RT1-S02v2

0.25W Unregulated Single Output DC/DC Converter

Picture similar

- **8 Pin (5) SMD Package**
- **±10% Input Range**
- **1500 or 3000VDC Isolation**
- **High efficiency designs**
- **Efficiency up to 77%**
- **High Operating Temperature Range -40°C ~ +105°C**
- **Continuous Short Circuit Protection**
- **Low Ripple and Noise**
- **Non Conductive Black Plastic Case**

RoHS

Output Specifications	
Voltage Accuracy	See tolerance envelope graph
Maximum Output Current	See table
Line Regulation	±1.2 ~ 1.5% max.(per ±1% Vin Change)
Load Regulation	from 10% to 100% Load: 10% to 20% max. –
Cross Regulation (Dual Output)	–
Short Circuit Protection	Continuous, self-recovery, not for RT1-03xx
Ripple & Noise (20 MHz bandwidth)	20mV typ., 120mV pk-pk max.
Temperature Coefficient	±0.03%/°C

Input Specifications	
Voltage Range	See table
Start-up Time	–
No-Load/Full-Load Input Current	See table
Input Filter	C/L (see filter details on following pages)
Input Reflected Ripple Current	0 ~ 20mA Typ.
Surge Voltage (100 ms) †)	
3.3V Models 5V Models 12V Models 24V Models	5VDC max. 9VDC max. 18VDC max. 30VDC max.

General Specifications	
I/O Isolation Voltage (60 sec)	1500 ~ 3000VDC
Out1/Out2 Isolation Voltage (Dual Separate)	–
I/O Isolation Capacitance	20pF typ.
I/O Isolation Resistance	1000M Ohm, min
Switching Frequency	100kHz typ. 300kHz max.
Humidity	95% rel H
Reliability Calculated MTBF	>3.5MHrs (MIL-HDBK-217 f)
Safety Standard(s)	–

Environmental Specifications	
Operating Temperature range	-40°C ~ +105°C (see Derating Curve)
Maximum Case Temperature	–
Storage Temperature	-55°C ~ +125°C
Cooling	Natural Convection
Soldering Profile and Peak Temperature	Pb-free Reflow: 245°C, 10s, max. / 217°C <60s (IPC/JEDEC J-STD-020D.1, MSL 1)

Physical Specifications	
Case Material	Black flame-retardant heat-proof epoxy resin (UL94 V-O)
Pin Material SIP Case	–
Pin Material DIP Case	–
Potting Material	Epoxy resin (UL94V-V0)
Weight SIP Case	–
Weight DIP Case	1.5g typ.
Dimensions SIP Case	–
Dimensions DIP Case	0.50" x 0.44" x 0.29"

EMC Specifications	
Radiated / Conducted Emissions	EN55032 Class B see EMI Filter
ESD	IEC 61000-4-2 Perf.Criteria B
Rad. RF	–
EFT	–
Surge	–
Cond. RF	–
PFMF	–
VD/SI/VV	–

†) These are stress ratings; exposure of devices to any of these conditions may adversely affect long-term reliability.
All specifications typical at T_A = 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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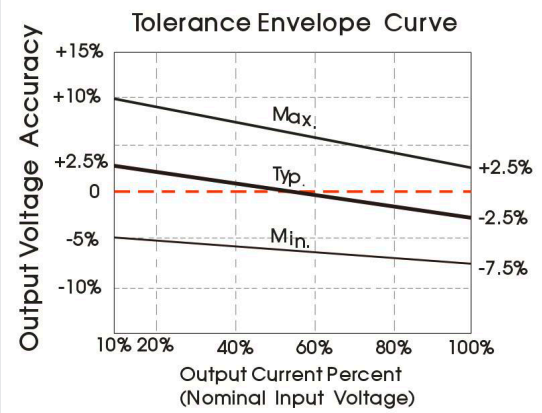
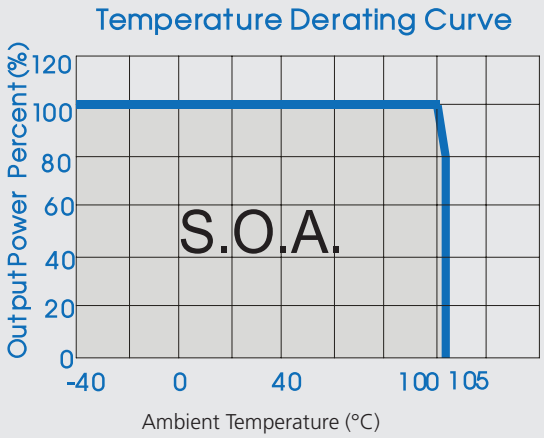
Number structure RT1

RT1	–	03	15	_	S	10	D	1	(v2)
Name / package		**V-input nom.**	**V-output**	**Regulation**	**Output type**	**Power**	**Int. Code**	**Isolation**	
RT1 = SMT-8		03 = 3.3 V 05 = 5 V … 24 = 24 V	03 = 3.3 V 05 = 5 V … 24 = 24 V	_ = unreg.	S = Single	02 = 0.25 W 10 = 1.00 W … 20 = 2.00 W	Logistics Code	1 = 1.5 kV DC 3 = 3.0/3.5kV DC	





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 (V DC)	Output		Efficiency	Capacitor Load
	Nominal (Range)	Output Voltage (V DC)	Output Current (mA) (Max./Min.)	@ Full Load (%, Min./Typ.)	(µF)
RT1-0303S02D1v2	3.3 (2.97 ~ 3.63)	3.3	76/8	68/73	220
RT1-0305S02D1v2	3.3 (2.97 ~ 3.63)	5	50/5	68/73	220
RT1-0312S02D1v2	3.3 (2.97 ~ 3.63)	12	21/2	68/73	220
RT1-0503S02D1v2	5 (4.5 ~ 5.5)	3.3	76/8	69/74	220
RT1-0505S02DXv2	5 (4.5 ~ 5.5)	5	50/5	72/77	220
RT1-0509S02D1v2	5 (4.5 ~ 5.5)	9	28/3	69/74	220
RT1-0512S02D1v2	5 (4.5 ~ 5.5)	12	21/2	69/74	220
RT1-0515S02D1v2	5 (4.5 ~ 5.5)	15	17/2	68/73	220
RT1-1203S02D1v2	12 (10.8 ~ 13.2)	3.3	76/8	68/73	220
RT1-1205S02DXv2	12 (10.8 ~ 13.2)	5	50/5	72/77	220
RT1-1209S02D1v2	12 (10.8 ~ 13.2)	9	28/3	68/73	220
RT1-1212S02D1v2	12 (10.8 ~ 13.2)	12	21/2	72/77	220
RT1-2405S02D1v2	24 (21.6 ~ 26.4)	5	50/5	66/71	220

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

Design Reference

1. Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3.
Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensured the modules running well, the recommended capacitive load values as shown in Table 1.
The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (see Fig. 4).

Fig.3

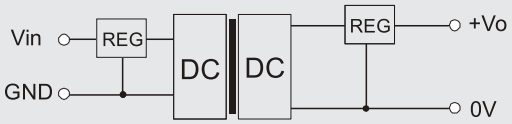
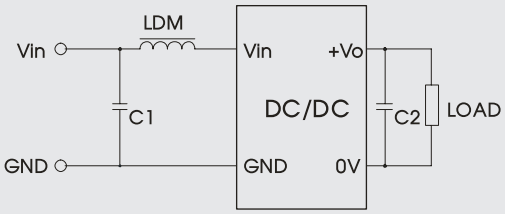


Fig.4

Recommended capacitive load value table (Table 1)			
Vin (VDC)	Cin (μF)	V_o (VDC)	Cout (μF)
3.3/5	4.7	3.3/5	10
12	2.2	12	2.2
24	1	15	1

2. EMC typical recommended circuit

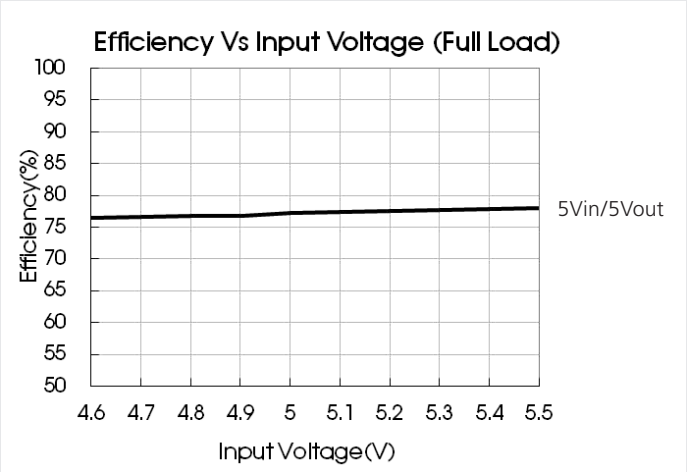


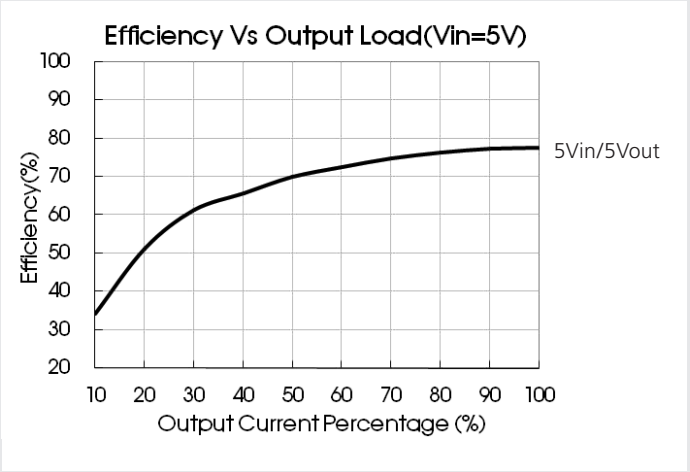
Input voltage (V DC)		3.3/5/12/24
EMI	C1	4.7μF /50V
	C2	Refer to the Cout in Fig.3
	LDM	6.8μH

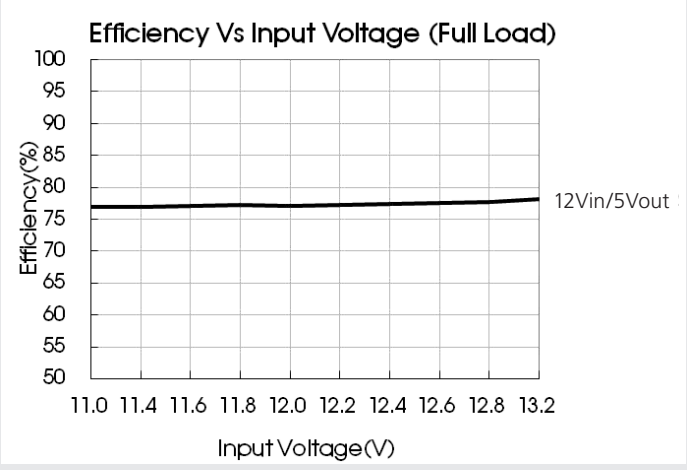
3. Output load requirements

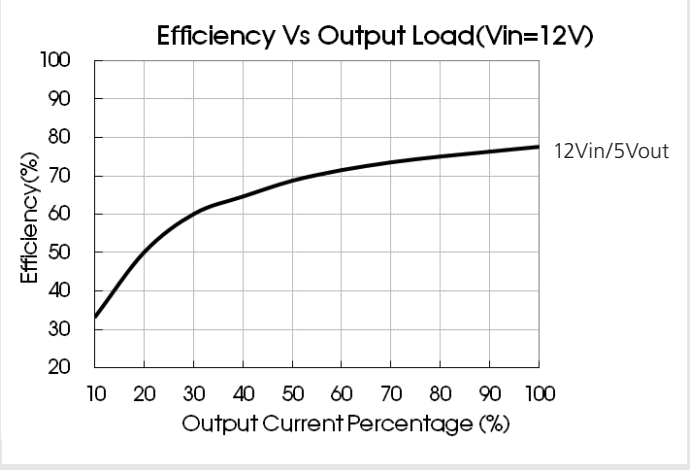
In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side (The sum of the efficient power and resistor consumption power is not less than 10%).

Electrical Characteristic Curves



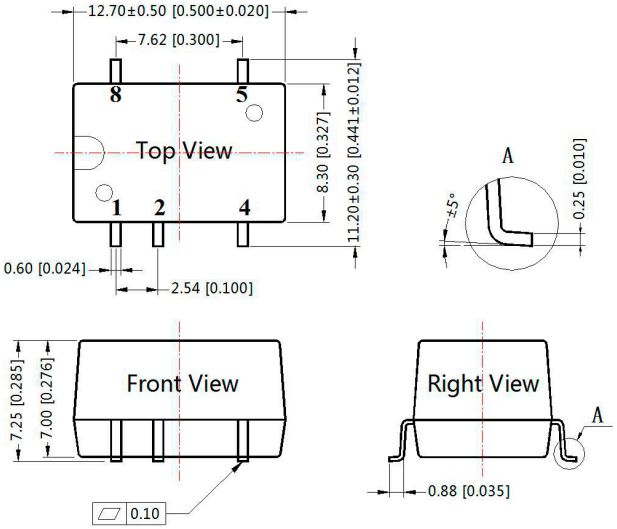




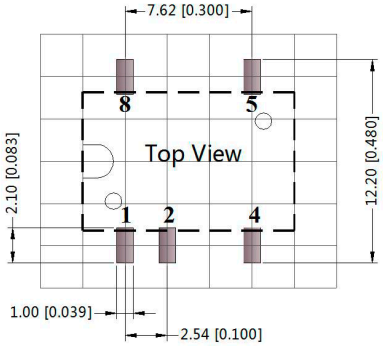


Mechanical Specifications

THIRD ANGLE PROJECTION



Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]



Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Function
1	GND
2	Vin
4	0V
5	+Vo
8	NC

NC: Pin to be isolated from circuitry

Notes

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet.
2. The maximum capacitive loads offered were tested at input voltage range and full load.
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25, humidity<75%RH with nominal input voltage and rated output load.

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