

RRA-S/D08

- 24 Pin DIL Package
- Ultra Wide Input Range
- 3000VDC Isolation
- EN50155 approval for railway applications
- Continuous Short Circuit Protection
- Over Voltage Protection, Over Load Protection
- Efficiency up to 86%
- Operating Temperature Range -40° ~ +85°C
- Under voltage lock-out circuit
- Remote on/off Control



RoHS

OUTPUT SPECIFICATION	ENVIRONMENTAL SPECIFICATION
Voltage accuracy: ±1%	Operating Temperature range: -40°C ~ +85°C (see Derating Curve)
Output Voltage Adjustability (Trim): –	Maximum Case Temperature: 105°C
Maximum Output Current: –	Storage Temperature: -55°C ~ +125°C
Line regulation: Single & Dual ±0.5% max.	Cooling: Nature Convection
Load regulation: from 0% to 100% Load: ±0.5% max.	Thermal Shock: IEC60068
–	Shock & Vibration: EN61373
Cross Regulation (Dual Output): ± 5%	PHYSICAL SPECIFICATIONS:
Over Voltage Protection (Zener diode clamp): Zener Diode Clamp	Case Material: Nickel-coated Copper
Over Load Protection: 160% of FI, typ..	Base Material: Non-conductive Black Plastic (UL94V-0 rated)
Short Circuit Protection : Indefinite (Automatic Recovery)	PIN Material: 0.5mm Brass Solder coated
Ripple noise (20Mhz bandwidth): 75mV pk-pk max.	PIN Material SIP Case: –
Temperature coefficient: ±0.02%/°C	PIN Material DIP Case: –
Capacitor load: See table	Weight Case - SIP: –
Transient Recovery Time: 250us,typ.	Potting Material: Epoxy (UL94V-0 rated)
Transient Response: (Deviation) ±3-5% max.	Weight Case - DIP: 18.0g
INPUT SPECIFICATIONS	Dimmension SIP: –
Voltage Range: See table	Dimmension DIP: 1.25" x 0.8" x 0.4"
Start up Time: –	ABSOLUTE MAXIMUM RATINGS (1)
Max. Input Current: See table	Input Surge Voltage (100ms)/
No-Load/Full-Load Input Current: See table	3.3V Models: –
Input Filter: PI Type	5V Models: –
Input Reflected Ripple Current : 20mA pk-pk typ.	12V Models: –
Remote On/Off (positive logic): On: 3.0~12VDC or open circuit	15V Models: –
Off: 0~1.2VDC or Short circuit	24V Models: 100VDC max.
pin 1 and pin 2/3	48V Models: –
Off stand by current (nominal Vin): –	Soldering Temperature (2): 260°C max.
Off idle current: 5mA typ.	EMC SPECIFICATIONS
GENERAL SPECIFICATIONS	Radiated-/Conducted Emissions: EN50121-3-2 see note EMI Filter
Efficiency: See table typ.	ESD: EN50121-3-2 Air ±8KV Perf.Criteria A
I/O Isolation Voltage (60sec): 3000VDC	RS: EN50121-3-2 20V/m Perf.Criteria A
I/O Isolation Voltage Metal Case: 1000VDC	EFT: EN50121-3-2 2.0KV Perf.Criteria A
I/O Isolation Voltage (3sec): –	SURGE: EN50121-3-2 2.0KV Perf.Criteria A
I/O Isolation Capacitance: 1000pF typ.	CS: EN50121-3-2 10V Perf.Criteria A
I/O Isolation Resistance: 1000M Ohm	PFMF: IEC 61000-4-8 10A/m Perf.Criteria A
Switching Frequency: 330kHz (24V), 220kHz (110V) typ.	
Humidity: 95% rel H	
Reliability Calculated MTBF : > 800KHrs	
(MIL-HDBK-217 f)	
Safety Standard: IEC/EN 60950-1, EN50155	

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

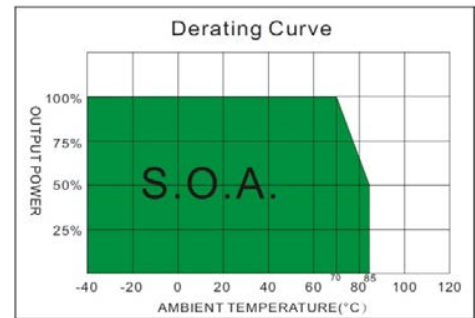
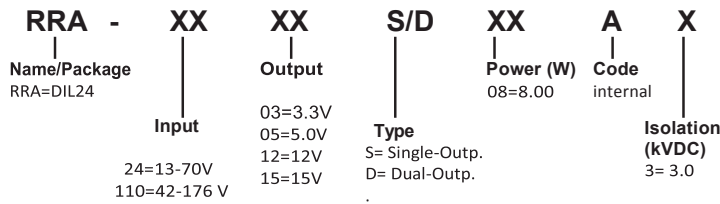
(2) 1.5mm from case 10sec max.

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.

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NUMBER STRUCTURE



MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL(%)	Capacitor Load(uF)
		No-Load (mA)	Full Load (mA)		Min. load (mA)	Full load (mA)		
RRA-2403S08A3	13.0 ~ 70.0VDC or 24.0VDC	30	397.59	3.3	0	2400	83	1330
RRA-2405S08A3	13.0 ~ 70.0VDC or 24.0VDC	20	387.60	5	0	1600	86	1330
RRA-2412S08A3	13.0 ~ 70.0VDC or 24.0VDC	10	391.18	12	0	665	85	330
RRA-2415S08A3	13.0 ~ 70.0VDC or 24.0VDC	10	388.18	15	0	535	86	220
RRA-2405D08A3	13.0 ~ 70.0VDC or 24.0VDC	10	401.61	±5	0	±800	83	±900
RRA-2412D08A3	13.0 ~ 70.0VDC or 24.0VDC	10	394.12	±12	0	±335	85	±220
RRA-2415D08A3	13.0 ~ 70.0VDC or 24.0VDC	10	385.17	±15	0	±265	86	±100
RRA-1103S08A3	42.0 ~ 176.0VDC or 110.0VDC	10	88.89	3.3	0	2400	81	1330
RRA-11005S08A3	42.0 ~ 176.0VDC or 110.0VDC	10	86.58	5	0	1600	84	1330
RRA-11012S08A3	42.0 ~ 176.0VDC or 110.0VDC	5	86.36	12	0	665	84	330
RRA-11015S08A3	42.0 ~ 176.0VDC or 110.0VDC	5	87.90	15	0	535	83	220
RRA-11005D08A3	42.0 ~ 176.0VDC or 110.0VDC	5	90.91	±5	0	±800	80	±900
RRA-11012D08A3	42.0 ~ 176.0VDC or 110.0VDC	5	89.14	±12	0	±335	82	±220
RRA-11015D08A3	42.0 ~ 176.0VDC or 110.0VDC	5	87.08	±15	0	±265	83	±100

- One load is 25% to 100% load, the other load is 100% load, the output voltage variable rate is within ±5%.
- Ripple/Noise Measured with a 0.1uF ceramic capacitor and 10uF electrolytic capacitor.
- Test by nominal input voltage and constant resistor load.
- Tested by normal Vin and 25% load step change (75%-50%-25% of Io) at 1A/ μ s.
- Measured Input reflected ripple current with a simulated source inductance of 12uH and a source capacitor Cin(33uF, ESR<1.0Ω at 100KHz).
- The remote on/off control pin is referenced to -Vin(pin2,pin3).
- Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
- Input filter components are used to help meet conducted emissions 79dBuV from 0.15-0.5MHZ and 73dBuV from 0.5-30MHZ requirement for the module,
Which application refer to the EMI Filter of design & feature configuration.
- An external filter capacitor is required if the module has to meet EFT and Surge in EN50121-3-2.
The filter capacitor RSG suggest:
RRA-24XXX : one electrolytic capacitor (Nippon - chemi - con KY series, 330 μ F/100V).
RRA-110XXX : two electrolytic capacitors (Ruby-con BXF series, 100 μ F/250V) in parallel. 10.
"Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).

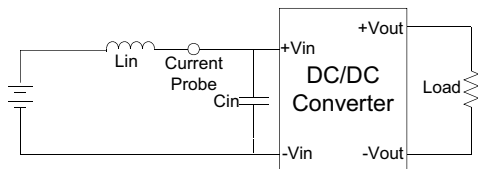
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DESIGN & FEATURE CONFIGURATIONS

RRA-S/D08

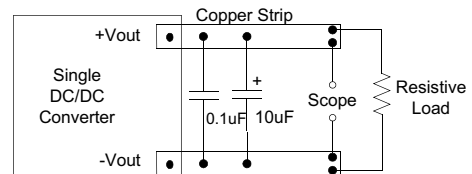
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor L_{in} (12uH) and a source capacitor C_{in} (33uF, ESR<1.0Ω at 100KHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

Use a 0.1uF ceramic capacitor and a 10uF electrolytic capacitor measurement. The Scope measurement bandwidth is 0-20MHz.

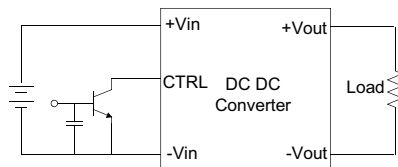


CTRL Module ON / OFF

Positive logic turns on the module during high logic and off during low logic.

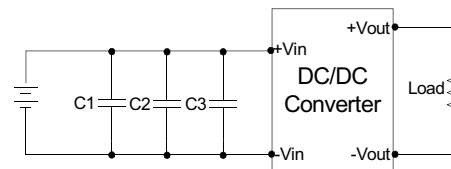
Ctrl module on/off can be controlled by an external switch between the ctrl terminal and -Vin terminal. The switch can be an open collector or open drain

For positive logic if the ctrl feature is not used, please leave the ctrl pin floating.



EMI Filter

Input filter components (C1,C2,C3) are used to help meet conducted emissions 79dBuV from 0.15-0.5MHZ and 73dBuV from 0.5-30MHZ 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 - C2 - C3
RRA-24XXXX	None
RRA-110XXX	MLCC,1uF, 250V

Over Voltage Protection

The module includes an internal output over voltage protection circuit, which monitors the voltage on the output terminals. If this voltage exceeds the over voltage set point, the module will activate the control loop of internal circuit to clamp the output voltage.

Over Current Protection

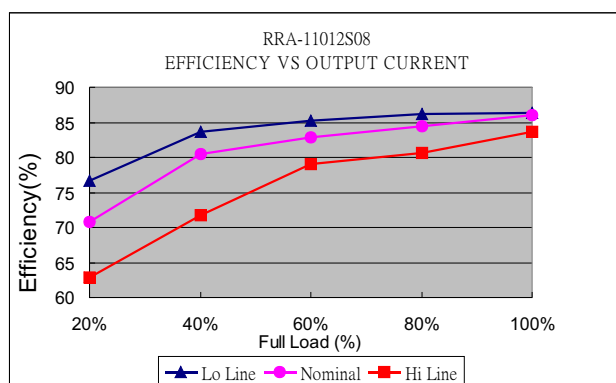
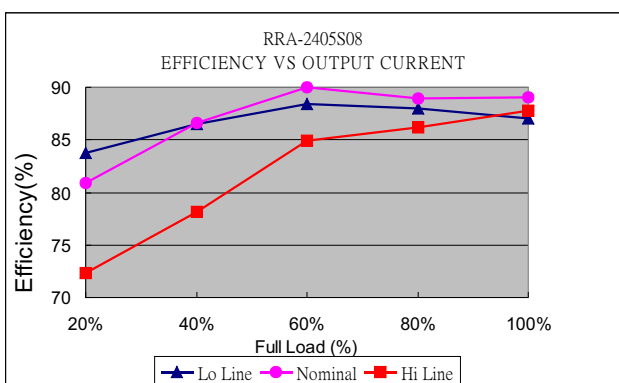
The module includes an internal over current protection circuit, which will endure current limiting for an unlimited duration during output over load condition. If the output current exceeds the OCP set point, the module will shut down automatically (hiccup).

The module will try to restart after shut down. If the over load condition still exists, the module will shut down again.

RRA-S/D08

Typical Operating Conditions

ELECTRICAL CHARACTERISTICS CURVES



MECHANICAL SPECIFICATIONS

DC-DC CONVERTER
RRA-XXXXS08A3
RSG
XXXX

Printed Face

Bottom View

24 Pin DIL Package
Nickel-Coated Copper

PIN CONNECTIONS		
PIN NUMBER	SINGLE	DUAL
1	CTRL	CTRL
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

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)

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