Solid State Relays

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

OSSRD2001D and OSSRD2002A

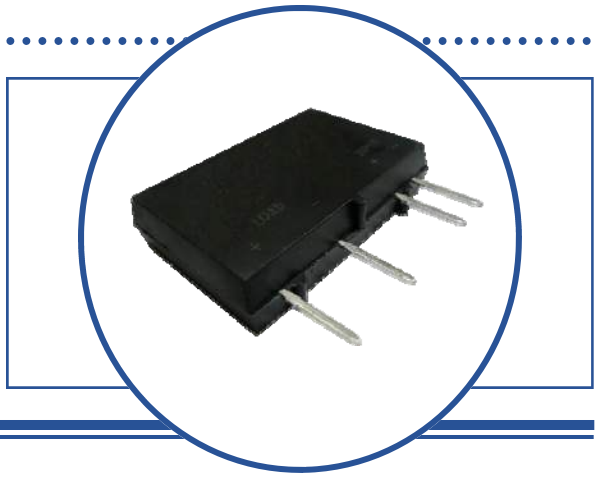
TT electronics
OPTEK Technology

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 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.

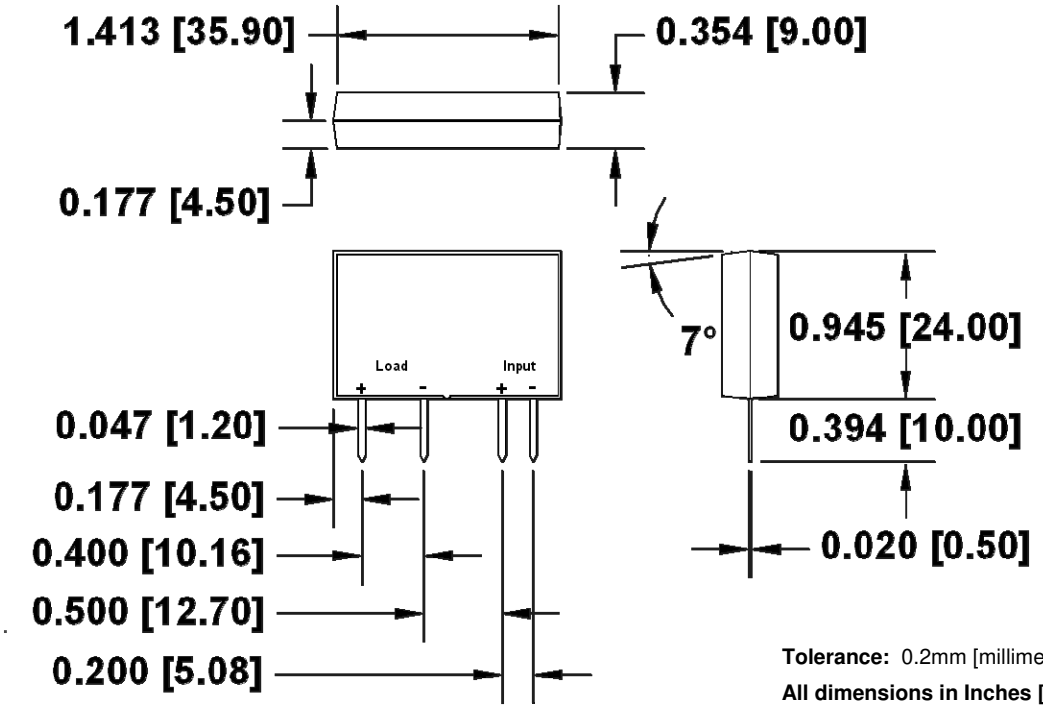
The **OSSRD2001D and OSSRD2002A** are offered in a standard 4-pin SIP, Single In-Line Package, for PCB mounting applications. The package offers a light weight, compact and robust molded epoxy body with extended operating temperature range of up to 100°C.
The **OSSRD2001D** input circuit features a DC range from 4 to 24 VDC. The output consists of a photo darlington circuit featuring a load current rating of 3 Amps and a maximum load voltage of 100VDC and 30 Watts with normally open output.
The **OSSRD2002A** input circuit features a DC range from 4 to 32 VDC. The output consists of a Triac circuit featuring a load current rating of 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

Pb

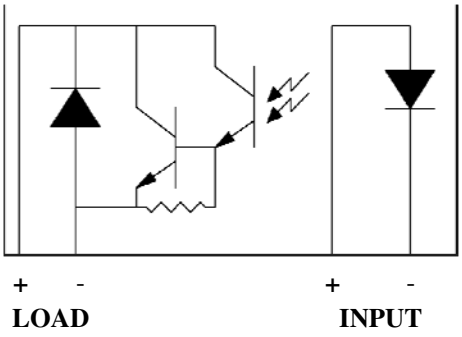
Package Outline Dimensions: 4-Pin SIP



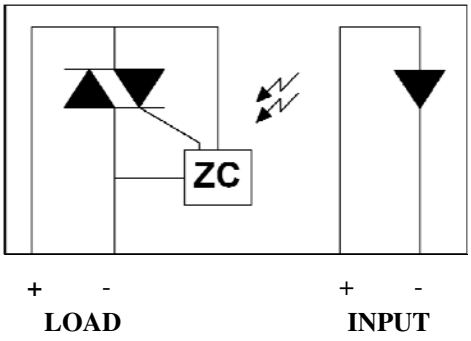
Tolerance: 0.2mm [millimeters]

All dimensions in Inches [millimeters]

Schematic: Top View



OSSRD2001D



OSSRD2002A

Pin Configuration:

Part Number	Pin #			
	1	2	3	4
OSSRD2001D	A	K	C	E (Dar.)
OSSRD2002A	A	K	A1 (+)	A2 (-)

OPTEK Technology Inc. — 1645 Wallace Drive, Carrollton, Texas 75006
Phone: (972) 323-2200 or (800) 341-4747 FAX: (972) 323-2396 sensors@optekinc.com www.optekinc.com

VDC Input with VDC/VAC Output Devices Ordering Information

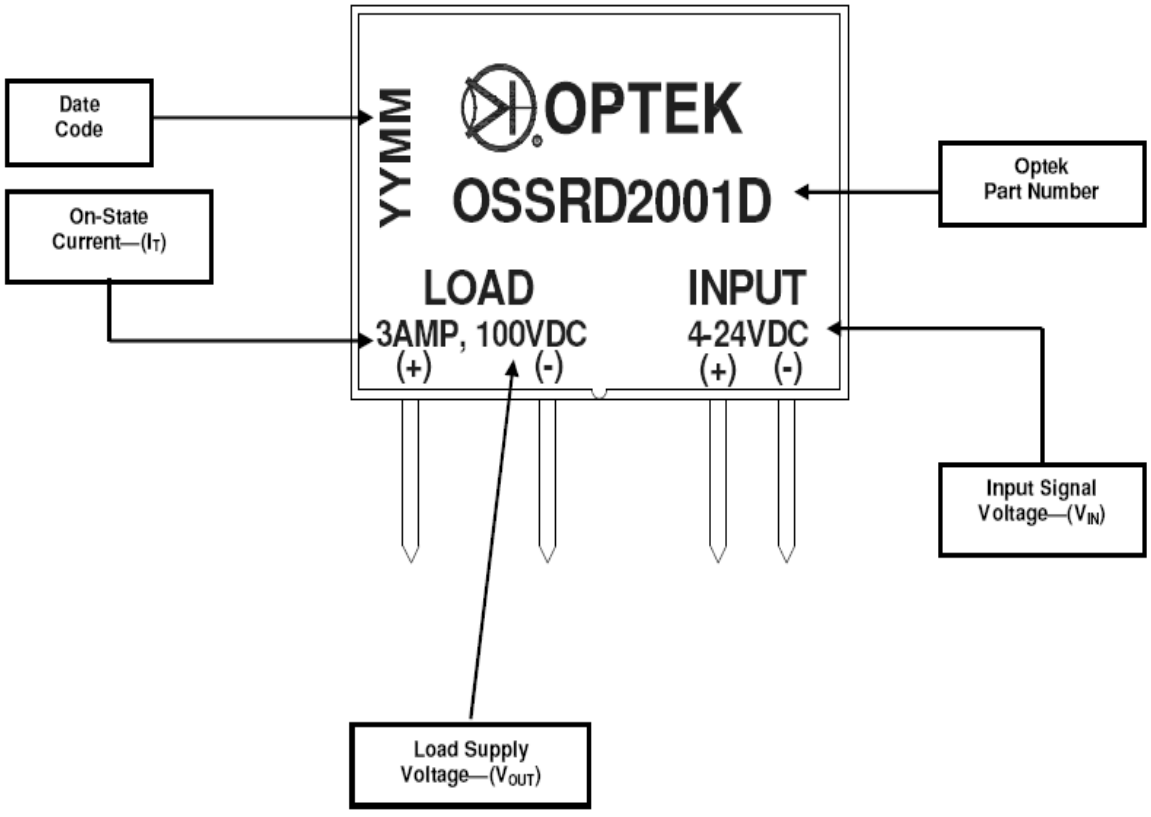
Part Number	Input	Min. Tgr Current Ift	Max. Output Current	Min. Ouput Current	Max. Vout	Min. Vout	Output Type	Br. Vol. Input to Output	Configuration
OSSRD2001D	4-24VDC	100mA	3A	0.05A	100VDC	-	DC	4000VAC	A K—C E (Darl.)
OSSRD2002A	4-32VDC	50mA	3A	0.05A	250VAC	50VAC	AC	4000VAC	A K—A1(+) A2(-)

Configuration: Definition of Terms

LED Identification—Sensor Identification

Configuration Information	LED	A = Anode	K = Cathode
	Sensor	C = Collector	E = Emitter
		A1(+) and A2(-) = Main Terminals of Triac	

Part Number Symbolization



Absolute Maximum Ratings (T_A = 25° C unless otherwise noted)

Storage Temperature OSSRD2001D, OSSRD2002A	-30° C to +125° C
Operating Temperature OSSRD2001D, OSSRD2002A	-30° C to +100° C
Isolation Voltage (Input to Output) OSSRD2001D, OSSRD2002A	4,000 Vrms
Soldering Temperature 10 sec. OSSRD2001D, OSSRD2002A	260° C

Input Diode

Input Signal Voltage—(V_{IN}) OSSRD2001D OSSRD2002A	 4—24 VDC 4—32 VDC
Drop-out Voltage—(Vdo) OSSRD2001D, OSSRD2002A	1 VDC
Output Power Dissipation—(Pc) OSSRD2001D	30 W

Output Triac

RMS On-State Current - (I_T) OSSRD2002A	3 Arms
Peak One Cycle Surge Current - (I surge) OSSRD2001D @ 50µS OSSRD2002A @ 8.3ms	 9 A 30 A
Repetitive Peak-Off State Voltage—(V_{DRM}) OSSRD2002A	600 V
Operating Frequency—(f) OSSRD2002A	47—70 Hz
Critical Rate of Rise of On-State Current—(di/dt) OSSRD2002A	50 A/µS
Load Supply Voltage—(V_{OUT}) OSSRD2002A	250 Vrms AC

Output Photo Darlington

Collector Voltage - (V_{CEO}) OSSRD2001D	100 VDC
Output Current - (Io) OSSRD2001D	3 A

OPTEK Technology Inc. — 1645 Wallace Drive, Carrollton, Texas 75006
Phone: (972) 323-2200 or (800) 341-4747 FAX: (972) 323-2396 sensors@optekinc.com www.optekinc.com

Electrical Characteristics (T_A = 25° C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode						
V_{PU}	**Pick-up Voltage** OSSRD2001D, OSSRD2002A	-	-	4	VDC	I_T = 1Arms
I_{IN}	**Input Current** OSSRD2001D OSSRD2002A	- 5	- -	25 12	mA	V_{IN}= 4 - 24 V V_{IN}= 4 - 32 V
C_T	**Terminal Capacitance** OSSRD2001D	-	30	-	pF	V=0, f=1kHz
Output Triac						
V_T	**On-State Voltage** OSSRD2002A	-	-	1.5	Vrms	I_T = 1Arms
I_{OP}	**Operating Current** OSSRD2002A	50	-	-	mArms	Vout = 240Vrms
I_{LEAK}	**Leakage Current** OSSRD2002A	-	-	7	mArms	Vout = 240Vrms
dv/dt	**Critical Rate of Rise of Off-State Voltage** OSSRD2002A	50	200	-	V/µs	See Note 1.
-	**Zero-Cross Voltage** OSSRD2002A	-	Yes	-	-	-
V_{OUT}	**Load Voltage Rating** OSSRD2002A	50	-	280	VAC	I_T = 50mArms MIN
I_{FT}	**Minimum Trigger Current** OSSRD2002A	-	-	10 25	mA	V_{DRM} = 600 V
Riso	**Isolation resistance Input to Output** OSSRD2002A	10^10	-	-	Ω	DC500 V
T_{ON}	**Turn-on Time** OSSRD2002A	-	-	8.3	mS	60Hz AC
T_{OFF}	**Turn-off Time** OSSRD2002A	-	-	8.3	mS	60Hz AC
Rth (j-C) I	**Thermal Resistance (between junction and case)**	-	1.3	-	°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.

Electrical Characteristics (T_A = 25° C unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Output Photodiode						
BV_{CEO}	**Collector-Emitter Breakdown Voltage** OSSRD0001D	100	-	-	Vrms	I_F = 0mA
I_{LEAK}	**Output LeakCurrent** OSSRD0001D	-	-	1.5	µA	I_F = 0mA, V=100V
I_C	**Collector Current** OSSRD0001D	0.05	-	3	A	I_F = 1mA, V_{CE}=2V
$V_{CE(sat)}$	**Collector-Emitter Saturation Voltage** OSSRD0001D	-	Yes	-	-	I_F = 20mA, I_C=100mA
Riso	**Isolation Resistance** OSSRD0001D	10^{10}	-	-	Ω	DC500 V
Cr	**Floating Capacitance** OSSRD0001D	-	-	3	pF	V=0, f=1MHz
f_c	**Cut-Off Frequency** OSSRD0001D	2	-	-	Hz	V_{CE} = 2V, I_C=200mA, R_L=200mA
t_f	**Response Time (Rise)** OSSRD0001D	-	-	500	µS	V_{CE} = 2V, I_C=20mA, R_L=200mA
t_r	**Response Time (Fall)** OSSRD0001D	-	-	200	µS	V_{CE} = 2V, I_C=20mA, R_L=200mA

OPTEK Technology Inc. — 1645 Wallace Drive, Carrollton, Texas 75006
Phone: (972) 323-2200 or (800) 341-4747 FAX: (972) 323-2396 sensors@optekinc.com www.optekinc.com

OSSRD2001D

Characteristic Data Curves

Fig.1 Input Voltage vs. Ambient Temperature

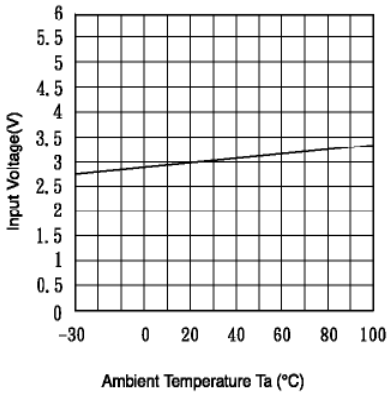


Fig.2 Collector Power Dissipation vs. Ambient Temperature

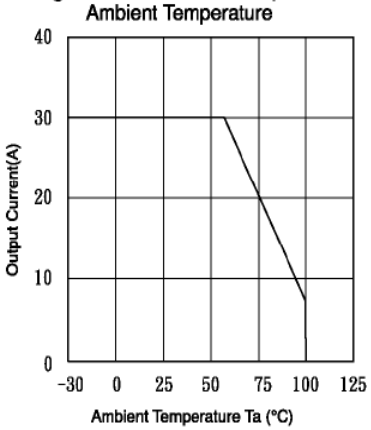


Fig.3 Input Current vs. Input Voltage

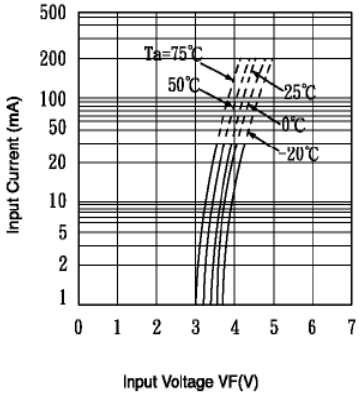


Fig.4 Collector to Emitter Voltage vs.Collector Current

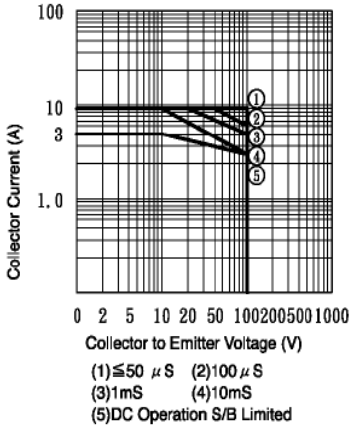


Fig.5 Input Current vs. Input Voltage

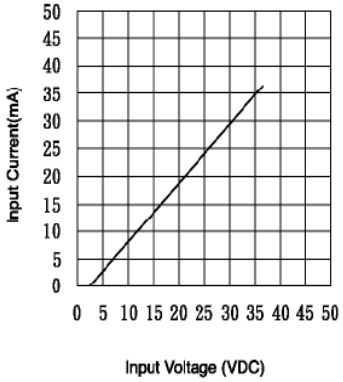


Fig.6 Output Current vs. Ambient Temperature

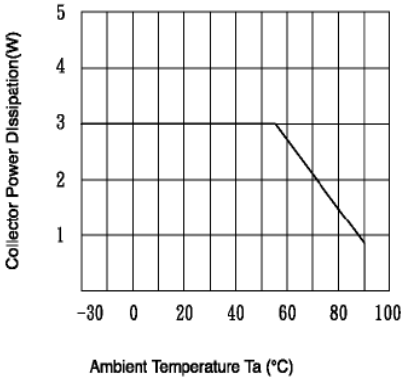


Fig.7 Action Waveform

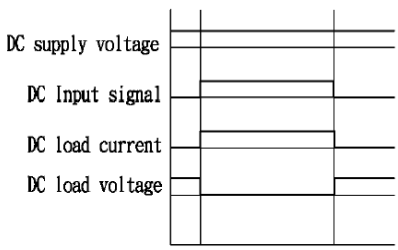
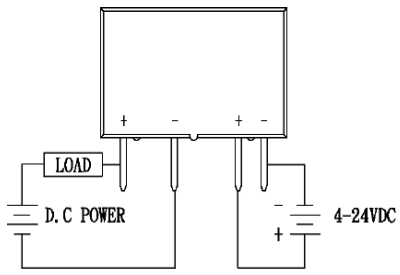


Fig.8 WIRING DIAGRAM



OSSRD2002A

Characteristic Data Curves

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

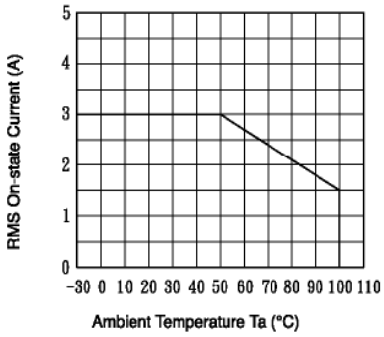


Fig.2 Surge Current vs. Time

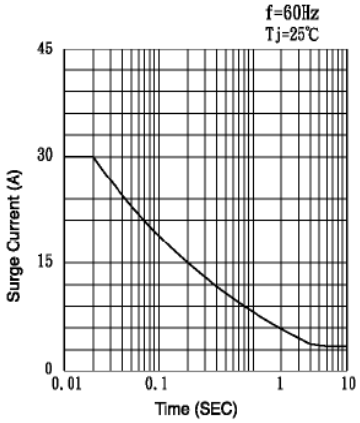


Fig.3 Open Circuit Leak Current vs. Supply Voltage

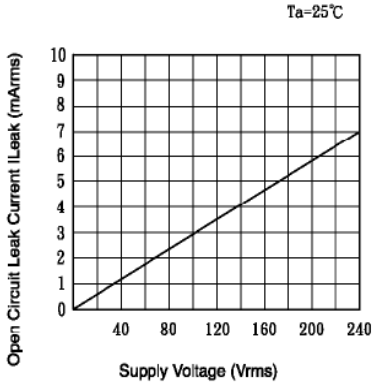


Fig.4 RMS On-state Current vs. CaseTemperature

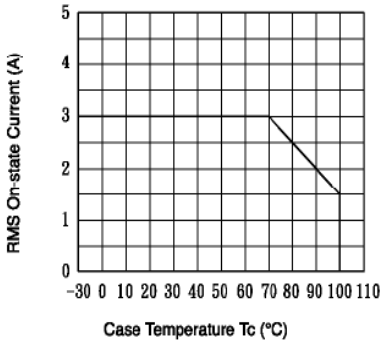


Fig.5 Input Voltage vs. Ambient Temperature

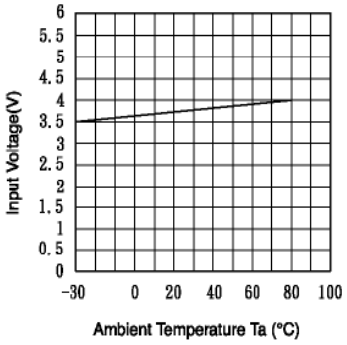


Fig.6 Input Current vs. Input voltage

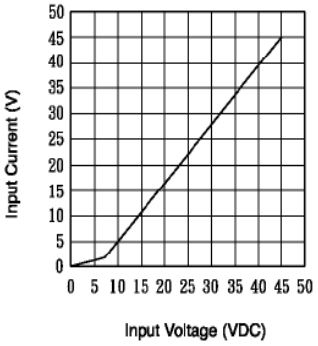


Fig.7 Action waveform

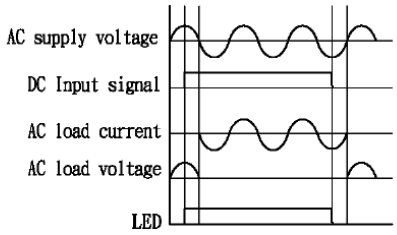
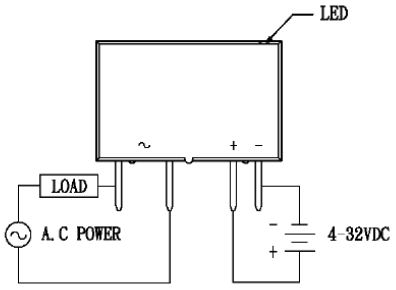


Fig.8 WIRING DIAGRAM



OPTEK Technology Inc. — 1645 Wallace Drive, Carrollton, Texas 75006
Phone: (972) 323-2200 or (800) 341-4747 FAX: (972) 323-2396 sensors@optekinc.com www.optekinc.com

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 Iceo
Temperature Cycle	± 20%	per Method 1010.7 of MIL-STD-883E
High Temperature Storage	± 20%	85°C, 500Hrs

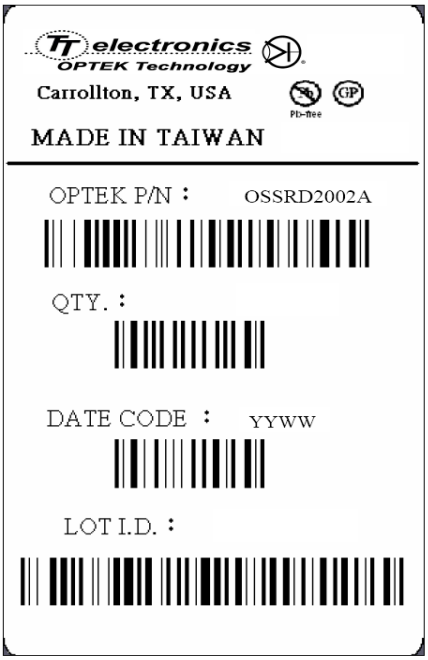
Label Identification:

DESCRIPTION:

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

Notes:

1. 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.
2. 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.



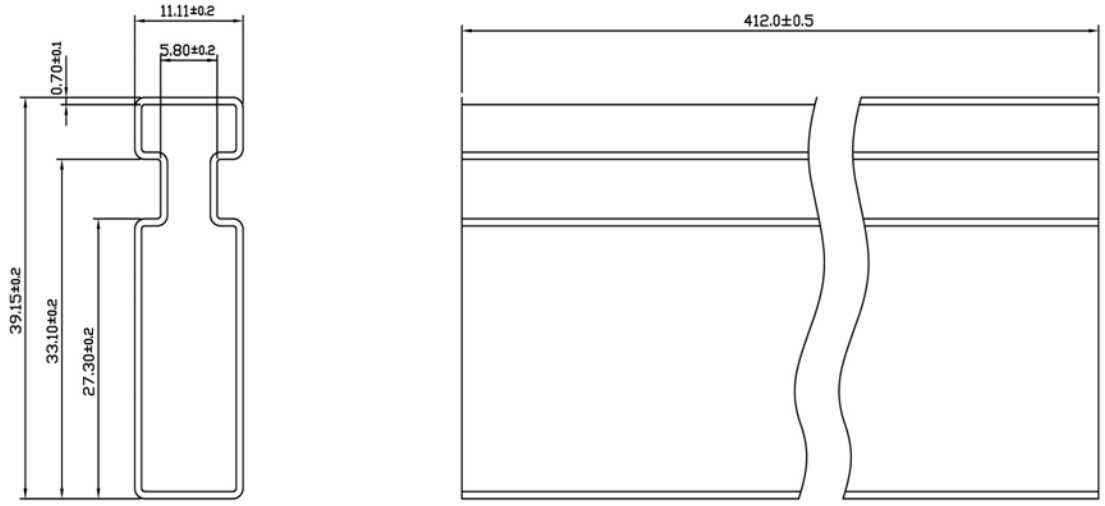
Packaging Information:

Optek's Solid-State Relays Part Numbers (4-Pin SIP)		Packaging Quantities / Package Type	Tubes Qty	Tubes Weight (g)	Inner 53.5 x 7.0 x 7.5 cm Qty	Inner Weight (kg)	Medium Carton 55.5 x 30.7 x 16.5 cm Qty	Medium Carton Net Weight (kg)	Medium Carton Gross Weight (kg)	Large Carton 55.5 x 30.7 x 23.5 cm Qty	Large Carton Net Weight (kg)	Large Carton 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 / Package Type	Trays 36 x 20 x 37 cm Qty	Trays Weight (g)	Small Carton 37 x 21 x 11 cm Qty	Small Carton Net Weight (kg)	Small Carton Gross Weight (kg)	Medium Carton 37 x 21 x 17 cm Qty	Medium Carton Net Weight (kg)	Medium Carton Gross Weight (kg)	Large Carton 37 x 21 x 32 cm Qty	Large Carton Net Weight (kg)	Large Carton 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:

Tube Packaging Dimensions



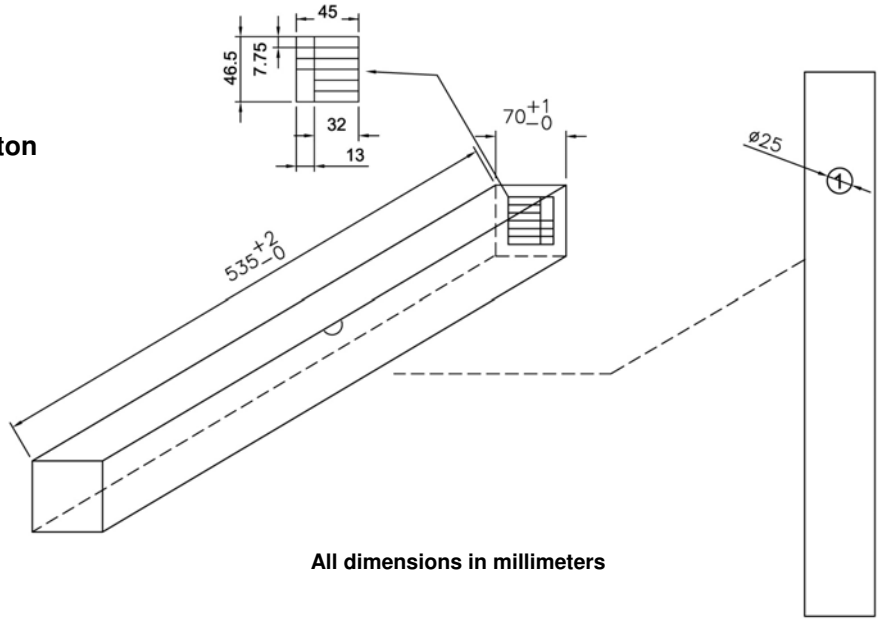
All dimensions in millimeters

OPTEK Technology Inc. — 1645 Wallace Drive, Carrollton, Texas 75006
Phone: (972) 323-2200 or (800) 341-4747 FAX: (972) 323-2396 sensors@optekinc.com www.optekinc.com

Tray and Carton Packaging Specifications (Cont.):

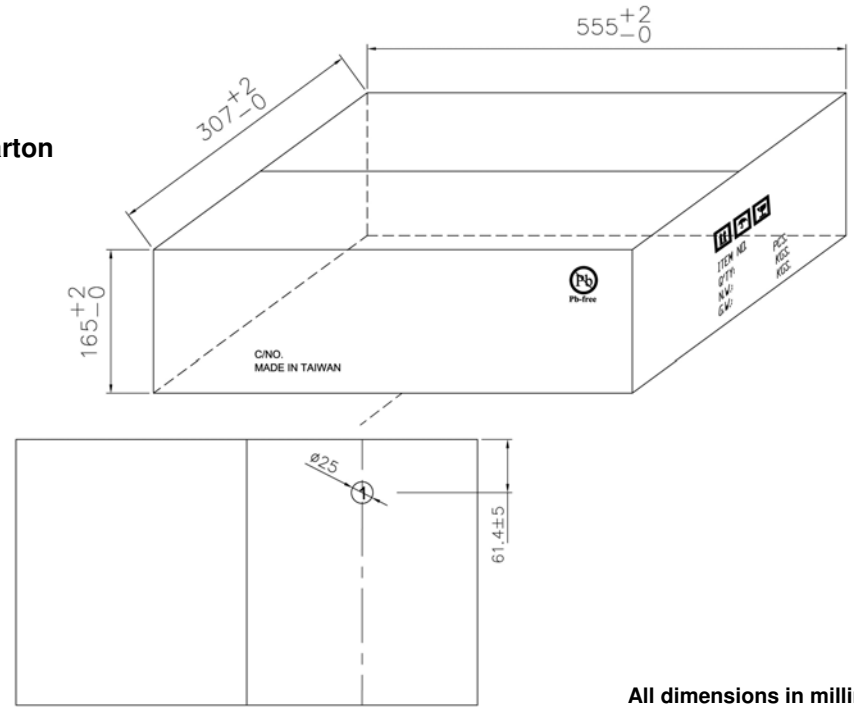
Carton Packaging Dimensions

Inner Carton



All dimensions in millimeters

Medium Carton



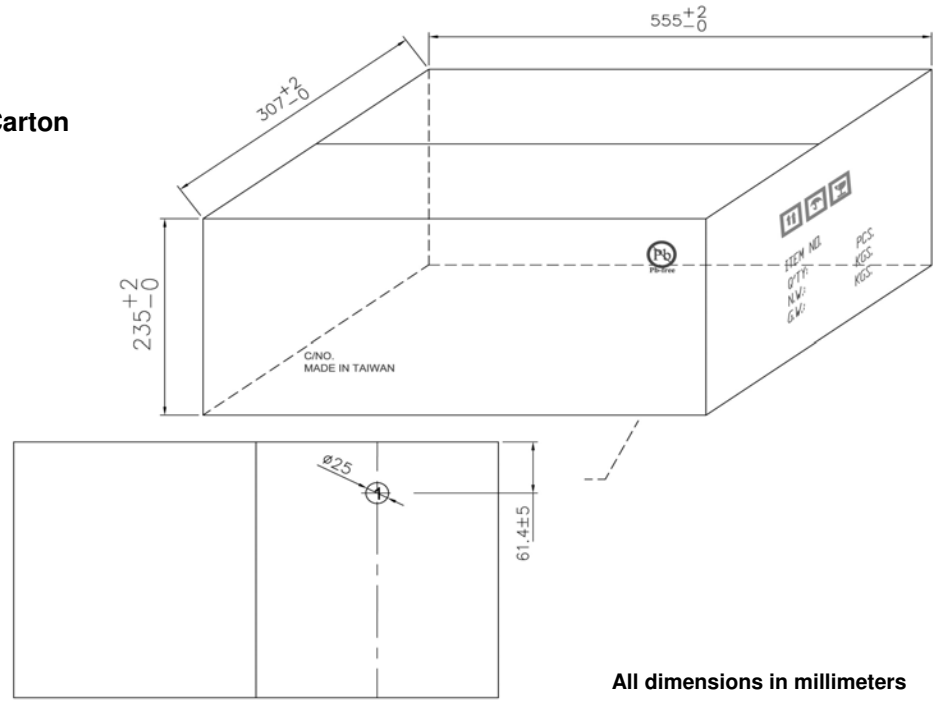
All dimensions in millimeters

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

Tray and Carton Packaging Specifications (Cont.):

Carton Packaging Dimensions

Large Carton



All dimensions in millimeters

OPTEK Technology Inc. — 1645 Wallace Drive, Carrollton, Texas 75006
Phone: (972) 323-2200 or (800) 341-4747 FAX: (972) 323-2396 sensors@optekinc.com www.optekinc.com