

# Features

## Unregulated Converters

- UL/CSA and EN Safety certified
- EN-60601 for Medical Applications
- Isolation 6.4kVDC
- Optional Continuous Short Circuit Protected
- Unique Transformer System (Patent Pending)
- Compact SIP7 Package
- /X2 Version with >9mm Input/Output Clearance
- Suitable for IGBT Applications
- Very Low Isolation Capacitance

### Selection Guide

Part Numbe SIP 7	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency Std (/R) (%)	Max Capacitive Load <sup>(1)</sup>
RxxP23.3S	5, 12, 15, 24	3.3	600	70 (72-78)	3300µF
RxxP205S	5, 12, 15, 24	5	400	70-75 (79-84)	1200µF
RxxP209S	5, 12, 15, 24	9	222	70-75 (80-87)	1200µF
RxxP212S	5, 12, 15, 24	12	167	70-75 (80-87)	680µF
RxxP215S	5, 12, 15, 24	15	132	75-80 (80-88)	680µF
RxxP23.3D	5, 12, 15, 24	±3.3	±300	70 (73-80)	±1500µF
RxxP205D	5, 12, 15, 24	±5	±200	70-75 (79-85)	±470µF
RxxP209D	5, 12, 15, 24	±9	±111	70-75 (80-87)	±470µF
RxxP212D	5, 12, 15, 24	±12	±85	70-75 (80-87)	±330µF
RxxP215D	5, 12, 15, 24	±15	±66	75-80 (80-88)	±330µF

xx = Input Voltage. Other input and output voltage combinations available on request.

No suffix is functional isolation e.g. R05P205S

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. R05P205S/P, R05P205D/P

\* add Suffix "/X2" for single output with alternative pinout, e.g. R05P205S/X2, R05P205S/P/X2

# ECONOLINE

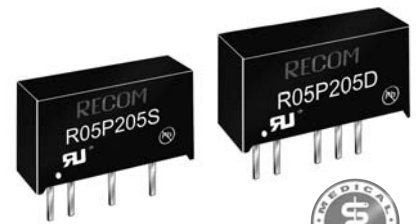
DC/DC-Converter

with 3 year Warranty

# RECOM

## 2 Watt

## SIP 7 Single & Dual Output



**EN-60950-1 Certified**  
**EN-60601-1 Certified**  
**UL/CSA 60950-1 Certified**

### Specifications (measured at T<sub>A</sub> = 25°C, nominal input voltage, full load and after warm-up)

Input Voltage Range		±10%
Output Voltage Accuracy		±5%
Line Voltage Regulation		1.2%/1% of Vin typ.
Load Voltage Regulation (10% to 100% full load)	3.3, 5V output types other output types	15% max. 10% max.
Output Ripple and Noise (20MHz BW)		200mVp-p max.
Operating Frequency		20kHz min. / 50kHz typ. / 85kHz max.
Efficiency at Full Load		65% min. / 80% max.
Minimum Load = 0%		Specifications valid for 10% minimum load only.
Isolation Voltage	(tested for 1 second) (rated for 1 minute)	6400VDC 3200VAC / 60Hz
Isolation Capacitance		1.5pF min / 10pF max.
Isolation Resistance		15 GΩ min.
Short Circuit Protection		1 Second
P-Suffix		Continuous
Operating Temperature Range (free air convection)		-40°C to +85°C (see Graph)
Storage Temperature Range		-55°C to +125°C
Relative Humidity		95% RH

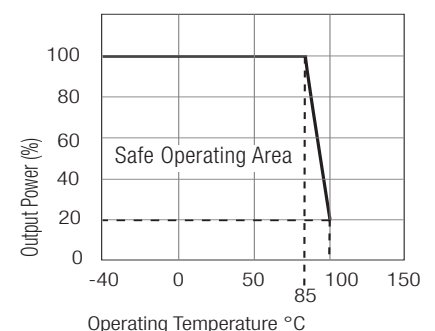
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# RxxP2xx

### Description

The RxxP2xxS\_D Series of DC/DC Converters are certified to UL/CSA-60950 and UL/CSA 60601. This makes them ideal for medical and safety applications where approved isolation is required. The /X2 version has an input/output clearance of more than 9mm.

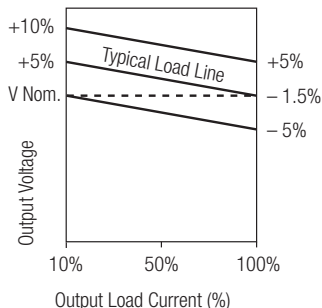
## Derating-Graph (Ambient Temperature)



Refer to Application Notes

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### Tolerance Envelope



### Specifications (continued)

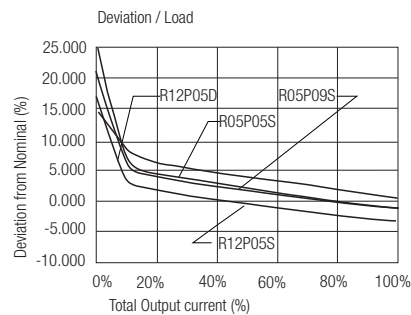
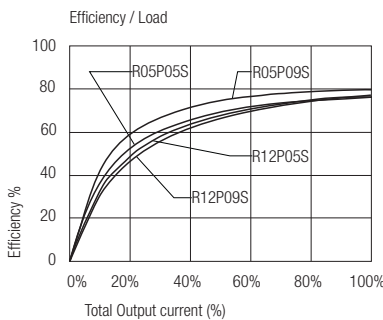
Package Weight				4.3g
Packing Quantity				25 pcs per Tube
MTBF (+25°C)	Detailed Information see Application Notes chapter "MTBF"	Single/Dual	using MIL-HDBK 217F	2113/2434 x 10 <sup>3</sup> hours
(+85°C)		Single/Dual	using MIL-HDBK 217F	299/334 x 10 <sup>3</sup> hours
Certifications A2:1995	CB Report: Medical Safety	Ref: CA/111158/CSAIEC60601-1:1988 + A1: 1991 +		
	CSA General Safety	Report: 2219431	C22.2 No. 60950-1-03	
		UL 60950-1 1st Ed.		
Certifications	UL General Safety	Report: E248550	UL 60950-1 1st Ed.	
			C22.2 No. 60950-1-03	
	EN General Safety	Report: PS-R7219C1	EN60950-1:2001 + A11: 2004	
	EN Medical Safety	Report: PS090301601	EN60601-1:1990 + A13: 1996	

### Notes

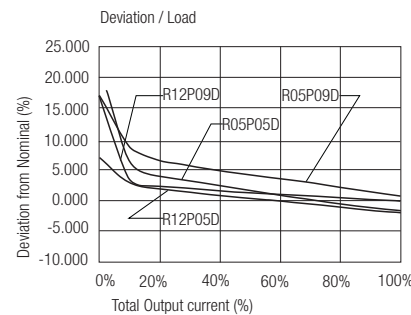
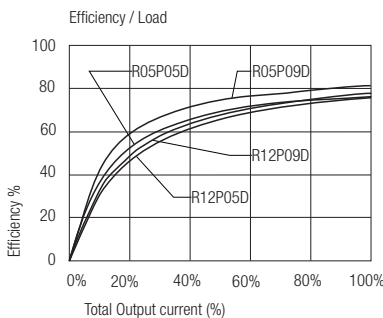
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

### Typical Characteristics

## RxxP205/09S



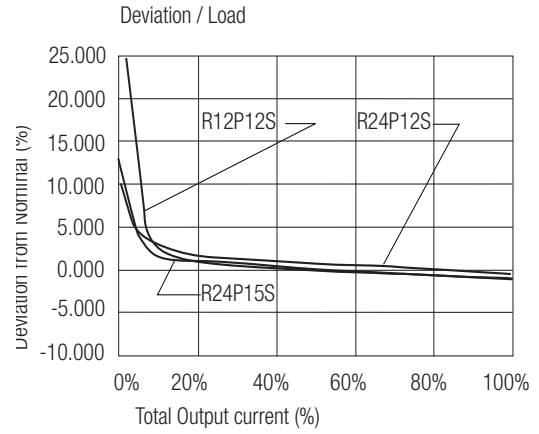
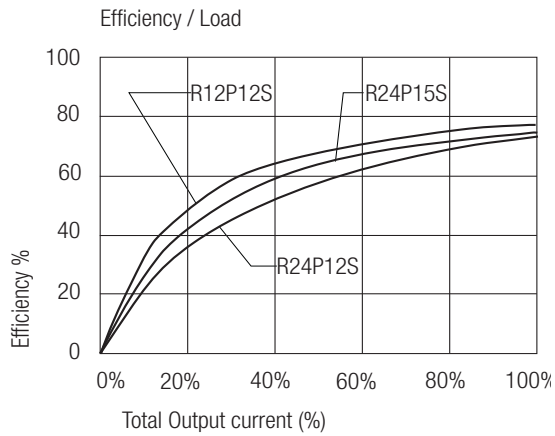
## RxxP205/09D



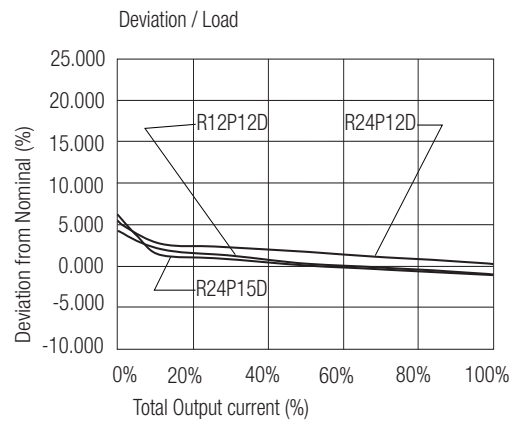
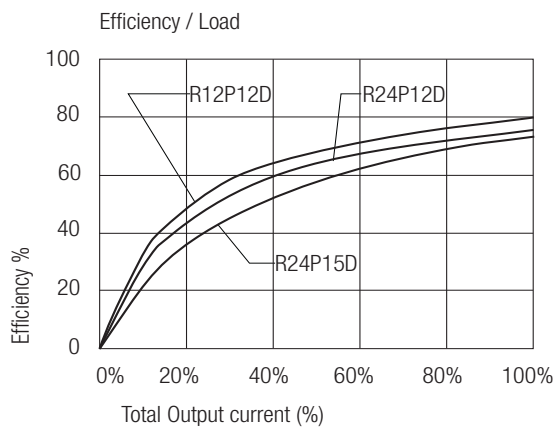
RxxP2xx

Typical Characteristics

## RxxP212/15S

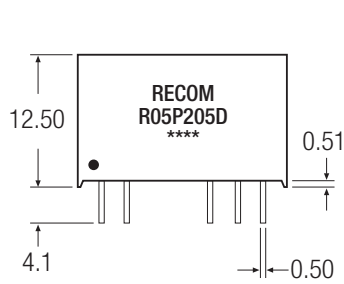


## RxxP212/15D

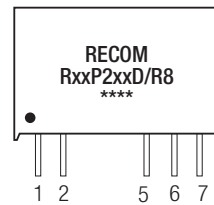


**Package Style and Pinning (mm)**

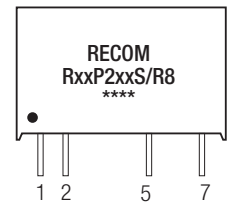
7 PIN SIP Package



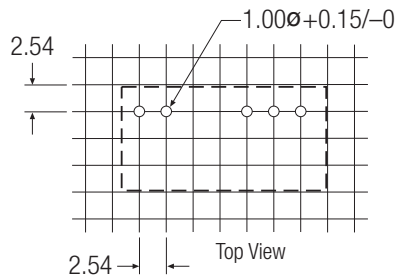
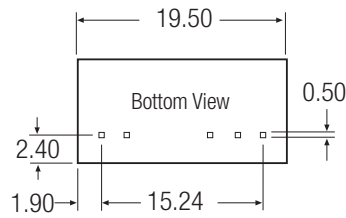
Dual Output



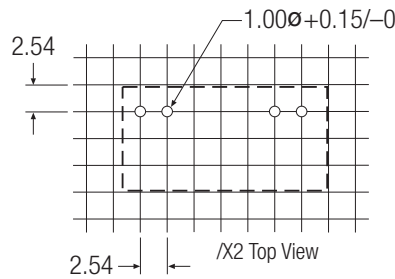
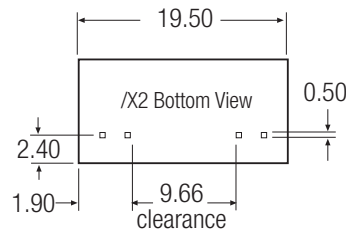
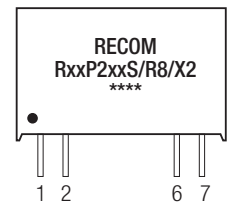
Single Output



Recommended Footprint Details



/X2 Single Output



Pin Connections

Pin #	Single	Dual	/X2
1	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin
5	-Vout	-Vout	No Pin
6	No Pin	Com	-Vout
7	+Vout	+Vout	+Vout

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

RxxP2xx

# Features

## Unregulated Converters

- UL/CSA and EN Safety certified
- EN-61010 for Test, Measurement and Lab. Use
- EN-60601 for Medical Applications
- Reinforced Isolation 6.4kVDC or 8kVDC
- Optional Continuous Short Circuit Protected
- Compact SIP7 Package
- Efficiency to 88%
- Very Low Isolation Capacitance
- /X2 Version with >9mm Input/Output Clearance

### Selection Guide

Part Number SIP 7	Reinforced Isolation (kVDC)	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency Std (%)	Max Capacitive Load <sup>(1)</sup>
RxxP23.3S	/R6.4 & /R8	5, 12, 15, 24	3.3	600	72-78	3300µF
RxxP205S	/R6.4 & /R8	5, 12, 15, 24	5	400	79-84	1200µF
RxxP209S	/R6.4 & /R8	5, 12, 15, 24	9	222	80-87	1200µF
RxxP212S	/R6.4 & /R8	5, 12, 15, 24	12	167	80-87	680µF
RxxP215S	/R6.4 & /R8	5, 12, 15, 24	15	132	80-88	680µF
RxxP23.3D	/R6.4 & /R8	5, 12, 15, 24	±3.3	±300	73-80	±1500µF
RxxP205D	/R6.4 & /R8	5, 12, 15, 24	±5	±200	79-85	±470µF
RxxP209D	/R6.4 & /R8	5, 12, 15, 24	±9	±111	80-87	±470µF
RxxP212D	/R6.4 & /R8	5, 12, 15, 24	±12	±85	80-87	±330µF
RxxP215D	/R6.4 & /R8	5, 12, 15, 24	±15	±66	80-88	±330µF

xx = Input Voltage. Other input and output voltage combinations available on request.

No suffix is functional isolation e.g. R05P205S

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. R05P205S/P, R05P205D/P

\* add Suffix "/X2" for single output with alternative pinout, e.g. R05P205S/X2, R05P205S/P/X2

\* add Suffix "/R6.4" or "/R8" for Reinforced Isolation, e.g. R05P205D/R6.4, R05P205S/P/X2/R8

### Specifications (measured at T<sub>A</sub> = 25°C, nominal input voltage, full load and after warm-up)

Input Voltage Range	±10%
Output Voltage Accuracy	±5%
Line Voltage Regulation	1.2%/1% of Vin typ.
Load Voltage Regulation (10% to 100% full load)	3.3, 5V output types 15% max. other output types 10% max.
Output Ripple and Noise (20MHz BW)	200mVp-p max.
Operating Frequency	20kHz min. / 50kHz typ. / 85kHz max.
Efficiency at Full Load	65% min. / 80% max.
Minimum Load = 0%	Specifications valid for 10% minimum load only.
/R6.4	(tested for 1 second) 6400VDC (rated for 1 minute) 3200VAC / 60Hz
/R8	(tested for 1 second) 8000VDC (rated for 1 minute) 4000VAC / 60Hz
Isolation Capacitance	1.5pF min. / 10pF max.
Isolation Resistance	15 GΩ min.
Short Circuit Protection	1 Second
P-Suffix	Continuous
Operating Temperature Range (free air convection)	-40°C to +85°C (see Graph)
Storage Temperature Range	-55°C to +125°C
Relative Humidity	95% RH

cont.

# ECONOLINE

## DC/DC-Converter

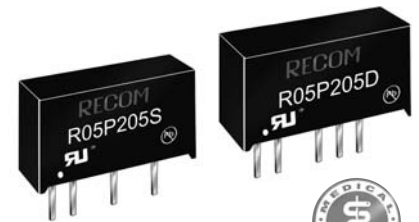
with 3 year Warranty

# RECOM

## 2 Watt

## SIP 7 Single &

## Dual Output



**EN-60950-1 Certified**

**EN-60601-1 Certified**

**UL/CSA 60950-1 Certified**

**UL/CSA 60601-1 Certified**

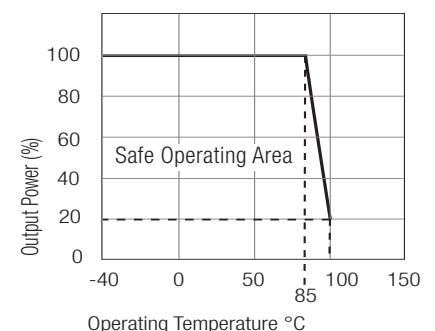
**EN-61010-1 Certified**

# RxxP2xx/R

### Description

The RxxP2xxS\_D Series of DC/DC Converters are certified to UL/CSA-60950 and UL/CSA 60601. This makes them ideal for medical and safety applications where approved or reinforced isolation is required. The reinforced versions are also EN61010-1 certified for Lab Equipment. The /X2 version has an input/output clearance of more than 9mm.

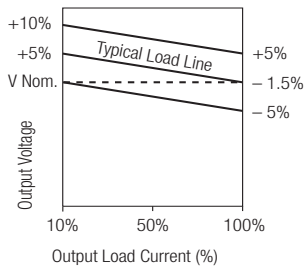
## Derating-Graph (Ambient Temperature)



Refer to Application Notes

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**Tolerance Envelope**



**Specifications (continued)**

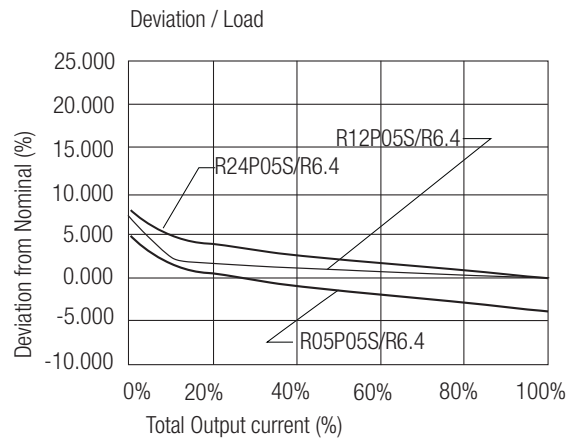
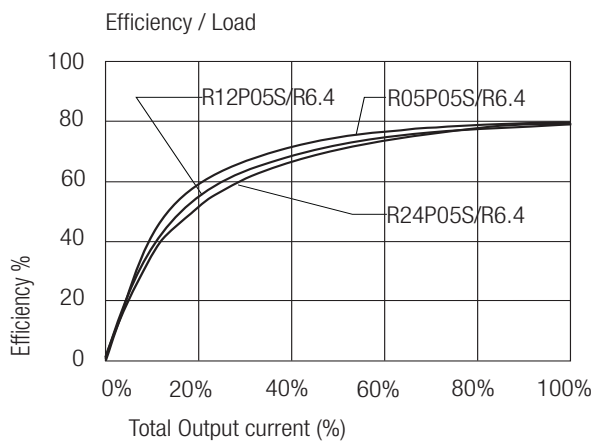
Package Weight				4.3g
Packing Quantity				25 pcs per Tube
MTBF (+25°C)	} Detailed Information see Application Notes chapter "MTBF"			1154 x 10 <sup>3</sup> hours
(+85°C)		Reinforced	168 x 10 <sup>3</sup> hours	
Reinforced Isolation	Transformer Creepage	/R6.4 Types	5.5 mm min.	
	Transformer Clearance	/R6.4 Types	5.5 mm min.	
	PCB Creepage & Clearance	/R6.4 Types	4.8 mm min.	
Certifications	CB Report: Medical Safety	Ref: CA/11158/CSA	IEC60601-1:1988 + A1: 1991 + A2:1995	
Reinforced Part	CSA Medical Safety	Report: 2207629	C22.2 601-1 2nd Ed. UL 60601-1 1st Ed.	
	CSA General Safety	Report: 2219431	C22.2 No. 60950-1-03 UL 60950-1 1st Ed.	
		Recognised as Reinforced Isolation	Supplement to Report: 2219431	
Measurement, Control and Laboratory Use Safety		Report: IL091212010M1	EN 61010-1 : 2001	
Certifications	UL General Safety	Report: E248550	UL 60950-1 1st Ed.	
Standard Part			C22.2 No. 60950-1-03	
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	EN Medical Safety	Report: PS090301601	EN60601-1:1990 + A13: 1996	

Notes

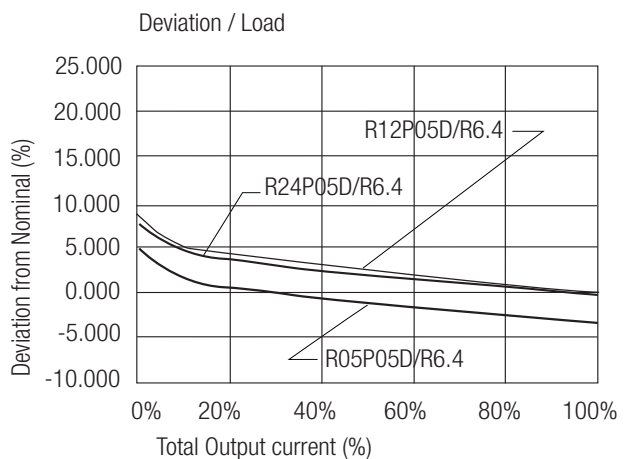
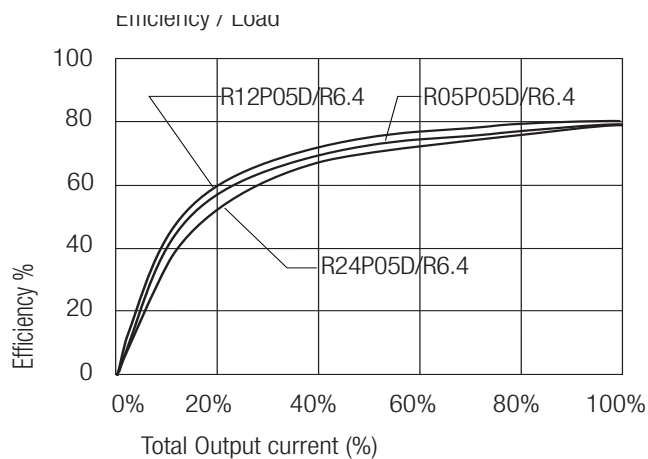
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

Typical Characteristics

## RxxP205S/R6.4 RxxP205S/R8

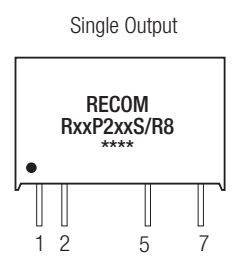
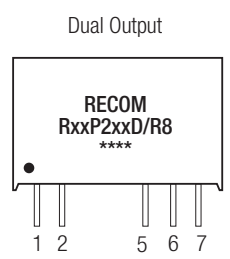
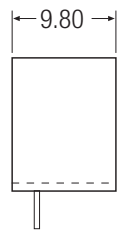
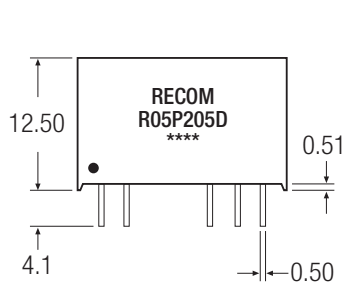


## RxxP205D/R6.4 RxxP205D/R8

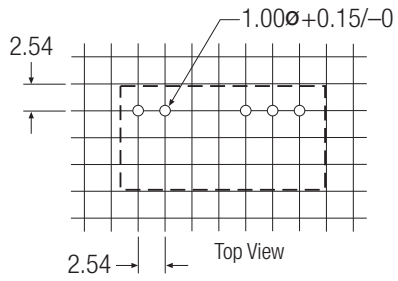
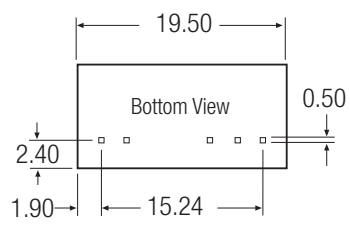


**Package Style and Pinning (mm)**

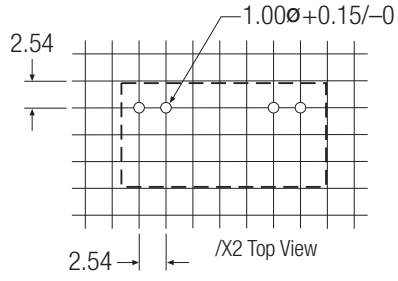
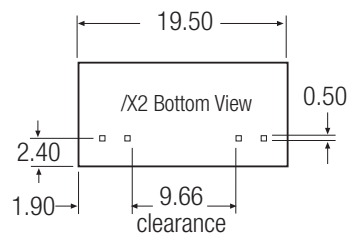
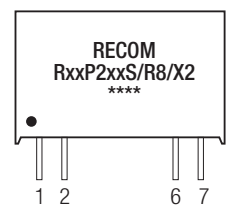
7 PIN SIP Package



**Recommended Footprint Details**



**/X2 Single Output**



**Pin Connections**

Pin #	Single	Dual	/X2
1	+Vin	+Vin	+Vin
2	-Vin	-Vin	-Vin
5	-Vout	-Vout	No Pin
6	No Pin	Com	-Vout
7	+Vout	+Vout	+Vout

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

RxxP2xx/R