

## Features

### Unregulated Converter

- Fully RoHS 6/6 Conform
- Full Power at 100°C Ambient Temperature
- 1kVDC Isolation
- Suitable for Fully Automated Assembly (including Vapor Phase Soldering)
- Optional Continuous Short Circuit Protection

#### Description

The R1DA converters are of the enclosed open frame type, i.e. they are not potted. The converters are typically used in general purpose and industrial low power isolation and voltage matching applications where an SMD converter is required. The converter series feature an extended ambient temperature operating range of -40°C to +100°C without derating and optional continuous short circuit protection. In addition to single, dual and independent outputs, two isolation options and three different case formats, the converters are also available prepacked as tape and reel for use with automatic insertion machines.

#### Selection Guide

| Part Number SMD | Input Voltage (VDC)   | Output Voltage (VDC) | Output Current (mA) | Efficiency typ. (%) | Max Capacitive Load <sup>(1)**</sup> |
|-----------------|-----------------------|----------------------|---------------------|---------------------|--------------------------------------|
| R1DA**xx3.33.3  | 3.3, 5, 9, 12, 15, 24 | 3.3/3.3              | 150/150             | 75                  | 470µF/470µF                          |
| R1DA**xx0505    | 3.3, 5, 9, 12, 15, 24 | 5/5                  | 100/100             | 72-78               | 470µF/470µF                          |
| R1DA**xx0909    | 3.3, 5, 9, 12, 15, 24 | 9/9                  | 56/56               | 74-78               | 220µF/220µF                          |
| R1DA**xx1212    | 3.3, 5, 9, 12, 15, 24 | 12/12                | 42/42               | 75-80               | 68µF/68µF                            |
| R1DA**xx1515    | 3.3, 5, 9, 12, 15, 24 | 15/15                | 33/33               | 75-82               | 68µF/68µF                            |

xx = Input Voltage (other input and output voltage combinations available on request)

\* add Suffix "P" for Continuous Short Circuit Protection, e. g. R1DA-050505/P

\* add Suffix -R for Tape & Reel Packing e.g. R1DA-050505-R. For more Details see Application Notes.

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

|                                                              |                                                         |                                         |
|--------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------|
| Input Voltage Range                                          | $\pm 10\%$                                              |                                         |
| Output Voltage Accuracy                                      | $-1\%$ typ., $\pm 5\%$ max.                             |                                         |
| Line Voltage Regulation (Low Line to High Line @ max. Load)  | All Variants                                            | 1% typ.                                 |
| Load Regulation (10% to 100% Load)                           | 3.3V output types                                       | 15% typ., 20% max.                      |
|                                                              | 5V output types                                         | 12% typ. / 15% max.                     |
|                                                              | 9V output types                                         | 7% typ., 10% max.                       |
|                                                              | 12V, 15V output types                                   | 6% typ., 10% max.                       |
| Output Ripple and Noise (20MHz BW limited)                   | 50 mVp-p typ. / 100mVp-p max.                           |                                         |
| Operating Frequency                                          | 20kHz min. / 50kHz typ. / 90kHz max.                    |                                         |
| Efficiency at Full Load                                      | See Selection Guide                                     |                                         |
| Minimum Load = 0%                                            | Specifications valid for 10% minimum Load only          |                                         |
| Isolation Voltage Input/Output (tested for 1 second)         | 1000VDC                                                 |                                         |
| Isolation Voltage Output/Output (rated for 1 minute**)       | 500VAC / 60Hz                                           |                                         |
| Isolation Capacitance                                        | 75pF max.                                               |                                         |
| Isolation Resistance $V_{iso}=500V$                          | 10 GΩ min.                                              |                                         |
| Short Circuit Protection                                     | 1 Second                                                |                                         |
| P-Suffix                                                     | Continuous                                              |                                         |
| Operating Temperature Range                                  | $-40^\circ\text{C}$ to $+100^\circ\text{C}$ (see Graph) |                                         |
| Storage Temperature Range                                    | $-50^\circ\text{C}$ to $+125^\circ\text{C}$             |                                         |
| Reflow Temperature                                           | RoHS compliant                                          | 245°C (30 sec), Peak 255°C (5 sec) max. |
| Vapor Phase Process (for more details see Application Notes) | 230°C (90 sec) max.                                     |                                         |
| Relative Humidity                                            | 95% RH                                                  |                                         |
| Humidity Susceptibility Test                                 | 1000 hrs / 90% humidity / $+85^\circ\text{C}$ ambient   |                                         |

continued on next page

\*\*Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.

**ECONOLINE**  
DC/DC-Converter

**RECOM**

## 1 Watt SMD Dual Independent Outputs

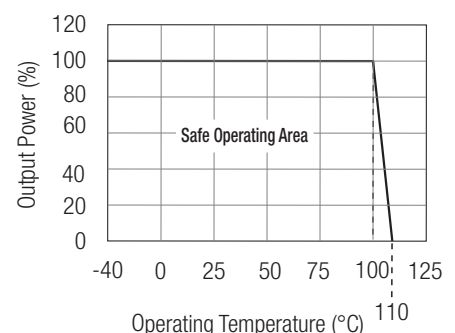


**UL-60950-1-Certified**  
**EN-60950-1-Certified**

# R1DA

## Derating-Graph (Ambient Temperature)

**R1DA-0505**



**Refer to Application Notes**

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

|                  |                             |                                    |
|------------------|-----------------------------|------------------------------------|
| Package Weight   |                             | 1.2g                               |
| Packing Quantity |                             | 33 pcs per tube / 500 pcs per reel |
| MTBF             | Using MIL-HDBK 217F (+25°C) | 1045 x 10 <sup>3</sup> hours       |
|                  | Using MIL-HDBK 217F (+85°C) | 183 x 10 <sup>3</sup> hours        |

Detailed Information see Application Notes chapter „MTBF“

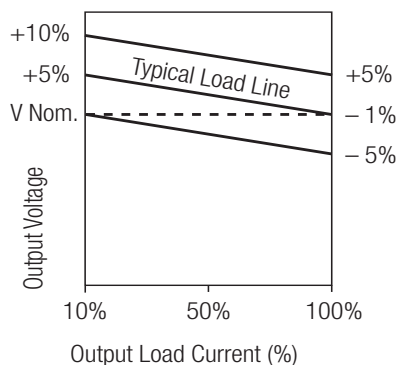
#### Certifications

|                     |                       |                             |
|---------------------|-----------------------|-----------------------------|
| EN General Safety   | Report: 10010807-2009 | EN-60950-1, 2nd Edition     |
| Conducted Emissions |                       | EN55022 Class B with Filter |
| Radiated Emissions  |                       | EN55022 Class B with Filter |
| UL General Safety   | Report: E358085       | UL60950-1, 2nd Edition      |

#### Notes

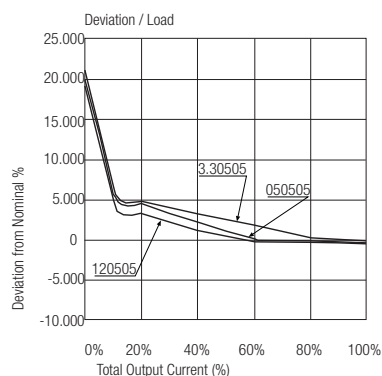
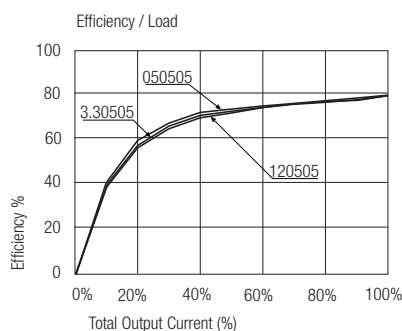
Note 1: Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

### Tolerance Envelope

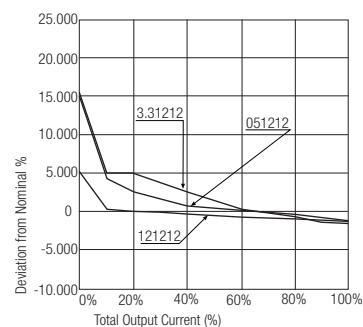
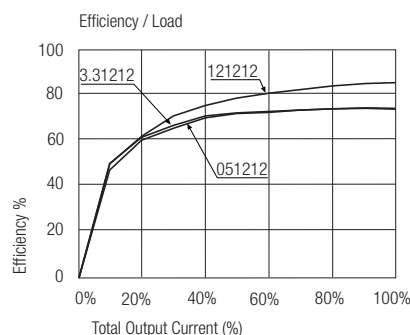


### Typical Characteristics

## R1DA-xx0505

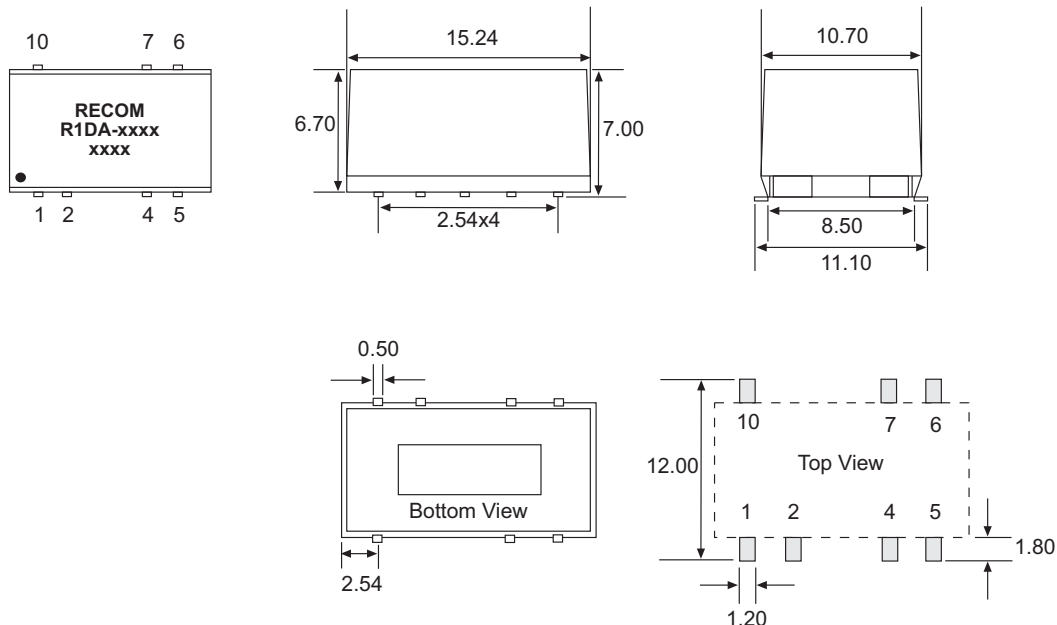


## R1DA-xx1212



### Package Style and Pinning (mm)

#### 2 PIN Dual SMD Package

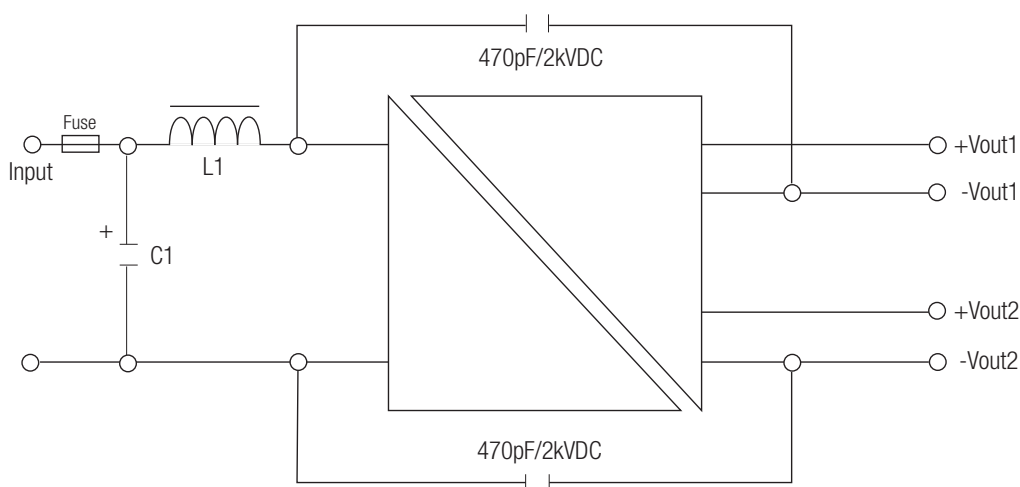


#### Pin Connections

| Pin # | Function |
|-------|----------|
| 1     | -Vin     |
| 2     | +Vin     |
| 4     | -Vout1   |
| 5     | +Vout1   |
| 6     | -Vout2   |
| 7     | +Vout2   |
| 10    | NC       |

NC= No Connection

### EMC Filtering - Suggestion for EN55022 Class B (Conducted and emitted)



#### Standard

| C1    | L1    | Vin  |
|-------|-------|------|
| 2.2μF | 4.7μH | 3.3V |
| 2.2μF | 4.7μH | 5V   |
| 2.2μF | 10μH  | 9V   |
| 2.2μF | 10μH  | 12V  |
| 2.2μF | 10μH  | 15V  |
| 2.2μF | 22μH  | 24V  |

#### /P versions

| C1    | L1   | Vin  |
|-------|------|------|
| 4.7μF | 10μH | 3.3V |
| 4.7μF | 10μH | 5V   |
| 4.7μF | 10μH | 9V   |
| 4.7μF | 10μH | 12V  |
| 4.7μF | 22μH | 15V  |

C1 = MLCC

L1 = SMD Inductor