

Features

Regulated Converters

- 6-Side Shielding
- External ON/OFF control
- 1.6kVDC Isolation
- UL/CSA/EN-60950-1 Certified
- Wide 4:1 Input Voltage Range
- Continuous Short Circuit Protection
- Efficiency up to 91%
- Fixed Switching Frequency

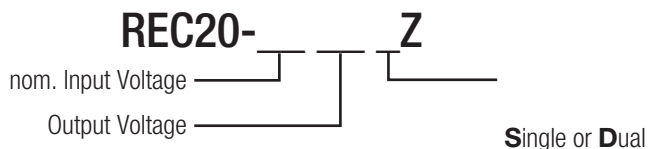
Description

The REC20-xxxxS_DZ -series offer single and dual regulated outputs in a 2"x1" 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.

Selection Guide

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. [%]	max. Capacitive Load [μ F]
REC20-243.4SZ	9-36	3.4	5000	88	13000
REC20-245.1SZ	9-36	5.1	4000	90	9600
REC20-2412SZ	9-36	12	1667	89.5	1650
REC20-2415SZ	9-36	15	1333	90	1050
REC20-2405DZ	9-36	$\pm$ 5	$\pm$ 2000	87	$\pm$ 4800
REC20-2412DZ	9-36	$\pm$ 12	$\pm$ 834	89	$\pm$ 625
REC20-2415DZ	9-36	$\pm$ 15	$\pm$ 667	89	$\pm$ 525
REC20-483.4SZ	18-75	3.4	5000	88	13000
REC20-485.1SZ	18-75	5.1	4000	90	9600
REC20-4812SZ	18-75	12	1667	89.5	1650
REC20-4815SZ	18-75	15	1333	90.5	1050
REC20-4805DZ	18-75	$\pm$ 5	$\pm$ 2000	87	$\pm$ 4800
REC20-4812DZ	18-75	$\pm$ 12	$\pm$ 835	90	$\pm$ 625
REC20-4815DZ	18-75	$\pm$ 15	$\pm$ 667	91	$\pm$ 525

Model Numbering



Ordering Examples:

REC20-4812SZ, Single Output, 18-75Vin (4:1) and 12Vout
REC20-2412DZ, Dual Output, 9-36Vin (4:1) and $\pm$ 12Vout

RECOM
DC/DC Converter

REC20-Z

20 Watt

2" x 1"

Single and Dual Output



UL
E224736

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

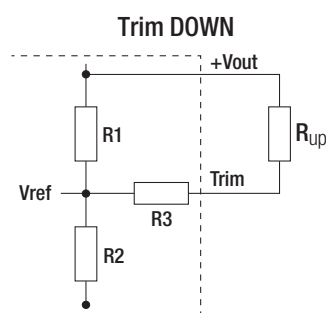
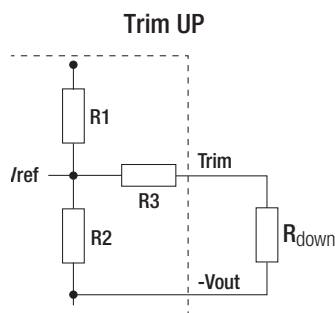
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm up unless otherwise specified)

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			10ms	
Under Voltage Lockout	nom. $V_{in} = 24\text{V}$	DC-DC ON DC-DC OFF	9VDC 7.5VDC	
	nom. $V_{in} = 48\text{V}$	DC-DC ON DC-DC OFF	18VDC 16VDC	
Output Voltage Trimming	see calculation below			$\pm 10\%$
Remote ON/OFF	DC-DC ON DC-DC OFF			Open or $2.5\text{V} < V_r < 12\text{V}$ Short or $0\text{V} < V_r < 1.2\text{V}$
Operating Frequency			300kHz	
Minimum Load			0%	
Output Ripple and Noise ⁽¹⁾				100mVp-p

Notes:

Note1: 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	4.71 k Ω	2.3 k Ω	19.43 k Ω	25.6 k Ω
R2	2.7 k Ω	2.2 k Ω	5.1 k Ω	
R3	15 k Ω	9.1 k Ω	36 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), $V_{ref} = 2.5\text{V}$

$$a = \left[\frac{2.5\text{V}}{5.61\text{V} - 2.5\text{V}} \right] \cdot 2.3\text{k}\Omega = 1.849\text{k}\Omega$$

$$R_{up} = \left[\frac{1.849\text{k}\Omega \cdot 2.2\text{k}\Omega}{2.2\text{k}\Omega - 1.849\text{k}\Omega} \right] - 9.1 = 3.411\text{k}\Omega$$

Trim down:

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

$$b = \left[\frac{4.59\text{V} - 2.5\text{V}}{2.5\text{V}} \right] \cdot 2.2\text{k}\Omega = 1.839\text{k}\Omega$$

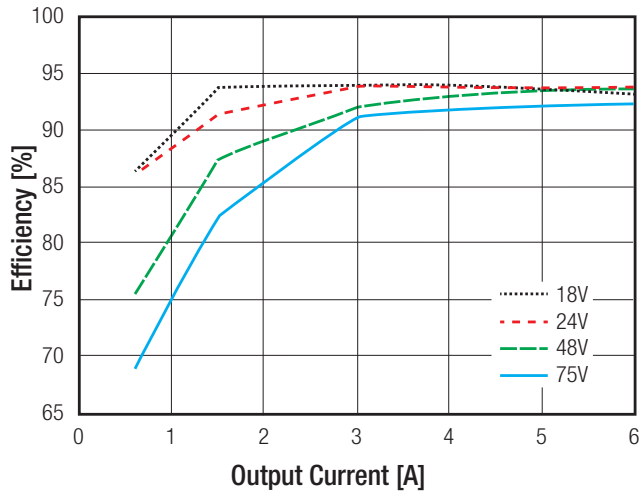
$$R_{down} = \left[\frac{1.839\text{k}\Omega \cdot 2.3\text{k}\Omega}{2.3\text{k}\Omega - 1.839\text{k}\Omega} \right] - 9.1\text{k}\Omega = 0.075\text{k}\Omega$$

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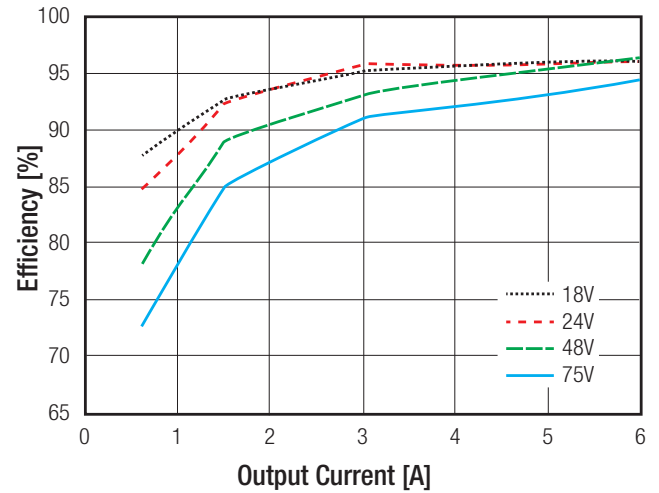
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm up unless otherwise specified)

Efficiency vs. Load

REC20-485.1SZ



REC20-4815SZ

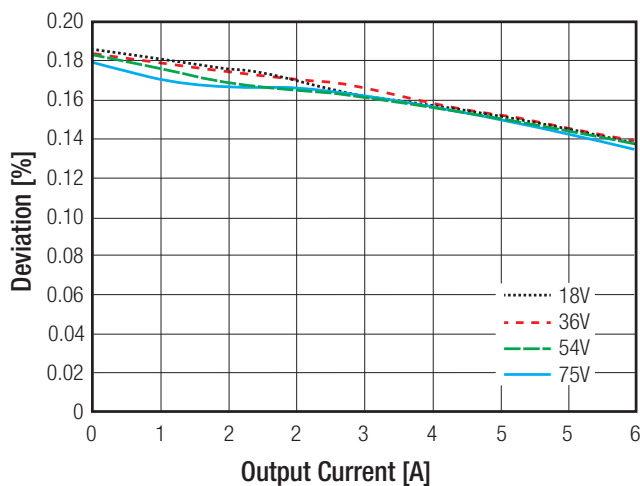


REGULATIONS

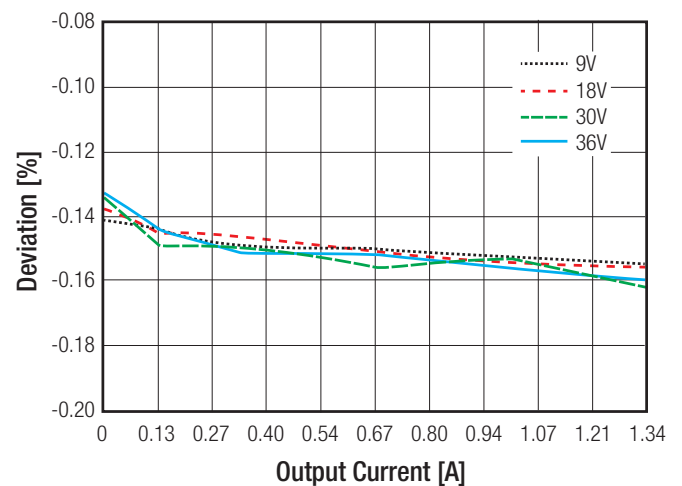
Parameter	Condition	Type	Values
Output Voltage Accuracy			$\pm 1\%$ max.
Line Voltage Regulation	low line to high line, full load		$\pm 0.2\%$ max.
Load Voltage Regulation	0% to 100% load	single output	$\pm 0.5\%$ max.
		dual output	$\pm 1\%$ max.
Cross Regulation	25% to 100% load	dual output	$\pm 5\%$ max.
Transient Response Recovery Time	25% load step change		250 μs typ.

Deviation vs. Load

REC20-485.1SZ



REC20-2415SZ



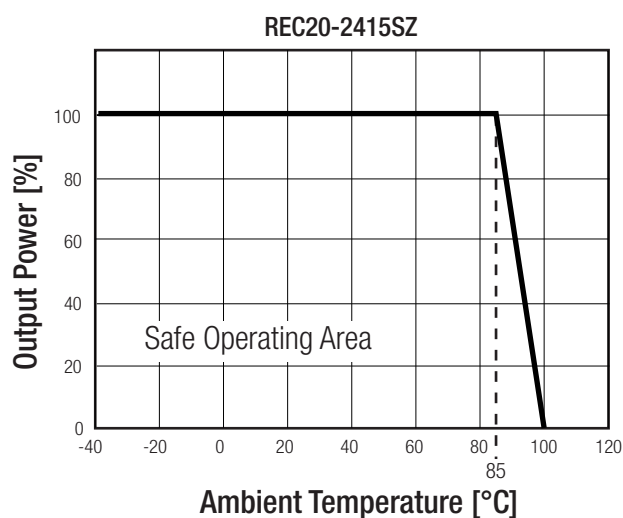
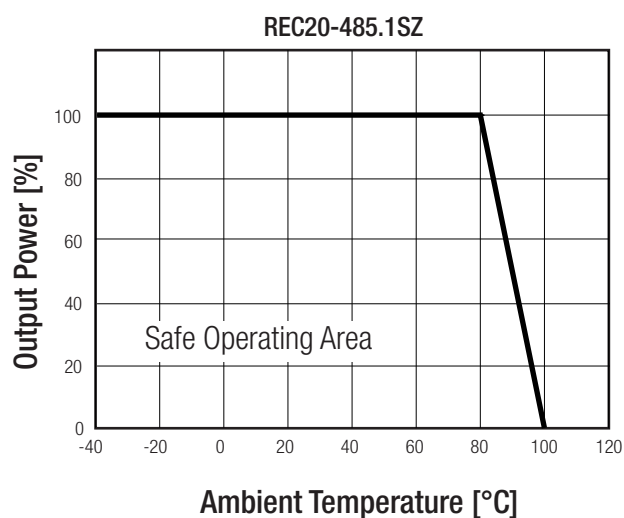
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm up unless otherwise specified)

PROTECTIONS		
Parameter	Condition	Value
Short Circuit Protection (SCP)		continuous, automatic recovery
Over Voltage Protection (OVP)	Zener Diode Clamp 3.4Vout 5.1Vout 12Vout 15Vout	4.5VDC typ. 7VDC typ. 16VDC typ. 20VDC typ.
Over Load Protection (OLP)		180% typ.
Isolation Voltage	I/P to O/P	1.6kVDC / 1 minute
Isolation Capacitance		1200pF typ.
Isolation Resistance		1G Ω min.

ENVIRONMENTAL		
Parameter	Condition	Value
Operating Temperature Range	with derating	-40°C to +100°C
Maximum Case Temperature		+105°C
Temperatur Coefficient		0.02%/°C typ.
Thermal Impedance	natural convection	12°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 REC20-485.1SZ	1098 x 10 ³ hours

Derating Graph

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



Notes:

Note2: 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

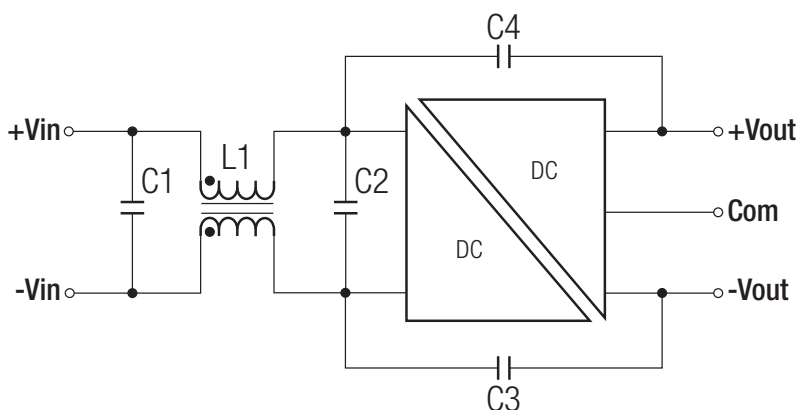
EMC Compliance	Condition	Standard / Criterion
EMI ⁽³⁾	with external filter (see filter suggestions)	EN55022, Class A EN55022, Class B
ESD	Air: $\pm 8\text{kV}$; Contact: 4kV	EN61000-4-2, Criteria B
Radiated Immunity	10V/m	EN61000-4-3, Criteria A
Fast Transient	$\pm 1\text{kV}$	EN61000-4-4, Criteria B
Surge ⁽⁴⁾	$\pm 1\text{kV}$	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:

Note3: REC20-Z Series can meet EN55022 Class A without any external filter.

Note4: 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
REC20-24xxS(D)Z	4.7 $\mu\text{F}/50\text{V}$	4.7 $\mu\text{F}/50\text{V}$	1.5mH	1000pF/2kV	1000pF/2kV
REC20-48xxS(D)Z	2.2 $\mu\text{F}/100\text{V}$	2.2 $\mu\text{F}/100\text{V}$	2.0mH	1000pF/2kV	1000pF/2kV

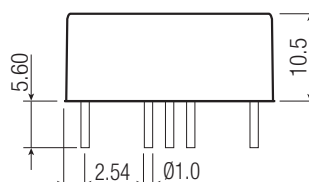
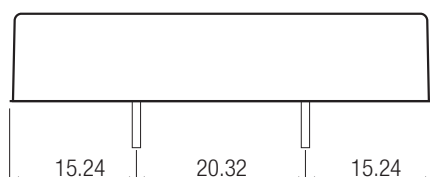
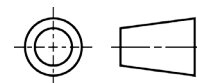
DIMENSION and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case	nickel plated copper
	Base	FR4 PCB
	Potting	silicone (UL94 V-0)
Package Dimension (LxWxH)		50.8 x 25.4 x 10.2mm
Package Weight		27g

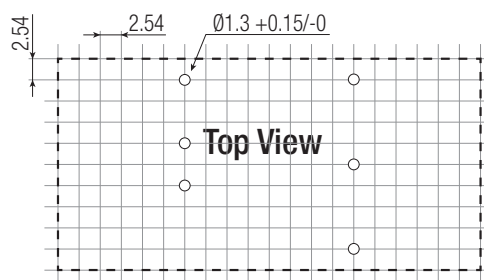
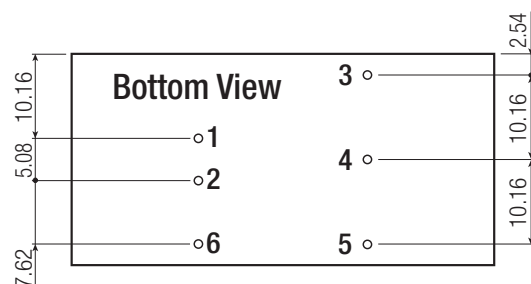
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Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load and after warm up unless otherwise specified)

Dimension Drawing (mm)



Recommended Footprint Details



Pin Connections

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	Com
5	-Vout	-Vout
6	Remote On/Off	

Tolerance: xx.x= $\pm 0.5\text{mm}$

xx.xx= ±0.35mm

Pin dimension: $\pm 0.05\text{mm}$

PACKAGING INFORMATION

Packaging Dimension (LxWxH)	Tube	520.0 x 54.5 x 21.0mm
Packaging Quantity		18pcs
Storage Temperature Range		-55°C to +125°C

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