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With the principle of "Quality Parts, Customers Priority, Honest Operation, and Considerate Service", our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip, ALPS, ROHM, Xilinx, Pulse, ON, Everlight and Freescale. Main products comprise IC, Modules, Potentiometer, IC Socket, Relay, Connector. Our parts cover such applications as commercial, industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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## **Features**

# Unregulated Converters

- Fully RoHS 6/6 Conform
- Full Power at 100°C Ambient Temperature
- 1kVDC or 3kVDC Isolation Options
- UL /CSA Certified, CB Report
- Suitable for Fully Automated Assembly (including Vapor Phase Soldering)
- Optional Continuous Short Circuit Protection
- Efficiency to 84%
- Built-In EN55022 Class A Filter

#### Description

The R1S and R1D 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 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<br>Number |       | Input<br>Voltage   | Output<br>Voltage | Output<br>Current | Efficiency | Max<br>Capacitive |
|----------------|-------|--------------------|-------------------|-------------------|------------|-------------------|
| SMD            | (3kV) | (VDC)              | (VDC)             | (mA)              | (%)        | Load(1)           |
| R1S**-xx3.3    | (H)   | 3.3, 5, 12, 15, 24 | 3.3               | 303               | 75         | 2200µF            |
| R1S**-xx05     | (H)   | 3.3, 5, 12, 15, 24 | 5                 | 200               | 72-78      | 1000µF            |
| R1S**-xx09     | (H)   | 3.3, 5, 12, 15, 24 | 9                 | 111               | 74-78      | 1000µF            |
| R1S**-xx12     | (H)   | 3.3, 5, 12, 15, 24 | 12                | 84                | 75-80      | 470μF             |
| R1S**-xx15     | (H)   | 3.3, 5, 12, 15, 24 | 15                | 66                | 75-82      | 470µF             |
| R1S**-xx24     | (H)   | 3.3, 5, 12, 15, 24 | 24                | 42                | 74-84      | 220µF             |
| R1D**-xx3.3    | (H)   | 3.3, 5, 12, 15, 24 | ±3.3              | ±152              | 75         | ±1000µF           |
| R1D**-xx05     | (H)   | 3.3, 5, 12, 15, 24 | ±5                | ±100              | 72-78      | ±470µF            |
| R1D**-xx09     | (H)   | 3.3, 5, 12, 15, 24 | ±9                | ±56               | 74-78      | ±470µF            |
| R1D**-xx12     | (H)   | 3.3, 5, 12, 15, 24 | ±12               | ±42               | 75-80      | ±220μF            |
| R1D**-xx15     | (H)   | 3.3, 5, 12, 15, 24 | ±15               | ±33               | 75-82      | ±220μF            |
| R1D**-xx24     | (H)   | 3.3, 5, 12, 15, 24 | ±24               | ±21               | 74-84      | ±100µF            |

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

- \* add Suffix "H" for 3kV Isolation, e.g. R1S-0505/H, R1D-0505/H, R1S12-0505/H, R1D12-0505/H
- \* add Suffix "P" for Continuous Short Circuit Protection, e.g. R1S8-0505/P, R1S-0505/HP, R1D12-0505/HP
- \* add suffix -R for tape & reel packing e.g. R1S-0505-R. For more details see Application Notes.

#### Case and Pinning Options (note restrictions on /H option)

R1S\*\*: \*\* without marking denotes 5 pins out of 8 fitted (includes /H option)

- \*\* with marking 8 denotes 8 pins out of 8 fitted (/H option not available)
- \*\* with marking 12 denotes 10 pins out of 12 fitted (includes /H option)

R1D\*\*: \*\* without marking denotes 6 pins out of 10 fitted (includes /H option)

- \*\* with marking 10 denotes with 10 pins out of 10 fitted (/H option not available)
- \*\* with marking 12 denotes 10 pins out of 12 fitted (includes /H option)

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

| Input Voltage Range                        |                            | ±10%                       |
|--|----------------------------|----------------------------|
| Output Voltage Accuracy                    |                            | ±2% typ., ±5% max.         |
| Line Voltage Regulation                    | All Variants               | 1.2%/1% of Vin typ.        |
| Load Voltage Regulation                    | 3.3V output types          | 15% typ., 20% max.         |
| (10% to 100% full load)                    | 5V output type             | 12% typ., 15% max.         |
|  | 9V output type             | 7% typ., 10% max.          |
|  | 12V, 15V, 24V output types | 6% typ., 10% max.          |
| Output Ripple and Noise (20MHz BW limited) | 50r                        | mVp-p typ., 100mVp-p max.  |
| Operating Frequency                        | 20kHz min.                 | / 60kHz typ. / 100kHz max. |
|  | -                          | continued on payt page     |

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## **ECONOLINE**

DC/DC-Converter with 3 year Warranty



# 1 Watt SMD Single & Dual Output

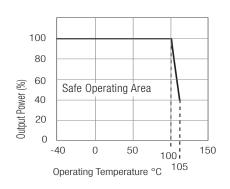


UL-60950-1 Certified EN-60950-1 Certified EN-60601-1 Certified\* (\*/H suffix)

**R15\_R1D** 

## **Derating-Graph**

(Ambient Temperature)



## **ECONOLINE**

## DC/DC-Converter

# R15\_R1D Series

| Efficiency at Full Load   See Selection Guide   See Selection Guide   See Selection Guide   See Selection See Selection See Selection See Selection Full Load   See Selection See Sel |   |                               |           |   |   |                    |
|---|---|-------------------------------|-----------|---|---|--------------------|
| Specifications valid for 10% minimum load only.   Isolation Voltage   | Specifications (meas  | ured at T <sub>A</sub> = 25°C | , nominal | input voltage, full load and after warm-up) |   |                    |
| Solation Voltage  | Efficiency at Full Load   |                               |           |   | See Selection Guide                             |                    |
| Trailed for 1 minute***)   S00VAC / 60Hz     Solation Voltage   H-Suffix   (tested for 1 second)   3000VDC     H-Suffix   (rated for 1 minute***)   1500VAC / 60Hz     Solation Capacitance   R1S, R1S8, R1D, R1D10   15pF min. / 70pF max.     R1S12, R1D12   10pF min. / 75pF max.     Solation Resistance   10 GΩ min.     Short Circuit Protection   1 Spermin. / 75pF max.     Solation Resistance   10 GΩ min.     Short Circuit Protection   1 Spermin. / 75pF max.     Solation Resistance   10 GΩ min.     Short Circuit Protection   1 Spermin. / 75pF max.     Short Circuit Protection   1 SpF min. / 75pF max.     Short Circuit Protection   1 SpF min. / 75pF max.     Short Circuit Protection   1 SpF min. / 75pF max.     Short Circuit Protection   1 SpF min. / 75pF max.     Short Circuit Protection   1 SpF min. / 75pF max.     Short Circuit Protection   1 SpF min. / 75pF max.     Short Circuit Protection   1 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Circuit Protection   2 SpF min. / 75pF max.     Short Short Protection   2 SpF min. / 75pF max.     Short Short Protection   2 SpF min. / 75pF max.     Short Short Protection   2 SpF min. | Minimum Load = 0%   |                               |           |   | Specifications valid for 10% minimum load only. |                    |
| Solation Voltage  | Isolation Voltage   |                               | (teste    | d for 1 second)                             | 1000VDC   |                    |
| No.   No. |   |                               | (rated    | for 1 minute***)                            | 500VAC / 60Hz                                   |                    |
| Solation Capacitance  | Isolation Voltage   | H-Suffix                      | (test     | ed for 1 second)                            | 3000VDC   |                    |
| Solation Resistance   R1S12   R1D12   10 0 Cm in     Short Circuit Protection   1 0 0 Cm in     Short Circuit Protection   1 0 Cm in     Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 25° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.     Short Short Circuit Protection   2 45° C (30 sec), Peak 255° C (5 sec) max.  |   | H-Suffix                      | (rated    | for 1 minute***)                            | 1500VAC / 60Hz                                  |                    |
| Solation Resistance   10 GΩ min.  | Isolation Capacitance   |                               | R1S,      | R1S8, R1D, R1D10                            | ·   |                    |
| Short Circuit Protection         1 Second P-Suffix           P-Suffix         Continuous           Operating Temperature Range (free air convection)         -40°C to +100°C (see Graph)           Storage Temperature Range         -55°C to +125°C           Reflow Temperature         ROMS compliant         245°C (30 sec), Peak 255°C (5 sec) max.           Vapor Phase Process         ROM row details see Application Notes)         230°C (90 sec) max.           Relative Humidity         95% RH           Humidity Susceptibility Test         1000 hrs / 90% humidity / +85°C ambient           Package weight         R1S         1.0g           R1S8         1.1g           R1S8, R1S8         40 pcs per Tube           R1S12, R1D, R1D10, R1D12         33 pcs per Tube           Packing Quantity         R1S, R1S8         40 pcs per Tube           R1S12, R1D, R1D10, R1D12         33 pcs per Tube           MITSF (+25°C)         Detailed Information see         using MIL-HDBK 217F         4275 x 10° hours           (+85°C)         Application Notes chapter "MTBF"         using MIL-HDBK 217F         4275 x 10° hours           (+85°C)         Application Notes chapter "MTBF"         using MIL-HDBK 217F         4275 x 10° hours           (+85°C)         Application Notes chapter "MTBF"         using MIL-HDBK 217F  |   |                               | R1S1      | 2, R1D12                                    | 10pF min. / 75pF max.                           |                    |
| P-Suffix         Continuous           Operating Temperature Range (free air convection)         - 40°C to +100°C (see Graph)           Storage Temperature Range         - 40°C to +100°C (see Graph)           Reference Range         - 40°C to +100°C (see Graph)           Reference Range         - 40°C (30 sec), Peak 255°C (5 sec) max.           Vapor Phase Process         (for more details see Application Notes)         245°C (30 sec), Peak 255°C (5 sec) max.           Vapor Phase Process         (for more details see Application Notes)         245°C (30 sec), Peak 255°C (5 sec) max.           Vapor Phase Process         (for more details see Application Notes)         100 ms           Beaking Humidity         100 ms         95% RB           Humidity Susceptibility Test         RB 18         1000 ms / 90% humidity / +85°C ambient           Package weight         R1S         1000 ms / 90% humidity / +85°C ambient           Package weight         R1S         R1S         100           R1S R1S         R1S         100         100         100         100         100         100         100 <th colsp<="" td=""><td>Isolation Resistance</td><td></td><td></td><td></td><td>10 G<math>\Omega</math> min.</td></th>  | <td>Isolation Resistance</td> <td></td> <td></td> <td></td> <td>10 G<math>\Omega</math> min.</td> | Isolation Resistance          |           |   |   | 10 G $\Omega$ min. |
| Operating Temperature Range (free air convection)         -40°C to +100°C (see Graph)           Storage Temperature Range         55°C to +125°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°C ambient           Package weight         R1S         1.0g           R1S8         1.1g           R1S12, R1D, R1D10, R1D12         1.2g           Racking Quantity         R1S, R1S8         40 pcs per Tube           R1S12, R1D, R1D10, R1D12         33 pcs per tube           R1S12, R1D, R1D10, R1D12         33 pcs per tube           MTBF (+25°C)         Detailed Information see (+85°C)         MIT ypes         500 pcs per Reel           MTBF (+25°C)         Detailed Information see (+85°C)         Using MIL-HDBK 217F         4275 x 10³ hours           Certifications         Report: US/14402A/UL         IEC 60950-1:2001 1st Ed.           CB Test Report         Report: E358085         UL 60950-1:2001 1st Ed.           UL General Safety         Report: MDD1205098-2 + RM1205098-2         IEC/EN 60601-1 3rd Edition           Medical Report  | Short Circuit Protection  |                               |           |   | 1 Second  |                    |
| Storage Temperature Range         -55°C to +125°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°C ambient           Package weight         R1S         1.0g           R1S8         1.1g           R1S12, R1D, R1D10, R1D12         1.2g           Packing Quantity         R1S, R1S8         40 pcs per Tube           R1S12, R1D, R1D10, R1D12         33 pcs per tube           All Types         500 pcs per Reel           MTBF (+25°C)  | P-Suffix  |                               |           |   |   |                    |
| 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°C ambient           Package weight         R1S         1.0g           R1S8         1.1g           R1S12, R1D, R1D10, R1D12         1.2g           Packing Quantity         R1S, R1S8         40 pcs per Tube           R1S12, R1D, R1D10, R1D12         33 pcs per tube           M1SF (+25°C)         Detailed Information see (+85°C)         using MIL-HDBK 217F         4275 x 10³ hours           Certifications         4275 x 10³ hours         365 x 10³ hours           Certifications         8         40 pcs per Tube         4275 x 10³ hours           Certifications         500 pcs per Reel         4275 x 10³ hours         4275 x 10³ hours           Certifications         4275 x 10³ hours         4275 x 10³ hours         4275 x 10³ hours           Certifications         4275 x 10³ hours         4275 x 10³ hours         4275 x 10³ hours           Certifications         4275 x 10³ hours   | Operating Temperature I   | Range (free air con           | vection)  |   | -40°C to +100°C (see Graph)                     |                    |
| Vapor Phase Process         (for receitals see Application Notes)         230°C (90 sec) max.           Relative Humidity         95% RH           Humidity Susceptibility Test         1000 hrs / 90% humidity / +85°C ambient           Package weight         R1S           R1S8         1.1g           R1S12, R1D, R1D10, R1D12         1.2g           Packing Quantity         R1S, R1S8         40 pcs per Tube           R1S12, R1D, R1D10, R1D12         33 pcs per tube           R1S12, R1D, R1D10, R1D12         33 pcs per tube           All Types         500 pcs per Reel           MTBF (+25°C)         Detailed Information see (+85°C)         4275 x 10° hours           (+85°C)         Application Notes chapter "MTBF"         using MIL-HDBK 217F         1365 x 10° hours           Certifications         8         4275 x 10° hours           Certifications         15C 60950-1:2001 1st Ed.           UL General Safety         Report: US/14402A/UL         1EC 60950-1:2001 1st Ed.           UL General Safety         Report: E358085         UL 60950-1:2001 1st Ed.           EN Medical Safety         Report: MDD1205098-2 + RM1205098-2         1EC/EN 66061-1 3rd Edition           Medical Report + ISO14971 Risk Assessment         EN60950-1:2006 + A12:2011   | Storage Temperature Ra  | ınge                          |           |   | -55°C to +125°C                                 |                    |
| Relative Humidity         95% RH           Humidity Susceptibility Test         1000 hrs / 90% humidity / +85°C ambient           Package weight         R1S         1.0g           R1S8         1.1g         1.1g           R1S12, R1D, R1D10, R1D12         1.2g           Packing Quantity         R1S, R1S8         40 pcs per Tube           R1S12, R1D, R1D10, R1D12         33 pcs per tube           All Types         500 pcs per Reel           MTBF (+25°C)         Detailed Information see         using MIL-HDBK 217F         4275 x 10³ hours           (+85°C)         Application Notes chapter "MTBF"         1365 x 10³ hours           Certifications         E         1365 x 10³ hours           Certifications         E         EEC 60950-1:2001 1st Ed.           UL General Safety         Report: US/14402AVUL         IEC 60950-1:2001 1st Ed.           UL General Safety         Report: E358085         UL 60950-1 2001 1st Ed.           EN Medical Safety         Report: MDD1205098-2 + RM1205098-2         IEC/EN 60601-1 3rd Edition           Medical Report + ISO14971 Risk Assessment         EN60950-1:2006 + A12:2011  | Reflow Temperature  |                               | ROHS      | S compliant                                 | 245°C (30 sec), Peak 255°C (5 sec) max.         |                    |
| Humidity Susceptibility Test  | Vapor Phase Process   |                               | (for m    | nore details see Application Notes)         | 230°C (90 sec) max.                             |                    |
| Package weight         R1S         1.0g           R1S8         1.1g           R1S12, R1D, R1D10, R1D12         1.2g           Packing Quantity         R1S, R1S8         40 pcs per Tube           R1S12, R1D, R1D10, R1D12         33 pcs per tube           All Types         500 pcs per Reel           MTBF (+25°C)         Detailed Information see (+85°C)         using MIL-HDBK 217F         4275 x 10³ hours           Certifications         CET         1365 x 10³ hours           CB Test Report         Report: US/14402A/UL         IEC 60950-1:2001 1st Ed.           UL General Safety         Report: E358085         UL 60950-1 2nd Ed.           CUL General Safety         Report: MDD1205098-2 + RM1205098-2         IEC/EN 60601-1 3rd Edition           EN Medical Safety         Report: MDD1205098-2 + RM1205098-2         IEC/EN 60601-1 3rd Edition           Medical Report + IS014971 Risk Assessment         EN60950-1: 2006 + A12:2011   | Relative Humidity   |                               |           |   | 95% RH  |                    |
| R1S8   1.1g   R1S12, R1D, R1D10, R1D12   1.2g     Packing Quantity   R1S, R1S8   40 pcs per Tube   R1S12, R1D, R1D10, R1D12   33 pcs per tube   R1S12, R1D, R1D10, R1D12   33 pcs per tube   R1S12, R1D, R1D10, R1D12   33 pcs per Reel   R1S12, R1D, R1D10, R1D12   33 pcs per Reel   R1S12, R1D, R1D10, R1D12   33 pcs per Reel   R1S12, R1D, R1D10, R1D12   R1S00, pcs per Reel   R1S12, R1D, R1D10, R1D12   R1S00, pcs per Reel   R1S12, R1D, R1D10, R1D12   R1S00, pcs per Reel   R1S12, R1D, R1D12, | Humidity Susceptibility T   | est                           |           |   | 1000 hrs / 90% humidity / +85°C ambient         |                    |
| R1S12, R1D, R1D10, R1D12   1.2g   | Package weight  |                               |           | R1S   | 1.0g  |                    |
| Packing Quantity R1S, R1S8 R1S12, R1D, R1D10, R1D12 All Types S00 pcs per Ruel MTBF (+25°C) Detailed Information see (+85°C) Application Notes chapter "MTBF" using MIL-HDBK 217F Certifications CB Test Report UL General Safety Report: US/14402A/UL Report: B58085 Report: WDD1205098-2 + RM1205098-2 EN Medical Safety Report: MDD1205098-2 + RM1205098-2 Medical Report + IS014971 Risk Assessment Report: SPCLVD1211033-3 EN 60950-1: 2006 + A12:2011   |   |                               |           | R1S8  | 1.1g  |                    |
| R1S12, R1D, R1D10, R1D12   33 pcs per tube All Types   500 pcs per Reel   |   |                               |           | R1S12, R1D, R1D10, R1D12                    | 1.2g  |                    |
| All Types         500 pcs per Reel           MTBF (+25°C)         Detailed Information see         using MIL-HDBK 217F         4275 x 10³ hours           Certifications           CB Test Report         Report: US/14402A/UL         IEC 60950-1:2001 1st Ed.           UL General Safety         Report: E358085         UL 60950-1:2001 1st Ed.           CUL General Safety         Report: MDD1205098-2 + RM1205098-2         IEC/EN 60601-1 3rd Edition           Medical Report + IS014971 Risk Assessment           EN General Safety         Report: SPCLVD1211033-3         EN60950-1:2006 + A12:2011  | Packing Quantity  |                               |           | R1S, R1S8                                   | 40 pcs per Tube                                 |                    |
| MTBF (+25°C)       Detailed Information see (+85°C)       Using MIL-HDBK 217F       4275 x 10³ hours 1365 x 10³ hours         Certifications       CB Test Report       Report: US/14402A/UL       IEC 60950-1:2001 1st Ed.         UL General Safety       Report: E358085       UL 60950-1 2nd Ed.         CUL General Safety       EN Medical Safety       Report: MDD1205098-2 + RM1205098-2       IEC/EN 60601-1 3rd Edition         EN General Safety       Report: MDD1205098-2 + RM1205098-2       IEC/EN 60601-1 3rd Edition         EN General Safety       Report: SPCLVD1211033-3       EN60950-1: 2006 + A12:2011  |   |                               |           | R1S12, R1D, R1D10, R1D12                    | 33 pcs per tube                                 |                    |
| (+85°C)         Application Notes chapter "MTBF"         using MIL-HDBK 217F         1365 x 10³ hours           Certifications         CB Test Report         Report: US/14402A/UL         IEC 60950-1:2001 1st Ed.           UL General Safety         Report: E358085         UL 60950-1 2nd Ed.           CUL General Safety         C22.2 No. 60950-1-03           EN Medical Safety         Report: MDD1205098-2 + RM1205098-2         IEC/EN 60601-1 3rd Edition           Medical Report + IS014971 Risk Assessment           EN General Safety         Report: SPCLVD1211033-3         EN60950-1: 2006 + A12:2011   |   |                               |           | All Types                                   | 500 pcs per Reel                                |                    |
| Certifications           CB Test Report         Report: US/14402A/UL         IEC 60950-1:2001 1st Ed.           UL General Safety         Report: E358085         UL 60950-1 2nd Ed.           CUL General Safety         C22.2 No. 60950-1-03           EN Medical Safety         Report: MDD1205098-2 + RM1205098-2         IEC/EN 60601-1 3rd Edition           Medical Report + IS014971 Risk Assessment         EN60950-1: 2006 + A12:2011   | MTBF (+25°C)  | iled Information see          |           | using MIL-HDBK 217F                         | 4275 x 10 <sup>3</sup> hours                    |                    |
| CB Test Report         Report: US/14402A/UL         IEC 60950-1:2001 1st Ed.           UL General Safety         Report: E358085         UL 60950-1 2nd Ed.           CUL General Safety         C22.2 No. 60950-1-03           EN Medical Safety         Report: MDD1205098-2 + RM1205098-2 Medical Report + IS014971 Risk Assessment         IEC/EN 60601-1 3rd Edition           EN General Safety         Report: SPCLVD1211033-3         EN60950-1: 2006 + A12:2011  | (+85°C) ∫ <i>Appli</i>  | cation Notes chapter          | "MTBF"    | using MIL-HDBK 217F                         | 1365 x 10 <sup>3</sup> hours                    |                    |
| UL General Safety         Report: E358085         UL 60950-1 2nd Ed.           CUL General Safety         C22.2 No. 60950-1-03           EN Medical Safety         Report: MDD1205098-2 + RM1205098-2         IEC/EN 60601-1 3rd Edition           Medical Report + ISO14971 Risk Assessment         EN General Safety         EN60950-1: 2006 + A12:2011   | Certifications  |                               |           |   |   |                    |
| CUL General Safety         C22.2 No. 60950-1-03           EN Medical Safety         Report: MDD1205098-2 + RM1205098-2 Medical Report + IS014971 Risk Assessment         IEC/EN 60601-1 3rd Edition           EN General Safety         Report: SPCLVD1211033-3         EN60950-1: 2006 + A12:2011  | CB Test Report  |                               |           | Report: US/14402A/UL                        | IEC 60950-1:2001 1st Ed.                        |                    |
| EN Medical Safety         Report: MDD1205098-2 + RM1205098-2 Medical Report + IS014971 Risk Assessment         IEC/EN 60601-1 3rd Edition           EN General Safety         Report: SPCLVD1211033-3         EN60950-1: 2006 + A12:2011  | UL General Safety   |                               |           | Report: E358085                             | UL 60950-1 2nd Ed.                              |                    |
| EN General Safety         Medical Report + ISO14971 Risk Assessment           EN General Safety         Report: SPCLVD1211033-3           EN60950-1: 2006 + A12:2011  | CUL General Safety  |                               |           |   | C22.2 No. 60950-1-03                            |                    |
| EN General Safety Report: SPCLVD1211033-3 EN60950-1: 2006 + A12:2011  | <b>EN Medical Safety</b>  |                               |           | Report: MDD1205098-2 + RM1205098-2          | IEC/EN 60601-1 3rd Edition                      |                    |
|   |   |                               |           | Medical Report + ISO14971 Risk Assessment   |   |                    |
| Conducted / Radiated Emissions EN55022 Level A  | EN General Safety   |                               |           | Report: SPCLVD1211033-3                     | EN60950-1: 2006 + A12:2011                      |                    |
|   | Conducted / Radiated El   | missions                      | EN55      | 022   | Level A   |                    |

<sup>\*\*\*</sup>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.

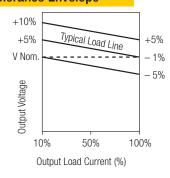
Notes

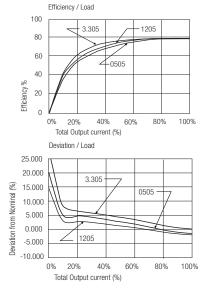
Note 1: Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter.

R1S\*\*-xx05

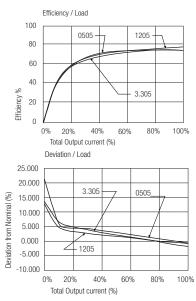
#### **Typical Characteristics**

## Tolerance Envelope





## R1D\*\*-xx05



## **ECONOLINE**

## DC/DC-Converter

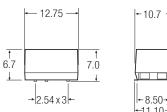
# R15\_R1D Series

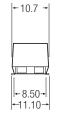
#### Package Style and Pinning (mm)

**5 PIN Single SMD Package** 

Note: /H option is available in these pin packages

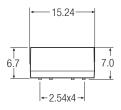
6 PIN Dual SMD Package





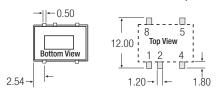








#### **Recommended Footprint Details**



#### Pin # Single Dual -Vin –Vin

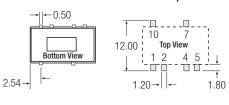
Pin Connections



NC = No Connection

 $XX.X \pm 0.5 \text{ mm}$ XX.XX  $\pm$  0.25 mm

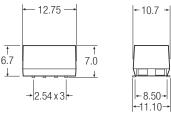
#### **Recommended Footprint Details**

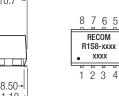


#### 8 PIN Single SMD Package

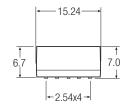
#### Note: /H option is not available in these pin packages

#### 10 PIN Dual SMD Package



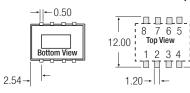








#### **Recommended Footprint Details**



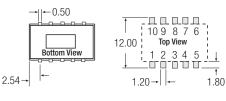
| Pin #            | Single | Dual  |
|------------------|--------|-------|
| 1                | –Vin   | –Vin  |
| 2<br>3<br>4<br>5 | +Vin   | +Vin  |
| 3                | NC     | NC    |
| 4                | -Vout  | Com   |
| 5                | +Vout  | –Vout |
| 6                | NC     | NC    |
| 7 8              | NC     | +Vout |
|                  | NC     | NC    |
| 9                | -      | NC    |
| 10               | -      | NC    |

NC = No Connection

Pin Connections

 $XX.X \pm 0.5 \text{ mm}$ XX.XX  $\pm$  0.25 mm

#### **Recommended Footprint Details**



- R1S\*\*: \*\* without marking denotes 5 pins out of 8 fitted (includes /H option)
  - \*\* with marking 8 denotes 8 pins out of 8 fitted (/H option not available)
- e.g. R1S-0505, R1S-0505/H, R1S-0505/HP
- e.g. R1S8-0505, R1S8-0505/P
- R1D\*\*: \*\* without marking denotes 6 pins out of 10 fitted (includes /H option)
  - \*\* with marking 10 denotes with 10 pins out of 10 fitted (/H option not available)
- e.g. R1D-0505, R1D-0505/H, R1D-0505/HP
- e.g. R1D10-0505, R1D10-0505/P

## **ECONOLINE**

DC/DC-Converter

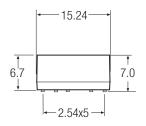
# R15\_R1D Series

#### Package Style and Pinning (mm)

#### 12 PIN Single and Dual SMD Package

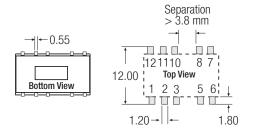
Note: /H option is available in this pin package







#### **Recommended Footprint Details**



#### Pin Connections

| Pin# | Single | Dual  |
|------|--------|-------|
| 1    | –Vin   | –Vin  |
| 2    | +Vin   | +Vin  |
| 3    | NC     | NC    |
| 5    | –Vout  | Com   |
| 6    | NC     | -Vout |
| 7    | NC     | NC    |
| 8    | +Vout  | +Vout |
| 10   | NC     | NC    |
| 11   | NC     | NC    |
| 12   | NC     | NC    |
|      |        |       |

NC = No Connection

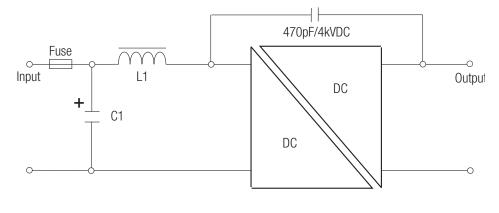
 $XX.X \pm 0.5 \text{ mm}$  $XX.XX \pm 0.25 \text{ mm}$ 

R1S\*\*: \*\* with marking 12 denotes 10 pins out of 12 fitted (includes /H option)

R1D\*\*: \*\* with marking 12 denotes 10 pins out of 12 fitted (includes /H option)

e.g. R1S12-0505, R1S12-0505/H, R1S12-0505/HP e.g. R1D12-0505, R1D12-0505/H, R1D12-0505/HP

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



| Otalidala alla / 11 volololla |       |      |  |  |
|-------------------------------|-------|------|--|--|
| C1                            | L1    | Vin  |  |  |
| 4.7µF                         | 3.3µH | 3.3V |  |  |
| 2.2µF                         | 4.7µH | 5V   |  |  |
| 2.2µF                         | 10μΗ  | 12V  |  |  |
| 2.2µF                         | 22μΗ  | 15V  |  |  |
| 4.7µF                         | 22µH  | 24V  |  |  |

Standard and /H versions

## /P and /HP versions

| C1    | L1   | Vin  |
|-------|------|------|
| 4.7μF | 10μΗ | 3.3V |
| 10μF  | 10μΗ | 5V   |
| 4.7μF | 22µH | 12V  |
| 4.7μF | 22µH | 15V  |
| 10μF  | 47μΗ | 24V  |

C1 = MLCC L1 = SMD Inductor

|         | 470pF/4kVDC |       |
|---------|-------------|-------|
| Fuse L1 |             | +Vout |
| L1      | DC          | Com   |
| 0       | DC          | -Vout |

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