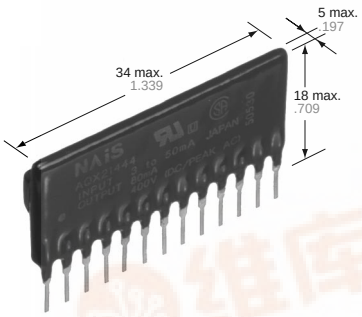
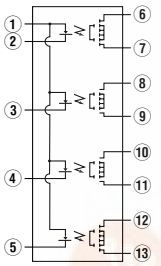
NAiS

# GU (General Use) Type [Multi-Channel (4-Channel) Type]

# PhotoMOS RELAYS




mm inch



① Input Common: DC+
② Input 1: DC–
③ Input 2: DC–
④ Input 3: DC–
⑤ Input 4: DC–
⑥ Output 1 (N.O.): DC or AC
⑦ Output 1 (N.O.): DC or AC
⑧ Output 2 (N.O.): DC or AC
⑨ Output 2 (N.O.): DC or AC
⑩ Output 3 (N.O.): DC or AC
⑪ Output 3 (N.O.): DC or AC
⑫ Output 4 (N.O.): DC or AC
⑬ Output 4 (N.O.): DC or AC

## FEATURES

**1. 4-circuit (4-Form A) of GU**
PhotoMOS Relay in a compact and slim 13 pin SIL

**2. Applicable for 4 Form A use, as well as 4 independent 1 Form A**

**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. Low-level off state leakage current (Typical 100 pA at 100 V load voltage)**

**5. Optical coupling for extremely high isolation**

**6. Eliminates the need for a counter electromotive protection diode in the drive circuit on the input side**

**7. PC board layout is simplified**

**8. Eliminates the need for a separate power supply to drive the power MOS-FET**

**9. Low thermal electromotive force (Approx. 1 μV)**

**10. No restriction on mounting direction**

**11. No arc, no bounce, no noise**

## TYPICAL APPLICATIONS

• Telecommunication equipment
• High speed inspection machine, Scanner, IC checker
• Robots

## TYPES

| | Output rating* | | Part No. | Packing quantity | |
|---|---|---|---|---|---|
| | Load voltage | Load current | | Inner case | Outer carton |
| AC/DC type | 400 V | 80 mA | AQX21444 | 20 pcs. | 200 pcs. |

*Indicate the peak AC and DC values.

## RATINGS

**1. AC/DC type**

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

| Item | | Symbol | AQX21444 | 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 | $I_L$ | 80 mA (100 mA) | ( ): in case of using only 1 channel Peak AC, DC |
| | Peak load current | $I_{peak}$ | 0.3 A | 100 ms (1 shot), $V_L$ = DC |
| | Power dissipation | $P_{out}$ | 1,450 mW | |
| Total power dissipation | | $P_T$ | 1,500 mW | |
| I/O isolation voltage | | $V_{iso}$ | 1,500 V AC | |
| 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 | |

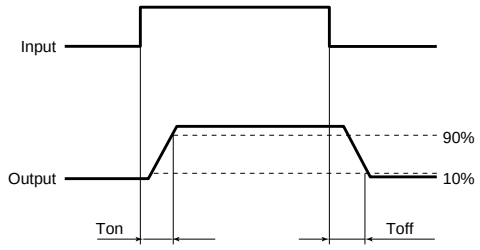
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

| Item | | | | Symbol | AQX21444 | Condition |
|---|---|---|---|---|---|---|
| Input | LED operate current | | Typical | $I_{Fon}$ | 1.1 mA | $I_L$ = 80 mA |
| | | | Maximum | | 3 mA | |
| | LED turn off current | | Minimum | $I_{Foff}$ | 0.4 mA | $I_L$ = 80 mA |
| | | | Typical | | 1.0 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 | $R_{on}$ | 30 Ω | $I_F$ = 5 mA<br>$I_L$ = 80 mA<br>Within 1 s on time |
| | | | Maximum | | 50 Ω | |
| | Off state leakage current | | Maximum | $I_{Leak}$ | 1 μA | $I_F$ = 0 mA<br>$V_L$ = 400 V |
| Transfer characteristics | Switching speed | Turn on time* | Typical | $T_{on}$ | 0.52 ms | $I_F$ = 5 mA<br>$I_L$ = 80 mA |
| | | | Maximum | | 2 ms | |
| | | | Typical | | 0.29 ms | $I_F$ = 10 mA<br>$I_L$ = 80 mA |
| | | | Maximum | | 1 ms | |
| | | Turn off time* | Typical | $T_{off}$ | 0.19 ms | $I_F$ = 5 mA or 10 mA<br>$I_L$ = 80 mA |
| | | | Maximum | | 0.5 ms | |
| | I/O capacitance | | Typical | $C_{iso}$ | 4.0 pF | f = 1 MHz<br>$V_B$ = 0 |
| | | | Maximum | | 8.0 pF | |
| | Initial I/O isolation resistance | | Minimum | $R_{iso}$ | 1,000 MΩ | 500 V DC |
| Vibration resistance | | | Minimum | — | 10 to 55 Hz at double amplitude of 3 mm | 2 hours for 3 axes |
| Shock resistance | | | Minimum | — | 4,900 m/s² {500 G} 1 ms | 3 times for 3 axes |

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

For type of connection, see page 34.

*Turn on/Turn off time

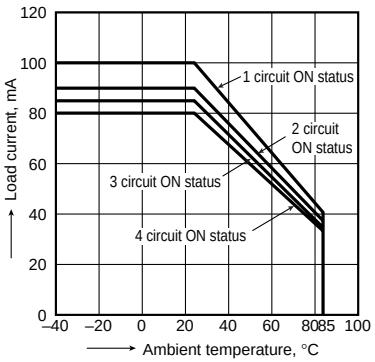



■ **For Dimensions, see Page 29.**
■ **For Schematic and Wiring Diagrams, see Page 34.**
■ **For Cautions for Use, see Page 36.**

# REFERENCE DATA

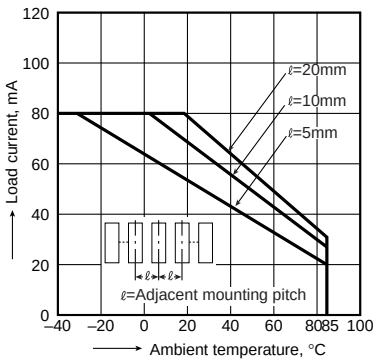
1. Load current vs. ambient temperature characteristics

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



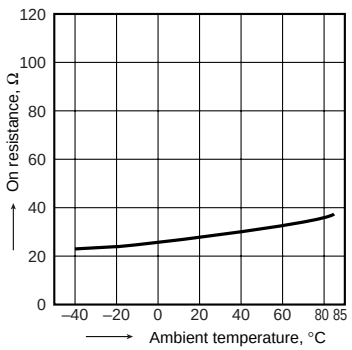

2. Load current in adjacent mounting vs. ambient temperature

Condition: 4 circuits ON status



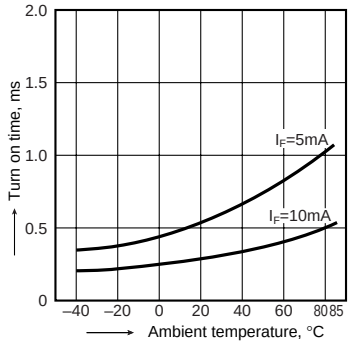

3. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 6 and 7, 8 and 9, 10 and 11, 12 and 13; LED current: 5 mA;
Continuous load current: 80 mA (DC)

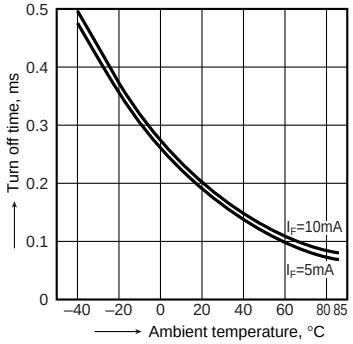


# AQX21444

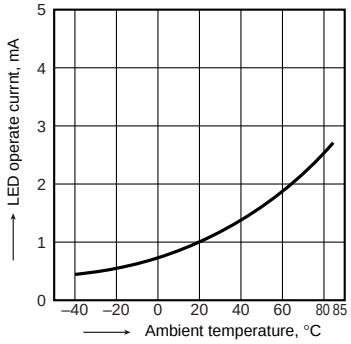
4. Turn on time vs. ambient temperature characteristics
Load voltage: 400 V (DC);
Continuous load current: 80 mA (DC)



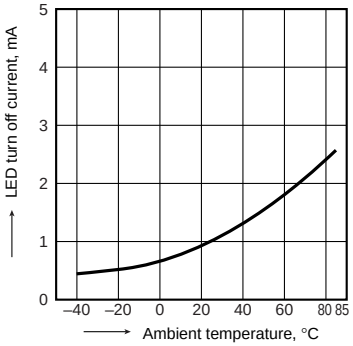

5. Turn off time vs. ambient temperature characteristics
Load voltage: 400 V (DC);
Continuous load current: 80 mA (DC)



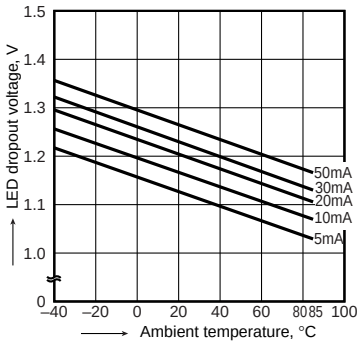

6. LED operate current vs. ambient temperature characteristics
Load voltage: 400 V (DC);
Continuous load current: 80 mA (DC)



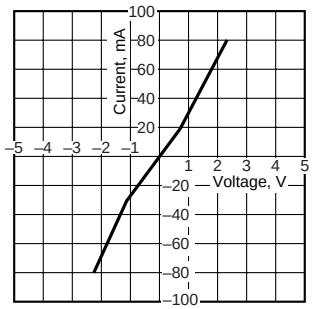

7. LED turn off current vs. ambient temperature characteristics
Load voltage: 400 V (DC);
Continuous load current: 80 mA (DC)



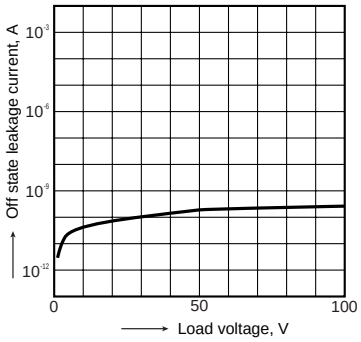

8. LED dropout voltage vs. ambient temperature characteristics
LED current: 5 to 50 mA



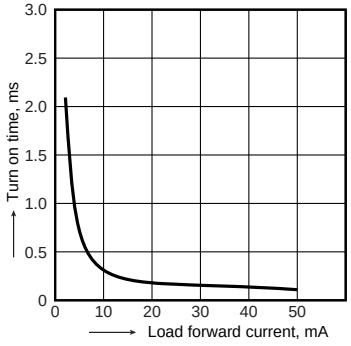

9. Voltage vs. current characteristics of output at MOS portion
Measured portion: between 6 and 7, 8 and 9, 10 and 11, 12 and 13; Ambient temperature: 25°C 77°F



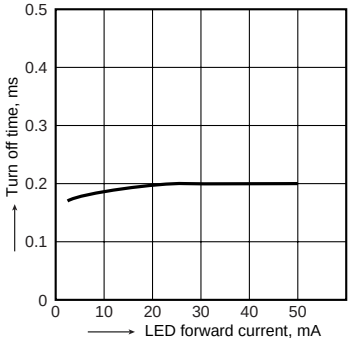

10. Off state leakage current
Measured portion: between terminals 6 and 7, 8 and 9, 10 and 11, 12 and 13;
Ambient temperature: 25°C 77°F




11. LED forward current vs. turn on time characteristics
Measured portion: between terminals 6 and 7, 8 and 9, 10 and 11, 12 and 13; Load voltage: 400 V (DC);
Continuous load current: 80 mA (DC);
Ambient temperature: 25°C 77°F




12. LED forward current vs. turn off time characteristics
Measured portion: between terminals 6 and 7, 8 and 9, 10 and 11, 12 and 13; Load voltage: 400 V (DC);
Continuous load current: 80 mA (DC);
Ambient temperature: 25°C 77°F




13. Applied voltage vs. output capacitance characteristics (AC/DC type)
Measured portion: between terminals 6 and 7, 8 and 9, 10 and 11, 12 and 13; Load voltage: 400 V (DC);
Frequency: 1 MHz; Ambient temperature: 25°C 77°F