

# RRD-S/D03

3W Regulated Single & Dual Output DC/DC Converter



Picture similar



- 24 Pin DIL Package
- Wide 2:1 Input Range
- 1500 or 3000VDC Isolation
- EMI filter meets EN55032 class A without external components
- Efficiency up to 81%
- Operating Temperature Range -40°C ~ +85°C
- Continuous Short Circuit Protection
- Over Current Protection, Under Voltage Protection
- Plastic Case

Output Specifications	
Voltage Accuracy	±2%, max.
Output Voltage Adjustability (Trim)	–
Maximum Output Current	See table
Line Regulation	Single & Dual ±0.5% max.
Load Regulation	from 0% to 100% Load: ±1.2% max.
Cross Regulation (Dual Output)	±5%
Over Voltage Protection	–
Over Current Protection	160% of I <sub>out</sub> typ.
Short Circuit Protection	Indefinite (Automatic Recovery)
Ripple & Noise (20 MHz bandwidth)	80 ~ 100mV pk-pk max.
Temperature Coefficient	±0.02%/°C
Capacitor Load	See table
Transient Recovery Time	300µs typ.
Transient Response	(Deviation) ±3 ~ 5% max.

Input Specifications	
Voltage Range	See table
Start-up Time	20ms typ.
No-Load/Full-Load Input Current	See table
Input Filter	C/L (see filter details on following pages)
Input Reflected Ripple Current	20mA pk-pk typ.
Remote ON	–
Remote OFF	–
OFF Stand By Current	–
OFF Idle Current	–

General Specifications	
Efficiency	See table typ.
I/O Isolation Voltage (60 sec)	1500 ~ 3000VDC
Isolation Voltage Metal Case/Input&Output	–
I/O Isolation Capacitance	1000pF typ.
I/O Isolation Resistance	1000M Ohm, min
Switching Frequency	330kHz typ.
Humidity	95% rel H
Reliability Calculated MTBF	>800KHrs (MIL-HDBK-217 f)
Safety Standard(s)	UL60950-1 (approval), UL62368-1 (meet)

Environmental Specifications	
Operating Temperature Range	-40°C ~ +85°C (see Derating Curve)
Maximum Case Temperature	100°C
Storage Temperature	-55°C ~ +125°C
Cooling	Natural Convection

Physical Specifications	
Case Material	Non-conductive Black Plastic (UL94V-0 rated)
Pin Material	0.5mm Brass Solder-coated
Potting Material	Epoxy (UL94V-0 rated)
Weight	13.0g
Case Dimensions	1.25" x 0.80" x 0.40"

Absolute Maximum Ratings (1)	
Input Surge Voltage (100 ms)	
12V Models	25VDC max.
24V Models	50VDC max.
48V Models	100VDC max.
Soldering Temperature (2)	260°C max.

EMC Specifications	
Radiated / Conducted Emissions	EN55032 Class A see EMI Filter
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 or Voltage Dip/Drop/Interruption	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) 1.5 mm from case 10 sec max.

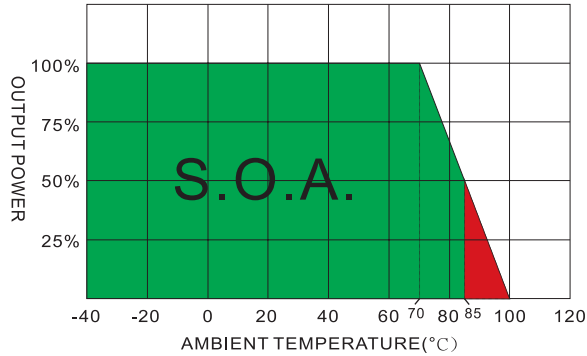
All specifications typical at TA = 25 °C, nominal input voltage and full load unless otherwise specified.

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.**

## Number structure RRD Series

RRD	–	48	12	S	06	A	3	(W)
Name / package	V-input nom.	V-output	Output type	Power	Int. Code	Isolation (VDC)	Wide-Input	
RRD = DIL24	12 = 9V~18V 24 = 18V~36V or 9V~36V 48 = 36V~75V or 18V~75V	03 = 3.3V 05 = 5V ...	S = Single D = Dual	03 = 3.0W 06 = 6.0W	Logistics Code	1 = 1.5k 3 = 3.0k	_ = 2:1 W = 4:1	

Derating Curve



## Model Selection Guide

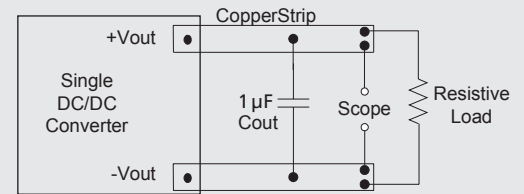
Suffix X = 1 means 1.5 kV DC and X = 3 means 3.0 kV DC Isolation Voltage

Model Number	Input Voltage Range (VDC)	Input Current		Output Voltage (VDC)	Output Current		Efficiency @Full Load (%, typ.)	Capacitor Load @Full Load (µF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. Load (mA)	Full Load (mA)		
RRD-1203S03AX	9~18	7	339	3.3	0	900	74	470
RRD-1205S03AX	9~18	7	325	5	0	600	78	470
RRD-1212S03AX	9~18	10	313	12	0	250	81	100
RRD-1215S03AX	9~18	10	313	15	0	200	81	100
RRD-1224S03AX	9~18	20	316	24	0	125	80	47
RRD-1203D03AX	9~18	10	339	±3.3	0	±450	74	±220
RRD-1205D03AX	9~18	10	325	±5	0	±300	78	±220
RRD-1212D03AX	9~18	15	313	±12	0	±125	81	±100
RRD-1215D03AX	9~18	20	313	±15	0	±100	81	±100
RRD-1224D03AX	9~18	35	319	±24	0	±63	80	±47
RRD-2403S03AX	18~36	7	172	3.3	0	900	73	470
RRD-2405S03AX	18~36	7	164	5	0	600	77	470
RRD-2412S03AX	18~36	7	156	12	0	250	81	100
RRD-2415S03AX	18~36	7	156	15	0	200	81	100
RRD-2424S03AX	18~36	10	156	24	0	125	81	47
RRD-2403D03AX	18~36	7	167	±3.3	0	±450	75	±220
RRD-2405D03AX	18~36	7	160	±5	0	±300	79	±220
RRD-2412D03AX	18~36	10	156	±12	0	±125	81	±100
RRD-2415D03AX	18~36	15	156	±15	0	±100	81	±100
RRD-2424D03AX	18~36	20	158	±24	0	±63	81	±47
RRD-4803S03AX	36~75	7	84	3.3	0	900	75	470
RRD-4805S03AX	36~75	7	80	5	0	600	79	470
RRD-4812S03AX	36~75	7	78	12	0	250	81	100
RRD-4815S03AX	36~75	7	78	15	0	200	81	100
RRD-4824S03AX	36~75	7	78	24	0	125	81	47
RRD-4803D03AX	36~75	7	81	±3.3	0	±450	77	±220
RRD-4805D03AX	36~75	7	78	±5	0	±300	81	±220
RRD-4812D03AX	36~75	7	78	±12	0	±125	81	±100
RRD-4815D03AX	36~75	7	78	±15	0	±100	81	±100
RRD-4824D03AX	36~75	15	81	±24	0	±63	79	±47

## Test Configurations

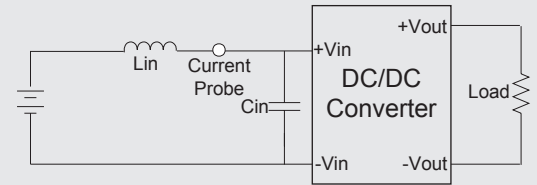
### Output Ripple & Noise Measurement Test

Use a capacitor  $C_{out}$  ( $1.0 \mu\text{F}$ ) measurement.  
The Scope measurement bandwidth is 0~20 MHz.

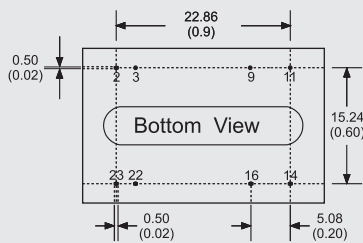
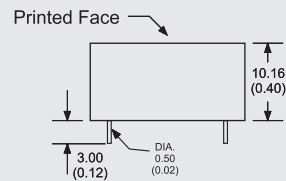
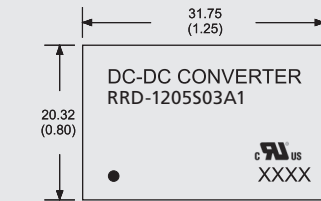


### Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor  $L_{in}$  ( $12 \mu\text{H}$ ) and a source capacitor  $C_{in}$  ( $47 \mu\text{F}$ ,  $\text{ESR} < 1.0 \Omega$  at  $100 \text{ kHz}$ ) at nominal input and full load.



## Mechanical Specifications



### 24 Pin DIL Package Non-Conductive Plastic

Notes: All dimensions are typical in millimeters ( inches ).

1. Pin diameter:  $0.5 \pm 0.05$  (  $0.02 \pm 0.002$  )
2. Pin pitch and length tolerance:  $\pm 0.35$  (  $\pm 0.014$  )
3. Case Tolerance:  $\pm 0.5$  (  $\pm 0.02$  )

### Pin Connections

Pin Number	Single	Dual
2	-V Input	-V Input
3	-V Input	-V Input
9	N.P.	Common
11	N.C.	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

(Pin-out is identical for standard and high isolation models.)

Note:

1. Cross regulation: one load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within  $\pm 5\%$ .
2. Ripple/Noise measured with a  $1 \mu\text{F}$  ceramic capacitor.
3. Capacitive load is tested at minimal  $V_{in}$  and constant resistive load.
4. Transient recovery and response are tested at normal  $V_{in}$  and 25% load step change (75%-50%-25% of  $I_o$ ).
5. Measured Input reflected ripple current with a simulated source inductance of  $12 \mu\text{H}$  and a source capacitor  $C_{in}$  ( $47 \mu\text{F}$ ,  $\text{ESR} < 1.0 \Omega$  at  $100 \text{ kHz}$ ).
6. An external filter capacitor is required if the module has to meet IEC61000-4-5. The suggested filter capacitor: Nippon chemi-con KY series,  $220 \mu\text{F}/100\text{V}$ .
7. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.