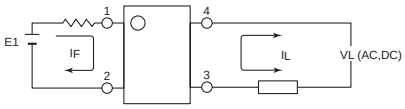
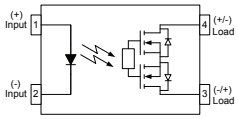
| Parameter | Symbol | Rating | Units |
|---|---|---|---|
| Load Voltage | $V_L$ | 350 | V |
| Load Current | $I_L$ | 0.13 | A |
| On-Resistance | $R_{on}$ | 14 | Ω |
| I/O Breakdown Voltage | V/IO | 2500 | Vrms |

(Unit: mm)

SOP-4




AC/DC




1. LED Anode
2. LED Cathode
3.4. Drain(MOS FET)

## APSEMI PhotoRelays

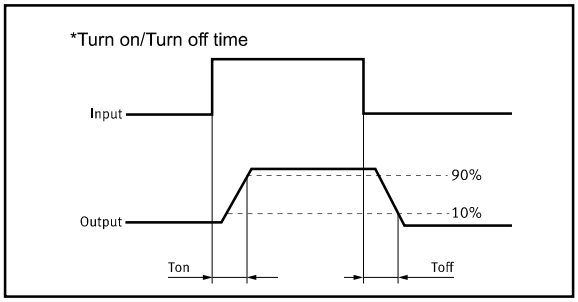
- Long life (No limit on mechanical and electrical lifetime)Bounce-free switching
- Higher speed and high frequency switching
- Higher sensitivity (less power consumption)
- Immunity to EMI or RFI
- No have voltaic arc, bounce, and noise More resistant to vibration and impact AC or DC load switching
- Small package size

## Applications

- Telecom/Datacom switching
- Multiplexers
- Meter reading systems
- Data acquisition
- Medical equipment
- Battery monitoring
- I/O Sub-Systems
- Robotics
- Aerospace
- Home/Safety security systems
- Process Control
- Energy Management
- Reed Relay EMR Replacement
- Programmable Controllers

**TPYES**

| Category | Output Rating | | Package | Part No. | Packing Quantity |
|---|---|---|---|---|---|
| | Load Voltage | Load Current | | | |
| AC/DC | 350V | 0.13A | SOP-4 | GAQY210S | 2000pcs /reel |



## Absolute Maximum Ratings (Ta = 25°C)

| Item | | Symbol | Value | Units | Note |
|---|---|---|---|---|---|
| Input | Continuous LED Current | $I_F$ | 50 | mA | |
| | Peak LED Current | $I_{FP}$ | 1000 | mA | f=100Hz, duty=1% |
| | LED Reverse Voltage | $V_R$ | 5 | V | |
| | Input Power Dissipation | $P_{In}$ | 75 | mW | |
| Output | Load Voltage | $V_L$ | 350 | V(AC peak or DC) | |
| | Load Current | $I_L$ | 0.13 | A | |
| | Peak Load Current | $I_{Peak}$ | 0.6 | A | 100ms(1 pulse) |
| | Output Power Dissipation | Pout | 300 | mW | |
| Total Power Dissipation | | $P_T$ | 350 | mW | |
| I/O Breakdown Voltage | | $V_{I/O}$ | 2500 | Vrms | RH=60%, 1min |
| Operating Temperature | | $T_{opr}$ | -40 to 85 | ℃ | |
| Storage Temperature | | $T_{stg}$ | -40 to 100 | ℃ | |
| Pin Soldering Temperature | | $T_{sol}$ | 260 | ℃ | 10 sec max. |

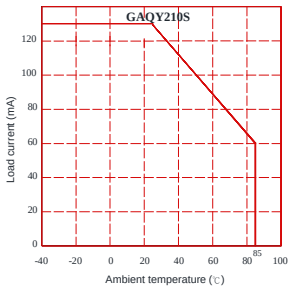
## Electrical Characteristics (Ta = 25°C)

| Item | | Symbol | MIN. | TYP. | MAX. | Units | Conditions |
|---|---|---|---|---|---|---|---|
| Input | LED Forward Voltage | $V_F$ | | 1.2 | 1.40 | V | $I_F$= 5 mA |
| | Operation LED Current | $I_{Fon}$ | | 0.5 | 2.0 | mA | |
| | Recovery LED Current | $I_{Foff}$ | | 0.35 | 0.5 | mA | |
| | Recovery LED Voltage | $V_{Foff}$ | 0.7 | | | V | |
| Output | On-Resistance | $R_{on}$ | | 14 | 20 | Ω | $I_F$=5mA,$I_L$=130mA, Time to flow is within 1 sec. |
| | Off-State Leakage Current | $I_{Leak}$ | | 0.1 | | uA | $V_L$=Rating |
| | Output Capacitance | $C_{out}$ | | 45 | | pF | $V_L$=0, f=1MHz |
| Transmission | Turn-On Time | $T_{on}$ | | 0.08 | 0.15 | ms | $I_F$=5mA, $I_L$=130mA, |
| | Turn-Off Time | $T_{off}$ | | 0.03 | 0.20 | ms | |
| Coupled | I/O Isolation Resistance | $R_{I/O}$ | $10^{10}$ | | | Ω | DC500V |
| | I/O Capacitance | $C_{I/O}$ | | 0.8 | 1.5 | pF | f=1MHz |

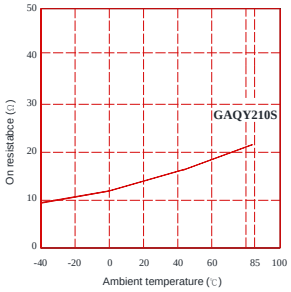
Please obey the following conditions to ensure proper device operation and resetting. Input LED current (Recommended value): IF ≥5mA and ≤30mA

## Engineering Data

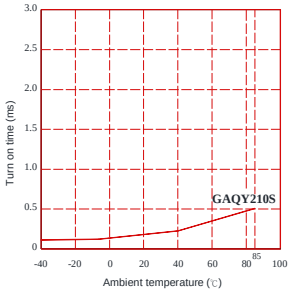
Load current Vs. Ambient temperature



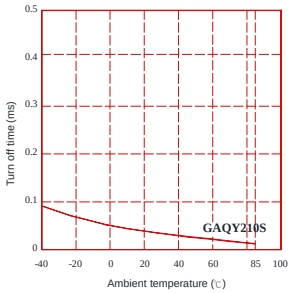

On resistance Vs. Ambient temperature



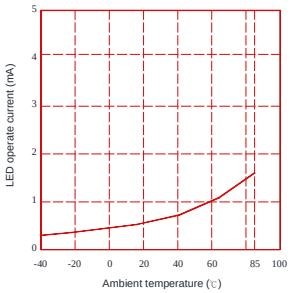

Turn on time Vs. Ambient temperature



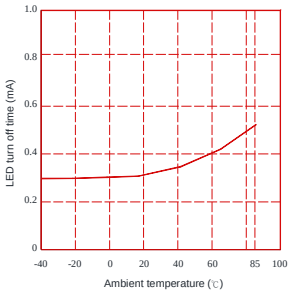

Turn off time Vs. Ambient temperature



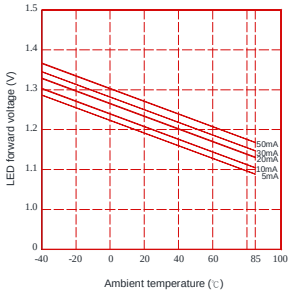

LED operate current Vs. Ambient temperature



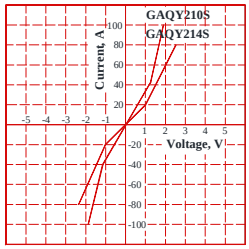

LED turn off current Vs. Ambient temperature



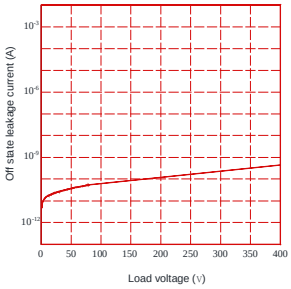

LED forward voltage Vs. Ambient temperature



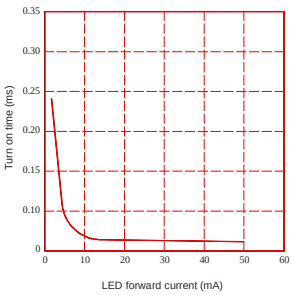

Voltage Vs. currennt characteristics of output at MOS portion



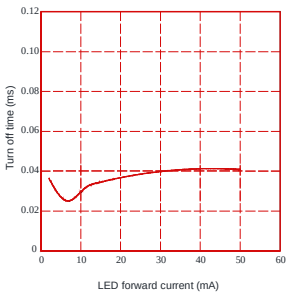

Off state leakage current Vs. Load voltage characteristics



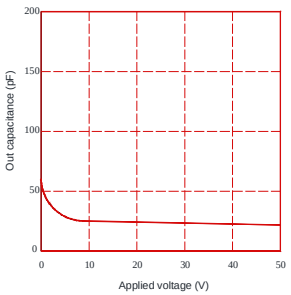

LED foward current Vs. turn on time characteristics




LED foward current Vs. turn off time characteristics

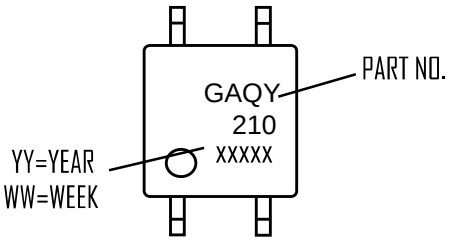



Applied voltage Vs. output capacitance characteristics

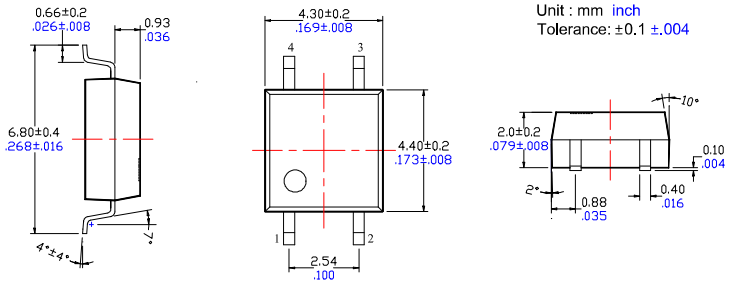


## Dimensions and Package

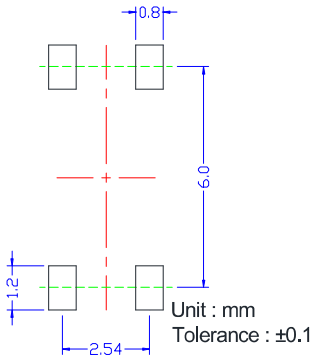
Marking



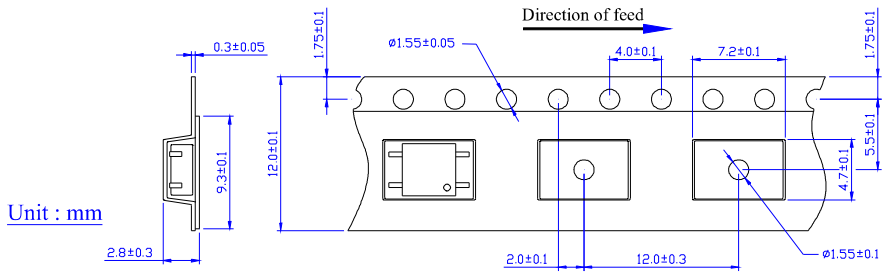

Surface mount terminal type



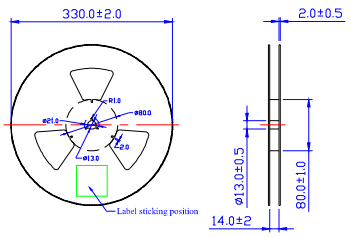

Recommended mounting pad (Top view)

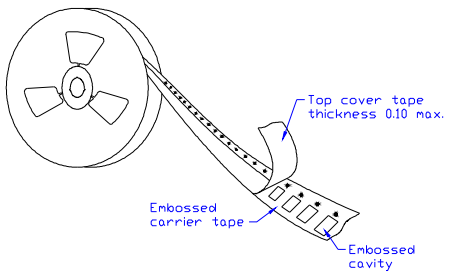



## Tape dimensions



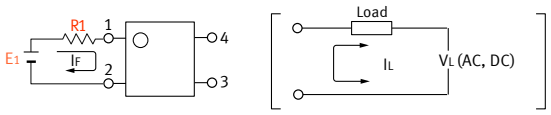

Dimensions of tape reel



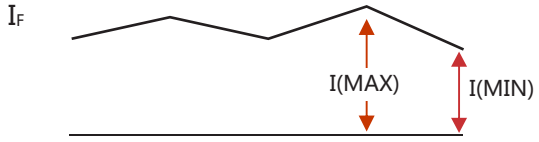
## Using Methods

Examples of resistance value to control LED forward current ($I_F$=5mA)




| E1 | R1 (Approx) |
|---|---|
| 3.3V | 300 Ω |
| 5.0V | 600 Ω |
| 12V | 1.9KΩ |
| 24V | 4.1KΩ |

LED forward current must be more than 5mA , at I(MIN) ,and less than 30mA , at I(MAX).




## Recommended Operating Conditions

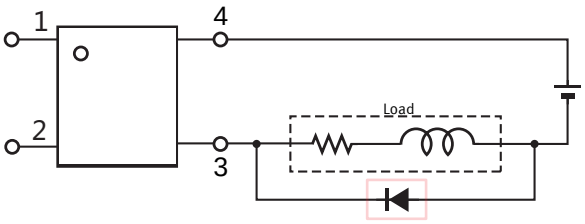
Please obey the following conditions to ensure proper device operation and resetting. Input LED current (Recommended value):

| Characteristic | Symbol | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|
| Forward current | $I_F$ | 5.0 | 7.0 | 30 | mA |

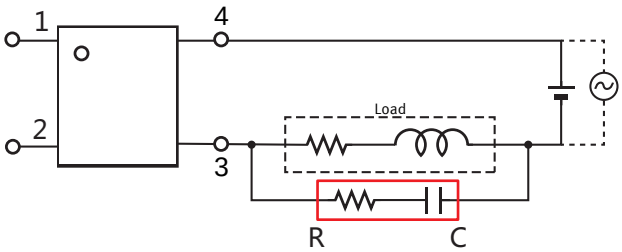
## Protection Circuit

Output spike voltages:if an inductive load generates spike voltages which exceed heabsolute maximum rating, the spike voltage shall be limited.

Clamp diode is connected in parallel with the load.
Absorb capacity with external diode.




CR Snubber is connected in parallel with the load.
Absorb capacity with buffer capacity.




When adding diodes, buffer circuits (C-R), and other protections, they need to be installed near the MOS RELAY to be effective.
Adding protection elements may result in a slow reset time, so adjust them according to the actual situation before use.

Note: When developing designs using this product, perform the expected performance of the equipment under the operating conditions recommended by the guidelines in this document. Continuous use under heavy loads (including, but not limited to, the application of high temperatures/current/voltage and significant changes in temperature, etc.) may result in deterioration of the reliability of this product.