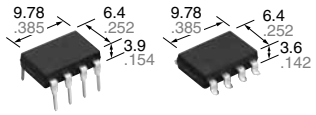
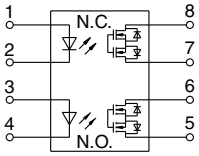
# Both N.O. and N.C. contacts incorporated in a compact DIP8-pin Reinforced insulation

# PhotoMOS® GE 1 Form A & 1 Form B (AQW61❍EH)




(Height includes standoff)

mm inch




**RoHS compliant**

## FEATURES

**1. 60V type couples high capacity (0.5A) with low on-resistance (Typ. 1Ω).**

**2. Reinforced insulation 5,000 V**
More than 0.4 mm internal insulation distance between inputs and outputs. Conforms to EN41003, EN60950 (reinforced insulation).

**3. Approx. 1/2 the space compared with the mounting area of a set of 1 Form A and 1 Form B PhotoMOS**

**4. Applicable for 1 Form A and 1 Form B use as well as two independent 1 Form A and 1 Form B use**

**5. Controls low-level analog signals**
PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.

**6. High sensitivity and high speed response**
Can control max. 0.14 A load current with 5 mA input current. Fast operation speed of Typ. 0.5 ms [N.O.] (AQW610EH).

**7. Low-level off-state leakage current**

## TYPICAL APPLICATIONS

- Power supply
- Measuring instruments
- Security equipment
- Modem
- Telephone equipment
- Electricity, plant equipment
- Sensing equipment

## TYPES

| | I/O isolation voltage | Output rating* | | Package | Part No. | | | | Packing quantity | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Through hole terminal | Surface-mount terminal | | | | |
| | | | | | Tube packing style | | Tape and reel packing style | | Tube | Tape and reel |
| | | Load voltage | Load current | | | | Picked from the 1/2/3/4-pin side | Picked from the 5/6/7/8-pin side | | |
| AC/DC dual use | Reinforced 5,000 Vrms | 60 V | 500 mA | DIP8-pin | AQW612EH | AQW612EHA | AQW612EHAX | AQW612EHAZ | 1 tube contains: 50 pcs. 1 batch contains: 500 pcs. | 1,000 pcs. |
| | | 350 V | 120 mA | | AQW610EH | AQW610EHA | AQW610EHAX | AQW610EHAZ | | |
| | | 400 V | 100 mA | | AQW614EH | AQW614EHA | AQW614EHAX | AQW614EHAZ | | |

*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 device.

## RATING

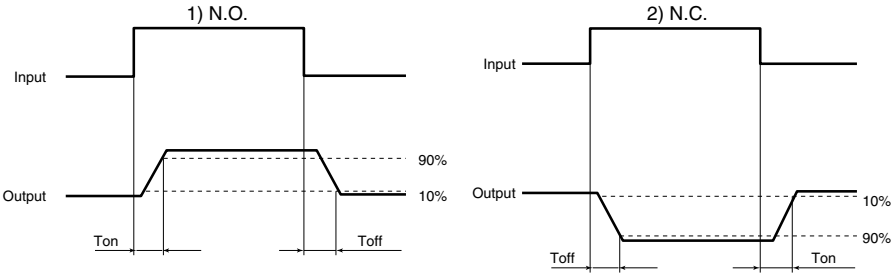
**1. Absolute maximum ratings** (Ambient temperature: 25°C 77°F)

| Item | | Symbol | AQW612EH(A) | AQW610EH(A) | AQW614EH(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) | $V_L$ | 60 V | 350 V | 400 V | |
| | Continuous load current | $I_L$ | 0.5 A (0.6 A) | 0.12 A (0.14 A) | 0.1 A (0.13 A) | Peak AC, DC ( ): in case of using only 1a or 1b, 1 channel |
| | Peak load current | $I_{peak}$ | 1.5 A | 0.36 A | 0.3 A | 100 ms (1 shot), $V_L$= DC |
| | Power dissipation | $P_{out}$ | 800 mW | | | |
| Total power dissipation | | $P_T$ | 850 mW | | | |
| I/O isolation voltage | | $V_{iso}$ | 5,000 Vrms | | | |
| Ambient temperature | Operating | $T_{opr}$ | –40 to +85°C –40 to +185°F | | | (Non-icing at low temperatures) |
| | Storage | $T_{stg}$ | –40 to +100°C –40 to +212°F | | | |

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

| Item | | | Symbol | AQW612EH(A) | AQW610EH(A) | AQW614EH(A) | Condition |
|---|---|---|---|---|---|---|---|
| Input | LED operate current | Typical | $I_{Fon}$(N.O.) $I_{Foff}$(N.C.) | 1.4 mA | | | $I_L$=Max. |
| | | Maximum | | 3.0 mA | | | |
| | LED reverse current | Minimum | $I_{Foff}$(N.O.) $I_{Fon}$(N.C.) | 0.4 mA | | | $I_L$=Max. |
| | | Typical | | 1.3 mA | | | |
| | LED dropout voltage | Typical | $V_F$ | 1.25 (1.14 V at $I_F$ = 5 mA) | | | $I_F$=50 mA |
| | | Maximum | | 1.5 V | | | |
| Output | On resistance | Typical | $R_{on}$ | 1Ω | 18Ω | 26Ω | $I_F$=5mA (N.O.) $I_F$ = 0mA (N.C.) $I_L$ = Max. Within 1 s |
| | | Maximum | | 2.5Ω | 25Ω | 35Ω | |
| | Off state leakage current | Maximum | $I_{Leak}$ | 1μA (N.O.), 10μA (N.C.) | | | $I_F$=0 mA (N.O.) $I_F$ = 5 mA (N.C.) $V_L$ = Max. |
| Transfer characteristics | Operate time* | Typical | $T_{on}$(N.O.) $T_{off}$(N.C.) | 1.0 ms (N.O.) 3.0 ms (N.C.) | 0.5 ms (N.O.) 1.0 ms (N.C.) | 0.5 ms (N.O.) 0.8 ms (N.C.) | $I_F$ = 0 mA → 5 mA $I_L$ = Max. |
| | | Maximum | | 4.0 ms (N.O.) 10.0 ms (N.C.) | 3.0 ms | | |
| | Reverse time* | Typical | $T_{off}$(N.O.) $T_{on}$(N.C.) | 0.05ms (N.O.), 0.2ms (N.C.) | 0.08ms (N.O.), 0.3ms (N.C.) | 0.08ms (N.O.), 0.2ms (N.C.) | $I_F$ = 5 mA → 0 mA $I_L$ = Max. |
| | | Maximum | | 1.0ms | | | |
| | I/O capacitance | Typical | $C_{iso}$ | 0.8 pF | | | f = 1MHz $V_B$ = 0 V |
| | | Maximum | | 1.5 pF | | | |
| | Initial I/O isolation resistance | Minimum | $R_{iso}$ | 1,000MΩ | | | 500 V DC |

*Operate/Reverse time




**3. Recommended operating conditions** (Ambient temperature: 25°C 77°F)

Please use under recommended operating conditions to obtain expected characteristics.

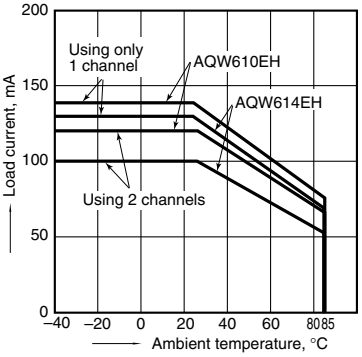
| Item | | Symbol | Number of used channels | Min. | Max. | Unit |
|---|---|---|---|---|---|---|
| LED current | | $I_F$ | | 5 | 30 | mA |
| AQW612EH(A) | Load voltage (Peak AC) | $V_L$ | | — | 48 | V |
| | Continuous load current | $I_L$ | 1ch<br>2ch | — | 0.6<br>0.5 | A |
| AQW610EH(A) | Load voltage (Peak AC) | $V_L$ | | — | 280 | V |
| | Continuous load current | $I_L$ | 1ch<br>2ch | — | 0.14<br>0.12 | A |
| AQW614EH(A) | Load voltage (Peak AC) | $V_L$ | | — | 320 | V |
| | Continuous load current | $I_L$ | 1ch<br>2ch | — | 0.13<br>0.1 | A |

■ **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

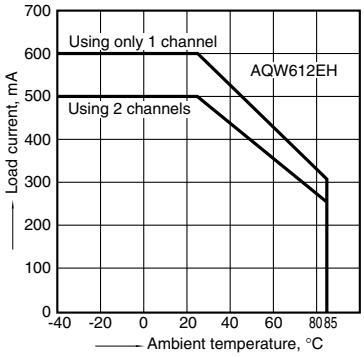
1-(1). Load current vs. ambient temperature characteristics

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



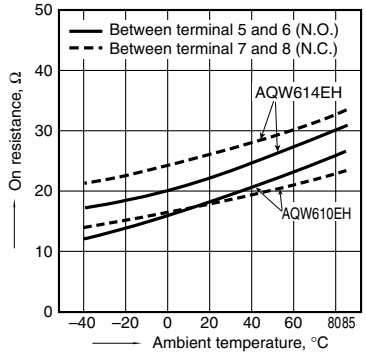

1-(2). Load current vs. ambient temperature characteristics

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



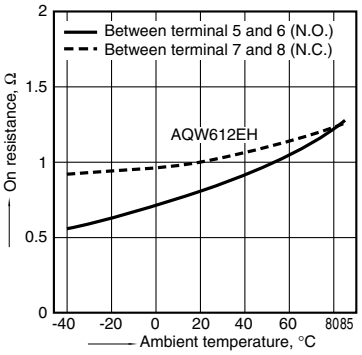

2-(1). On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
LED current: 5 mA; Load voltage; Max. (DC)
Continuous load current: Max. (DC)



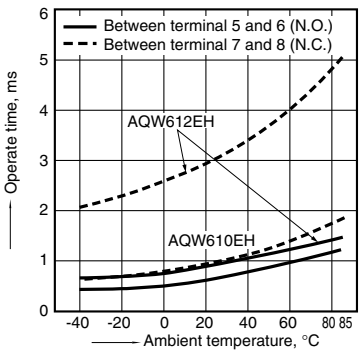

2-(2). On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
LED current: 5 mA; Load voltage; Max. (DC)
Continuous load current: Max. (DC)



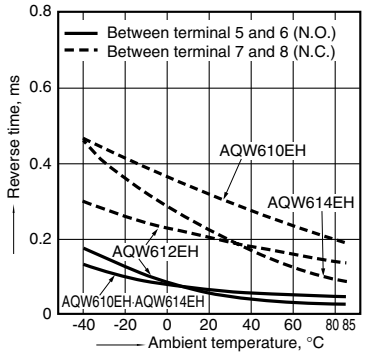

3. Operate time vs. ambient temperature characteristics

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



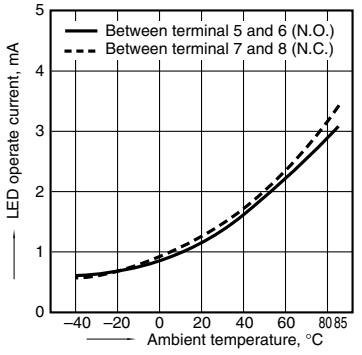

4. Reverse time vs. ambient temperature characteristics

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



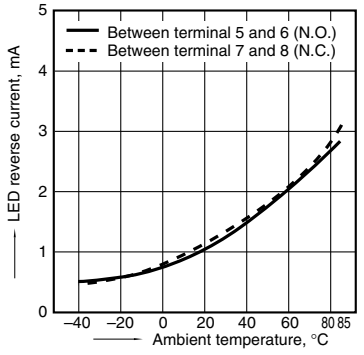

5. LED operate current vs. ambient temperature characteristics

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



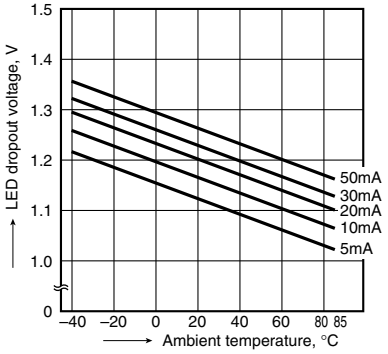

6. LED reverse current vs. ambient temperature characteristics

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



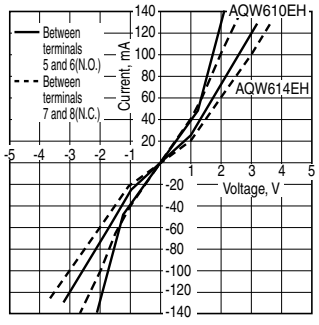

7. LED dropout voltage vs. ambient temperature characteristics

Sample: All types;
LED current: 5 to 50 mA



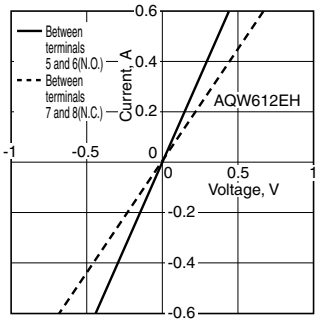

8-(1). Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



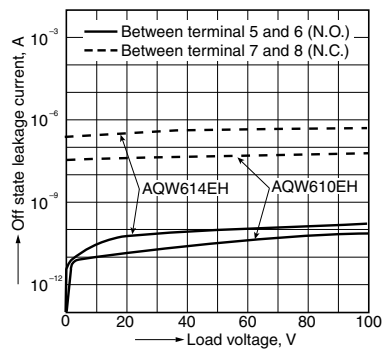

8-(2). Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



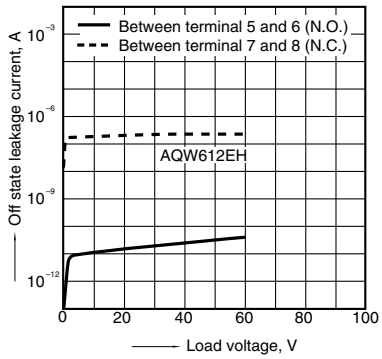

9-(1). Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



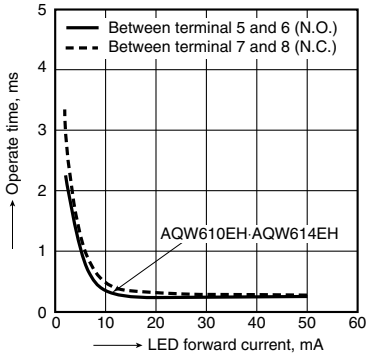
9-(2). Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
Ambient temperature: 25°C 77°F



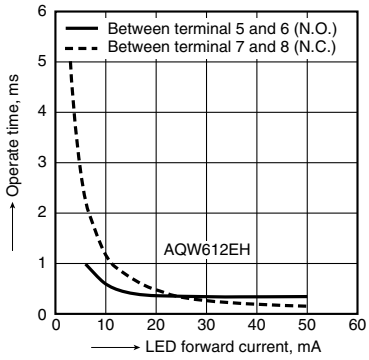

10-(1). Operate time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



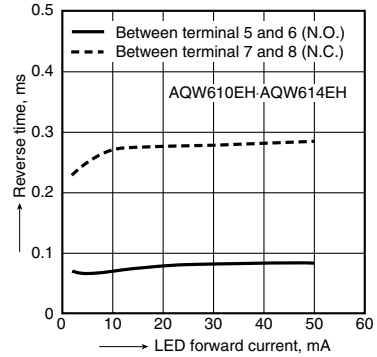

10-(2). Operate time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



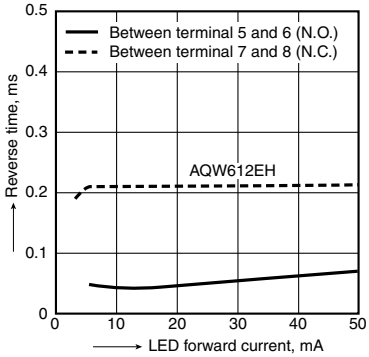

11-(1). Reverse time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



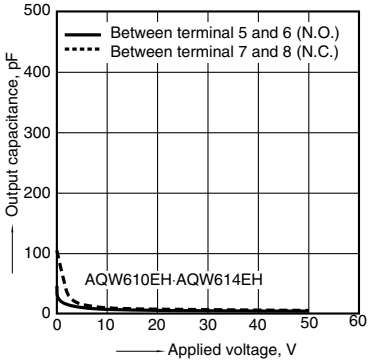

11-(2). Reverse time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



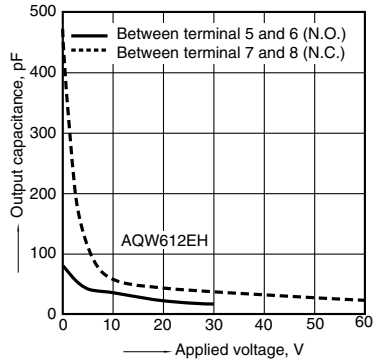

12-(1). Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
Frequency: 1 MHz;
Ambient temperature: 25°C 77°F




12-(2). Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 5 and 6, 7 and 8;
Frequency: 1 MHz;
Ambient temperature: 25°C 77°F



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