

Regulated Converters

- RECOM**
DC/DC Converter

REC30-Z

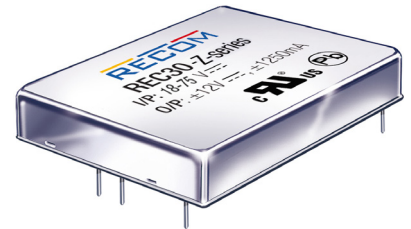
30 Watt
2" x 1.6"
Single and Dual
Output



The REC30-xxxxS_DZ -series offer single and dual regulated outputs in a 2"x1.6" package with 1.6kVDC isolation and are suitable for higher power industrial applications. Remote on/off control is standard. The higher current outputs have raised output voltages to compensate for track losses as standard. The converter is fully certified to UL/EN/IEC safety standards.

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. [%]	max. Capacitive Load ⁽¹⁾ [μF]
REC30-243.4SZ	9-36	3.4	6000	86.5	10000
REC30-245.1SZ	9-36	5.1	6000	87.5	6800
REC30-2412SZ	9-36	12	2500	88.5	1800
REC30-2415SZ	9-36	15	2000	89	1000
REC30-2412DZ	9-36	±12	±1250	88.5	±800
REC30-2415DZ	9-36	±15	±1000	89	±500
REC30-483.4SZ	18-75	3.4	6000	87	10000
REC30-485.1SZ	18-75	5.1	6000	88	6800
REC30-4812SZ	18-75	12	2500	89	1800
REC30-4815SZ	18-75	15	2000	89.5	1000
REC30-4812DZ	18-75	±12	±1250	88	±800
REC30-4815DZ	18-75	±15	±1000	88.5	±500

Note1: Max. capacitive load is tested at nominal input voltage and full load.



UL[®]
C US
E224736

IEC/EN60950-1 Certified
UL60950 Certified
CSA C22.2 NO. 60950 Certified
EN55022 Certified

REC30- **Z**

nom. Input Voltage _____

Output Voltage _____

Single or Dual _____

REC30-4812SZ, Single Output, 18-75Vin (4:1) and 12Vout
REC30-2412DZ, Dual Output, 9-36Vin (4:1) and ± 12 Vout

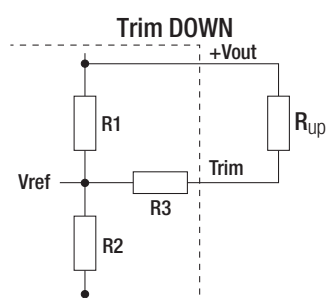
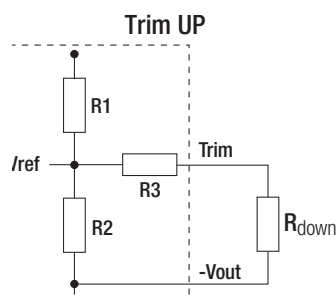
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm up unless otherwise specified)

BASIC CHARACTERISTICS				
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range	nom. $V_{in} = 24\text{V}$ nom. $V_{in} = 48\text{V}$	9VDC 18VDC		36VDC 75VDC
Start/up Time			20ms	
Under Voltage Lockout	nom. $V_{in} = 24\text{V}$	DC-DC ON DC-DC OFF	8.3VDC 7.9VDC	
	nom. $V_{in} = 48\text{V}$	DC-DC ON DC-DC OFF	17.4VDC 16.7VDC	
Output Voltage Trimming	see calculation below			$\pm 10\%$
Remote ON/OFF	DC-DC ON DC-DC OFF			Open or $3\text{V} < V_r < 12\text{V}$ Short or $0\text{V} < V_r < 1.2\text{V}$
Operating Frequency			350kHz	
Minimum Load			0%	
Output Ripple and Noise ⁽²⁾				100mVp-p

Notes:

Note2: Ripple and Noise is measured with a 20MHz bandwidth and a 0.1 μF ceramic capacitor.

Output Voltage Trimming



Vout	3.4V	5.1V	12V	15V
R1	2.1 k Ω	2.55 k Ω	9.53 k Ω	9.09 k Ω
R2	1.198 k Ω	2.449 k Ω	2.498 k Ω	1.810 k Ω
R3	6.8 k Ω	9.76 k Ω	16.9 k Ω	13 k Ω
Vref	1.24 V	2.5 V		

Trim Calculation

$$R_{up} = \left[\frac{a \cdot R_2}{R_2 - a} \right] - R_3 = \text{k}\Omega$$

$$a = \left[\frac{V_{ref}}{\Delta V_{out} - V_{ref}} \right] \cdot R_1 = \text{k}\Omega$$

ΔV_{out} = Output Voltage Trim

R_{up} = trim up resistor

R_{down} = trim down resistor

a = trim up factor

b = trim down factor

$$R_{down} = \left[\frac{b \cdot R_1}{R_1 - b} \right] - R_3 = \text{k}\Omega$$

$$b = \left[\frac{\Delta V_{out} - V_{ref}}{V_{ref}} \right] \cdot R_2 = \text{k}\Omega$$

Practical Example:

Trim Up:

$V_{out} = 5.1\text{V}$, $\Delta V_{out} = 10\%$ (5.61V), $V_{ref} = 2.5\text{V}$

$$a = \left[\frac{2.5\text{V}}{5.61\text{V} - 2.5\text{V}} \right] \cdot 2.55 \text{ k}\Omega = \mathbf{2.05 \text{ k}\Omega}$$

$$R_{up} = \left[\frac{2.05 \text{ k}\Omega \cdot 2.449 \text{ k}\Omega}{2.449 \text{ k}\Omega - 2.05 \text{ k}\Omega} \right] - 9.76 \text{ k}\Omega = \mathbf{2.826 \text{ k}\Omega}$$

Trim down:

$V_{out} = 5.1\text{V}$, $\Delta V_{out} = -10\%$ (4.59V), $V_{ref} = 2.5\text{V}$

$$b = \left[\frac{4.59\text{V} - 2.5\text{V}}{2.5\text{V}} \right] \cdot 2.449 \text{ k}\Omega = \mathbf{2.047 \text{ k}\Omega}$$

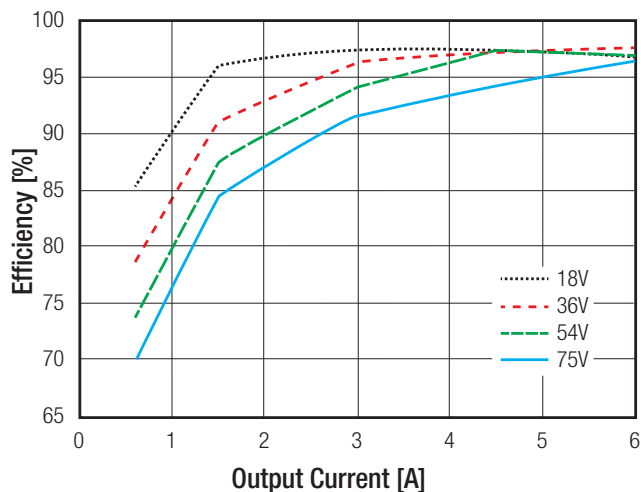
$$R_{down} = \left[\frac{2.047 \text{ k}\Omega \cdot 2.55 \text{ k}\Omega}{2.55 \text{ k}\Omega - 2.047 \text{ k}\Omega} \right] - 9.76 \text{ k}\Omega = \mathbf{0.617 \text{ k}\Omega}$$

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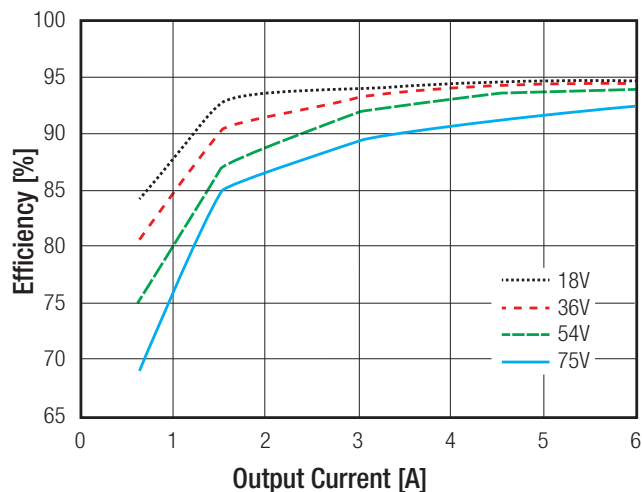
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm up unless otherwise specified)

Efficiency vs. Load

REC30-485.1SZ



REC30-4815DZ

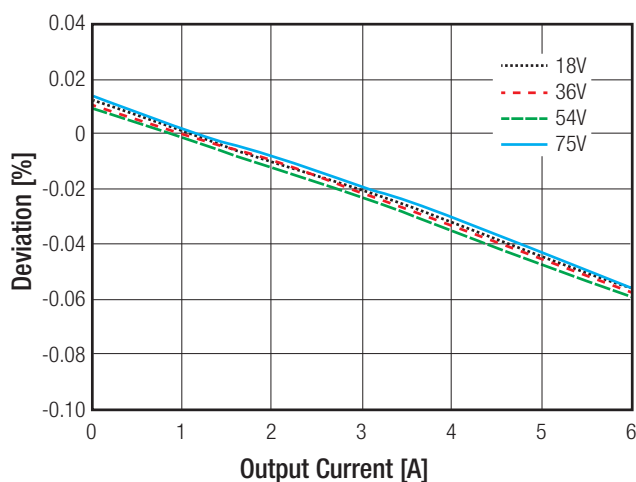


REGULATIONS

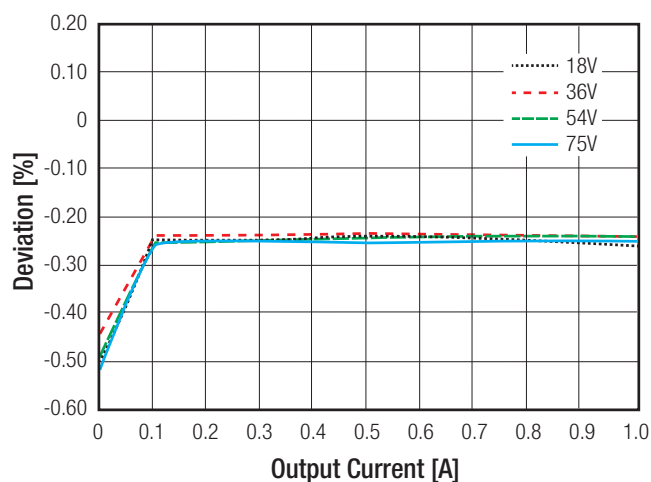
Parameter	Condition	Type	Values
Output Voltage Accuracy			$\pm 1\%$ max.
Line Voltage Regulation	low line to high line, full load		$\pm 0.2\%$ max.
Load Voltage Regulation	10% to 100% load	single output dual output	$\pm 0.5\%$ max. $\pm 1\%$ max.
Cross Regulation	25% to 100% load	dual output	$\pm 5\%$ max.
Transient Response Recovery Time	25% load step change		250 μs typ.

Deviation vs. Load

REC30-485.1SZ



REC30-2415DZ



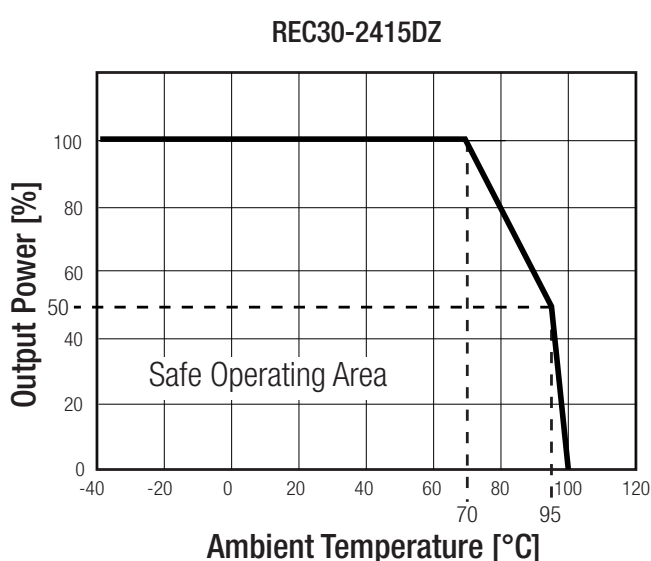
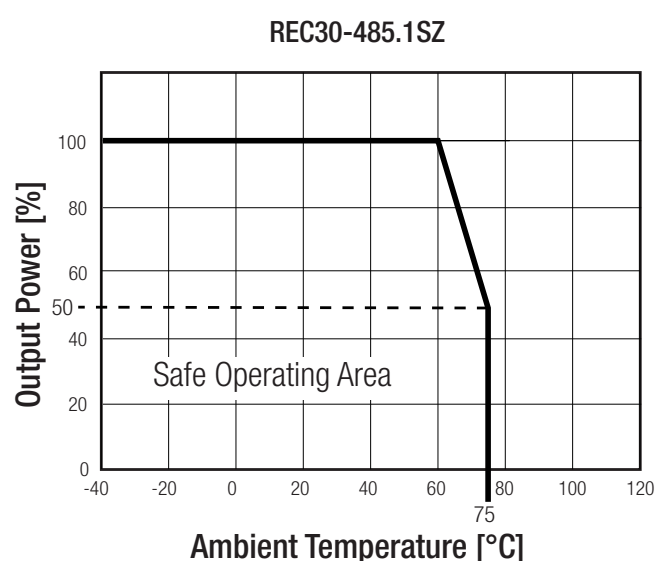
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm up unless otherwise specified)

PROTECTIONS		
Parameter	Condition	Value
Short Circuit Protection (SCP)		continuous, automatic recovery
Over Voltage Protection (OVP)	Zener Diode Clamp 3.4Vout 5.1Vout 12Vout 15Vout	4VDC typ. 6.2VDC typ. 15VDC typ. 18VDC typ.
Over Load Protection (OLP)		180% typ.
Isolation Voltage	I/P to O/P	1.6kVDC / 1 minute
Isolation Capacitance		3900pF typ.
Isolation Resistance		1G Ω min.

ENVIRONMENTAL		
Parameter	Condition	Value
Operating Temperature Range	with derating	-40°C to +85°C
Maximum Case Temperature		+105°C
Temperatur Coefficient		$\pm 0.05\%/^\circ\text{C}$
Thermal Impedance	natural convection	8°C/W
Operating Altitude		5000m
Operating Humidity	non-condensing	5% - 95% RH max.
Vibration		MIL-STD-202G
MTBF	according to MIL-HDBK-217F, 25°C, referring to REC30-2415DZ	1541 x 10 ³ hours

Derating Graph

@ nominal input voltage, full load and natural convection (20LFM)



Notes:

Note3: For more details, please contact our technical support service at TechsupportAT@recom-power.com

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

SAFETY AND CERTIFICATIONS

Certificate Type	Report / File Number	Standard
CB General Safety	E224736	IEC60950-1, 2nd Edition, 2013
UL General Safety		UL60950-1, 2nd Edition, 2014
EN General Safety		EN60950-1, 2nd Edition, 2013
CAN/CSA General Safety		C22.2 No. 60950-1-07, 2014

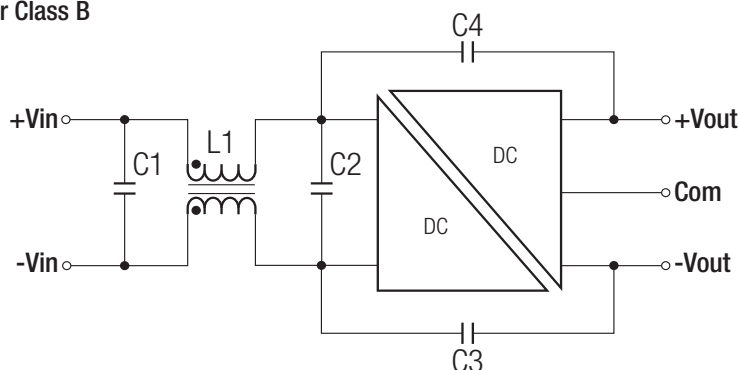
EMC Compliance	Condition	Standard / Criterion
EMI ⁽⁴⁾	with external filter (see filter suggestions)	EN55022, Class A,B
ESD	Air: $\pm 8\text{kV}$; Contact: 4kV	EN61000-4-2, Criteria B
Radiated Immunity	10V/m	EN61000-4-3, Criteria A
Fast Transient	$\pm 1\text{kV}$	EN61000-4-4, Criteria B
Surge ⁽⁵⁾	$\pm 1\text{kV}$	EN61000-4-5, Criteria A
Conducted Immunity	10Vr.m.s	EN61000-4-6, Criteria A
Power Magnetic Field	$50\text{Hz } 1\text{A/m (r.m.s)}$	EN61000-4-8, Criteria A

Notes:

Note4: REC30-Z Series can meet EN55022 Class A without an external filter; meets Class B with external filter.

Note5: An external MOV is required if the module has to meet EN61000-4-5. The MOV suggest: NichTek SVI32-380

EMC Filtering - Suggestions for Class B



MODEL	C1	C2	L1	C3	C4
REC30-24xxSZ	330 $\mu\text{F}/50\text{V}$	10 $\mu\text{F}/50\text{V}$	1.3mH	2200pF/3kV	NA
REC30-48xxSZ	330 $\mu\text{F}/100\text{V}$	10 $\mu\text{F}/100\text{V}$	1.3mH	2200pF/3kV	NA
REC30-24xxDZ	330 $\mu\text{F}/50\text{V}$	10 $\mu\text{F}/50\text{V}$	1.3mH	2200pF/3kV	2200pF/3kV
REC30-48xxDZ	330 $\mu\text{F}/100\text{V}$	10 $\mu\text{F}/100\text{V}$	1.3mH	2200pF/3kV	2200pF/3kV

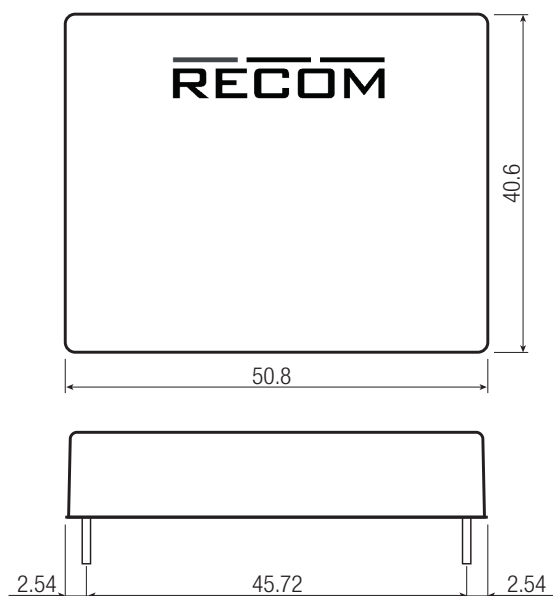
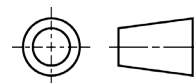
DIMENSION and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case	Nickel plated copper
	Base	non conductive black plastic
	Potting	(UL94V-0) Epoxy
Package Dimension (LxWxH)		50.8 x 40.6 x 10.2mm
Package Weight		48g

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

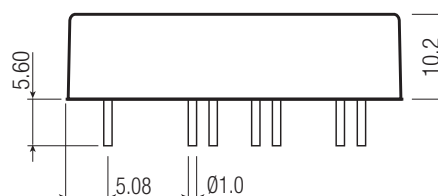
Dimension Drawing (mm)



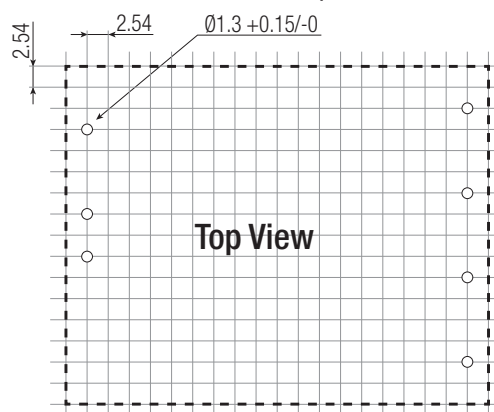
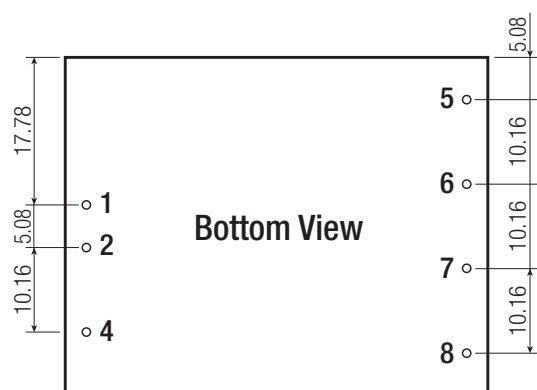
Pin Connections

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	Remote ON/OFF	
5	No Pin	+Vout
6	+Vout	Com
7	-Vout	-Vout
8	Trim	Trim

Tolerance: xx.x= $\pm 0.5\text{mm}$
 xx.xx= $\pm 0.35\text{mm}$
 Pin dimension: $\pm 0.05\text{mm}$



Recommended Footprint Details



PACKAGING INFORMATION

Packaging Dimension (LxWxH)	Tube	520.0 x 54.5 x 21.0mm
Packaging Quantity		11pcs
Storage Temperature Range		-55°C to +125°C

The product information and specifications are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The buyer 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.