

RV1S2752Q

R08DS0189EJ0200

Rev.2.00

Mar 09, 2023

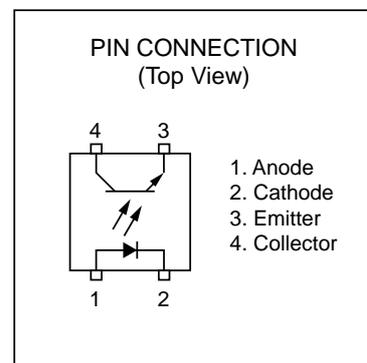
AUTOMOTIVE HIGH ISOLATION VOLTAGE, 4-PIN SOP (SO4) PHOTOCOUPLER

DESCRIPTION

The RV1S2752Q is an optically coupled isolator containing an AlGaAs LED and an NPN silicon phototransistor. The package is a small outline package (SOP) type and has a shield effect to cut the ambient light. The RV1S2752Q features high isolation voltage and wide operating temperature (-40 to +135 °C), which is suitable for automotive application.

FEATURES

- Operating ambient temperature ($T_A = -40$ to $+135$ °C)
- High isolation voltage ($BV = 3\ 750$ Vr.m.s.)
- Small package (SO4)
- Pb-free product
- AEC-Q100 (Grade 1: $T_A = -40$ to $+125$ °C) compliant
- Safety standard
- •UL : UL1577, Double protection

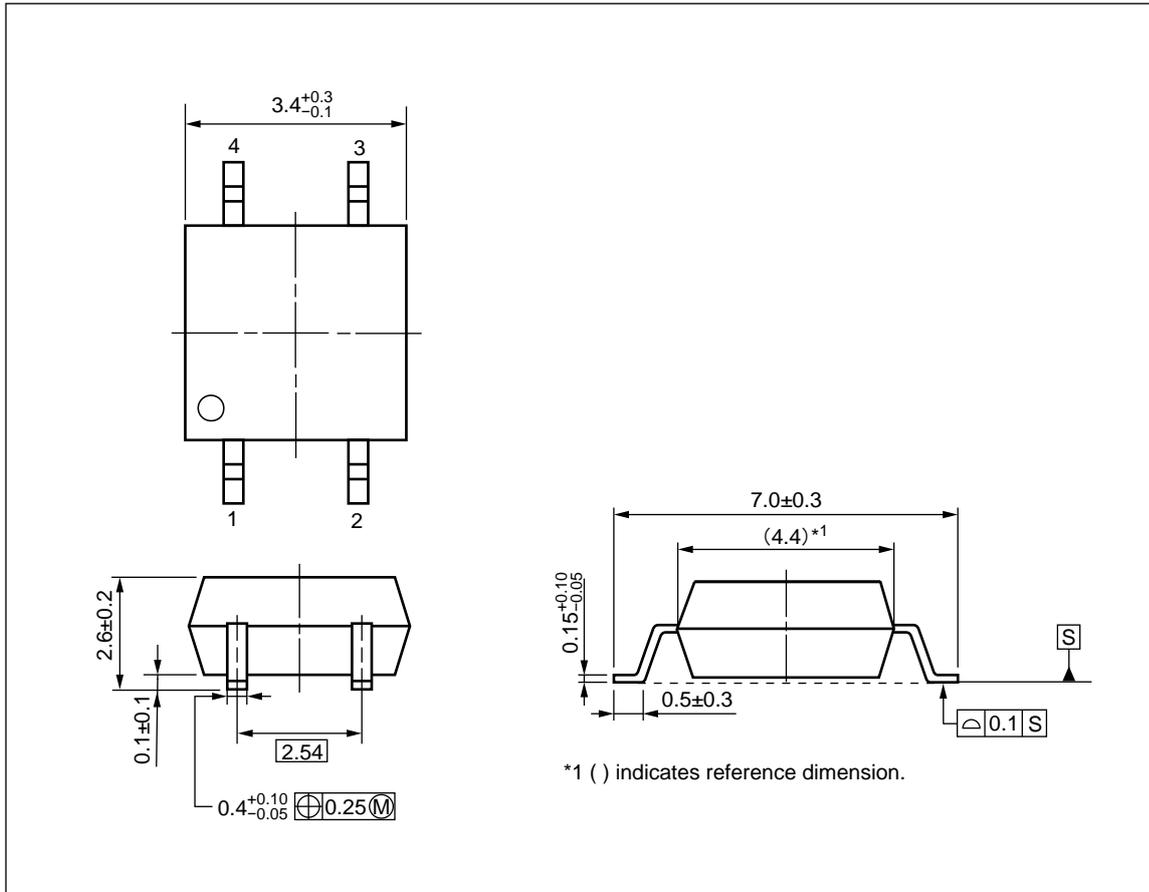


APPLICATIONS

- Consumer vehicles

Start of mass production
Feb.2020

PACKAGE DIMENSIONS (UNIT: mm)

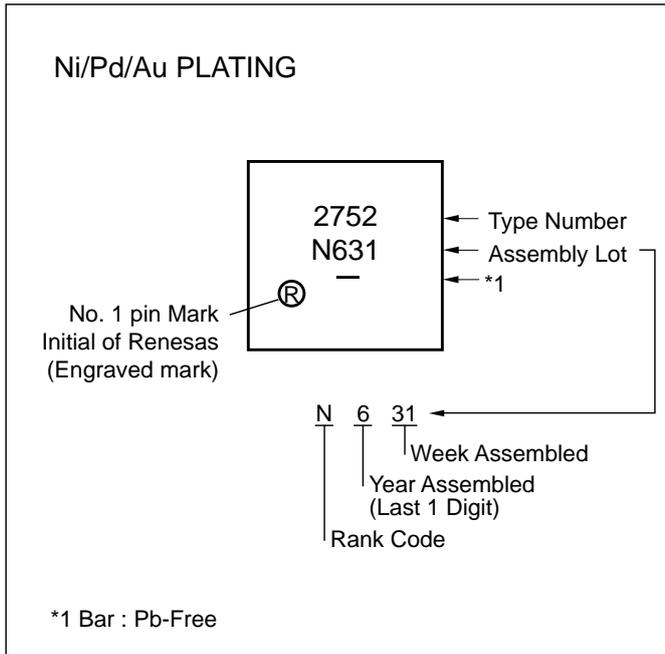


Weight : 0.08 g (TYP.)

PHOTOCOUPLER CONSTRUCTION

| Parameter | MIN. |
|--------------------|--------|
| Air Distance | 4.2 mm |
| Creepage Distance | 4.2 mm |
| Isolation Distance | 0.2 mm |

MARKING EXAMPLE



ORDERING INFORMATION

| Part Number | Order Number | Solder Plating Specification | Packing Style | Safety Standard Approval | Application Part Number *1 |
|---------------------|-------------------------|------------------------------|---------------------------------|---------------------------------|----------------------------|
| RV1S2752QKCSP-1000N | RV1S2752QKCSP-1000N#SC0 | Pb-Free (Ni/Pd/Au) | Embossed Tape 20 pcs | Standard Products (UL Approved) | RV1S2752Q |
| | RV1S2752QKCSP-1000N#KC0 | | Embossed Tape 2 500 pcs/reel | | |

. Notes: *1. For the application of the safety standard, the following part number should be used.

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise specified)

| Parameter | | Symbol | Ratings | Unit |
|-------------------------------|------------------------------|------------------|-------------|---------|
| Diode | Forward Current*1 | I _F | 25 | mA |
| | Reverse Voltage | V _R | 5 | V |
| | Power Dissipation*2 | P _D | 50 | mW |
| | Peak Forward Current*3 | I _{FP} | 1 | A |
| Transistor | Collector to Emitter Voltage | V _{CEO} | 40 | V |
| | Emitter to Collector Voltage | V _{ECO} | 6 | V |
| | Collector Current | I _C | 50 | mA |
| | Power Dissipation*4 | P _C | 150 | mW |
| Isolation Voltage*5 | | BV | 3 750 | Vr.m.s. |
| Operating Ambient Temperature | | T _A | -40 to +135 | °C |
| Storage Temperature | | T _{stg} | -55 to +150 | °C |

*1 Reduced at a rate of 0.5 mA/°C above T_A = 115 °C.

*2 Reduced at a rate of 1.0 mW/°C above T_A = 115 °C.

*3 PW = 100 μs, Duty Cycle = 1 %

*4 Reduced at a rate of 1.2 mW/°C above T_A = 25 °C.

*5 AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.

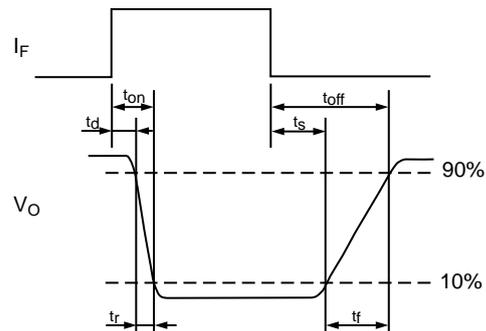
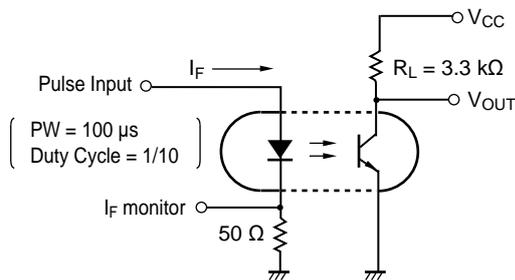
Pins 1-2 shorted together, 3-4 shorted together.

ELECTRICAL CHARACTERISTICS (T_A = - 40 to + 135 °C, unless otherwise specified)

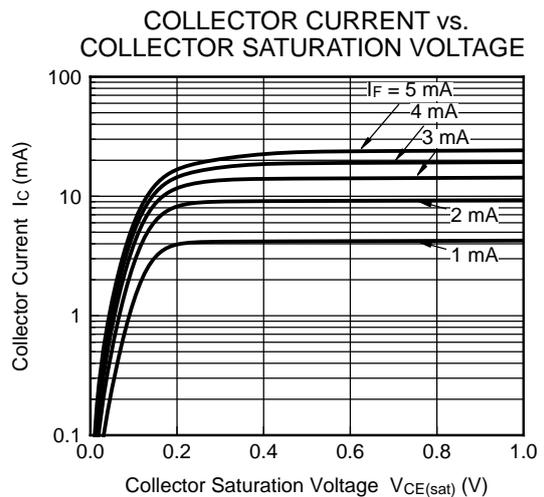
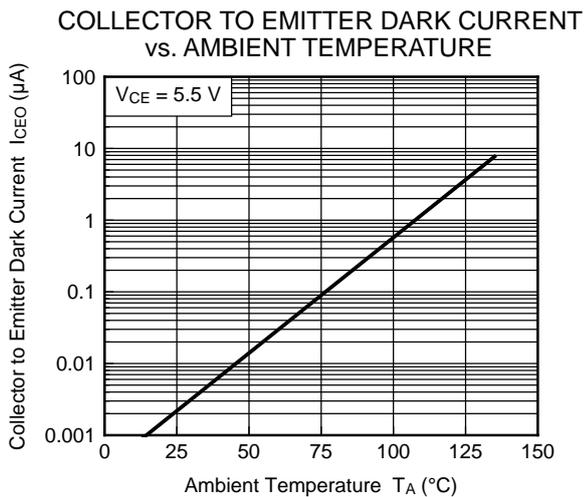
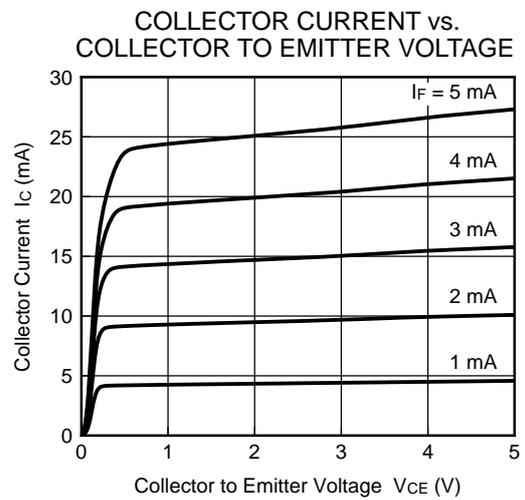
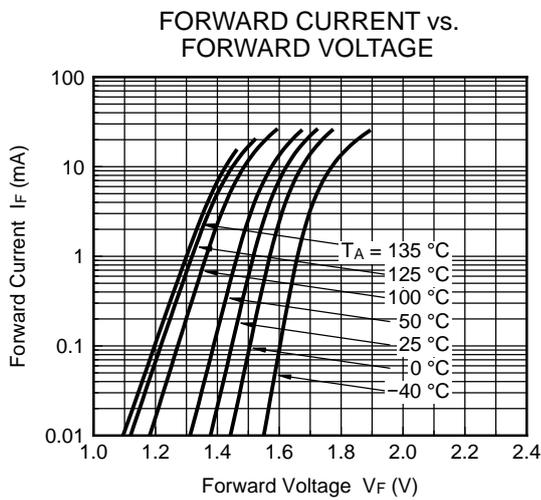
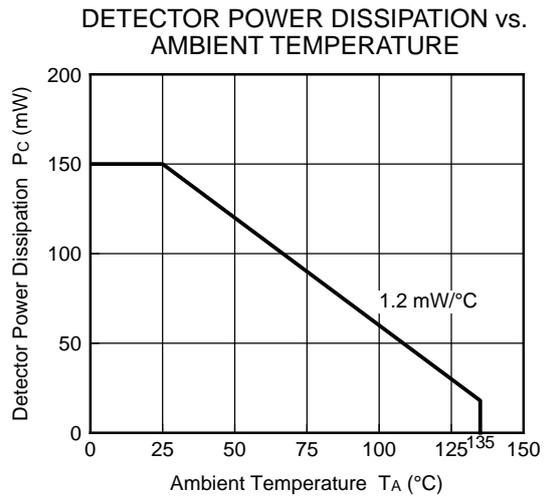
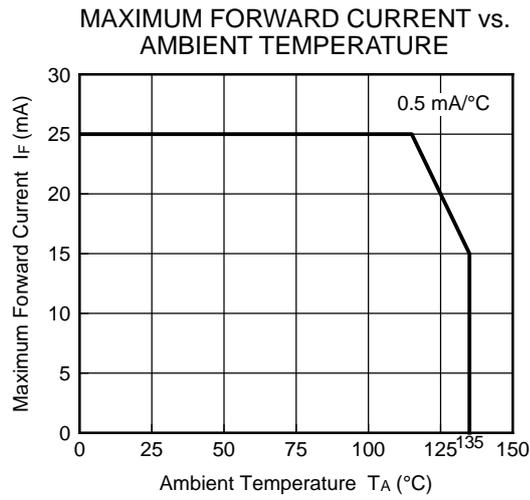
| Parameter | | Symbol | Conditions | MIN. | TYP.*1 | MAX. | Unit |
|-----------------|--|----------------------|---|------------------|--------|------|------|
| Diode | Forward Voltage | V _F | I _F = 10 mA | 1.18 | 1.65 | 1.98 | V |
| | Reverse Current | I _R | V _R = 3 V | | | 100 | μA |
| | Terminal Capacitance | C _t | V = 0 V, f = 1 MHz, T _A = 25 °C | | 30 | | pF |
| Transistor | Collector to Emitter Dark Current | I _{CEO} | V _{CE} = 5.5 V | | | 65 | μA |
| Coupled | Current Transfer Ratio (I _c /I _F) | CTR | I _F = 2 mA, V _{CE} = 5 V, T _A = 25 °C | 200 | 500 | 850 | % |
| | | | I _F = 2 mA, V _{CE} = 5 V | 65 | | | |
| | Collector Saturation Voltage | V _{CE(sat)} | I _F = 2 mA, I _c = 1.5 mA | | | 0.3 | V |
| | Isolation Resistance | R _{I-O} | V _{I-O} = 500 V _{DC} , RH = 40 ~ 60 % | 10 ¹⁰ | | | Ω |
| | Isolation Capacitance | C _{I-O} | V = 0 V, f = 1 MHz | | 0.4 | 1.0 | pF |
| | Turn-on Time *2 | t _{on} | V _{CC} = 5 V, I _F = 2 mA, R _L = 3.3 kΩ C _L = 15 pF | | 10 | 100 | μs |
| | Turn-off Time *2 | t _{off} | | | 150 | 300 | |
| | Rise Time *2 | t _r | | | 8 | | |
| | Fall Time *2 | t _f | | | 120 | | |
| Storage Time *2 | t _s | | | | 200 | | |

*1 Typical values at T_A = 25 °C

*2 Test circuit for switching time

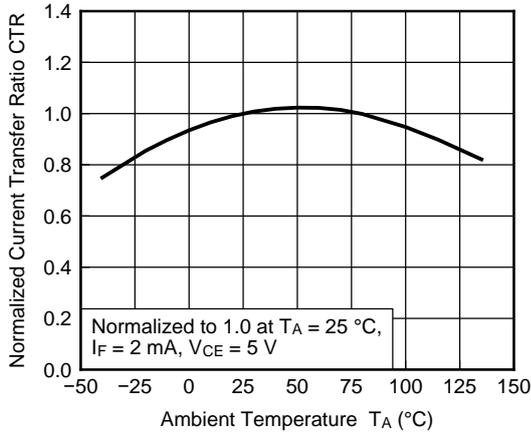


TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified)

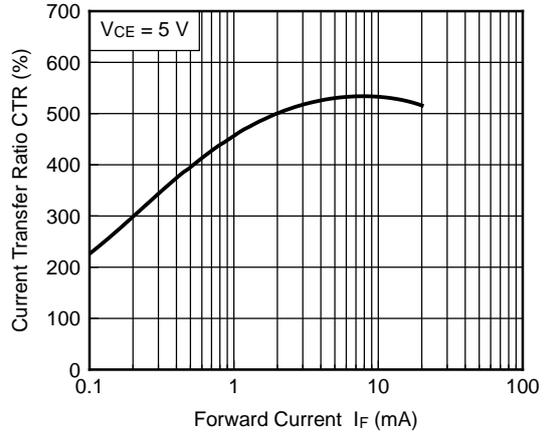


Remark The graphs indicate nominal characteristics.

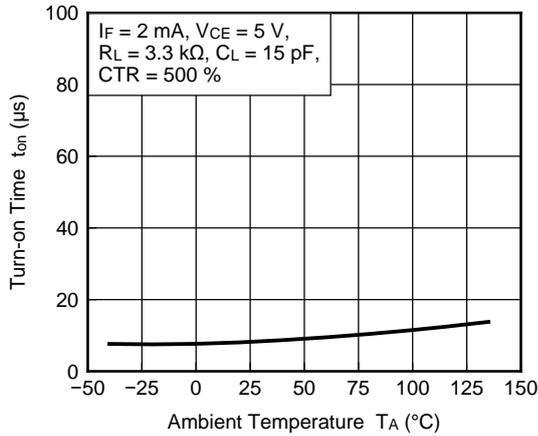
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



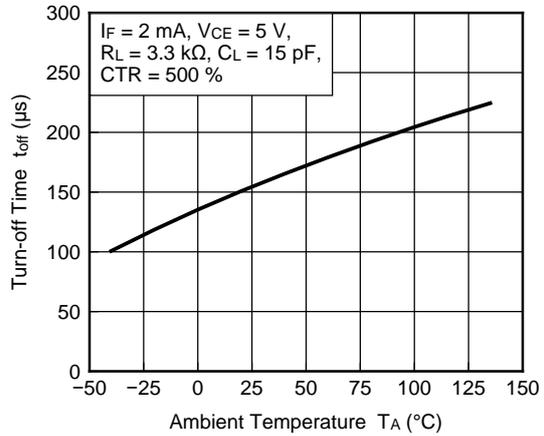
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



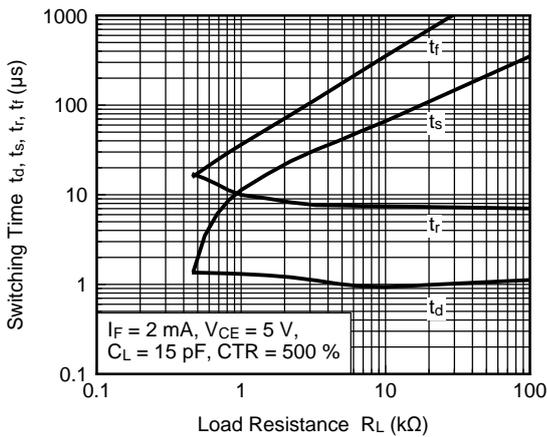
TURN-ON TIME vs. AMBIENT TEMPERATURE



TURN-OFF TIME vs. AMBIENT TEMPERATURE



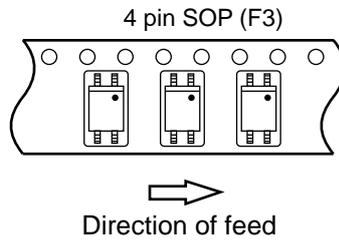
SWITCHING TIME vs. LOAD RESISTANCE



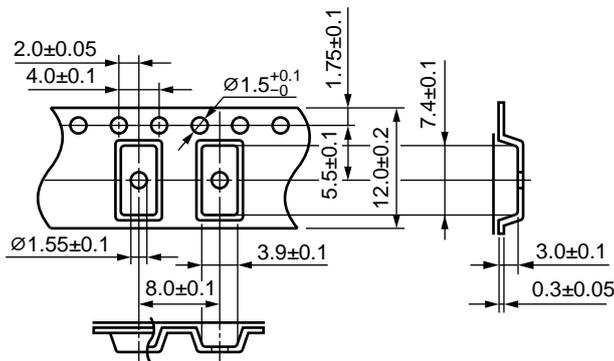
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT: mm)

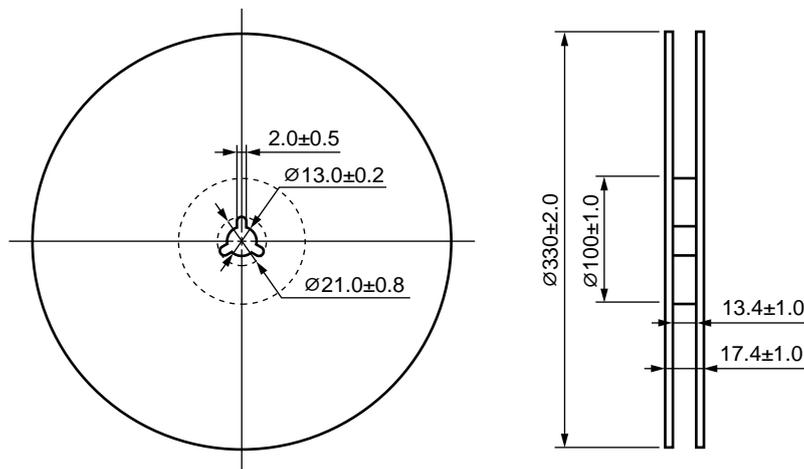
Tape Direction



Outline and Dimensions (Tape)

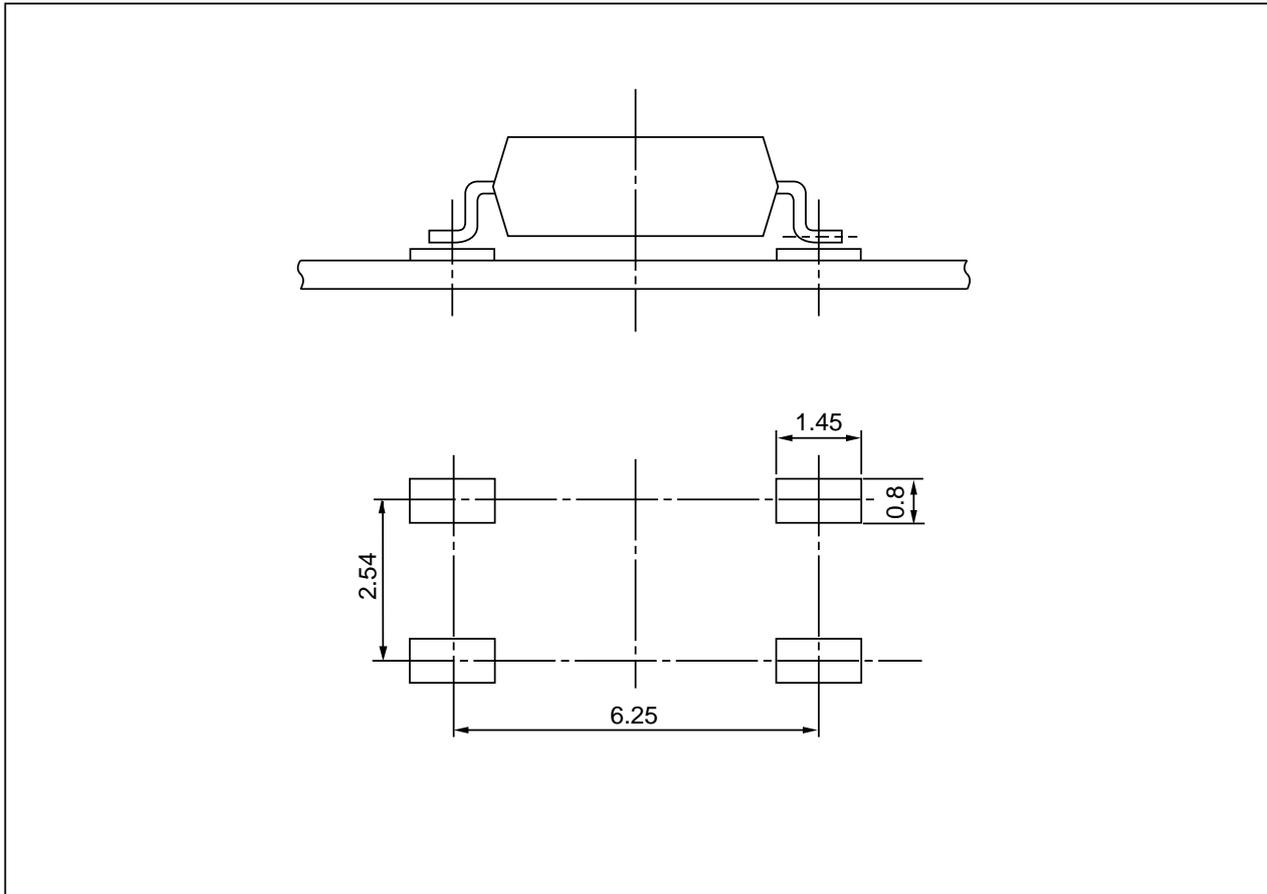


Outline and Dimensions (Reel)



Packing: 2 500 pcs/reel

RECOMMENDED MOUNT PAD DIMENSIONS (UNIT: mm)



Remark All dimensions in this figure must be evaluated before use.

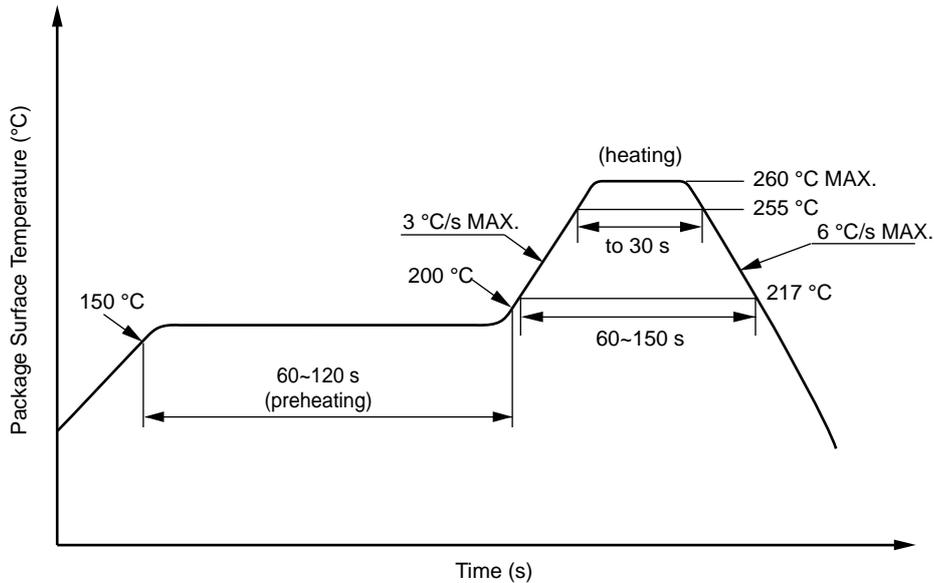
NOTES ON HANDLING

1. Recommended soldering conditions

(1) Infrared reflow soldering

- Peak reflow temperature 260 °C or below (package surface temperature)
- Time of peak reflow temperature -5 °C (255 °C) 30 s or less
- Time of temperature higher than 217 °C 60 ~ 150 s
- Time to preheat temperature from 150 to 200 °C 60 ~ 120 s
- Number of reflows 3
- 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



JEDEC J-STD-020E compliant soldering conditions

(2) 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 (Allowed to be dipped in solder including plastic mold portion.)
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

(3) Soldering by Soldering Iron

- Peak temperature (lead part temperature) 350 °C or below
- Time (per one side) 3 s or less
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)
- Place 1.5 to 2.0 mm or more away from the root of the lead

(4) Cautions

- Flux cleaning Avoid cleaning with Freon- or halogen-based (chlorinated etc.) solvents.
- Fixing/Coating Do not use fixing agents or coatings containing halogen-based substances.

USAGE CAUTIONS

1. Be aware that when voltage is applied suddenly between the photocoupler's input and output or between the collector and the emitter at startup, the output transistor may enter the on state, even if the voltage is within the absolute maximum ratings.
2. Protect against static electricity when handling.
3. Avoid storage at a high temperature and high humidity.

| | | |
|----------------|---------------|--|
| Caution | GaAs Products | <p>This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.</p> <ul style="list-style-type: none">• Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below.<ol style="list-style-type: none">1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials.2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal.• Do not burn, destroy, cut, crush, or chemically dissolve the product.• Do not lick the product or in any way allow it to enter the mouth. |
|----------------|---------------|--|

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