

## Features

## Regulated Converters

- 1kVDC & 2kVDC Isolation
- UL94V-0 Package Material
- RoHS 6/6
- Toroidal Magnetics
- Optional Continuous Short Circuit Protected
- Built-In EN55022 Class A Filter

### Description

The R1Z series DC/DC converter has been designed for isolating or converting DC power rails where an SMD format with regulated output is required, although it is no larger than a standard unregulated SMD converter.

### Selection Guide

| Part Number SMD | 2kVDC | Input Voltage (VDC) | Output Voltage (VDC) | Output Current (mA) | Max Capacitive Load <sup>(1)</sup> |
|-----------------|-------|---------------------|----------------------|---------------------|------------------------------------|
| R1Z-xx3.3*      | (/H)  | 3.3, 5, 12, 15, 24  | 3.3                  | 303                 | 2200µF                             |
| R1Z-xx05*       | (/H)  | 3.3, 5, 12, 15, 24  | 5                    | 200                 | 1200µF                             |
| R1Z-xx09*       | (/H)  | 3.3, 5, 12, 15, 24  | 9                    | 111                 | 680µF                              |
| R1Z-xx12*       | (/H)  | 3.3, 5, 12, 15, 24  | 12                   | 84                  | 680µF                              |
| R1Z-xx15*       | (/H)  | 3.3, 5, 12, 15, 24  | 15                   | 66                  | 470µF                              |

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

\*add suffix -R for tape & reel packing e.g. R1Z-0505-R

\*add suffix /P for continuous short circuit protection, e.g. R1Z-0505/P-R

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

|                                                  |                |                                                                        |
|--------------------------------------------------|----------------|------------------------------------------------------------------------|
| Input Voltage Range                              |                | $\pm 5\%$                                                              |
| Output Voltage Accuracy                          |                | $\pm 2\%$                                                              |
| Line Voltage Regulation                          |                | 1% max.                                                                |
| Load Voltage Regulation                          |                | 1% max.                                                                |
| Output Ripple and Noise (at 20MHz BW)            |                | 100mVp-p max.                                                          |
| Operating Frequency                              |                | 20kHz min. / 40kHz typ. / 80kHz max.                                   |
| Efficiency at Full Load                          |                | 50% min. / 60% typ.                                                    |
| Minimum Load                                     |                | 10% (2)                                                                |
| No Load Power Consumption                        |                | 134mW min. / 217mW typ. / 350mW max.                                   |
| Isolation Voltage                                |                | (tested for 1 second) 1000VDC<br>(rated for 1 minute**) 500VAC / 60Hz  |
| Isolation Voltage                                | H-Suffix       | (tested for 1 second) 2000VDC<br>(rated for 1 minute**) 1000VAC / 60Hz |
| Isolation Capacitance                            |                | 70pF typ.                                                              |
| Isolation Resistance                             |                | 10 GW min.                                                             |
| Short Circuit Protection                         |                | 1 Second                                                               |
| P-Suffix                                         |                | Continuous                                                             |
| Operating Temperature Range (natural convection) |                | -40°C to +70°C (see Graph)                                             |
| Storage Temperature Range                        |                | -55°C to +125°C                                                        |
| Reflow Temperature                               | ROHS compliant | 245°C (30 sec) max.                                                    |
| Vapor Phase Process                              |                | 230°C (90 sec) max.                                                    |
|                                                  |                | (for more details see Application Notes)                               |
| Relative Humidity                                |                | 95% RH                                                                 |
| Package Weight                                   |                | 1.6g                                                                   |
| Packing Quantity                                 |                | 33 pcs per tube<br>250 pcs per Reel                                    |
| MTBF                                             | R1Z (+25°C)    | using MIL-HDBK 217F 2203 x 10 <sup>3</sup> hours                       |
|                                                  | (+70°C)        | using MIL-HDBK 217F 391 x 10 <sup>3</sup> hours                        |
|                                                  | R1Z/P (+25°C)  | using MIL-HDBK 217F 2387 x 10 <sup>3</sup> hours                       |
|                                                  | (+70°C)        | using MIL-HDBK 217F 641 x 10 <sup>3</sup> hours                        |

For detailed information see Application Notes chapter "MTBF"

|                                |                                    |                                           |
|--------------------------------|------------------------------------|-------------------------------------------|
| Conducted / Radiated Emissions | EN55022                            | Level A                                   |
| EN General Safety              | Report: SPCLVD1211033-3            | EN60950-1:2006 + A12:2011                 |
| EN Medical Safety              | Report: MDD1205098-4 + RM1205098-4 | IEC/EN 60601-1 3rd Edition                |
|                                |                                    | Medical Report + ISO14971 Risk Assessment |
| UL General Safety              | Report: E358085                    | UL60950-1, 2nd Edition                    |

## ECONOLINE

## DC/DC-Converter

with 3 year Warranty

RECOM

## 1 Watt SMD Miniature Isolated Single Output



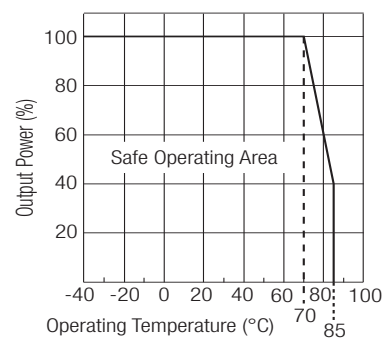
E358085



**EN-60950-1 Certified**  
**EN-60601-1 Certified\***  
**UL-60950-1 Certified**  
**(\* /H suffix)**

# R1Z

## Derating-Graph (Ambient Temperature)

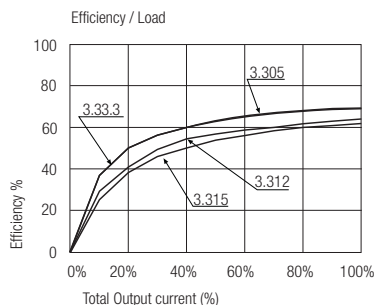


\*\*Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.

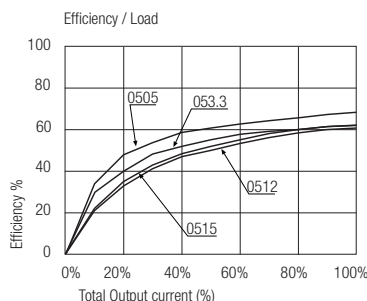
Refer to Application Notes

## Typical Characteristics

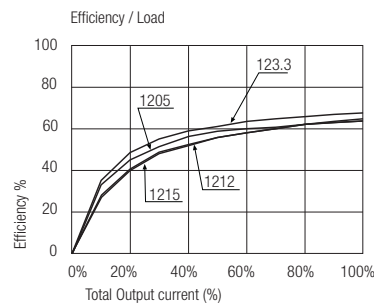
### R1Z-3.3xx/P



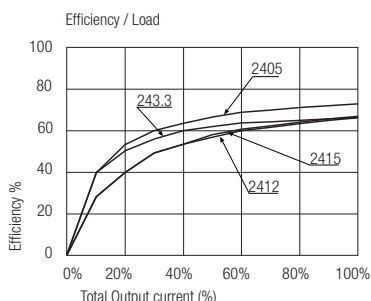
### R1Z-05xx/P



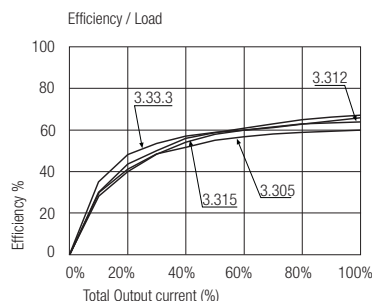
### R1Z-12xx/P



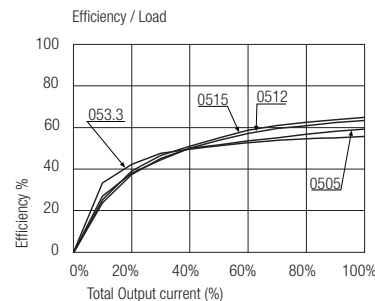
### R1Z-15xx/P



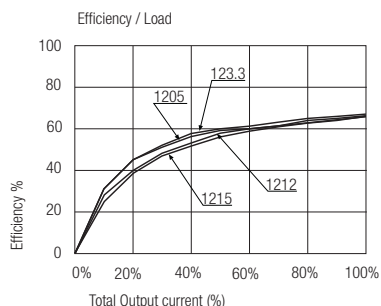
### R1Z-3.3xx



### R1Z-05xx



### R1Z-12xx

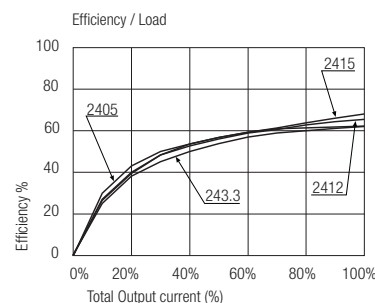


#### Notes

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

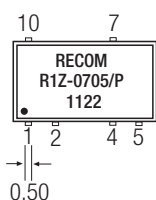
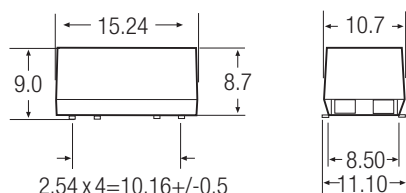
Note 2: The R1Z series requires a minimum of 10% load on the output to maintain specified regulation. Operating under no-load conditions will not damage these devices; however, they may not meet all listed specifications.

### R1Z-15xx

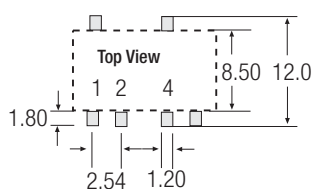


## Package Style and Pinning (mm)

### 10 PIN Single SMD Package



#### Recommended Footprint Details



Ordering Example: R1Z-0505 (5V Input, 5V Output, not short circuit protected)  
R1Z-0505/HP (5V Input, 5V Output, 2kVDC Isolation and short circuit protection)

#### Pin Connections

| Pin # | Function |
|-------|----------|
| 1     | -Vin     |
| 2     | +Vin     |
| 4     | -Vout    |
| 5     | -Vout    |
| 7     | +Vout    |
| 10    | NC       |

NC= No Connection

XX.X ± 0.5 mm  
XX.XX ± 0.25 mm

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