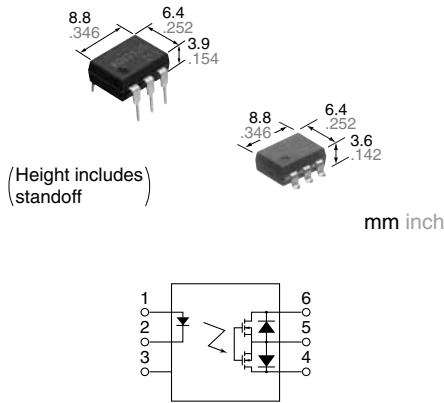




<b>Capable of 2A to 3A high-frequency load switching</b>	<b>PhotoMOS<sup>®</sup> HE 1 Form A High Capacity</b>
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**RoHS compliant**

### FEATURES

- 1. Greatly increased load current in a compact DIP package**  
Continuous load current: 3.5A (AQV251G)
- 2. Greatly improved specifications allow you to use this in place of mercury and mechanical relays.**
- 3. Low on-resistance (typ. 35mΩ, AQV251G)**

### TYPICAL APPLICATIONS

- **Measuring instrument market**  
(Testers etc.)
- **Industrial machinery and equipment**
- **Power supply controls**
- **Security/Disaster prevention market**  
I/O sections of warning devices, security systems, etc.

### TYPES

	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	30 V	3.5 A	DIP6-pin	AQV251G	AQV251GA	AQV251GAX	AQV251GAZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.
	60 V	2.5 A	DIP6-pin	AQV252G	AQV252GA	AQV252GAX	AQV252GAZ		

\*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.

### RATING

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

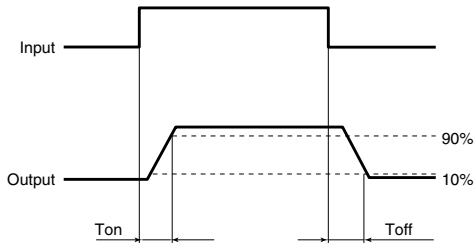
Item		Symbol	Type of connection	AQV251G(A)	AQV252G(A)	Remarks
Input	LED forward current	I <sub>F</sub>	/	50 mA		
	LED reverse voltage	V <sub>R</sub>		5 V		
	Peak forward current	I <sub>FP</sub>		1 A		f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P <sub>in</sub>		75 mW		
Output	Load voltage (peak AC)	V <sub>L</sub>		30 V	60 V	
	Continuous load current	I <sub>L</sub>	A	3.5 A	2.5 A	A connection: Peak AC, DC B, C connection: DC
			B	4.0 A	3.5 A	
			C	6.0 A	5.0 A	
	Peak load current	I <sub>peak</sub>		6.0 A		100ms (1 shot), V <sub>L</sub> = DC
Power dissipation	P <sub>out</sub>		600 mW			
Total power dissipation		P <sub>T</sub>		650 mW		
I/O isolation voltage		V <sub>iso</sub>		1,500 V AC		
Temperature limits	Operating	T <sub>opr</sub>		-40°C to +85°C -40°F to +185°F		Non-condensing at low temperatures
	Storage	T <sub>stg</sub>		-40°C to +100°C -40°F to +212°F		

# HE 1 Form A High Capacity

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

Item		Symbol	Type of connection	AQV251G(A)	AQV252G(A)	Condition	
Input	LED operate current	Typical	I <sub>Fon</sub>	—	0.55 mA	0.5 mA	
		Maximum			3 mA	3 mA	I <sub>L</sub> = 100mA
	LED turn off current	Minimum	I <sub>Foff</sub>	—	0.2 mA	0.2 mA	I <sub>L</sub> = 100mA
Typical		0.45 mA			0.45 mA		
	LED dropout voltage	Typical	V <sub>F</sub>	—	1.14 V (1.32 V at I <sub>F</sub> = 50 mA)		I <sub>F</sub> = 5 mA
		Maximum			1.5 V		
Output	On resistance	Typical	R <sub>on</sub>	A	0.035 Ω	0.08 Ω	I <sub>F</sub> = 5 mA I <sub>L</sub> = Max. Within 1 s on time
		Maximum			0.08 Ω	0.12 Ω	
		Typical	R <sub>on</sub>	B	0.018 Ω	0.04 Ω	
		Maximum			0.04 Ω	0.06 Ω	
		Typical	R <sub>on</sub>	C	0.01 Ω	0.02 Ω	
		Maximum			0.02 Ω	0.03 Ω	
	Off state leakage current	Maximum	I <sub>Leak</sub>	—	1 μA		I <sub>F</sub> = 0 mA, V <sub>L</sub> = Max.
Transfer characteristics	Turn on time*	Typical	T <sub>on</sub>	—	1.1 ms		I <sub>F</sub> = 5 mA, I <sub>L</sub> = 100 mA V <sub>L</sub> = 10 V
		Maximum			5.0 ms		
	Turn off time*	Typical	T <sub>off</sub>	—	0.1 ms	0.25 ms	I <sub>F</sub> = 5 mA, I <sub>L</sub> = 100 mA V <sub>L</sub> = 10 V
		Maximum			0.5 ms		
	I/O capacitance	Typical	C <sub>iso</sub>	—	0.8 pF		f = 1 MHz V <sub>B</sub> = 0 V
		Maximum			1.5 pF		
Initial I/O isolation resistance	Minimum	R <sub>iso</sub>	—	1,000 MΩ		500 V DC	
Max. switching frequency	Maximum	—	—	10 times/s	—	I <sub>F</sub> = 5 mA, duty = 50% V <sub>L</sub> × I <sub>L</sub> = 100 V·A	

\*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 <sub>F</sub>	5 to 10	mA

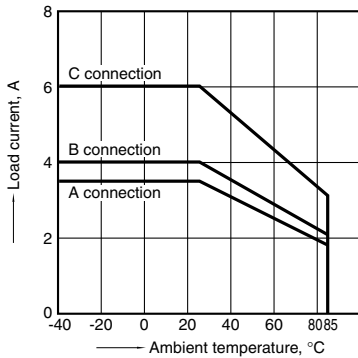
■ These products are not designed for automotive use.

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

## REFERENCE DATA

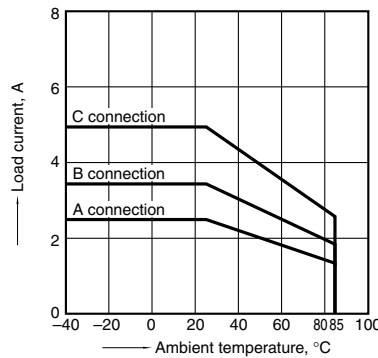
1.-(1) Load current vs. ambient temperature characteristics

Tested sample: Aqv251G;  
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F



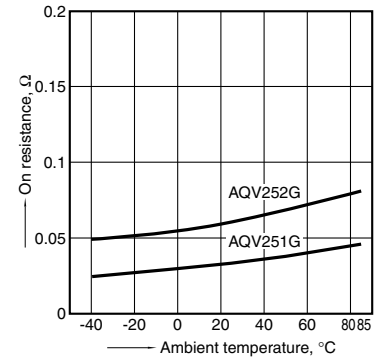
1.-(2) Load current vs. ambient temperature characteristics

Tested sample: Aqv252G;  
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F



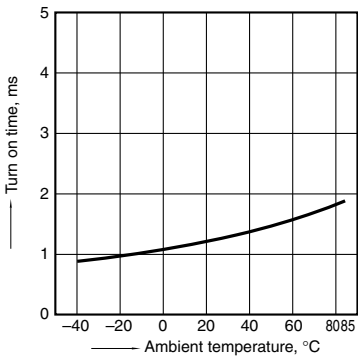
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;  
LED current: 5 mA; Load voltage: Max. (DC)  
Continuous load current: Max.(DC)



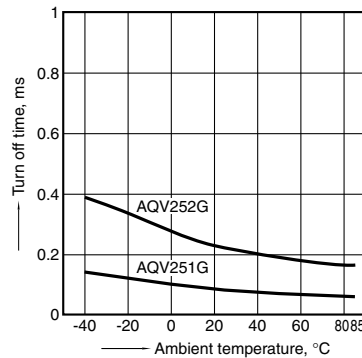
3. Turn on time vs. ambient temperature characteristics

Tested sample: All; LED current: 5 mA; Load voltage: 10 V (DC); Continuous load current: 100 mA (DC)



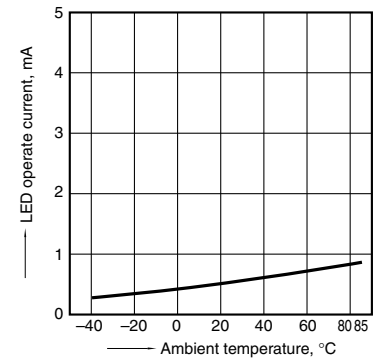
4. Turn off time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 10 V (DC); Continuous load current: 100 mA (DC)



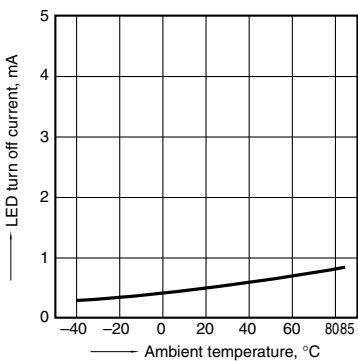
5. LED operate current vs. ambient temperature characteristics

Tested sample: All; Load voltage: 10 V (DC); Continuous load current: 100mA (DC)



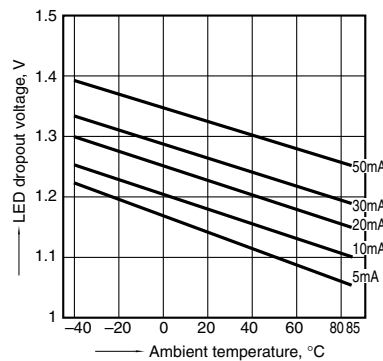
6. LED turn off current vs. ambient temperature characteristics

Tested sample: All; Load voltage: 10 V (DC); Continuous load current: 100mA (DC)



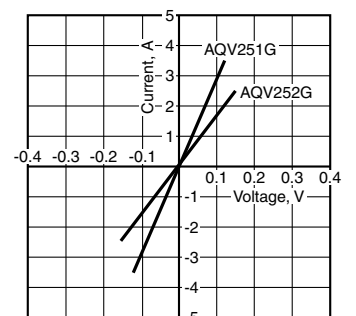
7. LED dropout voltage vs. ambient temperature characteristics

Tested sample: All;  
LED current: 5 to 50 mA



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

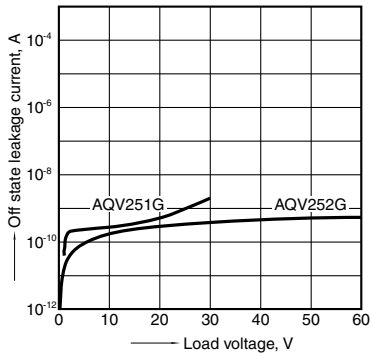
Measured portion: between terminals 4 and 6;  
Ambient temperature: 25°C 77°F



# HE 1 Form A High Capacity

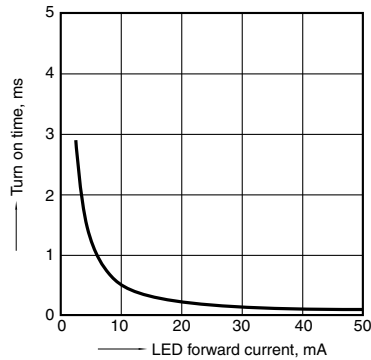
## 9. Off state leakage current vs. load voltage characteristics

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



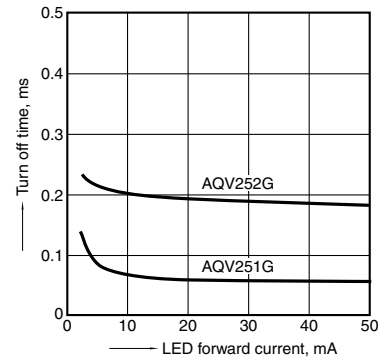
## 10. Turn on time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6;  
Tested sample: All; Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC);  
Ambient temperature: 25°C 77°F



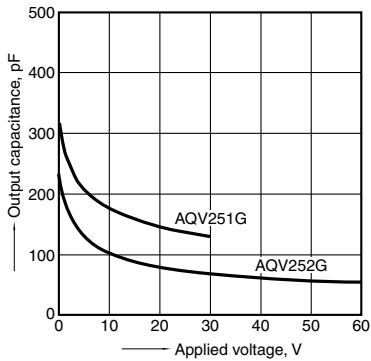
## 11. Turn off time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6;  
Load voltage: 10 V (DC);  
Continuous load current: 100 mA (DC);  
Ambient temperature: 25°C 77°F



## 12. Output capacitance vs. applied voltage characteristics

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



## 13. Max. switching frequency

Tested sample: AQV251G;  
LED current: 5 mA;  
Ambient temperature: 25°C 77°F

