Features

Unregulated Converters

- Low cost 1W converter
- Power sharing on dual output versions
- 1kVDC/1s or 2kVDC/1s isolation option
- Optional continuous short circuit protection
- Efficiency up to 85%
- UL94V-0 package material

RECOM
DC/DC Converter

RB

1 Watt SIP7 Single and Dual Output

3 YEAR warranty

Description

The RB series DC/DC converter has been designed for isolating or converting DC power rails in general purpose applications. Although low cost, it does not compromise on features and offers 1KVDC/1s or 2kVDC/1s isolation, a –40°C to +85°C operating temperature range and optional continuous short circuit protection.

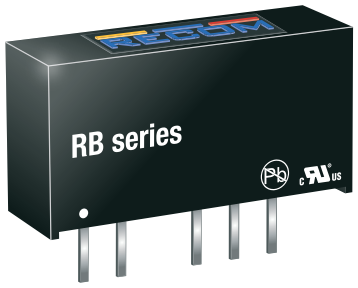
Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. (1) [%]	max. Capacitive Load (2) [µF]
RB-xx3.3S(3,4)	3.3, 5, 12, 15, 24	3.3	303	75	2200
RB-xx05S (3,4)	3.3, 5, 12, 15, 24	5	200	70-78	2200
RB-xx09S (3,4)	3.3, 5, 12, 15, 24	9	111	70-78	1000
RB-xx12S (3,4)	3.3, 5, 12, 15, 24	12	84	78-80	470
RB-xx15S (3,4)	3.3, 5, 12, 15, 24	15	66	80-84	470
RB-xx24S (3,4)	3.3, 5, 12, 15, 24	24	42	74-85	220
RB-xx3.3D (3,4)	3.3, 5, 12, 15, 24	±3.3	±152	70	±1000
RB-xx05D (3,4)	3.3, 5, 12, 15, 24	±5	±100	70-78	±1000
RB-xx09D (3,4)	3.3, 5, 12, 15, 24	±9	±56	76-79	±470
RB-xx12D (3,4)	3.3, 5, 12, 15, 24	±12	±42	78-82	±220
RB-xx15D (3,4)	3.3, 5, 12, 15, 24	±15	±33	80-84	±220
RB-xx24D (3,4)	3.3, 5, 12, 15, 24	±24	±21	80-84	±100

Notes:

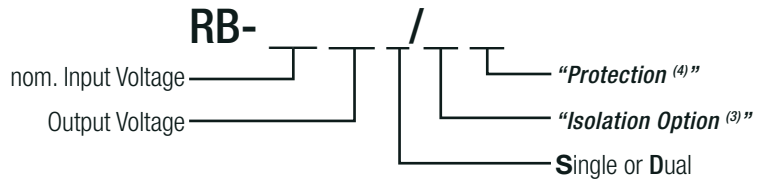
Note1: Efficiency is tested at nominal input and full load at +25°C ambient

Note2: Max Cap Load is tested at nominal input and full resistive load and is defined as the capacitive load that will allow start up in under 1s without damage to the converter



UL60950-1 certified
CAN/CSA-C22.2 No 60950-1 certified
IEC/EN60950-1 certified
EN55032 compliant

Model Numbering



Notes:

Note3: standard part is without Continuous Short Circuit Protection
add suffix „/P“ for Continuous Short Circuit Protection

Note4: standard part is with 1kVDC/1s Isolation
add suffix „/H“ for 2kVDC/1s Isolation
or add suffix „/HP“ for 2kVDC/1s Isolation and Continuous Short Circuit Protection

Ordering Examples:

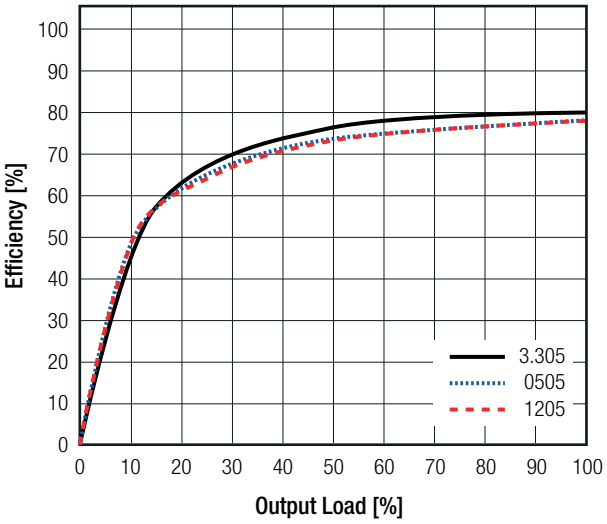
RB-123.3/P: 12VDC Input Voltage, 3.3VDC Output Voltage, Single Output with continuous short circuit protection and 1kVDC/1s isolation
RB-0509D/HP: 5VDC Input Voltage, ±9VDC Output Voltage, Dual Output with continuous short circuit protection and 2kVDC/1s isolation

Specifications (measured @ Ta= 25°C, nom. Vin, full load otherwise stated)

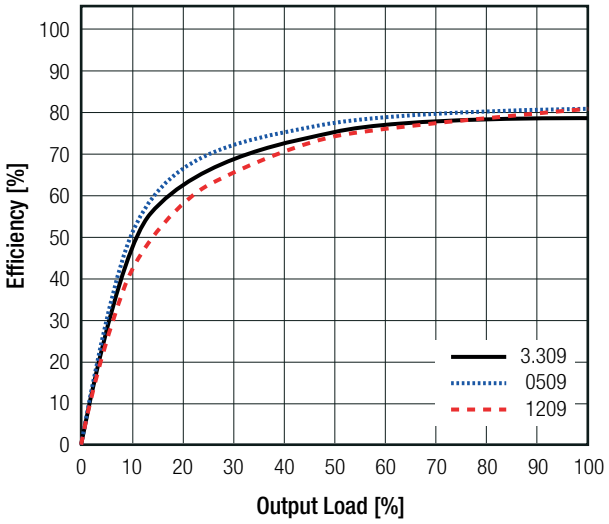
BASIC CHARACTERISTICS					
Parameter	**Condition**		**Min.**	**Typ.**	**Max.**
Internal Input Filter					capacitor
Input Voltage Range				±10%	
Minimum Load			0%		
Internal Operating Frequency			50kHz	100kHz	105kHz
Output Ripple and Noise	20MHz BW	Single output Dual output			100mVp-p ±75mVp-p

Efficiency vs. Load

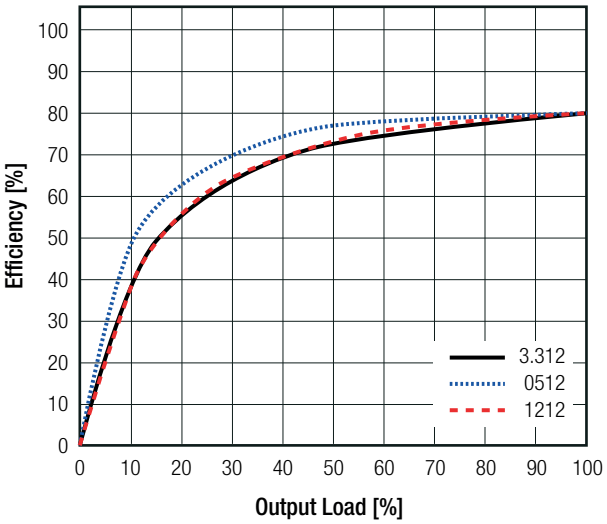
RB-xx05S



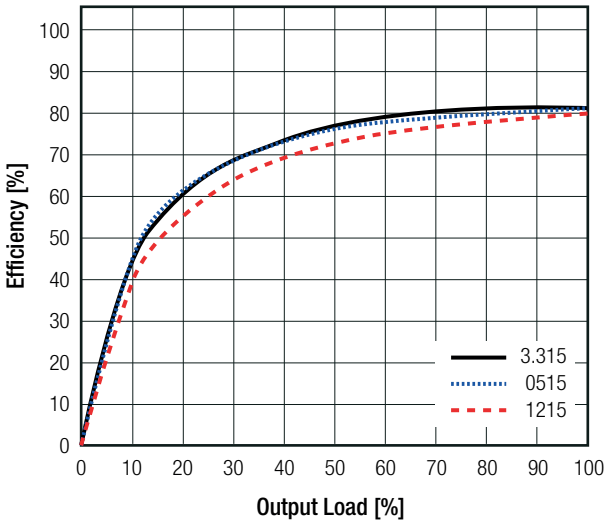
RB-xx09S



RB-xx12S



RB-xx15S



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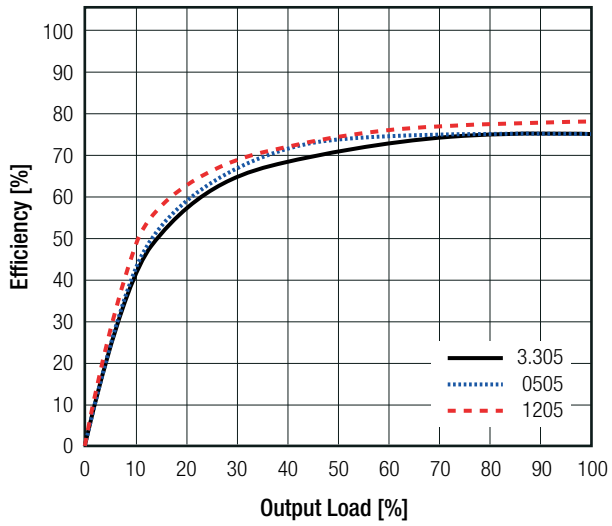
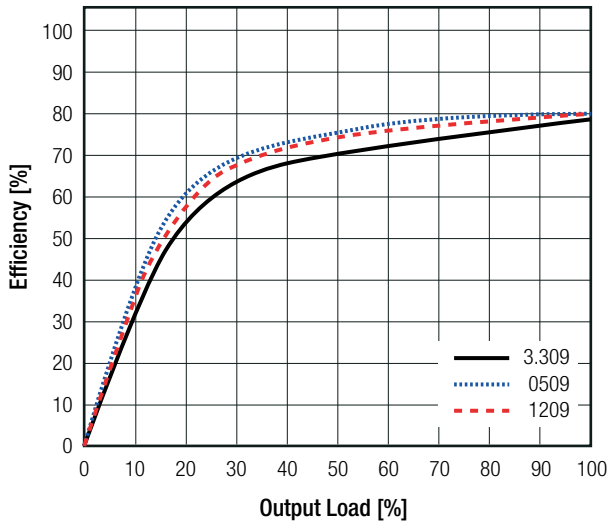
Specifications (measured @ Ta= 25°C, nom. Vin, full load otherwise stated)

Efficiency vs. Load

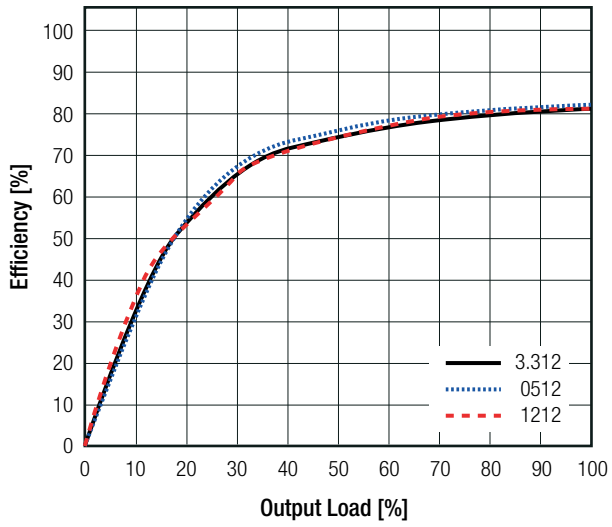
RB-xx05D



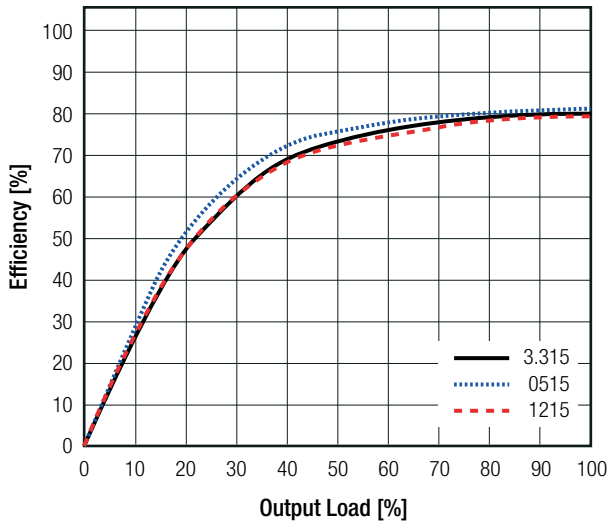
RB-xx09D



RB-xx12D



RB-xx15D



REGULATIONS			
Parameter	**Condition**		**Value**
Output Accuracy			±5.0% typ.
Line Regulation	low line to high line		±1.2% of 1.0% Vin typ.
Load Regulation (5)	10% to 100% load	3.3, 5Vout 9, 12, 15, 24Vout	15.0% max. 10.0% max.

Notes:

Note5: Operation below 10% load will not harm the converter, but specifications may not be met

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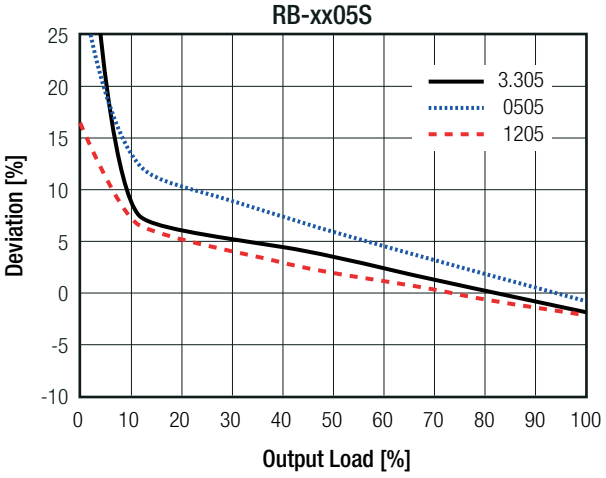
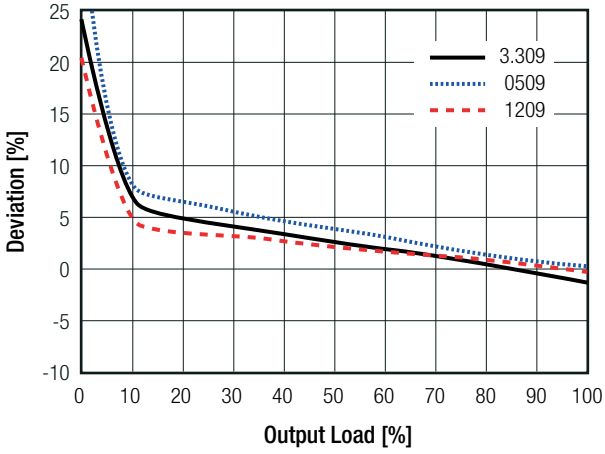
Specifications (measured @ Ta= 25°C, nom. Vin, full load otherwise stated)

Deviation vs. Load

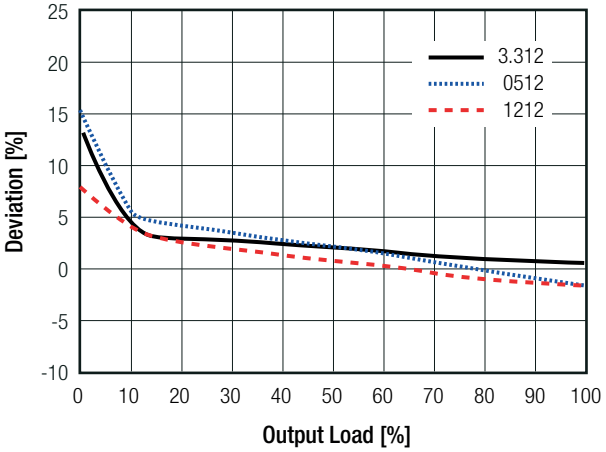
RB-xx05S



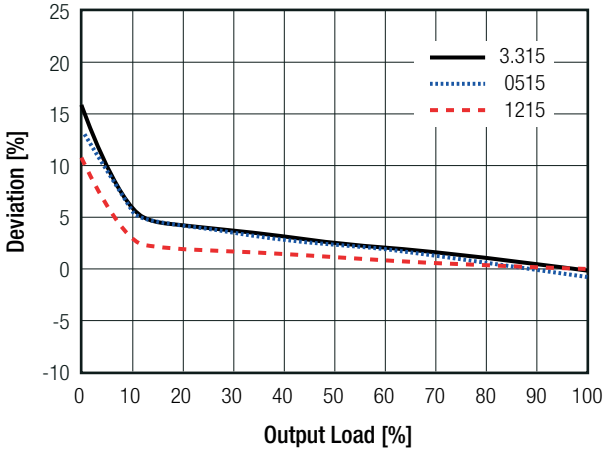
RB-xx09S



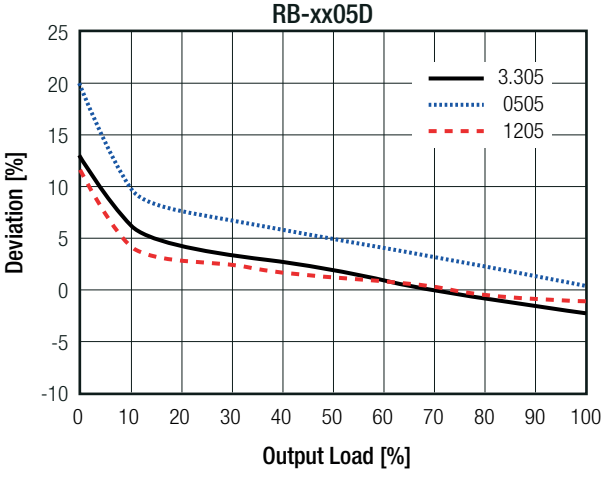
RB-xx12S



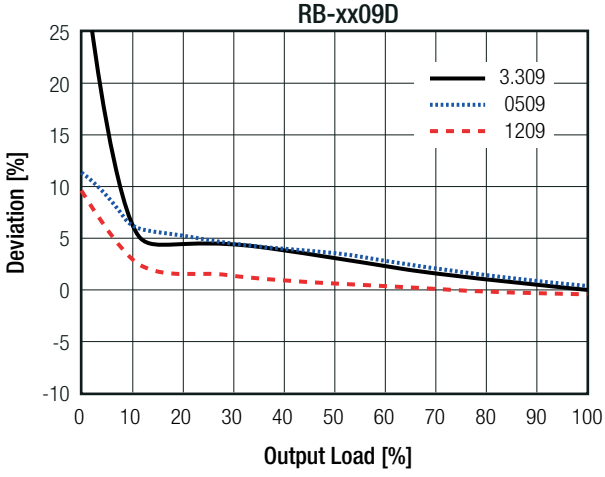
RB-xx15S



RB-xx05D



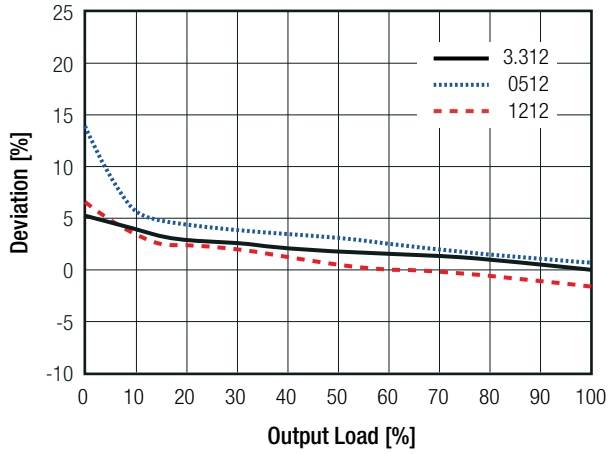
RB-xx09D



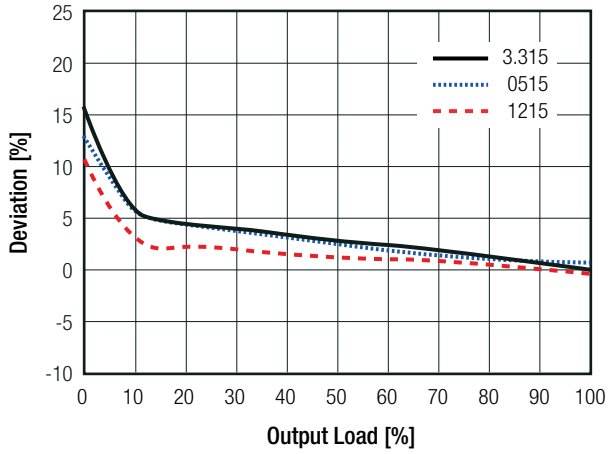
Specifications (measured @ Ta= 25°C, nom. Vin, full load otherwise stated)

Deviation vs. Load

RB-xx12D



RB-xx15D



PROTECTIONS

Parameter	Type			Value
Short Circuit Protection (SCP)	without suffix with suffix "/P"			1 second continuous
Isolation Voltage [6]	I/P to O/P	without suffix	tested for 1 second rated for 1 minute	1kVDC 500VAC/60Hz
		with suffix "/H"	tested for 1 second rated for 1 minute	2kVDC 1kVAC/60Hz
Isolation Resistance				10GΩ min.
Isolation Capacitance				20pF min. / 75pF max.
Insulation Grade				basic (IEC/EN60950-1) functional (IEC/EN60601-1)

Notes:

Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note7: Refer to local saftey regulations if input over-current protection is also required. Recommended fuse: slow blow type

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	full load @ free air convection, refer to ***"Derating Graph"***		-40°C to +85°C
Maximum Case Temperature			+105°C
Temperature Coefficient			±0.03%/K typ.
Thermal Impedance			56K/W typ.
Operating Altitude			3000m
Operating Humidity	non-condensing		95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +85°C	16400 x 10^3 hours 10200 x 10^3 hours

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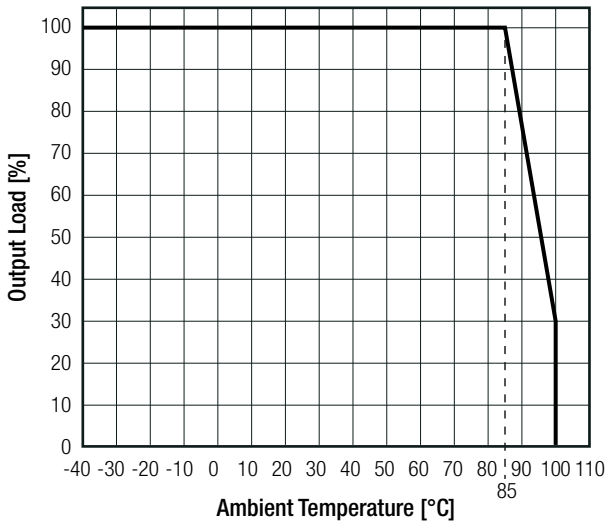
Specifications (measured @ Ta= 25°C, nom. Vin, full load otherwise stated)

Derating Graph
(@ free air convection)

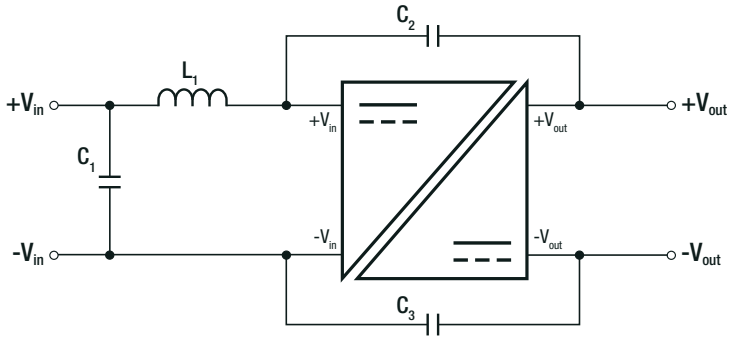


SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E358085-A4-UL	UL60950-1, 2nd Edition:2007 CAN/CSA C22.2 No. 60950-1-03, 2nd Edition:2007
Information Technology Equipment, General Requirements for Safety	LVD1602031	IEC60950-1:2005, 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013
Medical Electrical Equipment Part 1: General Requirements for Basic Safety and Essential Performance	WD-SE-R-180677-A0	IEC60601-1:2005 + A1:2012, 3rd Edition EN60601-1:2006 + A12:2014
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS 2		RoHS-2011/65/EU + AM-2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	with external filter (see filter suggestion below)	EN55032, Class A and B

EMC Filter Suggestion according to EN55032



Component List Class A

MODEL	C1	L1	C2 (safety)	C3 (safety)
RB-0505S	10µF 100V MLCC	N/A	N/A	2.2nF
RB-1205S				
RB-2405S				

Component List Class B

MODEL	C1	L1	C2 (safety)	C3 (safety)
RB-0505S	10µF 100V MLCC	22µH choke RLS-226	1nF	2.2nF
RB-1205S				
RB-2405S				

Notes:

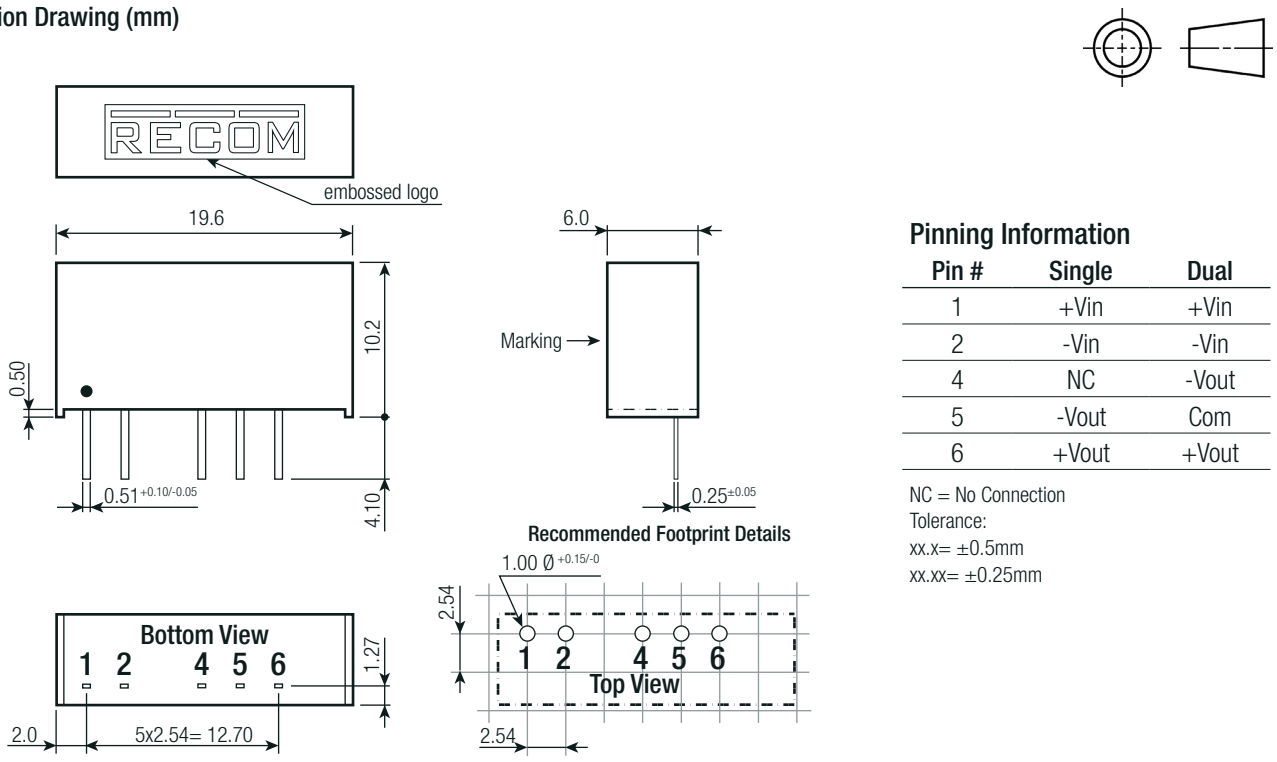
Note8: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

Specifications (measured @ Ta= 25°C, nom. Vin, full load otherwise stated)

DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case potting PCB	non-conductive black plastic, (UL94 V-0) epoxy, (UL94 V-0) FR4, (UL94 V-0)
Dimension (LxWxH)		19.6 x 6.0 x 10.2mm
Weight		2.2g typ.

Dimension Drawing (mm)



Pinning Information

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	NC	-Vout
5	-Vout	Com
6	+Vout	+Vout

NC = No Connection
Tolerance:
xx.x= ±0.5mm
xx.xx= ±0.25mm

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 16.0 x 9.0mm
Packaging Quantity	tube	25pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95% RH max.

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