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)

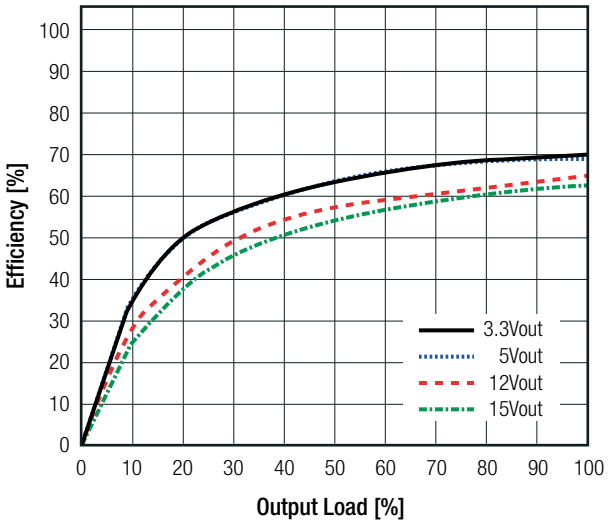
BASIC CHARACTERISTICS				
Parameter	**Condition**	**Min.**	**Typ.**	**Max.**
Internal Input Filter				capacitor
Input Voltage Range			±5%	
No Load Power Consumption		134mW	217mW	350mW
Minimum Load (6)		10%		
Internal Operating Frequency		20kHz	40kHz	80kHz
Output Ripple and Noise	20MHz BW			100mVp-p

Notes:

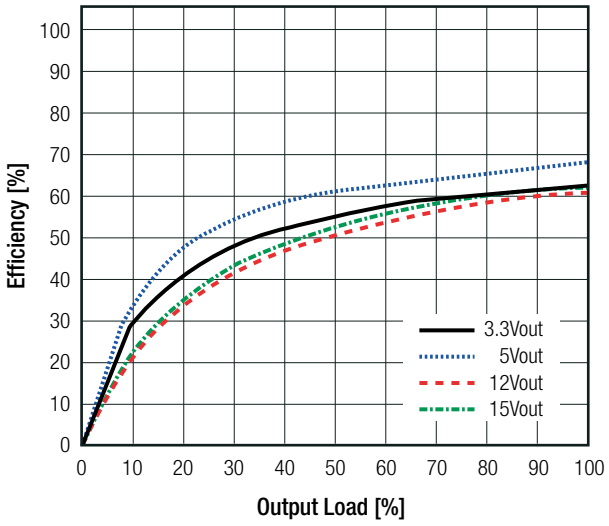
Note6: Operation below 10% load will not harm the converter, but specifications may not be met

Efficiency vs. Load (with SCP function)

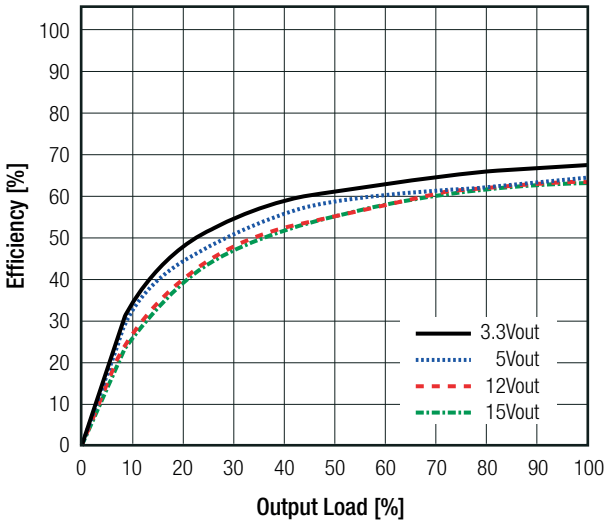
R1Z-3.3xx/P



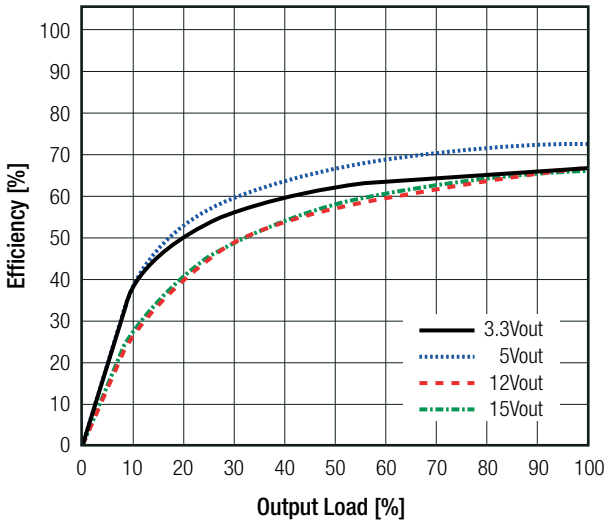
R1Z-05xx/P



R1Z-12xx/P



R1Z-15xx/P



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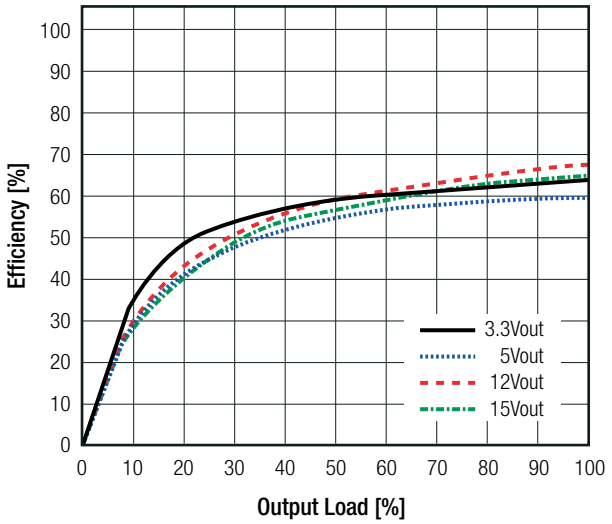
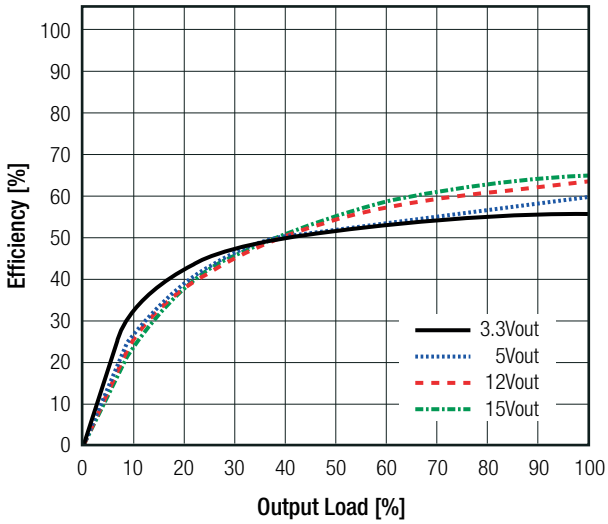
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Efficiency vs. Load (without SCP function)

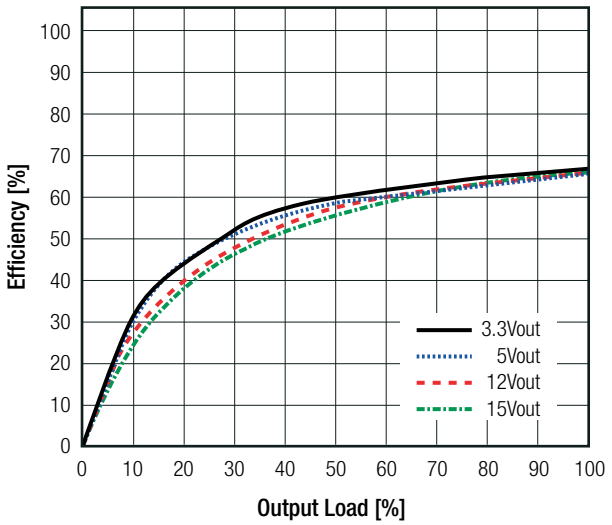
R1Z-3.3xx



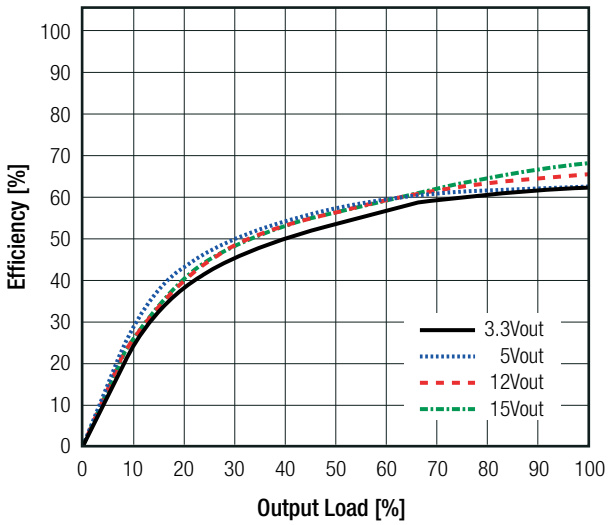
R1Z-05xx



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:

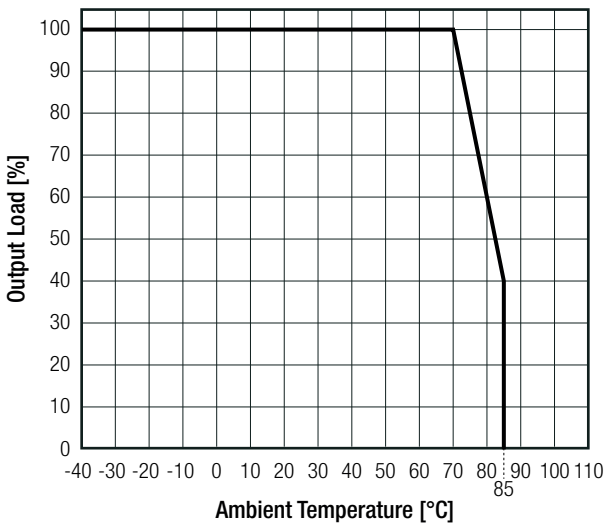
Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

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)

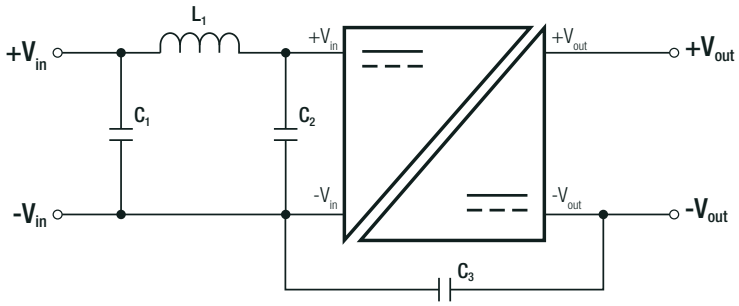


Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

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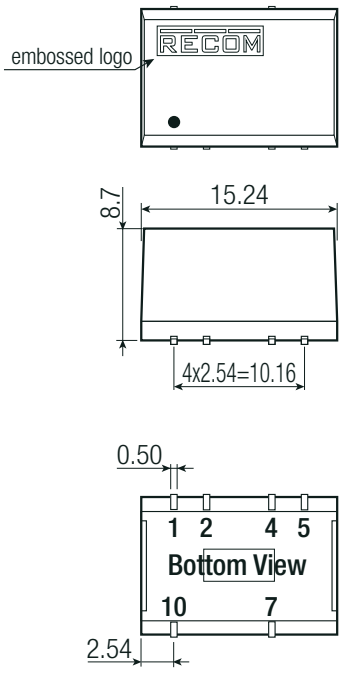
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing (mm)



Pinning Information

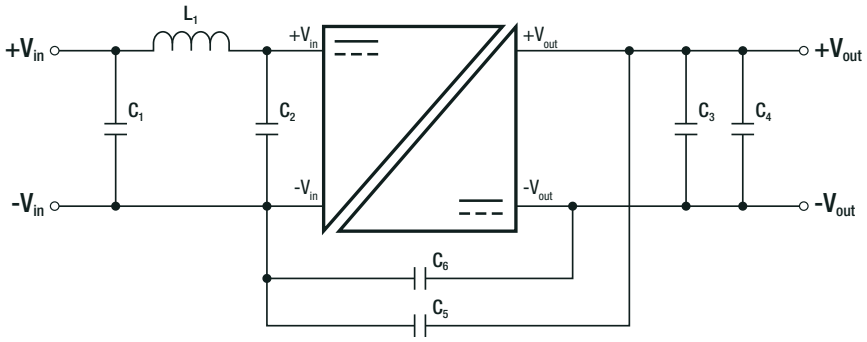
Pin #	Single
1	-Vin
2	+Vin
4	-Vout
5	-Vout
7	+Vout
10	NC

NC= no connection

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

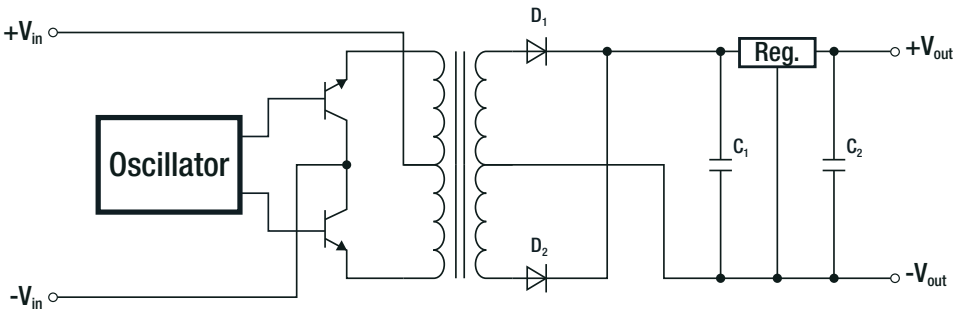
INSTALLATION AND APPLICATION

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.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

RECOM:

R1Z-0505 R1Z-0505/H R1Z-0505/HP R1Z-0505/HP-R R1Z-0505/H-R R1Z-0505/P R1Z-0505/P-R R1Z-0505-R R1Z-0509 R1Z-0509/H R1Z-0509/H-R R1Z-0509-R R1Z-0512 R1Z-0512/H R1Z-0512/H-R R1Z-0512-R R1Z-053.3/HP R1Z-053.3/HP-R R1Z-053.3/P R1Z-053.3/P-R R1Z-1205 R1Z-1205/H R1Z-1205/HP R1Z-1205/HP-R R1Z-1205/H-R R1Z-1205/P R1Z-1205/P-R R1Z-1205-R R1Z-1209 R1Z-1209/H R1Z-1209/H-R R1Z-1209-R R1Z-1212 R1Z-1212/H R1Z-1212/H-R R1Z-1212-R R1Z-123.3/HP R1Z-123.3/HP-R R1Z-123.3/P R1Z-123.3/P-R R1Z-1505 R1Z-1505/H R1Z-1505/HP R1Z-1505/HP-R R1Z-1505/H-R R1Z-1505/P R1Z-1505/P-R R1Z-1505-R R1Z-1509 R1Z-1509/H R1Z-1509/H-R R1Z-1509-R R1Z-1512 R1Z-1512/H R1Z-1512/H-R R1Z-1512-R R1Z-153.3/HP R1Z-153.3/HP-R R1Z-153.3/P R1Z-153.3/P-R R1Z-2405 R1Z-2405/H R1Z-2405/HP R1Z-2405/HP-R R1Z-2405/H-R R1Z-2405/P R1Z-2405/P-R R1Z-2405-R R1Z-2409 R1Z-2409/H R1Z-2409/H-R R1Z-2409-R R1Z-2412 R1Z-2412/H R1Z-2412/H-R R1Z-2412-R R1Z-243.3/HP R1Z-243.3/HP-R R1Z-243.3/P R1Z-243.3/P-R R1Z-3.305 R1Z-3.305/H R1Z-3.305/HP R1Z-3.305/HP-R R1Z-3.305/H-R R1Z-3.305/P R1Z-3.305/P-R R1Z-3.305-R R1Z-3.309 R1Z-3.309/H R1Z-3.309/H-R R1Z-3.309-R R1Z-3.312 R1Z-3.312/H R1Z-3.312/H-R R1Z-3.312-R R1Z-3.33.3/HP R1Z-3.33.3/HP-R R1Z-3.33.3/P R1Z-3.33.3/P-R