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Solid-State Relays

Panel Mount Package—VDC Input / VAC Output

OSSRD0001A thru OSSRD0006A



Features:

- Molded Epoxy package
- Zero crossing circuit
- High Input/output Optical Isolation 4k Vrms
- Superior heat sink package
- Includes LED indicator
- Fast switching time
- Non-contact switch
- UL Certification No: E321810



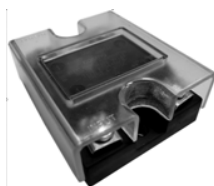
Description:

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 **OSSRD000XA** family comes in a standard panel mount package, commonly known as a “hockey puck” package. The package offers a robust molded epoxy body with exceptional thermal dissipation capability for a long reliable operational life.

The input circuit features a DC range from 4 to 32 VDC. The output consists of a Triac circuit featuring load current ratings from 10 to 40 Amps and maximum load voltages from 250 to 480VAC with normally open output.

Protective plastic covers are included with shipment of OSSRD series.
 Installation of the protection cover is necessary.



Applications:

- | | |
|--|---|
| <ul style="list-style-type: none"> • Temperature controlled systems • Office equipment • Motor controls • Industrial Equipment • Light controls systems • Heater control | <ul style="list-style-type: none"> • Appliances • HVAC temperature control • Plastic molding • Packaging industry • Food processing temperature controls |
|--|---|



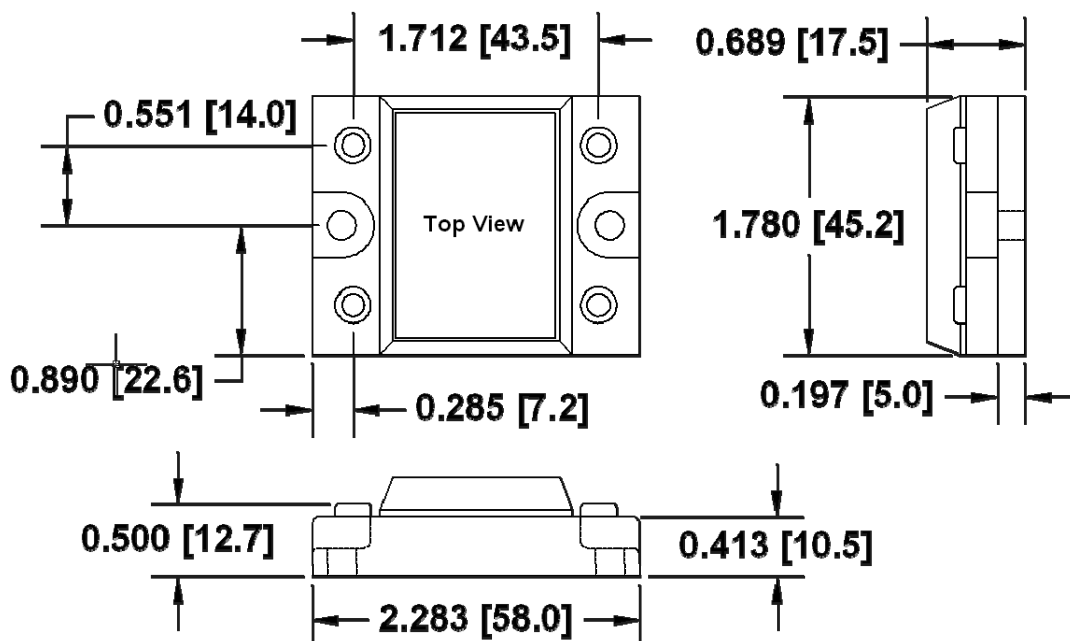
Moisture

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
Panel Mount Package—VDC Input / VAC Output
OSSRD0001A thru OSSRD0006A

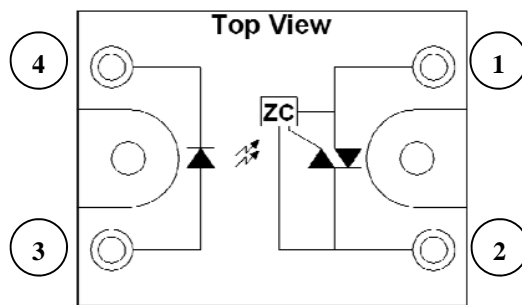


Package Outline Dimensions: Panel Mount



All dimensions in: inches [millimeters]
 Tolerance: ±0.004 inches [0.10 millimeters]

Schematic: Top View



OSSRD0001A—OSSRD0006A

Pin Configuration

| Part Number | Pin # | | | |
|-------------|-------|-------|---|---|
| | 1 | 2 | 3 | 4 |
| OSSRD0001A | A (-) | A (+) | A | K |
| OSSRD0002A | A (-) | A (+) | A | K |
| OSSRD0003A | A (-) | A (+) | A | K |
| OSSRD0004A | A (-) | A (+) | A | K |
| OSSRD0005A | A (-) | A (+) | A | K |
| OSSRD0006A | A (-) | A (+) | A | K |

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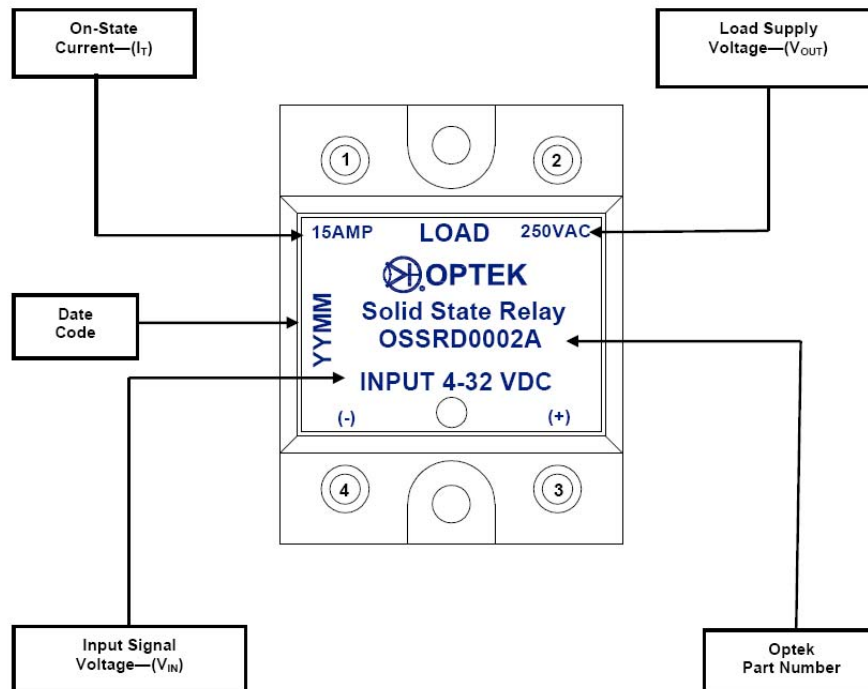
Solid-State Relays

Panel Mount Package—VDC Input / VAC Output OSSRD0001A thru OSSRD0006A



| VDC Input / VAC Output Devices Ordering Information | | | | | | | | | |
|--|---------|---|---------------------|--------------------|-----------|-------------|-------------|--------------------------|-----------------|
| Part Number | Input | Min. Tgr Current Ift | Max. Output Current | Min. Ouput Current | Max. Vout | Min. Vout | Output Type | Br. Vol. Input to Output | Configuration |
| OSSRD0001A | 4-32VDC | 5mA | 10A | 0.05A | 250VAC | 50VAC | AC | 4000VAC | A K—A1(+) A2(-) |
| OSSRD0002A | 4-32VDC | 5mA | 15A | 0.05A | 250VAC | 50VAC | AC | 4000VAC | A K—A1(+) A2(-) |
| OSSRD0003A | 4-32VDC | 5mA | 25A | 0.05A | 250VAC | 50VAC | AC | 4000VAC | A K—A1(+) A2(-) |
| OSSRD0004A | 4-32VDC | 5mA | 40A | 0.05A | 250VAC | 75VAC | AC | 4000VAC | A K—A1(+) A2(-) |
| OSSRD0005A | 4-32VDC | 5mA | 25A | 0.05A | 480VAC | 75VAC | AC | 4000VAC | A K—A1(+) A2(-) |
| OSSRD0006A | 4-32VDC | 5mA | 40A | 0.05A | 480VAC | 75VAC | AC | 4000VAC | A K—A1(+) A2(-) |
| Configuration: Definition of Terms LED Identification—Sensor Identification | | | | | | | | | |
| Configuration Information | LED | A = Anode | | | | K = Cathode | | | |
| | Sensor | A1(+) and A2(-) = Main Terminals of Triac | | | | | | | |

Part Number Symbolization



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Solid-State Relays

Panel Mount Package—VDC Input / VAC Output

OSSRD0001A thru OSSRD0006A



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

| | |
|--|-------------------|
| Storage Temperature OSSRD0001A thru OSSRD0006A | -30° C to +125° C |
| Operating Temperature OSSRD0001A thru OSSRD0006A | -30° C to +100° C |
| Isolation Voltage (Input to Output) OSSRD0001A thru OSSRD0006A | 4,000 Vrms |

Input Diode

| | |
|---|-----------|
| Input Signal Voltage—(V_{IN}) OSSRD0001A thru OSSRD0006A | 4- 32 VDC |
| Drop-out Voltage—(V_{do}) OSSRD0001A thru OSSRD0006A | 1 VDC |

Output Triac

| | |
|--|--|
| RMS On-State Current - (I_T) OSSRD0001A OSSRD0002A OSSRD0003A, OSSRD0005A OSSRD0004A, OSSRD0006A | 10 Arms 15 Arms 25 Arms 40 Arms |
| Peak One Cycle Surge Current - (I surge) OSSRD0001A OSSRD0002A OSSRD0003A, OSSRD0005A OSSRD0004A, OSSRD0006A | 100 A 150 A 250 A 400 A |
| Repetitive Peak-Off State Voltage—(V_{DRM}) OSSRD0001A thru OSSRD0004A OSSRD0005A, OSSRD0006A | 600 V 800 V |
| Operating Frequency—(f) OSSRD0001A thru OSSRD0006A | 47—70 Hz |
| Critical Rate of Rise of On-State Current—(di/dt) OSSRD0001A thru OSSRD0006A | 50 A/ μ S |
| Load Supply Voltage—(V_{OUT}) OSSRD0001A thru OSSRD0004A OSSRD0005A, OSSRD0006A | 250 Vrms AC 480 Vrms AC |

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Solid-State Relays

Panel Mount Package—VDC Input / VAC Output

OSSRD0001A thru OSSRD0006A



Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|---------------------|--|-----------|----------|------------|--------------------|--|
| Input Diode | | | | | | |
| V_{PU} | Pick-up Voltage OSSRD0001A thru OSSRD0006A | - | - | 4 | VDC | $I_T = 1\text{Arms}$ |
| I_{IN} | Input Current OSSRD0001A thru OSSRD0006A | 5 | - | 12 | mA | $V_{IN} = 4 - 32\text{ V}$ |
| Output Triac | | | | | | |
| V_T | On-State Voltage OSSRD0001A thru OSSRD0006A | - | - | 1.5 | Vrms | $I_T = 1\text{Arms}$ |
| I_{OP} | Operating Current OSSRD0001A thru OSSRD0004A OSSRD0005A, OSSRD0006A | 50 50 | - - | - - | mArms | $V_{out} = 240\text{Vrms}$ $V_{out} = 480\text{Vrms}$ |
| I_{leak} | Leakage Current OSSRD0001A thru OSSRD0004A OSSRD0005A, OSSRD0006A | - - | 3.5 - | 7 14 | mArms | $V_{out} = 240\text{Vrms}$ $V_{out} = 480\text{Vrms}$ |
| dv/dt | Critical Rate of Rise of Off-State Voltage OSSRD0001A thru OSSRD0006A | 50 | 200 | - | V/ μs | See Note 1. |
| ZC | Zero-Cross Voltage OSSRD0001A thru OSSRD0006A | - | Yes | - | - | - |
| V_{OUT} | Load Voltage Rating OSSRD0001A thru OSSRD0004A OSSRD0005A, OSSRD0006A | 50 75 | - - | 280 480 | VAC | $I_T = 50\text{mArms MIN}$ |
| I_{FT} | Minimum Trigger Current OSSRD0001A thru OSSRD0004A OSSRD0005A, OSSRD0006A | - - | - - | 10 25 | mA | $V_{DRM} = 600\text{ V}$ $V_{DRM} = 800\text{ V}$ |
| Riso | Isolation resistance Input to Output OSSRD0001A thru OSSRD0006A | 10^{10} | - | - | Ω | DC500 V |
| T_{ON} | Turn-on Time OSSRD0001A thru OSSRD0006A | - | - | 8.3 | mS | 60Hz AC |
| T_{OFF} | Turn-off Time OSSRD0001A thru OSSRD0006A | - | - | 8.3 | mS | 60Hz AC |
| $R_{th(j-c)}$ | Thermal Resistance (between junction and case) | - | 1.3 | - | $^\circ\text{C/W}$ | - |

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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Panel Mount Package—VDC Input / VAC Output

OSSRD0001A thru OSSRD0006A



OSSRD0001A, OSSRD0002A, OSSRD0003A, OSSRD0004A

Characteristic Data Curves

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

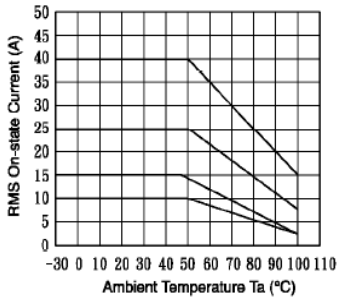


Fig.2 Surge Current vs. Time $f=60\text{Hz}$
 $T_j=25^\circ\text{C}$

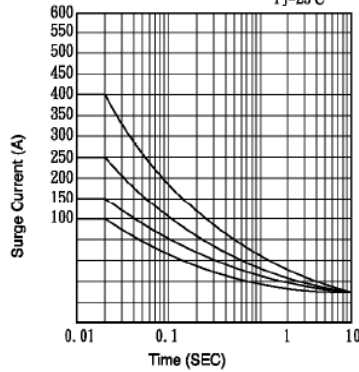


Fig.3 Open Circuit Leak Current vs. Supply Voltage

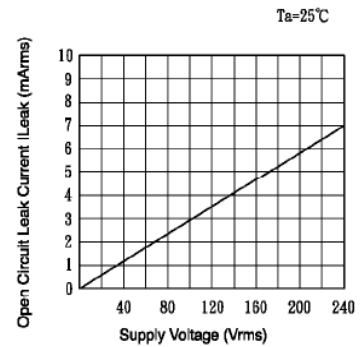


Fig.4 RMS On-state Current vs. Case Temperature

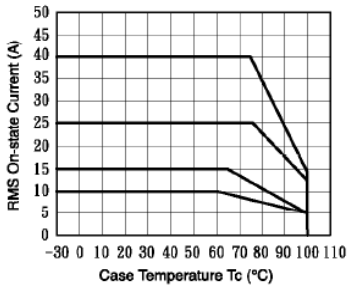


Fig.5 Input Voltage vs. Ambient Temperature

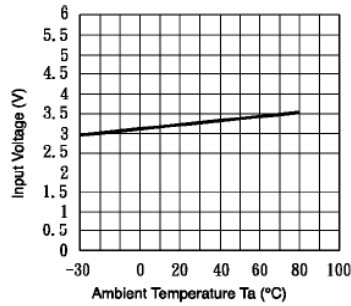


Fig.6 Input Current vs. Input voltage

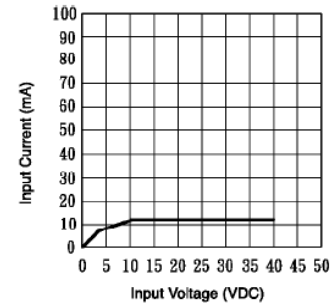


Fig.7 Action waveform

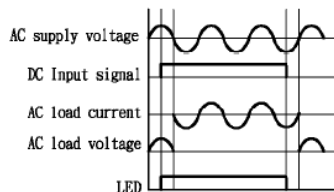
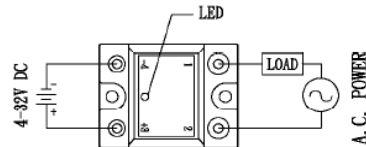


Fig.8 WIRING DIAGRAM



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Solid-State Relays

Panel Mount Package—VDC Input / VAC Output

OSSRD0001A thru OSSRD0006A



OSSRD0005A

Characteristic Data Curves

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

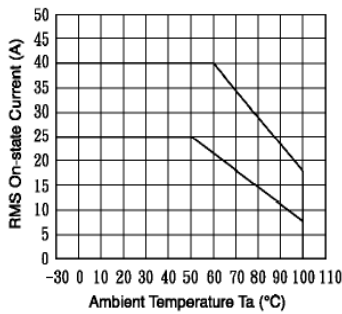


Fig.2 Surge Current vs. Time $f=60\text{Hz}$
 $T_j=25^\circ\text{C}$

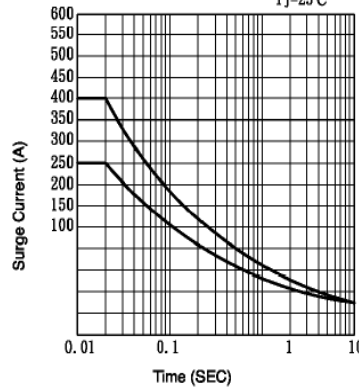


Fig.3 Open Circuit Leak Current vs. Supply Voltage $T_a=25^\circ\text{C}$

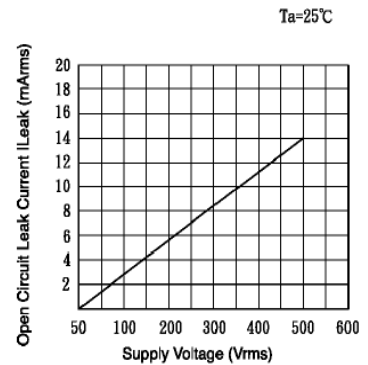


Fig.4 RMS On-state Current vs. Case Temperature

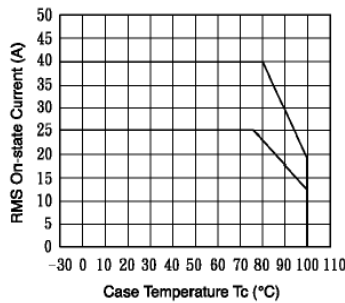


Fig.5 Input Voltage vs. Ambient Temperature

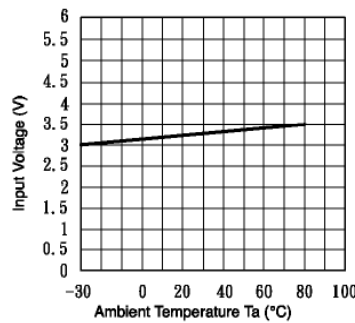


Fig.6 Input Current vs. Input voltage

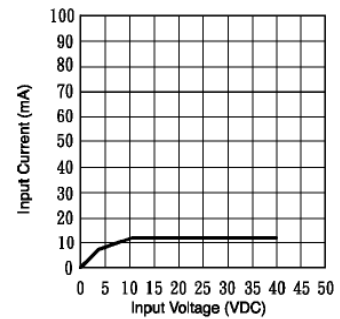


Fig.7 Action waveform

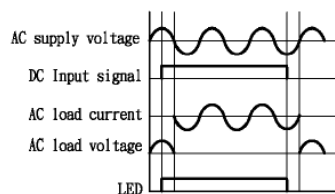
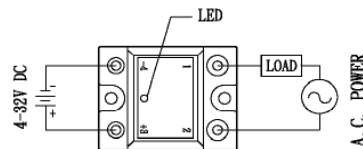


Fig.8 WIRING DIAGRAM



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Solid-State Relays

Panel Mount Package—VDC Input / VAC Output

OSSRD0001A thru OSSRD0006A



OSSRD0006A

Characteristic Data Curves

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

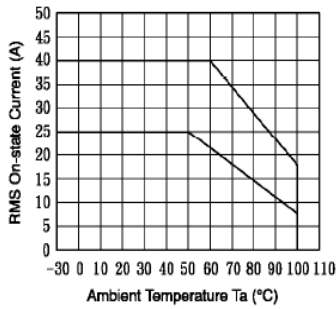


Fig.2 Surge Current vs. Time
 $f=60\text{Hz}$
 $T_j=25^\circ\text{C}$

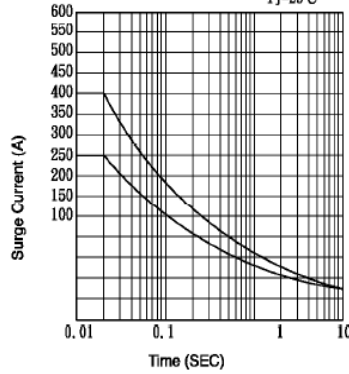


Fig.3 Open Circuit Leak Current vs. Supply Voltage
 $T_a=25^\circ\text{C}$

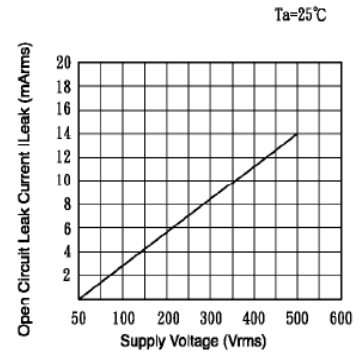


Fig.4 RMS On-state Current vs. Case Temperature

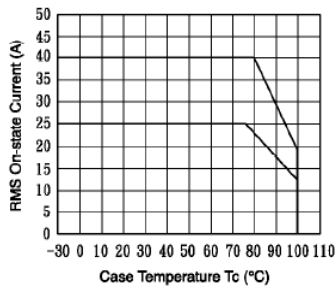


Fig.5 Input Voltage vs. Ambient Temperature

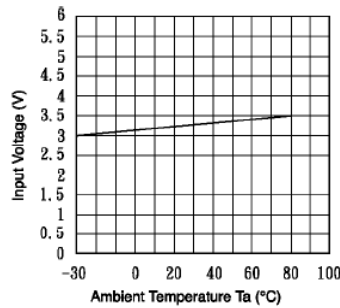


Fig.6 Input Current vs. Input voltage

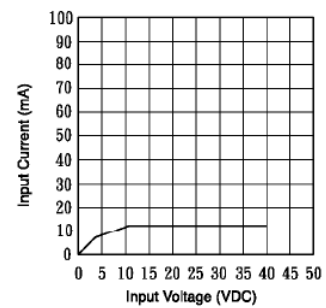


Fig.7 Action waveform

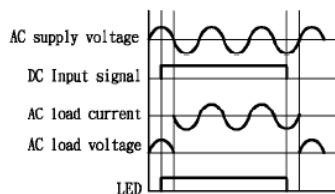
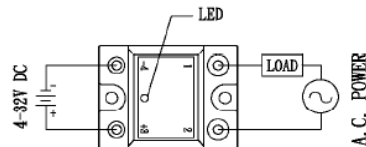


Fig.8 WIRING DIAGRAM



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Solid-State Relays

Panel Mount Package—VDC Input / VAC Output

OSSRD0001A thru OSSRD0006A



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 std J-STD-020B |
| Glass Transition of body | 125°C Min. | DSC test method |
| Temperature Humidity-Bias | ± 20% | 85°C, 85%RH, 500Hrs, 80% min Iceo |
| Temperature Cycle | ± 20% | per Method 1010.7 of MIL-STD-883E |
| High Temperature Storage | ± 20% | 85°C, 500Hrs |






Label Identification

DESCRIPTION:

Size: 3" (7.5 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 <small>RoHS compliant</small> |
| OPTEK P/N <u> OSSRD0001A </u>  |
| QTY. <u> — </u>  |
| DATE CODE <u> (YYWW) </u>  |
| LOT I.D. <u> (Y-NNNNDDD) </u>  |

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Solid-State Relays

Panel Mount Package—VDC Input / VAC Output OSSRD0001A thru OSSRD0006A



Packaging Information:

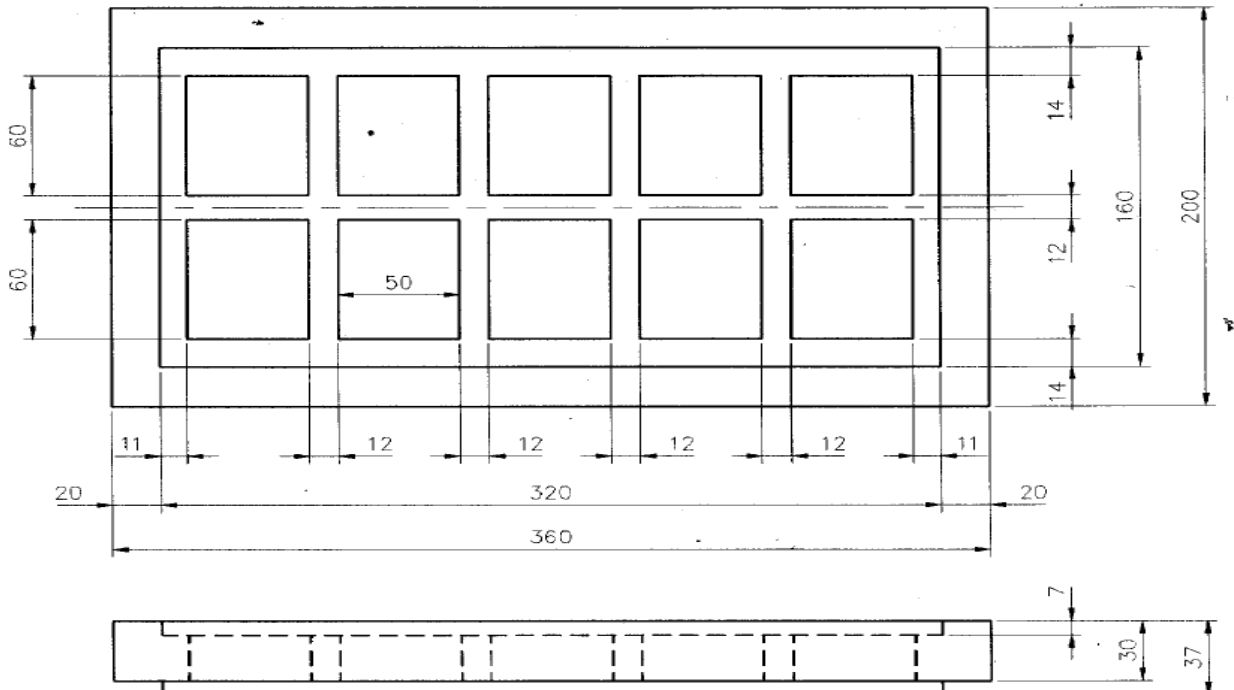
| Optek's Solid-State Relays Part Numbers (4-Pin SIP) | | Packaging Quantities | Tubes | | Inner | | Medium Carton | | | Large Carton | | |
|---|-------------------------|----------------------------|-------|---------------|---------------------|----------------|-----------------------|-----------------------|-------------------------|-----------------------|-----------------------|-------------------------|
| | | | Qty | Weight (g) | 53.5 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 | | |
| | | Package Type | Qty | Weight (g) | Qty | Weight (kg) | Qty | Net Weight (kg) | Gross Weight (kg) | Qty | Net Weight (kg) | Gross Weight (kg) |
| 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 | | |
|--|--|---------------------------------|-----------------|---------------|-----------------|-----------------------|-------------------------|-----------------|-----------------------|-------------------------|-----------------|-----------------------|-------------------------|
| | | | 36 x 20 x 37 cm | | 37 x 21 x 11 cm | | | 37 x 21 x 17 cm | | | 37 x 21 x 32 cm | | |
| | | Package Type | Qty | Weight (g) | Qty | Net Weight (kg) | Gross Weight (kg) | Qty | Net Weight (kg) | Gross Weight (kg) | Qty | Net Weight (kg) | Gross Weight (kg) |
| 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 |

Tray and Carton Packaging Specifications:

Tray Packaging Dimensions

All dimensions in centimeters (mm)



All dimensions in millimeters (mm)

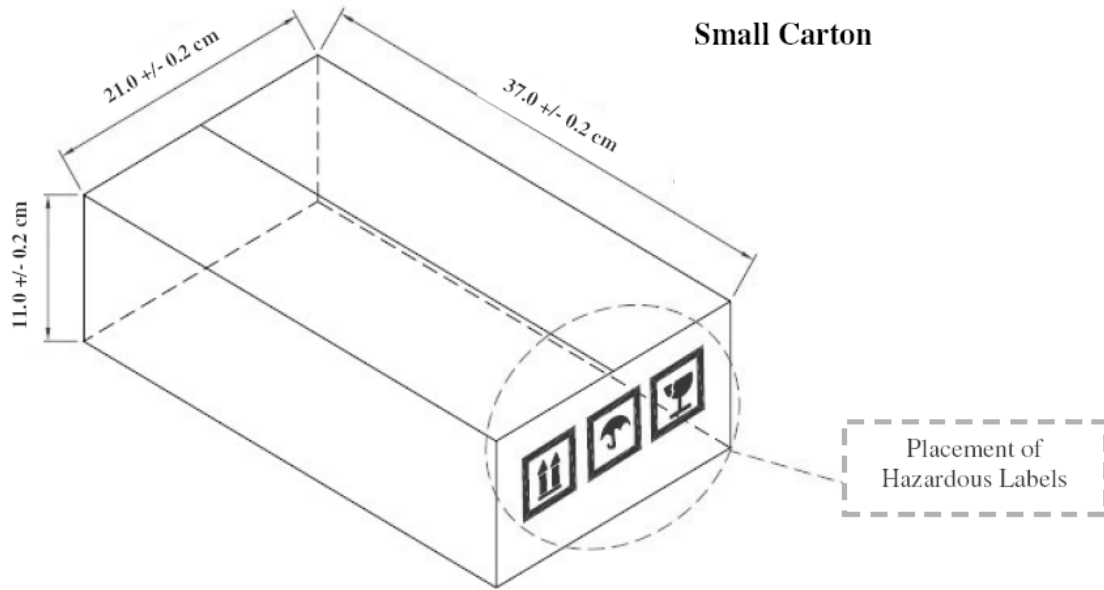
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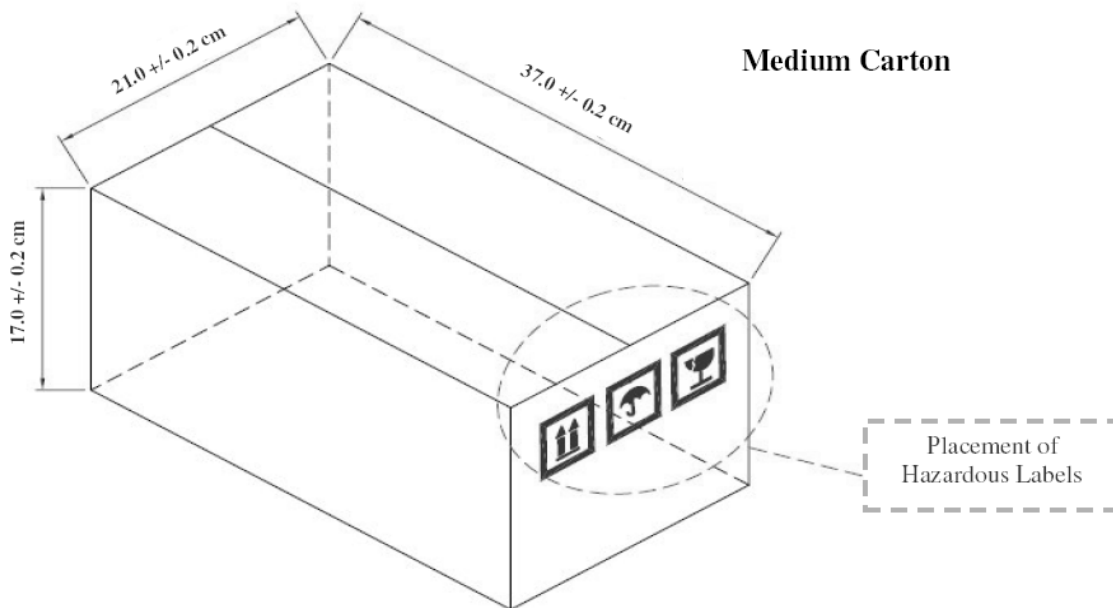


Tray and Carton Packaging Specifications (Cont.):

Carton Packaging Dimensions



All dimensions in centimeters (cm)



All dimensions in centimeters (cm)

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Solid-State Relays

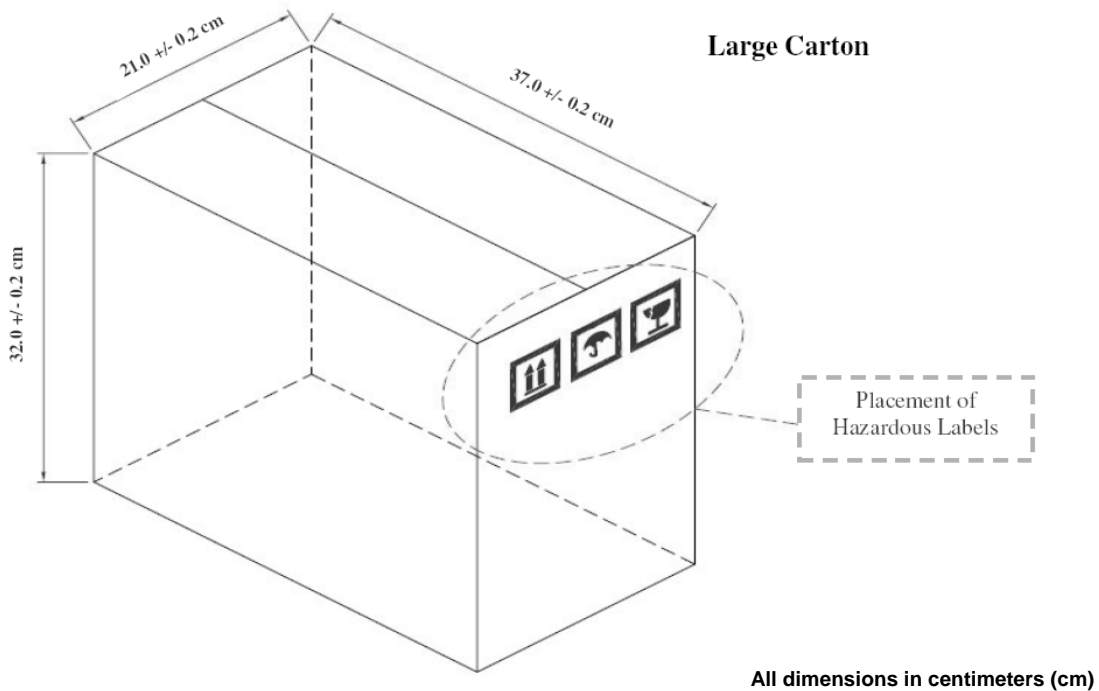
Panel Mount Package—VDC Input / VAC Output

OSSRD0001A thru OSSRD0006A



Tray and Carton Packaging Specifications (Cont.):

Carton Packaging Dimensions



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