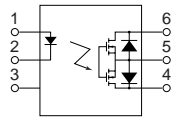
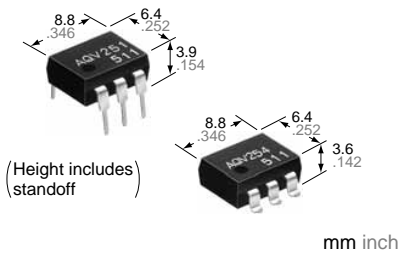


DIP6-pin type with low on-resistance and high cost-performance

PhotoMOS Relays HE 1 Form A (AQV25○)



FEATURES

1. Low on-resistance of typ. 0.6Ω (AQV251)
2. Reinforced insulation type of 5,000V I/O isolation available
3. Wide variation of 40V to 1,500V load voltage

TYPICAL APPLICATIONS

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

TYPES

| | I/O isolation | Output rating* | | Package | Part No. | | | | Packing quantity | |
|----------------|-------------------|----------------|--------------|----------|-----------------------|--------------------------------|--------------------------------|-----------------------------|--|---------------|
| | | | | | Through hole terminal | Surface-mount terminal | | | Tube | Tape and reel |
| | | | | | | Tube packing style | | Tape and reel packing style | | |
| | | Load voltage | Load current | | | Picked from the 1/2/3-pin side | Picked from the 4/5/6-pin side | | | |
| AC/DC dual use | 1,500V | 40 V | 500 mA | DIP6-pin | AQV251 | AQV251A | AQV251AX | AQV251AZ | 1 tube contains: 50 pcs. 1 batch contains: 500 pcs. | 1,000 pcs. |
| | | 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 | | |
| | Reinforced 5,000V | 250 V | 200 mA | | AQV253H | AQV253HA | AQV253HAX | AQV253HAZ | | |
| | | 400 V | 150 mA | | AQV254H | AQV254HA | AQV254HAX | AQV254HAZ | | |

*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 relay.

RATING

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

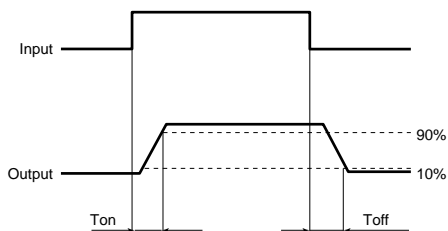
| Item | Symbol | Type of connection | AQV251(A) | AQV252(A) | AQV255(A) | AQV257(A) | AQV253(A) | AQV254(A) | AQV259(A) | AQV258(A) | AQV253H(A) | AQV254H(A) | Remarks | |
|-------------------------|-------------------------|--------------------|---------------------------------|-----------|-----------|-----------|-----------|-----------|------------|-----------|------------|------------|---|--|
| | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | |

HE 1 Form A (AQV25○)

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 = Max. | |
| | | Maximum | | 3 mA | | | | | | | | | | | |
| | LED turn off current | Minimum | — | 0.4 mA | | | | | | | | | | I _L = Max. | |
| | | Typical | | 0.8 mA | | | | | | | | 1.3 mA | | | |
| LED dropout voltage | Typical | V _F | — | 1.25 V (1.14 V at I _F = 5 mA) | | | | | | | | | | I _F = 50 mA | |
| | Maximum | | | 1.5 V | | | | | | | | | | | |
| Output | On resistance | Typical | R _{on} | 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 mA I _L = 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 | R _{on} | 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 mA I _L = 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 | R _{on} | 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 mA I _L = 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 | I _{Leak} | — | 1 μA | | | | | | 10 μA | | 1 μA | | I _F = 0 mA V _L = Max. | |
| Turn on time* | Typical | T _{on} | — | 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 mA I _L = Max. | |
| | Maximum | | | 3 ms | | 2 ms | 3 ms | 2 ms | | 1 ms | | 4 ms | 3 ms | | |
| Turn off time* | Typical | T _{off} | — | 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 mA I _L = Max. | |
| | Maximum | | | 0.2 ms | | | | | | | | | | | |
| I/O capacitance | Typical | C _{iso} | — | 1.3 pF | | | | | | | | | | f = 1 MHz V _B = 0 V | |
| | Maximum | | | 3 pF | | | | | | | | | | | |
| Initial I/O isolation resistance | Minimum | R _{iso} | — | 1,000 MΩ | | | | | | | | | | 500 V DC | |

*Turn on/Turn off time



RECOMMENDED OPERATING CONDITIONS

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

| Item | Symbol | Recommended value | Unit |
|-------------------|----------------|---|------|
| Input LED current | I _F | Standard type: 5 Reinforced insulation type: 5 to 10 | mA |

■ Dimensions

■ Schematic and Wiring Diagrams

■ 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 Electric Works technical representative.

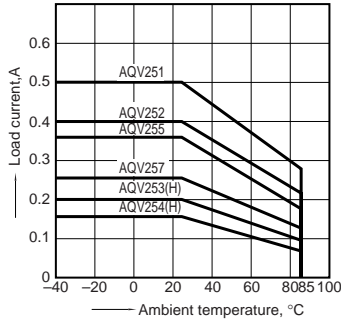
Please refer to our information on [PhotoMOS Relays for Automotive Applications](#).

REFERENCE DATA

1.-(1) Load current vs. ambient temperature characteristics

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

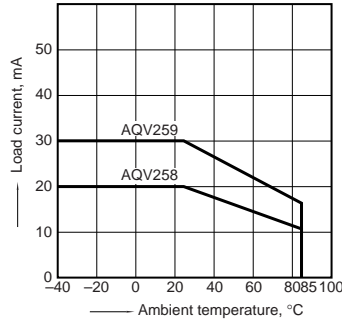
Type of connection: A



1.-(2) Load current vs. ambient temperature characteristics

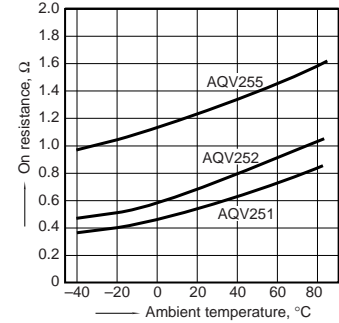
Allowable ambient temperature: -40°C to +85°C
-40°F to +185°F ;

Type of connection: A



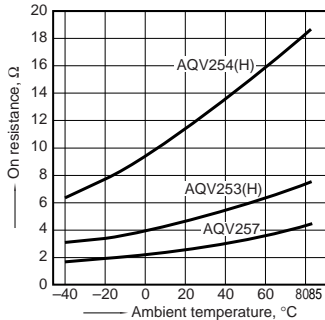
2.-(1) On resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: Max. (DC)



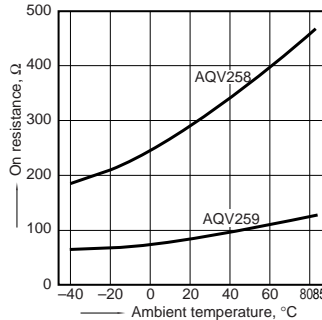
2.-(2) On resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: Max. (DC)



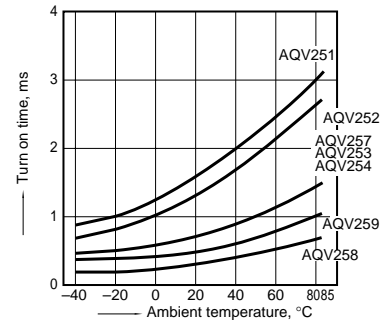
2.-(3) On resistance vs. ambient temperature characteristics

Measured portion: between terminals 4 and 6;
LED current: 5 mA;
Continuous load current: 30 mA (DC)



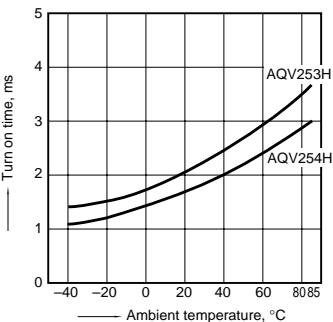
3.-(1) Turn on time vs. ambient temperature characteristics

LED current: 5 mA;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



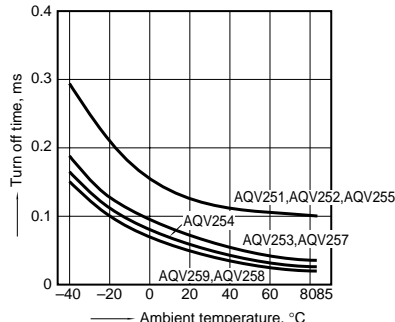
3.-(2) Turn on time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



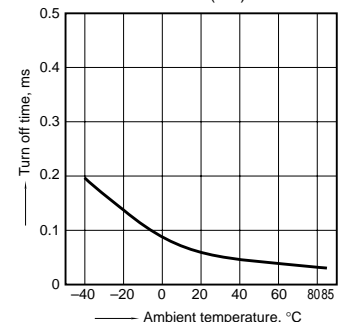
4.-(1) Turn off time vs. ambient temperature characteristics

LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



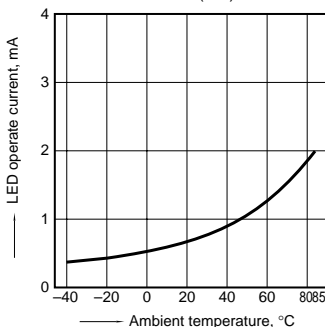
4.-(2) Turn off time vs. ambient temperature characteristics

Sample: AQV253H, AQV254H
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



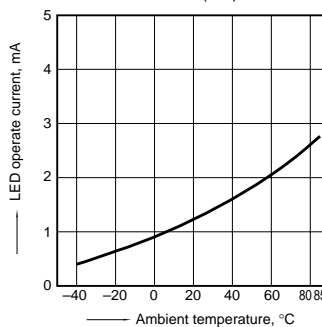
5.-(1) LED operate current vs. ambient temperature characteristics

Sample: AQV251, AQV252, AQV253, AQV254, AQV259; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



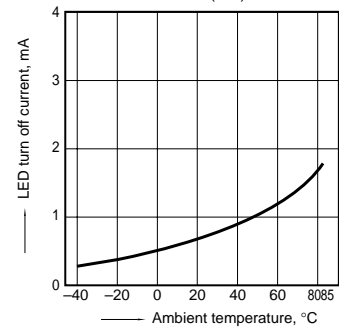
5.-(2) LED operate current vs. ambient temperature characteristics

Sample: AQV253H, AQV254H; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



6.-(1) LED turn off current vs. ambient temperature characteristics

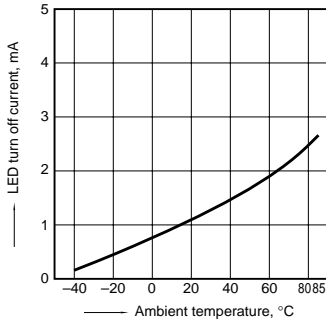
Sample: AQV251, AQV252, AQV253, AQV254, AQV259; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



HE 1 Form A (AQV250)

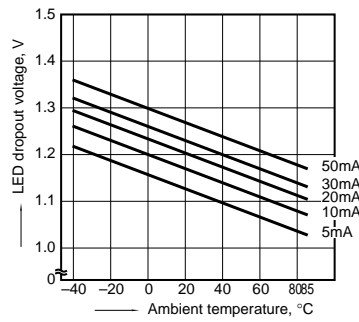
6.-(2) LED turn off current vs. ambient temperature characteristics

Sample: AQV251, AQV252, AQV253, AQV254, AQV259; Load voltage: Max. (DC); Continuous load current: Max. (DC)



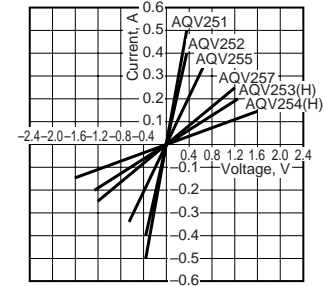
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



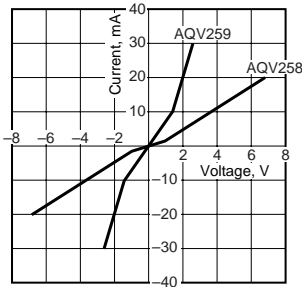
8.-(1) Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 4 and 6; Ambient temperature: 25°C 77°F



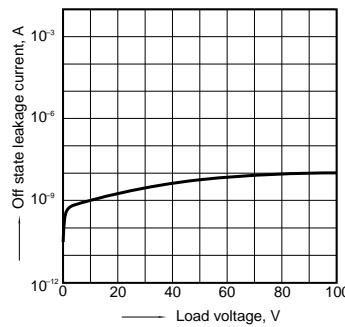
8.-(2) Current vs. voltage characteristics of output at MOS portion

Sample: AQV259; Measured portion: between terminals 4 and 6; Ambient temperature: 25°C 77°F



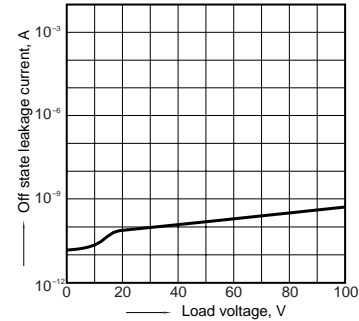
9.-(1). Off state leakage current vs. load voltage characteristics

Sample: AQV259; Measured portion: between terminals 4 and 6; Ambient temperature: 25°C 77°F



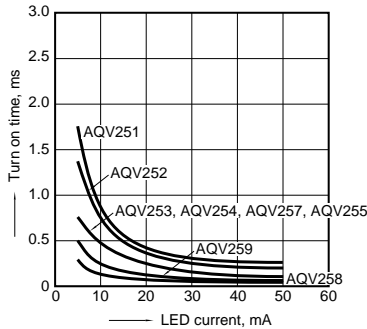
9.-(2). Off state leakage current vs. load voltage characteristics

Sample: AQV254H; Measured portion: between terminals 4 and 6; Ambient temperature: 25°C 77°F



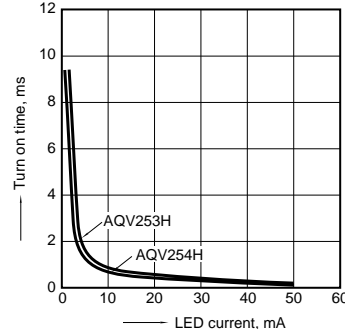
10.-(1). Turn on time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6; Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



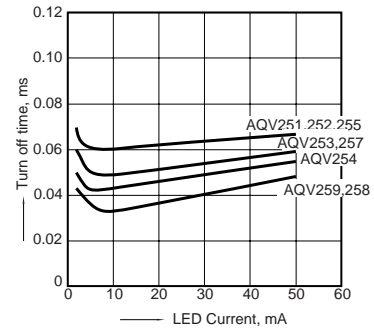
10.-(2). Turn on time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6; Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



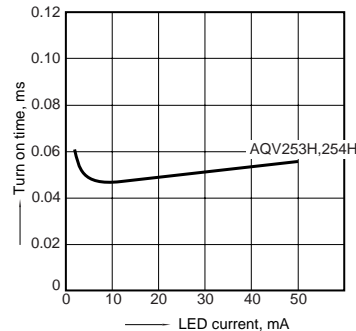
11.-(1). Turn off time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6; Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



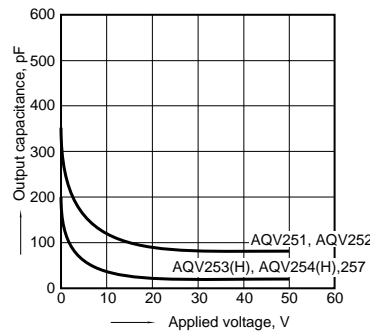
11.-(2). Turn off time vs. LED forward current characteristics

Measured portion: between terminals 4 and 6; Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



12.-(1) Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 4 and 6; Frequency: 1 MHz; Ambient temperature: 25°C 77°F



12.-(2) Output capacitance vs. applied voltage characteristics

Sample: AQV259; Measured portion: between terminals 4 and 6; Frequency: 1 MHz; Ambient temperature: 25°C 77°F

