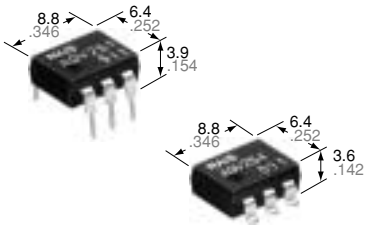


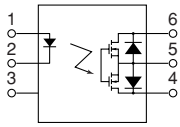


High sensitivity and low on-resistance.
DIP (1 Form A) 6-pin type.

HE PhotoMOS
(AQV250)



mm inch



FEATURES

- Highly sensitive and low on-resistance**
- Controls various types of loads such as relays, motors, lamps and solenoids.**
- Optical coupling for extremely high isolation**
5,000 Vrms I/O isolation available.
- Low-level off state leakage current**
- Eliminates the need for a power supply to drive the power MOSFET**
A power supply used to drive the power MOSFET is unnecessary because of the built-in optoelectronic device. This results in easy circuit design and small PC board area.
- Low thermal electromotive force (Approx. 1 μ V)**

TYPICAL APPLICATIONS

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

TYPES

1. I/O isolation voltage: 1,500 V AC

| Output rating* | | Part No. | | | | Packing quantity | |
|----------------|--------------|-----------------------|------------------------|----------|--------------------------------|--------------------------------|------|
| | | Through hole terminal | Surface-mount terminal | | Tape and reel packing style | | |
| Load voltage | Load current | | Tube packing style | | Picked from the 1/2/3-pin side | Picked from the 4/5/6-pin side | Tube |
| | | 40 V | 500 mA | AQV251 | AQV251A | AQV251AX | |
| 60 V | 400 mA | AQV252 | AQV252A | AQV252AX | AQV252AZ | | |
| 100 V | 350 mA | AQV255 | AQV255A | AQV255AX | AQV255AZ | | |
| 200 V | 250 mA | AQV257 | AQV257A | AQV257AX | AQV257AZ | | |
| 250 V | 200 mA | AQV253 | AQV253A | AQV253AX | AQV253AZ | | |
| 400 V | 150 mA | AQV254 | AQV254A | AQV254AX | AQV254AZ | | |
| 1,000 V | 30 mA | AQV259 | AQV259A | AQV259AX | AQV259AZ | | |
| 1,500 V | 20 mA | AQV258 | AQV258A | AQV258AX | AQV258AZ | | |

2. I/O isolation voltage: Reinforced 5,000 V

| Output rating* | | Part No. | | | | Packing quantity | |
|----------------|--------------|-----------------------|------------------------|-----------|--------------------------------|--------------------------------|------|
| | | Through hole terminal | Surface-mount terminal | | Tape and reel packing style | | |
| Load voltage | Load current | | Tube packing style | | Picked from the 1/2/3-pin side | Picked from the 4/5/6-pin side | Tube |
| | | 250 V | 200 mA | AQV253H | AQV253HA | AQV253HAX | |
| 400 V | 150 mA | AQV254H | AQV254HA | AQV254HAX | AQV254HAZ | | |

*Indicate the peak AC and DC values.

Note: For space reasons, the SMD terminal shape indicator "A" and 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 | Type of connection | AQV251(A) | AQV252(A) | AQV255(A) | AQV257(A) | AQV253(A) | AQV254(A) | AQV259(A) | AQV258(A) | AQV253H(A) | AQV254H(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 | | 40 V | 60 V | 100 V | 200 V | 250 V | 400 V | 1,000 V | 1,500 V | 250 V | 400 V | | | |
| | Continuous load current | I_L | A | 0.5 A | 0.4 A | 0.35 A | 0.25 A | 0.2 A | 0.15 A | 0.03 A | 0.02 A | 0.2 A | 0.15 A | A connection: Peak AC, DC B, C connection: DC | | |
| | | | B | 0.7 A | 0.6 A | 0.45 A | 0.35 A | 0.3 A | 0.18 A | 0.04 A | 0.025 A | 0.3 A | 0.18 A | | | |
| | | | C | 1.0 A | 0.8 A | 0.70 A | 0.5 A | 0.4 A | 0.25 A | 0.05 A | 0.04 A | 0.4 A | 0.25 A | | | |
| | Peak load current | I_{peak} | | 1.8 A | 1.5 A | 1.0 A | 0.75 A | 0.6 A | 0.5 A | 0.09 A | 0.06 A | 0.6 A | 0.5 A | A connection: 100 ms (1 shot) $V_L = DC$ | | |
| Power dissipation | P_{out} | | 360 mW | | | | | | | | | | | | | |
| Total power dissipation | | P_T | | 410 mW | | | | | | | | | | | | |
| I/O isolation voltage | | V_{iso} | | 1,500 V AC | | | | | | | | 5,000 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 | Type of connection | AQV251(A) | AQV252(A) | AQV255(A) | AQV257(A) | AQV253(A) | AQV254(A) | AQV259(A) | AQV258(A) | AQV253H(A) | AQV254H(A) | Condition | | |
|----------------------------------|----------------------|---------------|--------------------|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|---|---|--|---|
| Input | LED operate current | Typical | — | 0.9 mA | | | | | | | | 1.4 mA | | | | $I_L = \text{Max.}$ |
| | | Maximum | | 3 mA | | | | | | | | | | | | |
| | LED turn off current | Minimum | — | 0.4 mA | | | | | | | | | | | | $I_L = \text{Max.}$ |
| | | Typical | | 0.8 mA | | | | | | | | 1.3 mA | | | | |
| LED dropout voltage | Typical | — | — | 1.25 V (1.14 V at $I_F = 5 \text{ mA}$) | | | | | | | | | | | | $I_F = 50 \text{ mA}$ |
| | Maximum | | | 1.5 V | | | | | | | | | | | | |
| Output | On resistance | Typical | A | 0.6 Ω | 0.74 Ω | 1.8 Ω | 2.6 Ω | 5.5 Ω | 12.4 Ω | 85 Ω | 345 Ω | 5.5 Ω | 12.4 Ω | $I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time | | |
| | | Maximum | | 1 Ω | 1.4 Ω | 2.5 Ω | 4 Ω | 8 Ω | 16 Ω | 200 Ω | 500 Ω | 8 Ω | 16 Ω | | | |
| | | Typical | B | 0.3 Ω | 0.37 Ω | 0.9 Ω | 1.4 Ω | 2.7 Ω | 6.2 Ω | 60 Ω | 345 Ω | 2.7 Ω | 6.2 Ω | $I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time | | |
| | | Maximum | | 0.5 Ω | 0.7 Ω | 1.25 Ω | 2 Ω | 4 Ω | 8 Ω | 100 Ω | 500 Ω | 4 Ω | 8 Ω | | | |
| | Typical | C | 0.15 Ω | 0.18 Ω | 0.45 Ω | 0.7 Ω | 1.4 Ω | 3.1 Ω | 30 Ω | 160 Ω | 1.4 Ω | 3.1 Ω | $I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ Within 1 s on time | | | |
| | Maximum | | 0.25 Ω | 0.35 Ω | 0.63 Ω | 1 Ω | 2 Ω | 4 Ω | 50 Ω | 250 Ω | 2 Ω | 4 Ω | | | | |
| Off state leakage current | Maximum | — | — | 1 μA | | | | | | 10 μA | | 1 μA | | | | $I_F = 0 \text{ mA}$ $V_L = \text{Max.}$ |
| Transfer characteristics | Switching speed | Turn on time* | — | 1.7 ms | 1.4 ms | 0.9 ms | 1.5 ms | 0.8ms | 0.8ms | 0.6ms | 0.35 ms | 2.4ms | 1.8ms | $I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ | | |
| | | Maximum | | 3 ms | | 2 ms | 3 ms | 2 ms | | 1 ms | | 4 ms | 3 ms | | | |
| | Turn off time* | Typical | — | 0.07 ms | | 0.09 ms | 0.1 ms | 0.06 ms | 0.05 ms | 0.04 ms | | 0.06 ms | 0.05 ms | $I_F = 5 \text{ mA}$ $I_L = \text{Max.}$ | | |
| | | Maximum | | 0.2 ms | | | | | | | | | | | | |
| I/O capacitance | Typical | — | — | 1.3 pF | | | | | | | | | | | | f = 1 MHz $V_B = 0 \text{ V}$ |
| | Maximum | | | 3 pF | | | | | | | | | | | | |
| Initial I/O isolation resistance | Minimum | — | — | 1,000 MΩ | | | | | | | | | | | | 500 V DC |

Note: Recommendable LED forward current

Standard type: 5 mA
Reinforced type: 5 to 10 mA

*Turn on/Turn off time

