Features

Regulated Converters

- 8kVDC & 10kVDC Reinforced Isolation
- Industry Standard DIP24 Package
- 3.5W Regulated Output
- Continuous Short Circuit Protection
- Wide Input 2:1
- Medical Approved
- EN, CSA and CB Certificates
- 2 Pinout Options
- Control Pin Option
- Efficiency to 86%

ECONOLINE
DC/DC-Converter
with 3 year Warranty

RECOM

3.5 Watt DIP24 Reinforced Single & Dual Output



E-314885

C22.2-No. 60950 Certified
C22.2-601.1 Certified
UL-60601.1 Certified

REC3.5/R

Description

The REC3.5 series uses a reinforced isolation transformer to offer exceptionally high isolation of 8kVDC (4kVAC/1 minute) or 10kVDC (5kVAC/1minute) making it suitable for HT monitoring circuits, mains power meters, IGBT isolated power supplies and other sophisticated industrial and medical applications. The isolation capacitance of only 20pF makes them also suitable for low leakage applications. The isolation transformer is recognized by CSA as reinforced isolated with a minimum internal clearance of 2.4mm and a minimum internal creepage clearance of 4.6mm. The REC3.5 is available in two industry-standard pinouts (= "/A" or "/C"). Remote on/off control is possible with the /CTRL option (A pinning only) and an optional undervoltage lockout function is also available (="/X1"). The converters can deliver 140% rated power for short periods of time to cope with applications with large capacitive loads or high start up currents.

Selection Guide

Part Number DIP24	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Efficiency (%)	Max Capacitive Load [1]
REC3.5-xx05SRW/R*	9 - 18, 18 - 36, 36 - 75	5	700	80, 81, 82	4700µF
	4.5 - 9			77	
REC3.5-xx09SRW/R*	9 - 18, 18 - 36, 36 - 75	9	388	81, 82, 83	3300µF
	4.5 - 9			80	
REC3.5-xx12SRW/R*	9 - 18, 18 - 36, 36 - 75	12	290	82, 83, 84	2200µF
	4.5 - 9			82	
REC3.5-xx15SRW/R*	9 - 18, 18 - 36, 36 - 75	15	233	84, 85, 86	2200µF
	4.5 - 9			83	
REC3.5-xx24SRW/R*	9 - 18, 18 - 36, 36 - 75	24	145	83, 84, 85	1000µF
	4.5 - 9			82	
REC3.5-xx05DRW/R*	9 - 18, 18 - 36, 36 - 75	±5	±350	80, 81, 82	±2200µF
	4.5 - 9			77	
REC3.5-xx09DRW/R*	9 - 18, 18 - 36, 36 - 75	±9	±194	81, 82, 83	±1600µF
	4.5 - 9			80	
REC3.5-xx12DRW/R*	9 - 18, 18 - 36, 36 - 75	±12	±145	81, 82, 83	±1000µF
	4.5 - 9			82	
REC3.5-xx15DRW/R*	9 - 18, 18 - 36, 36 - 75	±15	±117	82, 83, 84	±1000µF
	4.5 - 9			80	

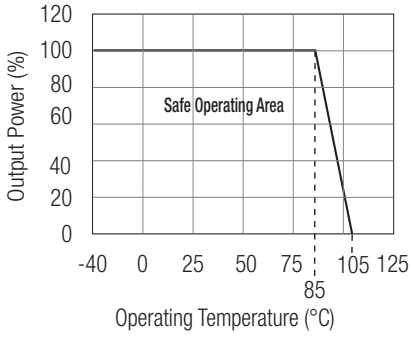
R* = R8 or R10 for 8kVDC or 10kVDC isolation.

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

* add suffix "/A" or "/C" for pinning options, see next page for details.
* add suffix "/CTRL" for control pin option (A Pinning only)
* add suffix "/X1" for Undervoltage Lockout

2:1 Input
(REC3.5-S_DRW/R8(R10)
xx = 4.5-9Vin = 05
xx = 9-18Vin = 12
xx = 18-36Vin = 24
xx = 36-75Vin = 48

Derating-Graph
(Ambient Temperature)



Ordering Examples:
REC3.5-0512DRW/R8/A/CTRL= 5V Vin, ±12V Vout, 8kVDC isolation, pinout "A",control pin
REC3.5-4805SRW/R10/A = 48V Vin, 5V Vout, 10kVDC isolation, pinout "A"
REC3.5-1212DRW/R8/C/X1 = 12V Vin, ±12V Vout, 8kVDC isolation, pinout "C",UVL
REC3.5-0505SRW/R10/A/CTRL/X1 = 5V Vin, 5V Vout, 10kVDC isolation, pinout "A",control pin, UVL

Refer to Application Notes

REC3.5-S_DRW /R* Series

Specifications (measured at T_A = 25°C, nominal input voltage, full load and after warm-up)

Input Voltage Range				2:1
Output Voltage Accuracy				±2% max.
Line Regulation	(HL-LL)			±0.3% max.
Load Regulation	(for output load current change from 20% to 100%)			±0.6% max.
Input Surge	(1 minute)		5V types	16V max.
			12V types	25V max.
			24V types	50V max.
			48V types	100V max.
Undervoltage Lockout	(/X1 Versions)		5V types	3.5V typ. (±20%)
			12V types	7V typ. (±20%)
			24V types	15V typ. (±10%)
			48V types	32V typ. (±10%)
Output Ripple and Noise	(0,1µF capacitor on output, 20MHz BW limited)			150mVp-p max.
Transient Response	(25% step change)			1ms typ.
Switching Frequency	(Full load and nominal input voltage)			150kHz min. / 500kHz max.
Input Filter				Pi Network
Capacitors	All types			MLCC capacitors only
Minimum Load	(Operation under no load will not damage the converter, but it may not meet all specifications)			20% Full Load
No Load Power Consumption				400mW max.
Isolation Voltage	R8-Suffix	(tested for 1 second)		8000VDC
		(rated for 1 minute**)		4000VAC / 60Hz
Isolation Voltage	R10-Suffix	(tested for 1 second)		10000VDC.
		(rated for 1 minute**)		5000VAC / 60Hz
Isolation Capacitance				20pF typ.
Isolation Resistance				10 GΩ min.
Short Circuit Protection		(Max operating temp. = 60°C during short circuit conditions)		Continuous, Auto Restart
Operating Temperature Range		(free air convection)		-40°C to +85°C (see Graph)
Case Temperature				105°C max.
Storage Temperature Range				-55°C to +125°C
Relative Humidity				95% RH
Case Material				Non-Conductive Plastic
Potting Material				Silicone
Thermal Impedance		Natural convection		20°C/W
Package Weight				14g
Packing Quantity				15 pcs per Tube
MTBF (+25°C) } *Detailed Information see*			using MIL-HDBK 217F	1206 x 10^3 hours
(+75°C) } *Application Notes chapter "MTBF"*			using MIL-HDBK 217F	392x 10^3 hours
EMC		Conducted Emissions	EN55022	Class A
(with 470µF//0.1µF capacitors across input)		Radiated Emissions	EN55022	Class A
Reinforced Isolation		Transformer Creepage	/R8 and /R10 Types	4.6 mm min.
		Transformer Clearance	/R8 and /R10 Types	2.4 mm min.
		PCB Creepage & Clearance	/R8 and /R10 Types	6.0 mm min.
		Optocoupler Creepage	/R8 and /R10 Types	6.0 mm min.
External Creepage and Clearance		Plastic Case	Input <> Output pins	14.2 mm min.
Certifications	EN Medical Safety		Report: MDD1207051 + RM1207051 Medical Report + ISO14971 Risk Assessment	EN 60601-1 3rd Edition
	IEC Medical Safety		CB Report: CA-10168-A1-UL	IEC 60601-1 3rd Edition
	CSA	Medical Safety	Report: 2202478	C22.2 601-1 2nd Ed.
	UL	Medical Safety	E314885-A4	UL 60601-1 3rd Edition
		General Safety	Report: 2219431	C22.2 No. 60950-1-03
	UL 60950-1 1st Ed.		Recognised as Reinforced Isolation	Supplement to Report: 2219431

**Any data referred to in this datasheet are of indicative nature and based on our practical experience only. For further details, please refer to our Application Notes.

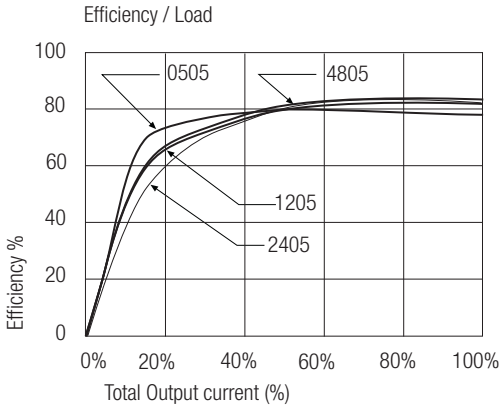
REC3.5-S_DRW /R* Series

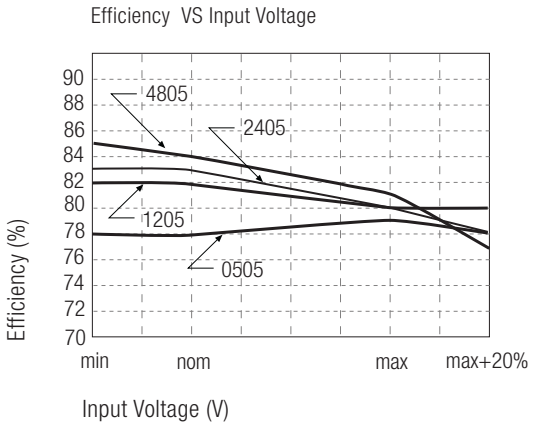
Typical Characteristics - Continued

Efficiency vs Load

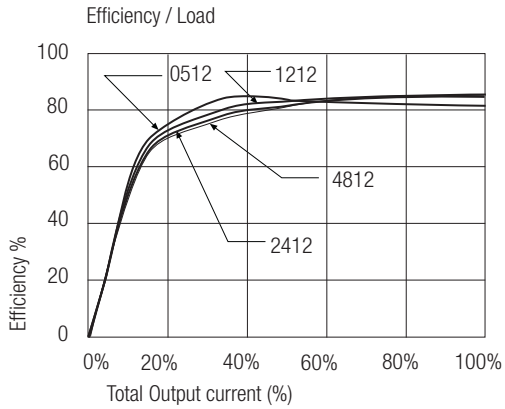
Efficiency vs Vin

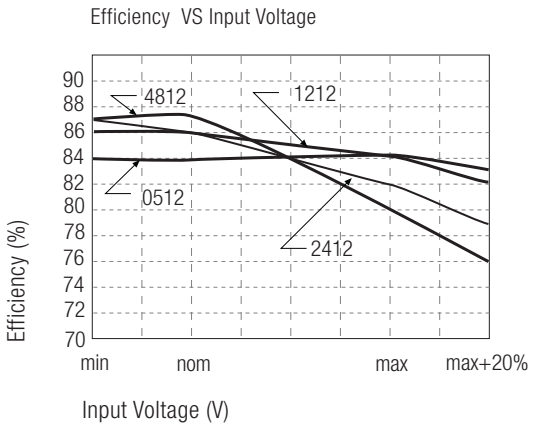
REC3.5-xx05SRW/R*
REC3.5-xx05DRW/R*



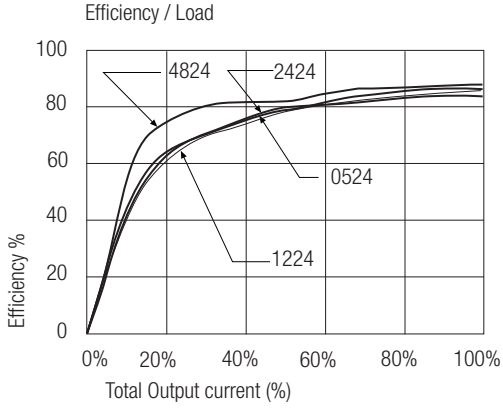


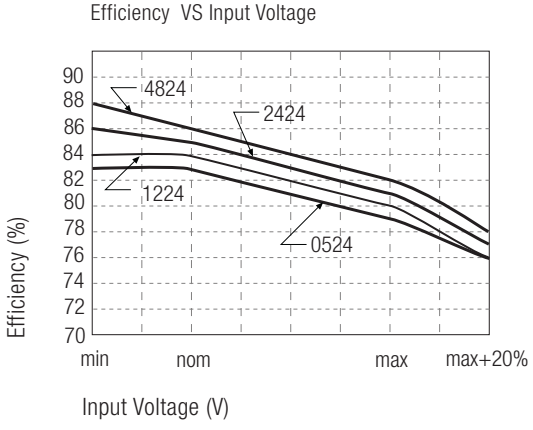
REC3.5-xx12SRW/R*





REC3.5-xx24SRW/R*
REC3.5-xx12DRW/R*

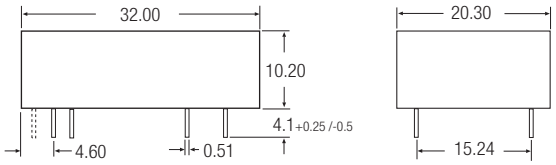




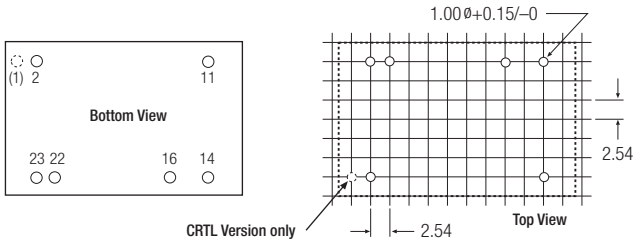
REC3.5-S_DRW /R* Series

Package Style and Pinning (mm) DIP 24 , Wide Input 2:1

"A" Pinning /R8 & /R10



Recommended Footprint Details



Pin Connections

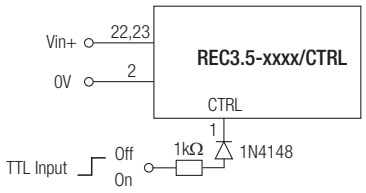
Pin #	Single	Dual
1 (option)	CTRL	CTRL
2	–Vin	–Vin
11	NC	–Vout
14	+Vout	+Vout
16	–Vout	Com
22	+Vin	+Vin
23	+Vin	+Vin

NC = No Connection

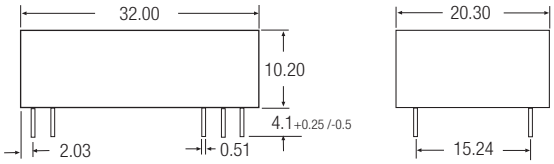
XX.X ± 0.5 mm
XX.XX ± 0.25 mm

CTRL Option

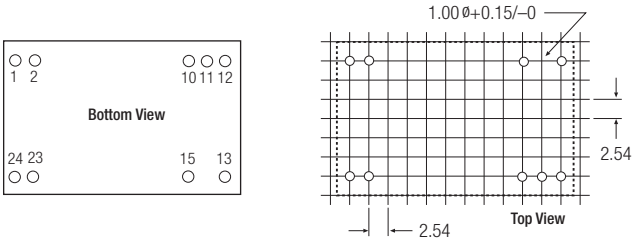
ON = Open or 0V< V_{ctrl} <1.2V
OFF = 2.2V< V_{ctrl} <12V



"C" Pinning /R8 & /R10



Recommended Footprint Details



Pin Connections

Pin #	Single	Dual
1	+Vin	+Vin
2	+Vin	+Vin
10	NC	Com
11	NC	Com
12	–Vout	NC
13	+Vout	–Vout
15	NC	+Vout
23	–Vin	–Vin
24	–Vin	–Vin

NC = No Connection

XX.X ± 0.5 mm
XX.XX ± 0.25 mm

REC3.5/R

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.