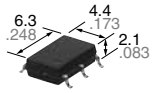
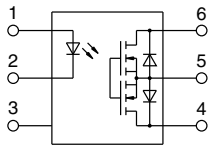
**Miniature SOP6-pin type of 60 to 600V load voltage**

PhotoMOS®
# GU SOP 1 Form A
(AQV21○S)




mm inch

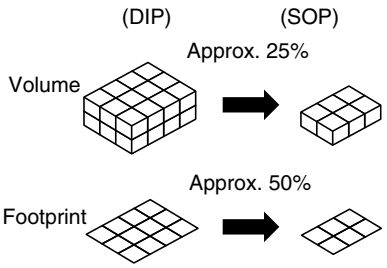



**RoHS compliant**

## FEATURES

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

**2. Small SOP6-Pin package**
The device comes in a miniature SOP measuring (W) 4.4 × (L) 6.3 ×(H) 2.1 mm (W) .173× (L) .248×(H) .083 inch approx. 25% of the volume and 50% of the footprint size of DIP type




**3. Low-level off state leakage current of max. 1 μA**

**4. Wide variation of load voltage 60V to 600V**

## TYPICAL APPLICATIONS

- Telephones
- Measuring instruments
- Computers
- Industrial robots

## TYPES

| | Output rating* | | Package | Part No. | | | Packing quantity | |
|---|---|---|---|---|---|---|---|---|
| | Load voltage | Load current | | Tube packing style | Tape and reel packing style | | Tube | Tape and reel |
| | | | | | Picked from the 1/2/3-pin side | Picked from the 4/5/6-pin side | | |
| AC/DC dual use | 60V | 500mA | SOP6-pin | AQV212S | AQV212SX | AQV212SZ | 1 tube contains: 75 pcs. 1 batch contains: 1,500 pcs. | 1,000 pcs. |
| | 100V | 300mA | | AQV215S | AQV215SX | AQV215SZ | | |
| | 200V | 160mA | | AQV217S | AQV217SX | AQV217SZ | | |
| | 350V | 120mA | | AQV210S | AQV210SX | AQV210SZ | | |
| | 400V | 100mA | | AQV214S | AQV214SX | AQV214SZ | | |
| | 600V | 40mA | | AQV216S | AQV216SX | AQV216SZ | | |

* Indicate the peak AC and DC values.
Note: For space reasons, the two initial letters of the part number "AQ" and the packing style indicator "X" or "Z" are not marked on the device.
(Ex. the label for product number AQV212SX is V212S.)

# RATING

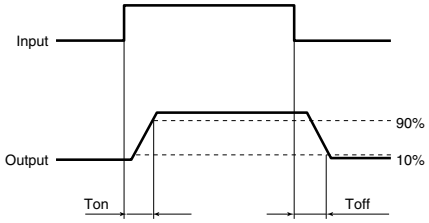
**1. Absolute maximum ratings** (Ambient temperature: 25°C 77°F)

| Item | | Symbol | Type of connection | AQV212S | AQV215S | AQV217S | AQV210S | AQV214S | AQV216S | 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) | $V_L$ | | 60 V | 100 V | 200 V | 350 V | 400 V | 600 V | |
| | Continuous load current | $I_L$ | A | 0.50 A | 0.30 A | 0.16 A | 0.12 A | 0.10 A | 0.04 A | A connection: Peak AC, DC<br>B, C connection: DC |
| | | | B | 0.65 A | 0.40 A | 0.20 A | 0.13 A | 0.11 A | 0.05 A | |
| | | | C | 0.80 A | 0.56 A | 0.28 A | 0.15 A | 0.12 A | 0.06 A | |
| | Peak load current | $I_{peak}$ | | 1.5A | 0.90A | 0.48A | 0.3 A | 0.3 A | 0.12 A | A connection: 100 ms (1 shot) $V_L$= DC |
| | Power dissipation | $P_{out}$ | | 450 mW | | | | | | |
| Total power dissipation | | $P_T$ | | 500 mW | | | | | | |
| I/O isolation voltage | | $V_{iso}$ | | 1,500 Vrms | | | | | | |
| Ambient temperature | Operating | $T_{opr}$ | | –40 to +85°C –40 to +185°F | | | | | | (Non-icing at low temperatures) |
| | Storage | $T_{stg}$ | | –40 to +100°C –40 to +212°F | | | | | | |

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

| Item | | | Symbol | Type of connection | AQV212S | AQV215S | AQV217S | AQV210S | AQV214S | AQV216S | Condition |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Input | LED operate current | Typical | $I_{Fon}$ | — | 0.7 mA | | | | | | $I_L$ = Max. |
| | | Maximum | | | 3 mA | | | | | | |
| | LED turn off current | Minimum | $I_{Foff}$ | — | 0.4 mA | | | | | | $I_L$ = Max. |
| | | Typical | | | 0.65 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 | 0.83 Ω | 2.3 Ω | 11 Ω | 23 Ω | 30 Ω | 70 Ω | $I_F$ = 5 mA<br>$I_L$ = Max.<br>Within 1 s |
| | | Maximum | | | 2.5 Ω | 4.0 Ω | 15 Ω | 35 Ω | 50 Ω | 120 Ω | |
| | | Typical | $R_{on}$ | B | 0.44 Ω | 1.15 Ω | 5.5 Ω | 11.5 Ω | 22.5 Ω | 55 Ω | $I_F$ = 5 mA<br>$I_L$ = Max.<br>Within 1 s |
| | | Maximum | | | 1.25 Ω | 2.0 Ω | 7.5 Ω | 17.5 Ω | 25 Ω | 100 Ω | |
| | | Typical | $R_{on}$ | C | 0.25 Ω | 0.6 Ω | 2.8 Ω | 6.0 Ω | 11.3 Ω | 28 Ω | $I_F$ = 5 mA<br>$I_L$ = Max.<br>Within 1 s |
| | | Maximum | | | 0.63 Ω | 1.0 Ω | 3.8 Ω | 8.8 Ω | 12.5 Ω | 50 Ω | |
| | Off state leakage current | Maximum | $I_{Leak}$ | — | 1 μA | | | | | | $I_F$ = 0 mA<br>$V_L$ = Max. |
| Transfer characteristics | Turn on time* | Typical | $T_{on}$ | — | 0.65 ms | 0.60 ms | 0.25 ms | | | 0.28 ms | $I_F$ = 5 mA<br>$V_L$ = Max. |
| | | Maximum | | | 2.0 ms | | 1.0 ms | 0.5 ms | | | |
| | Turn off time | Typical | $T_{off}$ | — | 0.08 ms | 0.06 ms | 0.05 ms | | | 0.04 ms | $I_F$ = 5 mA<br>$V_L$ = Max. |
| | | Maximum | | | 0.2 ms | | | | | | |
| | I/O capacitance | Typical | $C_{iso}$ | — | 0.8 pF | | | | | | f = 1 MHz<br>$V_B$ = 0 V |
| | | Maximum | | | 1.5 pF | | | | | | |
| | Initial I/C isolation resistance | Minimum | $R_{iso}$ | — | 1,000 MΩ | | | | | | 500 V DC |

*Turn on/Turn off time




**3. Recommended operating conditions** (Ambient temperature: 25°C 77°F)

Please use under recommended operating conditions to obtain expected characteristics.

| Item | | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|---|
| LED current | | $I_F$ | 5 | 30 | mA |
| AQV212S | Load voltage (Peak AC) | $V_L$ | — | 48 | V |
| | Continuous load current (A connection) | $I_L$ | — | 0.5 | A |
| AQV215S | Load voltage (Peak AC) | $V_L$ | — | 80 | V |
| | Continuous load current (A connection) | $I_L$ | — | 0.3 | A |
| AQV217S | Load voltage (Peak AC) | $V_L$ | — | 160 | V |
| | Continuous load current (A connection) | $I_L$ | — | 0.16 | A |
| AQV210S | Load voltage (Peak AC) | $V_L$ | — | 280 | V |
| | Continuous load current (A connection) | $I_L$ | — | 0.12 | A |
| AQV214S | Load voltage (Peak AC) | $V_L$ | — | 320 | V |
| | Continuous load current (A connection) | $I_L$ | — | 0.1 | A |
| AQV216S | Load voltage (Peak AC) | $V_L$ | — | 480 | V |
| | Continuous load current (A connection) | $I_L$ | — | 0.04 | A |

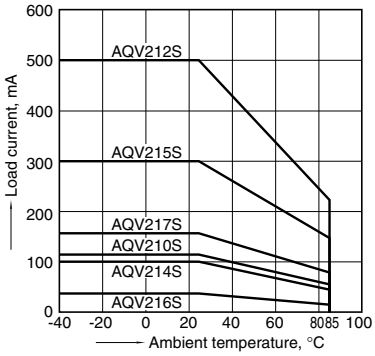
■ **These products are not designed for automotive use.**
**If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.**

# REFERENCE DATA

1. Load current vs. ambient temperature characteristics

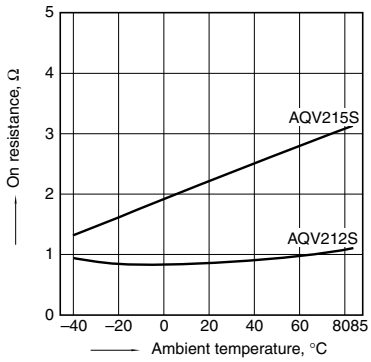
Allowable ambient temperature: –40 to +85°C
–40 to +185°F

Type of connection: A



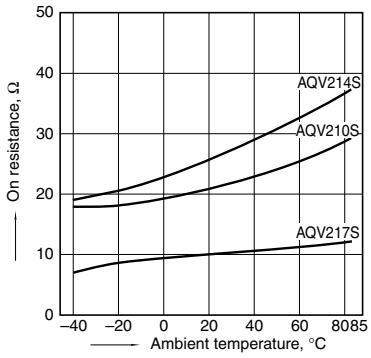

2.-(1) On resistance vs. ambient temperature characteristics

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



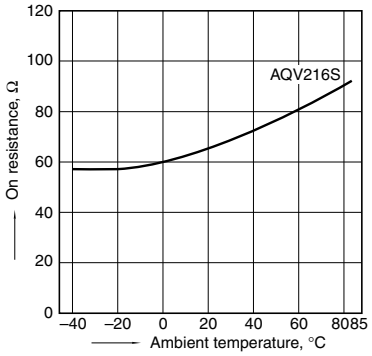

2.-(2) On resistance vs. ambient temperature characteristics

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



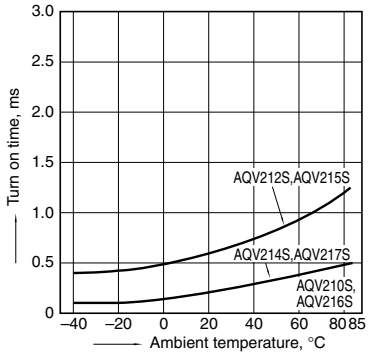

2.-(3) On resistance vs. ambient temperature characteristics

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



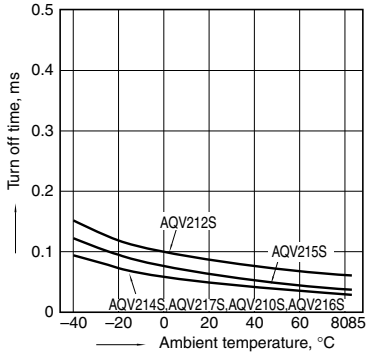

3. Turn on time vs. ambient temperature characteristics

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



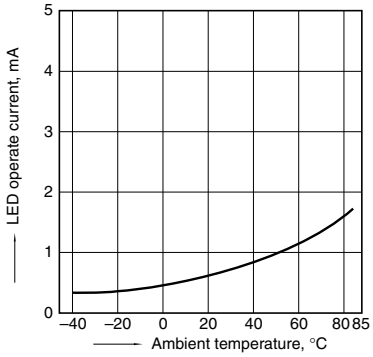

4. Turn off time vs. ambient temperature characteristics

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



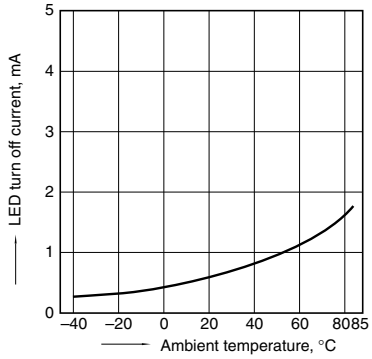

5. LED operate current vs. ambient temperature characteristics

Sample: All types;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)



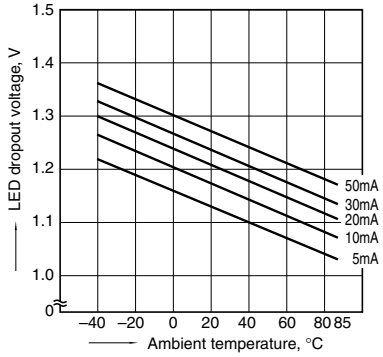

6. LED turn off current vs. ambient temperature characteristics

Sample: All types;
Load voltage: Max. (DC);
Continuous load current: Max. (DC)

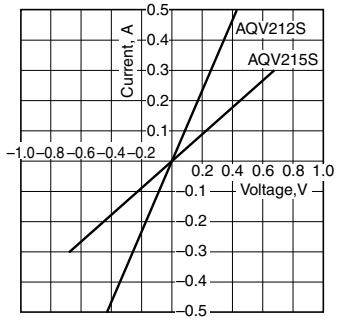



7. LED dropout voltage vs. ambient temperature characteristics

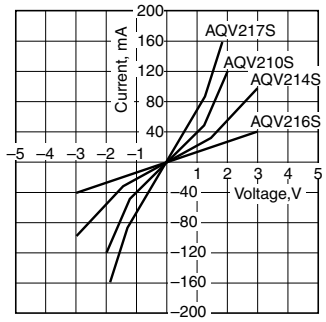
Sample: All types;
LED current: 5 to 50 mA



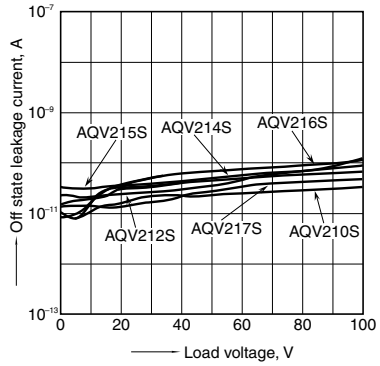
8.-(1). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



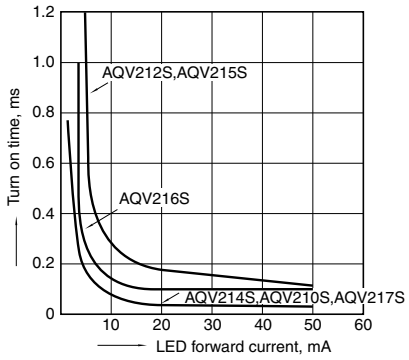

8.-(2). Current vs. voltage characteristics of output at MOS portion
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



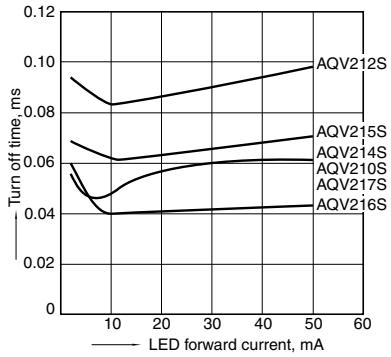

9. Off state leakage current vs. load voltage characteristics
Measured portion: between terminals 4 and 6;
Ambient temperature: 25°C 77°F



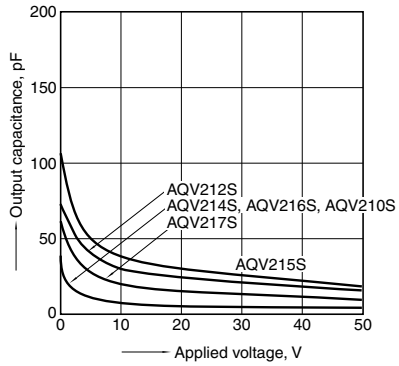

10. Turn on time vs. LED forward current characteristics
Measured portion: between terminals 4 and 6;
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F




11. 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. Output capacitance vs. applied voltage characteristics
Measured portion: between terminals 4 and 6;
Frequency: 1 MHz;
Ambient temperature: 25°C 77°F



Please contact .....

Panasonic Corporation
Electromechanical Control Business Division
■ 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8506, Japan
industrial.panasonic.com/ac/e/

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- Подбор аналогов;
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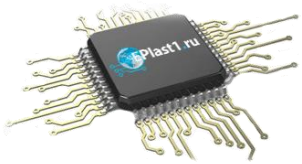


**Как с нами связаться**

**Телефон:** 8 (812) 309 58 32 (многоканальный)
**Факс:** 8 (812) 320-02-42
**Электронная почта:** org@eplast1.ru
**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.