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

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

IEC/EN62368-1 pending

Model Numbering

REC300H- ___ ___ S W

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

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	

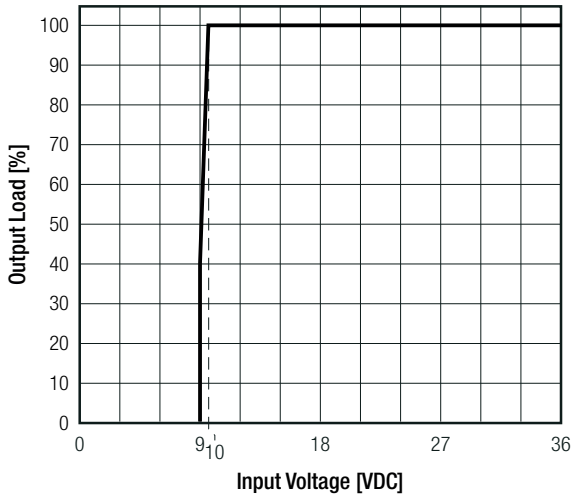
Notes:

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

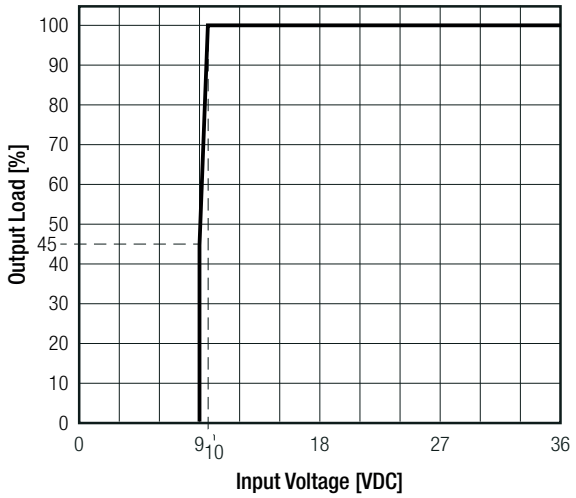
Output Load vs. Input Voltage

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

REC300H-2412SW



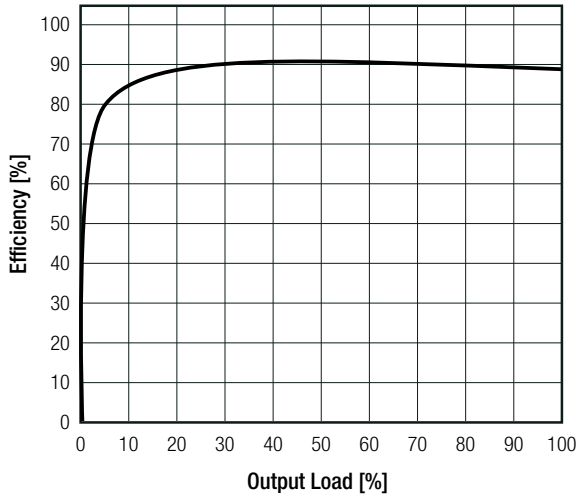
REC300H-2415SW



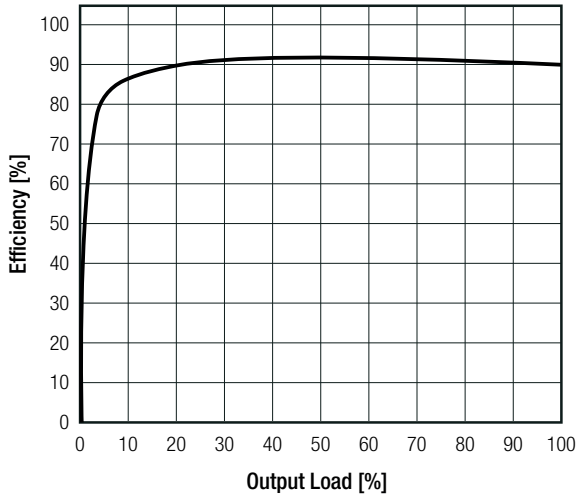
Efficiency vs. Load

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

REC300H-2412SW



REC300H-2415SW



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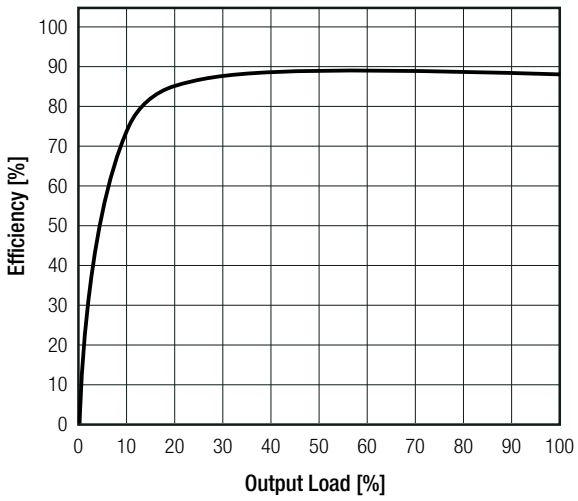
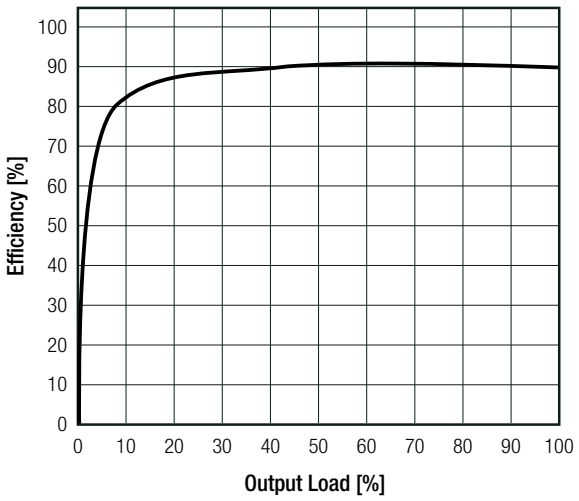
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

REC300H-2424SW

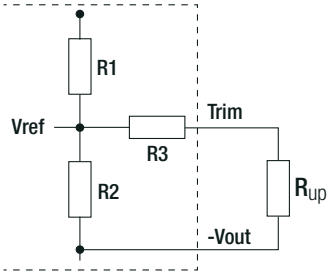


REC300H-2448SW

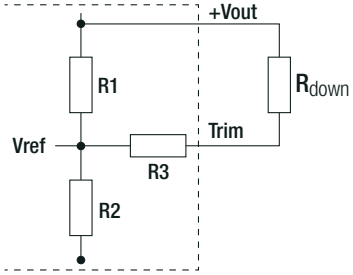


OUTPUT VOLTAGE TRIMMING

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) [ ]

$$k_u = \left[\frac{Vref}{Vout_{set} - Vref}\right] \times R1$$

$$k_d = \left[\frac{Vout_{set} - Vref}{Vref}\right] \times R2$$

$$R_{up} = \left[\frac{k_u * R2}{R2 - k_u}\right] - R3$$

$$R_{down} = \left[\frac{k_d * R1}{R1 - k_d}\right] - R3$$

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

$Vout_{nom}$ = 24V

$$k_u = \left[\frac{1.24V}{26.4 - 1.24V}\right] \times 103k\Omega = \mathbf{4k989\Omega}$$

$$R_{up} = \left[\frac{4.989k\Omega \times 5k6\Omega}{5k6\Omega - 4.989k\Omega}\right] - 51k\Omega = \mathbf{3k28\Omega}$$

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

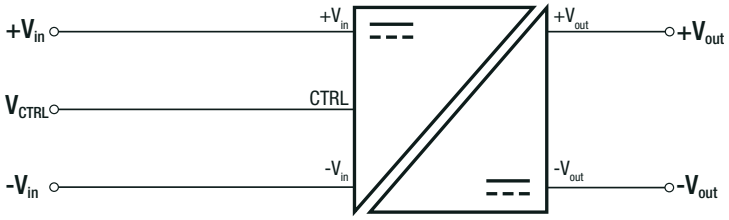
$Vout_{nom}$ = 24V

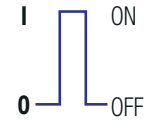
$$k_d = \left[\frac{21.6 - 1.24V}{1.24V}\right] \times 5k6\Omega = \mathbf{91k94\Omega}$$

$$R_{down} = \left[\frac{91.94k\Omega \times 103k\Omega}{103k\Omega - 91.94k\Omega}\right] - 51k\Omega = \mathbf{805k95\Omega}$$

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

ON/OFF CTRL

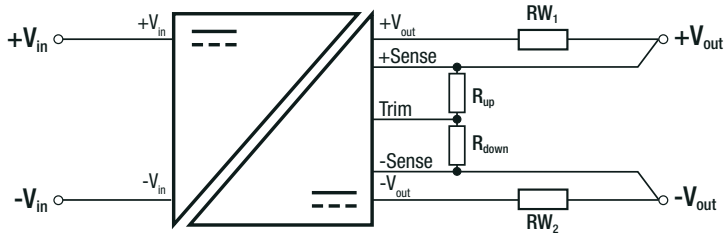




I = 3V
0 = 0V or GND

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

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

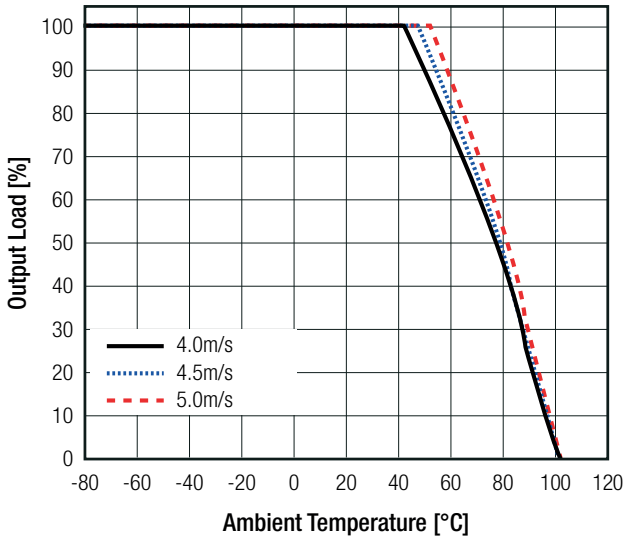
Thermal Impedance	
airflow [m/s]	**Rth** [K/W]
0	5.5
0.25	5.0
0.5	4.4
1.0	4.0
1.5	2.8
2.0	2.5
2.5	2.2
3.0	1.9
3.5	1.6
4.0	1.3
4.5	1.2
5.0	1.1

Thermal Calculation Example

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

$T_{OVER} = R_{th} \times P_{Diss} = 2.5K/W \times 21.395W = +\mathbf{53°C}$

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



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

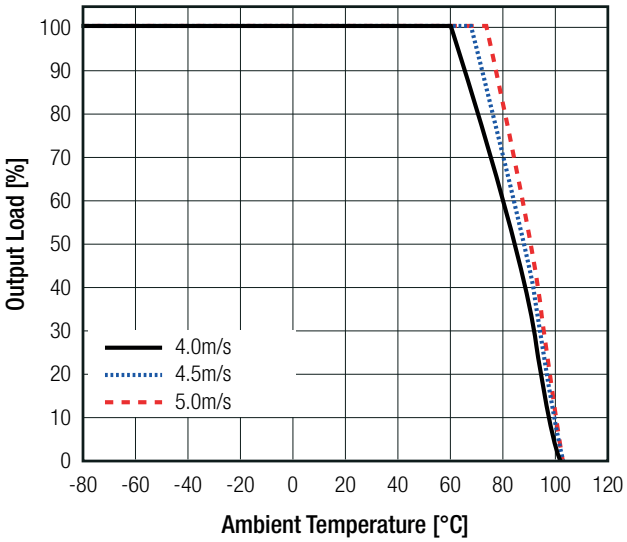
Thermal Impedance	
airflow [m/s]	**Rth** [K/W]
0.2	3.83
0.5	3.58
0.7	3.16
1.0	2.85
1.2	2.67
1.5	2.28
2.0	1.96
2.5	1.70
3.0	1.44
3.5	1.18
4.0	0.92
4.5	0.75
5.0	0.65

Thermal Calculation Example

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

$T_{OVER} = R_{th} \times P_{Diss} = 2.67K/W \times 21.395W = +\mathbf{57°C}$

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



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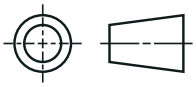
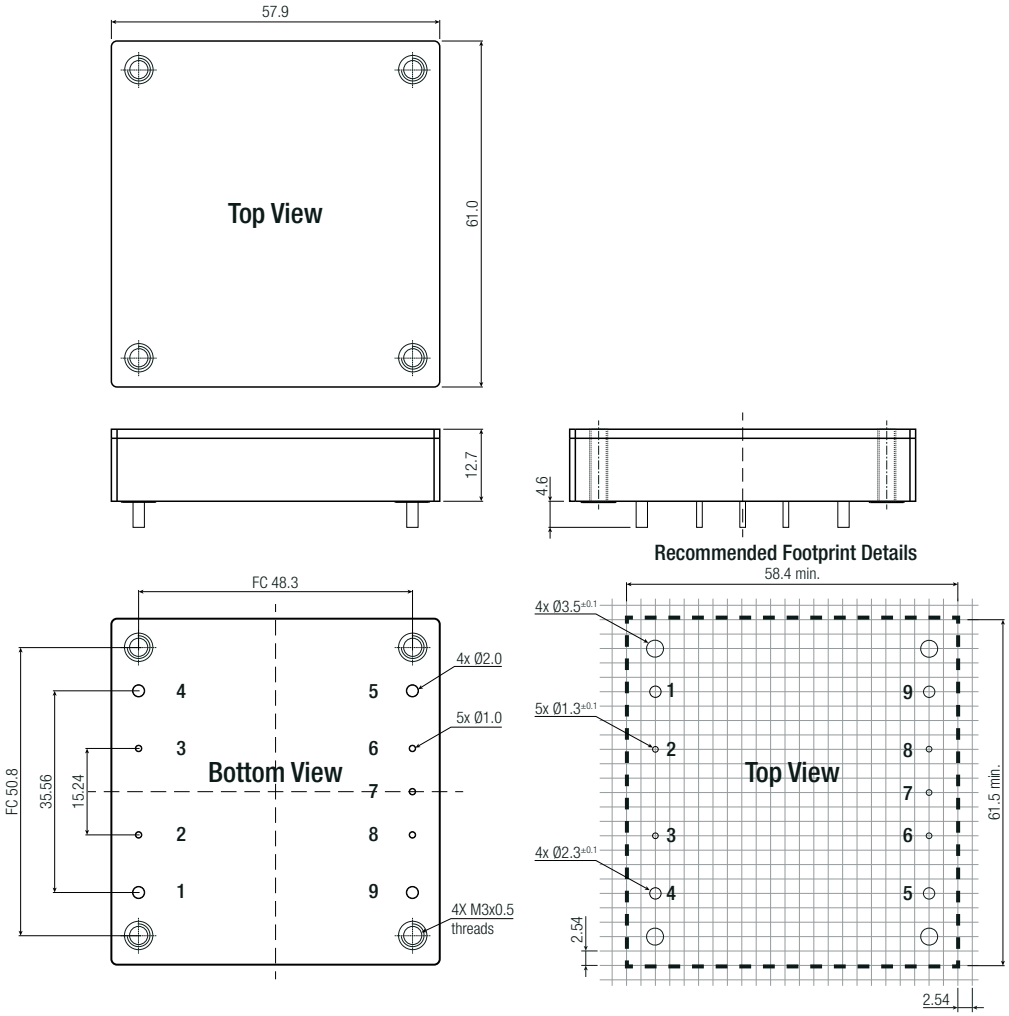
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

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.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

RECOM:

REC300H-2412SW REC300H-2415SW REC300H-2424SW REC300H-2448SW