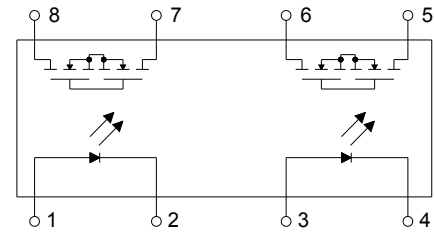


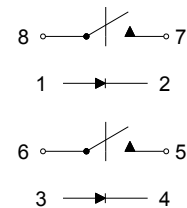
● Description

The KAQW214 series contains two normally open switches that can be used as two independent SPST relays or as one DPST relay. The relays is constructed using a GaAlAs LED for actuation control and an integrated monolithic dies for the switch output. The die, fabricated in a high-voltage dielectrically isolated technology, is comprised of a photodiode array, switch control circuitry and MOSFET switches.

● Schematic



DUAL 1 FORM A
NORMALLY OPEN



● Features

1. Normally open, double pole single throw
2. Control 400V AC or DC voltage
3. Switch 130mA loads
4. Controls low-level analog signals
5. High sensitivity, low ON resistance
6. Low-level off-state leakage current
7. High isolation voltage
8. Pb free and RoHS compliant
9. Agency Approvals :
 - UL 508 / CUL C22.2 No.14-M91, File No. E108430
 - FIMKO EN60950

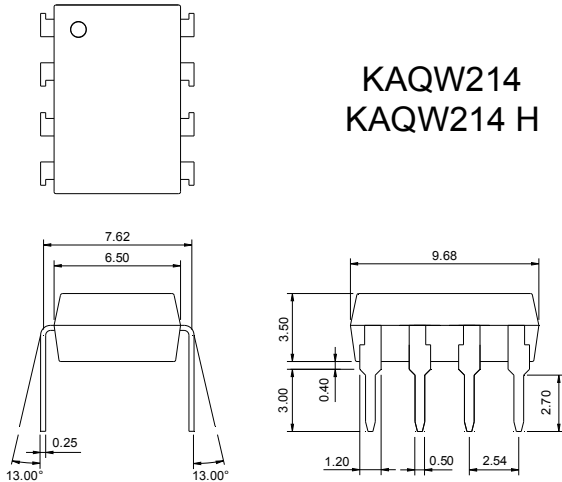
● Application

- Telecommunications (PC, electronic notepad)
- Modem
- Telephone equipment
- Security equipment
- Sensors
- Measuring and testing equipment
- Factory automation equipment
- High speed inspection machines

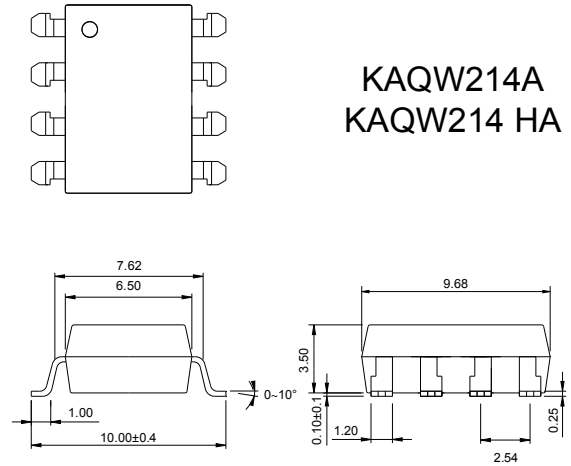
● **Outside Dimension**

Unit : mm

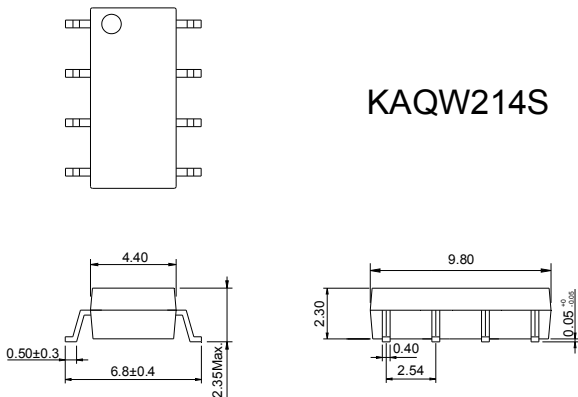
1. Dual-in-line type.



2. Surface mount type.

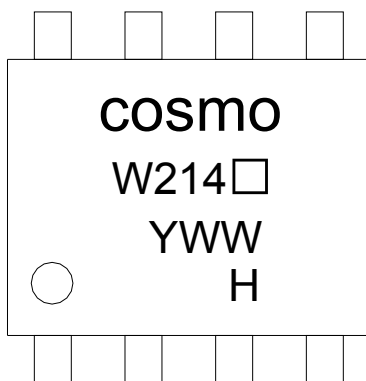


3. Small outline for surface mount type.



TOLERANCE : ±0.2mm

● **Device Marking**



Notes :

cosmo

W214 : Pin forming

YWW Y : Year code / W : Week code

H High isolation voltage series only

● **Absolute Maximum Ratings**

(Ta=25°C)

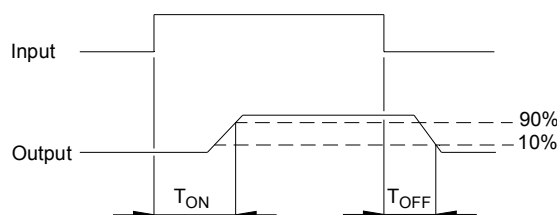
| Item | | Symbol | Rating | | Unit |
|----------------------------------|----------------------------|-----------|-----------------|----------------|-----------------|
| Input | Continuous forward current | I_F | 50 | | mA |
| | Peak forward current | I_{FP} | 1 | | A |
| | Reverse voltage | V_R | 5 | | V |
| | Power dissipation | P_{in} | 100 | | mW |
| | Derate linearly from 25°C | - | 1.3 | | mW/°C |
| Output | Breakdown voltage | V_B | 400 | | V |
| | Continuous load current | I_L | 130 | | mA |
| | Power dissipation | P_{out} | 500 | | mW |
| Isolation voltage | | V_{iso} | KAQW214S | KAQW214 | KAQW214H |
| | | | 1500Vrms | 3750Vrms | 5000Vrms |
| Isolation resistance (Vio=500V) | | R_{iso} | $\geq 10^{10}$ | | Ω |
| Total power dissipation | | P_t | 550 | | mW |
| Derate linearly from 25°C | | - | 2.5 | | mW/°C |
| Operating temperature | | T_{opr} | -40 to +85 | | °C |
| Storage temperature | | T_{stg} | -40 to +125 | | °C |
| Junction temperature | | T_j | 100 | | °C |
| Soldering temperature 10 seconds | | T_{sot} | 260 | | °C |

● **Electro-optical Characteristics**

(Ta=25°C)

| Parameter | | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|-----------------|---------------------------|------------|----------------------------|------|------|------|----------|
| Input | Forward voltage | V_F | $I_F=10mA$ | - | 1.2 | 1.5 | V |
| | Operation input current | I_{FON} | $V_L=20V, I_L=100mA$ | - | - | 3.0 | mA |
| | Recovery input current | I_{FOFF} | $V_L=20V, I_L \leq 5\mu A$ | 0.2 | - | - | mA |
| Output | Breakdown voltage | V_B | $I_B=50\mu A$ | 400 | - | - | V |
| | Off-state leakage current | I_{LEAK} | $V_L=400V, I_F=0mA$ | - | 0.2 | 1.0 | μA |
| I/O capacitance | | C_{iso} | $V_B=0V, f=1MHz$ | - | 6 | - | pF |
| ON resistance | | R_{ON} | $I_F=10mA, I_L=100mA$ | - | 20 | 30 | Ω |
| Turn-on time | | T_{ON} | $I_F=10mA, V_L=20V$ | - | 0.3 | 1.0 | ms |
| Turn-off time | | T_{OFF} | $I_L=100mA, t=10ms$ | - | 0.1 | 1.0 | ms |

● **Turn-on / Turn-off Time**



● Schematic and Wiring Diagrams

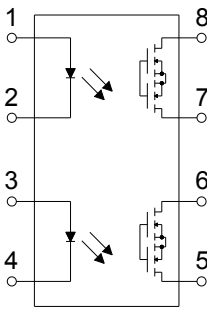
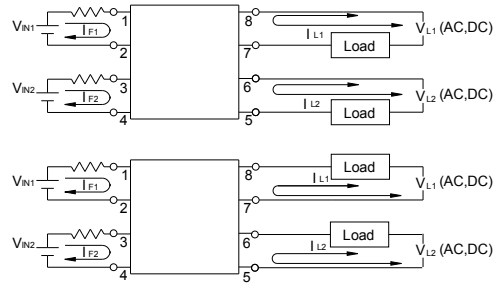
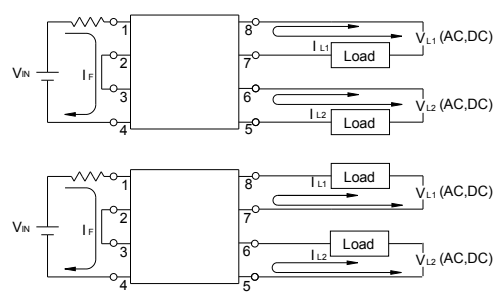
| Schematic | Output Configuration | Load | Connection | Wiring Diagrams |
|---|----------------------|----------|------------|--|
|  | 2a | AC DC | - | <p>(1) Two independent 1 Form A use</p>  <p>(2) 2 Form A use</p>  |

Fig.1 Load Current vs. Ambient Temperature

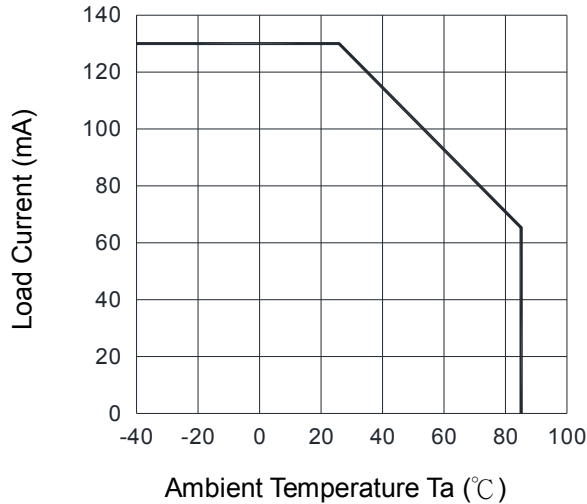


Fig.2 On Resistance vs. Ambient Temperature

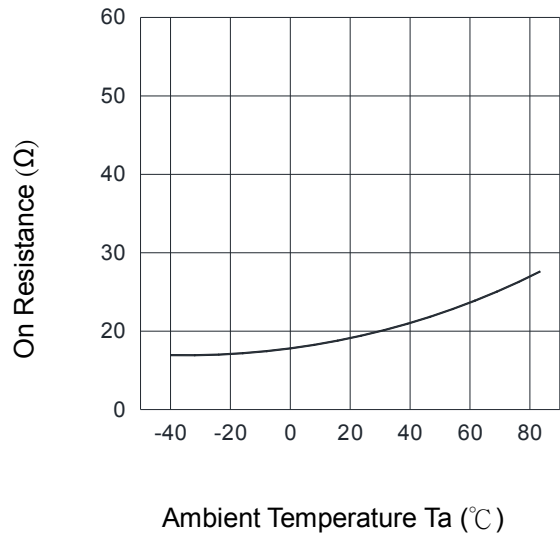


Fig.3 Turn-on Time vs. Ambient Temperature

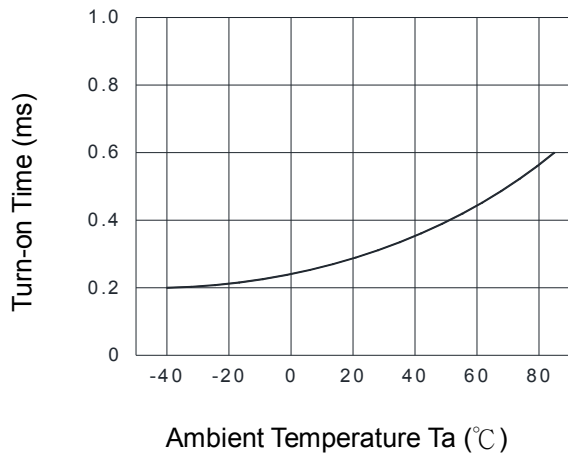


Fig.4 Turn-off Time vs. Ambient Temperature

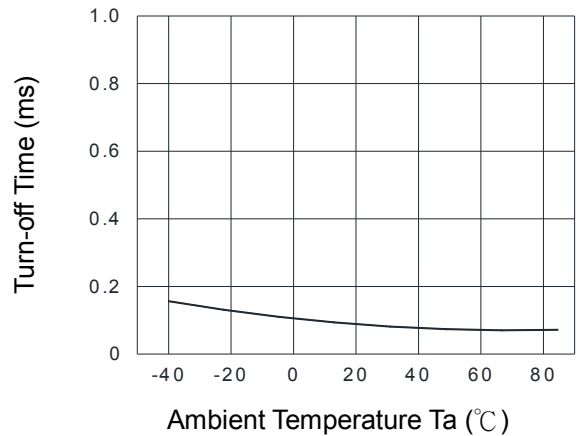


Fig.5 LED Operate Current vs. Ambient Temperature

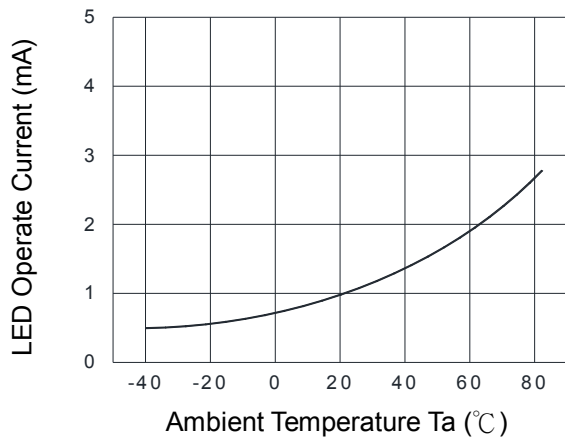


Fig.6 LED Turn-off Current vs. Ambient Temperature

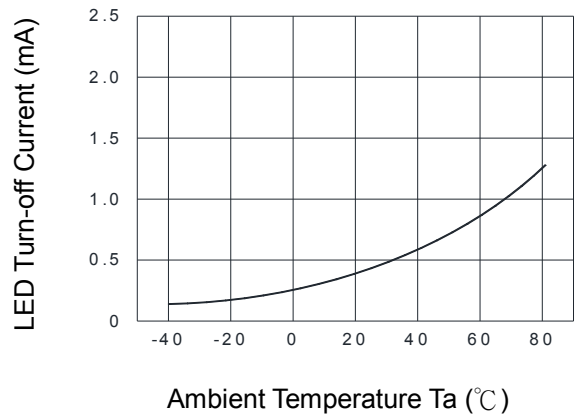


Fig.7 LED Dropout Voltage vs. Ambient Temperature

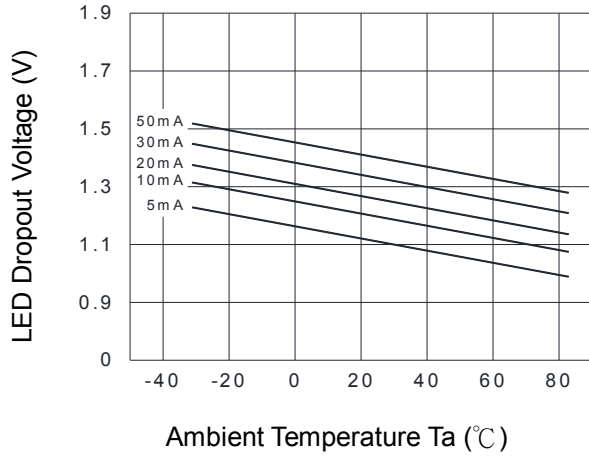


Fig.8 Voltage vs. Current Characteristics of Output at MOSFET Portion

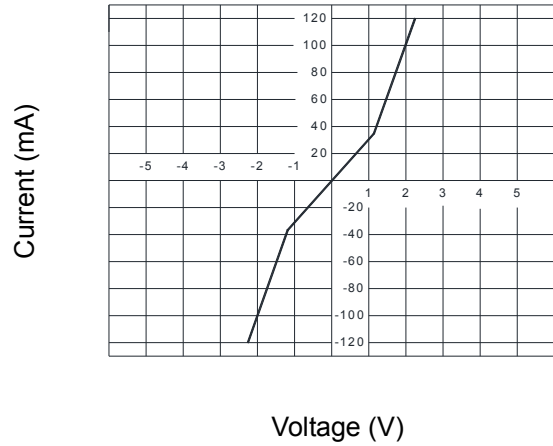


Fig.9 Turn-on Time vs. LED Forward Current

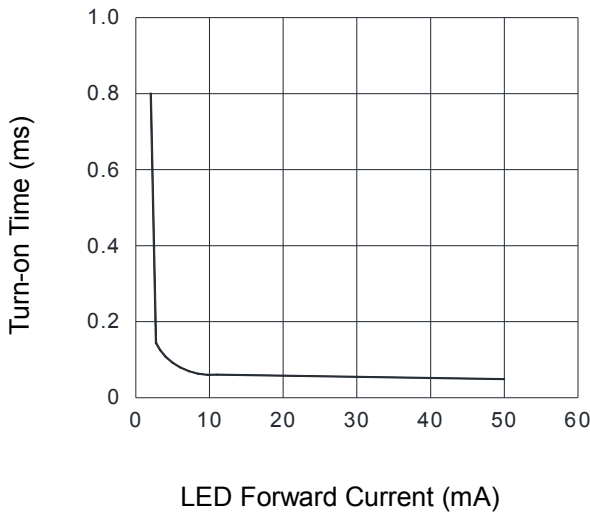


Fig.10 Off-state Leakage Current vs. Load Voltage

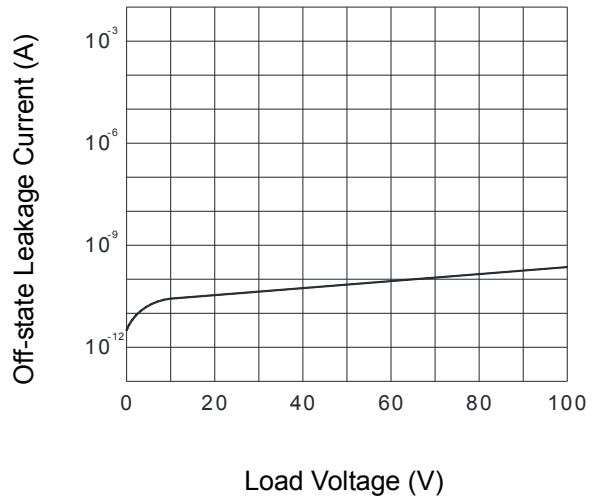


Fig.11 Turn-off Time vs. LED Forward Current

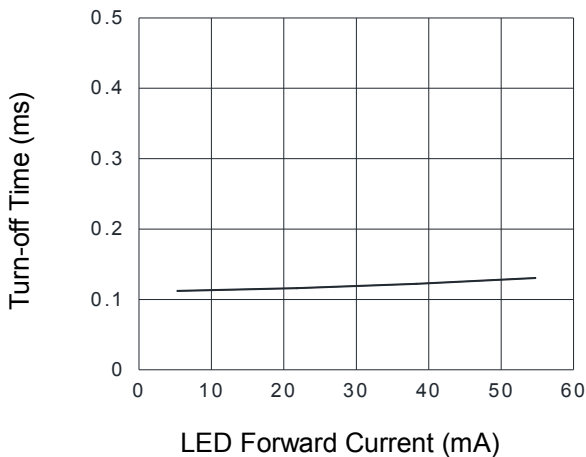
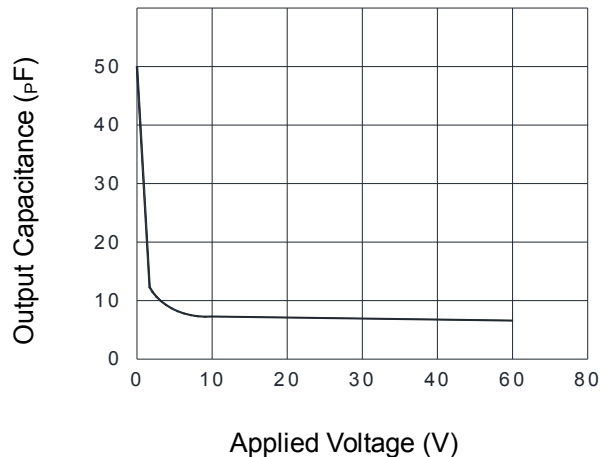
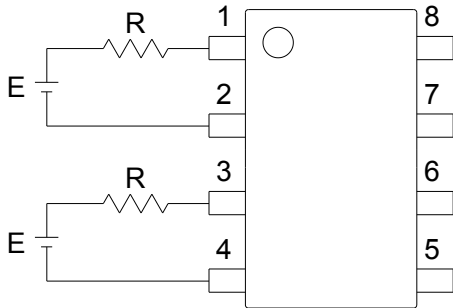


Fig.12 Output Capacitance vs. Applied Voltage



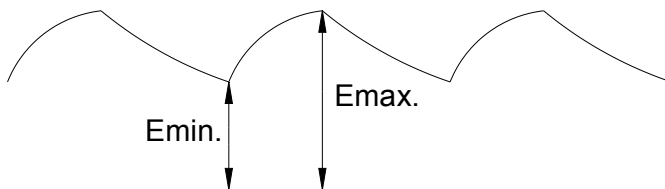
● **Using Methods**

Examples of resistance value to control LED forward current ($I_f=5\text{mA}$)

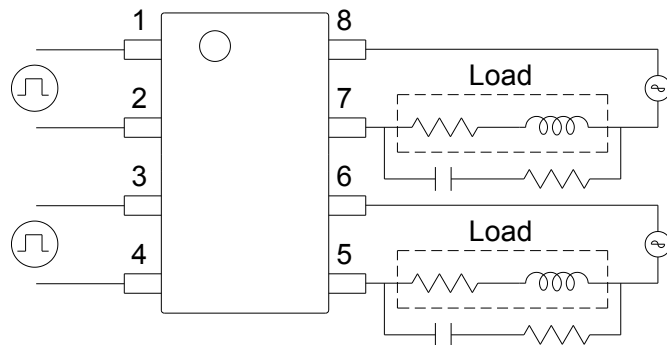
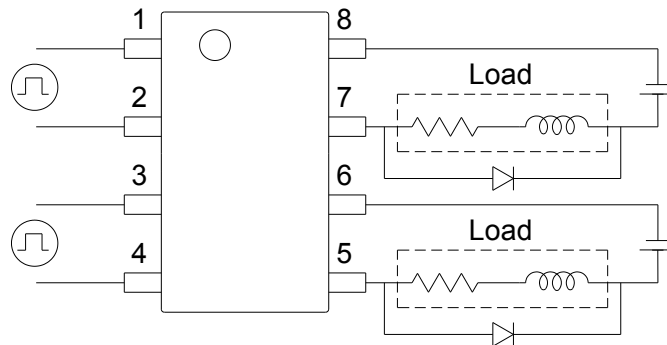


| E | R |
|------|-----------------------|
| 3.3V | Approx. 330 Ω |
| 5V | Approx. 640 Ω |
| 12V | Approx. 1.9K Ω |
| 15V | Approx. 2.5K Ω |
| 24V | Approx. 4.1K Ω |

1. LED forward current must be more than 5mA , at E min.
2. LED forward current must be less than 50mA , at E max.



Regulate the spike voltage generated on the inductive load as follows :



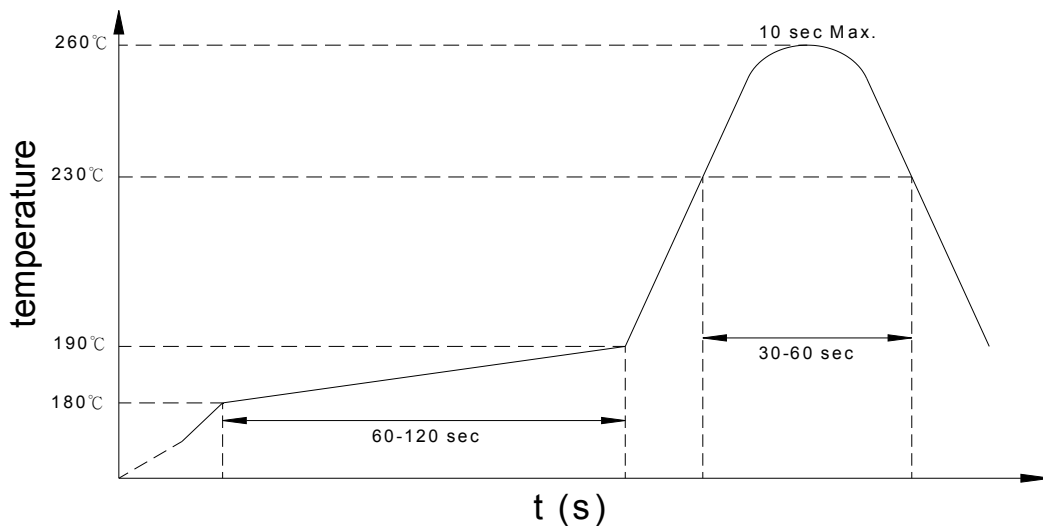
R-C Snubber

● **Recommended Soldering Conditions**

(a) Infrared reflow soldering :

- Peak reflow soldering : 260°C or below (package surface temperature)
- Time of peak reflow temperature: 10 sec
- Time of temperature higher than 230°C : 30-60 sec
- Time to preheat temperature from 180~190°C : 60-120 sec
- Number of reflows : Two
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

Recommended Temperature Profile of Infrared Reflow



(b) Wave soldering :

- Temperature : 260°C or below (molten solder temperature)
- Time : 10 seconds or less
- Preheating conditions: 120°C or below (package surface temperature)
- Number of times : One
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

(c) Cautions :

- Fluxes : Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.
- Avoid shorting between portion of frame and leads.

● **Numbering System**

KAQW214 X (Y)

Note :

KAQW214 = Part No.

X = Lead form option (blank 、 S 、 A 、 H or HA)

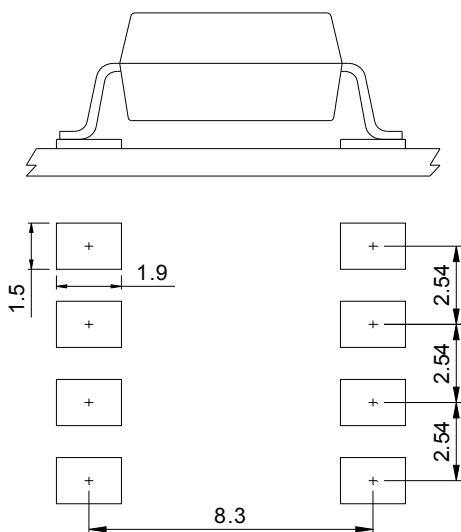
Y = Tape and reel option (TL 、 TR)

| Option | Description | Packing quantity |
|---------|--|---------------------|
| A (TL) | surface mount type package + TL tape & reel option | 1000 units per reel |
| A (TR) | surface mount type package + TR tape & reel option | 1000 units per reel |
| HA (TL) | surface mount type package + TL tape & reel option | 1000 units per reel |
| HA (TR) | surface mount type package + TR tape & reel option | 1000 units per reel |
| S (TL) | small outline for surface mount type package + TL tape & reel option | 2000 units per reel |
| S (TR) | small outline for surface mount type package + TR tape & reel option | 2000 units per reel |

● **Recommended Pad Layout for Surface Mount Lead Form**

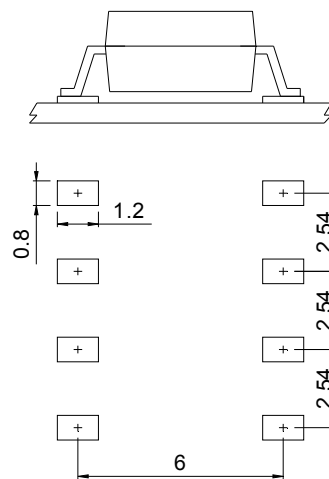
1. Surface mount type.

8-pin SMD



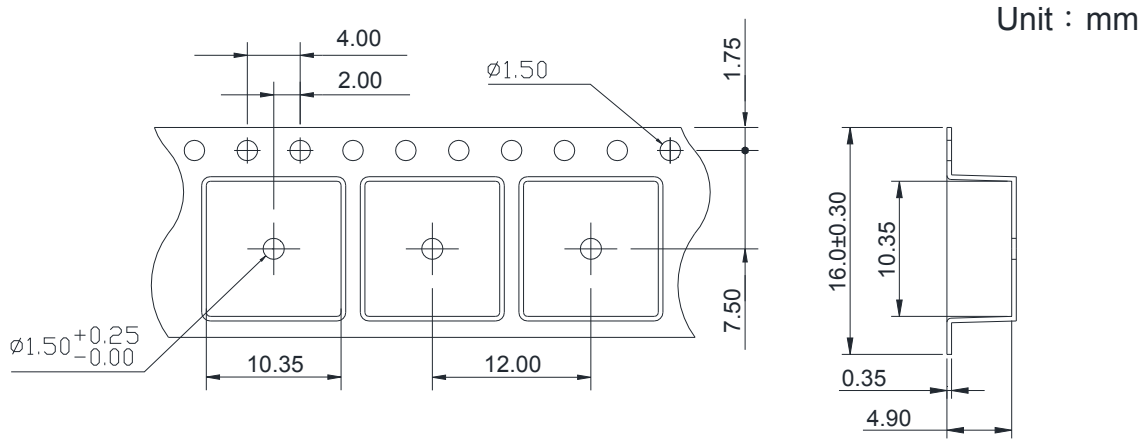
2. Small outline for surface mount type.

8-pin SOP



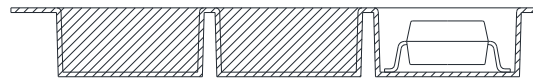
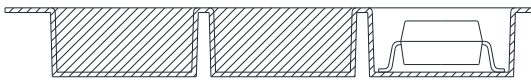
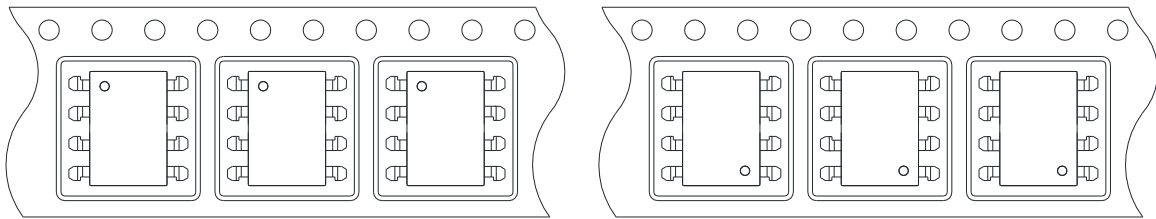
Unit : mm

● 8-pin SMD Carrier Tape & Reel



TL

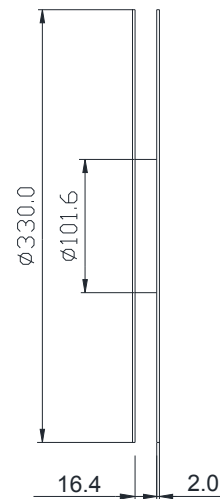
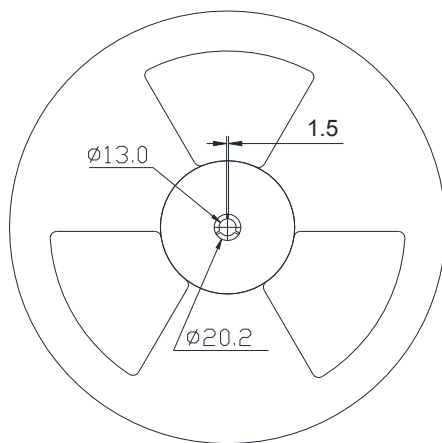
TR



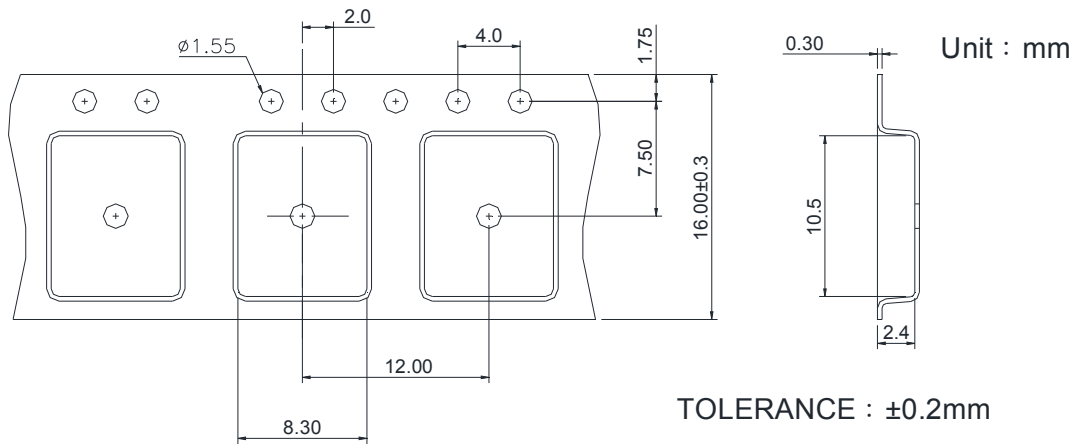
Direction of feed from reel



Direction of feed from reel

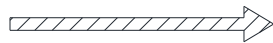
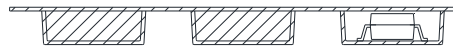
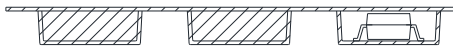
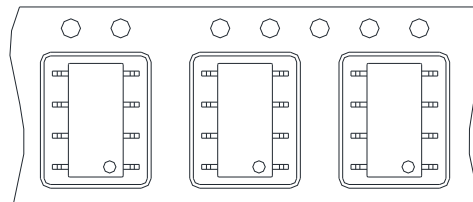
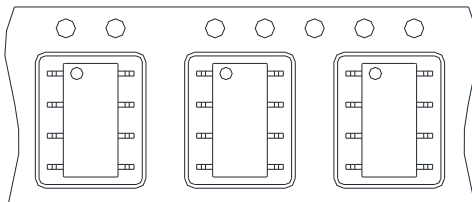


● 8-pin SOP Carrier Tape & Reel



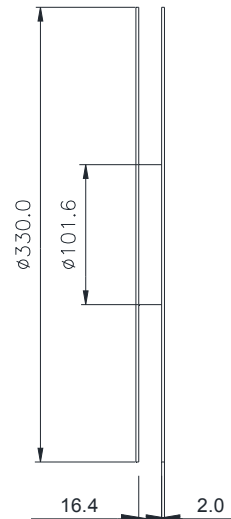
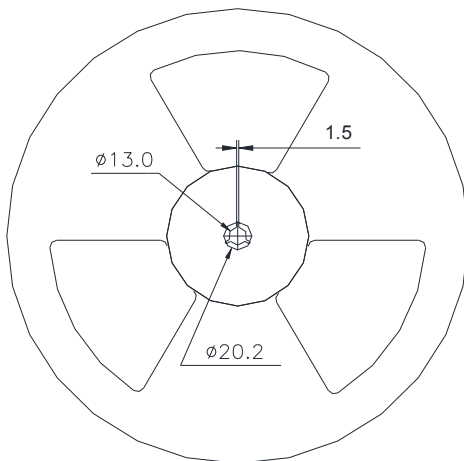
TL

TR



Direction of feed from reel

Direction of feed from reel





KAQW214 Series

8PIN 400V N.O. TYPE

SOLID STATE RELAY-MOSFET OUTPUT

● Application Notice

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- c. Audio / Video
- d. Instrumentation
- e. Electrical application
- f. Measurement equipment
- g. Consumer electronics
- h. Telecommunication

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- b. Space application
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- d. Nuclear power control
- e. Equipment used for automotive vehicles, trains, ships...etc.

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