

# Features

## Unregulated Converters

- Low cost 1W converter
- 1:1 input voltage range
- SIP7 package
- 1kVDC isolation
- Efficiency up to 80%
- UL60950-1, CAN/CSA C22.2 No. 60950-1 certified

### Description

The RFB DC/DC converter is typically used in cost sensitive general purpose power isolation and voltage matching applications. Despite its low cost, it is a fully specified converter with 1kVDC isolation, industrial operating temperature range of -40°C to +85°C without derating and UL/EN certifications.

### Selection Guide

Part Number	Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency <sup>(1)</sup> max. [%]	Max. Capacitive Load <sup>(2)</sup> [μF]
RFB-0505S	5	5	200	80	1000

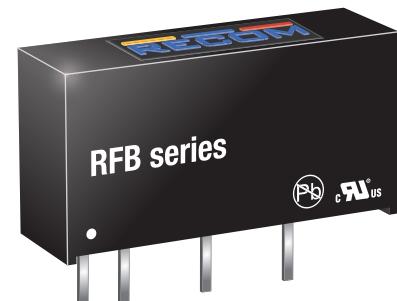
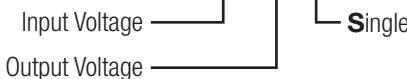
#### Notes:

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

### Model Numbering

**RFB-0505S**



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

### Specifications (measured @ Ta= 25°C, nominal input voltage, full load and after warm-up)

#### BASIC CHARACTERISTICS

Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				capacitor
Input Voltage Range			±10%	
Input Surge Voltage	100μs	-0.65VDC		9VDC
Input Current	max. load		250mA	
Quiescent Current	nom. Vin= 5VDC		25mA	30mA
Minimum Load <sup>(3)</sup>		0%		
Internal Operating Frequency		50kHz	82kHz	105kHz
Output Ripple and Noise <sup>(4)</sup>	20MHz BW		55mVp-p	100mVp-p
Reflected Back Ripple Current	20MHz BW, no external choke		20mA <sub>p-p</sub>	

#### Notes:

Note3: Operation below 10% load won't harm the converter, but specifications may not be met

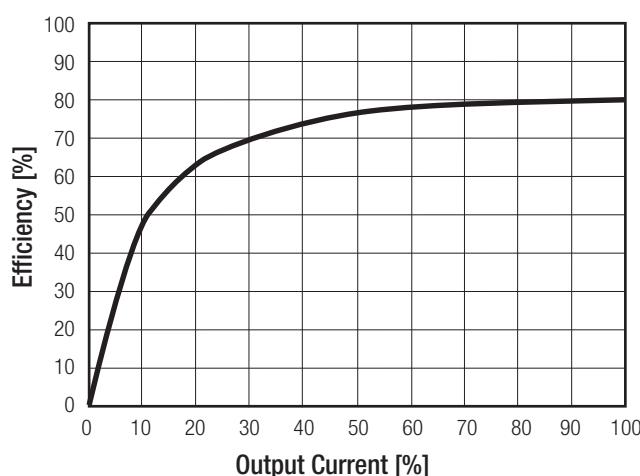
Note4: Measurements are made with a 100nF MLCC across output (low ESR)

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Specifications (measured @  $T_a = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up)

#### Efficiency vs. Load

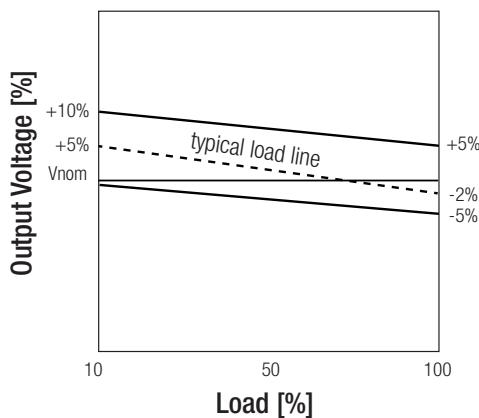
(nominal  $V_{in} = 5\text{VDC}$ )



#### REGULATIONS

Parameter	Condition	Values
Output Accuracy		-2% typ. / $\pm 5.0\%$ max.
Line Regulation	low line to high line, full load	$\pm 1.2\%$ typ. / 1.0% max.
Load Regulation	10% to 100%	$\pm 10\%$ typ. / $\pm 15\%$ max.

#### Tolerance Envelope



#### PROTECTIONS

Parameter	Condition	Value
Short Circuit Protection (SCP)	below $100\text{m}\Omega$	short term protection mode
Isolation Voltage <sup>(5)</sup>	I/P to O/P	tested for 1 second rated for 1 minute
Isolation Resistance		$1\text{G}\Omega$ min.
Isolation Capacitance		$75\text{pF}$ max.
Leakage Current	500VAC, 50Hz	$1\mu\text{A}$ max.
Insulation Grade		Functional

#### Notes:

Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage

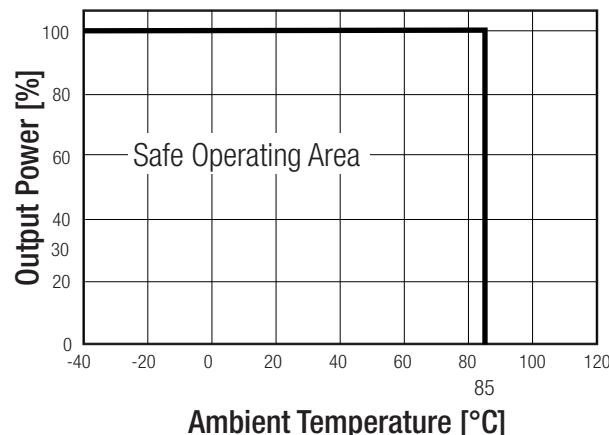
Specifications (measured @  $T_a = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up)

**ENVIRONMENTAL**

Parameter	Condition	Value
Operating Temperature Range	(@ natural convection 0.1m/s) (see graph)	-40°C to +85°C
Maximum Case Temperature		+105°C
Temperature Coefficient		$\pm 0.05\%/\text{C}$
Thermal Impedance	0.1m/s, horizontal direction	40°C/W
Operating Altitude		2000m
Operating Humidity	non-condensing	95% RH max.
Pollution Degree		PD2
Vibration		MIL-STD-202G
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +85°C 13200 x 10 <sup>3</sup> hours 5200 x 10 <sup>3</sup> hours

**Derating Graph**

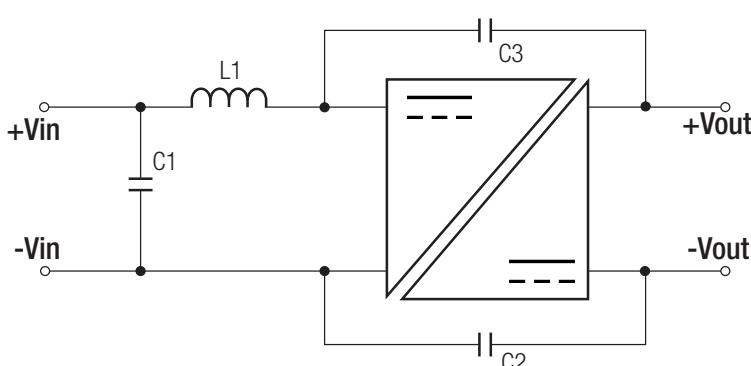
(@ Chamber and natural convection 0.1m/s)



**SAFETY AND CERTIFICATIONS (designed to meet)**

Certificate Type (Safety)	Report/File Number	Standard
Information Technology Equipment, General Requirements for Safety	E358085-A4	UL60950-1, 2nd Edition, 2007
		CSA C22.2 No. 60950-1-07, 2nd Edition, 2007
RoHS 2+		RoHS 10/10, 2015
EMC Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	with external filter (see below filter suggestion)	EN55032, Class A, B

**EMC Filtering - Suggestions for Class A and B**



Component List Class A			
C1	L1	C2	C3
6.8µF	-	-	-

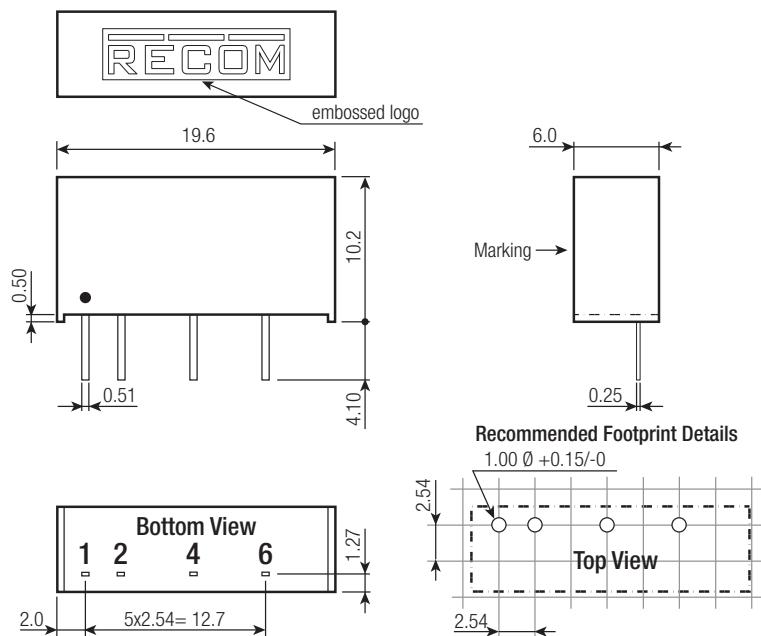
Component List Class B			
C1	L1	C2	C3
10µF	22µH	1nF/1kV	2.2nF/1kV

Specifications (measured @  $T_a = 25^\circ\text{C}$ , nominal input voltage, full load and after warm-up)

## DIMENSION AND PHYSICAL CHARACTERISTICS

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

## Dimension Drawing (mm)



## Pin Connections

Pin #	Function
1	-Vin
2	+Vin
4	-Vout
6	+Vout

Tolerance: xx.x=  $\pm 0.5\text{mm}$   
xx.xx=  $\pm 0.25\text{mm}$ Pin tolerance:  
Thickness:  $\pm 0.05\text{mm}$   
Length:  $+0.25/-0.50\text{mm}$ 

## PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 16.0 x 9.0mm
Packaging Quantity		25pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity		5% - 95%, RH

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