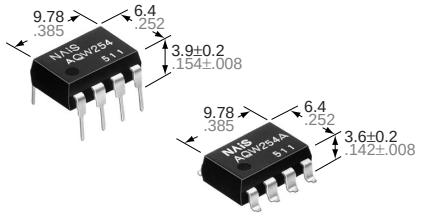
# NAiS

## HE (High-function Economy) Type [2-Channel (Form A) 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 mm (W) .252×(L) .385×(H) .154 inch , 8-pin DIP size (through hole terminal type).

**2. Applicable for 2 Form A use as well as two independent 1 Form A 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 (AQW254) load current with a 5 mA input current. Low ON resistance of 16 Ω (AQW254). 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 miliamperes, whereas the PhotoMOS relay has only 100 pA even with the rated load voltage of 400 V (AQW254).

**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 | | | | |
| | Load voltage | Load current | Tube packing style | | Tape and reel packing style | | Tube | Tape and reel |
| | | | | | Picked from the 1/2/3/4-pin side | Picked from the 5/6/7/8-pin side | | |
| AC/DC | 400 V | 120 mA | AQW254 | AQW254A | AQW254AX | AQW254AZ | 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)

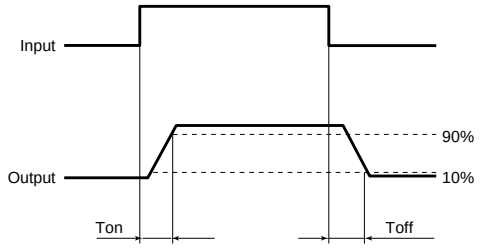
| Item | | Symbol | AQW254(A) | Remarks |
|---|---|---|---|---|
| Input | LED forward current | $I_F$ | 50 mA | |
| | LED reverse voltage | $V_R$ | 3 V | |
| | Peak forward current | $I_{FP}$ | 1 A | f = 100 Hz, Duty factor = 0.1% |
| | Power dissipation | $P_{in}$ | 75 mW | |
| Output | Load voltage (peak AC) | $V_L$ | 400 V | |
| | Continuous load current | $I_L$ | 0.12 A (0.16 A) | A connection: 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 | |

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

| Item | | | | Symbol | AQW254(A) | Condition |
|---|---|---|---|---|---|---|
| Input | LED operate current | | Typical | $I_{Fon}$ | 0.9 mA | $I_L$= Max. |
| | | | Maximum | | 3 mA | |
| | LED turn off current | | Minimum | $I_{Foff}$ | 0.4 mA | $I_L$= Max. |
| | | | Typical | | 0.8 mA | |
| | LED dropout voltage | | Typical | $V_F$ | 1.14 V (1.25 V at $I_F$ = 50 mA) | $I_F$ = 5 mA |
| | | | Maximum | | 1.5 V | |
| Output | On resistance | | Typical | $R_{on}$ | 12.4 Ω | $I_F$ = 5 mA<br>$I_L$ = Max.<br>Within 1 s on time |
| | | | Maximum | | 16 Ω | |
| | Off state leakage current | | Maximum | $I_{Leak}$ | 1 μA | $I_F$ = 0 mA<br>$V_L$ = Max. |
| Transfer characteristics | Switching speed | Turn on time* | Typical | $T_{on}$ | 0.8 ms | $I_F$ = 5 mA<br>$I_L$ = Max. |
| | | | Maximum | | 2 ms | |
| | | Turn off time* | Typical | $T_{off}$ | 0.05 ms | $I_F$ = 5 mA<br>$I_L$ = Max. |
| | | | Maximum | | 0.2 ms | |
| | I/O capacitance | | Typical | $C_{iso}$ | 0.8 pF | f = 1 MHz<br>$V_B$ = 0 |
| | | | Maximum | | 1.5 pF | |
| | Initial I/O isolation resistance | | Minimum | $R_{iso}$ | 1,000 MΩ | 500 V DC |

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

*Turn on/Turn off time

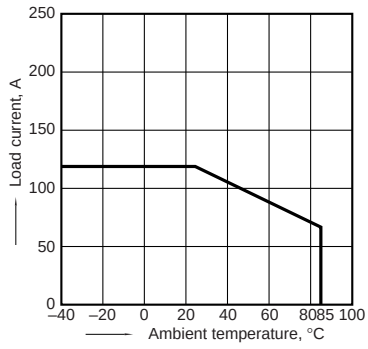



■ **For Dimensions, see Page 440.**
■ **For Schematic and Wiring Diagrams, see Page 445.**
■ **For Cautions for Use, see Page 449.**

## REFERENCE DATA

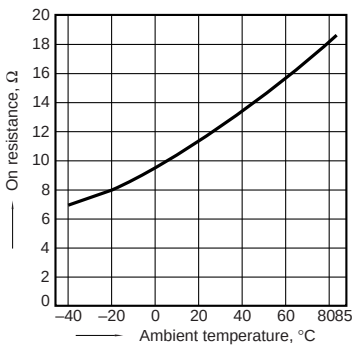
1. Load current vs. ambient temperature characteristics

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



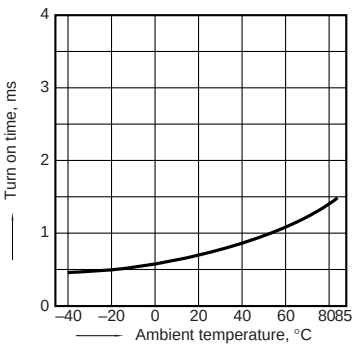

2. On resistance vs. ambient temperature characteristics

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)



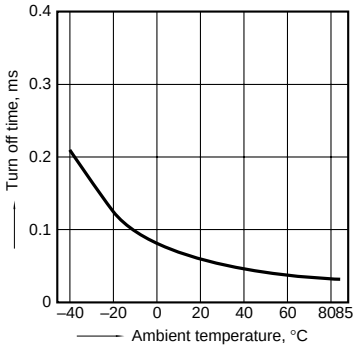

3. Turn on time vs. ambient temperature characteristics

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



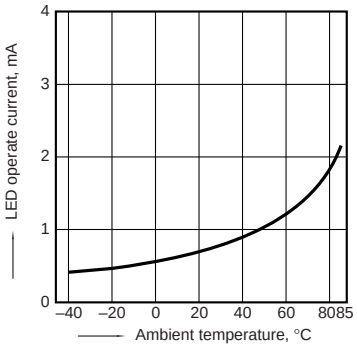
4. Turn off time vs. ambient temperature characteristics

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



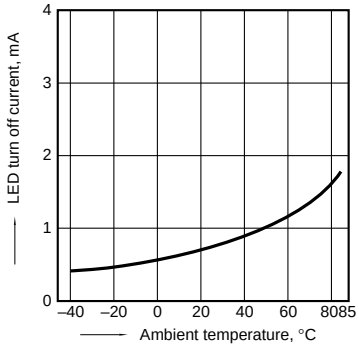

5. LED operate current vs. ambient temperature characteristics

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



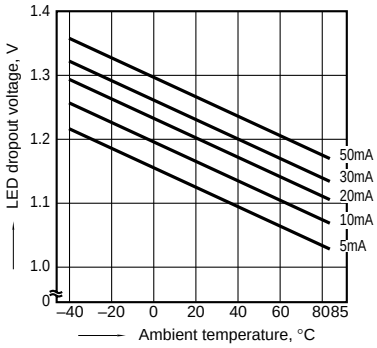

6. LED turn off current vs. ambient temperature characteristics

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



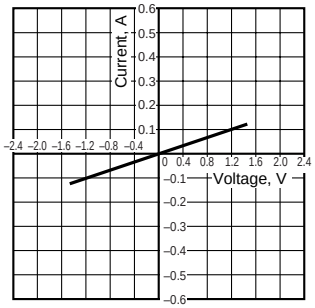

7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



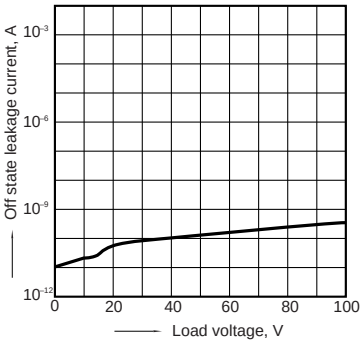

8. Voltage vs. current characteristics of output at MOS portion

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



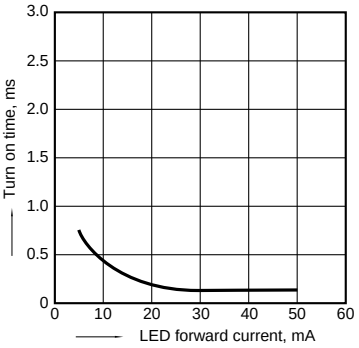

9. Off state leakage current

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



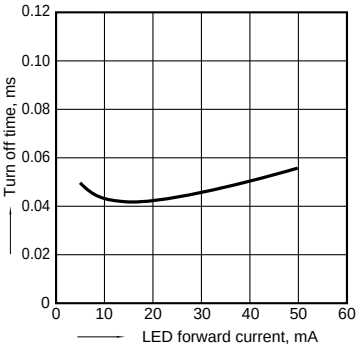

10. LED forward current vs. turn on time characteristics

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



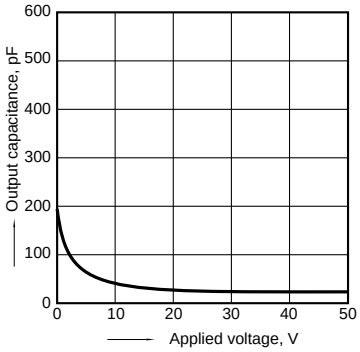

11. LED forward current vs. turn off time characteristics

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




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






**Go To Online Catalog**