



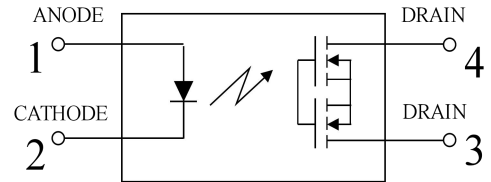
JOR212-2 Series

2A/60V MOSFET PhotoRelay

Description

The JOR212-2 PhotoRelay consist of a MOSFET、Photoelectric generator optically coupled to an infrared LED 。

Block Diagram and Package



PIN DEFINITION

- 1: Anode (LED)
- 2: Cathode (LED)
- 3, 4: Drain (MOS FET)

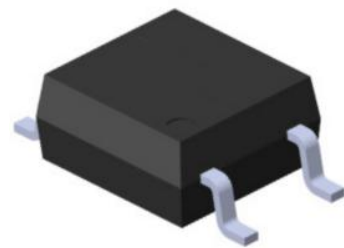
Features

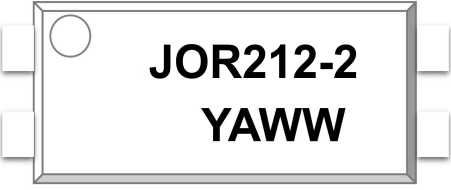

- Control 60 V AC or DC voltage
- Switch 2A load
- Control low level analog signal
- High sensitivity, low conductivity resistance
- High isolation voltage 3750V
- Pb free and RoHS compliant

Applications

- Communications products (personal computers, laptops)
- Modem/sensor
- Mobile phones/security equipment
- Measuring and testing equipment
- Plant automation equipment
- High-speed inspection machines

PACKAGE OUTLINE



| ORDERING AND MARKING INFORMATION   |   |
|--|---|
| MARKING INFORMATION  |   |
|   | <p><b>JOR</b> : Company Abbr.<br/> <b>212-2</b> : Part Number<br/> <b>Y</b> : Fiscal Year<br/> <b>A</b> : Manufacturing Code<br/> <b>WW</b> : Work Week</p> |
| ORDERING INFORMATION   | LABEL INFORMATION   |
| <p><b>JOR212-2(Y)(Z)-G</b></p>   |   |
| <p><b>JOR</b> – Company Abbr<br/> <b>212-2</b> – Part Number<br/> <b>Y</b> – Lead Form Option (M/S/SL/None)<br/> <b>Z</b> – Tape and Reel Option (T1/T2)<br/> <b>G</b> – Green</p> |   |

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

| Parameter             |                                   | Symbol            | Rating          | Unit | Parameter                            |
|-----------------------|-----------------------------------|-------------------|-----------------|------|--------------------------------------|
| Input                 | Input forward current             | I <sub>F</sub>    | 50              | mA   |                                      |
|                       | Input reverse voltage             | V <sub>R</sub>    | 3               | V    |                                      |
|                       | Input forward current (pulsed)    | I <sub>FP</sub>   | 1               | A    | f =100 Hz, Duty cycle= 0.1%          |
|                       | Input power dissipation           | P                 | 75              | mW   |                                      |
| Output                | OFF-state output terminal voltage | V <sub>L</sub>    | 60              | V    |                                      |
|                       | ON-state current                  | I <sub>L</sub>    | 2               | A    |                                      |
|                       | Peak leakage current              | I <sub>peak</sub> | 6               | A    | 100 ms (1 shot), V <sub>L</sub> = DC |
|                       | Output power dissipation          | P <sub>out</sub>  | 150             | mW   |                                      |
| I/O Isolation voltage |                                   | V <sub>iso</sub>  | 3750            | VAC  |                                      |
| Limit temperature     | Operating temperature             | T <sub>opr</sub>  | -40°C ~ + 85°C  | °C   | Do not freeze at low temperatures    |
|                       | Storage temperature               | T <sub>stg</sub>  | -40°C ~ + 100°C |      |                                      |

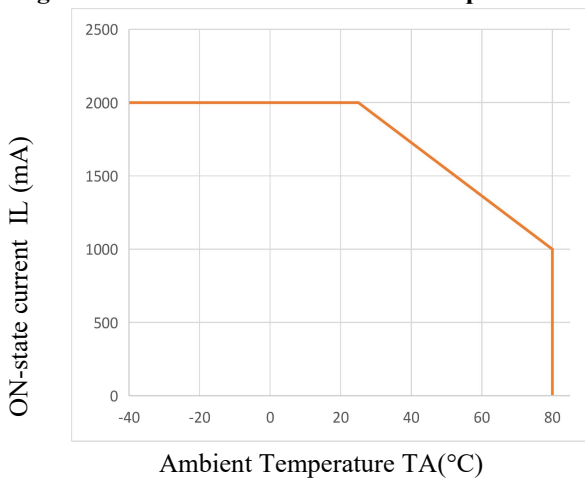
**Electro-optical Characteristics (Ta=25°C)**

| Parameter                |                          | Symbol             | Condition   | Min.  | Typ. | Max. | Unit |
|--------------------------|--------------------------|--------------------|---|-------|------|------|------|
| Input                    | Trigger LED current      | I <sub>Fon</sub>   | I <sub>L</sub> =2A  | 0.5   | 1.9  | 3    | mA   |
|                          | Return LED current       | I <sub>Foff</sub>  | I <sub>L</sub> =2A  | -     | 1.6  | 3    | mA   |
|                          | Input Forward Voltage    | V <sub>F</sub>     | I <sub>F</sub> =5mA   | 1     | 1.3  | 1.4  | V    |
| Output                   | Output On-resistance     | R <sub>on</sub>    | I <sub>F</sub> =5mA, I <sub>L</sub> =2A, Electricity less than 1 second | -     | 0.58 | 1.5  | Ω    |
|                          | Output Leakage Current   | I <sub>Lleak</sub> | I <sub>F</sub> =0mA, V <sub>L</sub> =60V                                | -     | -    | 1000 | nA   |
| Transfer Characteristics | Turn-on time             | T <sub>on</sub>    | I <sub>F</sub> =5mA, I <sub>L</sub> =2A                                 | 0.2   | 4.8  | 5    | ms   |
|                          | Turn-off time            | T <sub>off</sub>   |   | 0.05  | 0.15 | 1    | ms   |
|                          | Input-Output Capacitance | C <sub>iso</sub>   | f=1MHz, V <sub>B</sub> =0   | -     | 0.8  | 1.5  | pF   |
|                          | Isolation Resistance     | R <sub>iso</sub>   | 500V DC   | 1,000 | -    | -    | MΩ   |

Note: Recommended values for LED forward current I<sub>F</sub>=5 to 10 mA

**Typical Performance Curves**

**Fig.1 ON-state current vs Ambient Temperature**



**Fig.2 Output On-resistance vs. Ambient Temperature**

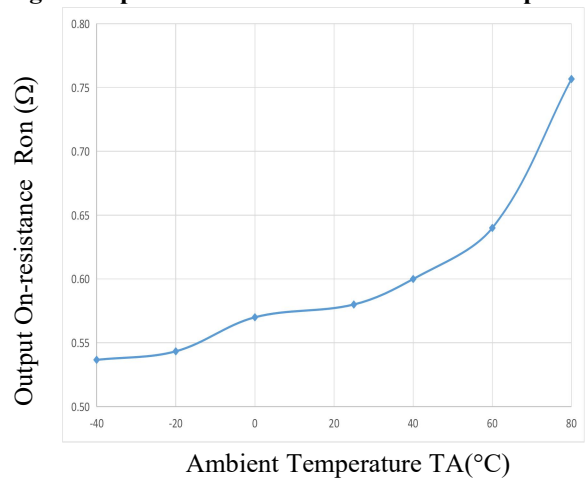
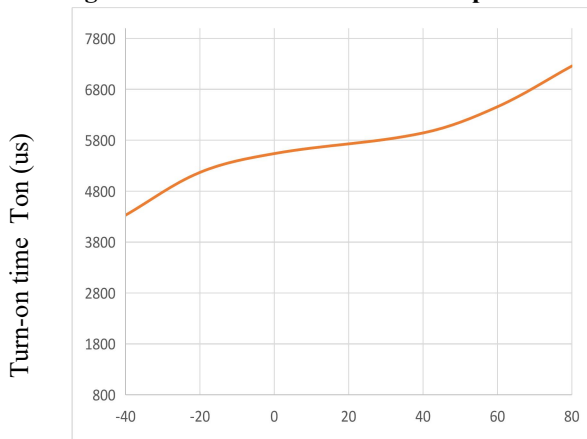
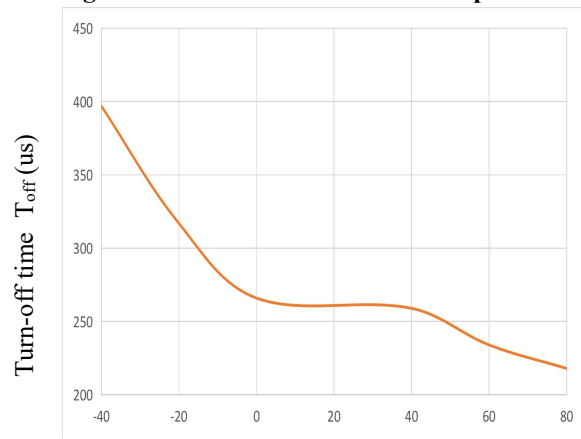


Fig.3 Turn-on time vs Ambient Temperature



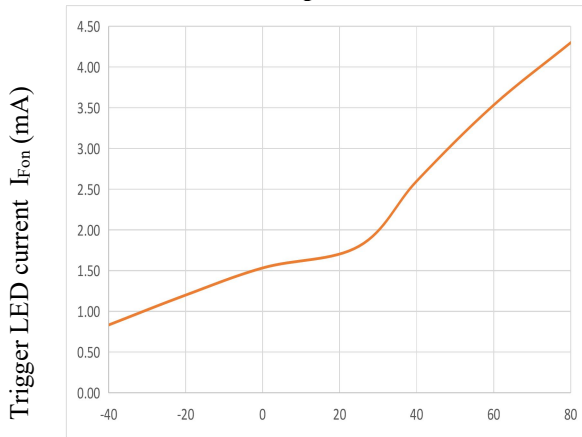
Ambient Temperature  $T_A$ (°C)

Fig.4 Turn-off time vs Ambient Temperature



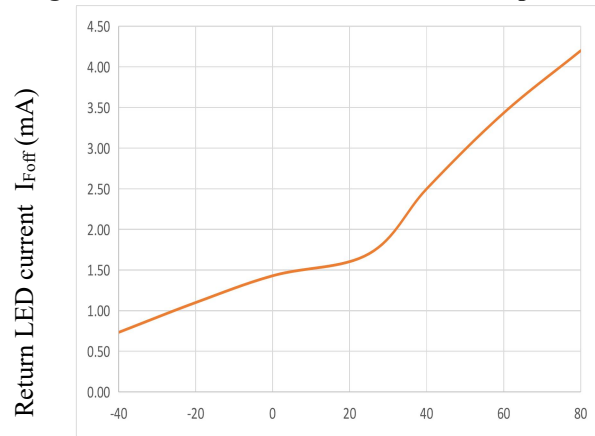
Ambient Temperature  $T_A$ (°C)

Fig.5 Trigger LED current vs Ambient Temperature



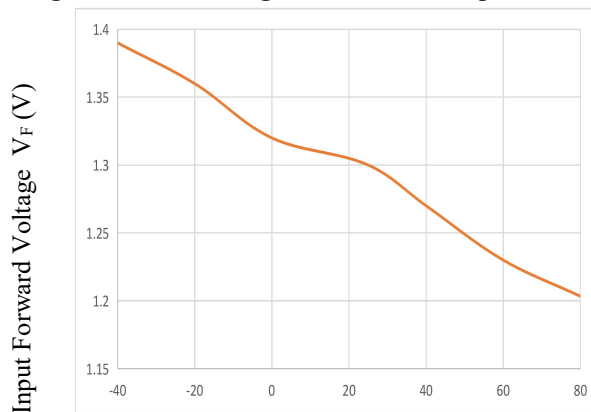
Ambient Temperature  $T_A$ (°C)

Fig.6 Return LED current vs Ambient Temperature



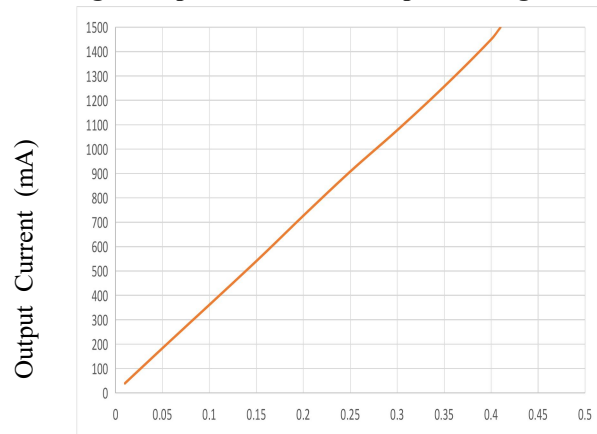
Ambient Temperature  $T_A$ (°C)

Fig.7 Forward Voltage vs Ambient Temperature



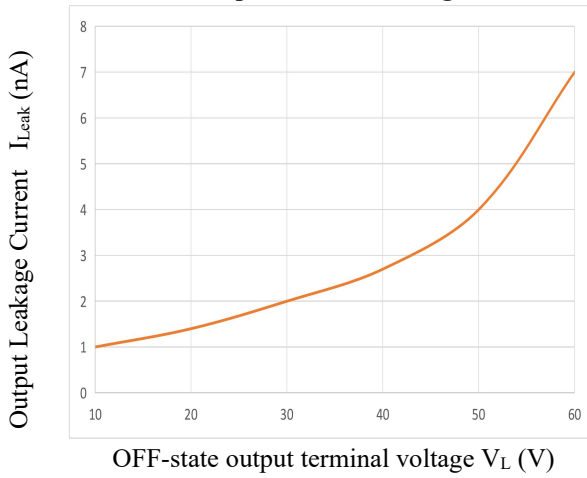
Ambient Temperature  $T_A$ (°C)

Fig.8 Output Current vs Output Voltage

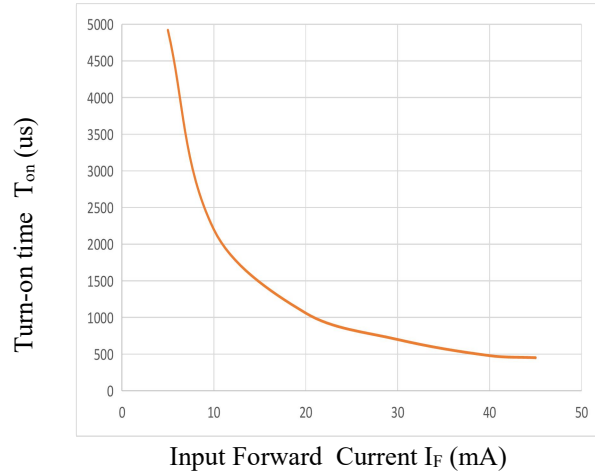


Output Voltage (V)

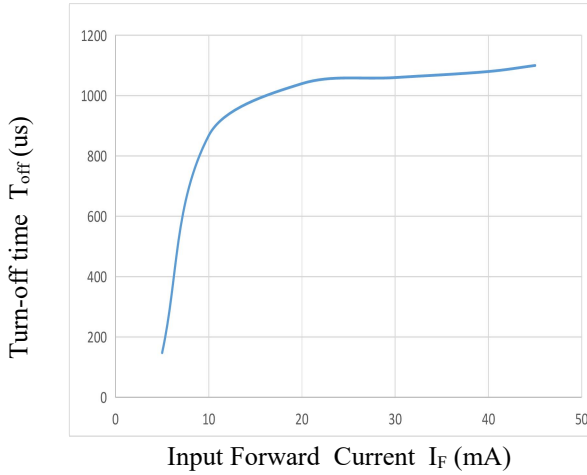
**Fig.9 Output Leakage Current vs OFF-state output terminal voltage**



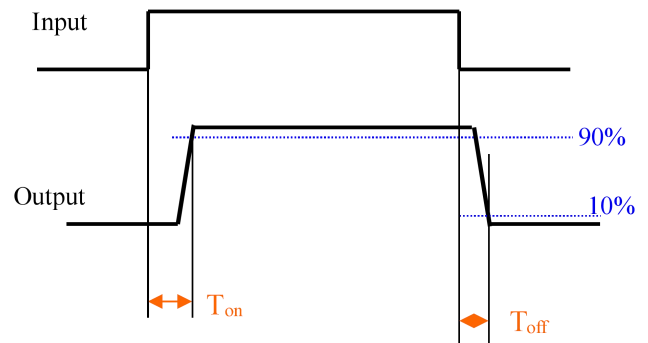
**Fig.10 Turn-on time vs Input Forward Current**



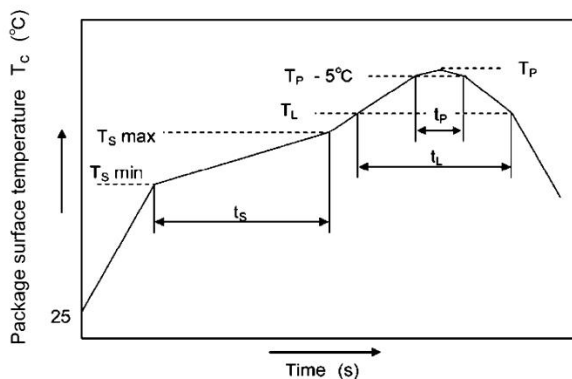
**Fig.11 Turn-off time vs Input Forward Current**



★ Turn-on time and Turn-off time



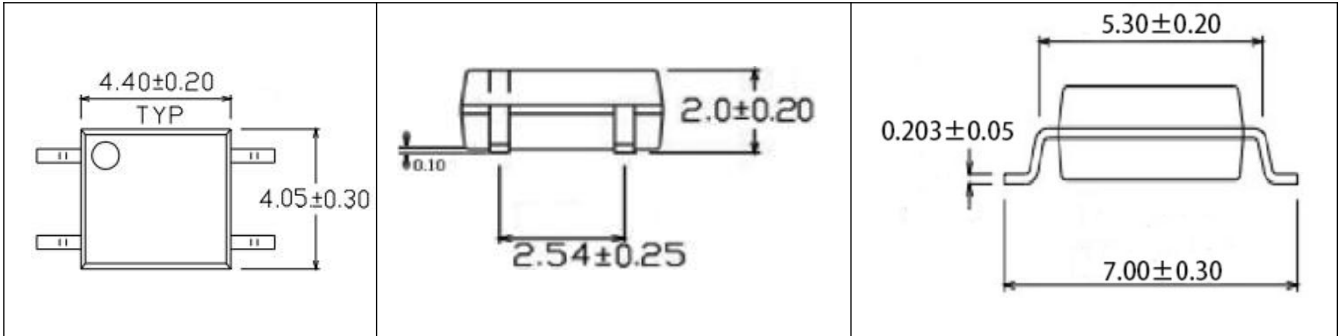
**Solder Reflow Profile**



|  | Symbol | Min | Max | Unit |
|--|--------|-----|-----|------|
| Preheat temperature  | $T_s$  | 150 | 200 | °C   |
| Preheat time   | $t_s$  | 60  | 120 | s    |
| Ramp-up rate ( $T_L$ to $T_P$ )                            |        |     | 3   | °C/s |
| Liquidus temperature                                       | $T_L$  | 217 |     | °C   |
| Time above $T_L$   | $t_L$  | 60  | 150 | s    |
| Peak temperature   | $T_P$  |     | 260 | °C   |
| Time during which $T_c$ is between ( $T_P - 5$ ) and $T_P$ | $t_p$  |     | 30  | s    |
| Ramp-down rate ( $T_P$ to $T_L$ )                          |        |     | 6   | °C/s |

**Outline Dimensions**

Unit: mm



4-pin SOP

**Packing**

■ Summary table

| Package Type | Packing Form      | Quantity per Reel | Quantity per Box | Quantity per Carton | Antistatic Bag Specification | Box Specification | Carton Specification | Note                  |
|--------------|-------------------|-------------------|------------------|---------------------|------------------------------|-------------------|----------------------|-----------------------|
| SOP-4        | Reel(φ330mm Blue) | 3k pcs/reel       | 2Reels/box       | 10boxes/ctn         | 380*380mm                    | 340*60*340mm      | 620*360*365mm        | Guard band 200mm min. |

■ SOP-4 (Reel)

- 1) Qty/reel: 3000 pcs. Qty/ctn: 60000 pcs.
- 2) Inner packing: 3000pcs/reel.
- 3) Schematic: (unit:mm)

