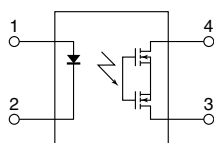


Micro-miniature SON package
C×R10: 40V load voltage
C×R5: 25V load voltage

PhotoMOS®
RF SON 1 Form A C×R10/C×R5
(AQY221○OM)



mm inch



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

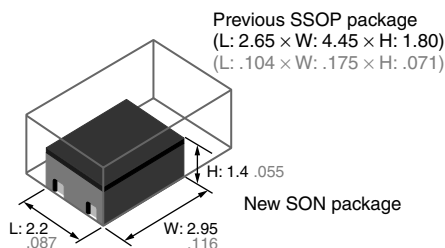
• C×R10

R type: Output capacitance 14pF (typ.)
 On resistance 0.8Ω (typ.)

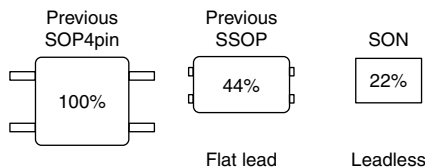
C type: Output capacitance 1.1pF (typ.)
 On resistance 9.5Ω (typ.)

• C×R5

Output capacitance 1.1pF (typ.)
 On resistance 5.5Ω (typ.)



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	40 V	120 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" or "1N2" is marked on the product as the part number.

RF SON 1 Form A C×R10/C×R5 (AQY221○○M)

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}	200V AC				
Operating temperature	T _{opr}	–40°C to +85°C –40°F to +185°F			Non-condensing at low temperatures	
Storage temperature	T _{stg}	–40°C to +100°C –40°F to +212°F				

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

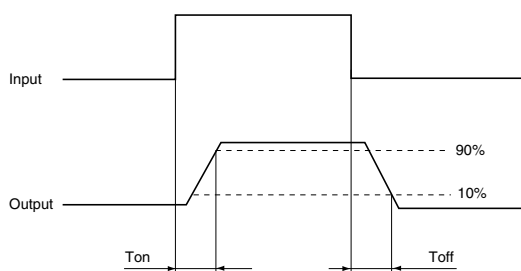
Item	Symbol	C×R10 R type	C×R10 C type	C×R5	Condition		
		AQY221R2M	AQY221N2M	AQY221N3M			
Input	LED operate current	Typical	0.8 mA	1.0 mA	AQY221R2M: I _L = 250 mA AQY221N2M: I _L = 80 mA AQY221N3M: I _L = 80 mA		
		Maximum	3.0 mA				
	LED turn off current	Minimum	0.1 mA	0.2 mA			
		Typical	0.7 mA	0.9 mA			
LED dropout voltage	Typical	1.35 V (1.14 V at I _F = 5 mA)			I _F = 50 mA		
	Maximum	1.5 V					
Output	On resistance	Typical	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 on time	
		Maximum	1.25Ω	12.5Ω	7.5Ω		
	Output capacitance	Typical	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	0.02 nA	0.01 nA		I _F = 0 mA V _L = Max.		
	Maximum	10 nA (1 nA or less)*					
Transfer characteristics	Turn on time**	Typical	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	0.04 ms	0.02 ms			
		Maximum	0.2 ms				
I/O capacitance	Typical	0.8 pF			f = 1 MHz V _B = 0 V		
	Maximum	1.5 pF					

Notes: 1. Please refer to the "Schematic and Wiring Diagrams" for connection method.

2. 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



RECOMMENDED OPERATING CONDITIONS

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

Item	Symbol	Recommended value	Unit
Input LED current	I _F	5	mA

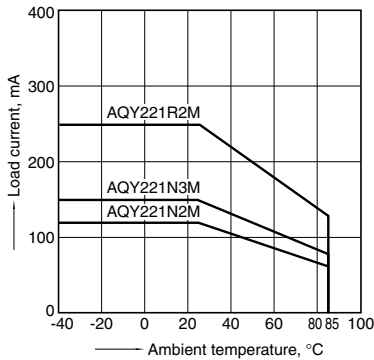
■ These products are not designed for automotive use.

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

REFERENCE DATA

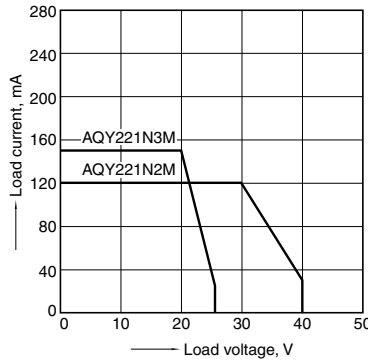
1. Load current vs. ambient temperature characteristics

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



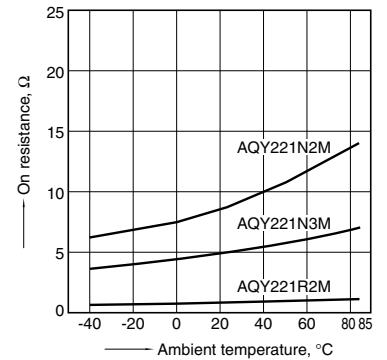
2. Load current vs. Load voltage characteristics

Ambient temperature: 25°C 77°F



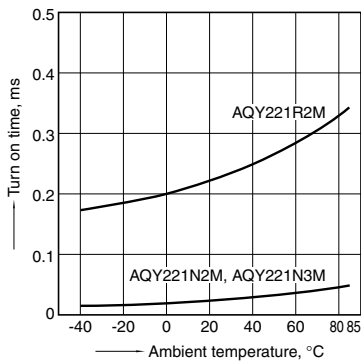
3. On resistance vs. ambient temperature characteristics

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



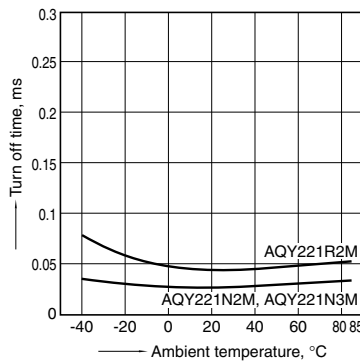
4. Turn on time vs. ambient temperature characteristics

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



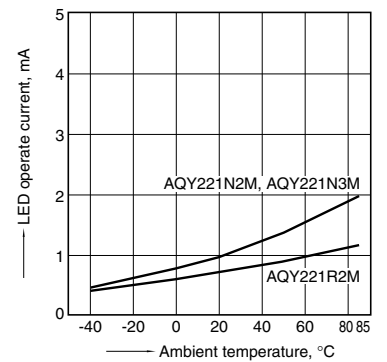
5. Turn off time vs. ambient temperature characteristics

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



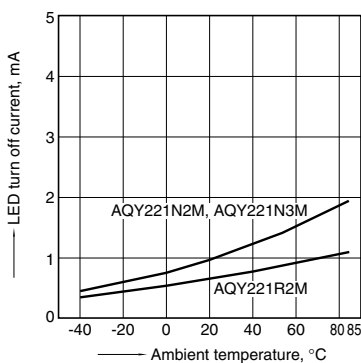
6. LED operate current vs. ambient temperature characteristics

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



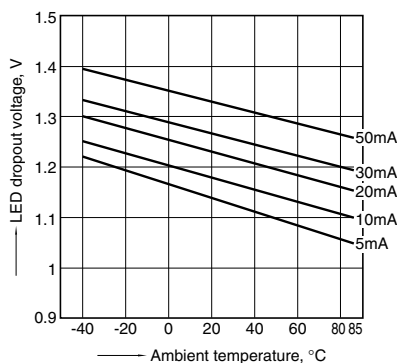
7. LED turn off current vs. ambient temperature characteristics

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



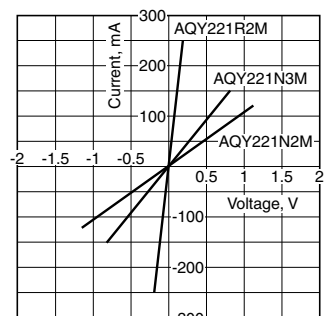
8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



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

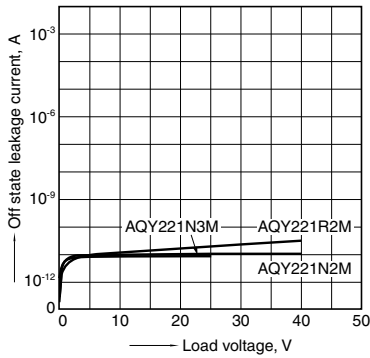
Measured portion: between terminals 3 and 4
Ambient temperature: 25°C 77°F



RF SON 1 Form A C×R10/C×R5 (AQY221○○M)

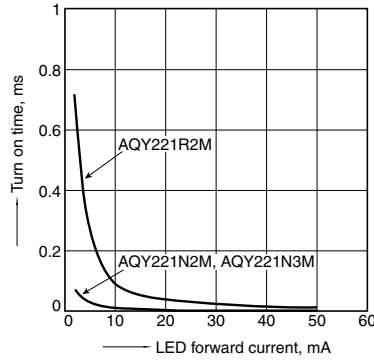
10. Off state leakage current vs. load voltage characteristics

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



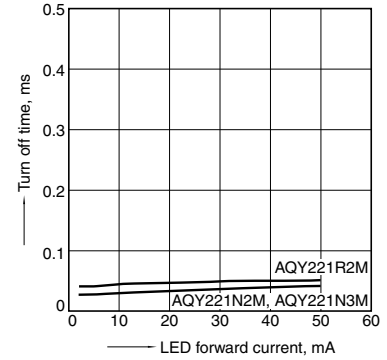
11. Turn on time vs. LED forward current characteristics

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



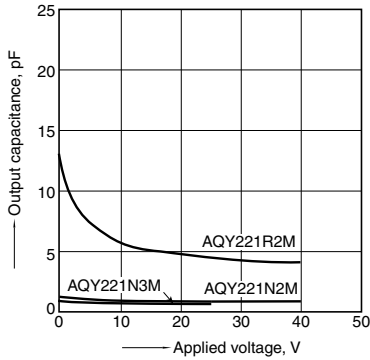
12. Turn off time vs. LED forward current characteristics

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



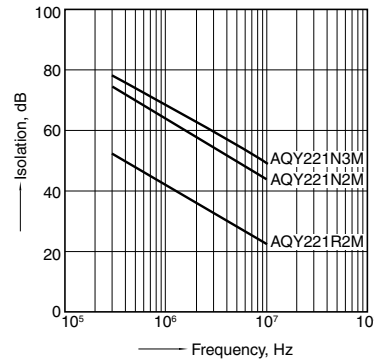
13. Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 3 and 4; Frequency: 1 MHz, 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

