

# 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%



## 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

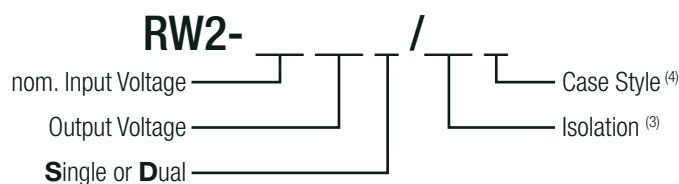
| Part Number | Input Voltage Range [VDC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ. <sup>(1)</sup> [%] | max. Capacitive Load <sup>(2)</sup> [μF] |
|-------------|---------------------------|----------------------|---------------------|------------------------------------|------------------------------------------|
| 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                                                                                           | 5VDC            | 4.5VDC |      | 9VDC    |
|                                                                                                               | nom. Vin= 12VDC | 9VDC   |      | 18VDC   |
|                                                                                                               | 24VDC           | 18VDC  |      | 36VDC   |
|                                                                                                               | 48VDC           | 36VDC  |      | 72VDC   |
| Minimum Load <sup>(5)</sup>                                                                                   |                 | 10%    |      |         |
| Internal Operating Frequency                                                                                  |                 | 100KHz |      | 700kHz  |
| Output Ripple and Noise                                                                                       | 20MHz BW        |        |      | 50mVp-p |
| <b>Notes:</b><br>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 <sup>(6)</sup>                                                                                                                                                                                           | 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            |
| <b>Notes:</b><br>Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage<br>Note7: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type |                         |                                           |                       |

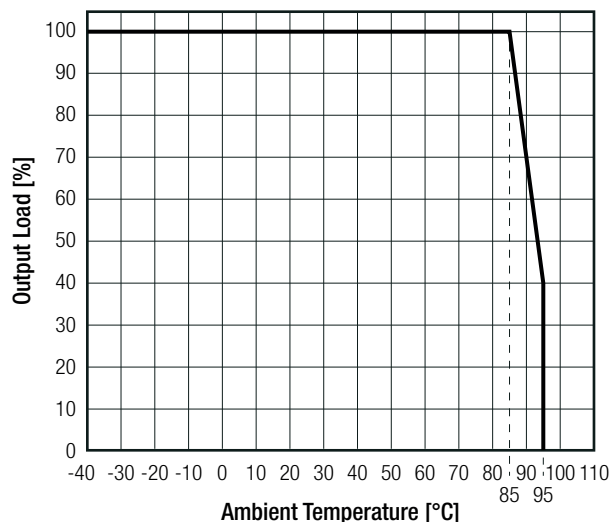
### Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

#### 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 <sup>3</sup> hours<br>658 x 10 <sup>3</sup> hours |

#### Derating Graph

(@ Chamber and free air convection)

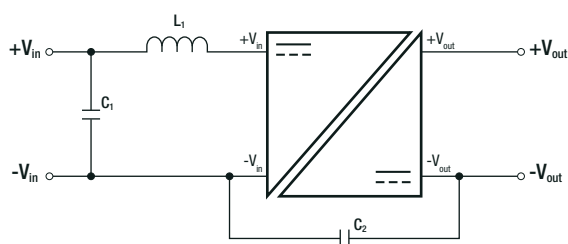


#### SAFETY AND CERTIFICATIONS

| 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 <sup>(8)</sup> | with external filter<br>(see filter suggestion below) | EN55032, Class A<br>EN55032, Class B |

#### EMC Filtering Suggestions according to EN55032



#### Notes:

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

#### Component List Class A

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

#### Component List Class B

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

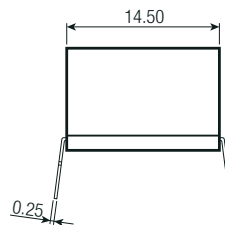
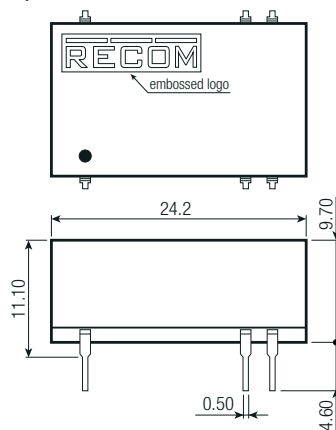
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

### DIMENSION AND PHYSICAL CHARACTERISTICS

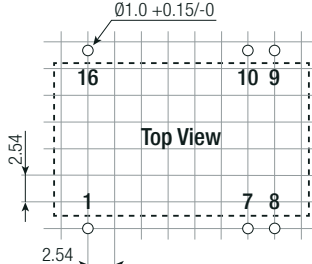
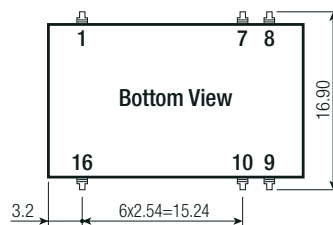
| Parameter         | Type       | Value                                    |
|-------------------|------------|------------------------------------------|
| Material          | case       | non-conductive black plastic, (UL94 V-0) |
|                   | potting    | epoxy, (UL94 V-0)              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

#### Dimension Drawing (mm)

##### DIP16



#### Recommended Footprint Details

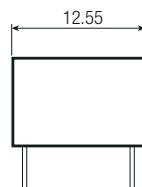
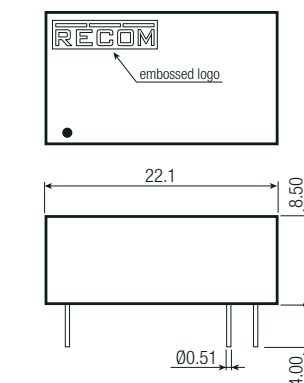


#### Pinning information

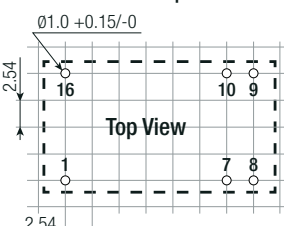
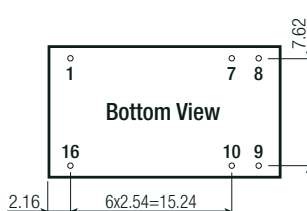
| Pin # | Single | Dual  |
|-------|--------|-------|
| 1     | -Vin   | -Vin  |
| 7     | NC     | NC    |
| 8     | NC     | Com   |
| 9     | +Vout  | +Vout |
| 10    | -Vout  | -Vout |
| 16    | +Vin   | +Vin  |

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

##### Mini DIP16 (/B)



#### Recommended Footprint Details



#### Pinning information

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

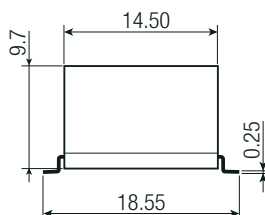
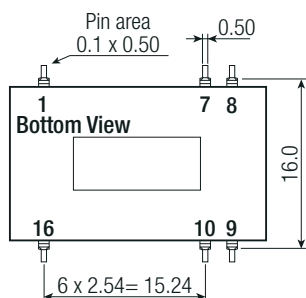
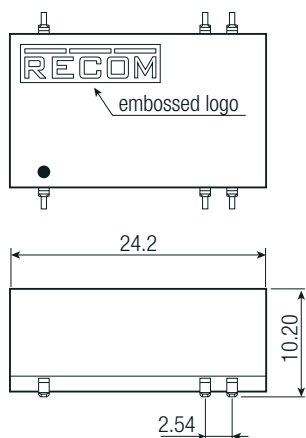
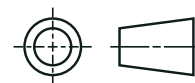
Tolerance: xx.x= ±0.5mm  
xx.xx= ±0.35mm

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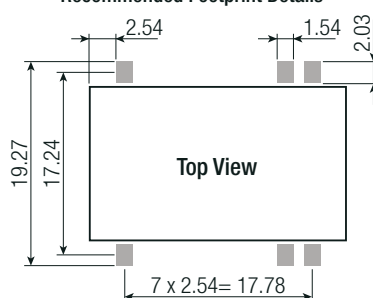
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

**Dimension Drawing SMD (mm)**

SMD (/SMD)



**Recommended Footprint Details**



**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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- Поставка более 17-ти миллионов наименований электронных компонентов;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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