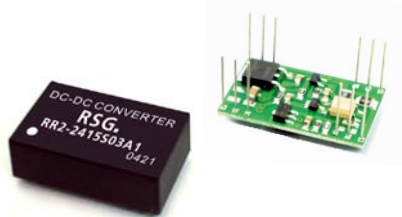


# RR2-S03/D03

3 Watt 2:1 regulated  
single & dual output



- DIP24, Wide 2:1 input range
- Full SMD technology
- 1500 VDC isolation up to 3500 VDC isolation
- Continuous short circuit protection
- Efficiency up to 80%
- -25°C~85°C operation temperature range
- Optional metal case

## OUTPUT SPECIFICATIONS

Voltage accuracy	± 1%
Line regulation	± 0.5%
Load regulation	± 0.5%
Ripple & Noise (20 MHz bandwidth) (1)	60 mV pk-pk
Short circuit protection	Continuous
Temperature coefficient	± 0.02%/°C
Capacitor load (2)	See table

## INPUT SPECIFICATIONS

Voltage range	See table
Max. input current	See table
No-load input current	See table
Input filter	PI Type
Input reflected ripple current (3)	35 mA pk-pk

## GENERAL SPECIFICATIONS

Efficiency (typ.)	See table
I/O isolation voltage (3 sec.)	
Input / Output	1500 ~ 3500 VDC
Metal case / input & output	1000 VDC
I/O isolation capacitance	60 pF typ.
I/O isolation resistance	1000 M Ohm
Switching frequency	100~400 kHz
Humidity	95% rel. H
Reliability calculated MTBF (MIL-HDBK-217F)	> 2.199 Mhrs.
Safety standard (designed to meet)	IEC 60950-1

## PHYSICAL SPECIFICATIONS

Case material	Non-conductive black plastic (UL94V-0 rated) Nickel-coated copper
Base material	Non-conductive black plastic (UL94V-0 rated)
Pin material	Ø 0.5 mm brass solder-coated
Potting material	Epoxy (UL94V-0 rated)
Weight	Plastic 12.5 g, Metal 15 g
Dimensions	1.25" x 0.8" x 0.4"

## ENVIRONMENT SPECIFICATIONS

Operating temperature (See derating curve)	-40°C~ 85°C
Maximum case temperature	100°C
Storage temperature	-40°C~125°C
Cooling	Nature convection

## EMC SPECIFICATIONS

Radiated emissions	EN55022	Class A
Conducted emissions	EN55022	Class A
ESD	IEC61000-4-2 Perf.	Crit. B
RS	IEC61000-4-3 Perf.	Crit. A
EFT (8)	IEC61000-4-4 Perf.	Crit. B
Surge (8)	IEC61000-4-5 Perf.	Crit. B
CS	IEC61000-4-6 Perf.	Crit. A
PFMF	IEC61000-4-8 Perf.	Crit. A

## ABSOLUTE MAXIMUM RATINGS (4)

These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.

Input voltage (100 mS)	
5 modes	-0.7 ~ 15 VDC
12 modes	-0.7 ~ 24 VDC
24 modes	-0.7 ~ 40 VDC
48 modes	-0.7 ~ 80 VDC

Lead soldering temperature 260°C  
(1.5 mm from case 10 sec.)

All specifications typical at  $T_a = 25^\circ\text{C}$ , nominal input voltage and full load unless otherwise specified.  
The information and specifications contained in this data sheet are believed to be correct at time of publication. However, we accept no responsibility for consequences arising from printing errors or inaccuracies.  
Subject to change without notice.

## NOTE

- 1) Typical value at nominal input voltage and full load.
- 2) Tested by nominal  $V_{in}$  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 a minimum capacitor in output for some models. Please check single model datasheet for detail value.
- 7) Input filter components are 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 EN 61000-4-4 and EN61000-4-5. The filter capacitor we suggest: Nippon-chemi-con KY series, 220 uF / 100V.

# RR2-S03/D03

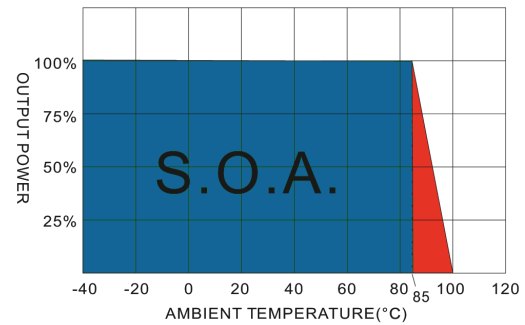
3 Watt 2:1 regulated  
single & dual output

## NUMBER STRUCTURE

<b>RR2</b>	-	<b>XX</b>	<b>XX</b>	<b>S</b>	<b>03</b>	<b>A</b>	<b>1</b>	<b>(M)</b>
<b>Name/Package</b> RR2=DIL24		<b>Input</b> 05=4.5~9V 12=9~18V 24=18~36V 48=36~72V	<b>Output</b> 05=5V 09=9V 12=12V 15=15V 24=24V	<b>Type</b> S=Single D=Dual	<b>Power</b> 03=3W	<b>Code</b> internal	<b>Isolation</b> 1=1.5 kVDC 3=3.5 kVDC	

Add suffix „M“ for Metal case! If no suffix mean Plastic case.

## DERATING CURVE



## MODEL SELECTION GUIDE

Model Number	Input Range VDC	Input current (mA) No Load/Full Load	Output VDC	Output current Min. Load (mA)	Output current Full Load (mA)	Efficiency @FL (%)	Capacitor Load (μF)
RR2-0505S03AX	4.5-9	40 / 857	5	150	600	70	2200
RR2-0509S03AX	4.5-9	40 / 833	9	83.3	333	72	470
RR2-0512S03AX	4.5-9	40 / 810	12	62.5	250	74	470
RR2-0515S03AX	4.5-9	40 / 810	15	50	200	74	470
RR2-0524S03AX	4.5-9	40 / 857	24	31.3	125	70	220
RR2-0505D03AX	4.5-9	40 / 869	±5	±75	±300	69	±1000
RR2-0509D03AX	4.5-9	40 / 857	±9	±41.8	±167	70	±220
RR2-0512D03AX	4.5-9	40 / 833	±12	±31.3	±125	72	±220
RR2-0515D03AX	4.5-9	40 / 810	±15	±25	±100	74	±220
RR2-0524D03AX	4.5-9	40 / 857	±24	±15.8	±63	70	±100
RR2-1205S03AX	9-18	20 / 328	5	150	600	76	2200
RR2-1209S03AX	9-18	20 / 324	9	83.3	333	77	470
RR2-1212S03AX	9-18	20 / 316	12	62.5	250	79	470
RR2-1215S03AX	9-18	20 / 316	15	50	200	79	470
RR2-1224S03AX	9-18	20 / 316	24	31.3	125	79	220
RR2-1205D03AX	9-18	20 / 324	±5	±75	±300	77	±1000
RR2-1209D03AX	9-18	20 / 320	±9	±41.8	±167	78	±220
RR2-1212D03AX	9-18	20 / 320	±12	±31.3	±125	78	±220
RR2-1215D03AX	9-18	20 / 320	±15	±25	±100	78	±220
RR2-1224D03AX	9-18	20 / 320	±24	±15.8	±63	78	±100
RR2-2405S03AX	18-36	12 / 156	5	150	600	80	2200
RR2-2409S03AX	18-36	12 / 156	9	83.3	333	80	470
RR2-2412S03AX	18-36	12 / 152	12	62.5	250	82	470
RR2-2415S03AX	18-36	12 / 152	15	50	200	82	470
RR2-2424S03AX	18-36	12 / 156	24	31.3	125	80	220
RR2-2405D03AX	18-36	12 / 160	±5	±75	±300	78	±1000
RR2-2409D03AX	18-36	12 / 158	±9	±41.8	±167	79	±220
RR2-2412D03AX	18-36	12 / 156	±12	±31.3	±125	80	±220
RR2-2415D03AX	18-36	12 / 156	±15	±25	±100	80	±220
RR2-2424D03AX	18-36	12 / 156	±24	±15.8	±63	80	±100
RR2-4805S03AX	36-72	8 / 81	5	150	600	77	2200
RR2-4809S03AX	36-72	8 / 80	9	83.3	333	78	470
RR2-4812S03AX	36-72	8 / 78	12	62.5	250	80	470
RR2-4815S03AX	36-72	8 / 78	15	50	200	80	470
RR2-4824S03AX	36-72	8 / 78	24	31.3	125	80	220
RR2-4805D03AX	36-72	8 / 80	±5	±75	±300	78	±1000
RR2-4809D03AX	36-72	8 / 79	±9	±41.8	±167	79	±220
RR2-4812D03AX	36-72	8 / 78	±12	±31.3	±125	80	±220
RR2-4815D03AX	36-72	8 / 78	±15	±25	±100	80	±220
RR2-4824D03AX	36-72	8 / 78	±24	±15.8	±63	80	±100

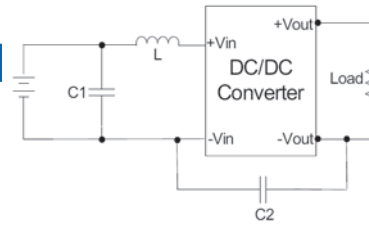
# RR2-S03/D03

3 Watt 2:1 regulated  
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## TEST CONFIGURATIONS

### EMI Filter

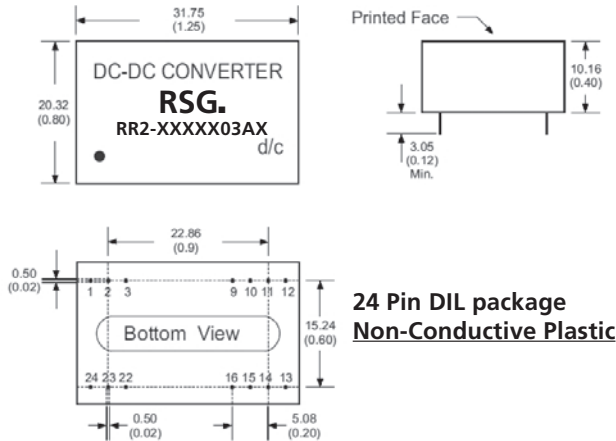
Input filter components (C1, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



RR2-05XXXXX  
RR2-12XXXXX  
RR2-24XXXXX  
RR2-48XXXXX

C1	L	C2
220uF/100V	12uH	
220uF/100V	12uH	
220uF/100V	12uH	MLCC 471K
220uF/100V	12uH	MLCC 471K

## MECHANICAL SPECIFICATIONS STANDARD



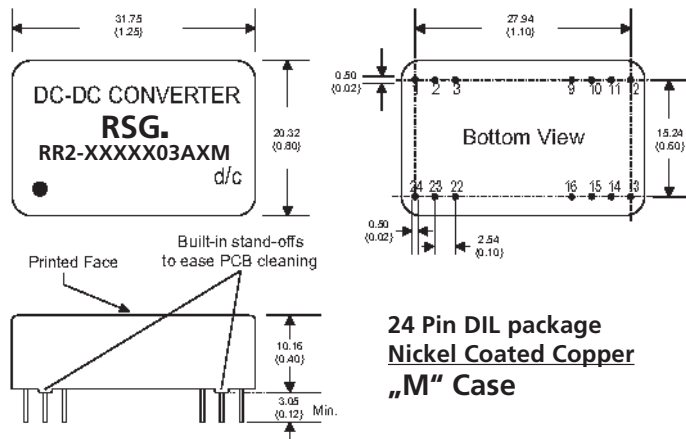
24 Pin DIL package  
Non-Conductive Plastic

- All dimensions are typical in millimeters (inches).
- 1) Pin diameter:  $0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )
  - 2) Pin pitch tolerance:  $\pm 0.35$  ( $\pm 0.014$ )
  - 3) Case tolerance:  $\pm 0.5$  ( $\pm 0.02$ )

## PIN CONNECTIONS

Pin #	SINGLE	DUAL	SINGLE-3	DUAL-3
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.C.	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.

## MECHANICAL SPECIFICATIONS METAL CASE



24 Pin DIL package  
Nickel Coated Copper  
„M“ Case

- All dimensions are typical in millimeters (inches).
- 1) Pin diameter:  $0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )
  - 2) Pin pitch tolerance:  $\pm 0.35$  ( $\pm 0.014$ )
  - 3) Case tolerance:  $\pm 0.5$  ( $\pm 0.02$ )