

Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

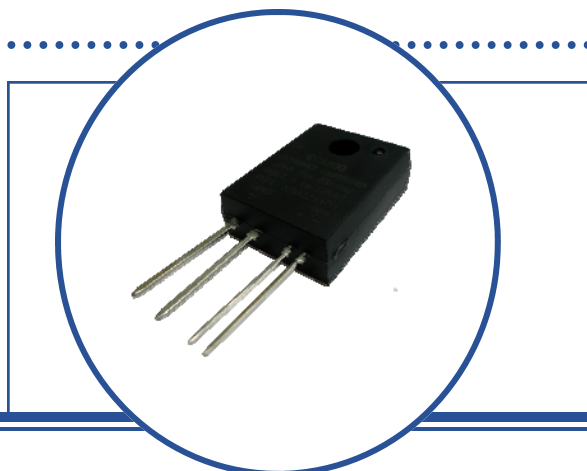
OSSRD1001A thru OSSRD1006A

Features:

- Molded Epoxy package
- Zero crossing circuit
- High Input/output Optical Isolation 4k Vrms
- Small size and light weight
- Can be installed directly on the P.C. board
- Fast switching time
- Non-contact switch

Approval Agency:

- UL Cert. No: E321810(1001A,1002A,1003A only)



Description:

The OSSR Solid State Relay series are electronic controlled switches, they contain no moving parts. When voltage is applied to the input, a Light Emitting Diode or LED illuminates a Photosensor which controls the internal output circuit. The output circuit is utilized to drive high current loads. The input and output are optically isolated. The OSSR series incorporates a zero crossing circuit which minimizes current and noise surges due to resistive and inductive loads. Optek provides three different electrical configurations of the OSSR series: DC input – AC output, AC input – AC output and DC input – DC output. These configurations meet most industry applications.

The **OSSRD100XA** family comes in a standard 4-pin SIP, Single In-Line Package, for PCB mounting applications. The package offers a light weight, compact and robust molded epoxy body with extended operating temperature range of up to 100°C.

The input circuit features a DC range from 5 to 12 VDC. The output consists of a Triac circuit featuring load current ratings from 3 to 40 Amps and a maximum load voltage of 250VAC with normally open output.

Applications:

- Temperature controlled systems
- Office equipment
- Motor controls
- Industrial Equipment
- Light controls systems
- Heater control
- Appliances
- HVAC temperature control
- Plastic molding
- Packaging industry



OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

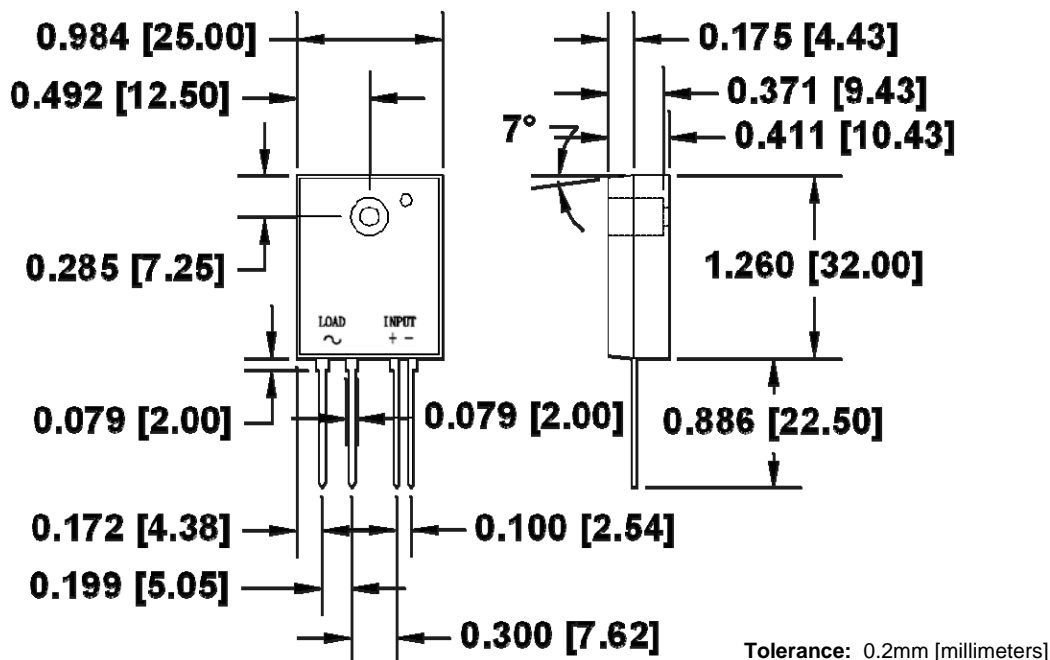
Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

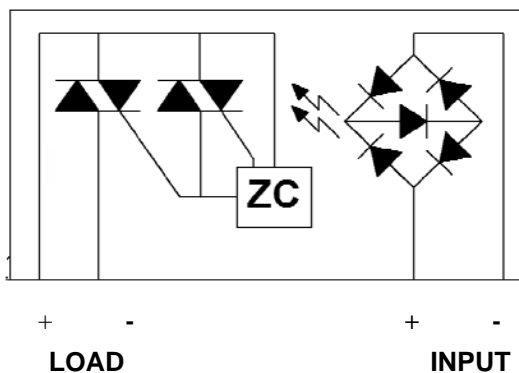
OSSRD1001A thru OSSRD1006A



Package Outline: 4-Pin SIP



Schematic: Top View



OSSRD1001A— OSSRD1006A

Pin Configuration

| Part Number | Pin # | | | |
|-------------|-------|---|--------|--------|
| | 1 | 2 | 3 | 4 |
| OSSRD1001A | A | K | A1 (+) | A2 (-) |
| OSSRD1002A | A | K | A1 (+) | A2 (-) |
| OSSRD1003A | A | K | A1 (+) | A2 (-) |
| OSSRD1004A | A | K | A1 (+) | A2 (-) |
| OSSRD1005A | A | K | A1 (+) | A2 (-) |
| OSSRD1006A | A | K | A1 (+) | A2 (-) |

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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

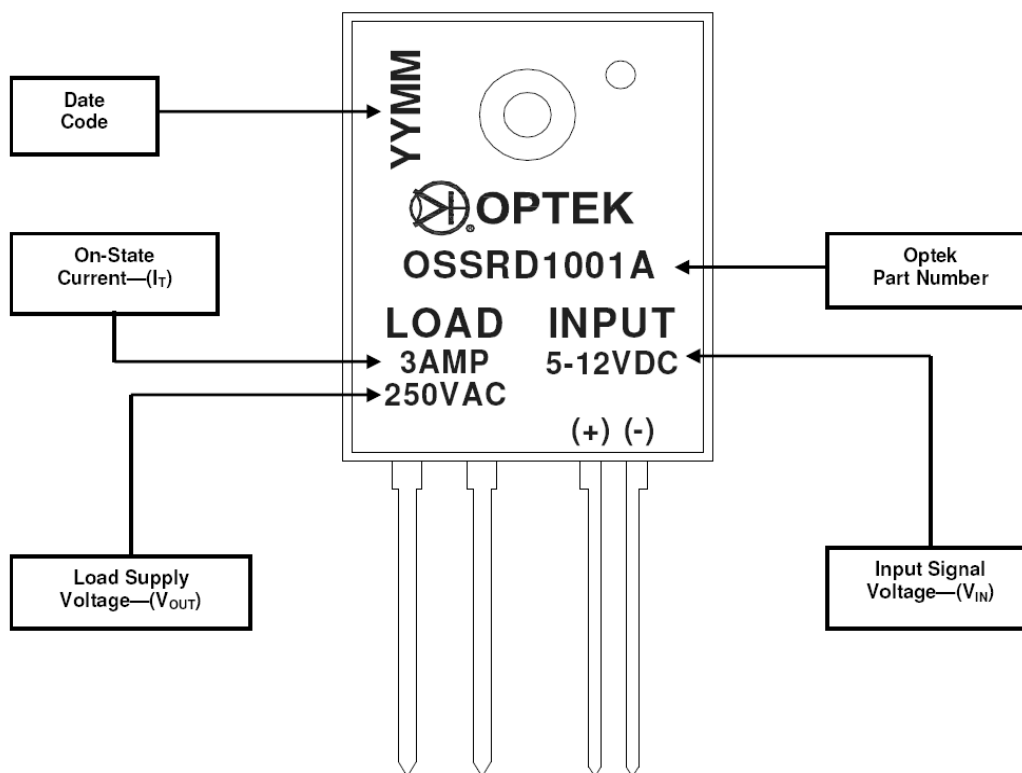
OSSRD1001A thru OSSRD1006A



VDC Input / VAC Output Devices Ordering Information

| Part Number | Input | Min. Tgr Current I _{ft} | Max. Output Current | Min. Ouput Current | Max. Vout | Min. Vout | Output Type | Br. Vol. Input to Output | Configuration |
|--|---------|----------------------------------|--|--------------------|-----------|-----------|-------------|--------------------------|-----------------|
| OSSRD1001A | 5-12VDC | 50mA | 3A | 0.05A | 250VAC | 50VAC | AC | 4000VAC | BR —A1(+) A2(-) |
| OSSRD1002A | 5-12VDC | 50mA | 5A | 0.05A | 250VAC | 50VAC | AC | 4000VAC | BR—A1(+) A2(-) |
| OSSRD1003A | 5-12VDC | 50mA | 10A | 0.05A | 250VAC | 50VAC | AC | 4000VAC | BR —A1(+) A2(-) |
| OSSRD1004A | 5-12VDC | 50mA | 15A | 0.05A | 250VAC | 50VAC | AC | 4000VAC | BR —A1(+) A2(-) |
| OSSRD1005A | 5-12VDC | 50mA | 25A | 0.05A | 250VAC | 50VAC | AC | 4000VAC | BR —A1(+) A2(-) |
| OSSRD1006A | 5-12VDC | 50mA | 40A | 0.05A | 250VAC | 50VAC | AC | 4000VAC | BR —A1(+) A2(-) |
| Configuration: Definition of Terms LED Identification—Sensor Identification | | | | | | | | | |
| Configuration Information | LED | | BR - Bridge Rectifier | | | | | | |
| | Sensor | | A1(+) and A2(-) = Main Terminals of Double Triac | | | | | | |

Part Number Symbolization



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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| | |
|--|-------------------|
| Storage Temperature OSSRD1001A thru OSSRD1006A | -30° C to +125° C |
| Operating Temperature OSSRD1001A thru OSSRD1006A | -30° C to +100° C |
| Isolation Voltage (Input to Output) OSSRD1001A thru OSSRD1006A | 4,000 Vrms |
| Soldering Temperature 10 sec. OSSRD1001A thru OSSRD1006A | 260° C |

Input Diode

| | |
|---|-----------|
| Input Signal Voltage—(V_{IN}) OSSRD1001A thru OSSRD1006A | 5– 12 VDC |
| Drop-out Voltage—(V_{do}) OSSRD1001A thru OSSRD1006A | 1 VDC |

Output Triac

| | |
|--|--|
| RMS On-State Current - (I_T) OSSRA1001A OSSRA1002A OSSRA1003A OSSRA1004A OSSRA1005A OSSRA1006A | 3 Arms 5 Arms 10 Arms 15 Arms 25 Arms 40 Arms |
| Peak One Cycle Surge Current - (I_{surge}) OSSRA1001A OSSRA1002A OSSRA1003A OSSRA1004A OSSRA1005A OSSRA1006A | 30 A 50 A 100 A 150 A 250 A 400 A |
| Repetitive Peak-Off State Voltage—(V_{DRM}) OSSRD1001A thru OSSRD1006A | 600 V |
| Operating Frequency—(f) OSSRD1001A thru OSSRD1006A | 47—70 Hz |
| Critical Rate of Rise of On-State Current—(di/dt) OSSRD1001A thru OSSRD1006A | 50 A/ μ S |
| Load Supply Voltage—(V_{OUT}) OSSRD1001A thru OSSRD1006A | 250 Vrms AC |

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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A



Electrical Characteristics

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|--------|-----------|-----|-----|-----|-------|-----------------|
|--------|-----------|-----|-----|-----|-------|-----------------|

Input Diode

| | | | | | | |
|----------|--|---|---|----|-----|---------------------|
| V_{PU} | Pick-up Voltage OSSRD1001A thru OSSRD1006A | - | - | 4 | VDC | $I_T = 1A_{rms}$ |
| I_{IN} | Input Current OSSRD1001A thru OSSRD1006A | 5 | - | 35 | mA | $V_{IN} = 5 - 12 V$ |

Output Triac

| | | | | | | |
|------------|--|-----------|--------|----------|---------------|--|
| V_T | On-State Voltage OSSRD1001A thru OSSRD1006A | - | - | 1.5 | Vrms | $I_T = 1A_{rms}$ |
| I_{OP} | Operating Current OSSRD1001A thru OSSRD1006A | 50 | - | - | mArms | $V_{out} = 240V_{rms}$ |
| I_{LEAK} | Leakage Current OSSRD1001A thru OSSRD1006A | - | - | 7 | mArms | $V_{out} = 240V_{rms}$ |
| dv/dt | Critical Rate of Rise of Off-State Voltage OSSRD1001A thru OSSRD1006A | 50 | 200 | - | V/ μ s | See Note 1. |
| - | Zero-Cross Voltage OSSRD1001A thru OSSRD1006A | - | Yes | - | - | - |
| V_{OUT} | Load Voltage Rating OSSRD1001A thru OSSRD1006A | 50 | - | 280 | VAC | $I_T = 50mArms$ MIN |
| I_{FT} | Minimum Trigger Current OSSRD1001A, OSSRD1002A, OSSRD1003A OSSRD1004A, OSSRD1005A, OSSRD1006A | - - | - - | 10 25 | mA | $V_{DRM} = 600 V$ $V_{DRM} = 600 V$ |
| Riso | Isolation resistance Input to Output OSSRD1001A thru OSSRD1006A | 10^{10} | - | - | Ω | DC500 V |
| T_{ON} | Turn-on Time OSSRD1001A thru OSSRD1006A | - | - | 8.3 | mS | 60Hz AC |
| T_{OFF} | Turn-off Time OSSRD1001A thru OSSRD1006A | - | - | 8.3 | mS | 60Hz AC |
| Rth (j-C) | Thermal Resistance (between junction and case) | - | 1.3 | - | $^{\circ}C/W$ | - |

Note1: Output (dv/dt) protection is provided in all models, and they are designed to switch resistive or inductive loads to 0.2 factor. The dv/dt rating is based on source impedance of 50 ohms.

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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A

OSSRD1001A

Characteristic Data Curves

Fig.1 RMS On-state Current vs. Ambient Temperature

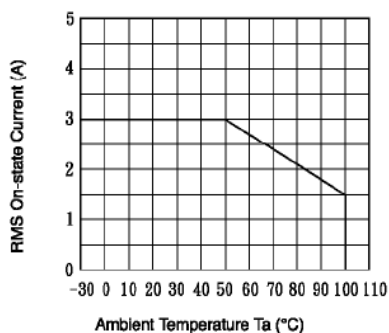


Fig.2 Surge Current vs. Time

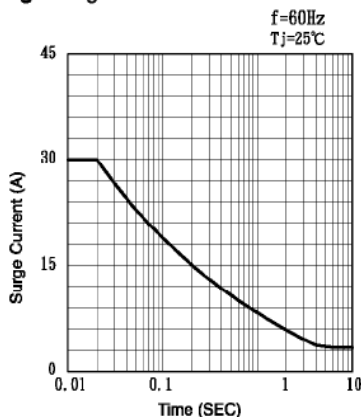


Fig.3 Open Circuit Leak Current vs. Supply Voltage

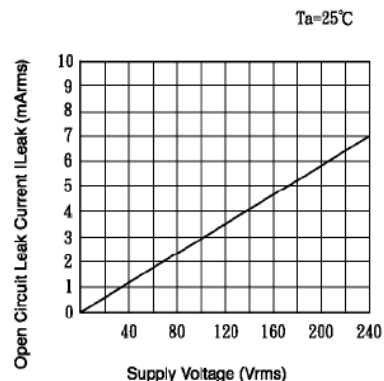


Fig.4 RMS On-state Current vs. Case Temperature

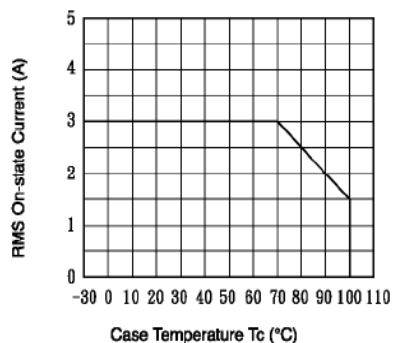


Fig.5 Input Voltage vs. Ambient Temperature

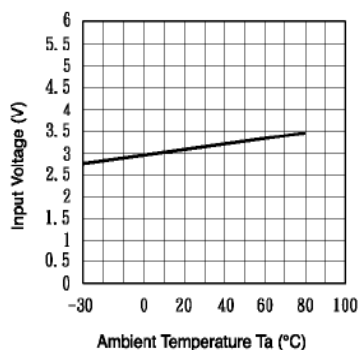


Fig.6 Input Current vs. Input voltage

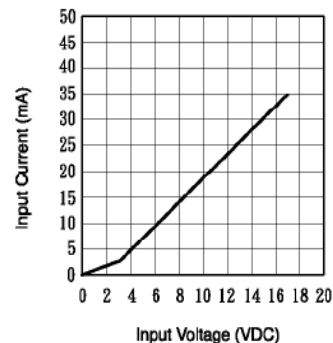


Fig.7 Action waveform

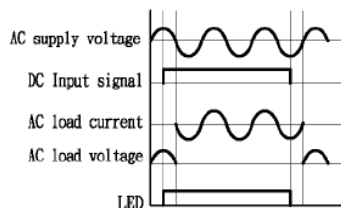
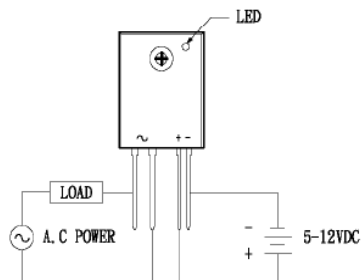


Fig.8 WIRING DIAGRAM



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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A

OSSRD1002A

Characteristic Data Curves

Fig.1 RMS On-state Current vs. Ambient Temperature

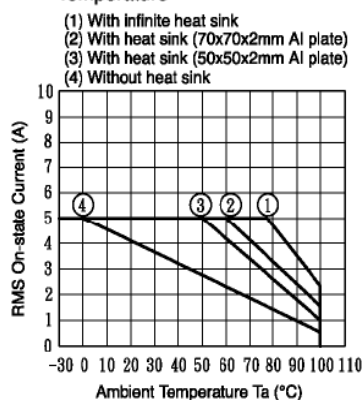


Fig.2 Surge Current vs. Time

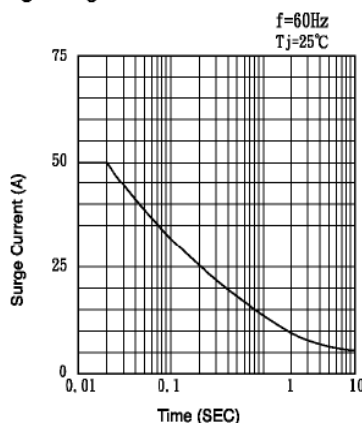


Fig.3 Open Circuit Leak Current vs. Supply Voltage

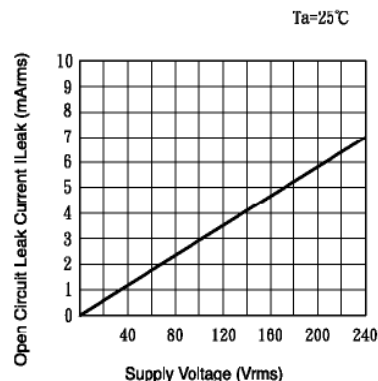


Fig.4 RMS On-state Current vs. Case Temperature

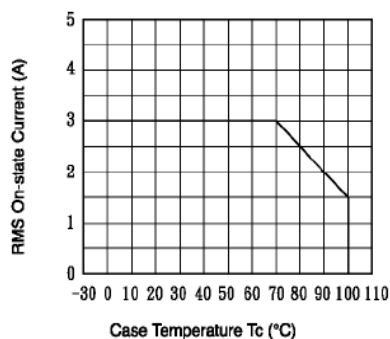


Fig.5 Input Voltage vs. Ambient Temperature

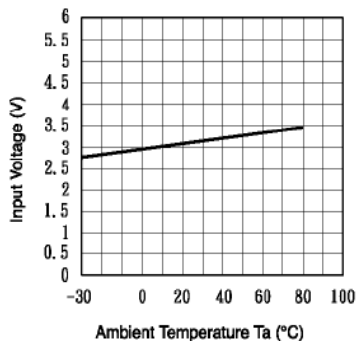


Fig.6 Input Current vs. Input voltage

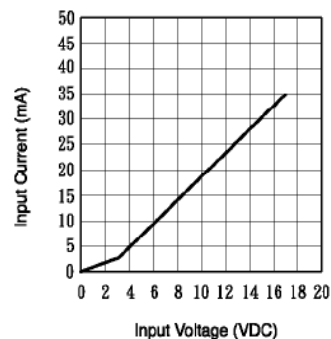


Fig.7 Action waveform

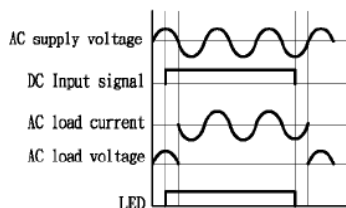
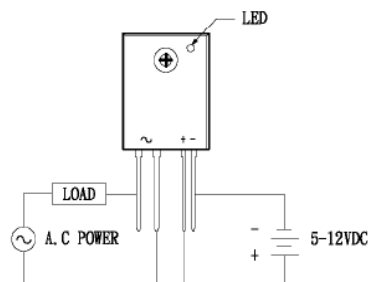


Fig.8 WIRING DIAGRAM



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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A

OSSRD1003A

Characteristic Data Curves

Fig.1 RMS On-state Current vs. Ambient Temperature

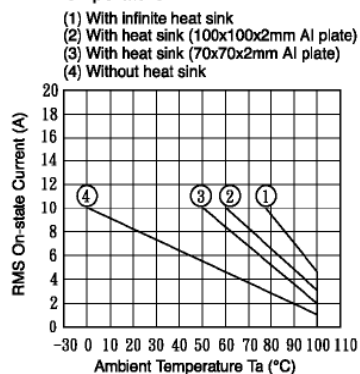


Fig.2 Surge Current vs. Time

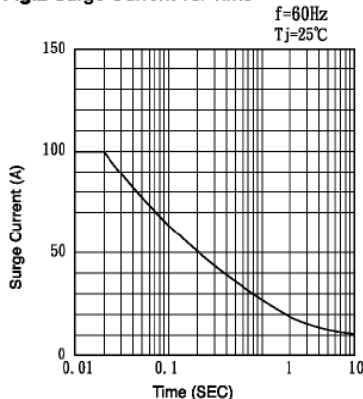


Fig.3 Open Circuit Leak Current vs. Supply Voltage

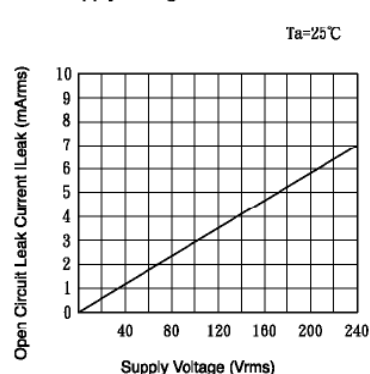


Fig.4 RMS On-state Current vs. Case Temperature

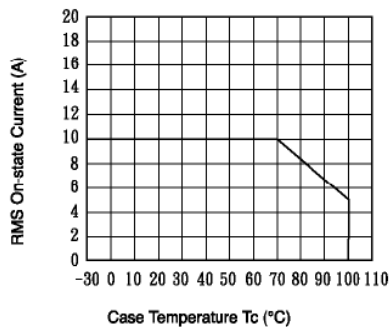


Fig.5 Input Voltage vs. Ambient Temperature

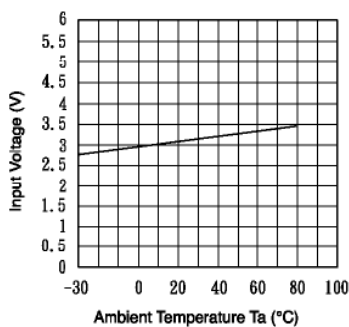


Fig.6 Input Current vs. Input voltage

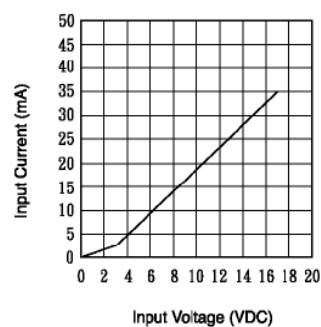


Fig.7 Action waveform

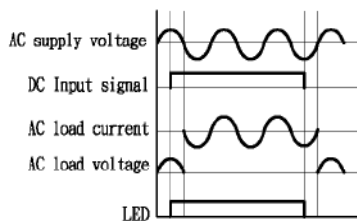
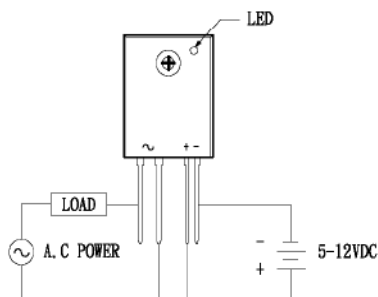


Fig.8 WIRING DIAGRAM



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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A

OSSRD1004A

Characteristic Data Curves

Fig.1 RMS On-state Current vs. Ambient Temperature

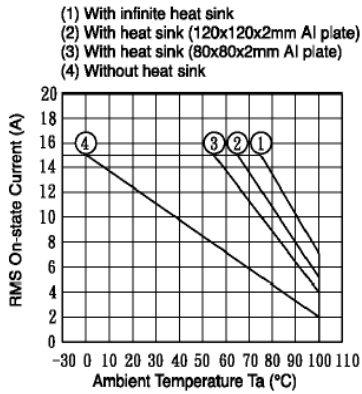


Fig.2 Surge Current vs. Time

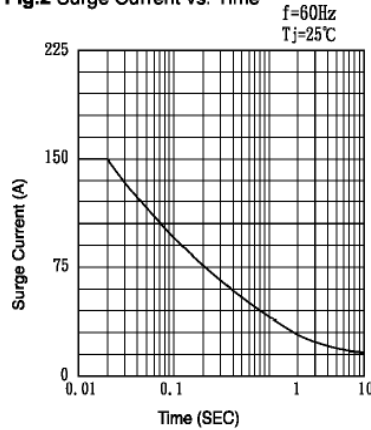


Fig.3 Open Circuit Leak Current vs. Supply Voltage

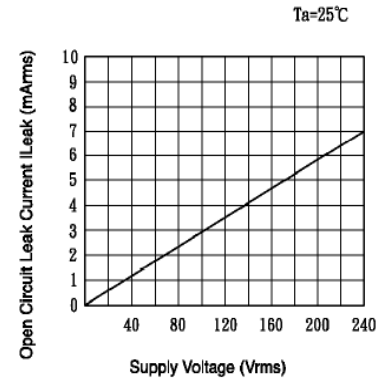


Fig.4 RMS On-state Current vs. Case Temperature

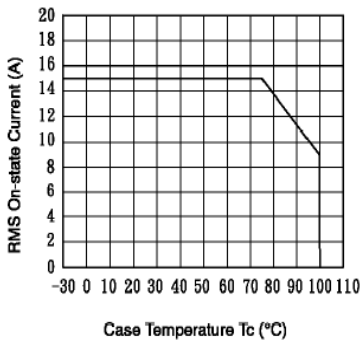


Fig.5 Input Voltage vs. Ambient Temperature

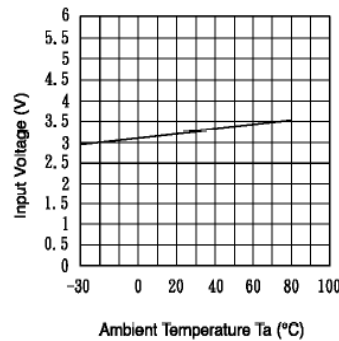


Fig.6 Input Current vs. Input voltage

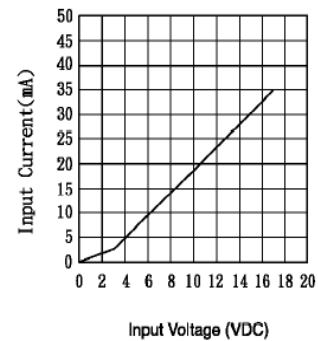


Fig.7 Action waveform

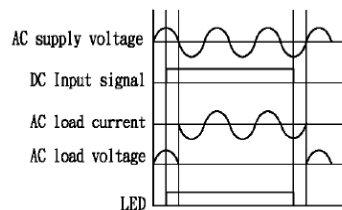
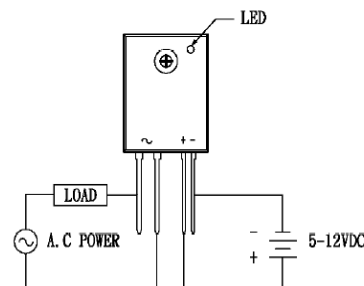


Fig.8 WIRING DIAGRAM



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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A



OSSRD1005A

Characteristic Data Curves

Fig.1 RMS On-state Current vs. Ambient Temperature

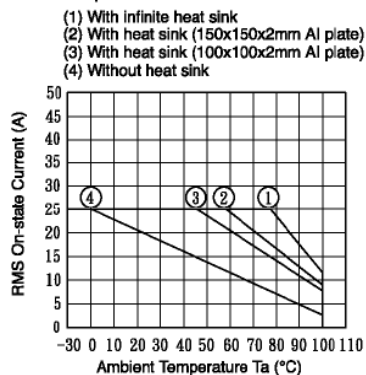


Fig.2 Surge Current vs. Time

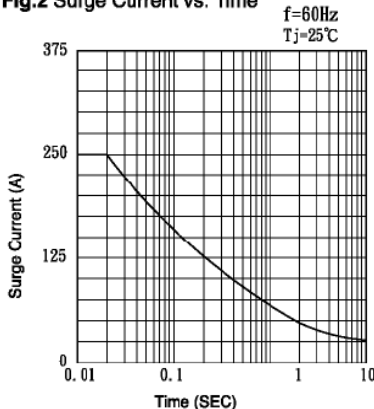


Fig.3 Open Circuit Leak Current vs. Supply Voltage

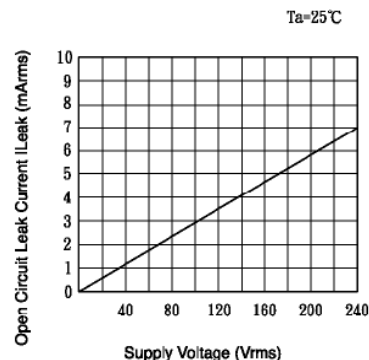


Fig.4 RMS On-state Current vs. Case Temperature

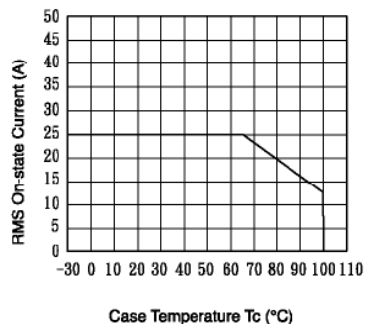


Fig.5 Input Voltage vs. Ambient Temperature

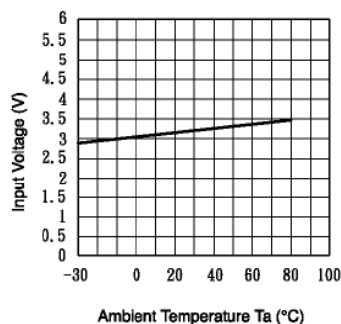


Fig.6 Input Current vs. Input voltage

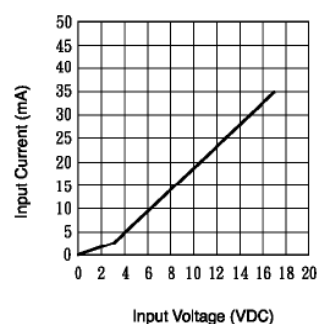


Fig.7 Action waveform

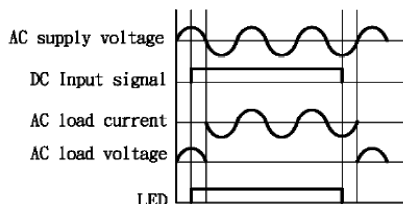
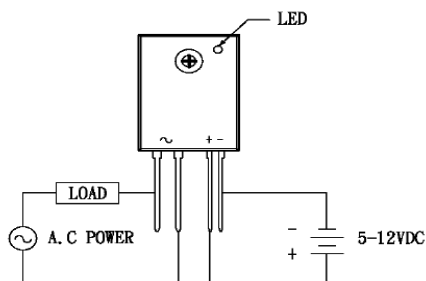


Fig.8 WIRING DIAGRAM



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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A

OSSRD1006A

Characteristic Data Curves

Fig.1 RMS On-state Current vs. Ambient Temperature

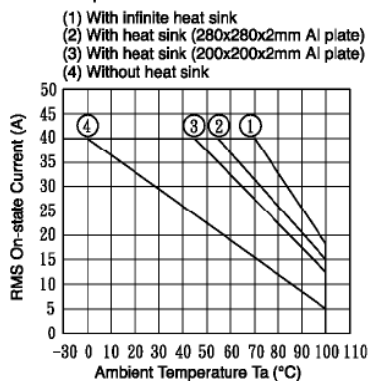


Fig.2 Surge Current vs. Time

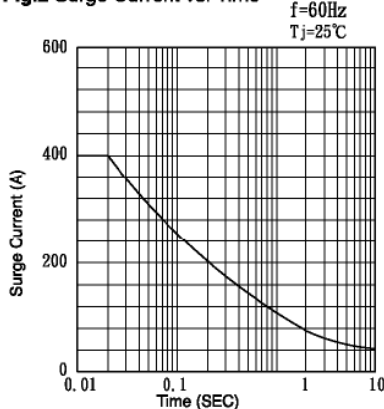


Fig.3 Open Circuit Leak Current vs. Supply Voltage

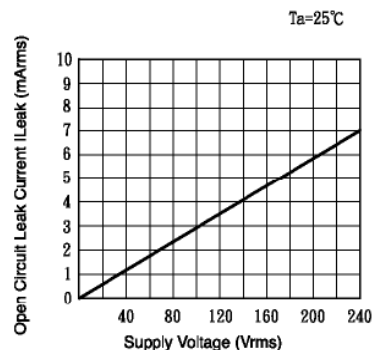


Fig.4 RMS On-state Current vs. Case Temperature

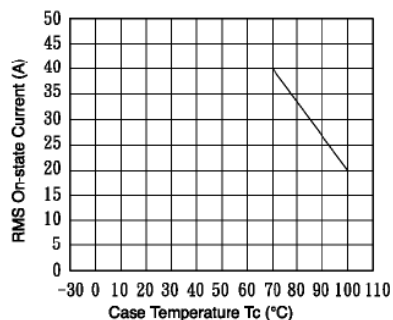


Fig.5 Input Voltage vs. Ambient Temperature

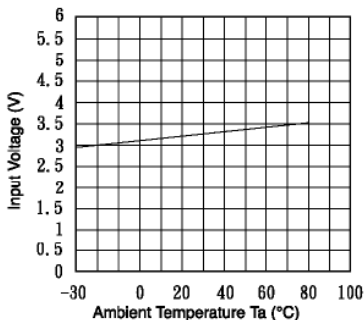


Fig.6 Input Current vs. Input voltage

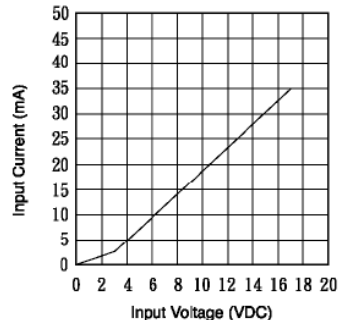


Fig.7 Action waveform

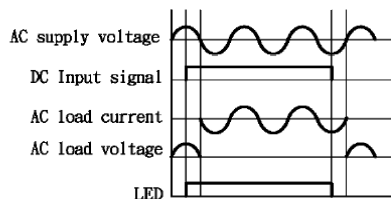
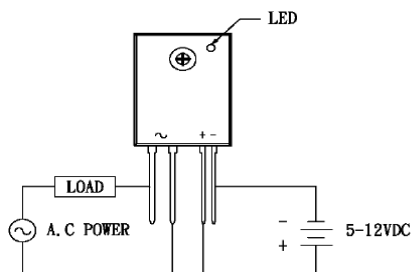


Fig.8 WIRING DIAGRAM



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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A



Quality and Reliability Requirements:

| Parameter | Failure Criteria | Test Conditions |
|--|------------------|---|
| Room Temperature Operating Life (for light emitting diodes only) | ± 20% | T _A = 25°C, I _F = 60mA or max. rated, Time = 1000 hours |
| High Humidity, High Temperature Reverse Bias | ± 20% | JEDEC, Method A101-B T _A = 85°C, Humidity = 85%RH, Time = 1000 hours |
| High Temperature Forward Bias | ± 20% | JEDEC, Method A108-A T _A = 70°C, I _F = 20mA, Time = 1000 hours |
| Autoclave | 0 Fail | T _A = 121°C, Pressure = 15psi, Humidity = 100% |
| IR Reflow / Solderability Test | 0 Fail | JEDEC (J-STD-020) / MIL-STD-883E, Method 2003.7 |
| MTTF @ 90% confidence | 150,000 Min. | @ 25°C, 25mADC |
| Moisture Sensitivity Level | MSL 1 | per JDEC stnd J-STD-020B |
| Glass Transition of body | 125°C Min. | DSC test method |
| Temperature Humidity-Bias | ± 20% | 85°C, 85%RH, 500Hrs, 80% min I _{ceo} |
| Temperature Cycle | ± 20% | per Method 1010.7 of MIL-STD-883E |
| High Temperature Storage | ± 20% | 85°C, 500Hrs |

Label Identification:

DESCRIPTION:

Size: 3" (7.4 cm) X 2.2" (5.5 cm)
 Lettering shall be black on white background.
 Format shall be as:

Notes:

- The DATE CODE is a 4-digit code for date of manufacture where YY is the last two digits of the year, and WW is week number of manufacture.
- The LOT I.D. is the manufacturing location lot identification where Y is the year of manufacture, NNNN is a sequential lot identifier, and DDD is the day of the year of manufacture. – or use equivalent label format.

| |
|---|
| Carrollton, TX, USA MADE IN TAIWAN |
| OPTEK P/N <u> OSSRD1001A </u> |
| QTY. <u> — </u> |
| DATE CODE <u> (YYWW) </u> |
| LOT I.D. <u> (Y-NNNNDDD) </u> |

OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A



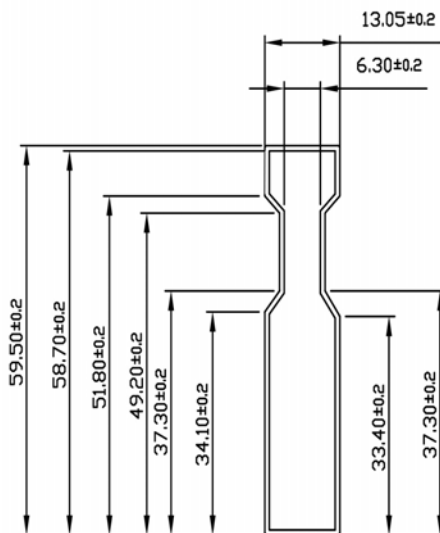
Packaging Information:

| Optek's Solid-State Relays Part Numbers (4-Pin SIP) | | Packaging Quantities | Tubes | | Inner | | Medium Carton | | | Large Carton | | |
|---|-------------------------|----------------------------|-------|---------------------|-------|-----------------------|---------------|-----------------------|-------------------------|--------------|-----------------------|-------------------------|
| | | | Qty | Weight (g) | Qty | Weight (kg) | Qty | Net Weight (kg) | Gross Weight (kg) | Qty | Net Weight (kg) | Gross Weight (kg) |
| | | Package Type | | 63.5 x 7.0 x 7.5 cm | | 55.5 x 30.7 x 16.5 cm | | | 55.5 x 30.7 x 23.5 cm | | | |
| SSR | OSSRD2001D, OSSRD2002A | 4 Pin SIP (24mm x 37mm) | 10 | 213 | 80 | 1.80 | 640 | 14.4 | 15.4 | 960 | 21.6 | 22.9 |
| | OSRRD1001A - OSSRD1006A | 4 Pin SIP (32mm x 24mm) | 20 | 421 | 80 | 1.90 | 640 | 15.2 | 16.2 | 960 | 22.8 | 24.1 |

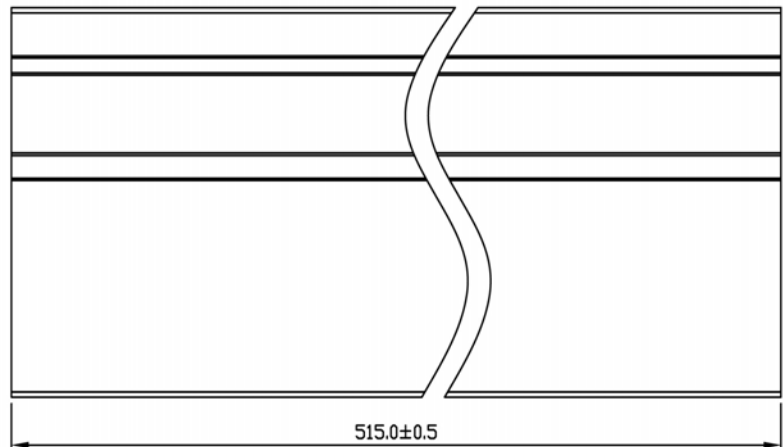
| Optek's Solid-State Relays Part Numbers (Panel Mounts) | | Packaging Quantities | Trays | | Small Carton | | | Medium Carton | | | Large Carton | | |
|--|--|---------------------------------|-------|-----------------|--------------|-----------------------|-------------------------|---------------|-----------------------|-------------------------|--------------|-----------------------|-------------------------|
| | | | Qty | Weight (g) | Qty | Net Weight (kg) | Gross Weight (kg) | Qty | Net Weight (kg) | Gross Weight (kg) | Qty | Net Weight (kg) | Gross Weight (kg) |
| | | Package Type | | 36 x 20 x 37 cm | | 37 x 21 x 11 cm | | | 37 x 21 x 17 cm | | | 37 x 21 x 32 cm | |
| SSR | OSSRD0001A - OSSRD0006A OSSRA0007A - OSSRA0012A | Panel Mounts (42.5mm x 58mm) | 10 | 920 | 30 | 2.80 | 3.3 | 50 | 4.7 | 5.4 | 100 | 9.5 | 10.5 |

Tube and Carton Packaging Specifications:

Tube Packaging Dimensions



All dimensions are in millimeters



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Solid State Relays

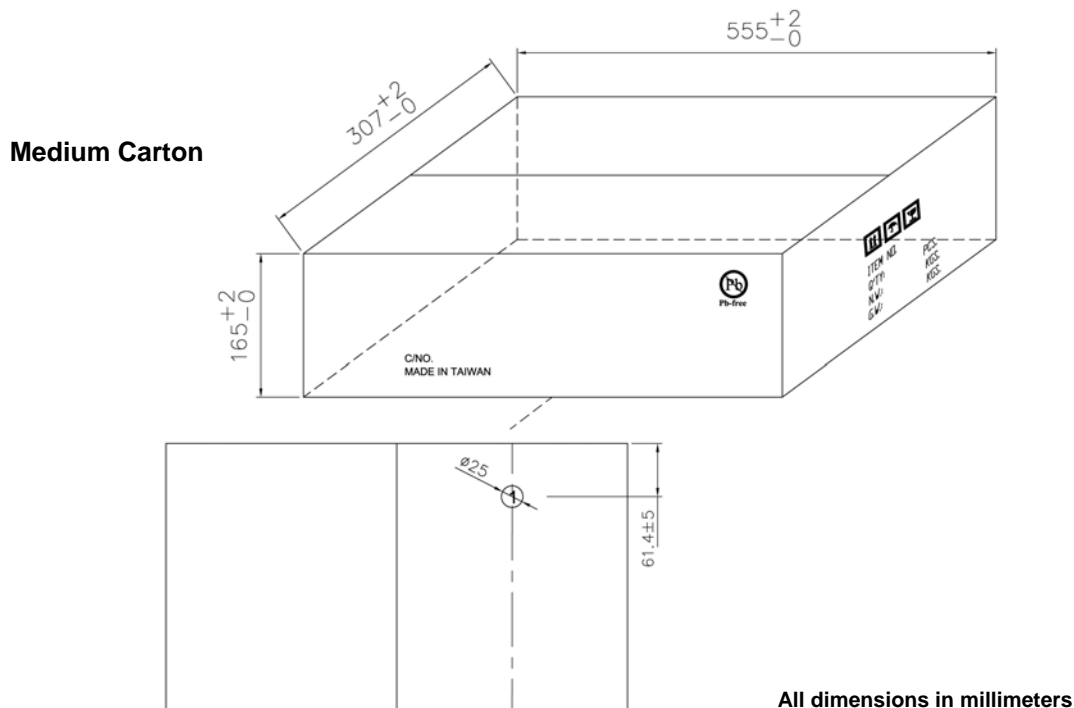
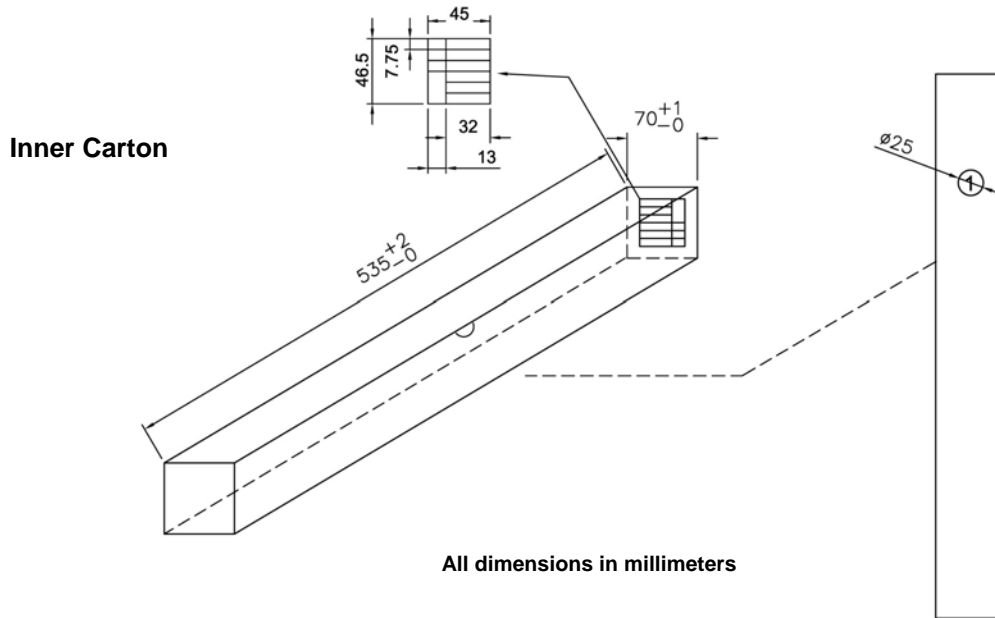
4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A



Tray and Carton Packaging Specifications (Cont.):

Carton Packaging Dimensions



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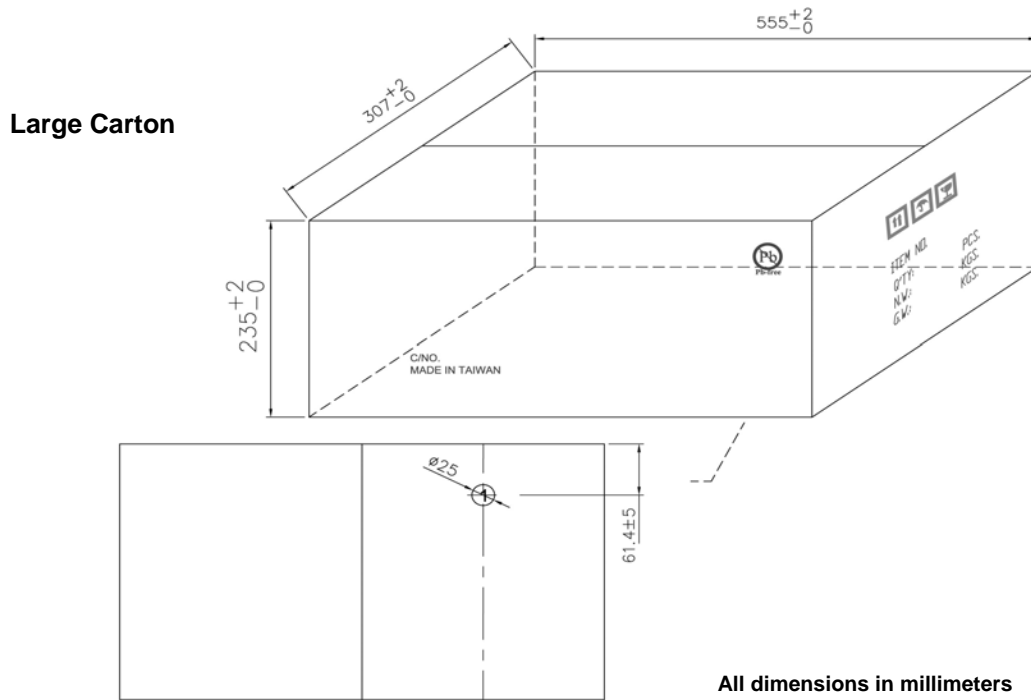
Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A

Tray and Carton Packaging Specifications (Cont.):

Carton Packaging Dimensions



OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.