Features

Regulated Converters

- 1kVDC/1s or 2kVDC/1s isolation
- SMD package style
- UL94 V-0 package material
- Optional continuous short circuit protection
- Toroidal magnetics

RECOM
DC/DC Converter

R1Z

1 Watt SMD Miniature Single Output

3 YEAR warranty

Description

The R1Z series DC/DC converter has been designed for isolating or converting DC power rails where an SMD format with regulated output is required, although it is no larger than a standard unregulated SMD converter.



Selection Guide

Part Number	nom. Input Voltage [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. (1) [%]	max. Capacitive Load (2) [µF]
R1Z-xx3.3	3.3, 5, 12, 15, 24	3.3	303	55	3300
R1Z-xx05	3.3, 5, 12, 15, 24	5	200	60	3300
R1Z-xx09	3.3, 5, 12, 15, 24	9	111	60	680
R1Z-xx12	3.3, 5, 12, 15, 24	12	84	63	680
R1Z-xx15	3.3, 5, 12, 15, 24	15	66	65	470

Notes:

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

Note2: Maximum capacitive load is defined as the capacitive load that will allow start up in under 1 second without damage to the converter

RoHS 2+ compliant 10 from 10 — REACH compliant — c UL us E358085

UL60950-1 certified
CAN/CSA-C22.2 No. 60950-1-07 certified
IEC/EN60950-1 certified
EN55032 compliant

Model Numbering

R1Z- ___ ___ / ___ ___

- nom. Input Voltage
- Output Voltage
- Isolation (3)
- Short Circuit Protection (4)
- Packaging (5)

Notes:

Note3: add suffix "/H" for 2kVDC/1s isolation
without suffix standard 1kVDC/1s isolation (refer to **"PROTECTIONS")**

Note4: add suffix "/P" for Continuous Short Circuit Protection
in combination with "/H", use "/HP" (refer to **"PROTECTIONS"**)

Note5: add suffix "-R" for Tape and Reel Packaging, without suffix standard tube packaging (refer to **"PACKAGING INFORMATION"**)

Ordering Examples:

R1Z-2405/P:	24Vin	5Vout	1kVDC/1s Isolation	SCP function	Tube Packaging
R1Z-0512/H:	5Vin	12Vout	2kVDC/1s Isolation	no SCP function	Tube Packaging
R1Z-2415/HP:	24Vin	15Vout	2kVDC/1s Isolation	SCP function	Tube Packaging
R1Z-1205-R:	12Vin	5Vout	1kVDC/1s Isolation	SCP function	Tape and Reel Packaging

PREFERRED ALTERNATIVES
For new medical applications:
REM2A

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

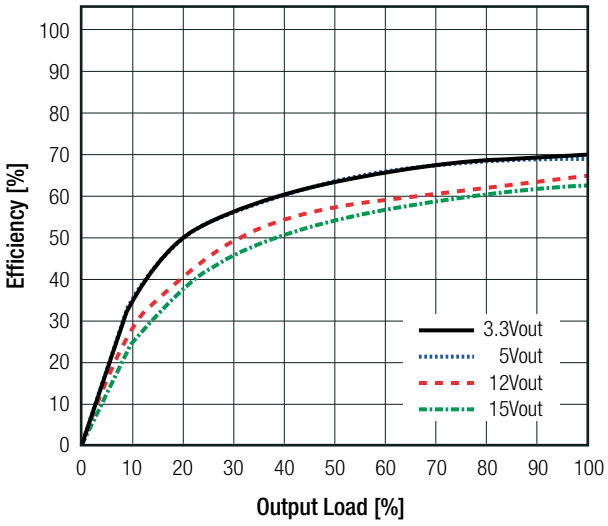
BASIC CHARACTERISTICS				
Parameter	**Condition**	**Min.**	**Typ.**	**Max.**
Internal Input Filter				capacitor
Input Voltage Range			±5%	
No Load Power Consumption		134mW	217mW	350mW
Minimum Load (6)		10%		
Internal Operating Frequency		20kHz	40kHz	80kHz
Output Ripple and Noise	20MHz BW			100mVp-p

Notes:

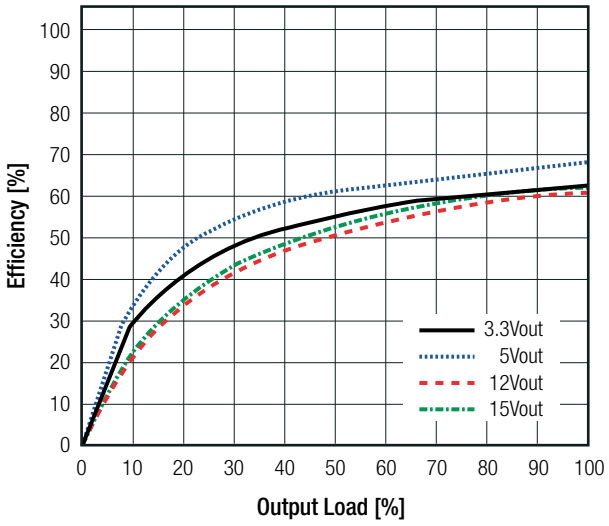
Note6: Operation below 10% load will not harm the converter, but specifications may not be met

Efficiency vs. Load (with SCP function)

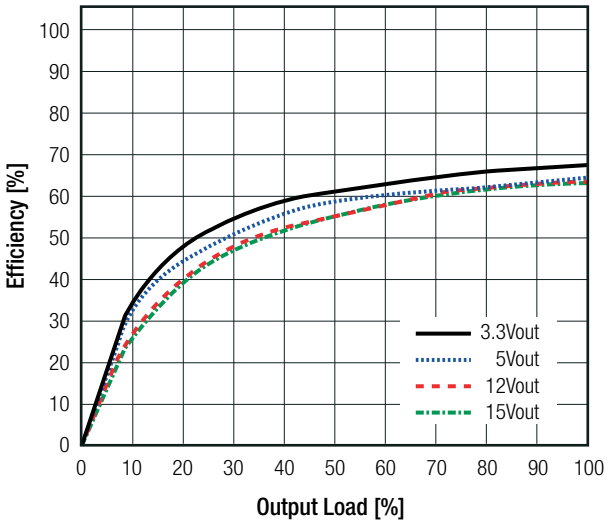
R1Z-3.3xx/P



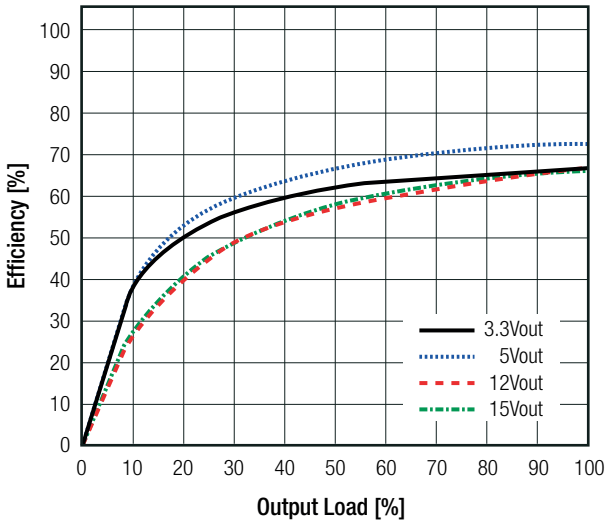
R1Z-05xx/P



R1Z-12xx/P



R1Z-15xx/P

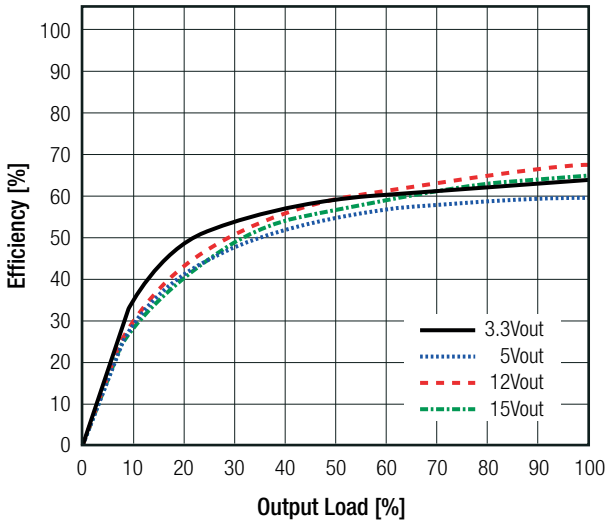


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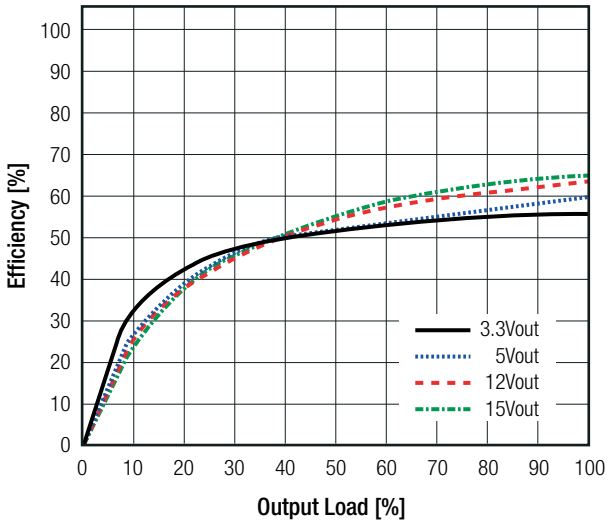
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Efficiency vs. Load (without SCP function)

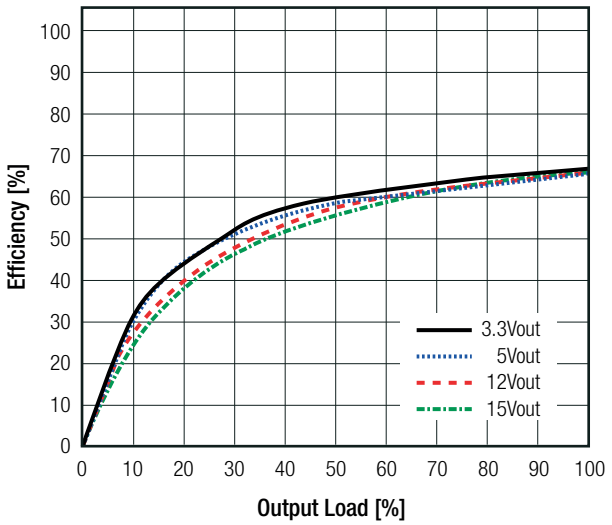
R1Z-3.3xx



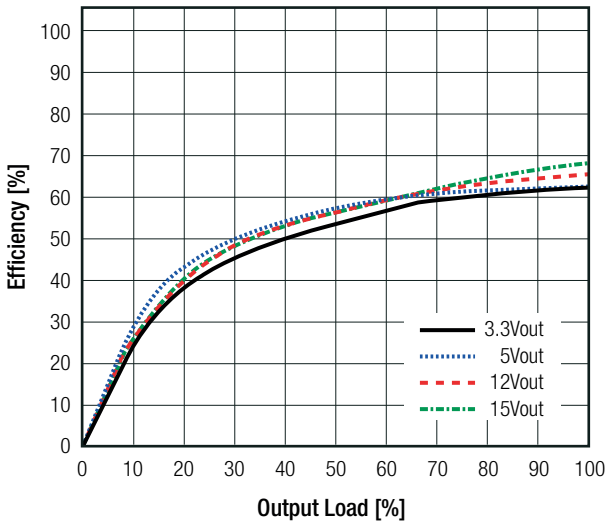
R1Z-05xx



R1Z-12xx



R1Z-15xx



REGULATIONS		
Parameter	**Condition**	**Value**
Output Accuracy		±2% max.
Line Regulation	low line to high line, full load	±1% max.
Load Regulation	10% to 100% load	1% max.

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)	below 100mΩ	without suffix with suffix "/P"	1 second continuous
Isolation Voltage [7]	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			70pF typ./ 100pF max.
Insulation Grade			functional

Notes:

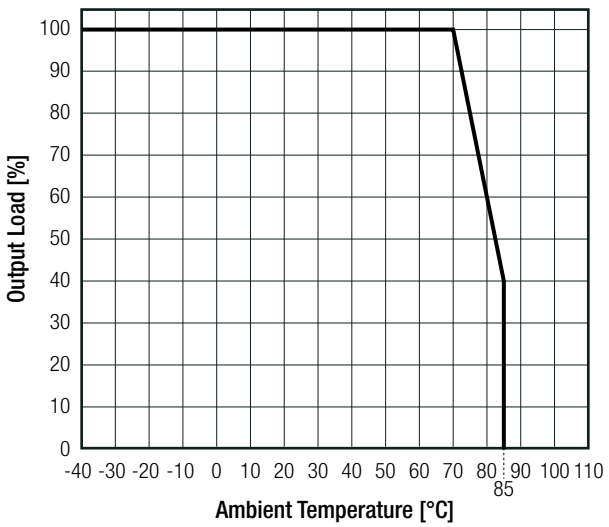
Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note8: Refer to local safety regulations if input over-current protection is also required. Recommended fuse: slow blow type

ENVIRONMENTAL

Parameter	Condition			Value
Operating Temperature Range	without derating (see graph)			-40°C to +70°C
Thermal Impedance	@natural convection			32K/W
Operating Altitude				3000m
Operating Humidity	non-condensing			95% RH max.
Pollution Degree				PD2
MTBF	according to MIL-HDBK-217F, G.B.	R1Z series	+25°C +70°C	2495 x 10^3 hours 1100 x 10^3 hours
		R1Z/P series	+25°C +70°C	2387 x 10^3 hours 641 x 10^3 hours

Derating Graph
(@ Chamber and natural convection 0.1m/s)

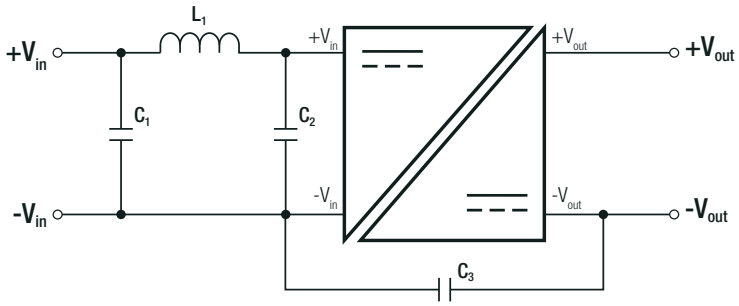


Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	**Report Number**	**Standard**
Information Technology Equipment, General Requirements for Safety (LVD)	SPCLVD1605077-08	IEC60950-1:2005, 2nd Edition, A2: 2013 EN60950-1:2006, A2:2013
Information Technology Equipment, General Requirements for Safety	E358085-A2	UL60950-1, 2nd Edition, 2007 CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2007
Medical Electric Equipment, General Requirements for Safety and Essential Performance	SPC1005061	IEC 60601-1:1988+A2:1995 EN 60601-1:1990+A13:1996
RoHS2		RoHS-2011/65/EU + AM-2015/863

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

EMC Filtering Suggestions according to EN55032



Component List Class A

MODEL	C1	L1	C2	C3
R1Z-0505S/H2	10µF	N/A	10µF	1nF
R1Z-1205S/H2	N/A			N/A
R1Z-2405S/H2				
R1Z-4805S/H2				

Component List Class B

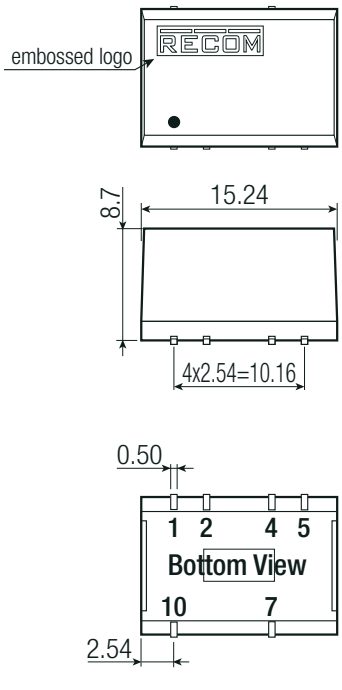
MODEL	C1	L1	C2	C3
R1Z-0505S/H2	10µF	3.9µH RLS-397	N/A	1nF
R1Z-1205S/H2				
R1Z-2405S/H2		12µH RLS-126		
R1Z-4805S/H2				

DIMENSION AND PHYSICAL CHARACTERISTICS		
Parameter	**Type**	**Value**
Material	case	non conductive-black plastic, (UL94 V-0)
Dimension (LxWxH)		15.24 x 10.7 x 9.0mm
Weight		1.6g typ.

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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing (mm)



Pinning Information

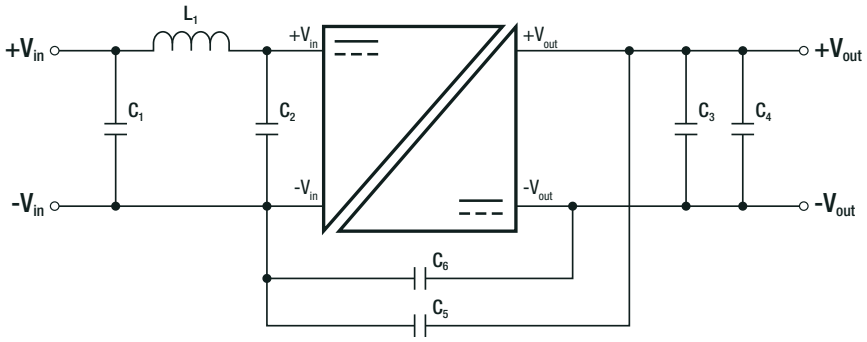
Pin #	Single
1	-Vin
2	+Vin
4	-Vout
5	-Vout
7	+Vout
10	NC

NC= no connection

Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm

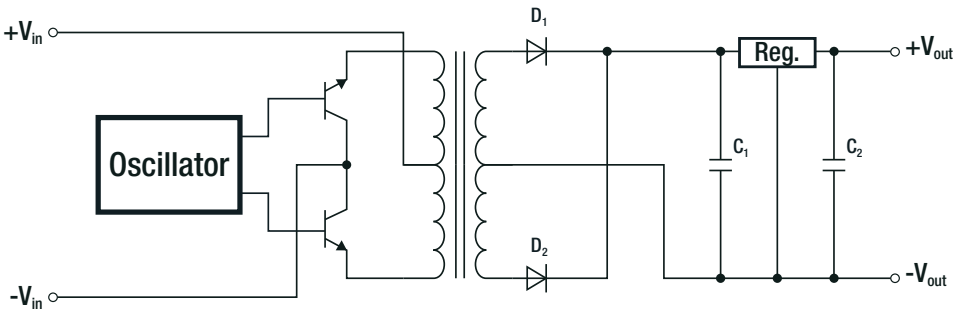
INSTALLATION AND APPLICATION

Low Noise Application



C1, C2, C3, C4	C5, C6	L1
10µF	10nF	4.7µH

Post-regulated Single Output



Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PACKAGING INFORMATION		
Parameter	**Type**	**Value**
Packaging Dimension (LxWxH)	tube tape and reel (carton)	530.0 x 17.0 x 13.0mm 355.0 x 342.0 x 36.0mm
Packaging Quantity	tube tape and reel	33pcs 250pcs
Tape Width		24mm
Storage Temperature Range		-55°C to +105°C
Storage Humidity	non-condensing	95% RH max.

The product information and specifications may be subject to changes even without prior written notice.The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.