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Features

- 300W DC/DC converter in Half Brick format
- 9-36VDC wide input voltage range
- 3kVDC/1 minute insulation
- Fully protected with UVLO, SCP, OVP, and OLP

Regulated Converters

RECOM
DC/DC Converter

REC300H-W

300 Watt Half Brick Single Output

3 YEAR Warranty



RoHS 2+ compliant 10 from 10
REACH compliant

IEC/EN62368-1 pending

Description

The REC300H-W is a half-brick encapsulated DC/DC converter which delivers up to 300W. The input range is 9-36VDC, and the tightly regulated, fully protected output voltage options are 12V, 15V, 24V, or 48V - all trimmable over a +/-10% range. Applications include demanding industrial power supplies, telecom, and PoE circuits.

Selection Guide

Part Number	Input Voltage Range [VDC]	nom. Output Voltage [VDC]	Output Current max. [A]	Efficiency typ. (1) [%]	Max. Capacitive Load (2) [µF]
REC300H-2412SW	9 - 36	12	25	86.5	8800
REC300H-2415SW	9 - 36	15	20	87	8800
REC300H-2424SW	9 - 36	24	12.5	86	4300
REC300H-2448SW	9 - 36	48	6.25	87	1500

Notes:

Note1: Efficiency is tested at nominal input and full load at +25°C ambient

Note2: Maximum capacitive load is tested by nominal input and constant resistive load

Model Numbering

REC300H-__ __ S W

- **H**alf Brick
- nom. Input Voltage
- nom. Output Voltage
- **W**ide Input
- **S**ingle Output

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					LC type
Input Voltage Range	nom. V_{IN}= 24VDC		9VDC	24VDC	36VDC
Input Surge Voltage	1000ms max.				50VDC
Under Voltage Lockout (UVLO)	0% to 100%		7VDC		
Quiescent Current	nom. V_{OUT}= 12, 15, 24VDC			50mA	
	nom. V_{OUT}= 48VDC			70mA	
Minimum Load			0%		
Output Voltage Trimming	V_{IN}= 9-36VDC	nom. V_{OUT}= 24VDC	-10%		+10%
	V_{IN}= 12-36VDC	nom. V_{OUT}= 12, 15VDC	-10%		+10%
		nom. V_{OUT}= 48VDC	-10%		+15%
ON/OFF CTRL	DC-DC ON		Open or 3VDC < V_{CTRL} < 12VDC		
	DC-DC OFF		Short or 0VDC < V_{CTRL} < 1.2VDC		

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

Parameter	Condition		Min.	Typ.	Max.
Start-up Time	nom. V_{IN}= 48VDC				200ms
Internal Operating Frequency				250kHz	
Output Ripple and Noise (3)	20MHz BW	nom. V_{OUT}= 12VDC		120mVp-p	
		nom. V_{OUT}= 15VDC		150mVp-p	
		nom. V_{OUT}= 24VDC		300mVp-p	
		nom. V_{OUT}= 48VDC		480mVp-p	

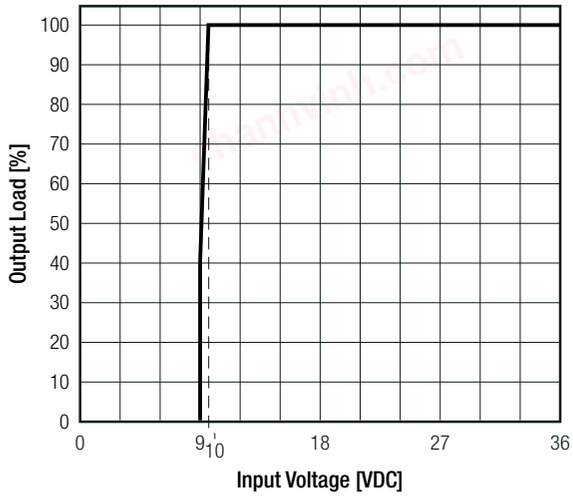
Notes:

Note3: Measured at 20MHz bandwidth and E-Cap, 47µF/100V + X7R MLCC 0.47µF/100V

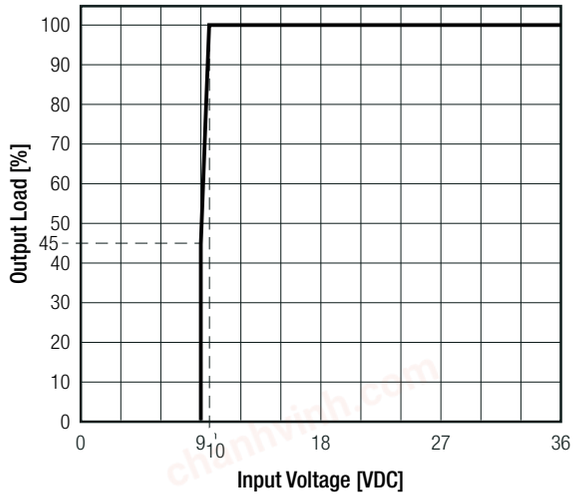
Output Load vs. Input Voltage

(@ nom. V_{IN}=24VDC)

REC300H-2412SW



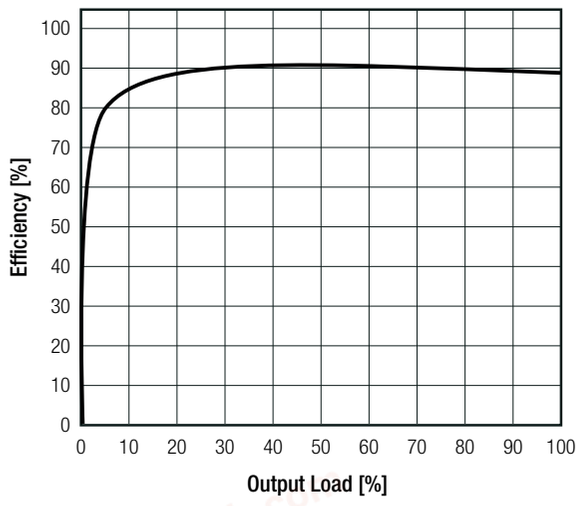
REC300H-2415SW



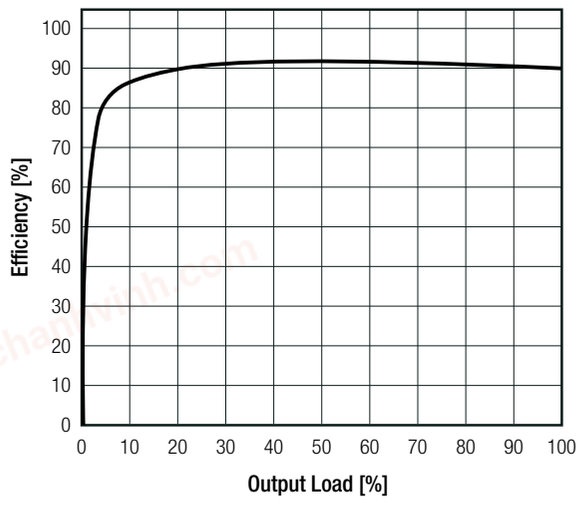
Efficiency vs. Load

(@ nom. V_{IN}=24VDC)

REC300H-2412SW



REC300H-2415SW



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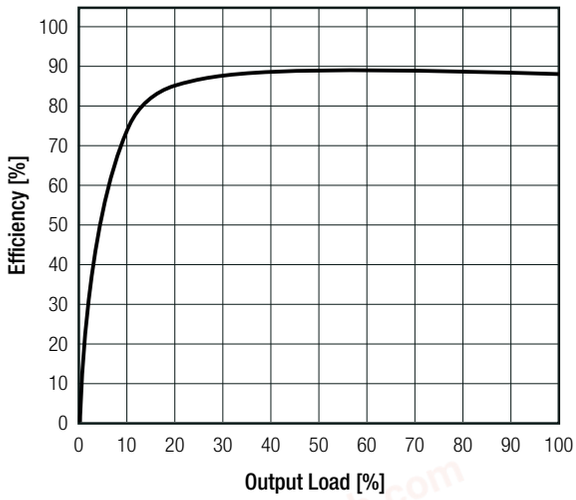
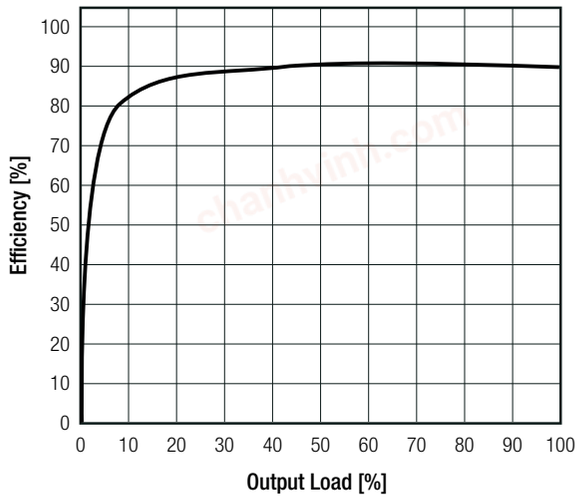
REC300H-W Series

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

REC300H-2424SW

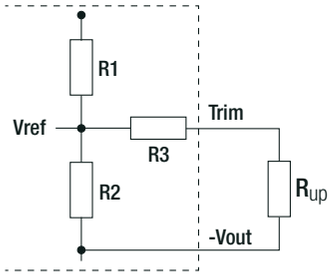


REC300H-2448SW

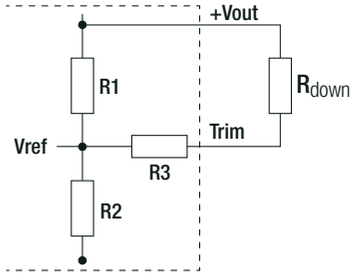


OUTPUT VOLTAGE TRIMMING

Trim UP



Trim DOWN



$Vout_{nom}$	R_1 [Ω]	R_2 [Ω]	R_3 [Ω]	V_{ref} [VDC]
12VDC	38k	10k	68k	2.5
15VDC	50k	10k	68k	2.5
24VDC	103k	5k6	51k	1.24
48VDC	36k4	2k	12k4	2.5

Trim Calculation

$Vout_{nom}$ = nominal output voltage [VDC]
$Vout_{set}$ = trimmed output voltage [VDC]
V_{ref} = reference voltage [VDC]
R_{up} = trim up resistor [Ω]
R_{down} = trim down resistor [Ω]
R_1, R_2, R_3 = internal resistors [Ω]
k_u = trim up factor (a) [ ]
k_d = trim down factor (b) [ ]

$$k_u = \left[\frac{Vref}{Vout_{set} - Vref}\right] \times R1 \qquad R_{up} = \left[\frac{k_u * R2}{R2 - k_u}\right] - R3$$

$$k_d = \left[\frac{Vout_{set} - Vref}{Vref}\right] \times R2 \qquad R_{down} = \left[\frac{k_d * R1}{R1 - k_d}\right] - R3$$

Trim Up: $Vout_{set}$= 26.4VDC

$Vout_{nom}$ = 24V

$$k_u = \left[\frac{1.24V}{26.4 - 1.24V}\right] \times 103k\Omega = \mathbf{4k989\Omega} \qquad R_{up} = \left[\frac{4.989k\Omega \times 5k6\Omega}{5k6\Omega - 4.989k\Omega}\right] - 51k\Omega = \mathbf{3k28\Omega}$$

Trim down: $Vout_{set}$= 21.6VDC

$Vout_{nom}$ = 24V

$$k_d = \left[\frac{21.6 - 1.24V}{1.24V}\right] \times 5k6\Omega = \mathbf{91k94\Omega} \qquad R_{down} = \left[\frac{91.94k\Omega \times 103k\Omega}{103k\Omega - 91.94k\Omega}\right] - 51k\Omega = \mathbf{805k95\Omega}$$

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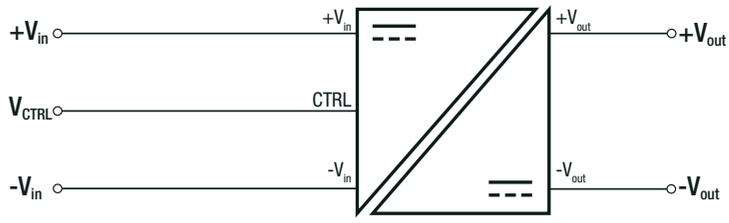
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

ON/OFF CTRL

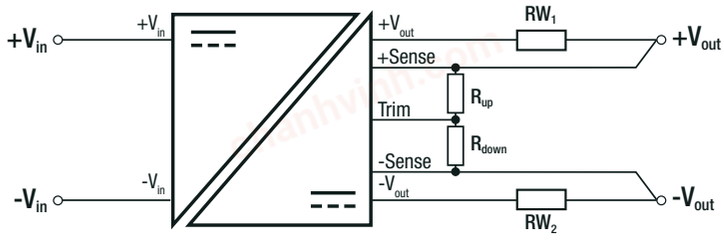




I = 3V
0 = 0V or GND

DC-DC ON: Open or 3VDC < V_{CTRL} < 12VDC
DC-DC OFF: Short or 0VDC < V_{CTRL} < 1.2VDC

REMOTE SENSE



The output voltage can be adjusted by both trim and remote sense. The maximum combined adjustment range is ±10%. Derate the maximum output power if using the trim or sense function to increase the output voltage.

R_{W1} = wire losses +
R_{W2} = wire losses -
R_{UP} = trim up resistor
R_{DOWN} = trim down resistor

REGULATIONS

Parameter	Condition	Value
Output Accuracy		±1.0% max.
Line Regulation	low line to high line, full load	±0.2% max.
Load Regulation	0% to 100% load	±0.5% max.
Transient Response Recovery Time	25% load step change (75% - 100%)	500µs typ.

PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)			continuous, auto recovery
Over Voltage Protection (OVP)	shut down	nom. V_{OUT}= 12VDC	13.4 - 19.2VDC
		nom. V_{OUT}= 15VDC	16.8 - 24VDC
		nom. V_{OUT}= 24VDC	26.9 - 38.4VDC
		nom. V_{OUT}= 48VDC	56.2 - 67.2VDC
Over Load Protection (OLP)			150% of rated I_{OUT}, hiccup
Over Temperature Protection (OTP)	automatic restart after cooldown		110°C max.
Isolation Voltage (4)	1 minute	I/P o O/P	3kVDC
			2kVAC (not safety certified)
	1 minute	I/P (O/P) to case	1.6kVDC
			1kVAC (not safety certified)
Isolation Resistance	V_{ISO}= 500VDC		1GΩ min.
Isolation Capacitance			4700pF max.

Notes:

Note4: For repeat Hi-Pot testing, reduce the time and/or the test voltage

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

ENVIRONMENTAL			
Parameter	**Condition**		**Value**
Operating Temperature Range [5]	with derating (refer to below calculations)		-40°C to +100°C
Max. Baseplate Temperature			+105°C
Temperature Coefficient			0.05%/K max.
Thermal Impedance			refer to ***"Thermal Calculation Example"***
Operating Altitude			2000m
Operating Humidity	non-condensing		5% - 95% RH max.
Pollution Degree			PD2
Vibration	according to MIL-STD-833G-Methode-2026-Letter-D		
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	150 x 10^3 hours

Notes:

Note5: Following calculations are made with REC300H-2424SW. Test PCB: Eurocard 160x100mm 105µm copper, double layer

Thermal Derating with Fan Cooling and Double Layer PCB without Heatsink

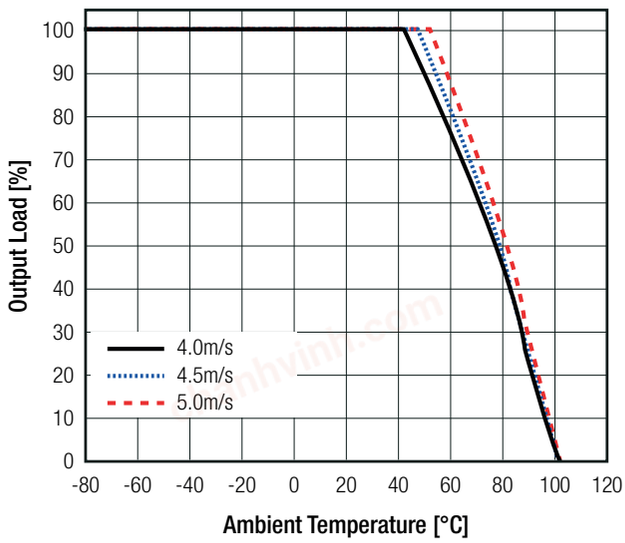
Thermal Impedance	
airflow [m/s]	**Rth** [K/W]
0	5.5
0.25	5.0
0.5	4.4
1.0	4.0
1.5	2.8
2.0	2.5
2.5	2.2
3.0	1.9
3.5	1.6
4.0	1.3
4.5	1.2
5.0	1.1

Thermal Calculation Example

Iout = 50%
R_{th} = 2.5K/W
P_{DISS} = 21.395W
$T_{BASEmax}$ = 105°C

T_{OVER} = R_{th} x P_{Diss} = 2.5K/W x 21.395W = +**53°C**

T_{AMBmax} = $T_{BASEmax}$ - T_{OVER} = 105°C - 53°C = +**52°C**



Thermal Derating with Fan Cooling, Double Layer PCB and Heat-sink

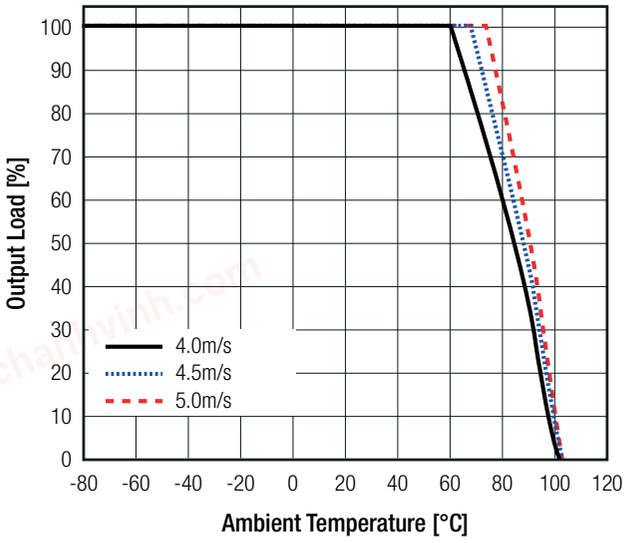
Thermal Impedance	
airflow [m/s]	**Rth** [K/W]
0.2	3.83
0.5	3.58
0.7	3.16
1.0	2.85
1.2	2.67
1.5	2.28
2.0	1.96
2.5	1.70
3.0	1.44
3.5	1.18
4.0	0.92
4.5	0.75
5.0	0.65

Thermal Calculation Example

Iout = 50%
R_{th} = 2.67K/W
P_{DISS} = 21.395W
$T_{BASEmax}$ = 105°C

T_{OVER} = R_{th} x P_{Diss} = 2.67K/W x 21.395W = +**57°C**

T_{AMBmax} = $T_{BASEmax}$ - T_{OVER} = 105°C - 57°C = +**48°C**



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

SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	**Report / File Number**	**Standard**
Audio/Video, information and communication technology equipment - Part1: Safety requirements (CB)	pending	IEC62368-1:2018 3rd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements		EN IEC 62368-1:2020+A11:2020
RoHS		RoHS-2011/65/EU + AM-2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements	with external components	EN55032:2015+A11:2020, Class A, B
ESD Electrostatic discharge immunity test	Air ±2, 4, 8kV Contact ±2, 4, 6kV	IEC61000-4-2, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	10V/m	IEC61000-4-3, Criteria A
Fast Transient and Burst Immunity	±2kV	IEC61000-4-4, Criteria A
Surge Immunity	±2kV	IEC61000-4-5, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	10Vr.m.s	IEC61000-4-6, Criteria A
Power Magnetic Field Immunity	10A/m 50Hz	IEC61000-4-8, Criteria A

DIMENSION AND PHYSICAL CHARACTERISTICS		
Parameter	**Type**	**Value**
Material	case	non-conductive black plastic, (UL94 V-0)
	baseplate	aluminum
	potting	silicone, (UL94 V-0)
	PCB	FR4, (UL94 V-0)
Dimension (LxWxH)		57.9 x 61.0 x 12.7mm
Weight		120g typ.

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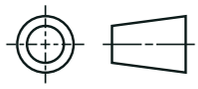
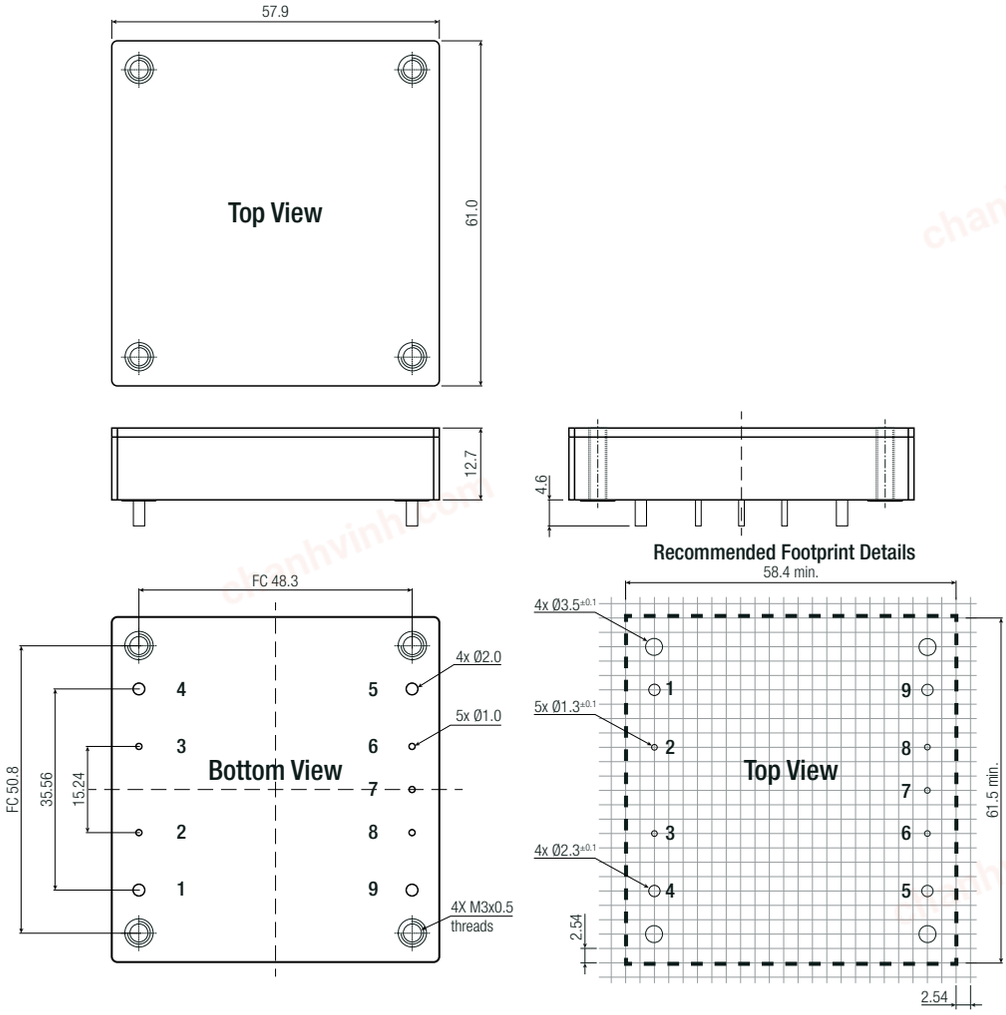
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing (mm)





Pinning Information

Pin #	Function
1	+Vin
2	CTRL
3	Case
4	-Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

FC= Fixing Centers for Heat-sink
XX.X = ±0.5mm
XX.XX = ±0.25mm
Pin Dimension Tolerance ±0.1mm

PACKAGING INFORMATION		
Parameter	**Type**	**Value**
Packaging Dimension (LxWxH)	tube	520.0 x 60.9 x 26.9mm
Packaging Quantity		7pcs
Storage Temperature Range		-55°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.