

Technical Data Sheet

REC5K-RW Series ♦ Regulated DIP24

5W ♦ Isolated Single Output ♦ 4:1 Input



FEATURES

- 4kVDC/1sec isolation
- Industry standard 5W DIP24 package
- Low ripple and noise
- Derates to 110°C ambient temperature
- Wide 4:1 input
- ON/OFF control pin, UVLO, SCP
- 0% minimum load
- Adjustable output (3.3 - 15VDC)
- 3 year warranty



Dimensions (LxWxH): 32.1 x 20.6 x 10.2mm (1.26 x 0.81 x 0.40inch)
12.0g (0.03 lbs)

APPLICATIONS



SAFETY & EMC



DESCRIPTION

This series offers 4kVDC/1sec isolation and internal filtering to reduce noise, making it ideal for both industrial and other sophisticated highend applications. The compact DIP24 non-conductive plastic package ensures high power density without compromising performance, operating with derating up to 110°C. Short circuit protection, undervoltage lockout, and remote on/off control is standard, and the converter are certified according to UL/IEC/EN62368-1.

SELECTION GUIDE

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current max. [mA]	Efficiency typ. ⁽¹⁾ [%]	max. Capacitive Load ⁽²⁾ [µF]
REC5K-2405SRW/H4/A	9-36	5	1000	78	3000
REC5K-2412SRW/H4/A/ADJ	9-36	3.3-15	1212	84	3000

Note1: Efficiency is tested at nominal input and full load at +25°C ambient
Note2: Max Cap Load is tested at nominal input and full resistive load

MODEL NUMBERING



REC5K-RW Series ◇ Regulated DIP24**5W ◇ Isolated Single Output ◇ 4:1 Input****BASIC CHARACTERISTICS** (measured @ $T_{AMB} = 25^{\circ}\text{C}$, nom. V_{IN} , full load and after warm-up unless otherwise stated)

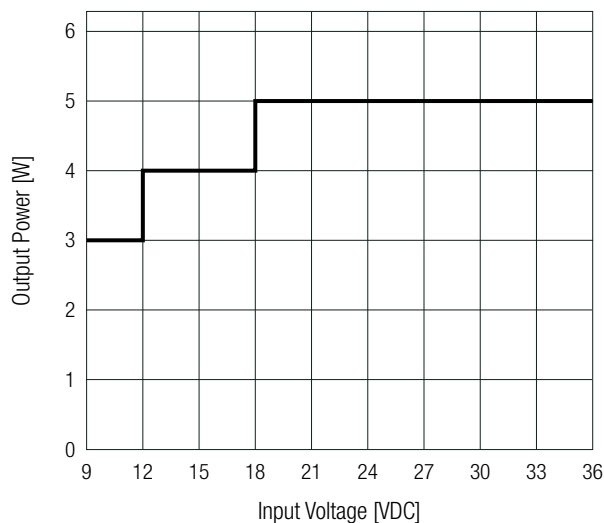
Parameter	Condition	Min.	Typ.	Max.
Input Voltage Range	nom. $V_{IN} = 24\text{VDC}$	9VDC		36VDC
Under Voltage Lockout	DC-DC ON	8.2VDC		8.8VDC
	DC-DC OFF	5.4VDC		6.0VDC
Input Current		240mA		270mA
Quiescent Current				20mA
Output Voltage Trimming	REC5K-2412SRW/H4/A/ADJ only, refer to „Output Voltage Trimming“	3.3VDC		15VDC
Minimum Load		0%		
Startup time				50ms
ON/OFF CTRL	DC-DC ON	Open or $V_{CTRL} > 1.5\text{VDC}$		
	DC-DC OFF	Short to $-V_{IN}$ or $< 1.5\text{VDC}$		
Input Current on CTRL Pin	DC-DC ON			1mA
Standby Current	DC-DC OFF		3mA	6mA
Internal Operating Frequency				400kHz
Output Ripple and Noise ⁽³⁾	20MHz BW, nom. $V_{IN} = 24\text{VDC}$			80mVp-p
	REC5K-2412SRW/H4/A/ADJ			200mVp-p

Note3: Measurements are made with a 0.1μF MLCC & 10μF E-cap in parallel across output. (low ESR)

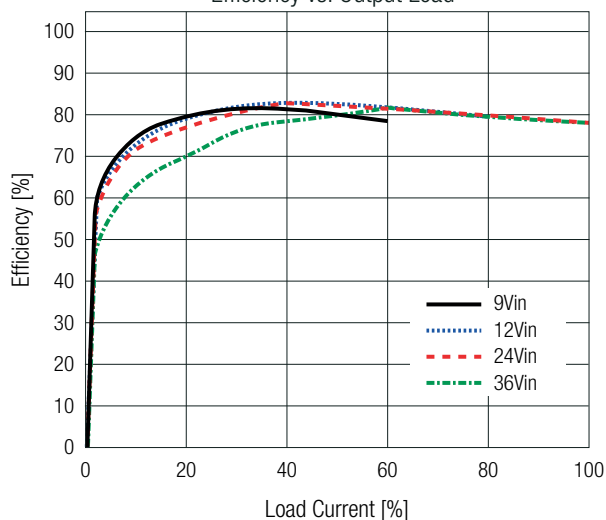
The test setup can have an impact on ripple noise values (placement of scope probe, capacitors, it's specifications, wires, PCB tracks, distances, etc.)

Line Derating

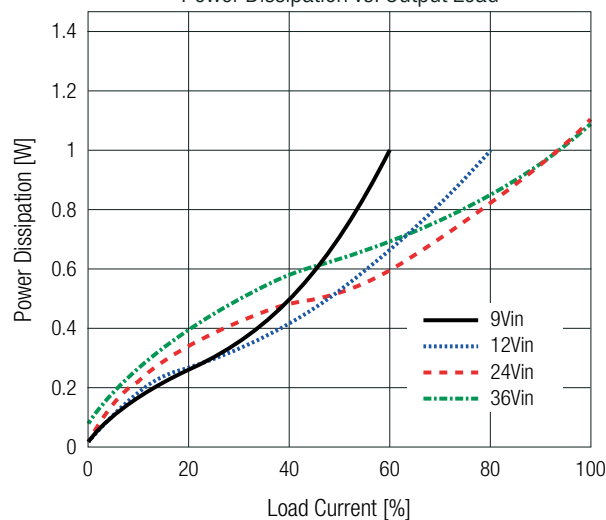
(@ Chamber and natural convection 0.1m/s)

**REC5K-2405SRW/H4/A**

Efficiency vs. Output Load



Power Dissipation vs. Output Load



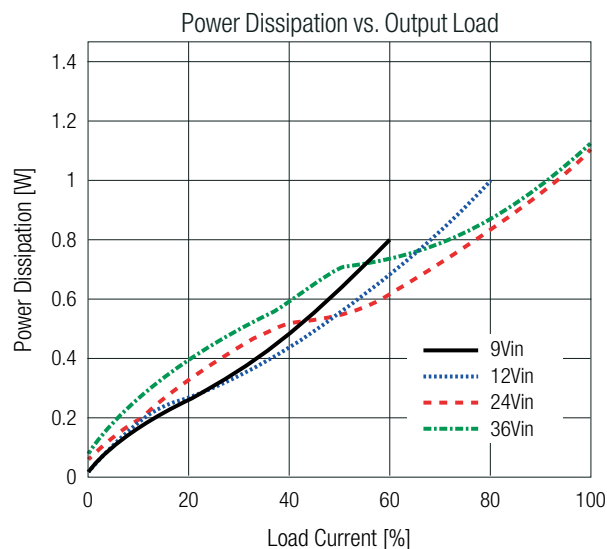
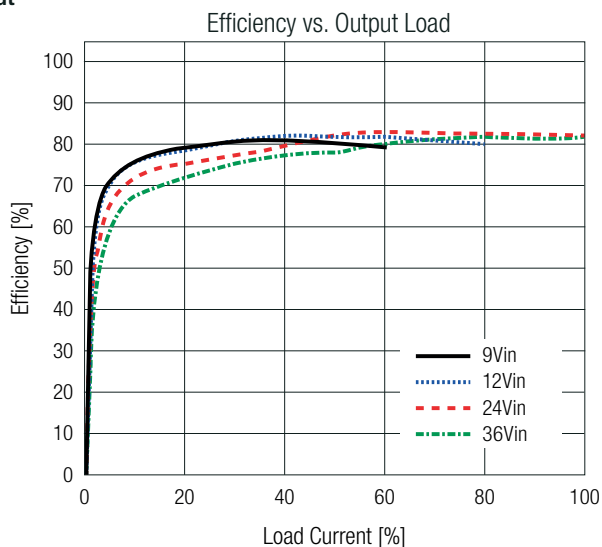
REC5K-RW Series ◇ Regulated DIP24

5W ◇ Isolated Single Output ◇ 4:1 Input

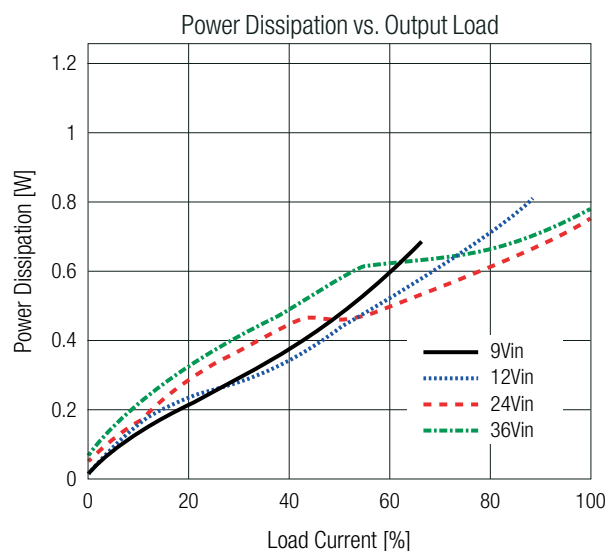
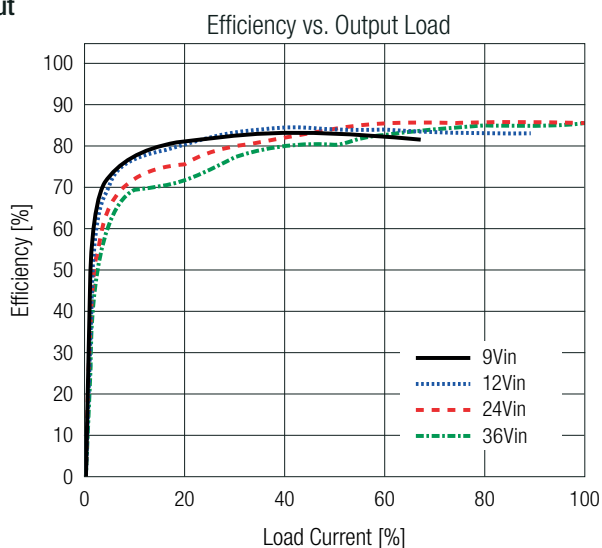
Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

REC5K-2412SRW/H4/A/ADJ

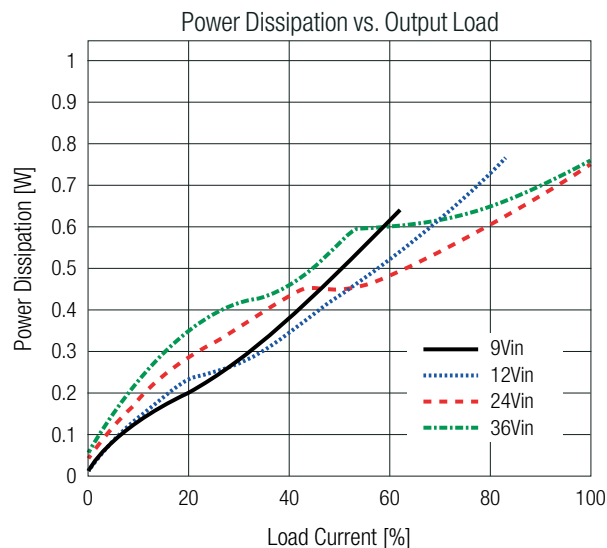
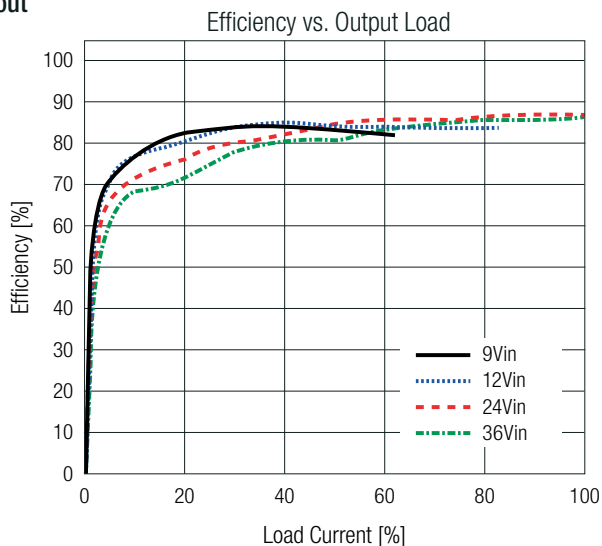
5Vout



9Vout



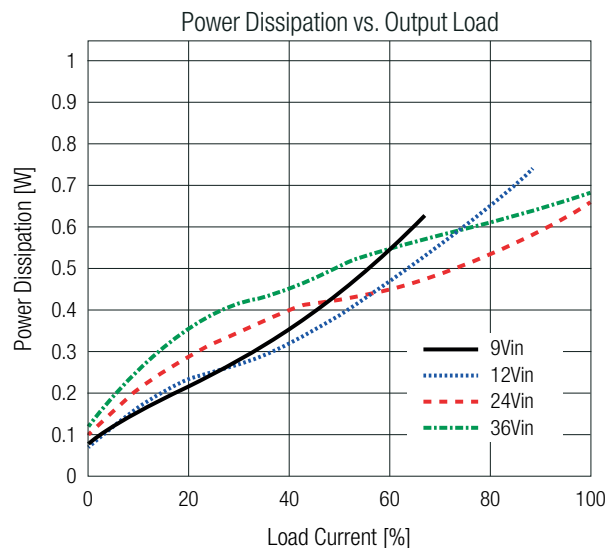
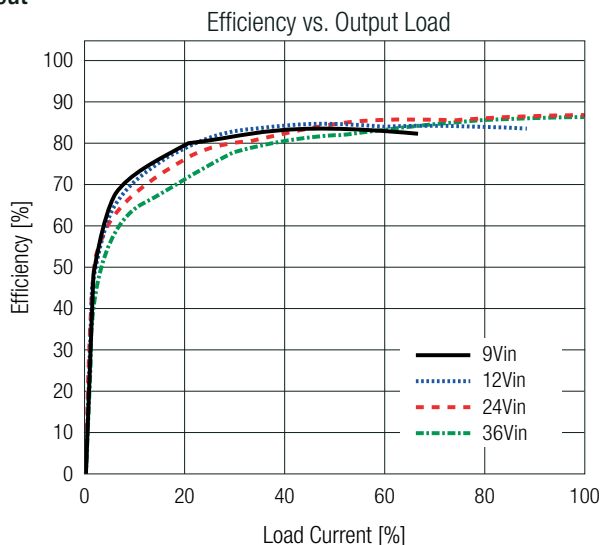
12Vout



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

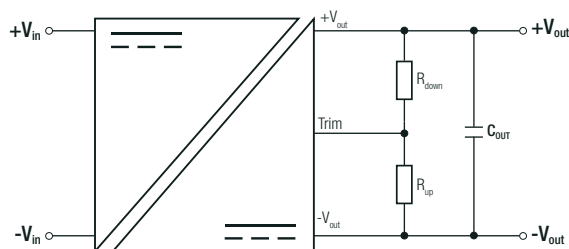
REC5K-2412SRW/H4/A/ADJ

15Vout



OUTPUT VOLTAGE TRIMMING

The nominal output voltage of REC5K-2412SRW/H4/A/ADJ is 12V but can be trimmed between 3.3V and 15V by using an external trim resistor. The values for the trim resistor are according to standard E96 values; therefore, the specified voltage may slightly vary. Resistor values may be calculated with the following equation:



V_{ref}	= reference voltage	[0.596VDC]
V_{out_set}	= trimmed output voltage	[VDC]
R_{up}	= trim up resistor	[Ω]
R_{down}	= trim down resistor	[Ω]
R_1	= internal resistor	[200kΩ]
R_2	= internal resistor	[10k5Ω]

Calculation:

$$R_{up} = \frac{V_{REF} \times R_1 \times R_2}{V_{OUT} \times R_2 - R_1 \times V_{REF} - R_2 \times V_{REF}} = \Omega$$

$$R_{down} = \frac{R_1 \times R_2 \times (V_{OUT} - V_{REF})}{R_1 \times V_{REF} - R_2 \times (V_{OUT} - V_{REF})} = \Omega$$

Trim up

V_{out_set}	13	14	15	[VDC]
R_{up} (E96) ≈	113k	59k	39k2	[Ω]

Trim down

V_{out_set}	3.3	5	9	[VDC]
R_{down} (E96) ≈	63k4	127k	39k2	[Ω]
C_{out}	22	10	-	[μF]

Practical Example trim up to 15VDC:

$$R_{up} = \frac{0.596V \times 200k\Omega \times 10.5k\Omega}{15V \times 10.5k\Omega - 200k\Omega \times 0.596V - 10.5k\Omega \times 0.596V} = 39.061\Omega$$

R_{up} according to E96 ≈ **39k2Ω**

Practical Example trim down to 3.3VDC:

$$R_{down} = \frac{200k\Omega \times 10.5k\Omega \times (3.3V - 0.596V)}{200k\Omega \times 0.596V - 10.5k\Omega \times (3.3V - 0.596V)} = 62.532\Omega$$

R_{down} according to E96 ≈ **61k9Ω**

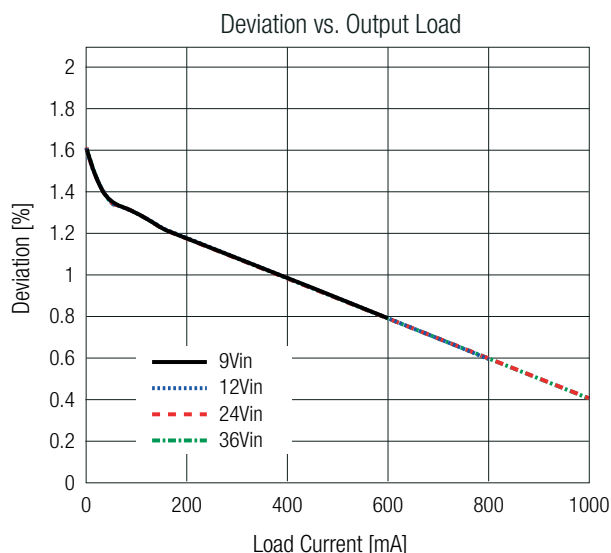
REC5K-RW Series ◇ Regulated DIP24

5W ◇ Isolated Single Output ◇ 4:1 Input

REGULATIONS

Parameter	Condition	Value
Output Accuracy		±2.5% typ.
Line Regulation	low line to high line, full load	±2.0% max.
Load Regulation ⁽⁴⁾	10% to 100% load	2.0% max.

Note4: Operation below 10% load will not harm the converter, but specifications may not be met



PROTECTIONS

Parameter	Condition	Value
Short Circuit Protection (SCP)		hiccup mode, auto recovery
Short Circuit Input Current	nom. V_{IN} = 24VDC	120mA max.
Isolation Voltage ⁽⁵⁾	I/P to O/P	1 second 4kVDC
		rated for 1 minute 2kVAC/50Hz
Isolation Resistance	I/P to O/P, V_{ISO} = 500VDC	1GΩ min.
Isolation Capacitance	I/P to O/P, 100kHz/0.1V	REC5K-2405SRW/H4/A 50pF max.
		REC5K-2412SRW/H4/A/ADJ 800pF max.
Insulation Grade	according to 62368-1	functional

Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage

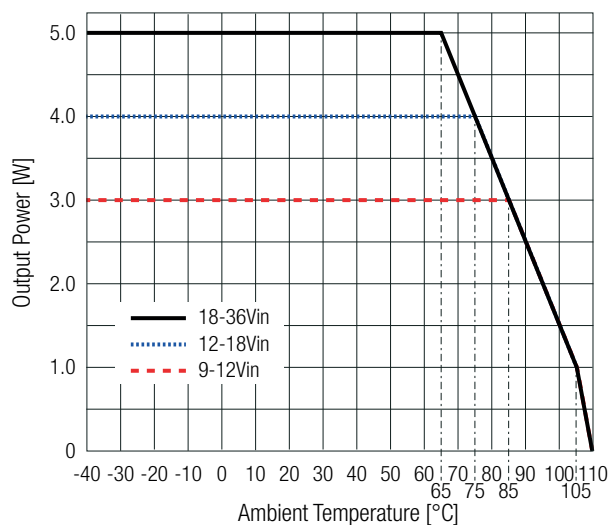
Note6: Refer to local safety regulations if input over-current protections is also required. Recommended fuse: slow blow type

ENVIRONMENTAL

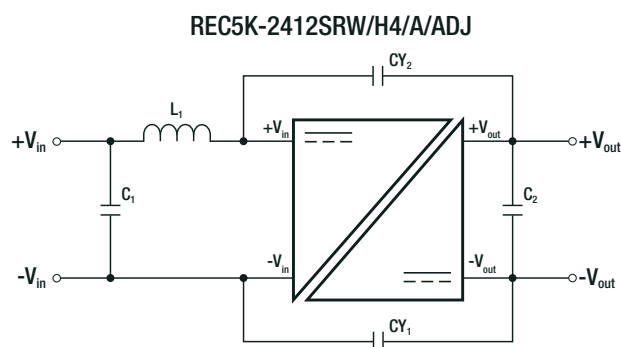
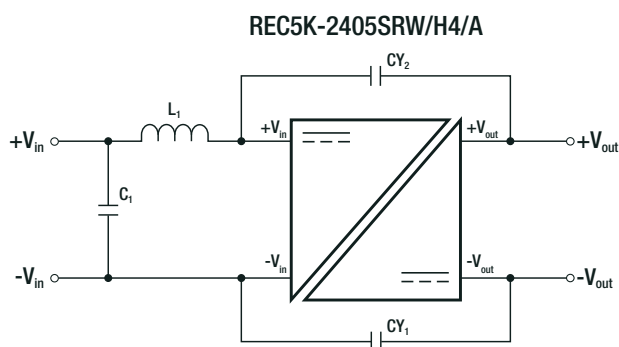
Parameter	Condition	Value
Operating Temperature Range	@natural convection 0.1m/s refer to „Derating Graph“	-40°C to +105°C
Maximum Case Temperature		+125°C
Operating Altitude		5000m
Operating Humidity	non-condensing	95% RH max.
Polution Degree		PD2
MTBF	according to MIL-HDBK-217F, G.B.	REC5K-2405SRW/H4/A T_{AMB} = +25°C 1741 x 10 ³ hours
		T_{AMB} = +65°C 661 x 10 ³ hours
		REC5K-2412SRW/H4/A/ADJ T_{AMB} = +25°C 1229 x 10 ³ hours
		T_{AMB} = +85°C 460 x 10 ³ hours

ENVIRONMENTAL**Derating Graph**

(@ Chamber and natural convection 0.1m/s)

**SAFETY AND CERTIFICATIONS**

Certificate Type (Safety)	Report Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition	E491408-A6026-UL	UL62368-1:2019 3rd Edition
		CAN/CSA-C22.2 No. 62368-1-19 3rd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition (CB Scheme)	231227039	IEC62368-1:2018 3rd Edition
		EN IEC 62368-1:2020+A11:2020
RoHS2		RoHS 2011/65/EU + AM2015/863
EMC Compliance	Condition	Standard /Criterion
Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements	with external filter	EN55032, Class B

EMC Filtering Suggestions according to EN55032**Component List Class B**

Part Number	L ₁	C ₁	C ₂	CY ₁ /CY ₂
REC5K-2405SRW/H4/A	22μH; RLS-226	22μF	N/A	1nF/5kVDC
REC5K-2412SRW/H4/A/ADJ	5.6μH; RLS-567	10μF	10μF	

DIMENSION & PHYSICAL CHARACTERISTICS

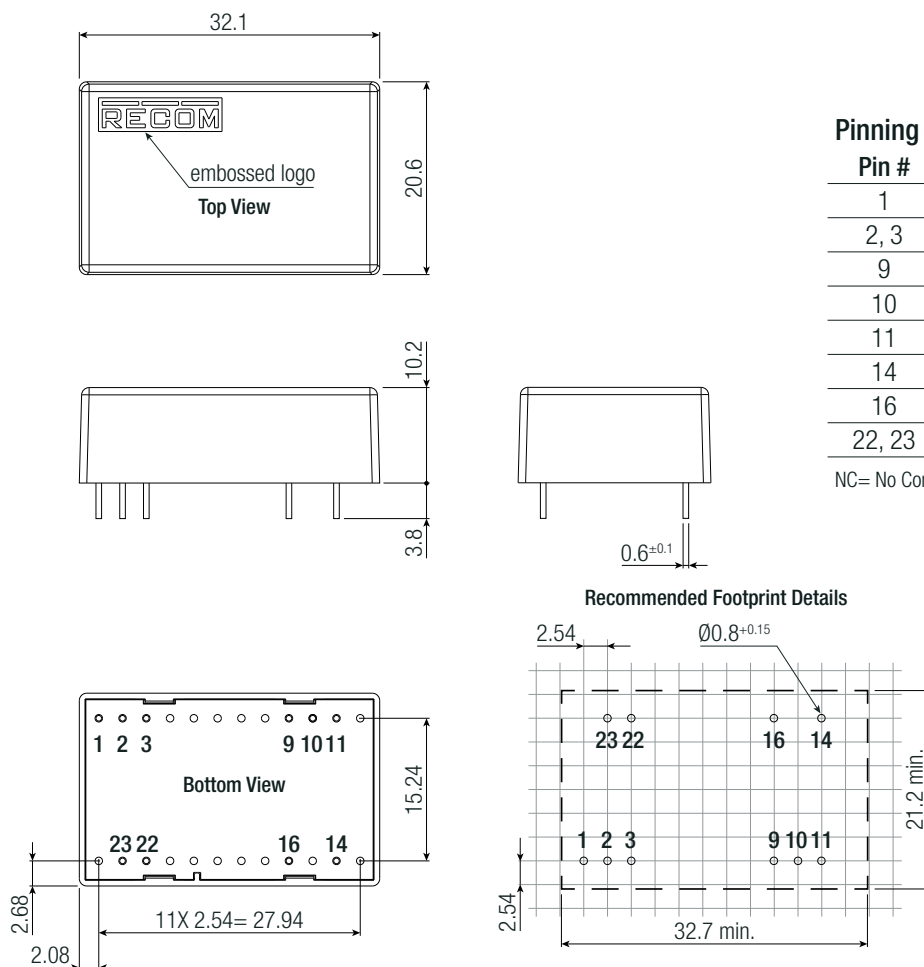
Parameter	Type	Value
Material	case	black plastic, (UL94 V-0)
	potting	PU, (UL94 V-0)
	PCB	FR4, (UL94 V-0)
Dimension (LxWxH)		32.1 x 20.6 x 10.2mm
		1.26 x 0.81 x 0.40 inch
Weight		12g typ.
		0.03 lbs

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DIMENSION & PHYSICAL CHARACTERISTICS

Dimension Drawing (mm)



Pinning Information

Pin #	Function	/ADJ
1	CTRL	CTRL
2, 3	-Vin	-Vin
9	NC	NC
10	No Pin	TRIM
11	NC	NC
14	+Vout	+Vout
16	-Vout	-Vout
22, 23	+Vin	+Vin

NC= No Connection

Tolerances:
x.x= ±0.5mm
x.xx= ±0.25mm

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	512.9 x 22.2 x 20.9mm
Packaging Quantity		14pcs
Storage Temperature Range		-50°C to +125°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.

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