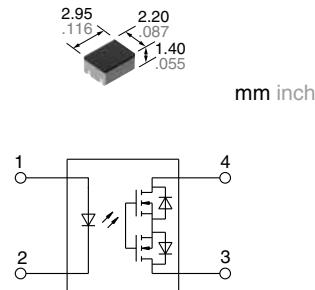


**Micro-miniature
SON package
CxR10: 40V load voltage
CxR5: 25V load voltage**

**PhotoMOS®
RF SON 1 Form A CxR10/CxR5
(AQY22000M)**

FEATURES



RoHS compliant

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

• CxR10

R type: Output capacitance Typ. 14pF
On resistance Typ. 0.8Ω
C type: Output capacitance Typ. 1.1pF
On resistance Typ. 9.5Ω

• CxR5

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

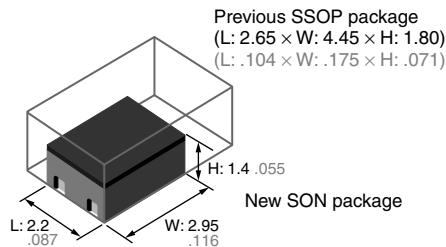
TYPICAL APPLICATIONS

1. Measuring equipment

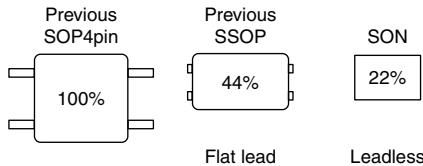
IC tester, Probe cards, board tester and other testing equipment

2. Telecommunication or broadcasting equipment

3. Medical equipment



Area comparison (including leads)



TYPES

AC/DC dual use	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	CxR10	Low on-resistance (R type)	40 V	SON	AQY221R2MY	AQY221R2MW	3,500 pcs.
		Low capacitance (C type)	40 V		AQY221N2MY	AQY221N2MW	
	CxR5	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	CxR10 R type	CxR10 C type	CxR5	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	

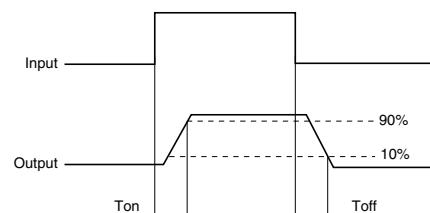
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

Item			Symbol	CxR10 R type	CxR10 C type	CxR5	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		AQY221R2M: I _L = 250 mA AQY221N2M: I _L = 80 mA AQY221N3M: I _L = 80 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 = 40Ω AQY221N2M: I _F = 5 mA, V _L = 10 V, R _L = 125Ω AQY221N3M: I _F = 5 mA, V _L = 10 V, R _L = 125Ω
		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

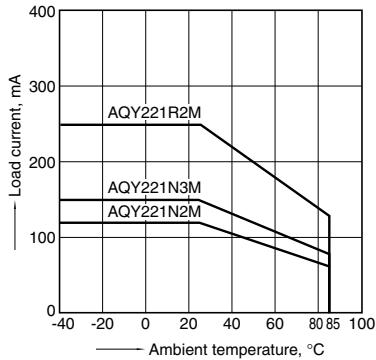
■ These products are not designed for automotive use.

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

REFERENCE DATA

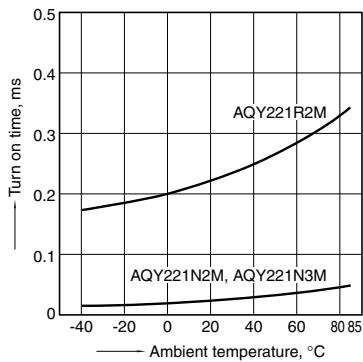
1. Load current vs. ambient temperature characteristics

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



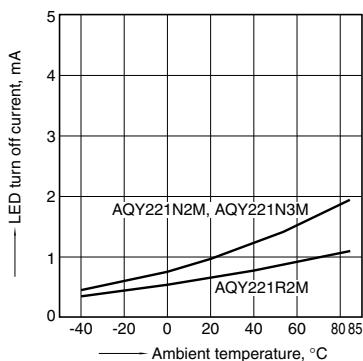
4. Turn on time vs. ambient temperature characteristics

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

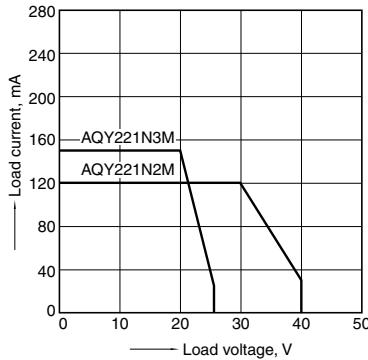


7. LED turn off current vs. ambient temperature characteristics

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

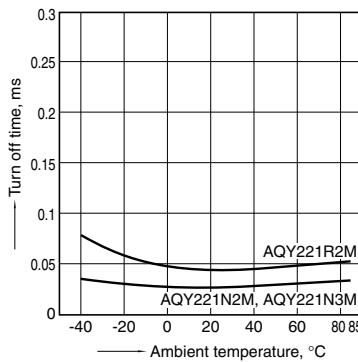


2. Load current vs. Load voltage characteristics
 Ambient temperature: 25°C 77°F



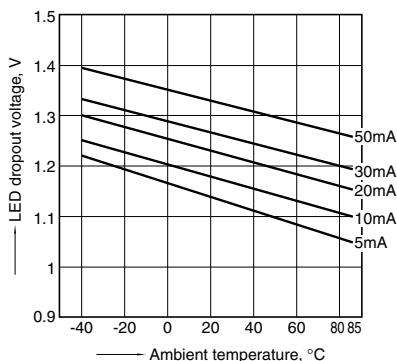
5. Turn off time vs. ambient temperature characteristics

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



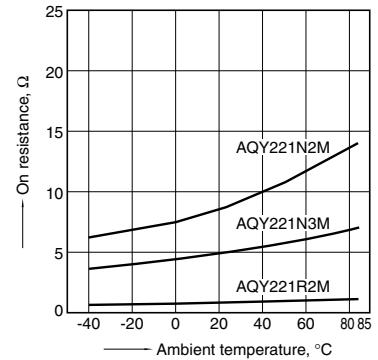
8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



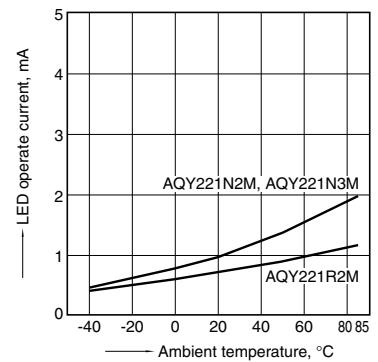
3. On resistance vs. ambient temperature characteristics

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



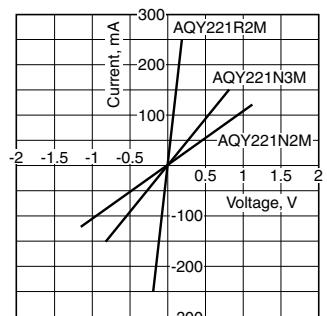
6. LED operate current vs. ambient temperature characteristics

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



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

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

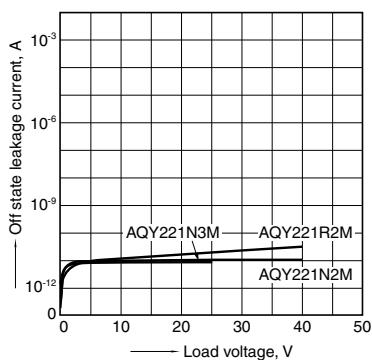


RF SON 1 Form A CxR10/CxR5 (AQY22000M)

10. Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 3 and 4

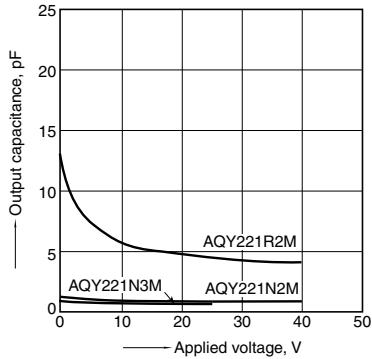
Ambient temperature: 25°C 77°F



13. Output capacitance vs. applied voltage characteristics

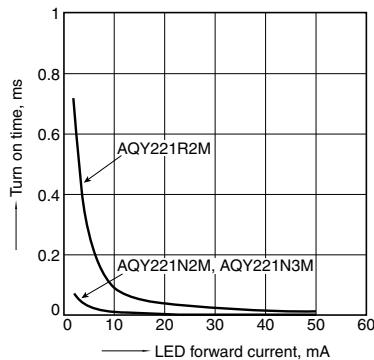
Measured portion: between terminals 3 and 4;

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



11. Turn on time vs. LED forward current characteristics

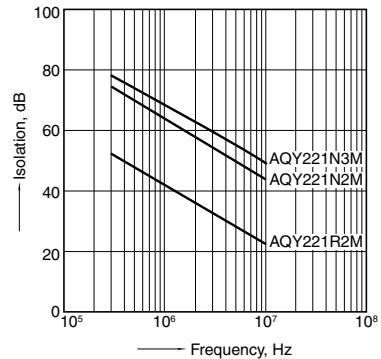
Measured portion: between terminals 3 and 4; Load voltage: 10V (DC); Continuous load current: 250mA (DC) AQY221R2M, 80mA (DC) AQY221N2M, AQY221N3M; Ambient temperature: 25°C 77°F



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

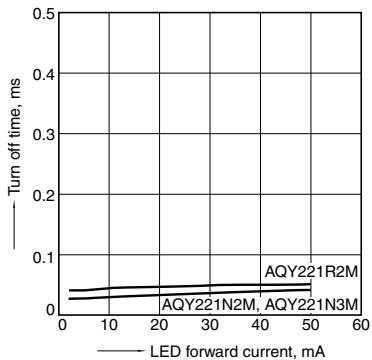
Measured portion: between terminals 3 and 4

Ambient temperature: 25°C 77°F



12. Turn off time vs. LED forward current characteristics

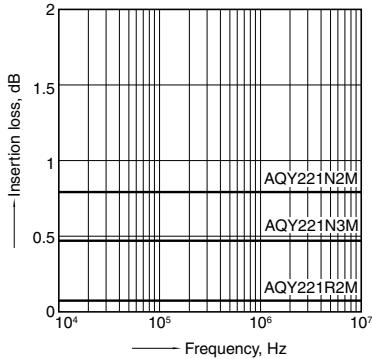
Measured portion: between terminals 3 and 4; Load voltage: 10V (DC); Continuous load current: 250mA (DC) AQY221R2M, 80mA (DC) AQY221N2M, AQY221N3M; Ambient temperature: 25°C 77°F



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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