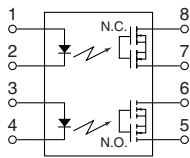
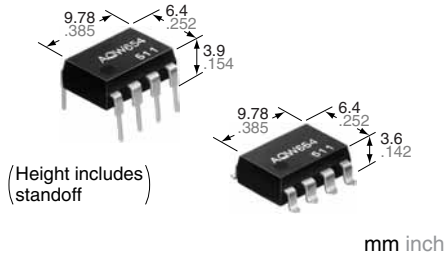


# Panasonic

ideas for life

Both 1 Form A and 1 Form B contacts incorporated in a compact DIP8-pin with low on-resistance

PhotoMOS<sup>®</sup>  
HE Form A & B  
(AQW654)



RoHS compliant

## FEATURES

- Applicable for 1 Form A 1 Form B use as well as two independent 1 Form A and 1 Form B use**
- Controls low-level analog signals**  
PhotoMOS feature extremely low closed-circuit offset voltage to enable control of low-level analog signals without distortion.
- High sensitivity and low on-resistance**  
Can control max. 0.16 A load current with 5 mA input current. Low on-resistance of max. 11 Ω.
- Low-level off state leakage current of max. 1 μA**

## TYPICAL APPLICATIONS

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

## 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 1/2/3/4-pin side | Picked from the 5/6/7/8-pin side |          |  |               |
| AC/DC dual use | 400 V          | 120 mA       | DIP8-pin | AQW654                | AQW654A                          | AQW654AX                         | AQW654AZ | 1 tube contains: 50 pcs.<br>1 batch contains: 500 pcs. | 1,000 pcs     |

\*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)

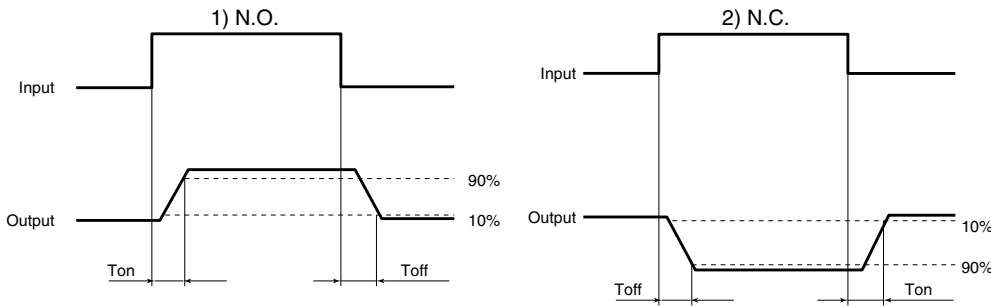
|                         | Item                    | Symbol            | AQW654(A)                       | Remarks  |
|-------------------------|-------------------------|-------------------|---------------------------------|--|
| Input                   | LED forward current     | I <sub>F</sub>    | 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>    | 400 V                           |  |
|                         | Continuous load current | I <sub>L</sub>    | 0.12A (0.16 A)                  | Peak AC, DC<br>( ) : in case of using only 1 channel |
|                         | Peak load current       | I <sub>peak</sub> | 0.36 A                          | A connection: 100 ms (1 shot), V <sub>L</sub> = DC   |
|                         | Power dissipation       | P <sub>out</sub>  | 800 mW                          |  |
| Total power dissipation |                         | P <sub>T</sub>    | 850 mW                          |  |
| I/O isolation voltage   |                         | V <sub>iso</sub>  | 1,500 V AC                      | Between input and output/between contact sets        |
| 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 Form A & B (AQW654)

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

| Item                             |                           | Symbol    | AQW654(A)                       | Remarks                       |
|----------------------------------|---------------------------|-----------|---------------------------------|-------------------------------|
| Input                            | LED operate current       | Typical   | $I_{Fon}$ (N.O.)                | 0.9 mA                        |
|                                  |                           | Maximum   | $I_{Foff}$ (N.C.)               | 3 mA                          |
|                                  | LED reverse current       | Minimum   | $I_{Foff}$ (N.O.)               | 0.4 mA                        |
|                                  |                           | Typical   | $I_{Fon}$ (N.C.)                | 0.8 mA                        |
| LED dropout voltage              | Typical                   | $V_F$     | 1.25 V (1.14 V at $I_F = 5$ mA) |                               |
|                                  | Maximum                   |           | 1.5 V                           | $I_F = 50$ mA                 |
| Output                           | On resistance             | Typical   | $R_{on}$                        | 11 $\Omega$                   |
|                                  |                           | Maximum   |                                 | 16 $\Omega$                   |
|                                  | Off state leakage current | Maximum   | $I_{Leak}$                      | 1 $\mu$ A                     |
| Transfer characteristics         | Operate time*             | Typical   | $T_{on}$ (N.O.)                 | 0.8 ms (N.O.) 1.2 ms (N.C.)   |
|                                  |                           | Maximum   | $T_{off}$ (N.C.)                | 2 ms                          |
|                                  | Reverse time*             | Typical   | $T_{off}$ (N.O.)                | 0.04 ms (N.O.) 0.36 ms (N.C.) |
|                                  |                           | Maximum   | $T_{on}$ (N.C.)                 | 1 ms                          |
|                                  | I/O capacitance           | Typical   | $C_{iso}$                       | 0.8 pF                        |
| Maximum                          |                           | 1.5 pF    |                                 |                               |
| Initial I/O isolation resistance | Minimum                   | $R_{iso}$ | 1,000 M $\Omega$                | 500 V DC                      |

\*Operate/Reverse time



## RECOMMENDED OPERATING CONDITIONS

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

| Item              | Symbol | Recommended value | Unit |
|-------------------|--------|-------------------|------|
| Input LED current | $I_F$  | 5                 | 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 Corporation technical representative.

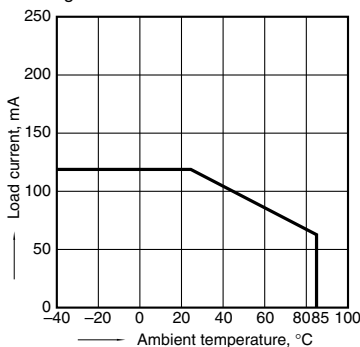
For more information.

## REFERENCE DATA

1. Load current vs. ambient temperature characteristics

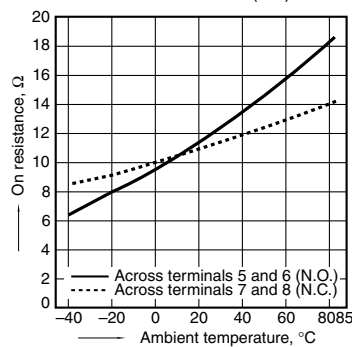
Allowable ambient temperature: -40°C to +85°C  
-40°F to +185°F

When using 2 channels



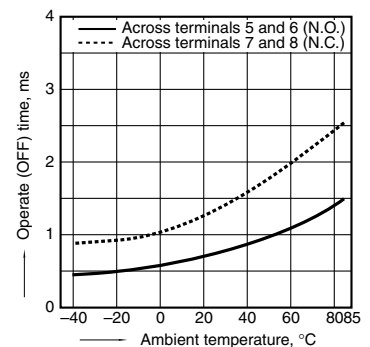
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8; LED current: 5 mA; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC)



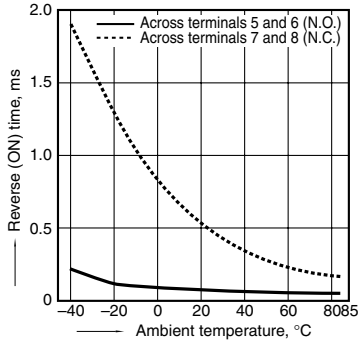
3. Operate time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: 400 V (DC); Continuous load current: 120 mA (DC)



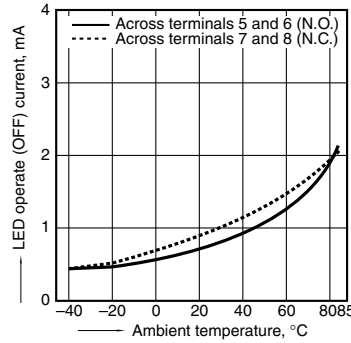
## 4. Reverse time vs. ambient temperature characteristics

LED current: 5 mA;  
Load voltage: 400 V (DC);  
Continuous load current: 120 mA (DC)



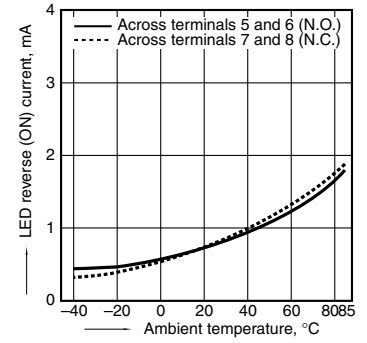
## 5. LED operate current vs. ambient temperature characteristics

Load voltage: 400 V (DC);  
Continuous load current: 120 mA (DC)



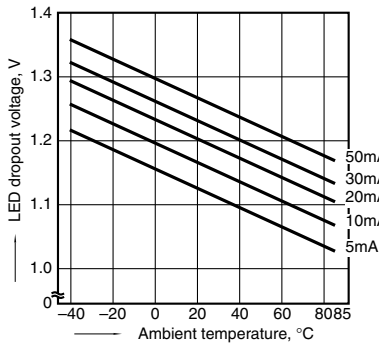
## 6. LED reverse current vs. ambient temperature characteristics

Load voltage: 400 V (DC);  
Continuous load current: 120 mA (DC)



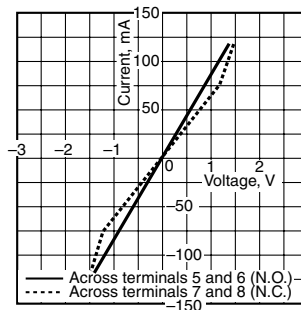
## 7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



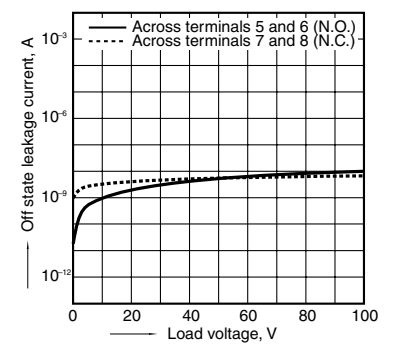
## 8. Current vs. voltage characteristics of output at MOS portion

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



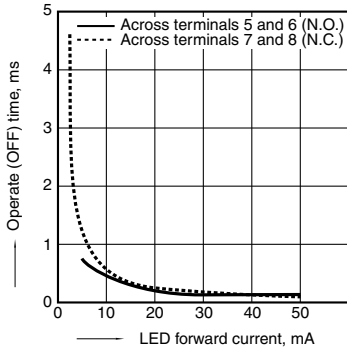
## 9. Off state leakage current vs. load voltage characteristics

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



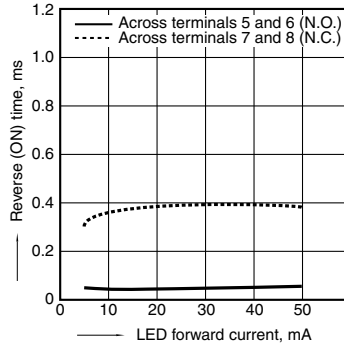
## 10. Operate time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8;  
Load voltage: 400 V (DC); Continuous load current:  
120 mA (DC); Ambient temperature: 25°C 77°F



## 11. Reverse time vs. LED forward current characteristics

Measured portion: between terminals 5 and 6, 7 and 8;  
Load voltage: 400 V (DC); Continuous load current:  
120 mA (DC); Ambient temperature: 25°C 77°F



## 12. 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

