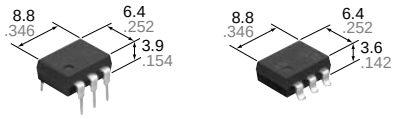
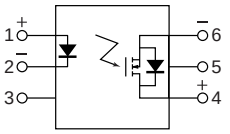
Panasonic
ideas for life

Short circuit protection (Non-latch type) only for DC load

PhotoMOS Relays
GU 1 Form A
Short Circuit Protection (AQV112KL)



mm inch



Compliance with RoHS Directive

FEATURES

1. Protects Circuit from excess current
The short circuit protection function prevents the continued flow of short current. After short current is detected, load current is monitored, and if the load returns to normal, the relay returns to normal operation.

2. No need for fuses, polyswitches, or other protectors
The built-in short circuit protection function eliminates the need for overcurrent protectors, reducing mounting costs and space requirements.

3. High capacity
Can control up to 0.5A (60V DC) load current.

TYPICAL APPLICATIONS

- Industrial equipment
- Traffic signal control
- Security equipment

TYPES

	Output rating*		Package	Part No.				Packing quantity	
				Through hole terminal	Surface-mount terminal				
	Load voltage	Load current		Tube packing style		Tape and reel packing style		Tube	Tape and reel
						Picked from the 1/2/3-pin side	Picked from the 4/5/6-pin side		
DC only	60 V	500 mA	DIP6-pin	AQV112KL	AQV112KLA	AQV112KLAX	AQV112KLAZ	1 tube contains: 50 pcs. 1 batch contains: 500 pcs.	1,000 pcs.

*Indicate the DC values.
Note: The surface mount terminal shape indicator “A” and the packing style indicator “X” or “Z” are not marked on the relay.

RATING

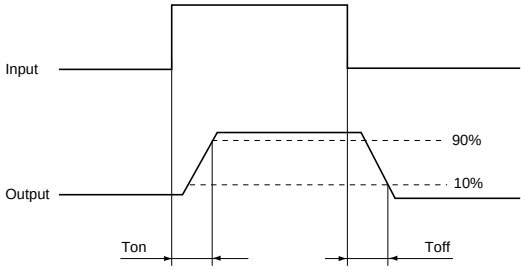
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

Item		Symbol	AQV112KL(A)	Remarks
Input	LED forward current	I_F	50 mA	
	LED reverse voltage	V_R	5 V	
	Peak forward current	I_{FP}	1 A	f = 100 Hz, Duty factor = 0.1%
	Power dissipation	P_{in}	75 mW	
Output	Load voltage (peak AC)	V_L	7 to 60V	
	Continuous load current	I_L	0.5 A	Peak AC, DC
	Power dissipation	P_{out}	500 mW	
Total power dissipation		P_T	550 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	AQV112KL(A)	Condition
Input	LED operate current	Typical	I_{Fon}	0.8 mA	I_L = 100mA
		Maximum		10 mA	
	LED turn off current	Minimum	I_{Foff}	0.3 mA	I_L = 100mA
		Typical		0.7 mA	
	LED dropout voltage	Typical	V_F	1.35 V (1.17 V at I_F = 10 mA)	I_F = 50 mA
		Maximum		1.5 V	
Output	On resistance	Typical	R_{on}	0.55 Ω	I_F = 10 mA I_L = Max.
		Maximum		2.0 Ω	
	Load short circuit detection voltage	Typical	V_{LSHT}	5 V	I_F = 10 mA
		Maximum		7 V	
	Off state leakage current	Maximum	I_{Leak}	1μA	I_F = 0 mA V_L = Max.
Transfer characteristics	Turn on time*	Typical	T_{on}	2.0 ms	I_F = 10 mA I_L = 100 mA V_L = 10 V
		Maximum		5.0 ms	
	Turn off time*	Typical	T_{off}	0.1 ms	I_F = 10 mA I_L = 100 mA V_L = 10 V
		Maximum		1.0 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

*Turn on/Turn off time



RECOMMENDED OPERATING CONDITIONS

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

Item	Symbol	Recommended value	Unit
Input LED current	I_F	10	mA

■ For Dimensions

■ For Schematic and Wiring Diagrams

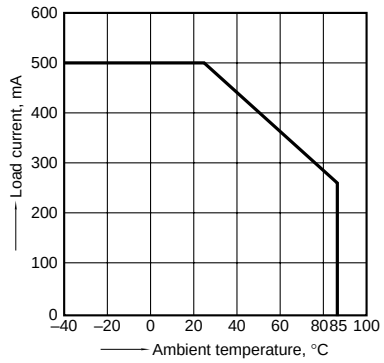
■ For Cautions for Use

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

REFERENCE DATA

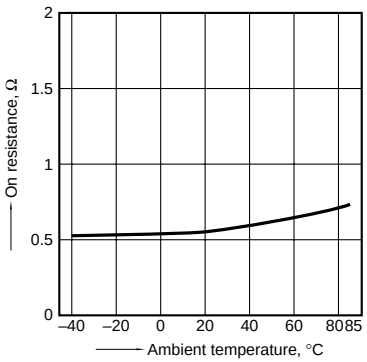
1. Load current vs. ambient temperature characteristics

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



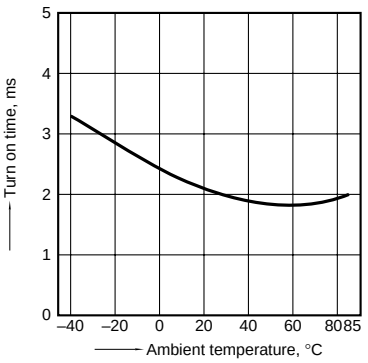
2. On resistance vs. ambient temperature characteristics

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



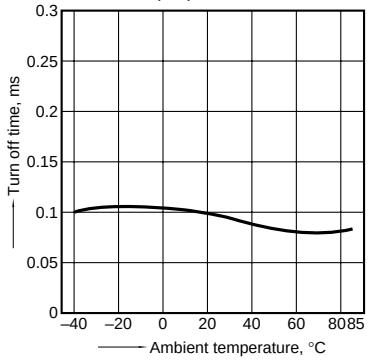
3. Turn on time vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;
LED current: 10 mA; Load voltage: 10V (DC);
Load current: 100 mA

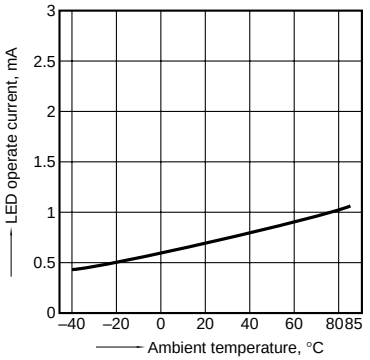


GU 1 Form A Short Circuit Protection (AQV112KL)

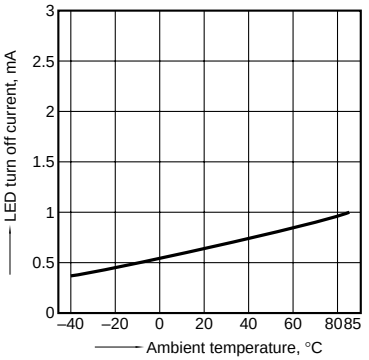
4. Turn off time vs. ambient temperature characteristics
Measured portion: between terminals 4 and 6;
LED current: 10 mA; Load voltage: 10 V (DC);
Load current: 100 mA (DC)



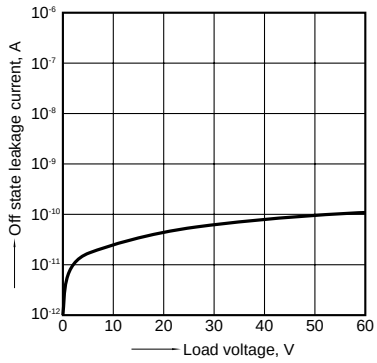
5. LED operate current vs. ambient temperature characteristics
Measured portion: between terminals 4 and 6;
Load current: 100 mA



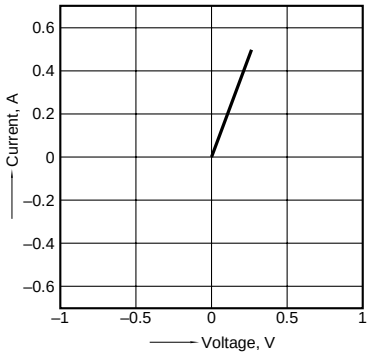
6. LED turn off current vs. ambient temperature characteristics
Measured portion: between terminals 4 and 6;
Load current: 100 mA



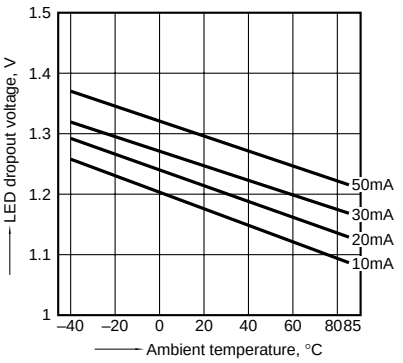
7. Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



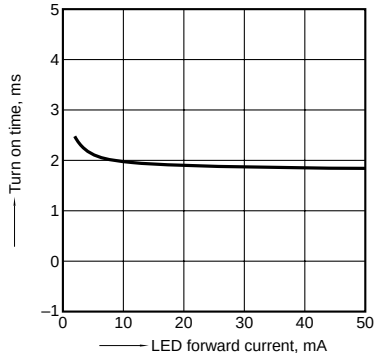
8. Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



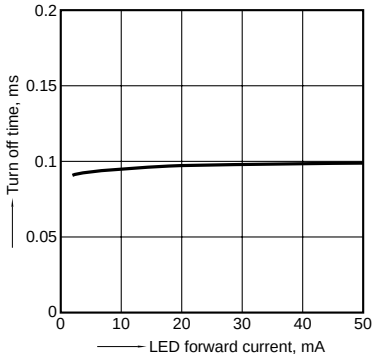
9. LED dropout voltage vs. ambient temperature characteristics
Measured portion: between terminals 1 and 2;
LED current: 10 to 50 mA



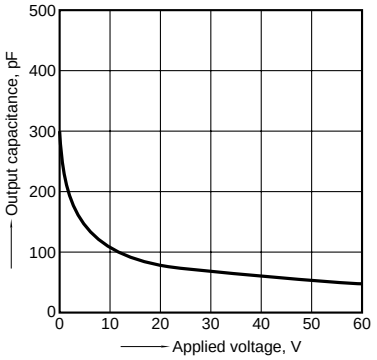
10. Turn on time vs. LED forward current characteristics
Measured portion: between terminals 4 and 6;
Load voltage: 10 V (DC); Load current: 100 mA (DC);
Ambient temperature: 25°C 77°F



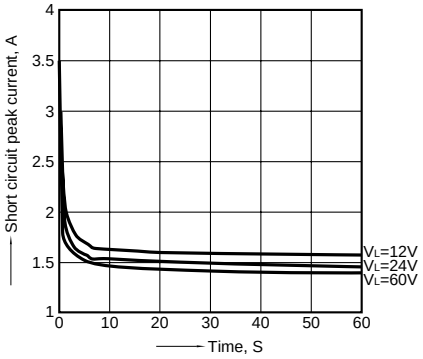
11. Turn off time vs. LED forward current characteristics
Measured portion: between terminals 4 and 6;
Load voltage: 10 V (DC); Load current: 100 mA (DC);
Ambient temperature: 25°C 77°F



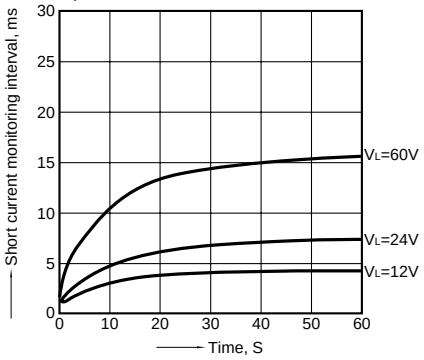
12. Output capacitance vs. applied voltage characteristics
Measured portion: between terminals 4 and 6;
Frequency: 1 MHz; Ambient temperature: 25°C 77°F



13. Short circuit peak current vs. time characteristics
Measured portion: between terminals 4 and 6;
LED current: 10 mA; Load resistance: 0;
Ambient temperature: 25°C 77°F



14. Short current monitoring interval vs. time characteristics
Measured portion: between terminals 4 and 6;
LED current: 10 mA; Load resistance: 0;
Ambient temperature: 25°C 77°F



What is short circuit protection Non-latch type?

If the load current reaches a predetermined overcurrent level, the output-side short circuit protection function cuts off the load current. It then monitors the load current, and if it returns to normal, automatically recovers to normal relay operation.
In order to operate the short circuit protection function, ensure that the input current is at least I_F = 10 mA.

Operation chart (Non-latch type)