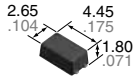
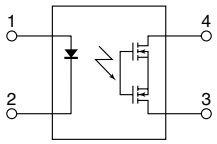
Panasonic
ideas for life

Miniature SSOP
C×R10: 30 V and 40 V load voltage
C×R5: 25 V load voltage

PhotoMOS®
RF SSOP 1 Form A C×R10/C×R5
(AQY221○○V)



mm inch

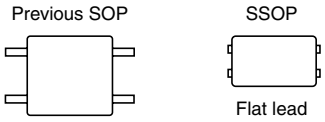


RoHS compliant

FEATURES

1. Miniature package (SSOP) using a new flat lead terminal shape

Compared to previous models (SOP 4-pin), mounting area can be reduced by approximately 53%*. This contributes to improved output signal transit characteristics.



*Comparison of area of SSOP and SOP 4-pin (including leads).

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

		On resistance (Typical)	Output capacitance (Typical)
C×R10 R type	New AQY221R6V	0.18Ω	37.5pF
	AQY221R4V	0.55Ω	24pF
	AQY221R2V	0.75Ω	12.5pF
C×R10 C type	AQY221N2V	9.5Ω	1.0pF
C×R5	AQY221N3V	5.5Ω	1.0pF

TYPICAL APPLICATIONS

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

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	New Low on-resistance (R type)	30 V	1,000 mA	SSOP	AQY221R6VY	AQY221R6VW	3,500 pcs.
			40 V	500 mA		AQY221R4VY	AQY221R4VW	
			40 V	250 mA		AQY221R2VY	AQY221R2VW	
		Low capacitance (C type)	40 V	120 mA		AQY221N2VY	AQY221N2VW	
	C×R5		25 V	150 mA		AQY221N3VY	AQY221N3VW	

Notes: *1. Indicate the peak AC and DC values.
*2. Tape and reel is the standard packing style for SSOP. Packing quantity of 1,000 pieces is possible. Please consult us.
For space reasons, the three initial letters of the part number "AQY", the package (SSOP) indication "V", and the packaging style "Y" or "W" are not marked on the device. (Ex. the label for product number AQY221R4VY is 221R4)

RATING

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

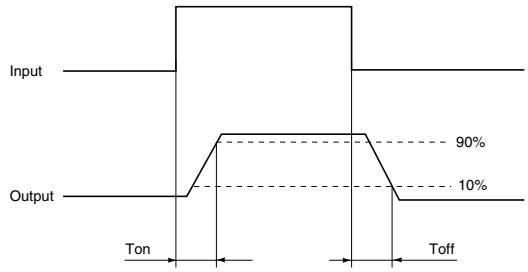
Item		Symbol	C×R10 R type			C×R10 C type	C×R5	Remarks
			AQY221R6V	AQY221R4V	AQY221R2V	AQY221N2V	AQY221N3V	
Input	LED forward current	I_F	50mA					
	LED reverse voltage	V_R	5V					
	Peak forward current	I_{FP}	1A					f=100 Hz, Duty factor=0.1%
	Power dissipation	P_{in}	75mW					
Output	Load voltage (peak AC)	V_L	30V	40V			25V	
	Continuous load current	I_L	1A	0.5A	0.25A	0.12A	0.15A	Peak AC, DC
	Peak load current	I_{peak}	1.5A	1A	0.75A	0.3A	0.4A	100ms (1shot), V_L=DC
	Power dissipation	P_{out}	250mW					
Total power dissipation		P_T	300mW					
I/O isolation voltage		V_{iso}	1,500V 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
				AQY221R6V	AQY221R4V	AQY221R2V	AQY221N2V	AQY221N3V	
Input	LED operate current	Typical	I_{Fon}	0.7 mA	0.9 mA		1.0 mA		AQY221R6V: I_L = 100 mA AQY221R4V: I_L = 500 mA AQY221R2V: I_L = 250 mA AQY221N2V: I_L = 80 mA AQY221N3V: I_L = 80 mA
		Maximum		3.0 mA					
	LED turn off current	Minimum	I_{Foff}	0.1 mA			0.2 mA		
		Typical		0.6 mA	0.8 mA		0.9 mA		
	LED dropout voltage*1	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}	0.18Ω	0.55Ω	0.75Ω	9.5Ω	5.5Ω	AQY221R6V: I_F = 5 mA, I_L = 1000 mA AQY221R4V: I_F = 5 mA, I_L = 500 mA AQY221R2V: I_F = 5 mA, I_L = 250 mA AQY221N2V: I_F = 5 mA, I_L = 80 mA AQY221N3V: I_F = 5 mA, I_L = 80 mA Within 1 s on time
		Maximum		0.35Ω	1Ω	1.25Ω	12.5Ω	7.5Ω	
	Output capacitance	Typical	C_{out}	37.5 pF	24 pF	12.5 pF	1.0 pF		I_F = 0 mA, V_B = 0 V, f = 1 MHz
		Maximum		100 pF	30 pF	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	0.25 ms	0.10 ms	0.02 ms		AQY221R6V: I_F = 5 mA, V_L = 10 V, R_L = 100Ω AQY221R4V: I_F = 5 mA, V_L = 10 V, R_L = 20Ω AQY221R2V: I_F = 5 mA, V_L = 10 V, R_L = 40Ω AQY221N2V: I_F = 5 mA, V_L = 10 V, R_L = 125Ω AQY221N3V: I_F = 5 mA, V_L = 10 V, R_L = 125Ω
		Maximum		0.5 ms	0.75 ms	0.5 ms		0.2 ms	
	Turn off time	Typical	T_{off}	0.07 ms	0.08 ms		0.02 ms		
		Maximum		0.2 ms	0.2 ms				
	I/O capacitance	Typical	C_{iso}	0.8 pF					f = 1 MHz, V_B = 0 V
		Maximum		1.5 pF					
	Initial I/O isolation resistance	Minimum	R_{iso}	1,000 MΩ					500 V DC

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.

*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

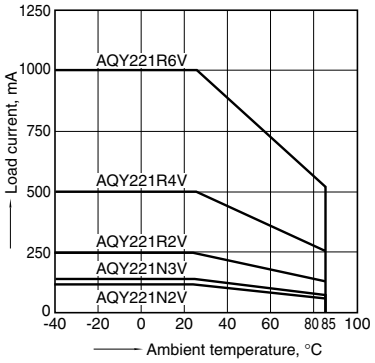
■ For Dimensions.
■ For Schematic and Wiring Diagrams.
■ For Cautions for Use.

■ These products are not designed for automotive use.
If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.
For more information.

REFERENCE DATA

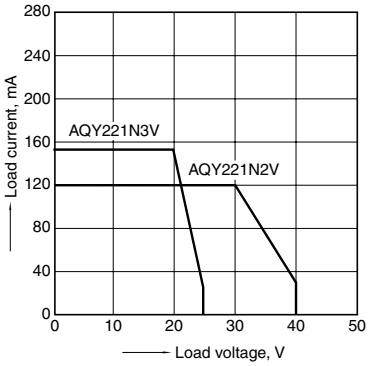
1. Load current vs. ambient temperature characteristics

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



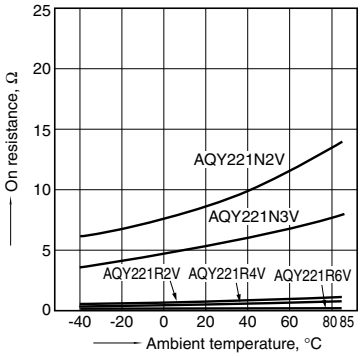
2. Load current vs. Load voltage characteristics

Ambient temperature: 25°C 77°F



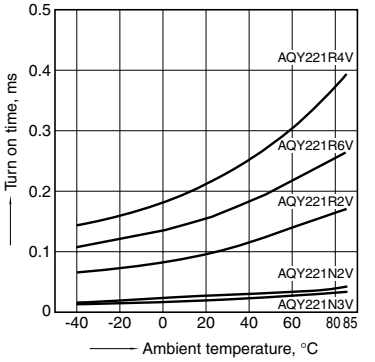
3. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4
LED current: 5 mA; Load voltage: 10V (DC)
Continuous load current: 1000mA (DC) AQY221R6V, 500mA (DC) AQY221R4V, 250mA (DC) AQY221R2V, 80mA (DC) AQY221N2V, AQY221N3V



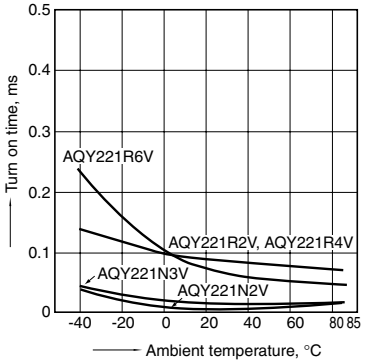
4. Turn on time vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4
LED current: 5 mA; Load voltage: 10V (DC)
Continuous load current: 100mA (DC) AQY221R6V, 500mA (DC) AQY221R4V, 250mA (DC) AQY221R2V, 80mA (DC) AQY221N2V, AQY221N3V



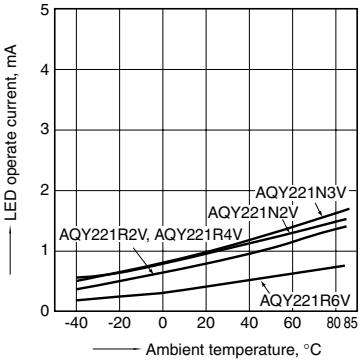
5. Turn off time vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4
LED current: 5 mA; Load voltage: 10V (DC)
Continuous load current: 100mA (DC) AQY221R6V, 500mA (DC) AQY221R4V, 250mA (DC) AQY221R2V, 80mA (DC) AQY221N2V, AQY221N3V



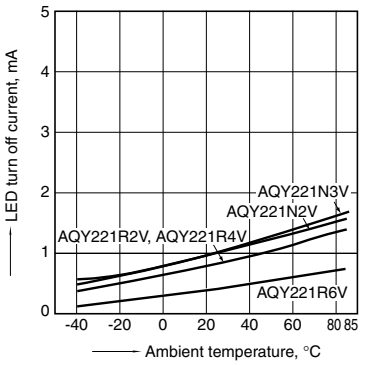
6. LED operate current vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4
Load voltage: 10V (DC)
Continuous load current: 100mA (DC) AQY221R6V, 500mA (DC) AQY221R4V, 250mA (DC) AQY221R2V, 80mA (DC) AQY221N2V, AQY221N3V



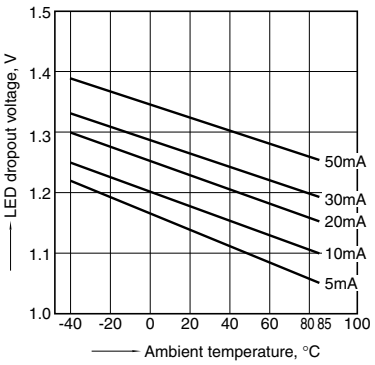
7. LED turn off current vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4
Load voltage: 10V (DC)
Continuous load current: 100mA (DC) AQY221R6V, 500mA (DC) AQY221R4V, 250mA (DC) AQY221R2V, 80mA (DC) AQY221N2V, AQY221N3V



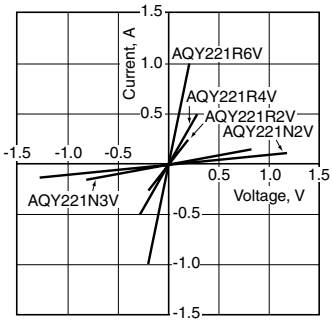
8. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



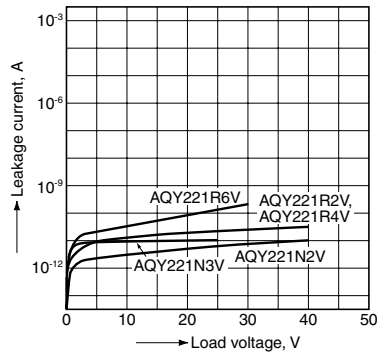
9. Current vs. voltage characteristics of output at MOS portion

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



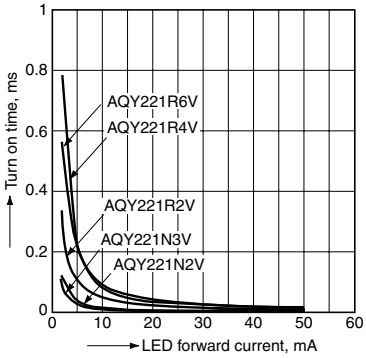
10. Off state leakage current vs. load voltage characteristics

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



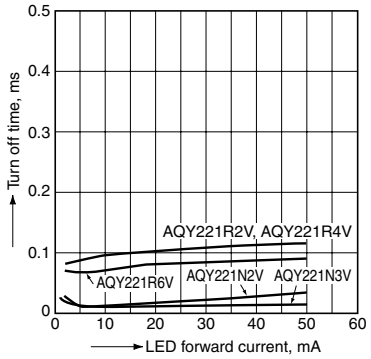
11. Turn on time vs. LED forward current characteristics

Measured portion: between terminals 3 and 4
Load voltage: 10V (DC)
Continuous load current: 100mA (DC) AQY221R6V, 500mA (DC) AQY221R4V, 250mA (DC) AQY221R2V, 80mA (DC) AQY221N2V, AQY221N3V
Ambient temperature: 25°C 77°F



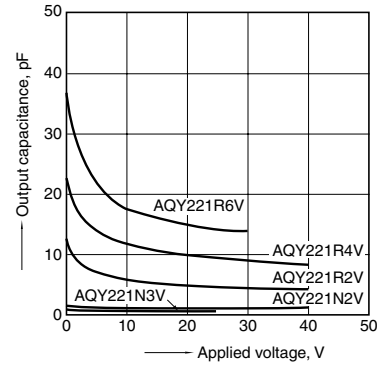
12. Turn off time vs. LED forward current characteristics

Measured portion: between terminals 3 and 4
Load voltage: 10V (DC)
Continuous load current: 100mA (DC) AQY221R6V, 500mA (DC) AQY221R4V, 250mA (DC) AQY221R2V, 80mA (DC) AQY221N2V, AQY221N3V
Ambient temperature: 25°C 77°F



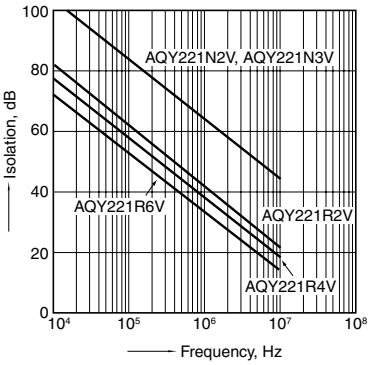
13. Output capacitance vs. applied voltage characteristics

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



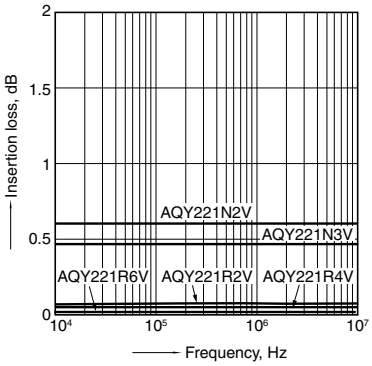
14. Isolation vs. frequency characteristics (50Ω impedance)

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



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AQY221N2VY AQY221N2VW AQY221R2VW AQY221R2VY