

# Solid State Relays

## 4-Pin SIP Package—VDC Input / VAC Output

### OSSRD1001A thru OSSRD1006A

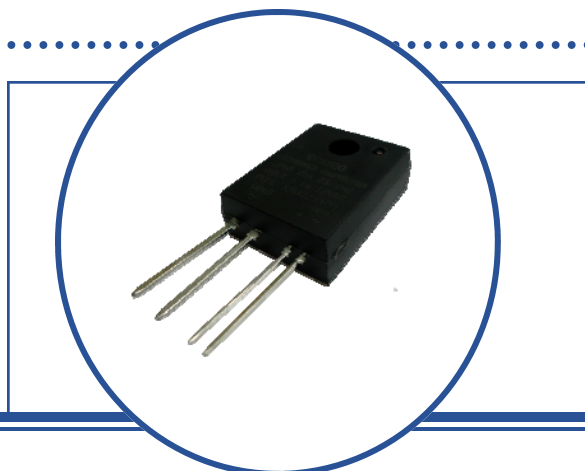


#### Features:

- 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.

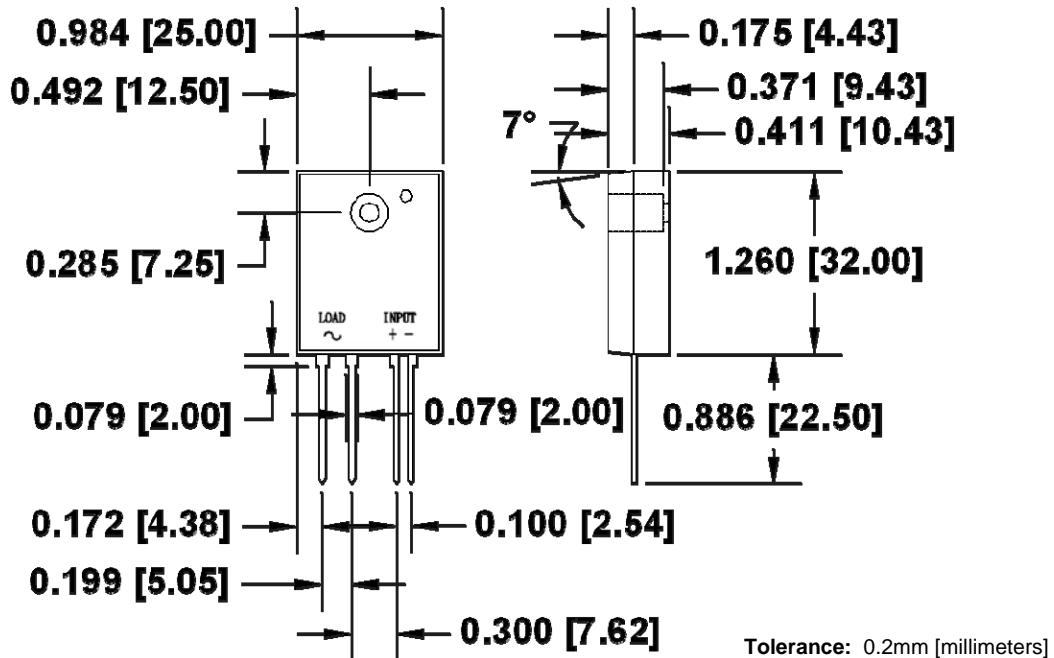
# Solid State Relays

## 4-Pin SIP Package—VDC Input / VAC Output

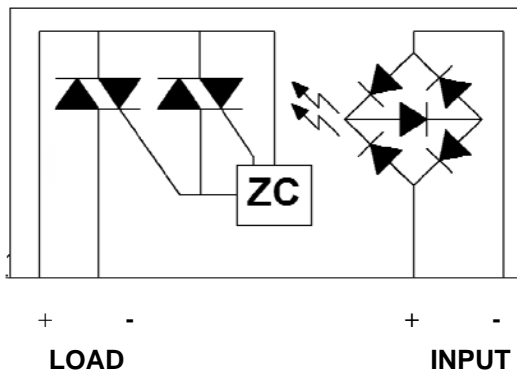
### OSSRD1001A thru OSSRD1006A



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

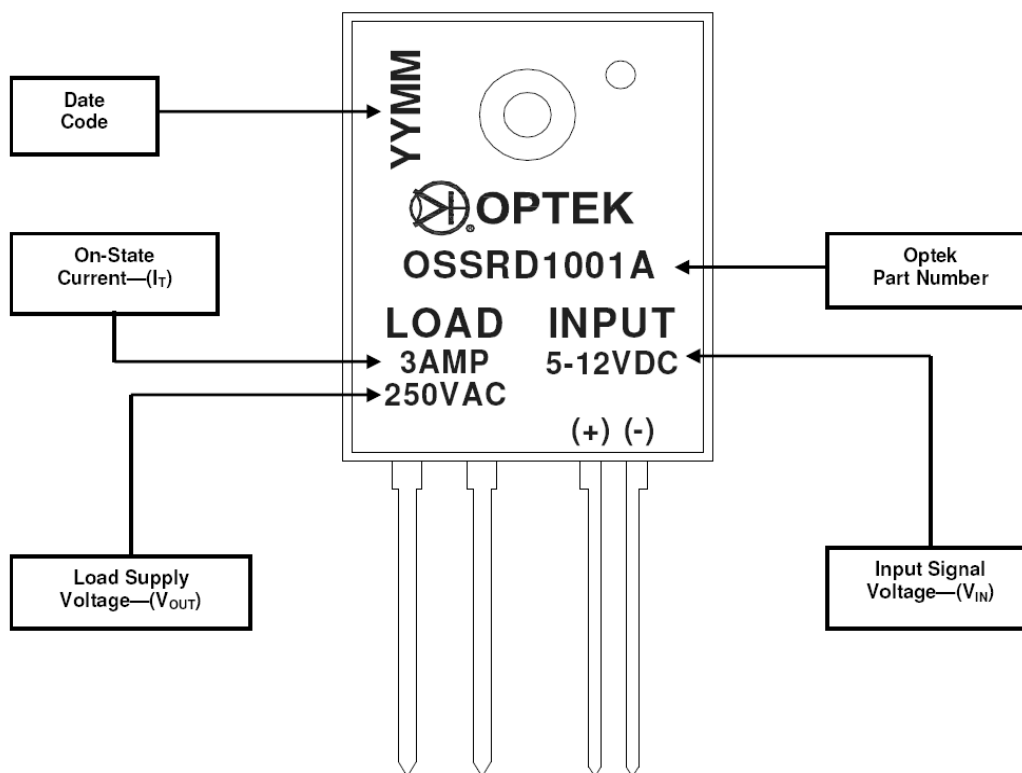
### OSSRD1001A thru OSSRD1006A



### VDC Input / VAC Output Devices Ordering Information

Part Number	Input	Min. Tgr Current I <sub>ft</sub>	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)

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

#### Input Diode

<b>Input Signal Voltage—(<math>V_{IN}</math>)</b> OSSRD1001A thru OSSRD1006A	5– 12 VDC
<b>Drop-out Voltage—(<math>V_{do}</math>)</b> OSSRD1001A thru OSSRD1006A	1 VDC

#### Output Triac

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

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

#### Output Triac

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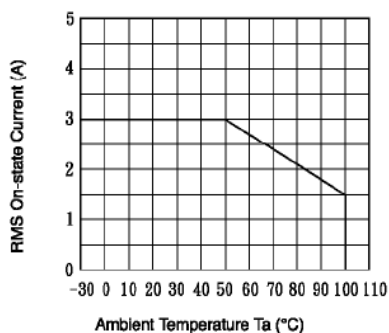
## 4-Pin SIP Package—VDC Input / VAC Output

### OSSRD1001A thru OSSRD1006A

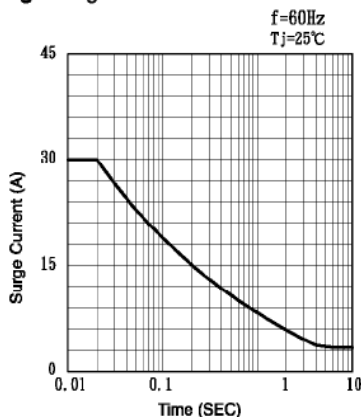
#### OSSRD1001A

#### Characteristic Data Curves

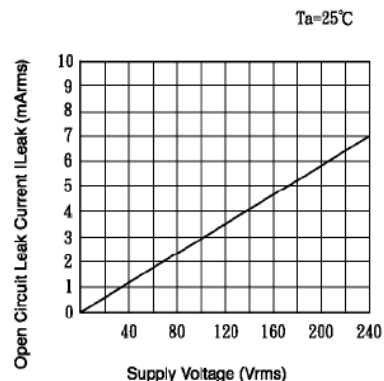
**Fig.1** RMS On-state Current vs. Ambient Temperature



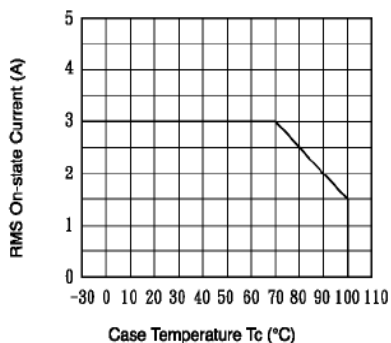
**Fig.2** Surge Current vs. Time



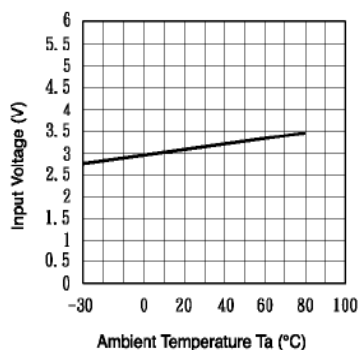
**Fig.3** Open Circuit Leak Current vs. Supply Voltage



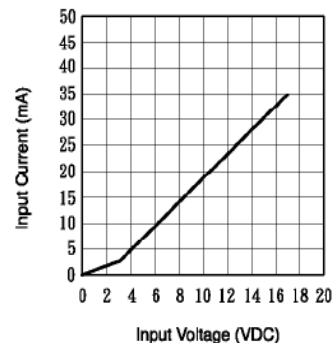
**Fig.4** RMS On-state Current vs. Case Temperature



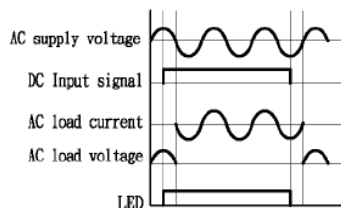
**Fig.5** Input Voltage vs. Ambient Temperature



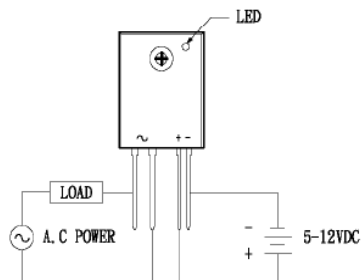
**Fig.6** Input Current vs. Input voltage



**Fig.7** Action waveform



**Fig.8** WIRING DIAGRAM



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# Solid State Relays

## 4-Pin SIP Package—VDC Input / VAC Output

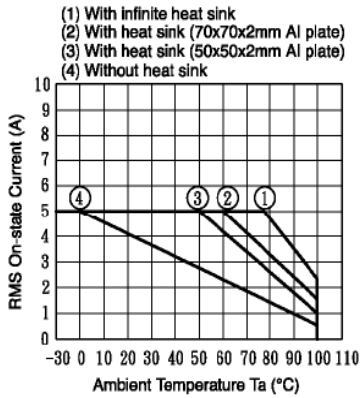
### OSSRD1001A thru OSSRD1006A



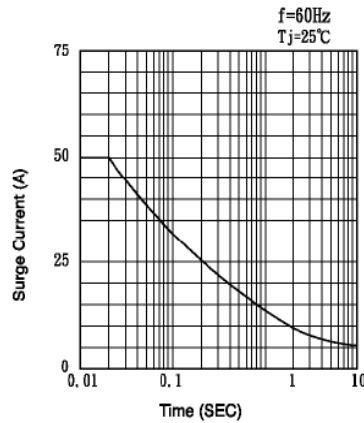
### OSSRD1002A

#### Characteristic Data Curves

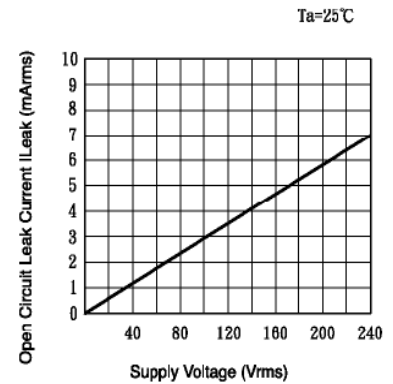
**Fig.1 RMS On-state Current vs. Ambient Temperature**



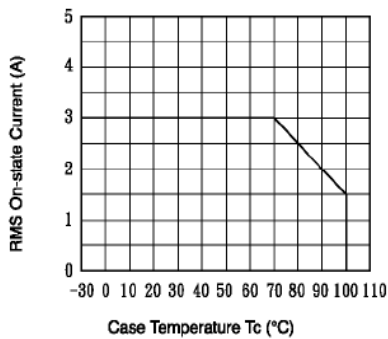
**Fig.2 Surge Current vs. Time**



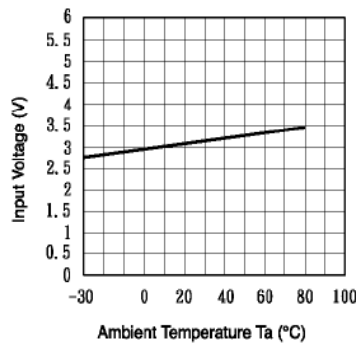
**Fig.3 Open Circuit Leak Current vs. Supply Voltage**



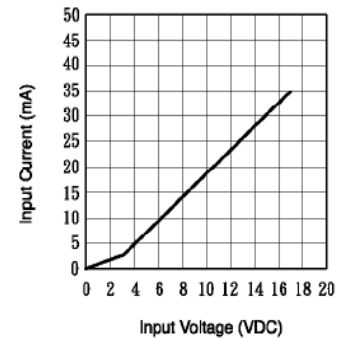
**Fig.4 RMS On-state Current vs. Case Temperature**



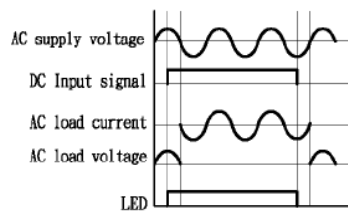
**Fig.5 Input Voltage vs. Ambient Temperature**



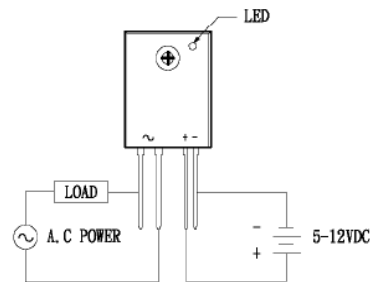
**Fig.6 Input Current vs. Input voltage**



**Fig.7 Action waveform**



**Fig.8 WIRING DIAGRAM**



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# Solid State Relays

## 4-Pin SIP Package—VDC Input / VAC Output

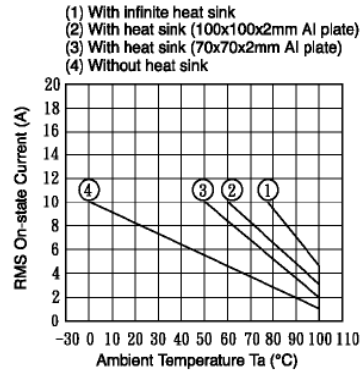
### OSSRD1001A thru OSSRD1006A



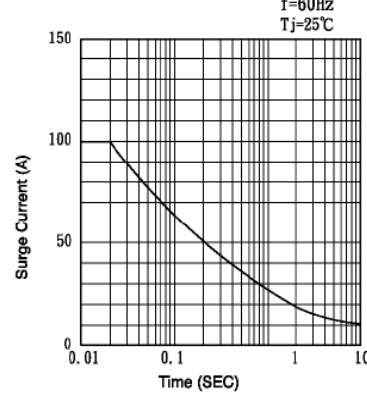
### OSSRD1003A

#### Characteristic Data Curves

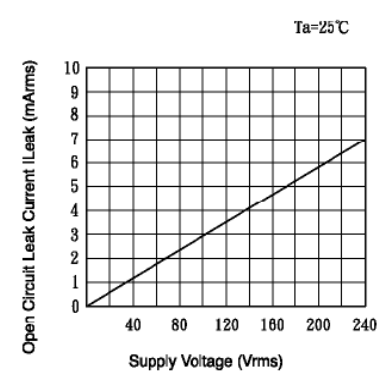
**Fig.1** RMS On-state Current vs. Ambient Temperature



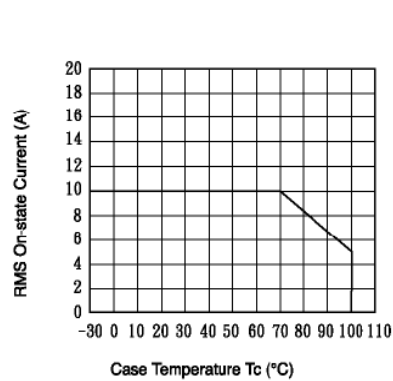
**Fig.2** Surge Current vs. Time



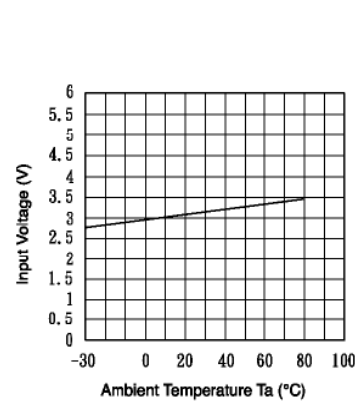
**Fig.3** Open Circuit Leak Current vs. Supply Voltage



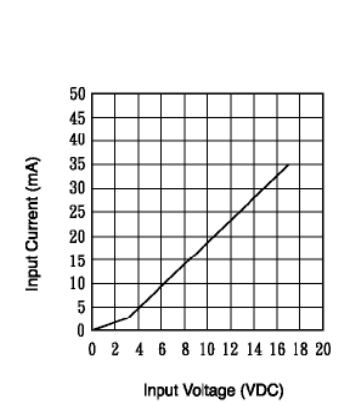
**Fig.4** RMS On-state Current vs. Case Temperature



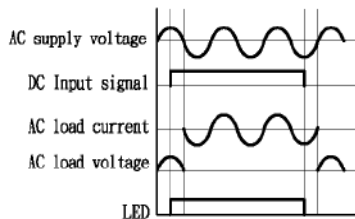
**Fig.5** Input Voltage vs. Ambient Temperature



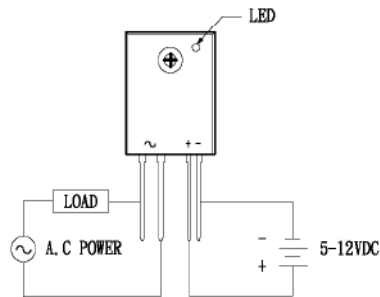
**Fig.6** Input Current vs. Input voltage



**Fig.7** Action waveform



**Fig.8** WIRING DIAGRAM



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# Solid State Relays

## 4-Pin SIP Package—VDC Input / VAC Output

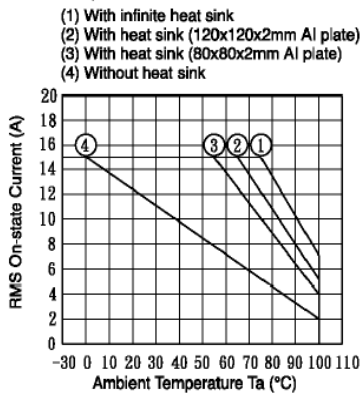
### OSSRD1001A thru OSSRD1006A



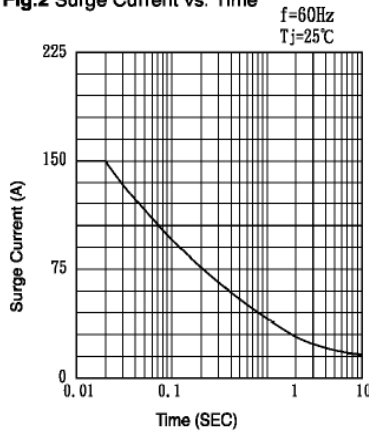
#### OSSRD1004A

#### Characteristic Data Curves

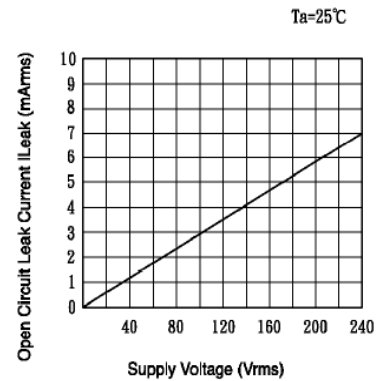
**Fig.1** RMS On-state Current vs. Ambient Temperature



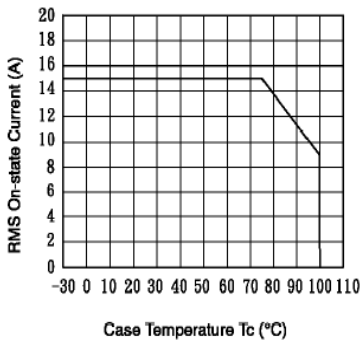
**Fig.2** Surge Current vs. Time



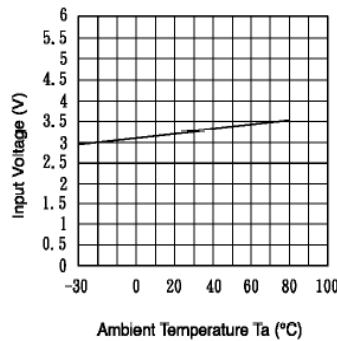
**Fig.3** Open Circuit Leak Current vs. Supply Voltage



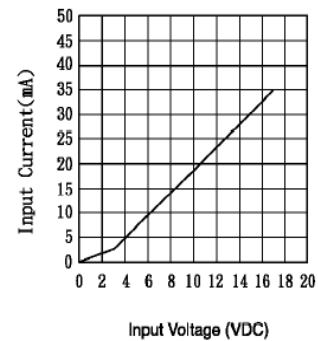
**Fig.4** RMS On-state Current vs. Case Temperature



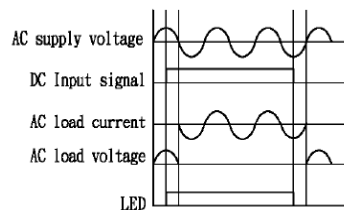
**Fig.5** Input Voltage vs. Ambient Temperature



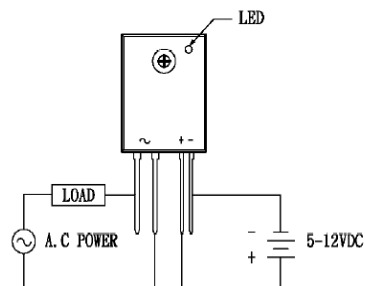
**Fig.6** Input Current vs. Input voltage



**Fig.7** Action waveform



**Fig.8** WIRING DIAGRAM



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# Solid State Relays

## 4-Pin SIP Package—VDC Input / VAC Output

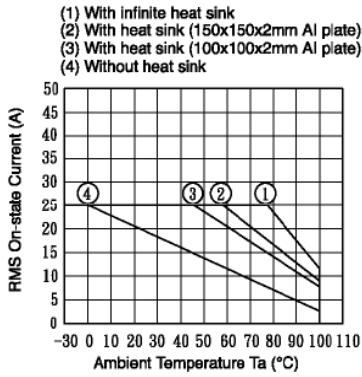
### OSSRD1001A thru OSSRD1006A



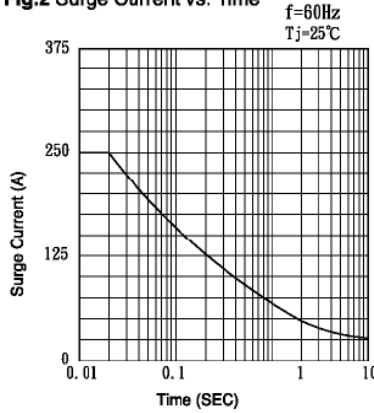
### OSSRD1005A

#### Characteristic Data Curves

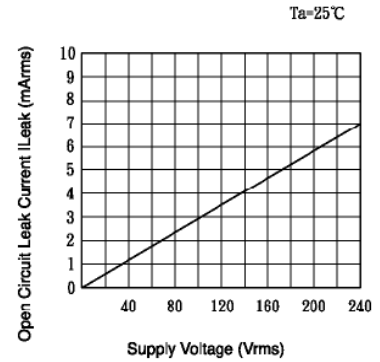
**Fig.1 RMS On-state Current vs. Ambient Temperature**



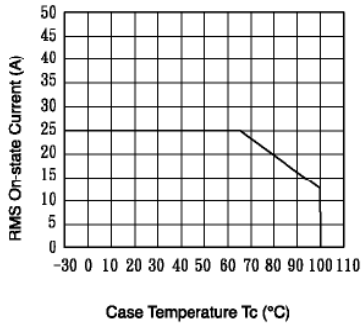
**Fig.2 Surge Current vs. Time**



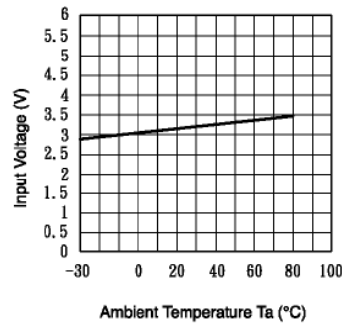
**Fig.3 Open Circuit Leak Current vs. Supply Voltage**



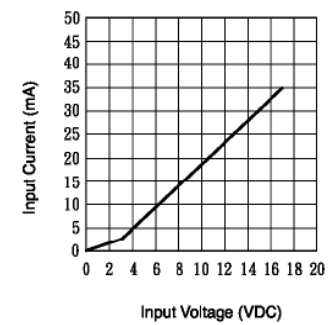
**Fig.4 RMS On-state Current vs. Case Temperature**



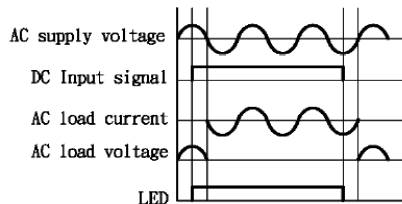
**Fig.5 Input Voltage vs. Ambient Temperature**



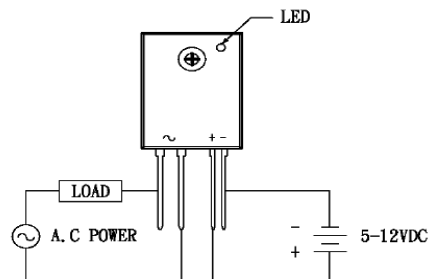
**Fig.6 Input Current vs. Input voltage**



**Fig.7 Action waveform**



**Fig.8 WIRING DIAGRAM**



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# Solid State Relays

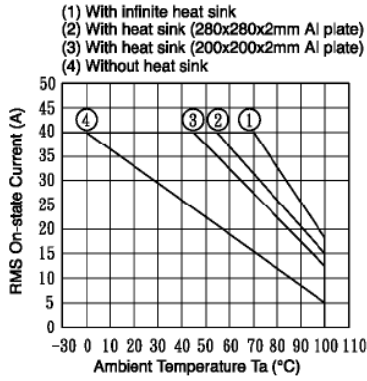
## 4-Pin SIP Package—VDC Input / VAC Output

### OSSRD1001A thru OSSRD1006A

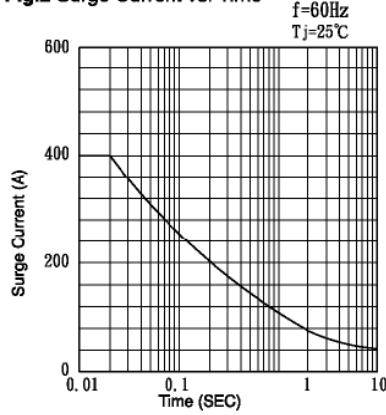
### OSSRD1006A

#### Characteristic Data Curves

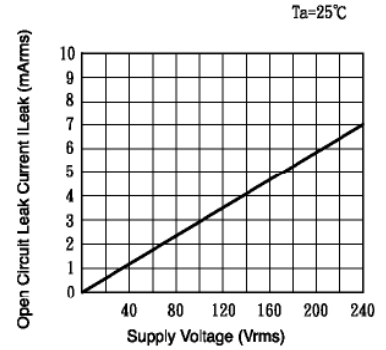
**Fig.1 RMS On-state Current vs. Ambient Temperature**



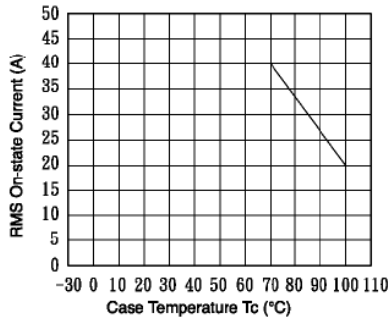
**Fig.2 Surge Current vs. Time**



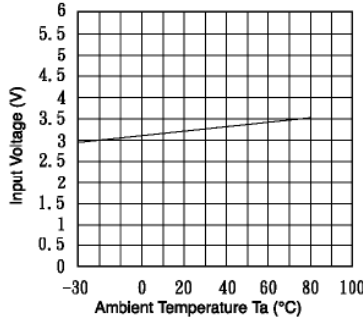
**Fig.3 Open Circuit Leak Current vs. Supply Voltage**



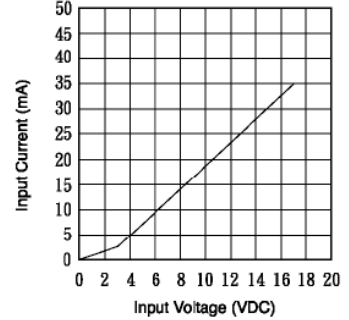
**Fig.4 RMS On-state Current vs. Case Temperature**



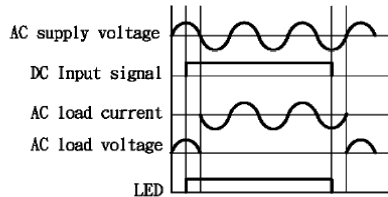
**Fig.5 Input Voltage vs. Ambient Temperature**



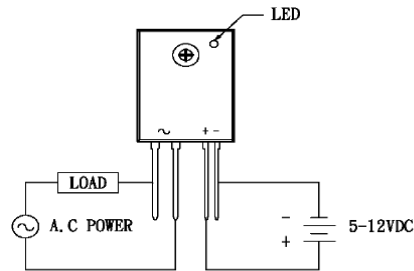
**Fig.6 Input Current vs. Input voltage**



**Fig.7 Action waveform**



**Fig.8 WIRING DIAGRAM**



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



#### Quality and Reliability Requirements:

Parameter	Failure Criteria	Test Conditions
Room Temperature Operating Life (for light emitting diodes only)	± 20%	T <sub>A</sub> = 25°C, I <sub>F</sub> = 60mA or max. rated, Time = 1000 hours
High Humidity, High Temperature Reverse Bias	± 20%	JEDEC, Method A101-B T <sub>A</sub> = 85°C, Humidity = 85%RH, Time = 1000 hours
High Temperature Forward Bias	± 20%	JEDEC, Method A108-A T <sub>A</sub> = 70°C, I <sub>F</sub> = 20mA, Time = 1000 hours
Autoclave	0 Fail	T <sub>A</sub> = 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 <sub>ceo</sub>
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> 

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# Solid State Relays

## 4-Pin SIP Package—VDC Input / VAC Output

### OSSRD1001A thru OSSRD1006A



#### Packaging Information:

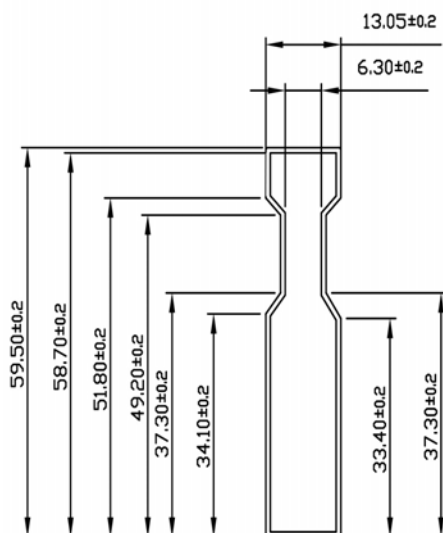
Optek's Solid-State Relays Part Numbers (4-Pin SIP)		Packaging Quantities	Tubes		Inner		Medium Carton			Large Carton		
			Qty	Weight (g)	53.5 x 7.0 x 7.5 cm		55.5 x 30.7 x 16.5 cm			55.5 x 30.7 x 23.5 cm		
		Package Type	Qty	Weight (g)	Qty	Weight (kg)	Qty	Net Weight (kg)	Gross Weight (kg)	Qty	Net Weight (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
	OSRRD1001A - OSSRD1006A	4 Pin SIP (32mm x 24mm)	20	421	80	1.90	640	15.2	16.2	960	22.8	24.1

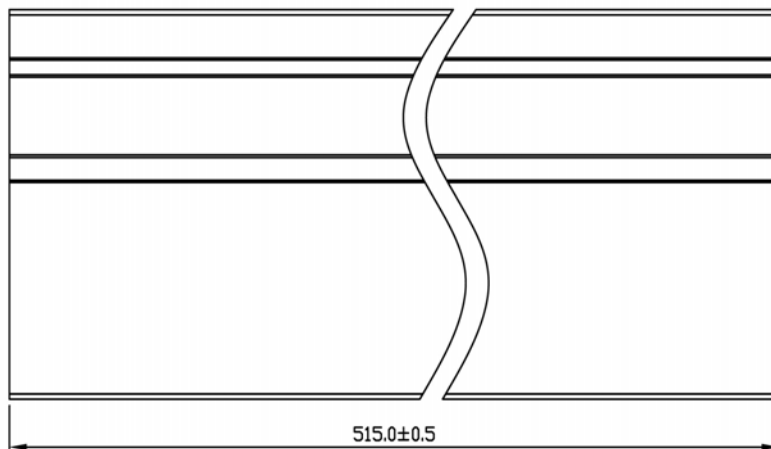
Optek's Solid-State Relays Part Numbers (Panel Mounts)		Packaging Quantities	Trays		Small Carton			Medium Carton			Large Carton		
			36 x 20 x 37 cm		37 x 21 x 11 cm			37 x 21 x 17 cm			37 x 21 x 32 cm		
		Package Type	Qty	Weight (g)	Qty	Net Weight (kg)	Gross Weight (kg)	Qty	Net Weight (kg)	Gross Weight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

#### Tube and Carton Packaging Specifications:

##### Tube Packaging Dimensions



All dimensions are in millimeters



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# Solid State Relays

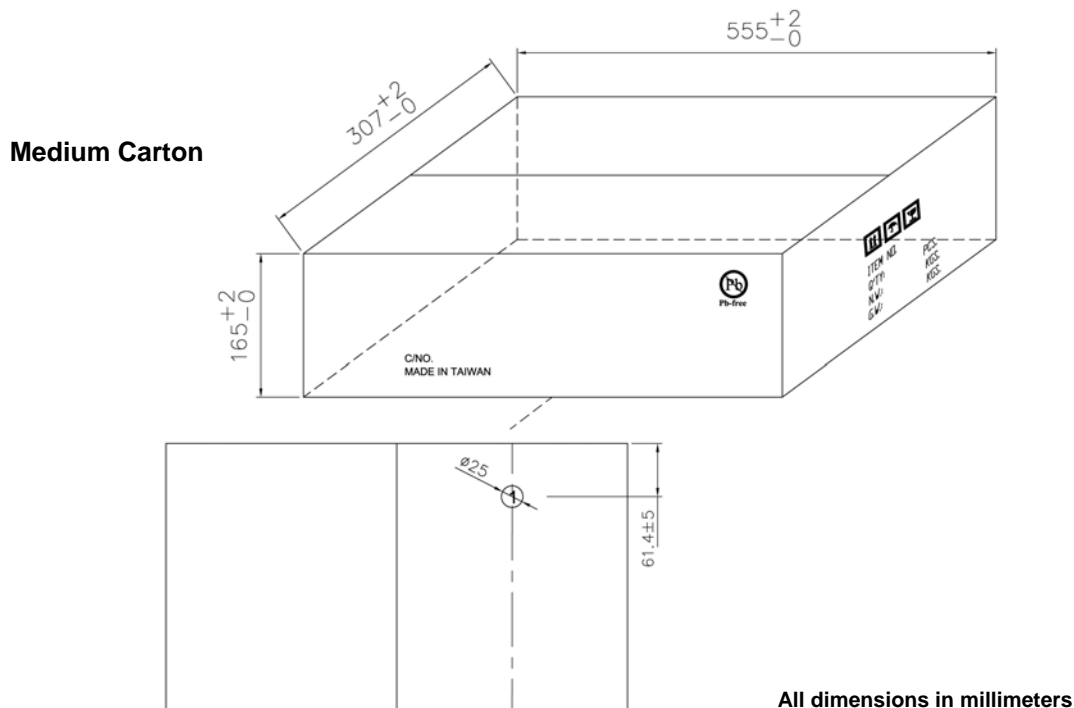
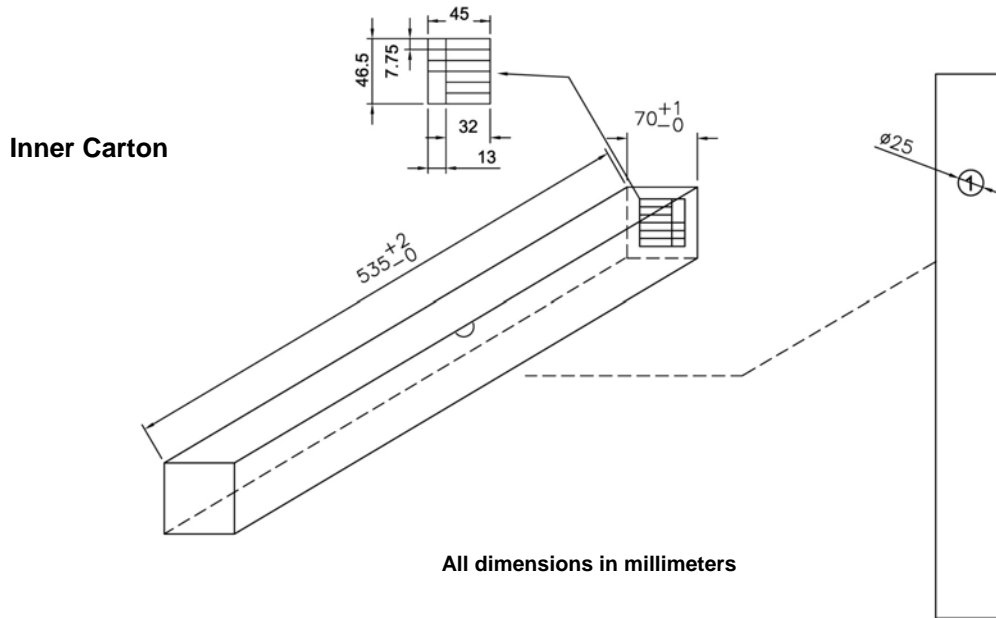
## 4-Pin SIP Package—VDC Input / VAC Output

### 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

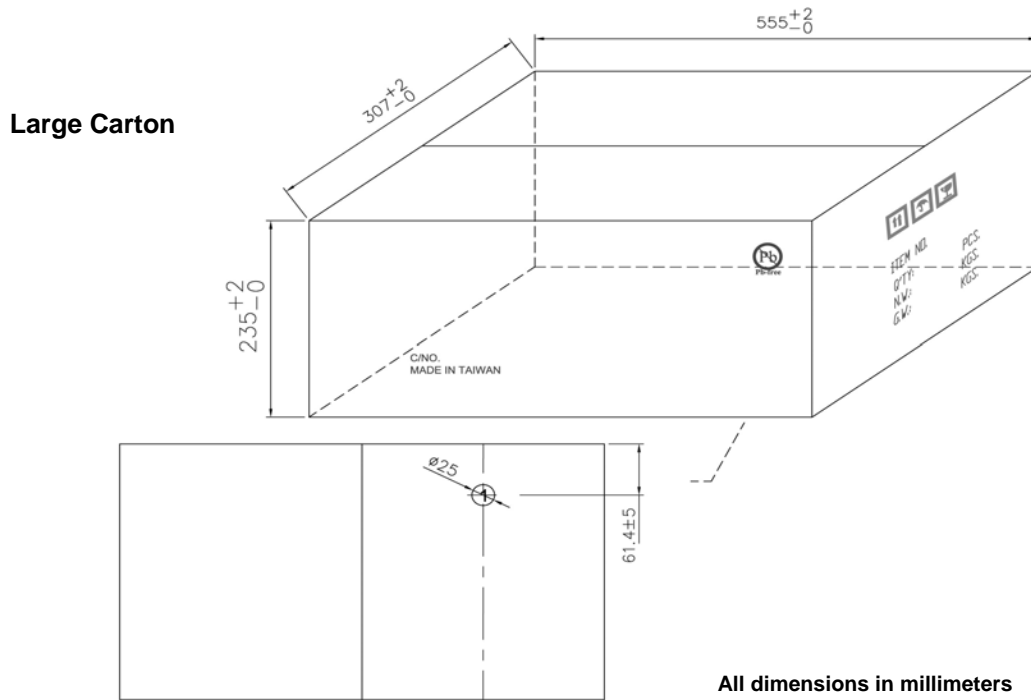
## 4-Pin SIP Package—VDC Input / VAC Output

### 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.