

RV1-1W Series

1W 2:1 Regulated Single output



Features

- Wide 2:1 Input Range
- 1500 ~ 3000VDC Isolation
- Fully regulated output
- No minimum load required
- Continuous Short Circuit Protection
- Efficiency up to 80%
- Low Ripple and Noise
- -40°C ~ +90°C Operating Temperature Range



The RV1-1W series is a family of cost effective 1W single output DC-DC converters. These converters are consisted with Non-conductive Black Plastic in a 7-pin SIL package with high performance features such as 1500~3000VDC input/output isolation voltage, continuous short circuit protection with automatic restart and tight line/load regulation. Devices are encapsulated using flame retardant resin. Input voltages of 5, 12 and 24 with output voltage of 5 and 12Vdc. High performance features include high efficiency operation up to 80% and output voltage accuracy of $\pm 2\%$ maximum.

All specifications typical at $T_a = 25^\circ\text{C}$, nominal input voltage and full load unless otherwise specified.

OUTPUT SPECIFICATIONS		GENERAL SPECIFICATIONS	
Output Voltage Accuracy	$\pm 2\%$, max.	Efficiency	See table, typ.
Output Current	See table, max.	I/O Isolation Voltage (60sec)	1500~3000Vdc
Line Regulation	$\pm 0.2\%$, max.	I/O Isolation Capacitance	70pF, typ.
Load Regulation (0% to 100%)	$\pm 1.0\%$, max.	I/O Isolation Resistance	1000M Ω , min.
Ripple & Noise (20MHz bandwidth) (1)	50mVpk-pk, max.	Switching Frequency	150~550KHz
Short Circuit Protection	Continuous(Automatic Recovery)	Humidity	95% rel H
Temperature Coefficient	$\pm 0.02\%/^\circ\text{C}$	Reliability Calculated MTBF (MIL-HDBK-217 F)	> 2.8Mhrs
Capacitive Load (2)	See table, max.	Safety Standard (designed to meet)	IEC/UL/EN 60950-1 IEC/UL/EN 62368-1
Transient Recovery Time (3)	500 μs , typ.		
Transient Response Deviation (3)	$\pm 3\%$, max.		
INPUT SPECIFICATIONS		ABSOLUTE MAXIMUM RATINGS (6)	
Input Voltage Range	See table.	These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.	
Input Filter	Capacitors	Input Surge Voltage (1000mS)	
Input Current (No-Load)	See table, max.	05 Models	15Vdc, max.
Input Current (Full-Load)	See table, typ.	12 Models	25Vdc, max.
Input Reflected Ripple Current (4)	35mA _{pk-pk} , typ.	24 Models	50Vdc, max.
		Soldering Temperature	260°C, max.
		(1.5mm from case 10sec max.)	
PHYSICAL SPECIFICATIONS		EMC SPECIFICATIONS	
Case Material	Non-conductive Black Plastic(UL94V-0 rated)	Radiated Emissions	EN55032 CLASS B
Pin Material	C5191R-H Solder-coated	Conducted Emissions (7)	EN55032 CLASS B
Potting Material	Epoxy (UL94V-0 rated)	ESD	IEC 61000-4-2 Perf. Criteria A
Weight	3.1g	RS	IEC 61000-4-3 Perf. Criteria A
Dimensions	0.76"x0.28"x0.39"	EFT (8)	IEC 61000-4-4 Perf. Criteria A
		Surge (8)	IEC 61000-4-5 Perf. Criteria A
		CS	IEC 61000-4-6 Perf. Criteria A
		PFMF	IEC 61000-4-8 Perf. Criteria A
ENVIRONMENT SPECIFICATIONS			
Operating Ambient Temperature	-40°C ~ +90°C(See Derating Curve) -40°C ~ +85°C(For 100% load)		
Maximum Case Temperature	105°C		
Storage Temperature	-55°C~125°C		
Cooling (5)	Nature Convection		

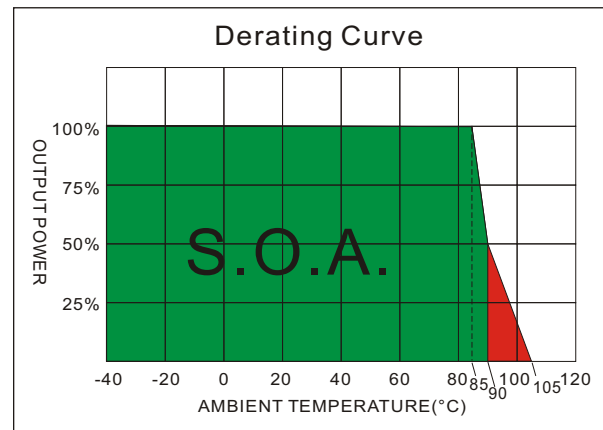
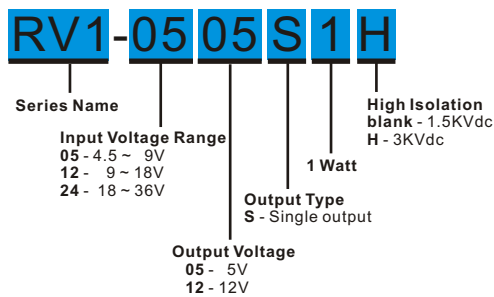
NOTE

1. Measured with a 0.1 μF ceramic disc capacitor and a 10 μF electrolytic capacitor.
2. Tested by minimal V_{in} and constant resistive load.
3. Tested by nominal V_{in} and 25% load step change (75%-50%-25% of I_o).
4. Measured with a simulated source inductance of 12 μH and a source capacitor C_{in} (47 μF , ESR<1.0 Ω at 100KHz).
5. "Nature Convection" is usually about 30-65 LFM but not equal to still air (0 LFM).
6. Exceeding the absolute ratings of the unit could cause damage. It is not allowed for continuous operating.
7. Input filter components are be required to help meet conducted emission class B, 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 Motien suggest: Nippon chemi-con KY series, 330 μF /100V.

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PART NUMBER STRUCTURE



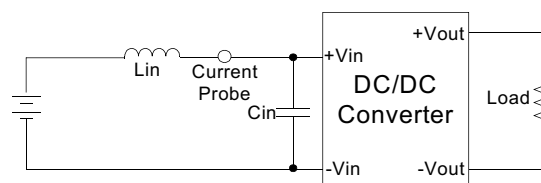
MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current		OUTPUT Voltage (Vdc)	OUTPUT Current		EFFICIENCY @FL (% , typ.)	Capacitor Load @FL (μF, max.)
		No-Load (mA, max.)	Full Load (mA, typ.)		Min. load (mA)	Full load (mA)		
RV1-0505S1	4.5 - 9	35	263	5	0	200	76	1680
RV1-0512S1	4.5 - 9	35	253	12	0	83	79	820
RV1-1205S1	9 - 18	20	107	5	0	200	78	1680
RV1-1212S1	9 - 18	20	105	12	0	83	80	820
RV1-2405S1	18 - 36	10	54	5	0	200	78	1680
RV1-2412S1	18 - 36	10	52	12	0	83	80	820

TEST CONFIGURATIONS

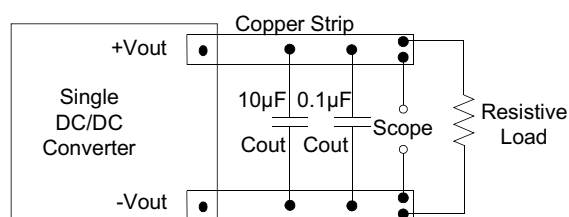
Input Reflected Ripple Current Test

Input reflected ripple current is measured with a source inductor L_{in} (12μH) and a source capacitor C_{in} (47μF, ESR<1.0Ω at 100KHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

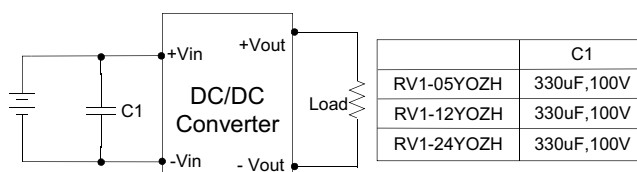
Use a C_{out} 0.1μF ceramic capacitor and a C_{out} 10μF electrolytic capacitor. The Scope measurement bandwidth is 20MHz.



DESIGN & FEATURE CONFIGURATIONS

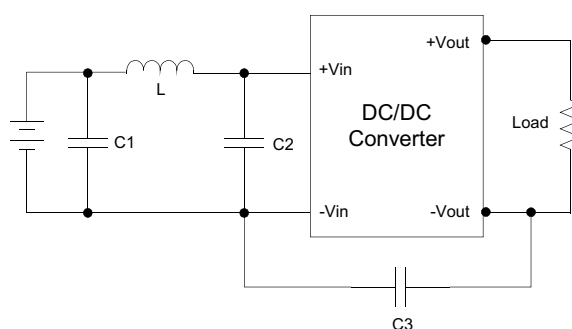
EFT & SURGE Filter

Input components (C1) are used to help meet surge test requirement for the module.



EMI Filter

Input filter components (C1~C3, L1) are used to help meet conducted emissions. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



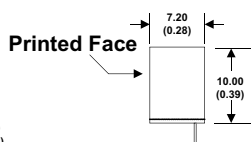
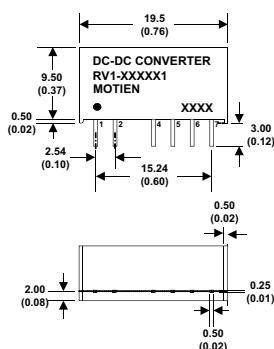
Recommended external EMI filter for class A:

	C1	C2	C3	L
RV1-05YOZH	1206,4.7μF/50V		1808,220pF/3KV	4.7μH
RV1-12YOZH	1206,4.7μF/50V		1808,220pF/3KV	4.7μH
RV1-24YOZH	1206,4.7μF/50V		1808,220pF/3KV	18μH

Recommended external EMI filter for class B:

	C1	C2	C3	L
RV1-05YOZH	1206,4.7μF/50V		1808,220pF/3KV	18μH
RV1-12YOZH	1206,4.7μF/50V		1808,220pF/3KV	18μH
RV1-24YOZH	1206,4.7μF/50V	1206,4.7μF/50V	1808,470pF/3KV	18μH

MECHANICAL SPECIFICATIONS



7 Pin SIL Package

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. Pin to case tolerance: ±0.5 (±0.02)
 4. Case Tolerance: ±0.5 (±0.02)

PIN CONNECTIONS

PIN NUMBER	SINGLE	SINGLE-H
1	+V Input	+V Input
2	-V Input	-V Input
4	-V Output	N.P.
5	N.P.	-V Output
6	+V Output	N.P.
7	N.P.	+V Output