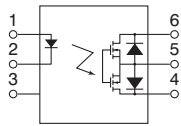
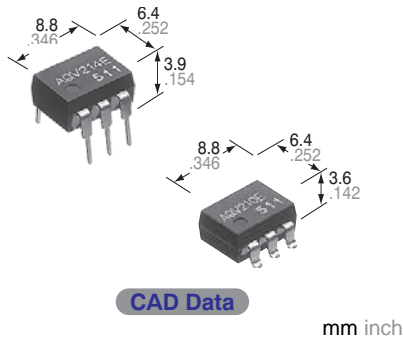


**High cost-performance
DIP6-pin type, reinforced
insulation available**

PhotoMOS Relays
GU-E 1 Form A
(AQV210E, AQV210EH)



FEATURES

- 1. Reinforced insulation of I/O isolation voltage 5,000V (Reinforced insulation type)**
- 2. Controls low-level analog signals**
PhotoMOS relays feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.
- 3. Stable on-resistance**
- 4. Low-level off state leakage current of max. 1 μ A**

TYPICAL APPLICATIONS

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

TYPES

| | I/O isolation | Output rating* | | Package | Part No. | | | | Packing quantity | |
|----------------|------------------------|----------------|--------------|----------|-----------------------|-----------------------------|------------|------------|--|------------|
| | | Load voltage | Load current | | Through hole terminal | Surface-mount terminal | | Tube | Tape and reel | |
| | | | | | | Tape and reel packing style | | | | |
| AC/DC dual use | Standard 1,500 V AC | 350 V | 130 mA | DIP6-pin | AQV210E | AQV210EA | AQV210EAX | AQV210EAZ | 1 tube contains: 50 pcs. 1 batch contains: 500 pcs. | 1,000 pcs. |
| | | 400 V | 120 mA | | AQV214E | AQV214EA | AQV214EAX | AQV214EAZ | | |
| | Reinforced 5,000 V | 350 V | 130 mA | | AQV210EH | AQV210EHA | AQV210EHAX | AQV210EHAZ | | |
| | | 400 V | 120 mA | | AQV214EH | AQV214EHA | AQV214EHAX | AQV214EHAZ | | |

*Indicate the peak AC and 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)

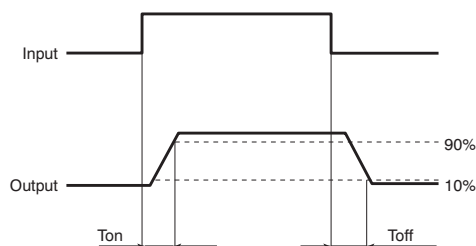
| Item | | Symbol | Type of connection | AQV210E(A) | AQV214E(A) | AQV210EH(A) | AQV214EH(A) | Remarks |
|-------------------------|-------------------------|------------|--------------------|---------------------------------|------------|-------------|-------------|--|
| Input | LED forward current | 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 | | 350 V | 400 V | 350 V | 400 V | |
| | Continuous load current | I_L | A | 0.13 A | 0.12 A | 0.13 A | 0.12 A | A connection: Peak AC, DC B, C connection: DC |
| | | | B | 0.15 A | 0.13 A | 0.15 A | 0.13 A | |
| | | | C | 0.17 A | 0.15 A | 0.17 A | 0.15 A | |
| | Peak load current | I_{peak} | | 0.4 A | 0.3 A | 0.4 A | 0.3 A | A connection: 100 ms (1 shot), $V_L=DC$ |
| Power dissipation | P_{out} | | 500 mW | | | | | |
| Total power dissipation | | P_T | | 550 mW | | | | |
| I/O isolation voltage | | V_{iso} | | 1,500 V AC | | 5,000 V AC | | |
| Temperature limits | Operating | T_{opr} | | -40°C to +85°C -40°F to +185°F | | | | Non-condensing at low temp. |
| | Storage | T_{stg} | | -40°C to +100°C -40°F to +212°F | | | | |

GU-E 1 Form A (AQV210E, AQV210EH)

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

| Item | | Symbol | Type of connection | AQV210E(A) | AQV214E(A) | AQV210EH(A) | AQV214EH(A) | Condition | |
|----------------------------------|----------------------|-------------------|--------------------|--|------------|-------------|-------------|--|--|
| Input | LED operate current | Typical | I _{Fon} | — | 1.1 mA | 1.6 mA | | I _L = Max. | |
| | | Maximum | | | 3 mA | | | | |
| | LED turn off current | Minimum | I _{Foff} | — | 0.3 mA | 0.4 mA | | I _L = Max. | |
| | | Typical | | | 1.0 mA | | | | |
| LED dropout voltage | Typical | V _F | — | 1.25 V (1.14 V at I _F = 5 mA) | | | | I _F = 50 mA | |
| | Maximum | | | 1.5 V | | | | | |
| Output | On resistance | Typical | R _{on} | A | 23 Ω | 30 Ω | 23 Ω | 30 Ω | I _F = 5 mA I _L = Max. Within 1 s on time |
| | | Maximum | | | 35 Ω | 50 Ω | 35 Ω | 50 Ω | |
| | | Typical | R _{on} | B | 11.5 Ω | 22.5 Ω | 11.5 Ω | 22.5 Ω | I _F = 5 mA I _L = Max. Within 1 s on time |
| | | Maximum | | | 17.5 Ω | 25 Ω | 17.5 Ω | 25 Ω | |
| | Typical | R _{on} | C | 6.0 Ω | 11.3 Ω | 6.0 Ω | 11.3 Ω | I _F = 5 mA I _L = Max. Within 1 s on time | |
| | Maximum | | | 8.8 Ω | 12.5 Ω | 8.8 Ω | 12.5 Ω | | |
| Output capacitance | Typical | C _{out} | A | 45 pF | | | | I _F = 0 mA V _B = 0 V f = 1 MHz | |
| Off state leakage current | Maximum | I _{Leak} | — | 1 μA | | | | I _F = 0 mA V _L = Max. | |
| Transfer characteristics | Turn on time* | Typical | T _{on} | — | 0.5 ms | 0.7 ms | | I _F = 0 mA → 5 mA** I _L = Max. | |
| | | Maximum | | | 2.0 ms | | | | |
| | Turn off time* | Typical | T _{off} | — | 0.05 ms | | | I _F = 0 mA → 5 mA I _L = Max. | |
| | | 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 | Standard type: 5 Reinforced type: 5 to 10 | mA |

■ Dimensions

■ Schematic and Wiring Diagrams

■ 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.

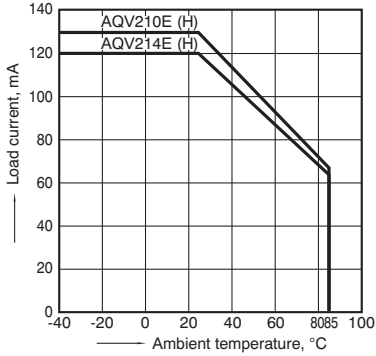
Please refer to our information on [PhotoMOS Relays for Automotive Applications](#).

REFERENCE DATA

1. Load current vs. ambient temperature characteristics

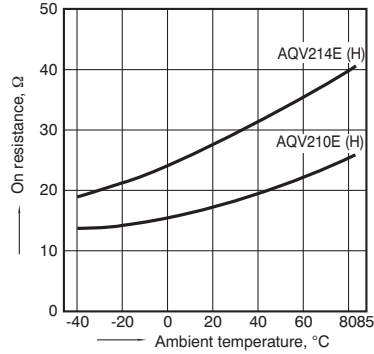
Allowable ambient temperature: -40°C to $+85^{\circ}\text{C}$
 -40°F to $+185^{\circ}\text{F}$

Type of connection: A



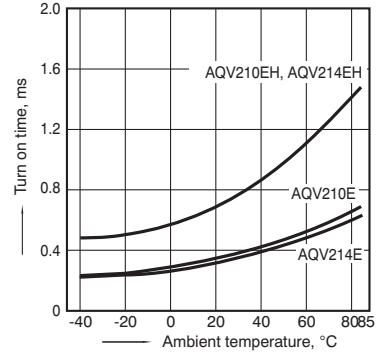
2. On-resistance vs. ambient temperature characteristics

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



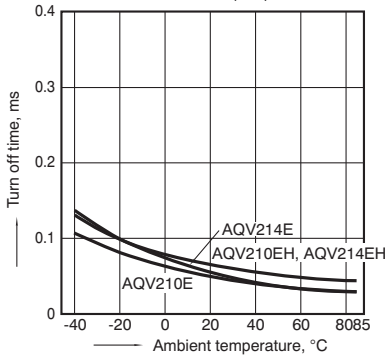
3. Turn on time vs. ambient temperature characteristics

LED current: 5 mA;
 Load voltage: Max. (DC);
 Continuous load current: Max. (DC)



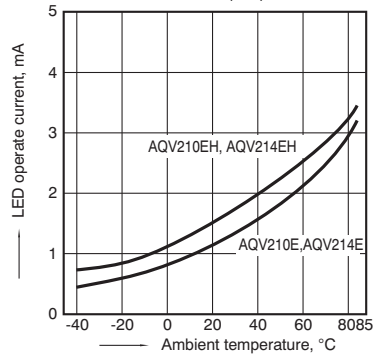
4. Turn off time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: Max. (DC);
 Continuous load current: Max. (DC)



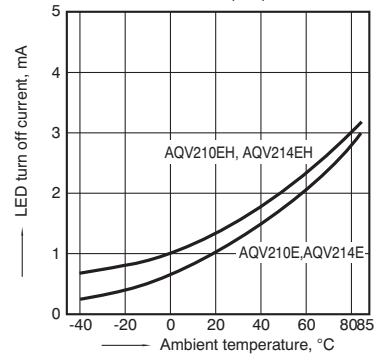
5. LED operate current vs. ambient temperature characteristics

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



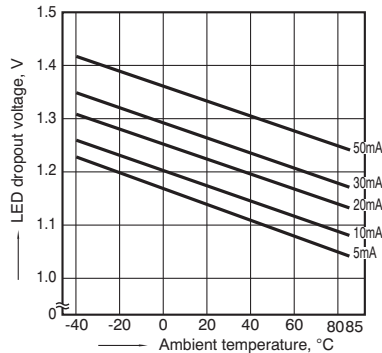
6. LED turn off current vs. ambient temperature characteristics

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



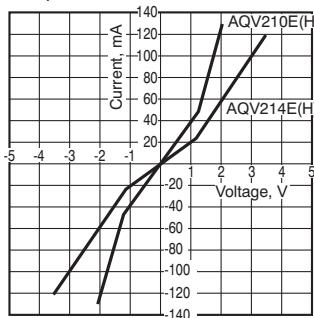
7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types
 LED current: 5 to 50 mA



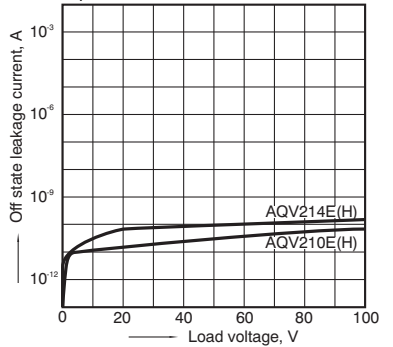
8. Current vs. voltage characteristics of output at MOS portion

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



9. Off state leakage current vs. load voltage characteristics

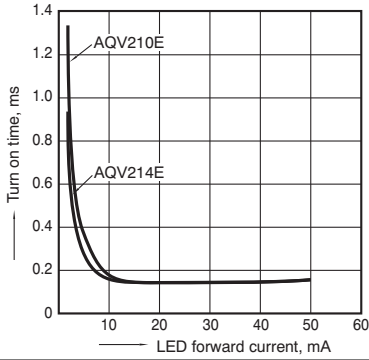
Measured portion: between terminals 4 and 6;
 Ambient temperature: 25°C 77°F



GU-E 1 Form A (AQV210E, AQV210EH)

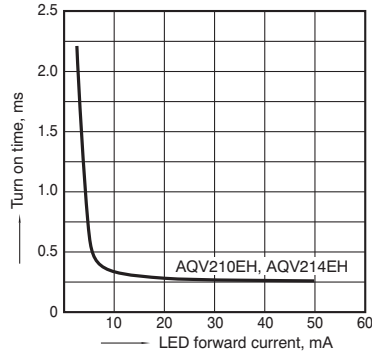
10-(1). Turn on time vs. LED forward current characteristics

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



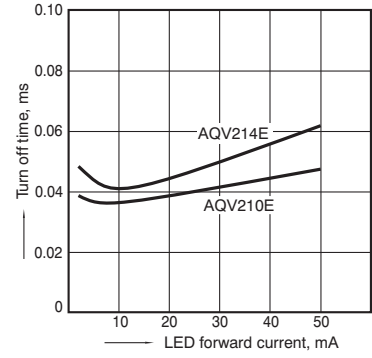
10-(2). Turn on time vs. LED forward current characteristics

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



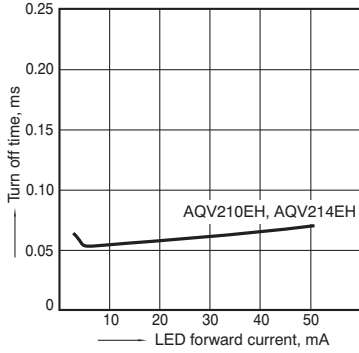
11-(1). Turn off time vs. LED forward current characteristics

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



11-(2). Turn off time vs. LED forward current characteristics

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

