

## Features

### Unregulated Converters

- UL/CSA and EN-60950-1 Safety certified
- EN-60601 for Medical Applications
- 6kVDC Isolation
- Optional Continuous Short Circuit Protection
- Efficiency up to 80%
- Space Saving „Skinny DIP“ Package
- Very Low Isolation Capacitance

#### Selection Guide

Part Number SIP 7	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency Std (%)	Max Capacitive Load <sup>(1)</sup>
RV-xx3.3S	3.3, 5, 12, 15, 24	3.3	600	70	3300µF
RV-xx05S	3.3, 5, 12, 15, 24	5	400	70-75	1200µF
RV-xx09S	3.3, 5, 12, 15, 24	9	222	70-75	1200µF
RV-xx12S	3.3, 5, 12, 15, 24	12	167	70-75	680µF
RV-xx15S	3.3, 5, 12, 15, 24	15	132	75-80	680µF
RV-xx24S	3.3, 5, 12, 15, 24	24	83	75-80	470µF
RV-xx3.3D	3.3, 5, 12, 15, 24	±3.3	±300	70	±1500µF
RV-xx05D	3.3, 5, 12, 15, 24	±5	±200	70-75	±470µF
RV-xx09D	3.3, 5, 12, 15, 24	±9	±111	70-75	±470µF
RV-xx12D	3.3, 5, 12, 15, 24	±12	±85	70-75	±220µF
RV-xx15D	3.3, 5, 12, 15, 24	±15	±66	75-80	±220µF
RV-xx24D	3.3, 5, 12, 15, 24	±24	±42	75-80	±100µF

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

No suffix is 6kVDC functional isolation

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. RV-0505S/P, RV-0505D/P

#### Specifications (measured at $T_A = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up)

Input Voltage Range		±10%
Output Voltage Accuracy		±5%
Line Voltage Regulation		1.2%/1% of $V_{in}$ typ.
Load Voltage Regulation (10% to 100% full load)	3.3V output types 5V output type 9V, 12V, 15V, 24V output types	20% max. 15% max. 10% max.
Output Ripple and Noise (20MHz limited)		200mVp-p max.
Operating Frequency		20kHz min. / 50kHz typ. / 85kHz max.
Efficiency at Full Load		70% min. / 75% typ.
Minimum Load = 0%	Specifications valid for 10% minimum load only.	
Isolation Voltage	(tested for 1 second) (rated for 1 minute)	6000VDC 3000VAC / 60Hz
Isolation Capacitance		2pF min. / 12pF max.
Isolation Resistance		15 GΩ min.
Short Circuit Protection P-Suffix		1 Second 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
Package Weight		9g
Packing Quantity		15 pcs per Tube cont.

## ECONOLINE

### DC/DC-Converter

with 3 year Warranty

# RECOM

## 2 Watt DIP24 Miniature Single & Dual Output



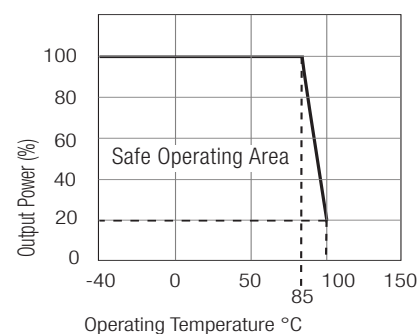
**EN-60950-1 Certified**  
**EN-60601-1 Certified**  
**UL/CSA-60950-1 Certified**

## RV

#### Description

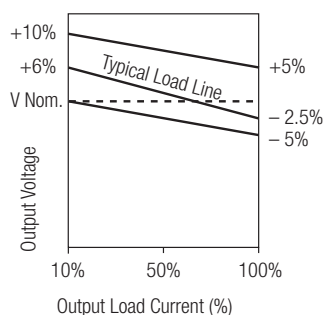
Very high isolation in a small size are the main features of this miniature DIP24 converter, ideal for highly sophisticated industrial, test and measurement and medical designs where board space is at a premium.

### Derating-Graph (Ambient Temperature)



Refer to Application Notes

## Tolerance Envelope



## Specifications (continued)

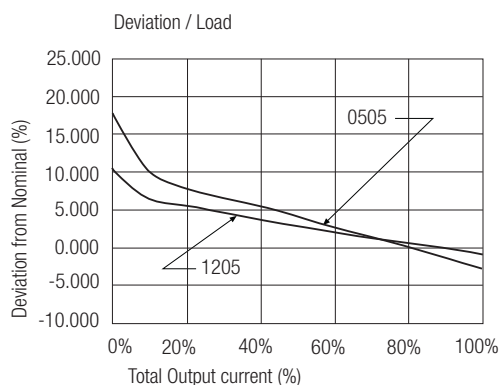
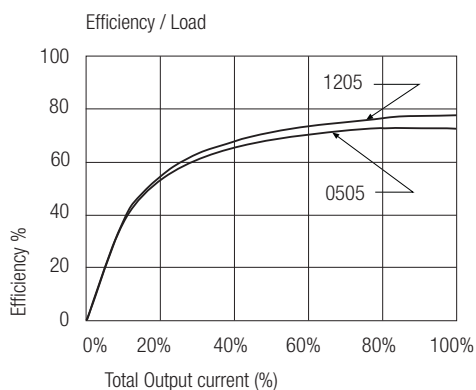
MTBF (+25°C)	} Detailed Information see Application Notes chapter "MTBF"	using MIL-HDBK 217F	1154 x 10 <sup>3</sup> hours
(+85°C)		using MIL-HDBK 217F	168 x 10 <sup>3</sup> hours
Certifications	CB Report: Medical Safety	Ref: CA/11158/CSA CSA General Safety	IEC60601-1:1988 + A1: 1991 + A2:1995 Report: 2219431 C22.2 No. 60950-1-03 UL 60950-1 1st Ed.
Certifications	UL General Safety	Report: E248550	UL 60950-1 1st Ed.
Standard Part			C22.2 No. 60950-1-03
	EN General Safety	Report: LVD-2K02066	EN60950-1:2000
	EN Medical Safety	Report: PS090301601	EN60601-1:1990 + A13: 1996

## Notes

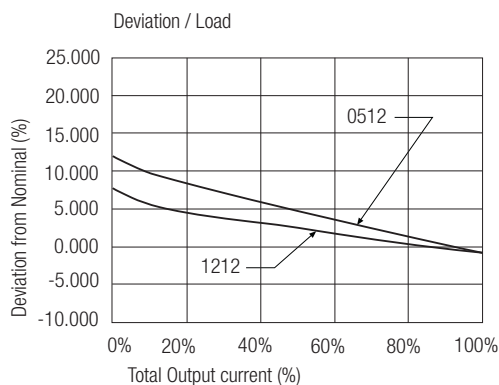
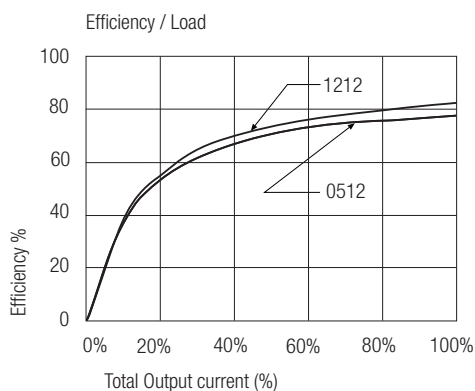
Note 1 Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

## Typical Characteristics

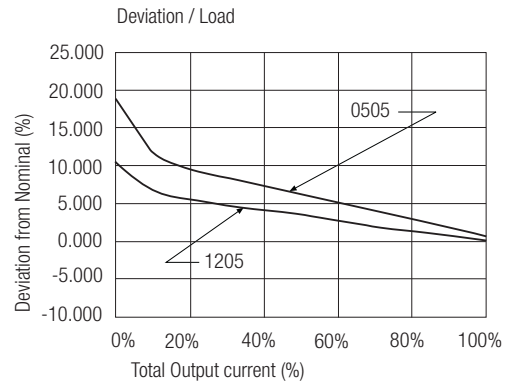
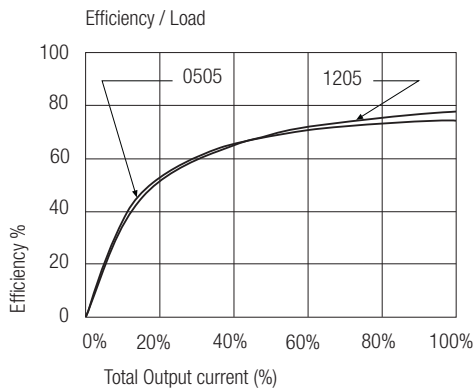
### RV-xx05S



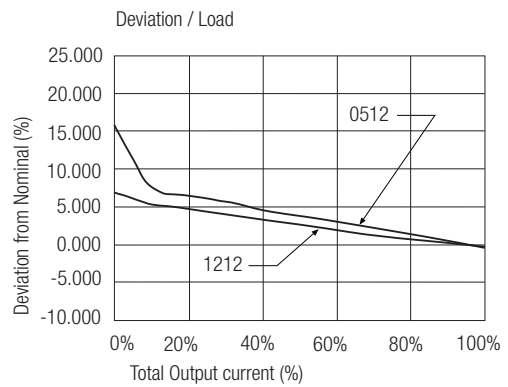
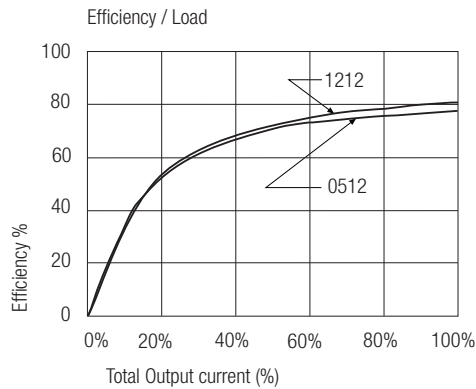
### RV-xx12S



## RV-xx05D



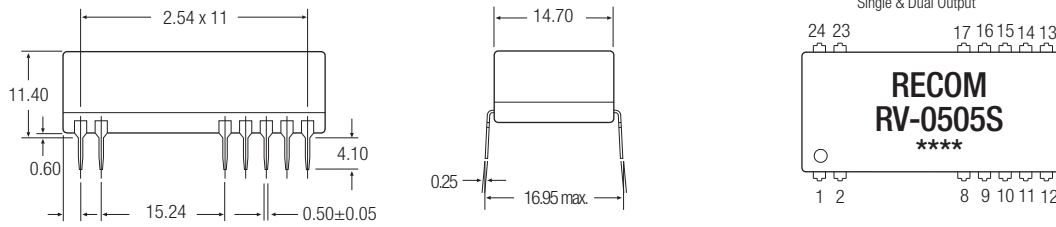
## RV-xx12D



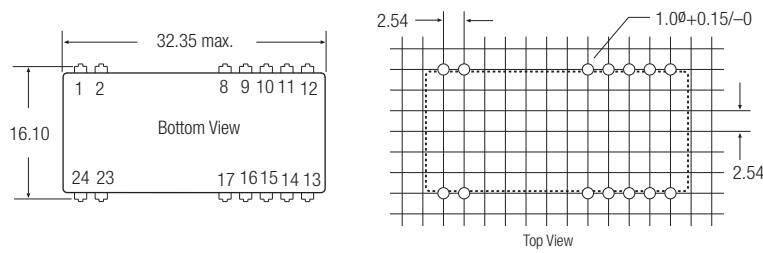
### Package Style and Pinning (mm)



#### 24 PIN DIP Miniature Package Style



#### Recommended Footprint Details



#### Pin Connections

Pin #	Single
1	+Vin
2	-Vin
8, 9, 11, 14	NC
10, 15	-Vout
12 & 13	+Vout
16, 17, 23, 24	NC

#### Pin Connections

Pin #	Dual
1	+Vin
2	-Vin
8, 17	-Vout
9, 11, 14, 16, 23, 24	NC
10 & 15	Com
12, 13	+Vout

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

## Features

## Unregulated Converters

- UL/CSA and EN-60950-1 Safety certified
- EN-61010 for Test, Measurement and Lab Use
- UL/CSA and EN-60601 for Medical Applications
- 6.4kVDC or 8kV Reinforced Isolation
- Optional Continuous Short Circuit Protection
- Efficiency to 88%
- Space Saving „Skinny DIP“ Package
- Very Low Isolation Capacitance

### 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>
RV-xx3.3S	/R6.4 & /R8	3.3, 5, 12, 15, 24	3.3	600	70-78	3300µF
RV-xx05S	/R6.4 & /R8	3.3, 5, 12, 15, 24	5	400	76-80	1200µF
RV-xx09S	/R6.4 & /R8	3.3, 5, 12, 15, 24	9	222	78-85	1200µF
RV-xx12S	/R6.4 & /R8	3.3, 5, 12, 15, 24	12	167	78-85	680µF
RV-xx15S	/R6.4 & /R8	3.3, 5, 12, 15, 24	15	132	78-88	680µF
RV-xx3.3D	/R6.4 & /R8	3.3, 5, 12, 15, 24	±3.3	±300	70-78	±1500µF
RV-xx05D	/R6.4 & /R8	3.3, 5, 12, 15, 24	±5	±200	75-82	±470µF
RV-xx09D	/R6.4 & /R8	3.3, 5, 12, 15, 24	±9	±111	76-84	±470µF
RV-xx12D	/R6.4 & /R8	3.3, 5, 12, 15, 24	±12	±85	78-86	±220µF
RV-xx15D	/R6.4 & /R8	3.3, 5, 12, 15, 24	±15	±66	78-86	±220µF

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

No suffix is 6kVDC functional isolation

\* add Suffix "P" for Continuous Short Circuit Protection, e.g. RV-0505S/P, RV-0505D/P

\* add Suffix "/R6.4" or "/R8" for Reinforced Isolation, e.g. RV-0505S/R6.4, RV-0505D/P/R8

### Specifications (measured at $T_A = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up)

Input Voltage Range		±10%
Output Voltage Accuracy		±5%
Line Voltage Regulation		1.2%/1% of $V_{in}$ typ.
Load Voltage Regulation (10% to 100% full load)	3.3V output types	20% max.
	5V output type	15% max.
	9V, 12V, 15V, 24V output types	10% max.
Output Ripple and Noise (20MHz limited)		200mVp-p max.
Operating Frequency		20kHz min. / 50kHz typ. / 85kHz max.
Efficiency at Full Load		70% min. / 75% typ.
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		2pF min. / 12pF 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
Package Weight		9g
Packing Quantity		15 pcs per Tube

cont.

## ECONOLINE

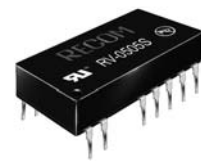
DC/DC-Converter

with 3 year Warranty

# RECOM

## 2 Watt DIP24

## Miniature Single & Dual Output



**EN-60950-1 Certified**

**EN-60601-1 Certified**

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

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

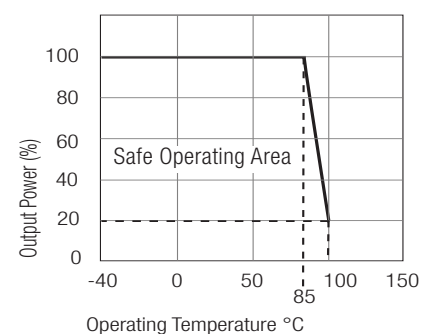
**EN-61010-1 Certified**

# RV/R

### Description

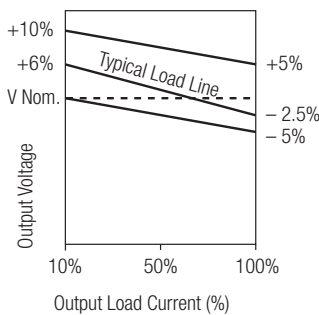
Very high isolation in a small size are the main features of this miniature DIP24 converter, ideal for highly sophisticated industrial, test and measurement and medical designs where board space is at a premium.

## Derating-Graph (Ambient Temperature)



Refer to Application Notes

## Tolerance Envelope



## Specifications (continued)

MTBF (+25°C)	} Detailed Information see Application Notes chapter "MTBF" using MIL-HDBK 217F	using MIL-HDBK 217F	1154 x 10 <sup>3</sup> hours
(+85°C)		using MIL-HDBK 217F	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: 227629	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. C22.2 No. 60950-1-03
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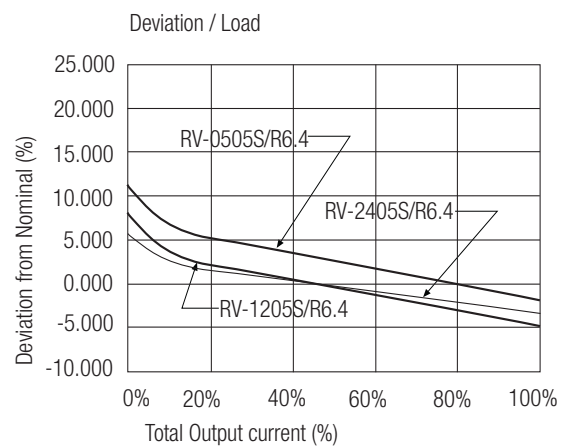
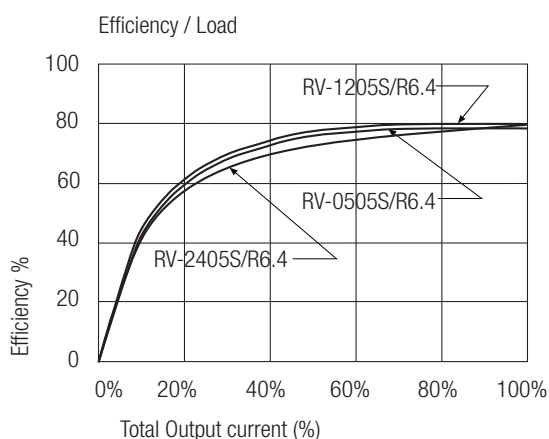
### Notes

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

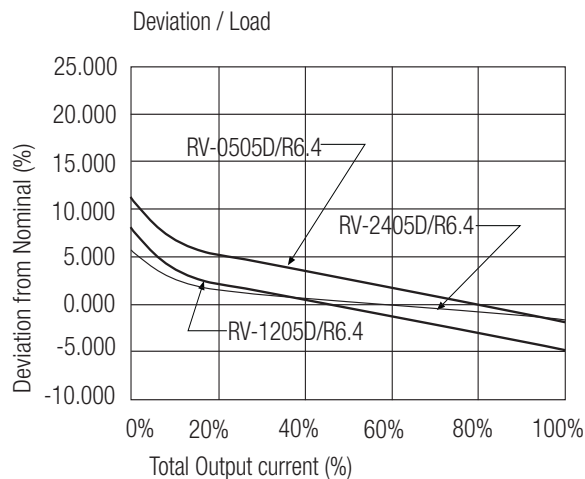
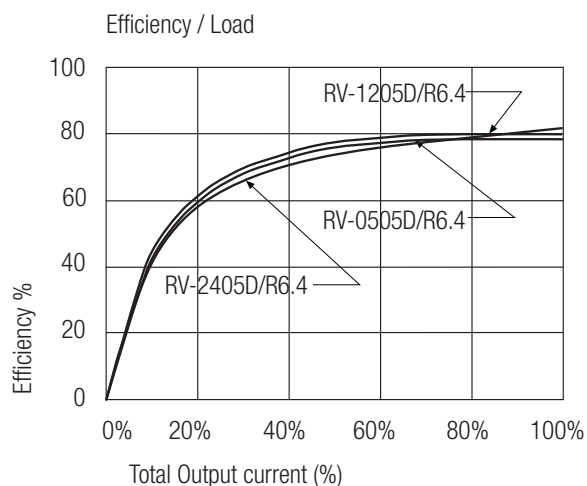
# RV-xx05S/R6.4

# RV-xx05S/R8



## RV-xx05D/R6.4

## RV-xx05D/R8



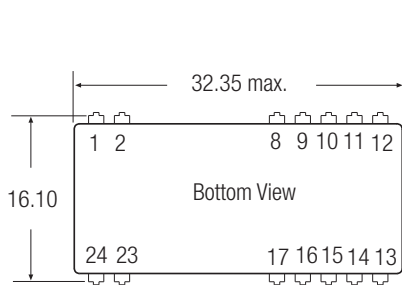
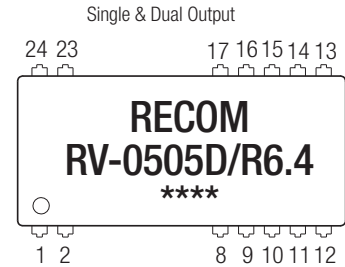
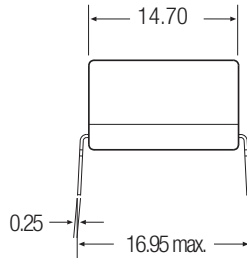
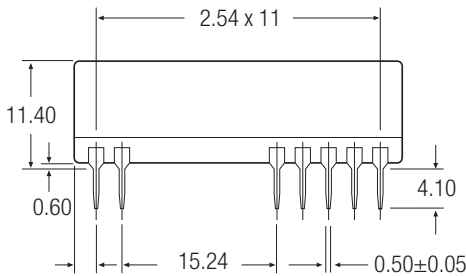
# ECONOLINE

## DC/DC-Converter

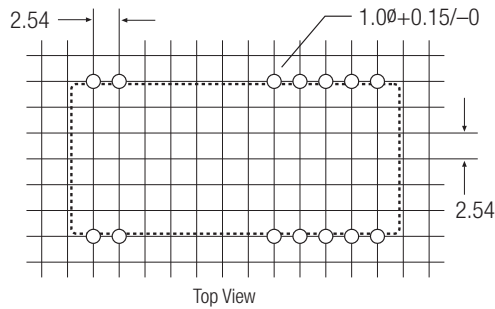
# RV/R Series

### Package Style and Pinning (mm)

#### 24 PIN DIP Miniature Package Style



#### Recommended Footprint Details



#### Pin Connections

Pin #	Single
1	+Vin
2	-Vin
8, 9, 11, 14	NC
10, 15	-Vout
12 & 13	+Vout
16, 17, 23, 24	NC

#### Pin Connections

Pin #	Dual
1	+Vin
2	-Vin
8, 17	-Vout
9, 11, 14, 16, 23, 24	NC
10 & 15	Com
12, 13	+Vout

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

NC = No Connection

NC = No Connection