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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A

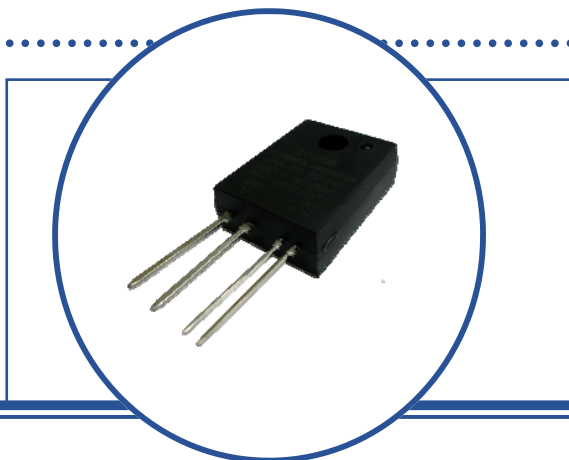


Features:

- 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

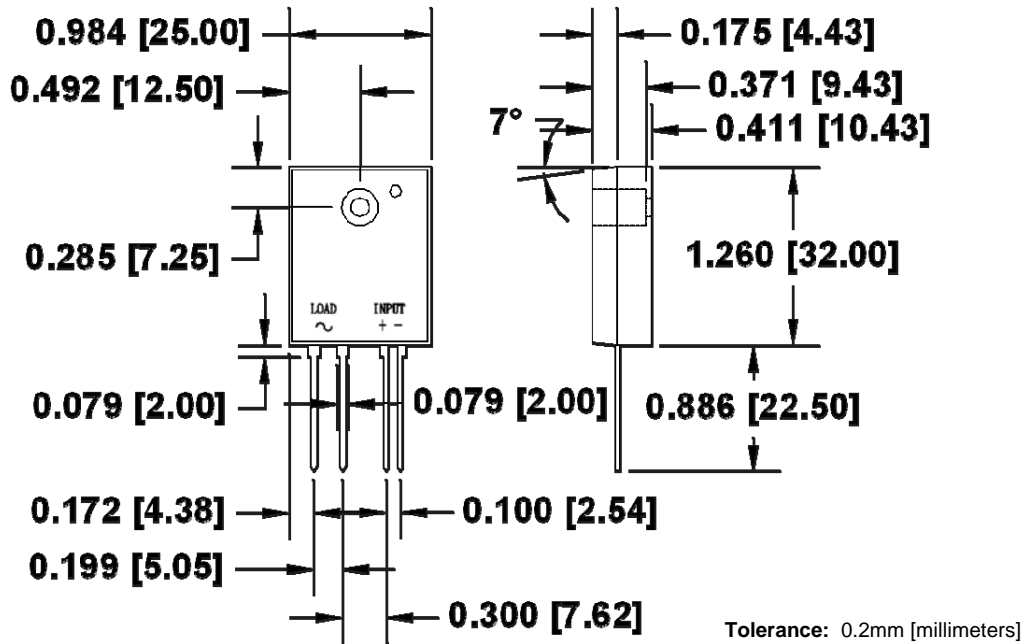


OPTEK reserves the right to make changes at any time in order to improve design and to supply the best product possible.

Solid State Relays
4-Pin SIP Package—VDC Input / VAC Output
OSSRD1001A thru OSSRD1006A

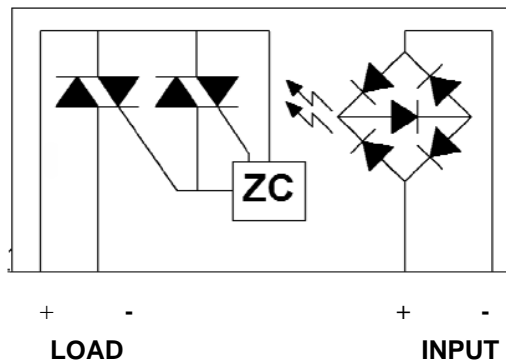


Package Outline: 4-Pin SIP



Tolerance: 0.2mm [millimeters]
 All dimensions in Inches [millimeters]

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

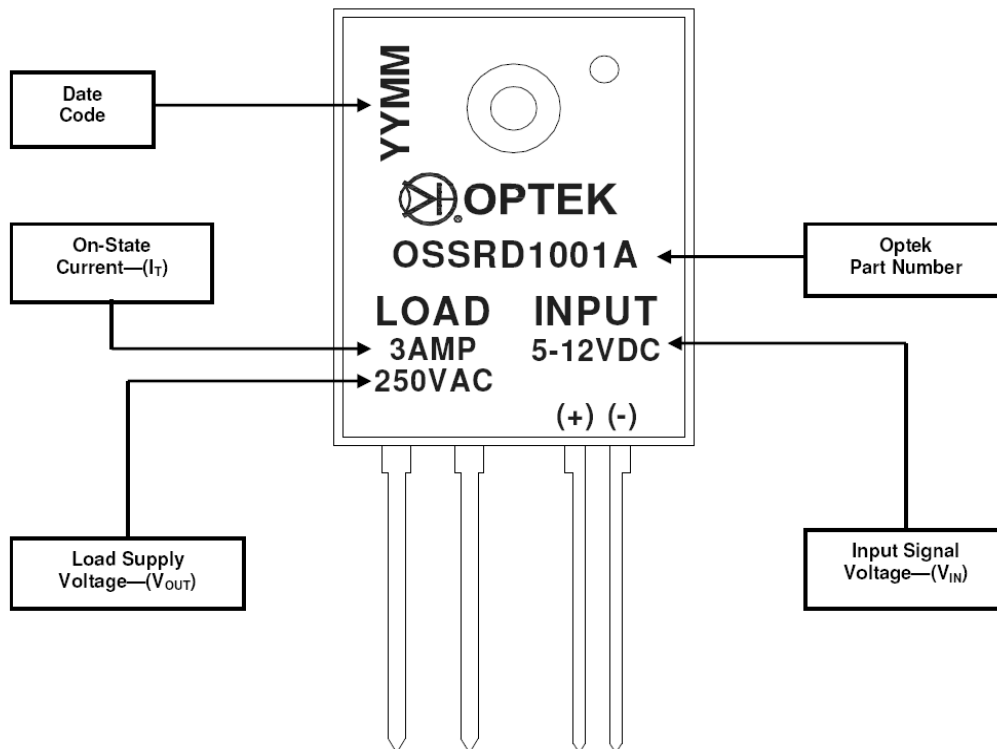
OSSRD1001A thru OSSRD1006A



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
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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
$R_{th}(j-C)$	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

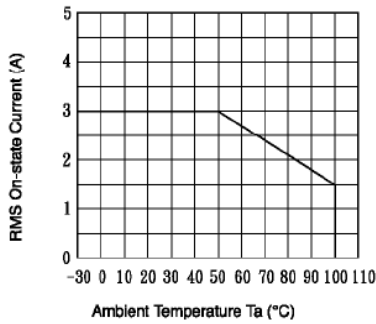


Fig.2 Surge Current vs. Time

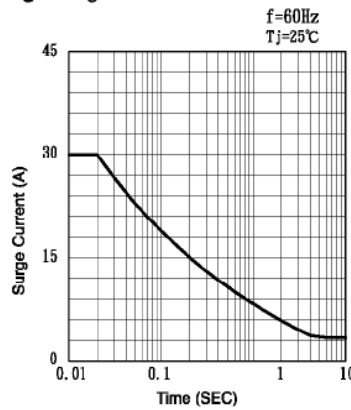


Fig.3 Open Circuit Leak Current vs. Supply Voltage

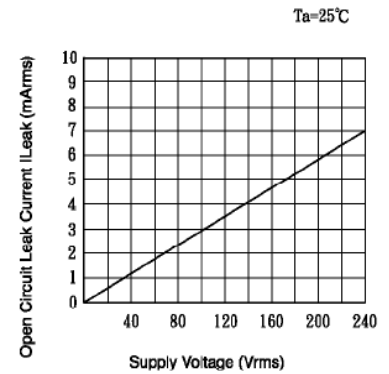


Fig.4 RMS On-state Current vs. Case Temperature

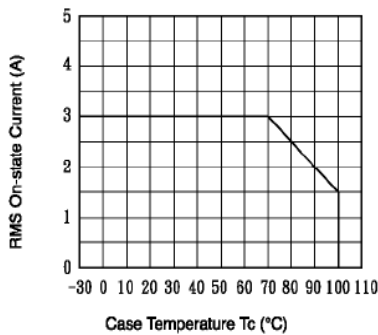


Fig.5 Input Voltage vs. Ambient Temperature

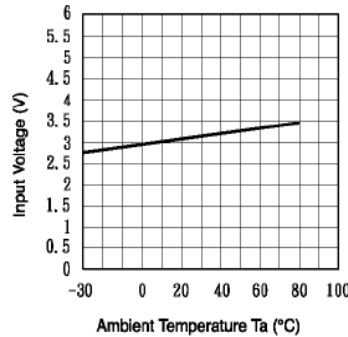


Fig.6 Input Current vs. Input voltage

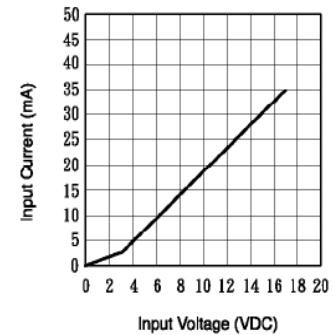


Fig.7 Action waveform

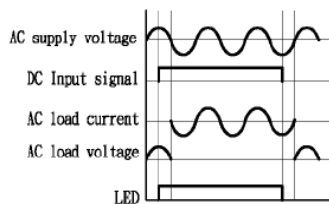
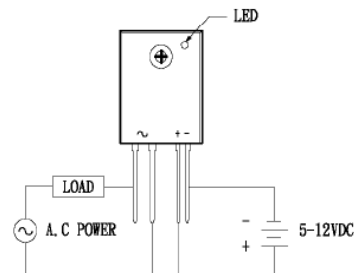


Fig.8 WIRING DIAGRAM



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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

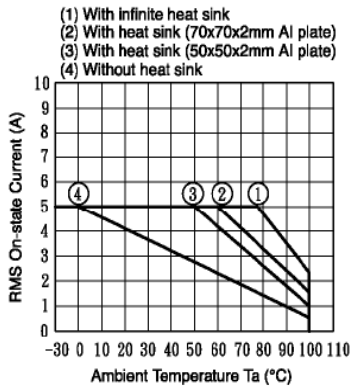


Fig.2 Surge Current vs. Time

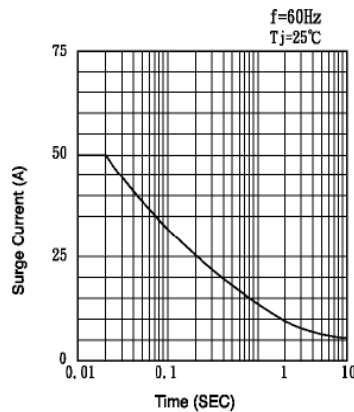


Fig.3 Open Circuit Leak Current vs. Supply Voltage

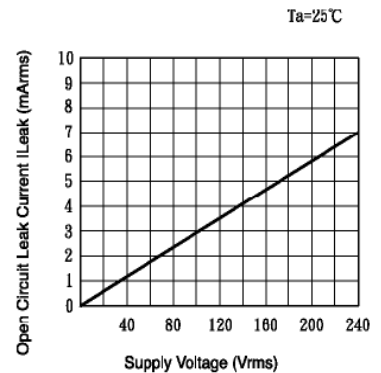


Fig.4 RMS On-state Current vs. Case Temperature

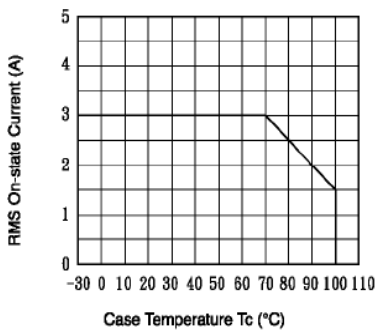


Fig.5 Input Voltage vs. Ambient Temperature

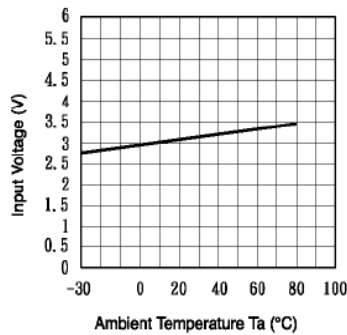


Fig.6 Input Current vs. Input voltage

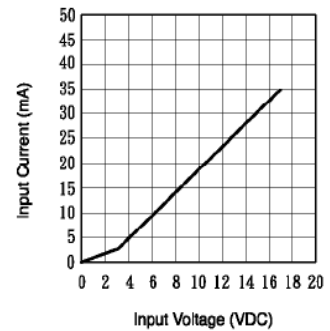


Fig.7 Action waveform

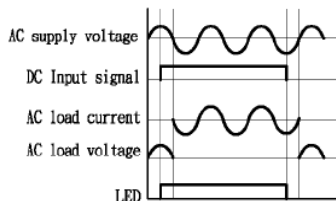
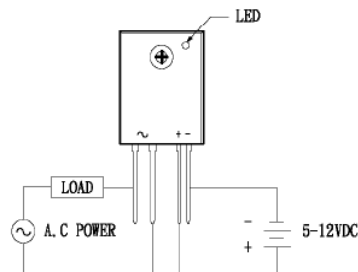


Fig.8 WIRING DIAGRAM



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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

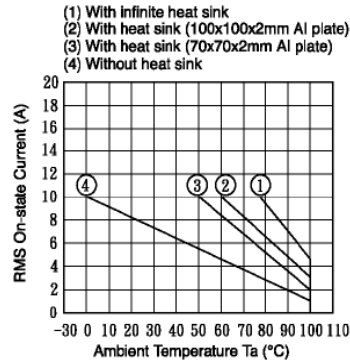


Fig.2 Surge Current vs. Time

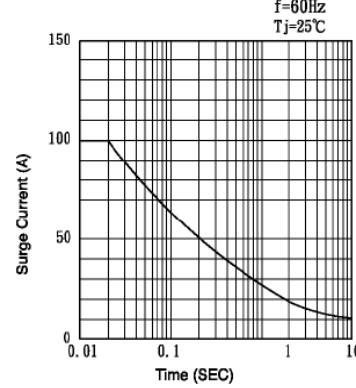


Fig.3 Open Circuit Leak Current vs. Supply Voltage

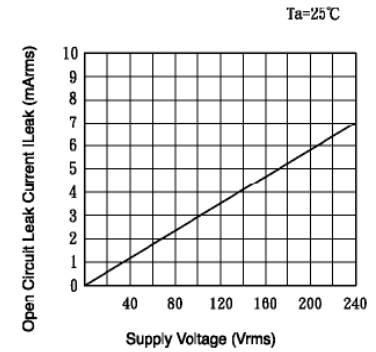


Fig.4 RMS On-state Current vs. Case Temperature

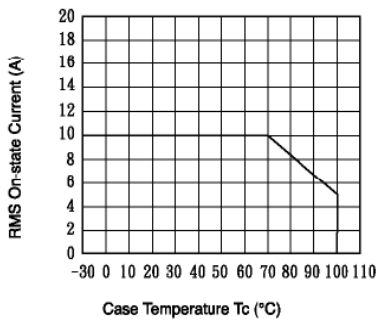


Fig.5 Input Voltage vs. Ambient Temperature

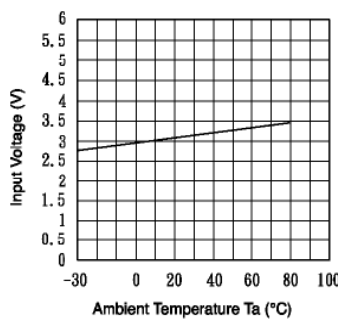


Fig.6 Input Current vs. Input voltage

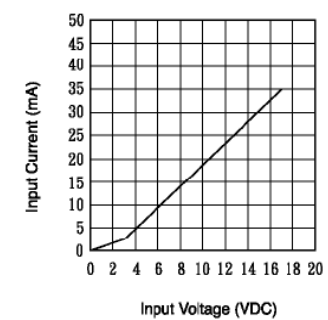


Fig.7 Action waveform

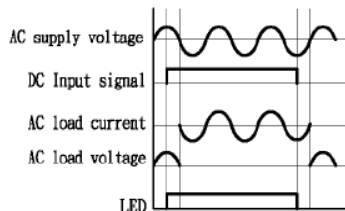
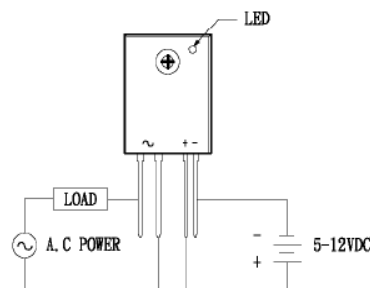


Fig.8 WIRING DIAGRAM



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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

- (1) With infinite heat sink
- (2) With heat sink (120x120x2mm Al plate)
- (3) With heat sink (80x80x2mm Al plate)
- (4) Without heat sink

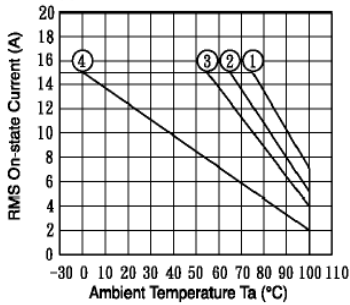


Fig.2 Surge Current vs. Time

$f=60\text{Hz}$
 $T_j=25^\circ\text{C}$

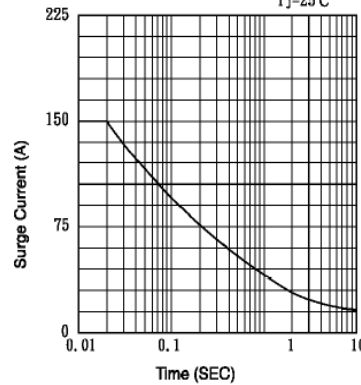


Fig.3 Open Circuit Leak Current vs. Supply Voltage

$T_a=25^\circ\text{C}$

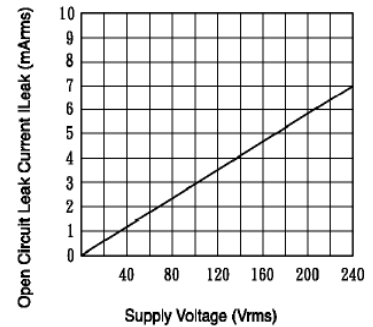


Fig.4 RMS On-state Current vs. Case Temperature

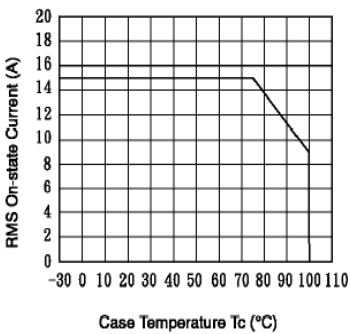


Fig.5 Input Voltage vs. Ambient Temperature

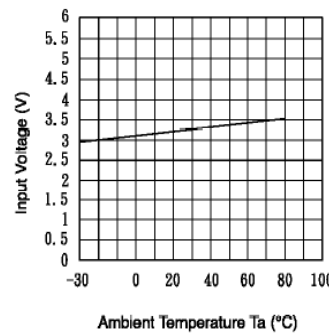


Fig.6 Input Current vs. Input voltage

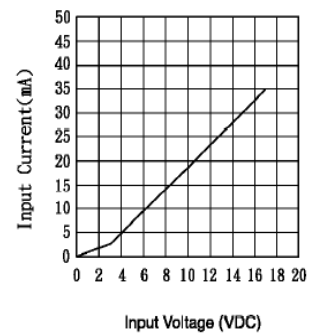


Fig.7 Action waveform

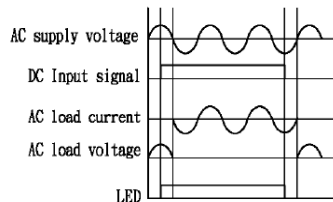
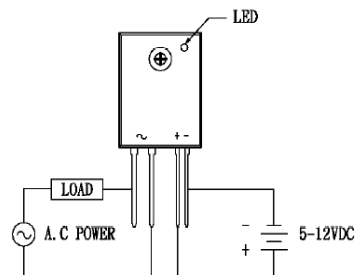


Fig.8 WIRING DIAGRAM



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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A



OSSRD1005A

Characteristic Data Curves

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

- (1) With infinite heat sink
- (2) With heat sink (150x150x2mm Al plate)
- (3) With heat sink (100x100x2mm Al plate)
- (4) Without heat sink

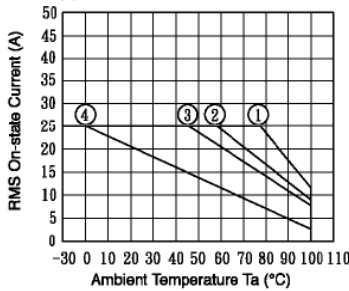


Fig.2 Surge Current vs. Time

f=60Hz
Tj=25°C

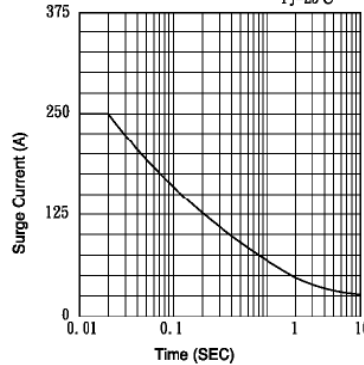


Fig.3 Open Circuit Leak Current vs. Supply Voltage

Ta=25°C

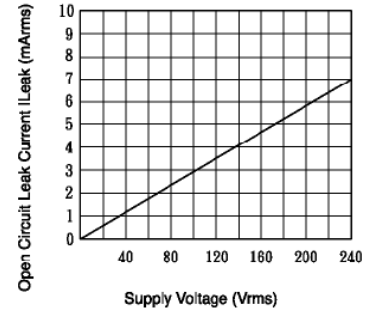


Fig.4 RMS On-state Current vs. Case Temperature

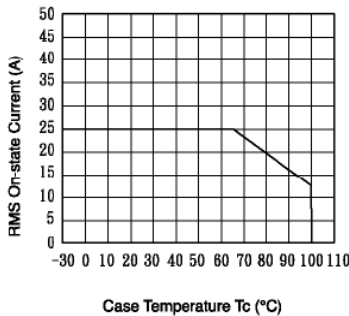


Fig.5 Input Voltage vs. Ambient Temperature

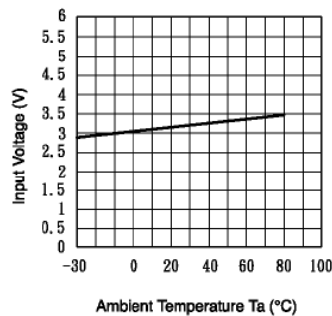


Fig.6 Input Current vs. Input voltage

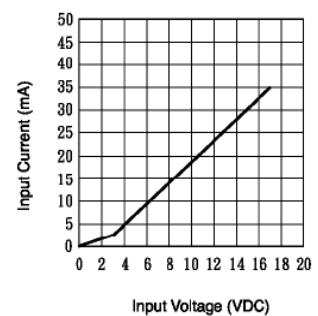


Fig.7 Action waveform

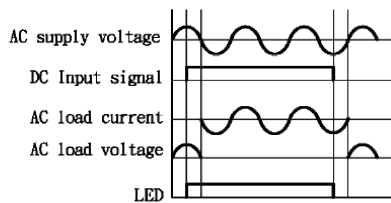
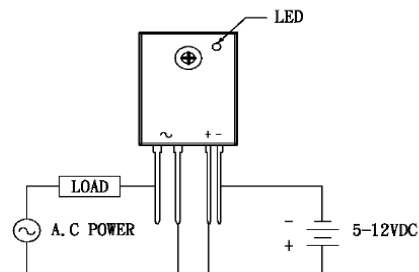


Fig.8 WIRING DIAGRAM



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Solid State Relays

4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A



OSSRD1006A

Characteristic Data Curves

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

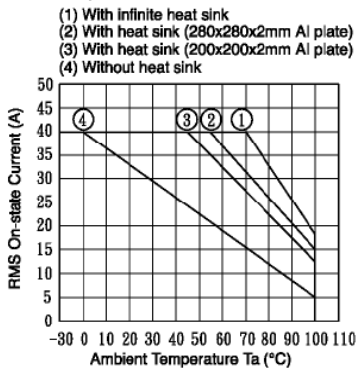


Fig.2 Surge Current vs. Time

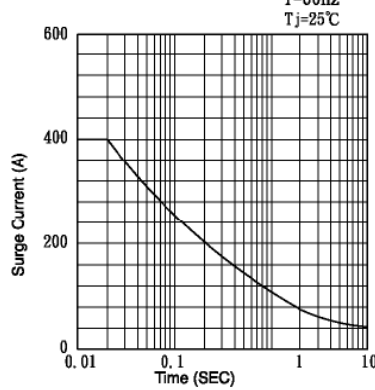


Fig.3 Open Circuit Leak Current vs. Supply Voltage

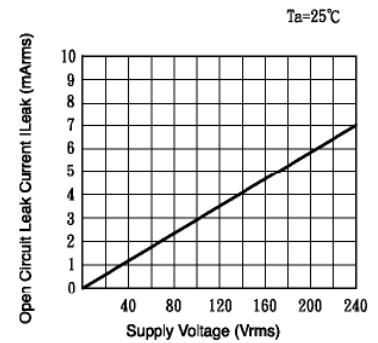


Fig.4 RMS On-state Current vs. Case Temperature

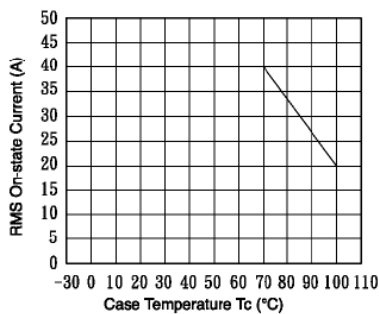


Fig.5 Input Voltage vs. Ambient Temperature

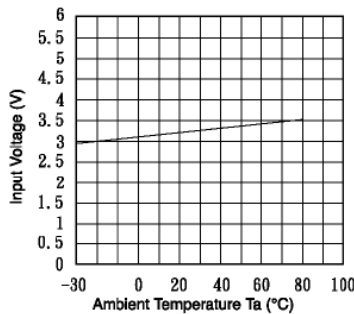


Fig.6 Input Current vs. Input voltage

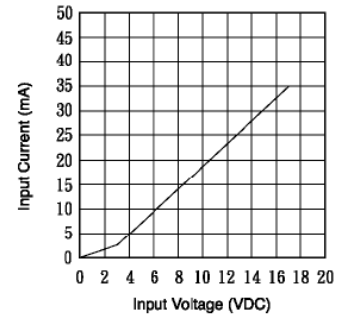


Fig.7 Action waveform

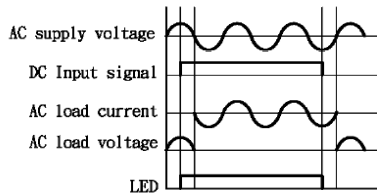
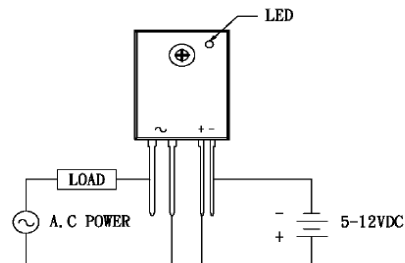


Fig.8 WIRING DIAGRAM



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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 lceo
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



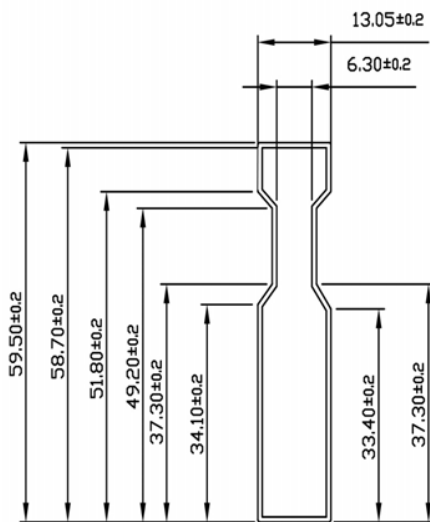
Packaging Information:

Optek's Solid-State Relays Part Numbers (4-Pin SIP)		Packaging Quantities	Tubes		Inner		Medium Carton			Large Carton		
			Qty	Weight (g)	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
	OSSRD1001A - OSSRD1006A	4 Pin SIP (32mm x 24mm)	20	421	80	1.90	640	15.2	16.2	960	22.8	24.1

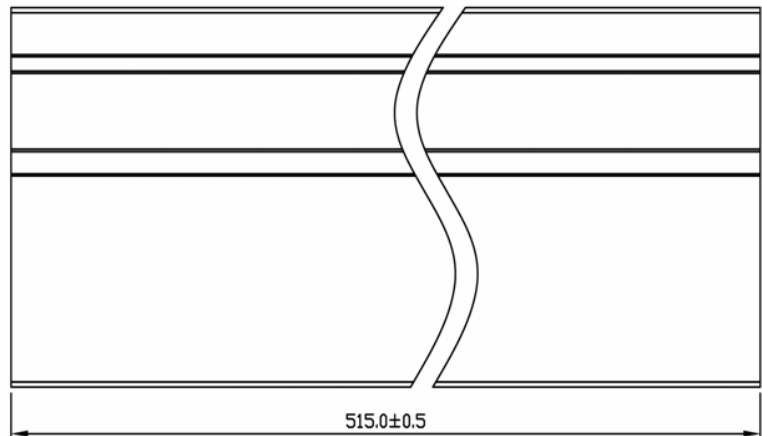
Optek's Solid-State Relays Part Numbers (Panel Mounts)		Packaging Quantities	Trays		Small Carton			Medium Carton			Large Carton		
			36 x 20 x 37 cm		37 x 21 x 11 cm			37 x 21 x 17 cm			37 x 21 x 32 cm		
Package Type		Qty	Weight (g)	Qty	Net Weight (kg)	Gross Weight (kg)	Qty	Net Weight (kg)	Gross Weight (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

Tube and Carton Packaging Specifications:

Tube Packaging Dimensions



All dimensions are in millimeters



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Solid State Relays

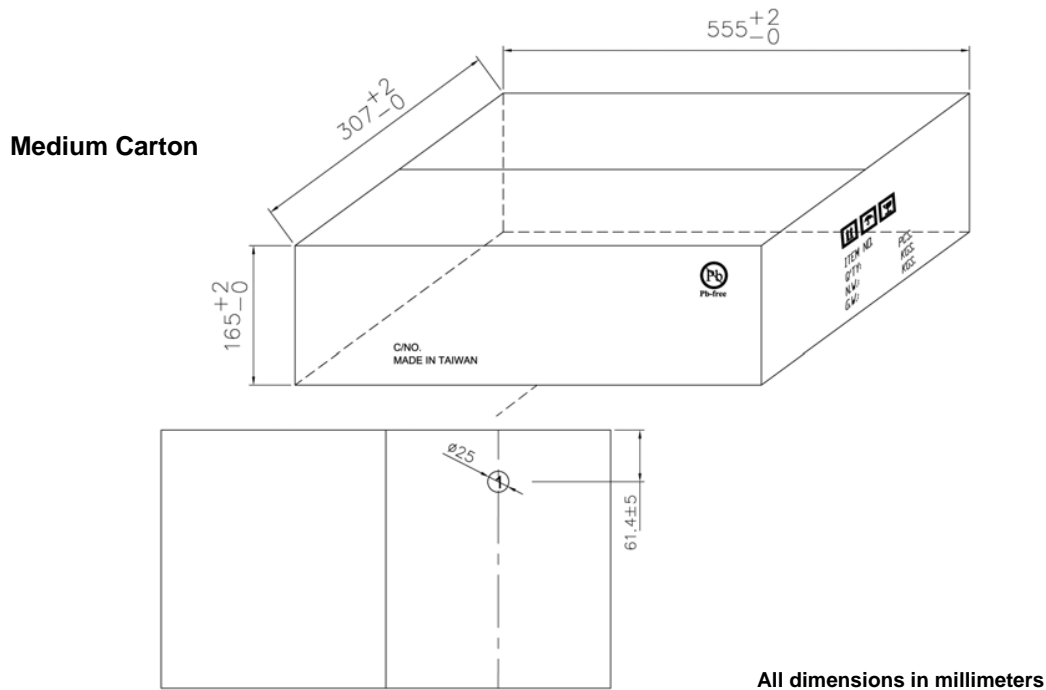
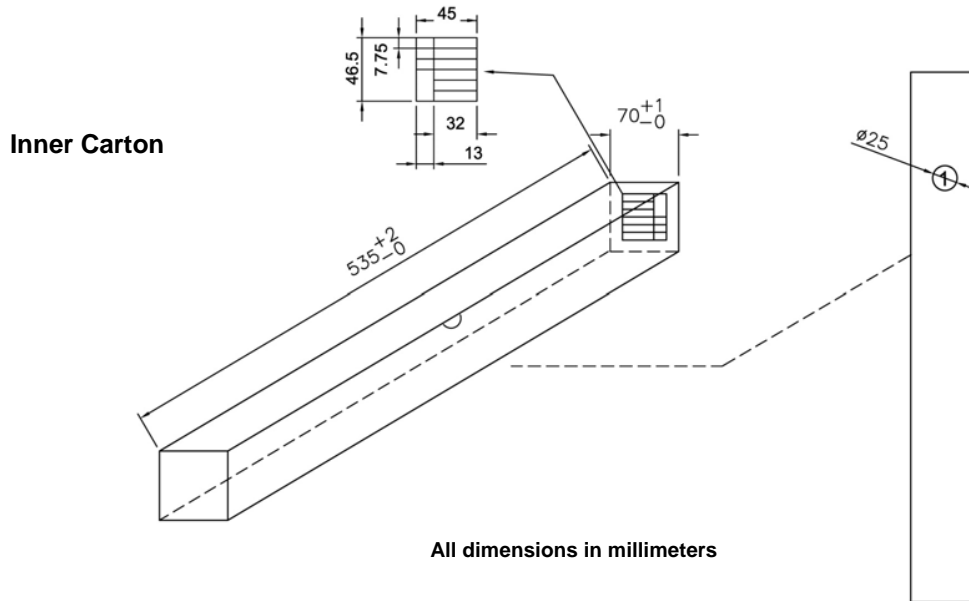
4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A



Tray and Carton Packaging Specifications (Cont.):

Carton Packaging Dimensions



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

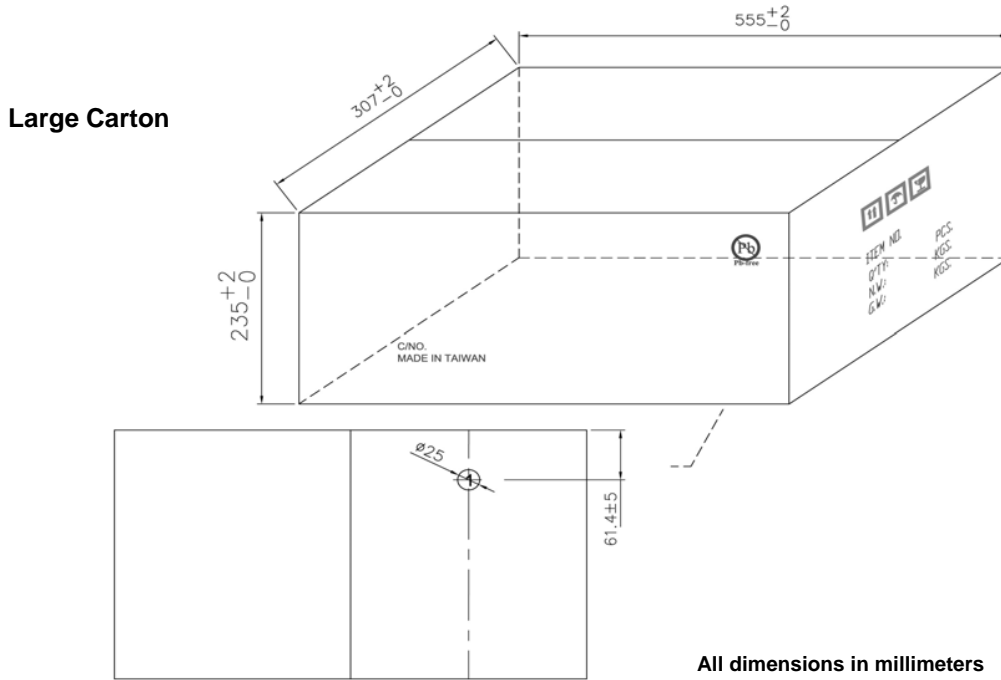
4-Pin SIP Package—VDC Input / VAC Output

OSSRD1001A thru OSSRD1006A



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.