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With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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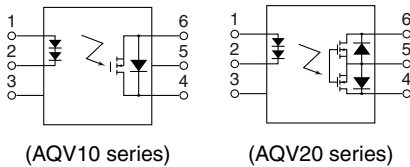
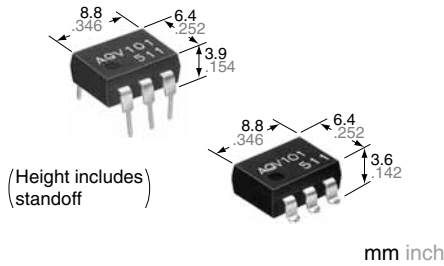
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





**DIP6-pin type
with wide variation
Low on-resistance**

**PhotoMOS[®]
HF 1 Form A
(AQV10○, 20○)**



RoHS compliant

FEATURES

- 1. Controls low-level analog signals**
PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.
- 2. Controlled with low-level input signals**
- 3. AC/DC dual use type and DC only type available.**

TYPICAL APPLICATIONS

- High-speed inspection machines
- Telephone equipment
- Data communication equipment
- Computers

TYPES

1. DC type (AQV10 series)

	Output rating*		Package	Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal		Tube	Tape and reel	
	Load voltage	Load current			Tube packing style				Tape and reel packing style
					Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side			
DC only	40 V	700 mA	DIP6-pin	AQV101	AQV101A	AQV101AX	AQV101AZ	1 tube contains: 50 pcs.	1,000 pcs
	60 V	600 mA		AQV102	AQV102A	AQV102AX	AQV102AZ		
	250 V	300 mA		AQV103	AQV103A	AQV103AX	AQV103AZ	1 batch contains: 500 pcs.	
	400 V	180 mA		AQV104	AQV104A	AQV104AX	AQV104AZ		

*Indicate the peak AC and DC values.
Note: The surface mount terminal indicator "A" and the packing style indicator "X" or "Z" are not marked on the device.

2. AC/DC type (AQV20 series)

	Output rating*		Package	Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal		Tube	Tape and reel	
	Load voltage	Load current			Tube packing style				Tape and reel packing style
					Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side			
AC/DC dual use	40 V	500 mA	DIP6-pin	AQV201	AQV201A	AQV201AX	AQV201AZ	1 tube contains: 50 pcs.	1,000 pcs
	60 V	400 mA		AQV202	AQV202A	AQV202AX	AQV202AZ		
	250 V	200 mA		AQV203	AQV203A	AQV203AX	AQV203AZ	1 batch contains: 500 pcs.	
	400 V	150 mA		AQV204	AQV204A	AQV204AX	AQV204AZ		

*Indicate the peak AC and DC values.
Note: The surface mount terminal indicator "A" and the packing style indicator "X" or "Z" are not marked on the device.

HF 1 Form A (AQV100, 200)

RATING

1. DC type

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

Item		Symbol	AQV101(A)	AQV102(A)	AQV103(A)	AQV104(A)	Remarks
Input	LED forward current	I_F	50 mA				
	LED reverse voltage	V_R	10 V				
	Peak forward current	I_{FP}	1 A				$f = 100$ Hz, Duty factor = 0.1%
	Power dissipation	P_{in}	150 mW				
Output	Load voltage (DC)	V_L	40 V	60 V	250 V	400 V	
	Continuous load current (DC)	I_L	0.7 A	0.6 A	0.3 A	0.18 A	
	Peak load current	I_{peak}	1.8 A	1.5 A	0.6 A	0.5 A	100 ms (1 shot)
	Power dissipation	P_{out}	360 mW				
Total power dissipation		P_T	410 mW				
I/O isolation voltage		V_{iso}	1,500 V (AC)				
Temperature limits	Operating	T_{opr}	-40°C to +85°C -40°F to +185°F				Non-condensing at low temperatures
	Storage	T_{stg}	-40°C to +100°C -40°F to +212°F				

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

Item		Symbol	AQV101(A)	AQV102(A)	AQV103(A)	AQV104(A)	Condition
Input	LED operate current	Typical	2.3 mA				$I_L = \text{Max.}$
		Maximum	5 mA				
	LED turn off current	Minimum	0.8 mA				$I_L = \text{Max.}$
		Typical	2.2 mA				
LED dropout voltage	Typical	2.3 V				$I_F = 10$ mA	
	Maximum	3 V					
Output	On resistance	Typical	0.3 Ω	0.37 Ω	2.7 Ω	6.3 Ω	$I_F = 10$ mA $I_L = \text{Max.}$ Within 1 s on time
		Maximum	0.5 Ω	0.7 Ω	4 Ω	8 Ω	
Off state leakage current		Maximum	1 μ A				$I_F = 0$ mA, $V_L = \text{Max.}$
Transfer characteristics	Turn on time*	Typical	0.23 ms	0.22 ms	0.13 ms	0.09 ms	$I_F = 10$ mA $I_L = \text{Max.}$
		Maximum	1 ms				
	Turn off time*	Typical	0.07 ms			0.08 ms	$I_F = 10$ mA $I_L = \text{Max.}$
		Maximum	1 ms				
	I/O capacitance	Typical	1.3 pF				$f = 1$ MHz $V_B = 0$ V
Maximum		3 pF					
Initial I/O isolation resistance		Minimum	1,000 M Ω				500 V DC

2. AC/DC type

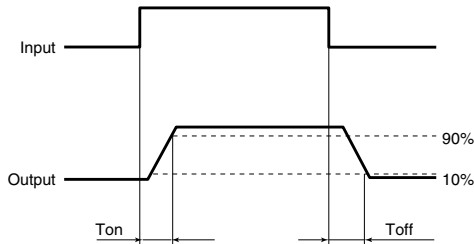
1) Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item		Symbol	Type of connection	AQV201(A)	AQV202(A)	AQV203(A)	AQV204(A)	Remarks
Input	LED forward current	I_F		50 mA				
	LED reverse voltage	V_R		10 V				
	Peak forward current	I_{FP}		1 A				$f = 100$ Hz, Duty factor = 0.1%
	Power dissipation	P_{in}		150 mW				
Load voltage (peak AC)		V_L		40 V	60 V	250 V	400 V	
Output	Continuous load current	I_L	A	0.5 A	0.4 A	0.2 A	0.15 A	A connection: Peak AC, DC B, C connection: DC
			B	0.7 A	0.6 A	0.3 A	0.18 A	
			C	1.0 A	0.8 A	0.4 A	0.25 A	
	Peak load current	I_{peak}		1.8 A	1.5 A	0.6 A	0.5 A	A connection 100 ms (1 shot) $V_L = \text{DC}$
Power dissipation		P_{out}		360 mW				
Total power dissipation		P_T		410 mW				
I/O isolation voltage		V_{iso}		1,500 V AC				
Temperature limits	Operating	T_{opr}		-40°C to +85°C -40°F to +185°F				Non-condensing at low temperature
	Storage	T_{stg}		-40°C to +100°C -40°F to +212°F				

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

Item			Symbol	Type of connection	AQV201(A)	AQV202(A)	AQV203(A)	AQV204(A)	Remarks	
Input	LED operate current	Typical	I _{Fon}	—	2.4 mA				I _L = Max.	
		Maximum			5 mA					
	LED turn off current	Minimum	I _{Foff}	—	0.8 mA				I _L = Max.	
		Typical			2.2 mA					
	LED dropout voltage	Typical	V _F	—	2.3 V				I _F = 10 mA	
		Maximum			3 V					
Output	On resistance	Typical	R _{ton}	A	0.6 Ω	0.74 Ω	5.5 Ω	12.4 Ω	I _F = 10 mA I _L = Max. Within 1 s on time	
		Maximum			1 Ω	1.4 Ω	8 Ω	16 Ω		
		Typical	R _{on}	B	0.3 Ω	0.37 Ω	2.7 Ω	6.2 Ω	I _F = 10 mA I _L = Max. Within 1 s on time	
		Maximum			0.5 Ω	0.7 Ω	4 Ω	8 Ω		
		Typical	R _{on}	C	0.15 Ω	0.18 Ω	1.4 Ω	3.1 Ω	I _F = 10 mA I _L = Max. Within 1 s on time	
		Maximum			0.25 Ω	0.35 Ω	2 Ω	4 Ω		
	Off state leakage current	Maximum	I _{Leak}	—	1 μA				I _F = 0 mA, V _L = Max.	
	Transfer characteristics	Turn on time*	Typical	T _{on}	—	0.38 ms	0.41 ms	0.21 ms	0.18 ms	I _F = 10 mA I _L = Max.
			Maximum			1 ms				
		Turn off time*	Typical	T _{off}	—	0.08 ms		0.07 ms		I _F = 10 mA I _L = Max.
Maximum			1 ms							
I/O capacitance		Typical	C _{iso}	—	1.3 pF				f = 1 MHz	
	Maximum	3 pF				V _B = 0 V				
Initial I/O isolation resistance	Minimum	R _{iso}	—	1,000 MΩ				500 V DC		

*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	10	mA

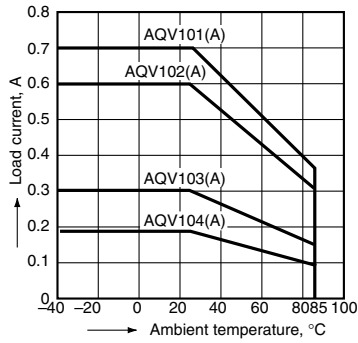
■ These products are not designed for automotive use.

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

REFERENCE DATA

1.-(1) Load current vs. ambient temperature characteristics (DC type)

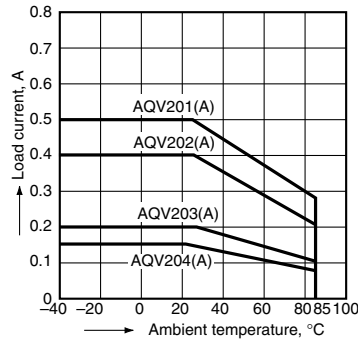
Allowable ambient temperature: -40°C to $+85^{\circ}\text{C}$
 -40°F to $+185^{\circ}\text{F}$



1.-(2) Load current vs. ambient temperature characteristics (AC/DC type)

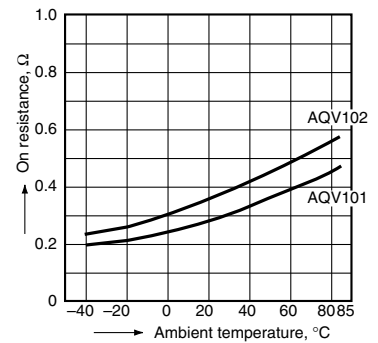
Allowable ambient temperature: -40°C to $+85^{\circ}\text{C}$
 -40°F to $+185^{\circ}\text{F}$

Type of connection: A



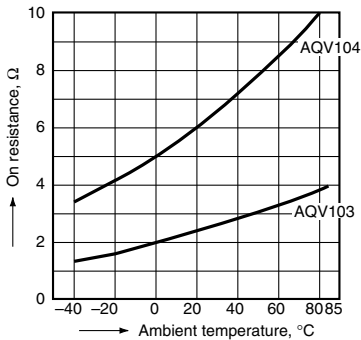
2.-(1) On resistance vs. ambient temperature characteristics (DC type: AQV101, AQV102)

LED current: 10 mA;
 Continuous load current: Max. (DC)



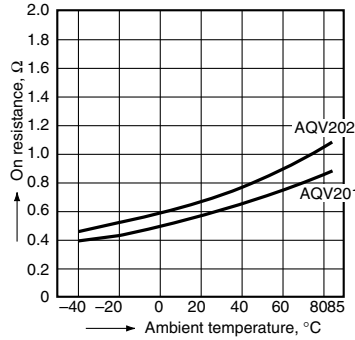
2.-(2) On resistance vs. ambient temperature characteristics (DC type: AQV103, AQV104)

LED current: 10 mA;
 Continuous load current: Max. (DC)



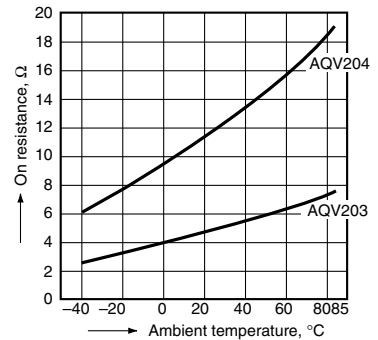
2.-(3) On resistance vs. ambient temperature characteristics (AC/DC type: AQV201, AQV202)

Measured portion: between terminals 4 and 6;
 LED current: 10 mA;
 Continuous load current: Max. (DC)



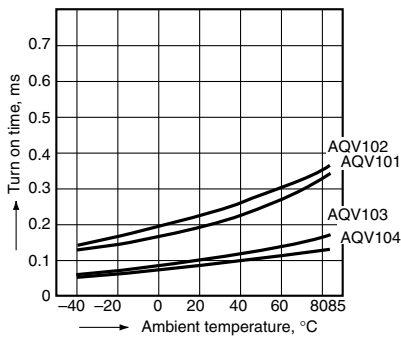
2.-(4) On resistance vs. ambient temperature characteristics (AC/DC type: AQV203, AQV204)

Measured portion: between terminals 4 and 6;
 LED current: 10 mA;
 Continuous load current: Max. (DC)



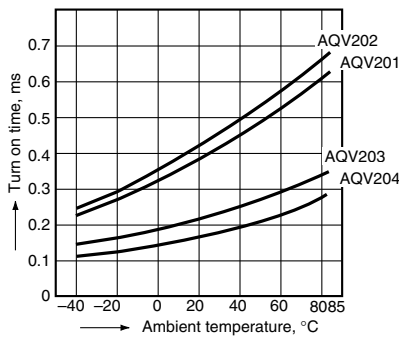
3.-(1) Turn on time vs. ambient temperature characteristics (DC type)

LED current: 10 mA;
 Load voltage: Max. (DC);
 Continuous load current: Max. (DC)



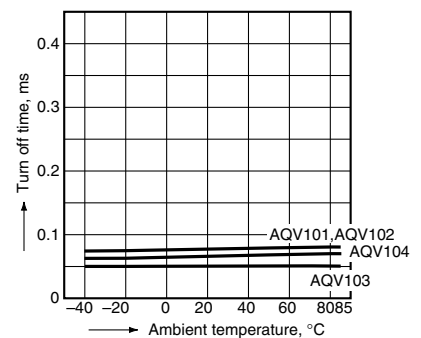
3.-(2) Turn on time vs. ambient temperature characteristics (AC/DC type)

LED current: 10 mA;
 Load voltage: Max. (DC);
 Continuous load current: Max. (DC)



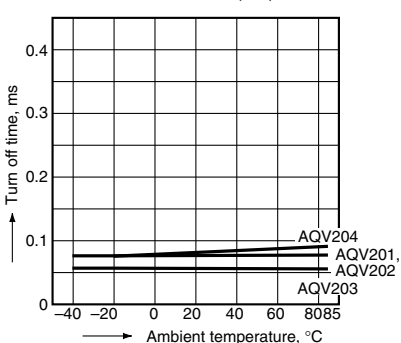
4.-(1) Turn off time vs. ambient temperature characteristics (DC type)

LED current: 10 mA;
 Load voltage: Max. (DC);
 Continuous load current: Max. (DC)



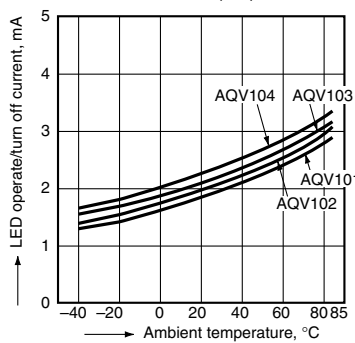
4.-(2) Turn off time vs. ambient temperature characteristics (AC/DC type)

LED current: 10 mA; Load voltage: Max. (DC);
 Continuous load current: Max. (DC)



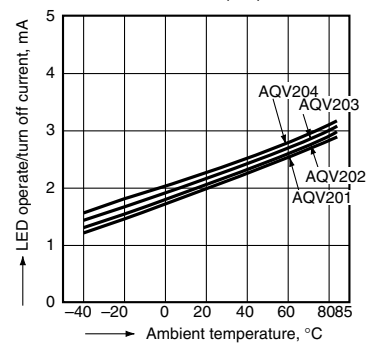
5.-(1) LED operate/turn off current vs. ambient temperature characteristics (DC type)

Load voltage: Max. (DC);
 Continuous load current: Max. (DC)



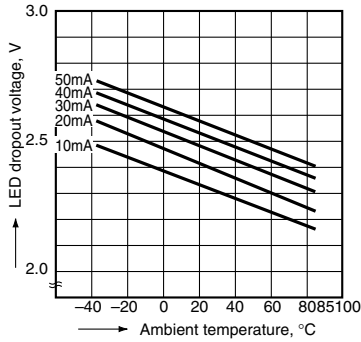
5.-(2) LED operate/turn off current vs. ambient temperature characteristics (AC/DC type)

Load voltage: Max. (DC);
 Continuous load current: Max. (DC)



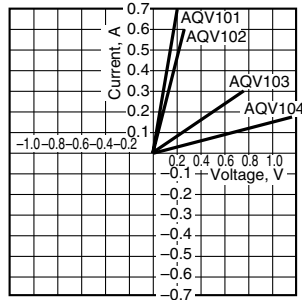
6. LED dropout voltage vs. ambient temperature characteristics

Sample: All types
LED current: 10 to 50 mA



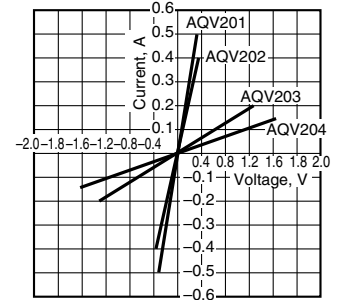
7.-(1) Current vs. voltage characteristics of output at MOS portion (DC type)

Ambient temperature: 25°C 77°F



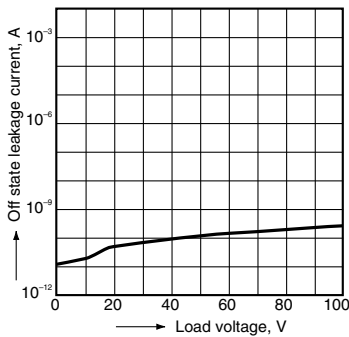
7.-(2) Current vs. voltage characteristics of output at MOS portion (AC/DC type)

Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



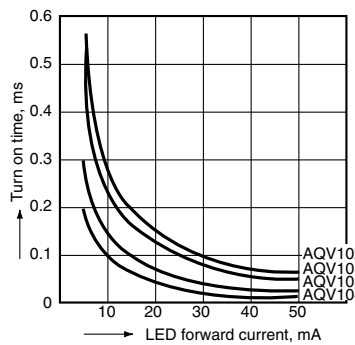
8. Off state leakage current vs. load voltage characteristics

Sample: AQV204;
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



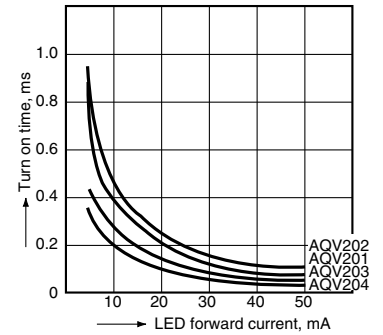
9.-(1) Turn on time vs. LED forward current characteristics (DC type)

Load voltage: Max. (DC);
Continuous load current: Max. (DC);
Ambient temperature: 25°C 77°F



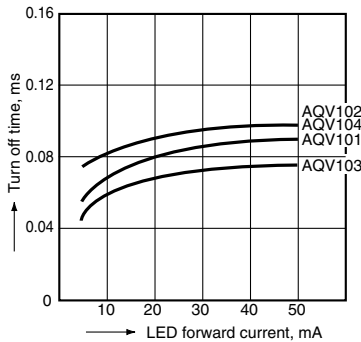
9.-(2) Turn on time vs. LED forward current characteristics (AC/DC type)

Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC);
Continuous load current: Max. (DC);
Ambient temperature: 25°C 77°F



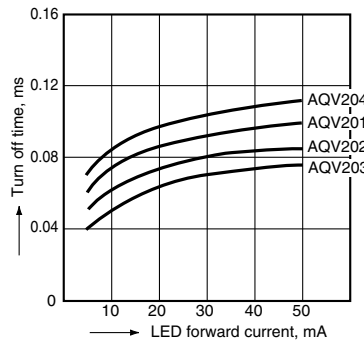
10.-(1) Turn off time vs. LED forward current characteristics (DC type)

Load voltage: Max. (DC);
Continuous load current: Max. (DC);
Ambient temperature: 25°C 77°F



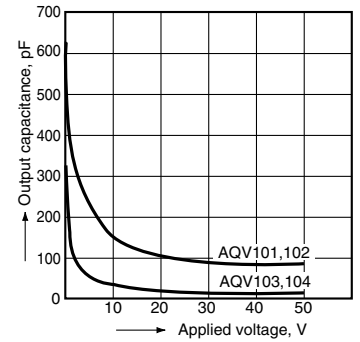
10.-(2) Turn off time vs. LED forward current characteristics (AC/DC type)

Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC);
Continuous load current: Max. (DC);
Ambient temperature: 25°C 77°F



11.-(1) Output capacitance vs. applied voltage characteristics (DC type)

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



11.-(2) Output capacitance vs. applied voltage characteristics (AC/DC type)

Measured portion: between terminals 4 and 6;
Frequency: 1 MHz;
Ambient temperature: 25°C 77°F

