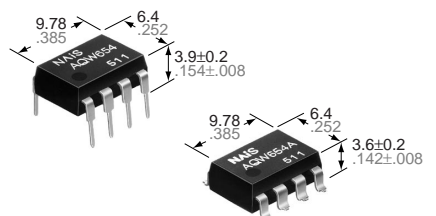


NAIS

HE (High-function Economy) Type [2-Channel (Form A Form B) Type]

PhotoMOS RELAYS



mm inch

FEATURES

1. Compact 8-pin DIP size

The device comes in a compact (W) 6.4×(L) 9.78×(H) 3.9 m (W) .252×(L) .385×(H) .154 inch, 8-pin DIP size (through hole terminal type).

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

3. Controls low-level analog signals

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

4. High sensitivity, low ON resistance

Can control a maximum 0.16 A (AQW654) load current with a 5 mA input current. Low ON resistance of 16 Ω (AQW654). Stable operation because there are no metallic contact parts.

5. Low-level off state leakage current

The SSR has an off state leakage current of several milliamperes, whereas the PhotoMOS relay has only 100 pA even with the rated load voltage of 400 V (AQW654).

6. Low thermal electromotive force (Approx. 1 μV)

TYPICAL APPLICATIONS

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

TYPES

| Type | Output rating* | | 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 | | | |
| AC/DC | 400 V | 120 mA | AQW654 | AQW654A | AQW654AX | AQW654AZ | 1 tube contains 40 pcs. 1 batch contains 400 pcs. | 1,000 pcs |

*Indicate the peak AC and DC values.

Note: For space reasons, the package type indicator "X" and "Z" are omitted from the seal.

RATING

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

| | Item | Symbol | AQW654(A) | Remarks |
|-------------------------|-------------------------|-------------------|---------------------------------|--|
| Input | LED forward current | I _F | 50 mA | |
| | LED reverse voltage | V _R | 3 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 | 400 V | |
| | Continuous load current | I _L | 0.12A (0.16 A) | Peak AC, DC (): in case of using only 1 channel) |
| | Peak load current | I _{peak} | 0.36 A | A connection: 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} | 1,500 V AC | Between input and output/between contact sets |
| 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 | |

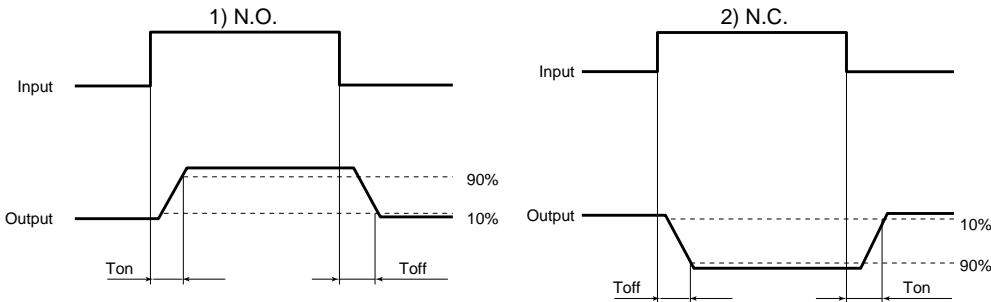
AQW654

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

| Item | | Symbol | AQW654(A) | Remarks | |
|----------------------------------|---------------------------|---------------------|---------------------------------------|--|---|
| Input | LED operate (OFF) current | Typical | I_{Fon} (N.O.) | 0.9 mA | |
| | | Maximum | I_{Foff} (N.C.) | 3 mA | |
| | LED reverse (ON) current | Minimum | I_{Foff} (N.O.) | 0.4 mA | |
| | | Typical | I_{Fon} (N.C.) | 0.8 mA | |
| LED dropout voltage | Typical | V_F | 1.14 V (1.25 V at $I_F = 50$ mA) | | |
| | Maximum | | 1.5 V | | |
| Output | On resistance | Typical | 10 Ω (N.O.) 11 Ω (N.C.) | | |
| | | Maximum | 16 Ω (N.O.) 16 Ω (N.C.) | | |
| | Off state leakage current | Maximum | I_{Leak} | 1 μ A | $I_F = 0$ mA (N.O.) $I_F = 5$ mA (N.C.) $V_L = 400$ V |
| Transfer characteristics | Switching speed | Operate (OFF) time* | Typical | T_{on} (N.O.) 0.8 ms (N.O.) 1.2 ms (N.C.) | |
| | | | Maximum | T_{off} (N.C.) 2 ms | |
| | | Reverse (ON) 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 | $f = 1$ MHz |
| Initial I/O isolation resistance | Maximum | | 1.5 pF | $V_B = 0$ | |
| | Minimum | R_{iso} | 1,000 M Ω | 500 V DC | |

Note: Recommendable LED forward current $I_F = 5$ mA.

*Operate/Reverse time

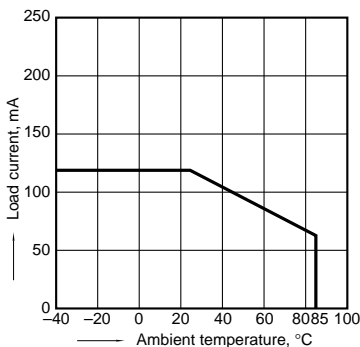


- For Dimensions, see Page 440.
- For Schematic and Wiring Diagrams, see Page 445.
- For Cautions for Use, see Page 449.

REFERENCE DATA

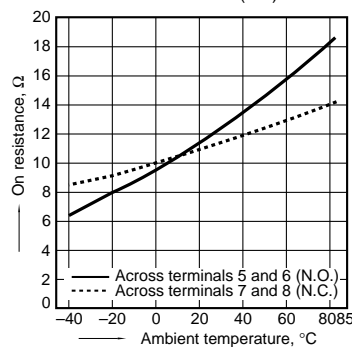
1. Load current vs. ambient temperature characteristics

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



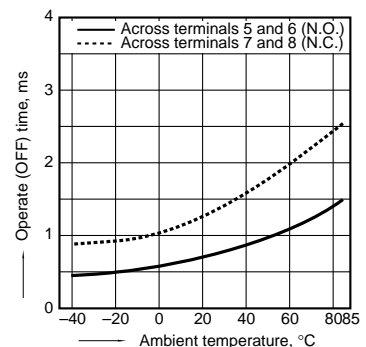
2. On resistance vs. ambient temperature characteristics

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



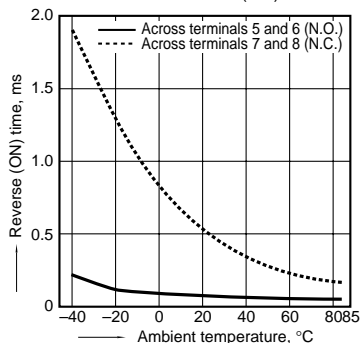
3. Operate (OFF) time vs. ambient temperature characteristics

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



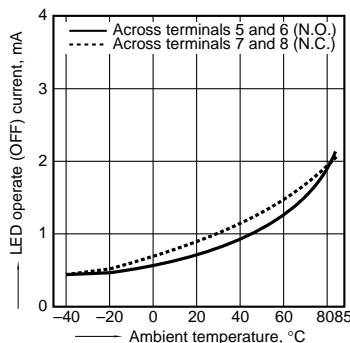
4. Reverse (ON) time vs. ambient temperature characteristics

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



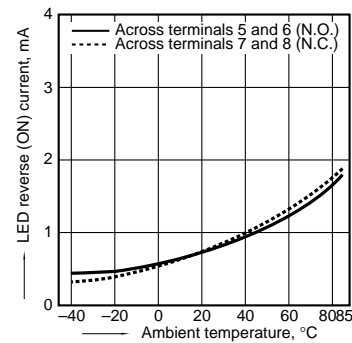
5. LED operate (OFF) current vs. ambient temperature characteristics

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



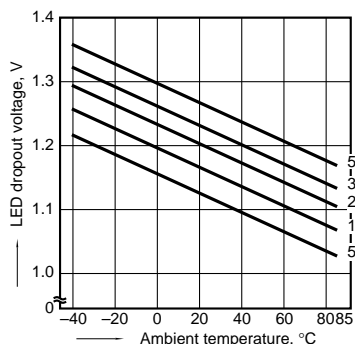
6. LED reverse (ON) current vs. ambient temperature characteristics

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



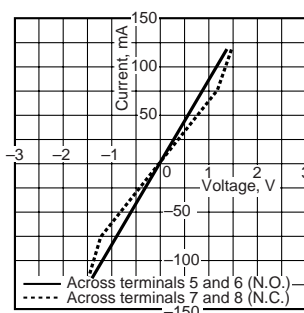
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



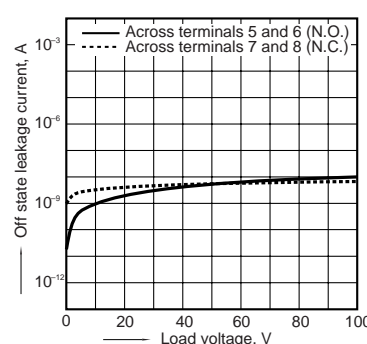
8. Voltage vs. current characteristics of output at MOS portion

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



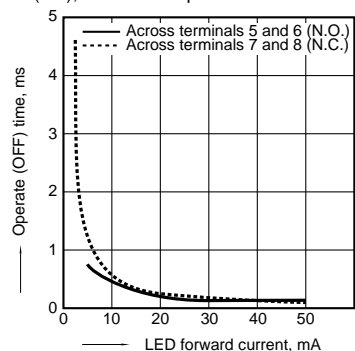
9. Off state leakage current

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



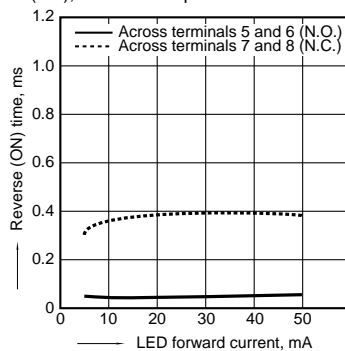
10. LED forward current vs. operate (OFF) time characteristics

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. LED forward current vs. reverse (ON) time 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. Applied voltage vs. output capacitance characteristics

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

