# RR2-S03/D03

- 24 Pin DIL Package
- Wide 2:1 Input Range
- 1500 or 3500VDC Isolation
- Up to 4200VDC Isolation (for selected models)
- Continuous Short Circuit Protection
- Efficiency up to 82%
- Operating Temperature Range -40° ~ +85°C
- Plastic Case Standard, Optional Metal Case

RoHS

| OUTPUT SPECIFICATION | |
|---|---|
| Voltage accuracy: | ±1% |
| Line regulation: | Single &Dual ±0.5% max. |
| Short Circuit Protection : | Continuous |
| Ripple noise (20Mhz bandwidth): | 60mV pk-pk |
| Temperature coefficient: | ±0.02% °C |
| Capacitor load: | See table |

| INPUT SPECIFICATIONS | |
|---|---|
| Voltage Range: | See table |
| Max. Input Current: | See table |
| No-Load/Full-Load Input Current: | See table |
| Input Filter: | PI Type |
| Input Reflected Ripple Current : | 35mA pk-pk |

| GENERAL SPECIFICATIONS | |
|---|---|
| Efficiency: | See table typ. |
| I/O Isolation Voltage Metal Case (3 sec.): | 1000VDC |
| I/O Isolation Voltage (3 sec): | 1500 ~ 3500VDC |
| | 4200VDC for 24Vin/12Vout |
| I/O Isolation Capacitance: | 60pF typ. |
| I/O Isolation Resistance: | 1000M Ohm |
| Switching Frequency: | 100 ~ 400kHz |
| Humidity: | 95% rel H |
| Reliability Calculated MTBF : | > 1.00MHrs |
| | (MIL-HDBK-217 f) |
| Safety Standard: (designed to meet): | IEC 60950-1 |

| ENVIRONMENTAL SPECIFICATION | |
|---|---|
| Operating Temperature range: | -40°C ~+85°C (see Derating Curve) |
| Maximum Case Temperature: | 100°C |
| Storage Temperature : | -40°C ~+125°C |
| Cooling : | Nature Convection |

| PHYSICAL SPECIFICATIONS: | |
|---|---|
| Case Material: | Non-conductive Black Plastic (UL94V-0 rated) |
| PIN Material: | Ø 0.5mm Brass Solder coated |
| Potting Material: | Epoxy (UL94V-0 rated) |
| Weight Case-DIP: | 12.5 (plastic), 15.0g ( Metal) |
| Dimmension DIP: | 1.25“ x 0.8“ x 0.4“ |

| ABSOLUTE MAXIMUM RATINGS (1) | |
|---|---|
| Input Surge Voltage (100ms)/ | |
| 5 V Models: | 15VDC max. |
| 12V Models: | 24VDC max. |
| 24V Models: | 40VDC max. |
| 48V Models: | 80VDC max. |
| Soldering Temperature (2): | 260°C max. |

| EMC SPECIFICATIONS | |
|---|---|
| Radiated-/Conducted Emissions: | EN55022 Class A (see EMI Filter note) |
| ESD: | IEC 61000-4-2 Perf.Criteria A |
| RS: | IEC 61000-4-3 Perf.Criteria A |
| EFT: | IEC 61000-4-4 Perf.Criteria A |
| SURGE: | IEC 61000-4-5 Perf.Criteria A |
| CS: | IEC 61000-4-6 Perf.Criteria A |
| PFMF | IEC 61000-4-8 Perf.Criteria A |

1)These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.
2) 1.5mm from case 10sec Max.
3)All specifications typical at TA= 25°C, nominal input voltage and full load unless otherwise specified.
4) The information and specification contained in this data sheet are believed to be correct at time of publication. However RSG accepts no responsibility for consequences arising from printing errors or inaccuracies. Specifications are subject to change without notice.

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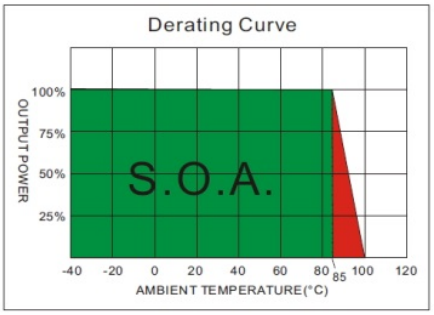
## NUMBER STRUCTURE

RR2 - XX XX S/D XX A X X

- **Name/Package**: RR2=DIL24
- **Input**: 05=4.5-9.0V, 12= 9-18V, 24=18-36V, 48=36-72 V
- **Output**: 05=5.0V, 07=7.2V, 09=9.0V, 12=12V, 15=15V, 18=18V, 24=24V
- **Type**: S= Single-Outp., D= Dual-Outp.
- **Power (W)**: 02=2.00, 03=3.00, 04=4.00, 05=5.00, 06=6.00
- **Code**: internal
- **Isolation (kVDC)**: 1= 1.5, 3= 3.5, 4= 4.2 (f. 2412)
- M = Metal Case, Standard =Plastic




## MODEL SELECTION GUIDE

| MODEL NUMBER | INPUT Voltage Range (Vdc) | INPUT Current No-Load (mA) | INPUT Current Full Load (mA) | OUTPUT Voltage (Vdc) | OUTPUT Current Min. load (mA) | OUTPUT Current Full load (mA) | EFFICIENCY @FL(%) | Capacitor Load(uF) |
|---|---|---|---|---|---|---|---|---|
| RR2-0505S03AX | 4.5-9 | 40 | 857 | 5 | 150 | 600 | 70 | 2200 |
| RR2-0507S03AX | 4.5-9 | 40 | 833 | 7.2 | 104 | 417 | 72 | 1000 |
| RR2-0509S03AX | 4.5-9 | 40 | 833 | 9 | 83 | 333 | 72 | 470 |
| RR2-0512S03AX | 4.5-9 | 40 | 810 | 12 | 63 | 250 | 74 | 470 |
| RR2-0515S03AX | 4.5-9 | 40 | 810 | 15 | 50 | 200 | 74 | 470 |
| RR2-0518S03AX | 4.5-9 | 40 | 810 | 18 | 42 | 167 | 74 | 220 |
| RR2-0524S03AX | 4.5-9 | 40 | 857 | 24 | 31 | 125 | 70 | 220 |
| RR2-0505D03AX | 4.5-9 | 40 | 869 | ±5 | ±75 | ±300 | 69 | ±1000 |
| RR2-0507D03AX | 4.5-9 | 40 | 896 | ±7.2 | ±52 | ±208 | 67 | ±220 |
| RR2-0509D03AX | 4.5-9 | 40 | 857 | ±9 | ±42 | ±167 | 70 | ±220 |
| RR2-0512D03AX | 4.5-9 | 40 | 833 | ±12 | ±31 | ±125 | 72 | ±220 |
| RR2-0515D03AX | 4.5-9 | 40 | 810 | ±15 | ±25 | ±100 | 74 | ±220 |
| RR2-0518D03AX | 4.5-9 | 40 | 810 | ±18 | ±21 | ±83 | 74 | ±220 |
| RR2-0524D03AX | 4.5-9 | 40 | 857 | ±24 | ±16 | ±63 | 70 | ±100 |
| RR2-1205S03AX | 9-18 | 20 | 328 | 5 | 150 | 600 | 76 | 2200 |
| RR2-1207S03AX | 9-18 | 20 | 338 | 7.2 | 104 | 417 | 74 | 1000 |
| RR2-1209S03AX | 9-18 | 20 | 324 | 9 | 83 | 333 | 77 | 470 |
| RR2-1212S03AX | 9-18 | 20 | 316 | 12 | 63 | 250 | 79 | 470 |
| RR2-1215S03AX | 9-18 | 20 | 316 | 15 | 50 | 200 | 79 | 470 |
| RR2-1218S03AX | 9-18 | 20 | 316 | 18 | 42 | 167 | 79 | 220 |
| RR2-1224S03AX | 9-18 | 20 | 316 | 24 | 31 | 125 | 79 | 220 |
| RR2-1205D03AX | 9-18 | 20 | 329 | ±5 | ±75 | ±300 | 76 | ±1000 |
| RR2-1207D03AX | 9-18 | 20 | 325 | ±7.2 | ±52 | ±208 | 77 | ±220 |
| RR2-1209D03AX | 9-18 | 20 | 325 | ±9 | ±42 | ±167 | 77 | ±220 |
| RR2-1212D03AX | 9-18 | 20 | 316 | ±12 | ±31 | ±125 | 79 | ±220 |
| RR2-1215D03AX | 9-18 | 20 | 316 | ±15 | ±25 | ±100 | 79 | ±220 |
| RR2-1218D03AX | 9-18 | 20 | 321 | ±18 | ±21 | ±83 | 78 | ±220 |
| RR2-1224D03AX | 9-18 | 20 | 316 | ±24 | ±16 | ±63 | 79 | ±100 |
| RR2-2405S03AX | 18-36 | 12 | 156 | 5 | 150 | 600 | 80 | 2200 |
| RR2-2407S03AX | 18-36 | 12 | 162 | 7.2 | 104 | 417 | 77 | 1000 |

Suffix “3” means 3.5KVdc isolation
Suffix “M” means Metal Case instead of standard Plastic case

1. Typical value at nominal input voltage and full load.
2. Test by nominal input voltage and constant resistor load.
3. Measured Input reflected ripple current with a simulated source inductance of 12uH.
4. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
5. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
6. It’s necessary to add minimum capacitor in output for some models, please check single model datasheet for detail value.
7. Input filter components are be required to help meet conducted emission class A, which application refer to the EMI Filter of design & feature configuration.
8. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5. The filter capacitor RSG suggest: Nippon - chemi - con KY series, 220uF/100V.

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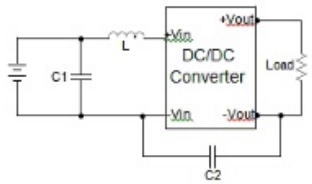
## TEST CONFIGURATIONS




### EMI FILTER

Input Filter Components (C1,C2,L) are used to help meet conducted emissions requirement for the module.
These Components should be mounted as close as possible to the module, and all leads should be minimized to decrease radiated noise.

| | C1 | L | C2 |
|---|---|---|---|
| RR2-05yyS/D03AX | 220uF/100V | 12uH | |
| RR2-12yyS/D03AX | 220uF/100V | 12uH | |
| RR2-24yyS/D03AX | 220uF/100V | 12uH | MLCC470pF |
| RR2-48yyS/D03AX | 220uF/100V | 12uH | MLCC470pF |

| MODEL NUMBER | INPUT Voltage Range (Vdc) | INPUT Current No-Load (mA) | INPUT Current Full Load (mA) | OUTPUT Voltage (Vdc) | OUTPUT Current Min. load (mA) | OUTPUT Current Full load (mA) | EFFICIENCY @FL(%) | Capacitor Load(uF) |
|---|---|---|---|---|---|---|---|---|
| RR2-2409S03AX | 18-36 | 12 | 156 | 9 | 83 | 333 | 80 | 470 |
| RR2-2412S03AX | 18-36 | 12 | 152 | 12 | 62 | 250 | 82 | 470 |
| RR2-2415S03AX | 18-36 | 12 | 152 | 15 | 50 | 200 | 82 | 470 |
| RR2-2418S03AX | 18-36 | 12 | 158 | 18 | 42 | 167 | 79 | 220 |
| RR2-2424S03AX | 18-36 | 12 | 156 | 24 | 31 | 125 | 80 | 220 |
| RR2-2405D03AX | 18-36 | 12 | 156 | ±5 | ±75 | ±300 | 80 | ±1000 |
| RR2-2407D03AX | 18-36 | 12 | 160 | ±7.2 | ±52 | ±208 | 78 | ±220 |
| RR2-2409D03AX | 18-36 | 12 | 158 | ±9 | ±42 | ±167 | 80 | ±220 |
| RR2-2412D03AX° | 18-36 | 12 | 152 | ±12 | ±31 | ±125 | 82 | ±220 |
| RR2-2415D03AX | 18-36 | 12 | 152 | ±15 | ±25 | ±100 | 82 | ±220 |
| RR2-2418D03AX | 18-36 | 12 | 156 | ±18 | ±21 | ±83 | 80 | ±220 |
| RR2-2424D03AX | 18-36 | 12 | 156 | ±24 | ±16 | ±63 | 80 | ±100 |
| RR2-4805S03AX | 36-72 | 8 | 81 | 5 | 150 | 600 | 77 | 2200 |
| RR2-4807S03AX | 36-72 | 8 | 80 | 7.2 | 104 | 417 | 78 | 1000 |
| RR2-4809S03AX | 36-72 | 8 | 80 | 9 | 83 | 333 | 78 | 470 |
| RR2-4812S03AX | 36-72 | 8 | 78 | 12 | 63 | 250 | 80 | 470 |
| RR2-4815S03AX | 36-72 | 8 | 78 | 15 | 50 | 200 | 80 | 470 |
| RR2-4818S03AX | 36-72 | 8 | 81 | 18 | 42 | 167 | 77 | 220 |
| RR2-4824S03AX | 36-72 | 8 | 78 | 24 | 31 | 125 | 80 | 220 |
| RR2-4805D03AX | 36-72 | 8 | 80 | ±5 | ±75 | ±300 | 78 | ±1000 |
| RR2-4807D03AX | 36-72 | 8 | 80 | ±7.2 | ±52 | ±208 | 78 | ±220 |
| RR2-4809D03AX | 36-72 | 8 | 79 | ±9 | ±42 | ±167 | 79 | ±220 |
| RR2-4812D03AX | 36-72 | 8 | 78 | ±12 | ±31 | ±125 | 80 | ±220 |
| RR2-4815D03AX | 36-72 | 8 | 78 | ±15 | ±25 | ±100 | 80 | ±220 |
| RR2-4818D03AX | 36-72 | 8 | 80 | ±18 | ±21 | ±83 | 78 | ±220 |
| RR2-4824D03AX | 36-72 | 8 | 78 | ±24 | ±15.8 | ±63 | 80 | ±100 |

X = 1 means 1.5kVDC, X = 3 means 3.5kVDC isolation
° X = 4 means 4.2kVDC

Suffix “M” means with Metal Case

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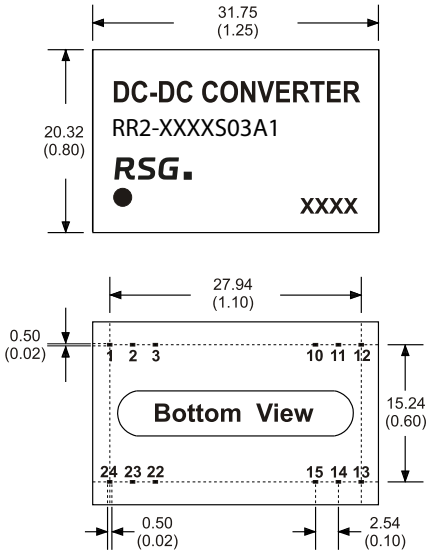
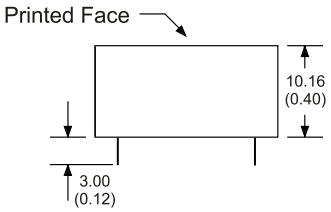
## MECHANICAL SPECIFICATIONS

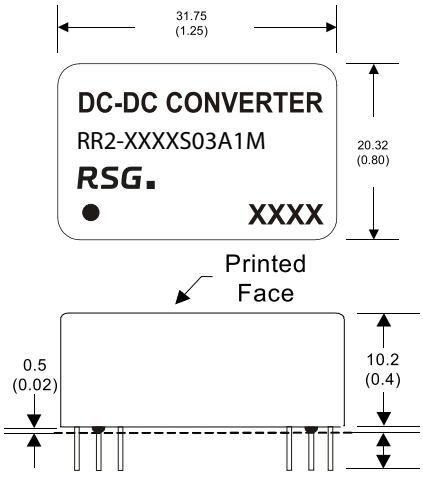


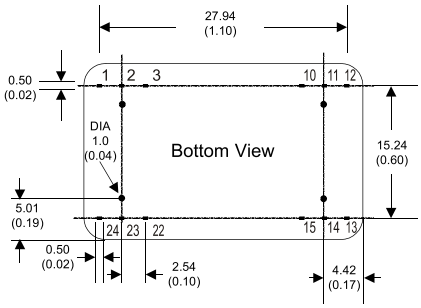




24 Pin DIL Package
Non-Conductive Plastic

Notes : All dimensions are typical in millimeters ( inches ).
1. Pin diameter: 0.5±0.05 ( 0.02±0.002 )
2. Pin pitch and length tolerance: ±0.35 ( ±0.014 )
3. Case Tolerance: ±0.5 ( ±0.02 )

| PIN CONNECTIONS | | | | |
|---|---|---|---|---|
| PIN NUMBER | SINGLE | DUAL | SINGLE-H | DUAL-H |
| 1 | +V Input | +V Input | N.P. | N.P. |
| 2 | N.C. | −V Output | -V Input | −V Input |
| 3 | N.C. | Common | -V Input | −V Input |
| 9 | N.P. | N.P. | N.P. | Common |
| 10 | −V Output | Common | N.P. | N.P. |
| 11 | +V Output | +V Output | N.C. | −V Output |
| 12 | −V Input | −V Input | N.P. | N.P. |
| 13 | −V Input | −V Input | N.P. | N.P. |
| 14 | +V Output | +V Output | +V Output | +V Output |
| 15 | −V Output | Common | N.P. | N.P. |
| 16 | N.P. | N.P. | −V Output | Common |
| 22 | N.C. | Common | +V Input | +V Input |
| 23 | N.C. | −V Output | +V Input | +V Input |
| 24 | +V Input | +V Input | N.P. | N.P. |




For “M” Case

24 Pin DIL Package

Nickel-Coated Copper

Notes: All dimensions are typical in millimeters ( inches ).
1. Pin diameter: 0.5 ±0.05 ( 0.02 ±0.002 )
2. Pin pitch and length tolerance: ±0.35 ( ±0.014 )
3. Case Tolerance: ±0.5 ( ±0.02 )
4. Stand-off tolerance: ±0.1 ( ±0.004 )

| PIN CONNECTIONS | | | | |
|---|---|---|---|---|
| PIN NUMBER | SINGLE | DUAL | SINGLE-H | DUAL-H |
| 1 | +V Input | +V Input | N.P. | N.P. |
| 2 | N.C. | −V Output | -V Input | −V Input |
| 3 | N.C. | Common | -V Input | −V Input |
| 9 | N.P. | N.P. | N.P. | Common |
| 10 | −V Output | Common | N.P. | N.P. |
| 11 | +V Output | +V Output | N.C. | −V Output |
| 12 | −V Input | −V Input | N.P. | N.P. |
| 13 | −V Input | −V Input | N.P. | N.P. |
| 14 | +V Output | +V Output | +V Output | +V Output |
| 15 | −V Output | Common | N.P. | N.P. |
| 16 | N.P. | N.P. | −V Output | Common |
| 22 | N.C. | Common | +V Input | +V Input |
| 23 | N.C. | −V Output | +V Input | +V Input |
| 24 | +V Input | +V Input | N.P. | N.P. |

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***The models listed above are standard types. If you need special specifications or have questions regarding packing (Tube or Tape&Reel) or need application support, please contact our specialists: sales@rsg-electronic.de or +49 69-984047-0***