# 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

# ECONOLINE

DC/DC-Converter

with 3 year Warranty

RECOM

# 2 Watt DIP24 Miniature Single & Dual Output

RoHS 2002/95/EC 6/6

E-224736

**EN-60950-1 Certified**
**EN-60601-1 Certified**
**UL/CSA 60950-1 Certified**
**IEC 60601-1 CB Report**

# RV

## Selection Guide

| Part Number SIP 7 | Input Voltage (VDC) | Output Voltage (VDC) | Output Current (mA) | Efficiency Std (%) | Max Capacitive Load(1) |
|---|---|---|---|---|---|
| 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°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) | 3.3V 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. |
| Isolation Voltage | (tested for 1 second) | 6000VDC |
| | (rated for 1 minute) | 3000VAC / 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 |

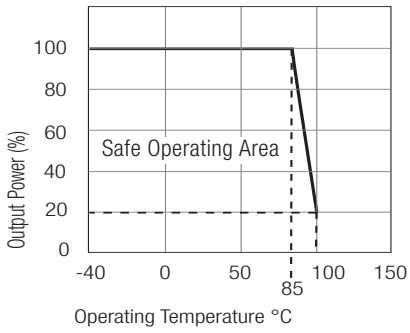
cont.

## 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.

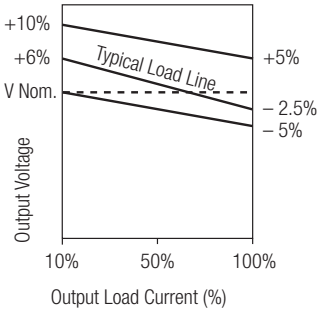
## Derating-Graph

(Ambient Temperature)




**Refer to Application Notes**

## Tolerance Envelope




## Specifications (continued)

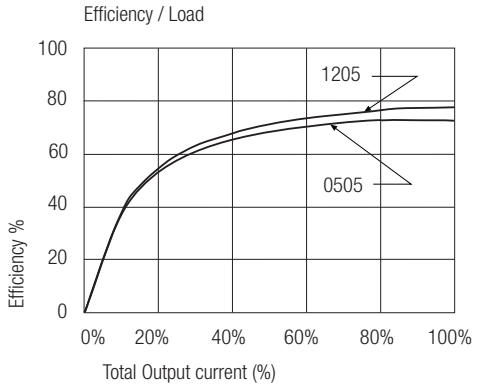
| | | | |
|---|---|---|---|
| MTBF (+25°C) | *Detailed Information see Application Notes chapter "MTBF"* | using MIL-HDBK 217F | 1154 x $10^3$ hours |
| (+85°C) | | using MIL-HDBK 217F | 168 x $10^3$ hours |
| Certifications | UL/cUL General Safety | Report: E248550 | UL 60950-1 1st Ed. |
| | EN General Safety | Report: PS-R7219C1 | EN60950-1:2001 + A11: 2004 |
| | CB/EN Medical Safety | Report: MDD1205098-4 + RM1205098-4 IEC/EN 60601-1 3rd Edition | |
| | | Medical Report + ISO14971 Risk Assessment | |

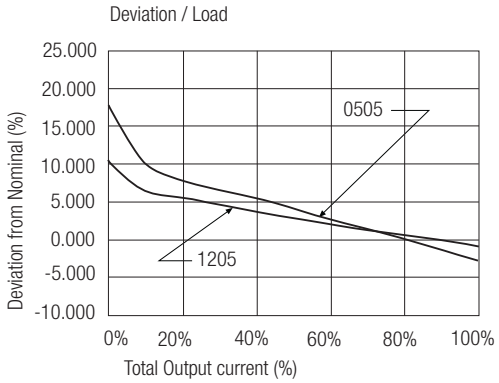
Notes

| | |
|---|---|
| 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. |

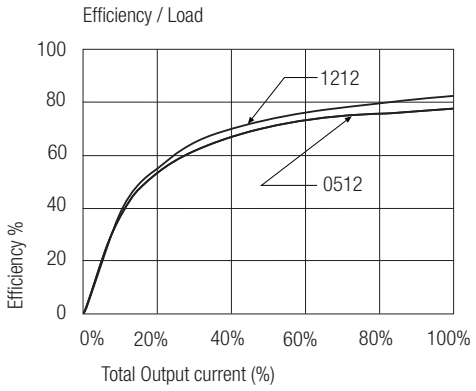
## Typical Characteristics

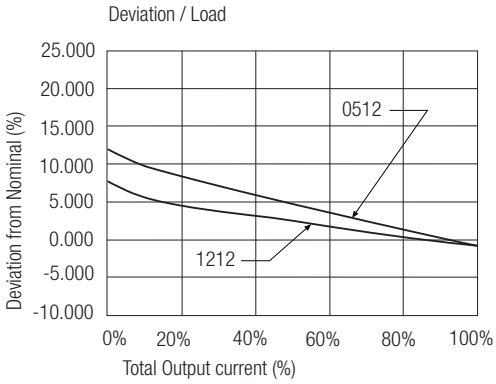
# RV-xx05S



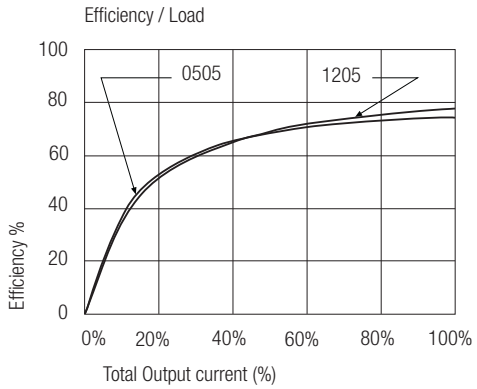

# RV-xx12S

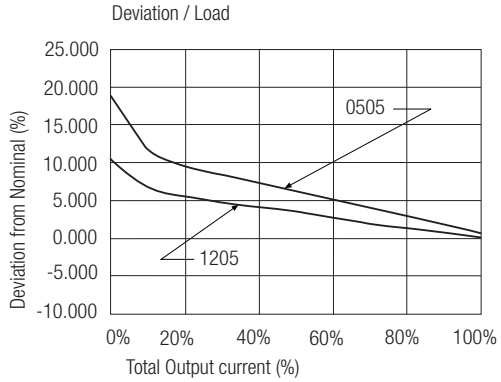


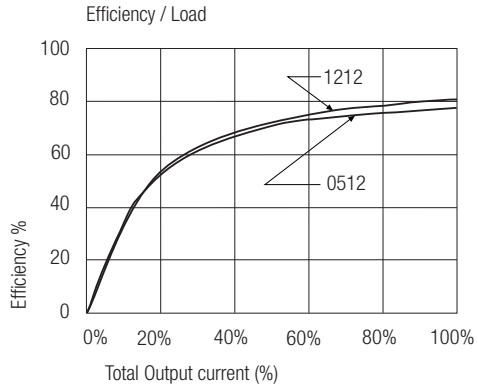
## Typical Characteristics

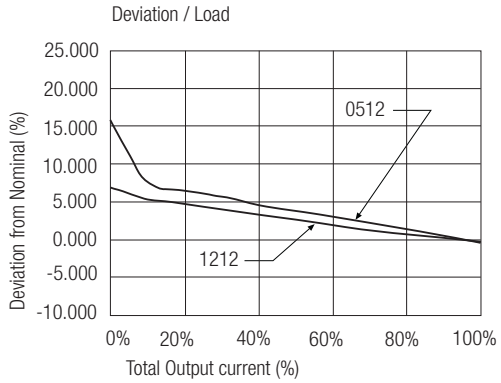
# RV-xx05D




# RV-xx12D

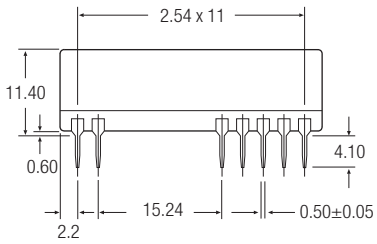


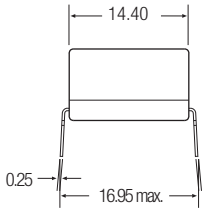



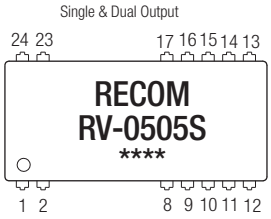
## Package Style and Pinning (mm)

3rd angle projection

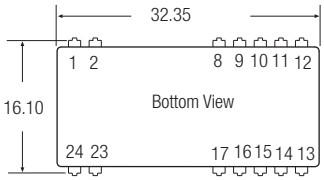
### 24 PIN DIP Miniature Package Style

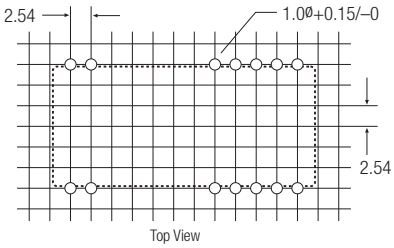



### Recommended Footprint Details




**Pin Connections**

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

NC = No Connection

**Pin Connections**

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

NC = No Connection

XX.X ± 0.5 mm
XX.XX ± 0.25 mm

RV

# 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

# ECONOLINE

DC/DC-Converter

with 3 year Warranty

RECOM

# 2 Watt DIP24 Miniature Single & Dual Output

RoHS 2002/95/EC 6/6

E-224736

**EN-60950-1 Certified**
**EN-60601-1 Certified**
**UL/CSA 60950-1 Certified**
**UL-60601-1 Certified**
**EN-61010-1 Certified**
**IEC-60601-1 CB Report**

# RV/R

## Selection Guide

| Part Number SIP 7 | Reinforced Isolation (kVDC) | Input Voltage (VDC) | Output Voltage (VDC) | Output Current (mA) | Efficiency Std (%) | Max Capacitive Load[1] |
|---|---|---|---|---|---|---|
| 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°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) | 3.3V 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 |

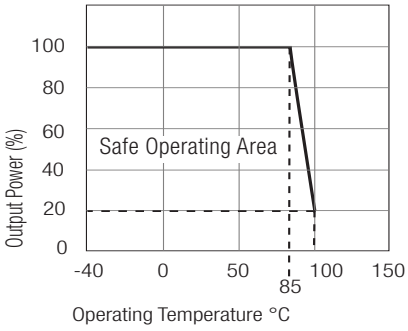
cont.

## 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.

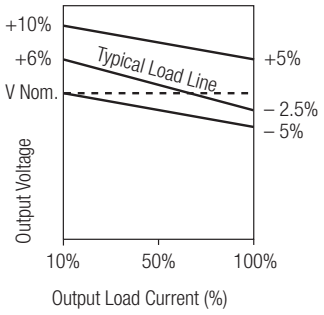
# Derating-Graph

(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 $10^3$ hours |
| (+85°C) | | using MIL-HDBK 217F | 168 x $10^3$ 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

| | | | |
|---|---|---|---|
| Measurement, Control and Laboratory Use Safety | | Report: IL091212010M1 | EN 61010-1 : 2001 |
| | CSA General Safety | | UL 60950-1 1st Ed. |
| | | | C22.2 No. 60950-1-03 |
| | UL/cUL Medical Safety | Report: E314885-A2-UL | UL60601-1 1st Edition |
| | CSA Medical Safety | Report: 2207629 | CAN/CSA-22.2 No 601.1-M90 |
| | EN General Safety | Report: PS-R7219C1 | EN60950-1:2001 + A11: 2004 |
| | EN Medical Safety | Report: MDD1205098-1 + RM1205098-1 | IEC/EN 60601-1 3rd Edition |
| | | Medical Report + ISO14971 Risk Assessment | |

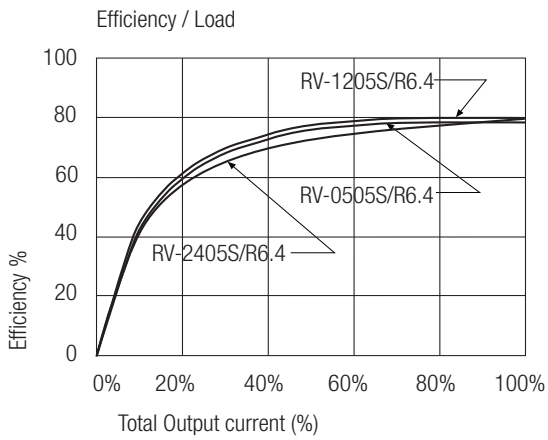
Notes

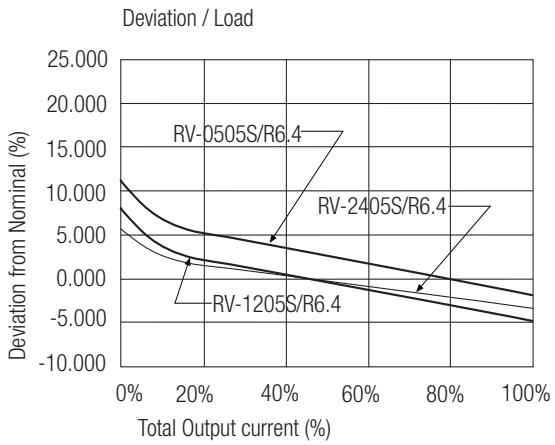
| | |
|---|---|
| Note 1 | Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter. |

## Typical Characteristics

# RV-xx05S/R6.4
# RV-xx05S/R8

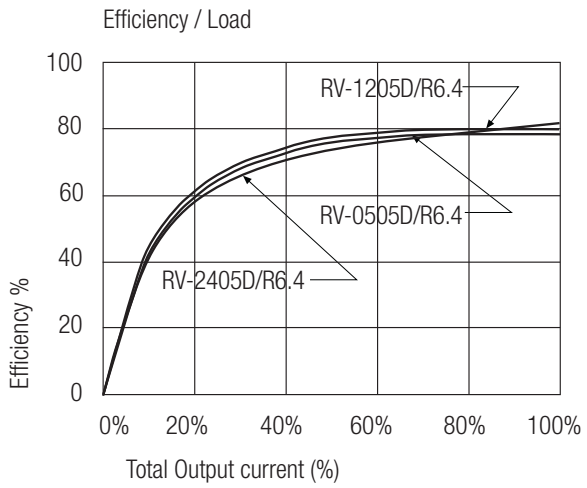


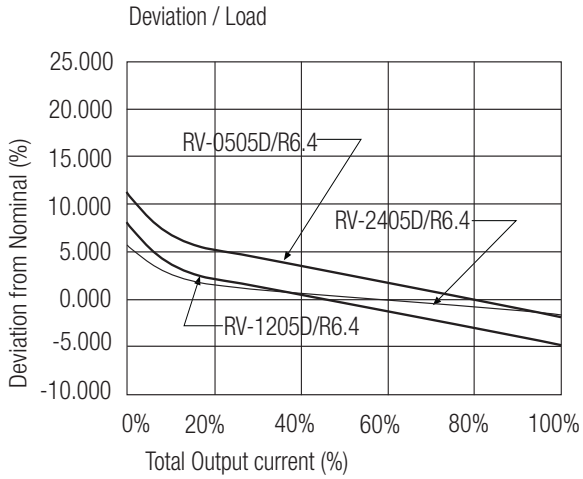


## Typical Characteristics

# RV-xx05D/R6.4
# RV-xx05D/R8

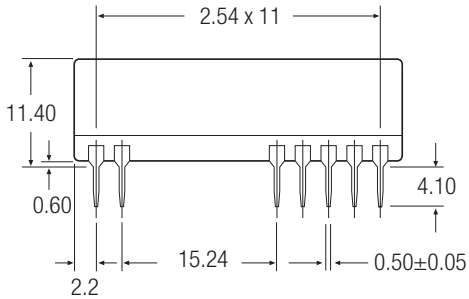


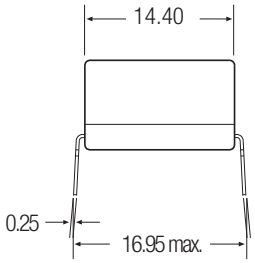



## Package Style and Pinning (mm)

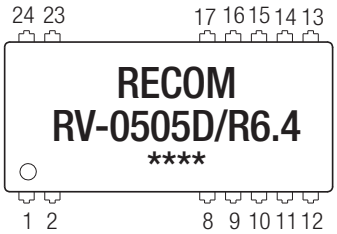
3rd angle projection

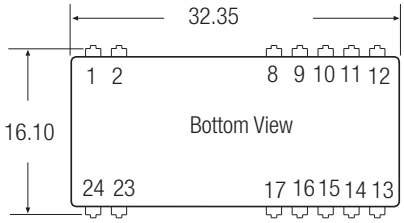
### 24 PIN DIP Miniature Package Style



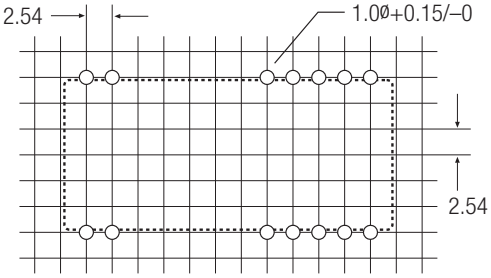




Single & Dual Output




### Recommended Footprint Details




Top View

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

NC = No Connection

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

NC = No Connection

XX.X ± 0.5 mm
XX.XX ± 0.25 mm

Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

**Как с нами связаться**

**Телефон:** 8 (812) 309 58 32 (многоканальный)
**Факс:** 8 (812) 320-02-42
**Электронная почта:** org@eplast1.ru
**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.