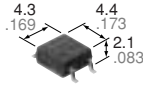


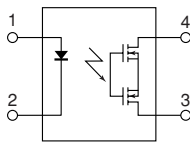
NAiS

**Lower output capacitance and on resistance. (C × R20)
High speed switching.
(Turn on time: 0.04ms,
Turn off time: 0.06ms).**

RF PhotoMOS (AQY221N1S)



mm inch



FEATURES

1. Low output capacitance between output terminals and low ON-resistance

Output capacitance(C): 2.0pF (typ.)
ON resistance(R): 9.8Ω (typ.)

2. High speed switching

Turn on time: 40ms
Turn off time: 60ms

3. SO package 4-pin type in super miniature design

Size: (W)4.3 × (L)4.4 × (H)2.1 mm
(W).169 × (L).173 × (H).083 inch

4. Low-level off state leakage current

The SSR has an off state leakage current of several milliamperes, where as this PhotoMOS relay has typ. 10pA (typical) even with the rated load voltage

5. Controls low-level analog signals

6. Low thermal electromotive force (Approx. 1 mV)

TYPICAL APPLICATIONS

Measuring and testing equipment

1. Testing equipment for semiconductor performance
IC tester, Liquid crystal driver tester, semiconductor performance tester
2. Board tester
Bear board tester, In-circuit tester, function tester
3. Medical equipment
Ultrasonic wave diagnostic machine
4. Multi-point recorder (warping, thermo couple)

TYPES

| Type | Output rating* | | Tape and reel packing style | | Packing quantity | |
|------------|----------------|--------------|------------------------------|------------------------------|------------------|---------------|
| | Load voltage | Load current | Picked from the 1/2-pin side | Picked from the 3/4-pin side | Tube | Tape and reel |
| AC/DC type | 40V | 120mA | AQY221N1SX | AQY221N1SZ | 1,000 pcs | 1,000 pcs |

* Indicate the peak AC and DC values.

Notes: (1) Tape package is the standard packing style. Also available in tube.

(Part No. suffix "X" or "Z" is not needed when ordering; Tube: 100 pcs.; Case: 2,000 pcs.)

(2) For space reasons, the initial letters of the product number "AQY and S", 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 | AQY221N1S | Remarks |
|-------------------------|-------------------------|-------------------|---------------------------------|--------------------------------------|
| Input | LED forward current | I _F | 50mA | |
| | LED reverse voltage | V _R | 5V | |
| | Peak forward current | I _{FP} | 1A | f=100 Hz, Duty factor=0.1% |
| | Power dissipation | P _{in} | 75mW | |
| Output | Load voltage (peak AC) | V _L | 40V | |
| | Continuous load current | I _L | 0.12A | Peak AC,DC |
| | Peak load current | I _{peak} | 0.30A | 100 ms (1 shot), V _L = DC |
| | Power dissipation | P _{out} | 300mW | |
| Total power dissipation | | P _T | 350mW | |
| I/O isolation voltage | | V _{iso} | 1,500V 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 | |

RF PhotoMOS (AQY221N1S)

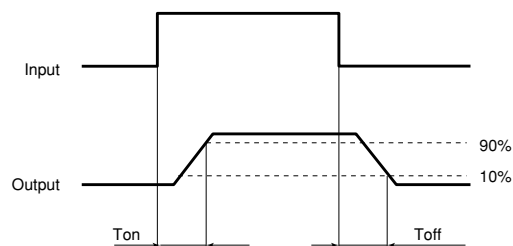
2. Electrical characteristics (Ambient temperature: 25°C 77°F)

| Item | | Symbol | AQY221N1S | Condition | | |
|--------------------------|----------------------------------|------------------------------------|-----------|---|---|---|
| Input | LED operate current | Typical | 0.9mA | $I_L=100\text{ mA}$ | | |
| | | Maximum | 3.0mA | | | |
| | LED turn off current | Minimum | 0.4mA | $I_L=100\text{ mA}$ | | |
| | | Typical | 0.85mA | | | |
| LED dropout voltage | Typical | 1.25V (1.14V at $I_F=5\text{mA}$) | | $I_F=50\text{mA}$ | | |
| | Maximum | 1.5V | | | | |
| Output | On resistance # | Typical | 9.8Ω | $I_F=5\text{mA}$ $I_L=100\text{ mA}$ Within 1 s on time | | |
| | | Maximum | 12.5Ω | | | |
| | Output capacitance # | Typical | 2.2pF | $I_F=0\text{mA}$ $V_B=0\text{V}$ $f=1\text{ MHz}$ | | |
| | | Maximum | 2.5pF | | | |
| | Off state leakage current | Typical | 0.01nA | $I_F=0\text{mA}$ $V_L=\text{Max.}$ | | |
| | | Maximum | 10nA | | | |
| Transfer characteristics | Switching speed | Turn on time* | Typical | 0.04ms | $I_F=5\text{mA}$ $V_L=10\text{V}$ $R_L=100\Omega$ | |
| | | | Maximum | 0.5ms | | |
| | | Turn off time* | Typical | 0.06ms | | $I_F=5\text{mA}$ $V_L=10\text{V}$ $R_L=100\Omega$ |
| | | | Maximum | 0.2ms | | |
| | I/O capacitance | Typical | 0.8pF | $f=1\text{MHz}$ $V_B=0\text{V}$ | | |
| | | Maximum | 1.5pF | | | |
| | Initial I/O isolation resistance | Minimum | R_{iso} | 1,000MΩ | 500V DC | |

Note: Recommendable LED forward current $I_F = 5\text{mA}$.

For type of connection

*Turn on/Turn off time



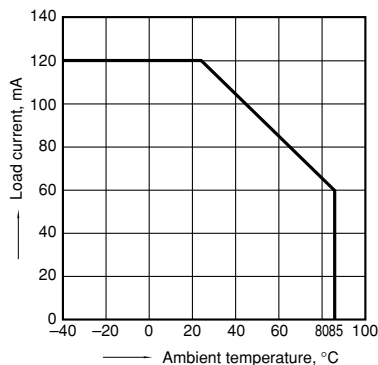
Other types of products than the C_{out} (typ. 2.0pF) and R_{on} (A connection typ. 9.8 ohm) combinations carried in this catalog are also available. (There is a trade-off between R_{on} and C_{out} both cannot be reduced at the same time.) For more information, please contact our sales office in your area.

- For Dimensions
- For Schematic and Wiring Diagrams
- For Cautions for Use

REFERENCE DATA

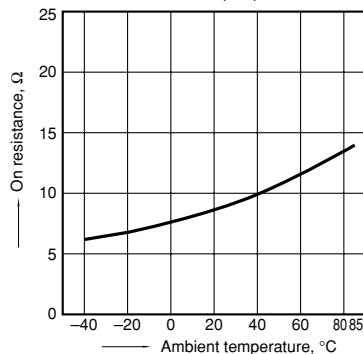
1. Load current vs. ambient temperature characteristics

Allowable ambient temperature: -40°C to $+85^\circ\text{C}$
 -40°F to $+185^\circ\text{F}$



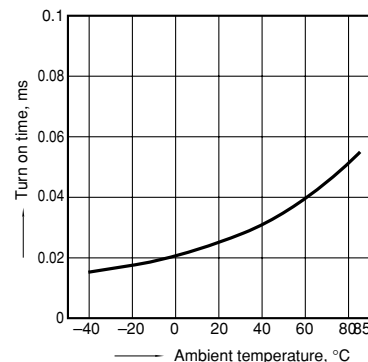
2. On resistance vs. ambient temperature characteristics

Measured portion: between terminals 3 and 4
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



3. Turn on time vs. ambient temperature characteristics

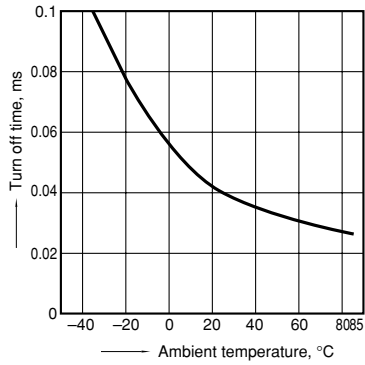
LED current: 5 mA; Load voltage: Max. (DC);
Continuous load current: Max. (DC)



RF PhotoMOS (AQY221N1S)

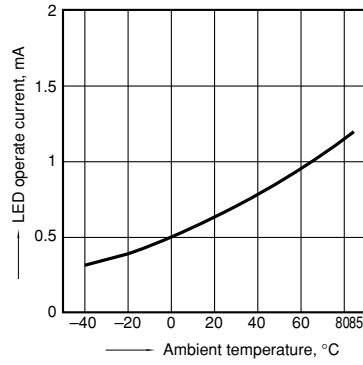
4. Turn off time vs. ambient temperature characteristics

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



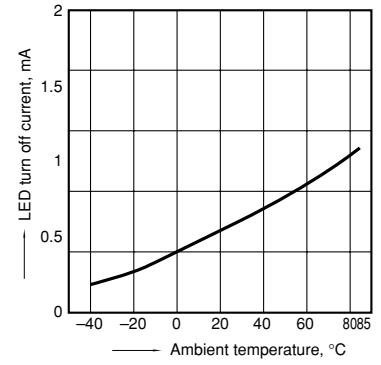
5. LED operate current vs. ambient temperature characteristics

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



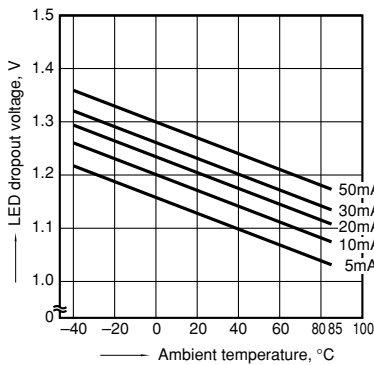
6. LED turn off current vs. ambient temperature characteristics

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



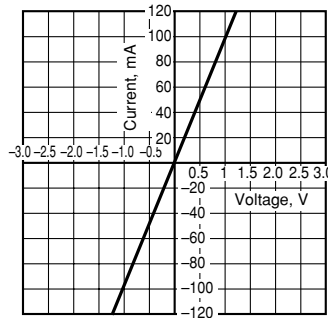
7. LED dropout voltage vs. ambient temperature characteristics

LED current: 5 to 50 mA



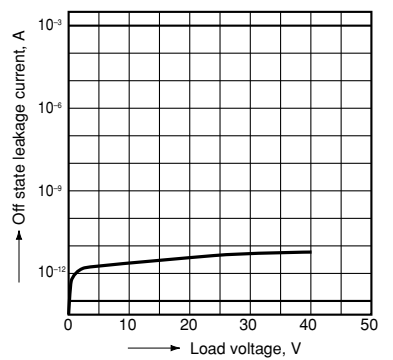
8. Current vs. voltage characteristics of output at MOS portion

Measured portion: between terminals 3 and 4
Ambient temperature: 25°C 77°F



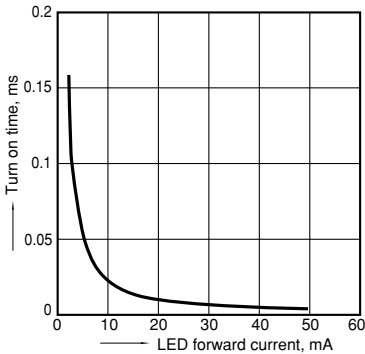
9. Off state leakage current vs. load voltage characteristics

Measured portion: between terminals 3 and 4
Ambient temperature: 25°C 77°F



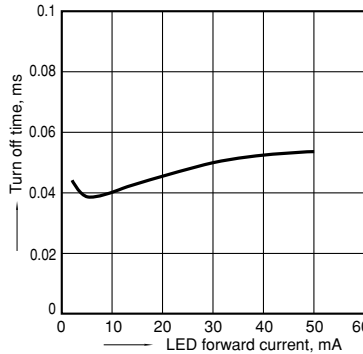
10. Turn on time vs. LED forward current characteristics

Measured portion: between terminals 3 and 4
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



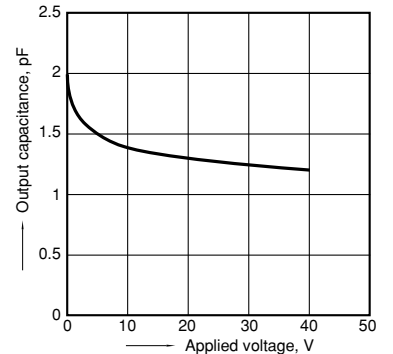
11. Turn off time vs. LED forward current characteristics

Measured portion: between terminals 3 and 4
Load voltage: Max. (DC); Continuous load current: Max. (DC); Ambient temperature: 25°C 77°F



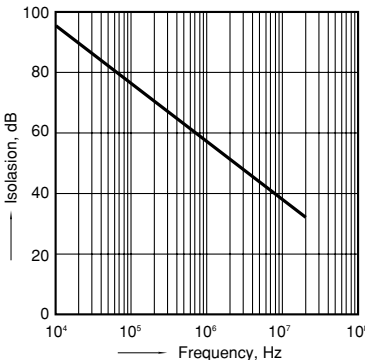
12. Output capacitance vs. applied voltage characteristics

Measured portion: between terminals 3 and 4
Frequency: 1 MHz, 30m Vrms;
Ambient temperature: 25°C 77°F



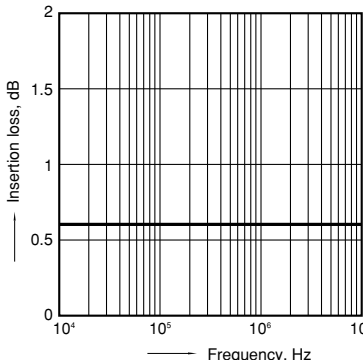
13. Isolation vs. frequency characteristics (50Ω impedance)

Measured portion: between terminals 3 and 4
Ambient temperature: 25°C 77°F



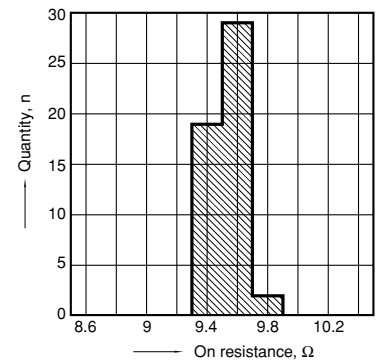
14. Insertion loss vs. frequency characteristics (50Ω impedance)

Measured portion: between terminals 3 and 4
Ambient temperature: 25°C 77°F



15. On resistance distribution

Measured portion: between terminals 3 and 4
Continuous load current: 120mA(DC)
Quantity, n=50; Ambient temperature: 25°C 77°F



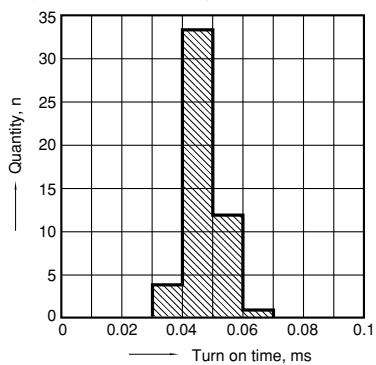
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16. Turn on time distribution

Load voltage: 40V(DC)

Continuous load current: 120mA(DC)

Quantity, n=50; Ambient temperature: 25°C 77°F

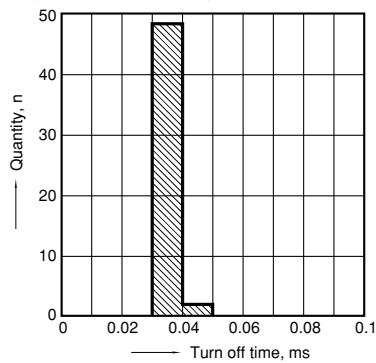


17. Turn off time distribution

Load voltage: 40V(DC)

Continuous load current: 120mA(DC)

Quantity, n=50; Ambient temperature: 25°C 77°F



18. LED operate current distribution

Load voltage: 40V(DC)

Continuous load current: 120mA(DC)

Quantity, n=50; Ambient temperature: 25°C 77°F

