# Features

# Regulated Converters

- DIP16, Mini DIP16 or SMD package style
- 1kVDC, 2kVDC or 3kVDC isolation
- Continuous short circuit protected
- Low ripple and noise
- IEC/EN60950-1 certified
- Efficiency up to 83%

RECOM
DC/DC Converter

## RW2

# 2 Watt MINI DIP16, DIP16 or SMD Single & Dual Output

IEC/EN60950-1 certified

## Description

High power-density, 2:1 input voltage range and a wide temperature range of -40°C to +85°C are just some of the characteristics of this versatile DIP16 converter, ideal for highly sophisticated industrial designs where a regulated converter is required but space is at a premium. Three different case styles and isolation options are available.

## Selection Guide

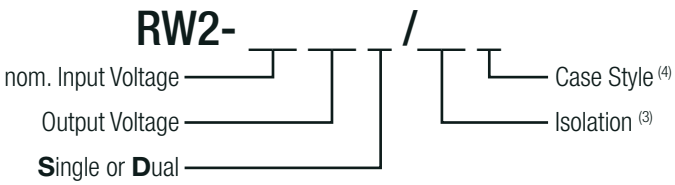
| Part Number | Input Voltage Range [VDC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ.(1) [%] | max. Capacitive Load (2) [µF] |
|---|---|---|---|---|---|
| RW2-053.3S | 4.5-9 | 3.3 | 500 | 68 | 4700 |
| RW2-0505S | 4.5-9 | 5 | 400 | 73 | 1000 |
| RW2-0512S | 4.5-9 | 12 | 166 | 75 | 1000 |
| RW2-0515S | 4.5-9 | 15 | 134 | 75 | 1000 |
| RW2-123.3S | 9-18 | 3.3 | 500 | 69 | 4700 |
| RW2-1205S | 9-18 | 5 | 400 | 75 | 1000 |
| RW2-1212S | 9-18 | 12 | 166 | 80 | 1000 |
| RW2-1215S | 9-18 | 15 | 134 | 80 | 1000 |
| RW2-243.3S | 18-36 | 3.3 | 500 | 70 | 4700 |
| RW2-2405S | 18-36 | 5 | 400 | 78 | 1000 |
| RW2-2412S | 18-36 | 12 | 166 | 83 | 1000 |
| RW2-2415S | 18-36 | 15 | 134 | 83 | 1000 |
| RW2-483.3S | 36-72 | 3.3 | 500 | 73 | 4700 |
| RW2-4805S | 36-72 | 5 | 400 | 76 | 1000 |
| RW2-4812S | 36-72 | 12 | 166 | 81 | 1000 |
| RW2-4815S | 36-72 | 15 | 134 | 81 | 1000 |
| RW2-0505D | 4.5-9 | ±5 | ±200 | 73 | ±680 |
| RW2-0509D | 4.5-9 | ±9 | ±111 | 74 | ±680 |
| RW2-0512D | 4.5-9 | ±12 | ±83 | 75 | ±680 |
| RW2-0515D | 4.5-9 | ±15 | ±67 | 75 | ±680 |
| RW2-1205D | 9-18 | ±5 | ±200 | 75 | ±680 |
| RW2-1209D | 9-18 | ±9 | ±111 | 78 | ±680 |
| RW2-1212D | 9-18 | ±12 | ±83 | 80 | ±680 |
| RW2-1215D | 9-18 | ±15 | ±67 | 80 | ±680 |
| RW2-2405D | 18-36 | ±5 | ±200 | 78 | ±680 |
| RW2-2409D | 18-36 | ±9 | ±111 | 81 | ±680 |
| RW2-2412D | 18-36 | ±12 | ±83 | 83 | ±680 |
| RW2-2415D | 18-36 | ±15 | ±67 | 83 | ±680 |
| RW2-4805D | 36-72 | ±5 | ±200 | 78 | ±680 |
| RW2-4809D | 36-72 | ±9 | ±111 | 81 | ±680 |
| RW2-4812D | 36-72 | ±12 | ±83 | 83 | ±680 |
| RW2-4815D | 36-72 | ±15 | ±67 | 83 | ±680 |

**Notes:**

Note1: Efficiency is tested at nominal input and full load at +25°C ambient

Note2: Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage on the converter

## Model Numbering




**Notes:**

Note3: „**/H2**“ = 2kVDC isolation; „**/H3**“ = 3kVDC isolation; without suffix standard 1kVDC isolation

Note4: add suffix „**/SMD**“ for SMD package or **„/B“** for Mini DIP16 THT package; without suffix = standard DIP16 package (refer to “DIP16”)

**Ordering Examples:**

| | | | | | |
|---|---|---|---|---|---|
| RW2-2405S/B: | 18-36Vin | 5Vout | Single | 1kVDC Isolation | Mini DIP16 Package |
| RW2-1212D/H2: | 9-18Vin | ±12Vout | Dual | 2kVDC Isolation | DIP16 Package |
| RW2-0515D/H3/SMD: | 4.5-9Vin | ±15Vout | Dual | 3kVDC Isolation | SMD Package |
| RW2-4812S/H2/B | 36-72Vin | 12Vout | Single | 2kVDC Isolation | Mini DIP16 Package |

## Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

### BASIC CHARACTERISTICS

| Parameter | Condition | Min. | Typ. | Max. |
|---|---|---|---|---|
| Input Voltage Range | nom. Vin= 5VDC | 4.5VDC | | 9VDC |
| | 12VDC | 9VDC | | 18VDC |
| | 24VDC | 18VDC | | 36VDC |
| | 48VDC | 36VDC | | 72VDC |
| Minimum Load (5) | | 10% | | |
| Internal Operating Frequency | | 100KHz | | 700kHz |
| Output Ripple and Noise | 20MHz BW | | | 50mVp-p |

**Notes:**

Note5: Operation below 10% load won‘t harm the converter, but specifications may not be met.

### REGULATIONS

| Parameter | Condition | Value |
|---|---|---|
| Output Accuracy | | ±2.0% typ. |
| Line Regulation | | ±0.5% max. |
| Load Regulation | 20% to 100% load | 0.5% typ. |

### PROTECTION

| Parameter | Type | | Value |
|---|---|---|---|
| Isolation Voltage (6) | standard without suffix | tested for 1 second<br>rated for 1 minute | 1kVDC<br>500VAC/60Hz |
| | /H2 version | tested for 1 second<br>rated for 1 minute | 2kVDC<br>1kVAC/60Hz |
| | /H3 version | tested for 1 second<br>rated for 1 minute | 3kVDC<br>1.5kVAC/60Hz |
| Isolation Resistance | | | 1GΩ min. |
| Isolation Capacitance | | | 30pF max. |
| Insulation Grade | | | functional |

**Notes:**

Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

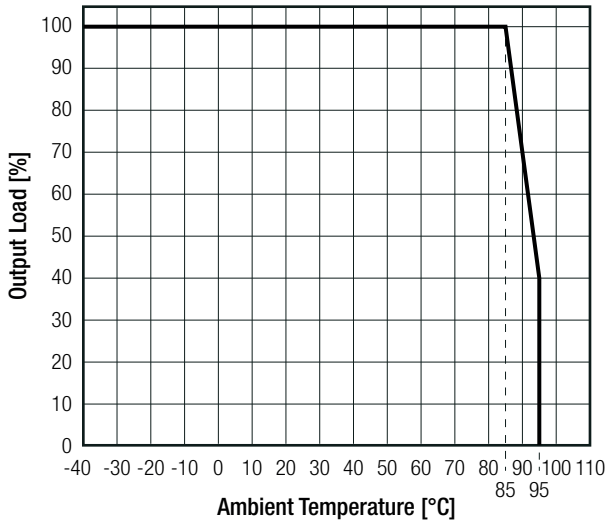
Note7: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

## Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

### ENVIRONMENTAL

| Parameter | Condition | | Value |
|---|---|---|---|
| Operating Temperature Range | full load @ free air convection (see graph) | | -40°C to +85°C |
| Maximum Case Temperature | | | +100°C |
| Operating Altitude | | | 2000m |
| Operating Humidity | non-condensing | | 95% RH max. |
| Pollution Degree | | | PD2 |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C<br>+85°C | 4366 x $10^3$ hours<br>658 x $10^3$ hours |

**Derating Graph**
(@ Chamber and free air convection)

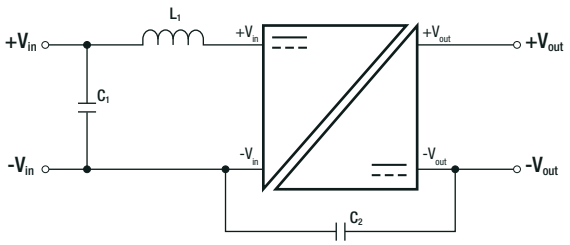



### SAFETY AND CERTIFICATIONS

| Certificate Type (Safety) | Report / File Number | Standard |
|---|---|---|
| Information Technology Equipment, General Requirements for Safety | SPCLVD1605077-10 | IEC60950-1:2005, 2nd Edition + A2:2013<br>EN60950-1:2006 + A2:2013 |
| Medical Electric Equipment, General Requirements for Safety and Essential Performance | WD-SE-R-180675-A0 | IEC60601-1:2005, 3rd Edition + A1:2012<br>EN60601-1:2006 + A12:2014 |
| EAC | RU-AT.AB49.B.09571 | TP TC 004/2011 |
| RoHS 2+ | TWNC00635328 | RoHS-2011/65/EU |

| EMC Compliance | Condition | Standard / Criterion |
|---|---|---|
| Electromagnetic compatibility of multimedia equipment - Emission requirements (8) | with external filter<br>(see filter suggestion below) | EN55032, Class A<br>EN55032, Class B |

**EMC Filtering Suggestions according to EN55032**




**Component List Class A**

| Models | C1 | C2 | L1 |
|---|---|---|---|
| RW2-1212S/H2/SMD<br>RW2-2405S/H2 | 10µF/100V MLCC | 330pF | 5.6µH choke RLS-567 |

**Component List Class B**

| Models | C1 | C2 | L1 |
|---|---|---|---|
| RW2-1212S/H2/SMD<br>RW2-2405S/H2 | 10µF/100V MLCC | 330pF | 22µH choke RLS-226 |

**Notes:**

Note8: Filter suggestions are valid for indicated part numbers only.
For other part numbers, please contact RECOM tech support for advice.

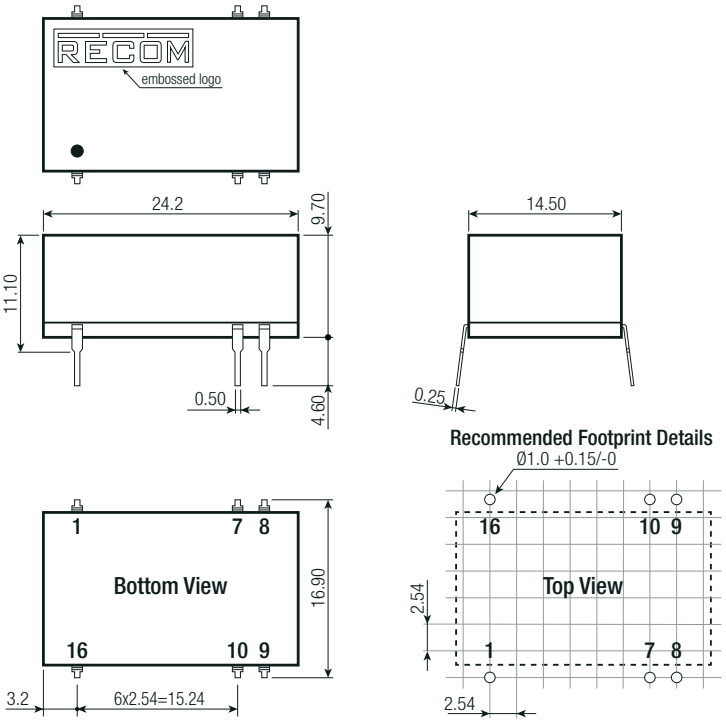
## Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

### DIMENSION AND PHYSICAL CHARACTERISTICS

| Parameter | Type | Value |
|---|---|---|
| Material | case<br>potting<br>PCB | non-conductive black plastic, (UL94 V-0)<br>epoxy, (UL94 V-0)<br>FR4, (UL94 V-0) |
| Dimension (LxWxH) | Mini DIP16<br>DIP16<br>SMD | 22.1 x 12.55 x 8.50mm<br>24.2 x 14.50 x 9.70mm<br>24.2 x 14.50 x 10.20mm |
| Weight | | 6.4g typ. |

**Dimension Drawing (mm)**

**DIP16**

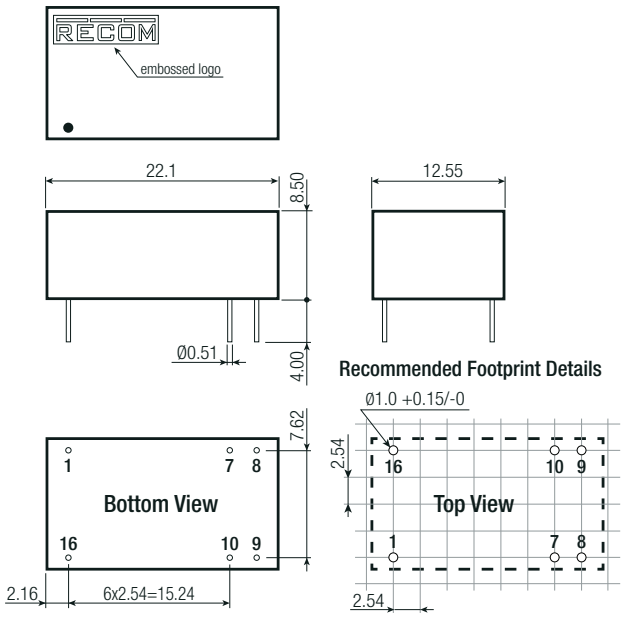



**Pinning information**

| Pin # | Single | Dual |
|---|---|---|
| 1 | -Vin | -Vin |
| 7 | NC | NC |
| 8 | NC | Com |
| 9 | +Vout | +Vout |
| 10 | -Vout | -Vout |
| 16 | +Vin | +Vin |

Tolerance: xx.x= ±0.5mm
xx.xx= ±0.35mm

**Mini DIP16 (/B)**




**Pinning information**

| Pin # | Single | Dual |
|---|---|---|
| 1 | -Vin | -Vin |
| 7 | NC | NC |
| 8 | NC | Com |
| 9 | +Vout | +Vout |
| 10 | -Vout | -Vout |
| 16 | +Vin | +Vin |

Tolerance: xx.x= ±0.5mm
xx.xx= ±0.35mm

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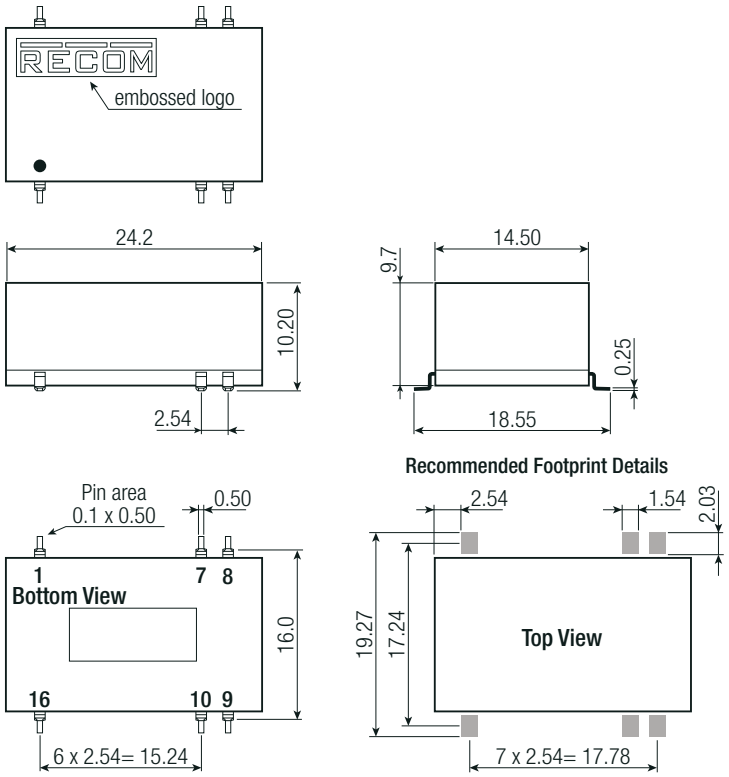
## Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

### Dimension Drawing SMD (mm)

SMD (/SMD)




### Pinning information

| Pin # | Single | Dual |
|---|---|---|
| 1 | -Vin | -Vin |
| 7 | NC | NC |
| 8 | NC | Com |
| 9 | +Vout | +Vout |
| 10 | -Vout | -Vout |
| 16 | +Vin | +Vin |

Tolerance: xx.x=±0.5mm
xx.xx=±0.35mm

| PACKAGING INFORMATION | | |
|---|---|---|
| **Parameter** | **Type** | **Value** |
| Packaging Dimension (LxWxH) | tube | 530.0 x 21.0 x 18.0mm |
| Packaging Quantity | DIP16 and SMD<br>Mini DIP16 | 20pcs<br>22pcs |
| Storage Temperature Range | | -55°C to +125°C |
| Storage Humidity | non-condensing | 95% RH max. |

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- Подбор аналогов;
- Консультации по применению компонента;
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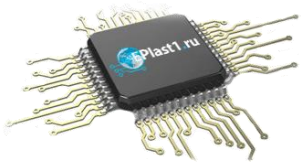


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