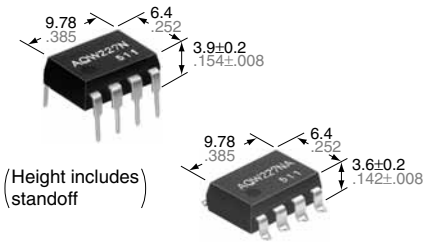
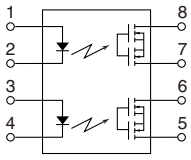
**DIP8-pin type featuring low on-resistance 200V/400V load voltage**

PhotoMOS®
# RF 2 Form A
Low on-resistance (AQW22○N)




mm inch




**RoHS compliant**

## FEATURES

**1. 2-channels (Form A) type with high response speed, low leakage current and low on-resistance.**
**2. Applicable for 2 Form A use as well as two independent 1 Form A use**
**3. Low capacitance between output terminals ensures high response speed:**
The capacitance between output terminals is small; typ. 10 pF.
This enables for a fast operation speed of typ. 0.2 ms.
**4. High sensitivity and low on-resistance:**
Max. 0.07 A of load current can be controlled with input current of 5 mA.
The on-resistance is less than our conventional models.
**5. Low-level off state leakage current**
**6. Controls low-level analog signals:**
PhotoMOS features extremely low closed-circuit offset voltages to enable control of small analog signals without distortion.

## TYPICAL APPLICATIONS

- **Measuring instruments**
  Scanner, IC checker, Board tester, etc.

## TYPES

| | Output rating* | | Package | Part No. | | | | Packing quantity | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Through hole terminal | Surface-mount terminal | | | | |
| | | | | Tube packing style | | Tape and reel packing style | | Tube | Tape and reel |
| | Load voltage | Load current | | | | Picked from the 1/2/3-pin side | Picked from the 4/5/6-pin side | | |
| AC/DC dual use | 200 V | 50 mA | DIP8-pin | AQW227N | AQW227NA | AQW227NAX | AQW227NAZ | 1 tube contains: 50 pcs. 1 batch contains: 500 pcs. | 1,000 pcs. |
| | 400 V | 40 mA | | AQW224N | AQW224NA | AQW224NAX | AQW224NAZ | | |

*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 device.

## RATING

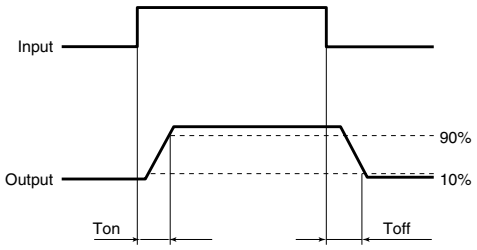
1. Absolute maximum ratings (Ambient temperature: 25°C 77°F)

| Item | | Symbol | AQW227N(A) | AQW224N(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) | $V_L$ | 200 V | 400 V | |
| | Continuous load current | $I_L$ | 0.05 A (0.07 A) | 0.04 A (0.05 A) | Peak AC, DC ( ): in case of using only 1 channel |
| | Peak load current | $I_{peak}$ | 0.15 A | 0.12 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 | | |
| 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 | AQW227N(A) | AQW224N(A) | Remarks |
|---|---|---|---|---|---|---|
| Input | LED operate current | Typical | $I_{Fon}$ | 0.9 mA | | $I_L$ = Max. |
| | | Maximum | | 3.0 mA | | |
| | LED turn off current | Minimum | $I_{Foff}$ | 0.4 mA | | $I_L$ = Max. |
| | | Typical | | 0.8 mA | | |
| | LED dropout voltage | Typical | $V_F$ | 1.25 V (1.14 V at $I_F$ = 5 mA) | | $I_F$ = 50 mA |
| | | Maximum | | 1.5 V | | |
| Output | On resistance | Typical | $R_{on}$ | 30 Ω | 70 Ω | $I_F$ = 5 mA<br>$I_L$ = Max.<br>Within 1 s on time |
| | | Maximum | | 50 Ω | 100 Ω | |
| | Output capacitance | Typical | $C_{out}$ | 10 pF | | $I_F$ = 0<br>$V_B$ = 0<br>f = 1 MHz |
| | | Maximum | | 15 pF | | |
| | Off state leakage current | Maximum | $I_{Leak}$ | 10 nA (1 nA or less)* | | $I_F$ = 0<br>$V_L$ = Max. |
| Transfer characteristics | Turn on time** | Typical | $T_{on}$ | 0.2 ms | | $I_F$ = 5 mA<br>$I_L$ = Max. |
| | | Maximum | | 0.5 ms | | |
| | Turn off time** | Typical | $T_{off}$ | 0.08 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 |

*Available as custom orders (1 nA or less)
**Turn on/Turn off time




## RECOMMENDED OPERATING CONDITIONS

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

| Item | Symbol | Recommended value | Unit |
|---|---|---|---|
| Input LED current | $I_F$ | 5 | mA |

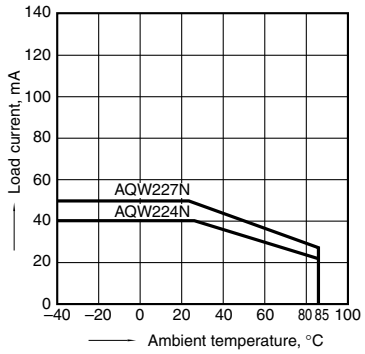
■ **These products are not designed for automotive use.**
**If you are considering to use these products for automotive applications, please contact your local Panasonic Corporation technical representative.**

## REFERENCE DATA

1. Load current vs. ambient temperature characteristics

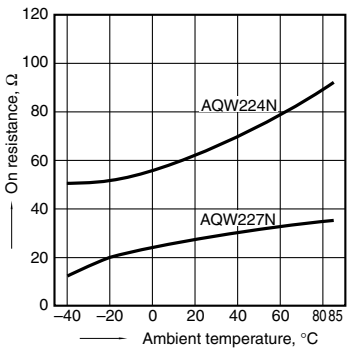
Allowable ambient temperature: –40°C to +85°C
–40°F to +185°F

When using 2 channels



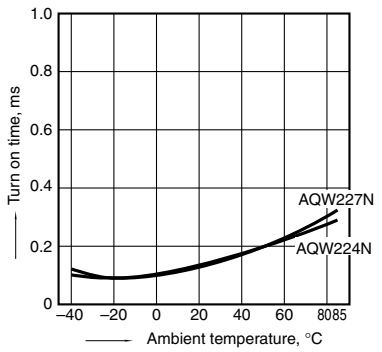

2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 5 and 6, 7 and 8; LED current: 5 mA; Load voltage: Max. (DC); Continuous load current: Max. (DC)



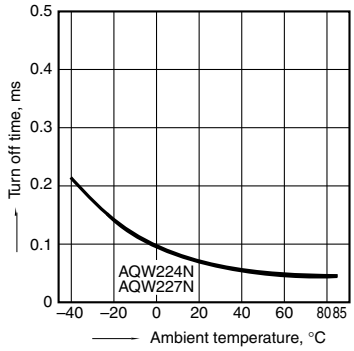

3. Turn on time vs. ambient temperature characteristics

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



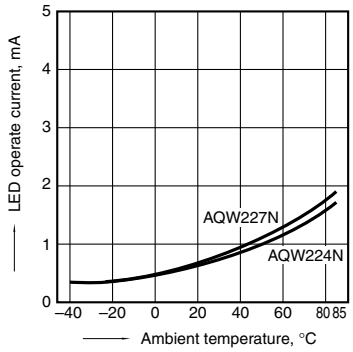
4. Turn off time vs. ambient temperature characteristics

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



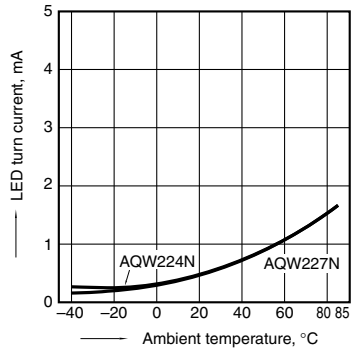

5. LED operate current vs. ambient temperature characteristics

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



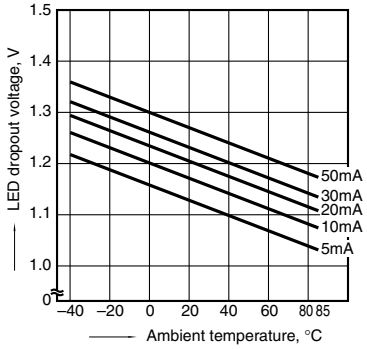

6. LED turn off current vs. ambient temperature characteristics

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



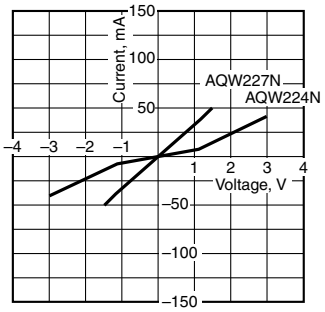

7. LED dropout voltage vs. ambient temperature characteristics

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



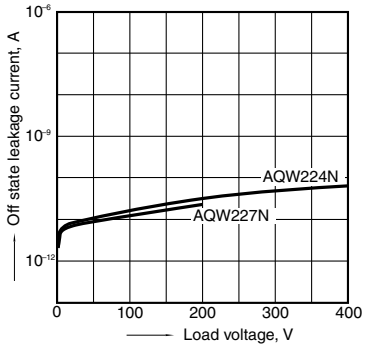

8. Voltage vs. current characteristics of output at MOS portion

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



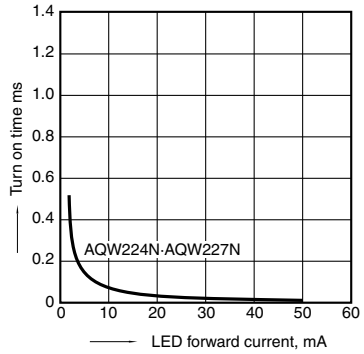

9. Off state leakage current

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



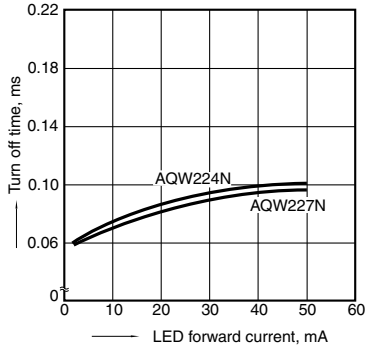

10. LED forward current vs. turn on time characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Load voltage: Max. (DC);
Continuous load current: Max. (DC);
Ambient temperature: 25°C 77°F



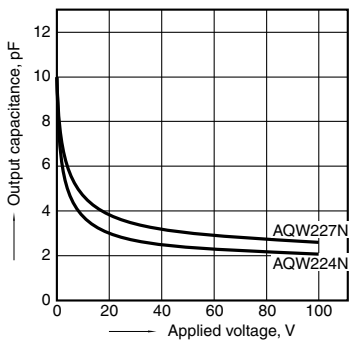

11. LED forward current vs. turn off time characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Load voltage: Max. (DC);
Continuous load current: Max. (DC);
Ambient temperature: 25°C 77°F



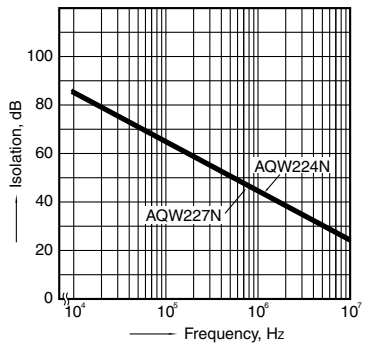

12. Applied voltage vs. output capacitance characteristics

Measured portion: between terminals 5 and 6, 7 and 8; Frequency: 1 MHz, 30 mVrms;
Ambient temperature: 25°C 77°F




13. Isolation characteristics (50 Ω impedance)

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




14. Insertion loss characteristics (50 Ω impedance)

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