Technical Data Sheet

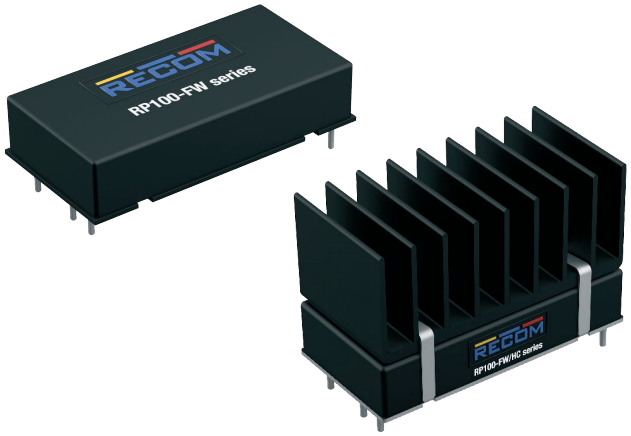
RP100-FW Series ◊ DC-DC Converter

100W ◊ 4:1 Wide Input: 9V-36VDC / 18V-75VDC

RECOM DC/DC Converter

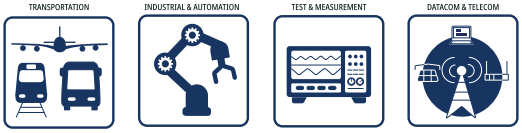
FEATURES

- 4:1 wide input voltage range
- 2.25kVDC isolation
- Efficiency up to 94%
- Wide operating temperature range -40°C to +110°C
- Operating altitude up to 5000m
- Optional heat sink version
- 3 year warranty



Dimensions (LxWxH) without heat sink:	50.8 x 25.4 x 11.5mm (2.00 x 1.00 x 0.45 inch) 47.2g (0.1 lbs)
Dimensions (LxWxH) with heat sink:	50.8 x 26.5 x 33.0mm (2.00 x 1.04 x 1.29 inch) 67.6g (0.15 lbs)

APPLICATIONS



SAFETY & EMC

RoHS² compliant 10 from 10

Reach compliant

c UL us E196683

DESCRIPTION

The RP100-FW series is a high-performance 100W isolated DC/DC converter family featuring a 4:1 wide input range and up to 94% efficiency. Designed for demanding applications in transportation, industrial & automation, test & measurement, and datacom & telecom. The series offers a 2.25kVDC isolation and comprehensive protection features including OVP, OLP, OTP and continuous short-circuit protection. With an operating temperature range of -40°C to +110°C, altitude capability up to 5000m, and optional heat sink versions for improved thermal performance, the RP100-FW series ensures reliable operation in harsh environments. The output voltage is adjustable by ±10%, remote ON/OFF control is available with positive or negative logic. The series meets RoHS & REACH standards.

SELECTION GUIDE

Part Number	Input Voltage Range [VDC]	nom. Output Voltage [VDC]	Output Current max. [mA]	Efficiency typ. (1) [%]	Max. Capacitive Load (2) [µF]
RP100-2405SFW (3, 4)	9-36	05	20000	92.5	30000
RP100-2412SFW (3, 4)	9-36	12	8400	94	5200
RP100-2415SFW (3, 4)	9-36	15	6700	94	3300
RP100-2424SFW (3, 4)	9-36	24	4200	93	1300
RP100-2428SFW (3, 4)	9-36	28	3600	93	970
RP100-2448SFW (3, 4)	9-36	48	2100	92.5	330
RP100-2454SFW (3, 4)	9-36	54	1860	93	260

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

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RP100-FW Series ◊ DC-DC Converter

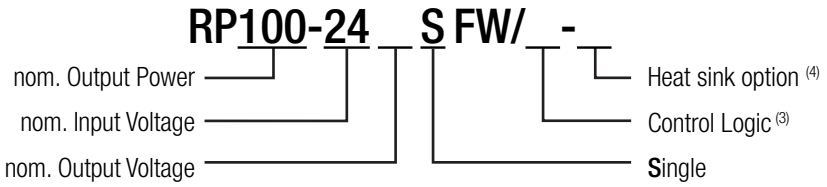
100W ◊ 4:1 Wide Input: 9V-36VDC / 18V-75VDC

RECOM DC/DC Converter

SELECTION GUIDE

Part Number	Input Voltage Range [VDC]	nom. Output Voltage [VDC]	Output Current max. [mA]	Efficiency typ. (1) [%]	Max. Capacitive Load (2) [µF]
RP100-4805SFW (3, 4)	18-75	05	20000	92.5	30000
RP100-4812SFW (3, 4)	18-75	12	8400	94	5200
RP100-4815SFW (3, 4)	18-75	15	6700	94	3300
RP100-4824SFW (3, 4)	18-75	24	4200	93	1300
RP100-4828SFW (3, 4)	18-75	28	3600	93	970
RP100-4848SFW (3, 4)	18-75	48	2100	92.5	330
RP100-4854SFW (3, 4)	18-75	54	1860	93	260

MODEL NUMBERING



Note3: add suffix "/N" for negative logic
add suffix "/P" for positive logic

Note4: add suffix "/N-HC" for negative logic and pre-mounted heat sink
add suffix "/P-HC" for positive logic and pre-mounted heat sink

BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

Parameter	Condition			Min.	Typ.	Max.
Internal Input Filter					Pi-Type	
Input Voltage Range	nom. V_{IN}= 24VDC			9VDC	24VDC	36VDC
	nom. V_{IN}= 48VDC			18VDC	48VDC	75VDC
Input Surge Voltage	nom. V_{IN}= 24VDC	1 second max.				50VDC
	nom. V_{IN}= 48VDC					100VDC
Under Voltage Lockout (UVLO)	nom. V_{IN}= 24VDC	DC-DC ON				9VDC
		DC-DC OFF		7VDC	8VDC	8.8VDC
	nom. V_{IN}= 48VDC	DC-DC ON				18VDC
		DC-DC OFF		15VDC	16VDC	17.5VDC
Input Current	no load @	nom. V_{IN}= 24VDC	nom. V_{OUT}= 5V, 12V, 15VDC		10mA	
		nom. V_{IN}= 24VDC	others		15mA	
		nom. V_{IN}= 48VDC	all types		15mA	
Output Voltage Trimming	refer to **„Output Voltage Trimming“**			-10%		+10%
Start-up Time	constant resistive load	power up			75ms	100ms
		remote ON/OFF			75ms	100ms
ON/OFF CTRL (5)	refer to **„ON/OFF CTRL“**	Positive Logic (Standard version)	DC-DC ON	Open or 3VDC - 12VDC		
			DC-DC OFF	Short or 0VDC - 1.2VDC		
		Negative Logic	DC-DC ON	Short or 0VDC - 1.2VDC		
			DC-DC OFF	Open or 3VDC - 12VDC		
Input Current of CTRL pin				-0.5mA		+1.0mA
Standby Current	remote OFF				3mA	

Note5: The ON/OFF control function can be positive or negative logic. The pin voltage is referenced to -Vin

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RP100-FW Series ◊ DC-DC Converter

100W ◊ 4:1 Wide Input: 9V-36VDC / 18V-75VDC

RECOM DC/DC Converter

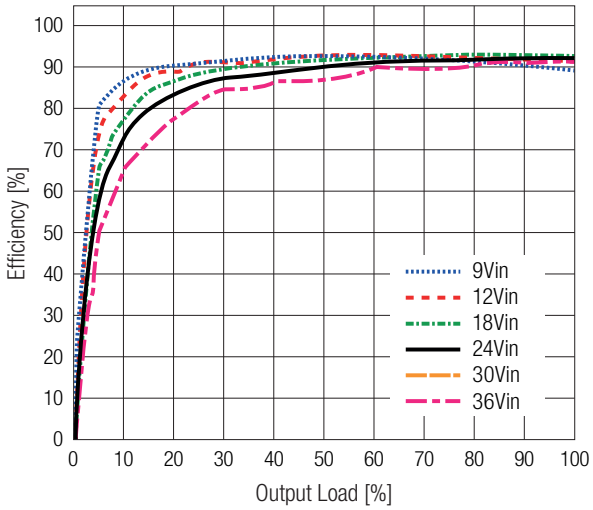
BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

Parameter	Condition			Min.	Typ.	Max.
Internal Operating Frequency	nom. V_{OUT}= 48V, 54VDC			200kHz	230kHz	260kHz
	all others			175kHz	200kHz	225kHz
Output Ripple and Noise (6)	measured with 20MHz BW	10µF/50V X7R MLCC	nom. V_{OUT}= 5VDC		75mVp-p	
			nom. V_{OUT}= 12V, 15VDC		100mVp-p	
			nom. V_{OUT}= 24V, 28VDC		200mVp-p	
		4.7µF/100V X7R MLCC	nom. V_{OUT}= 48V, 54VDC		300mVp-p	

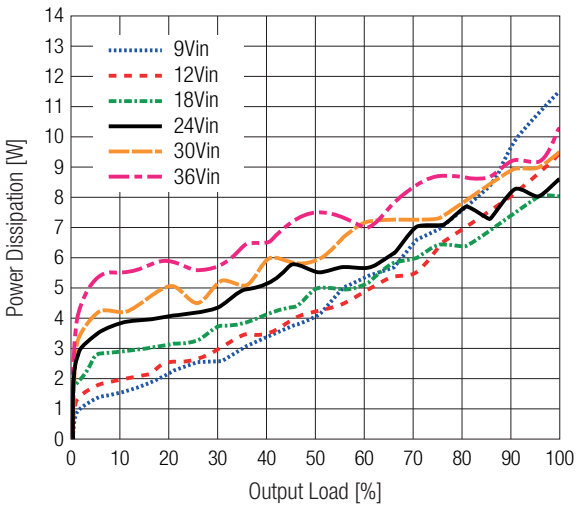
Note6: The test setup can have an impact on ripple noise values (placement of scope probe, capacitors, its specifications, wires, PCB tracks, distances, etc.)

RP100-2412SFW

Efficiency vs. Output Load

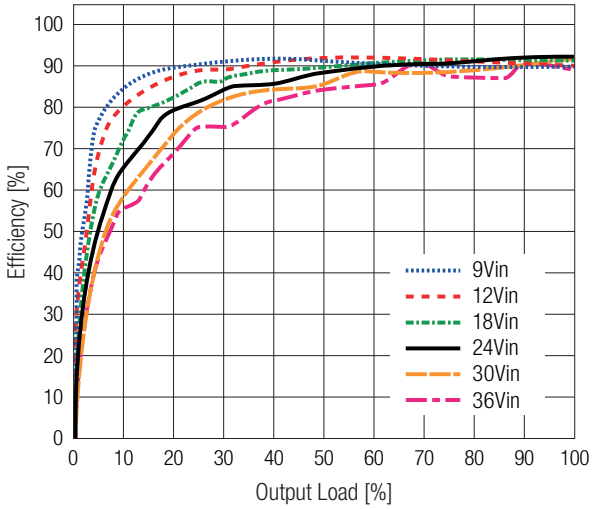


Power Dissipation vs. Output Load

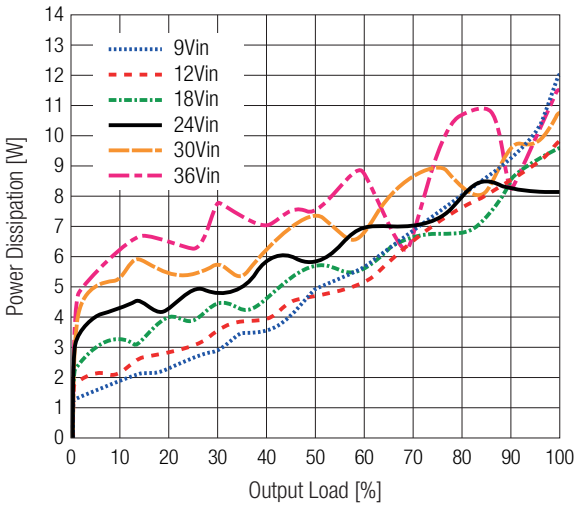


RP100-2424SFW

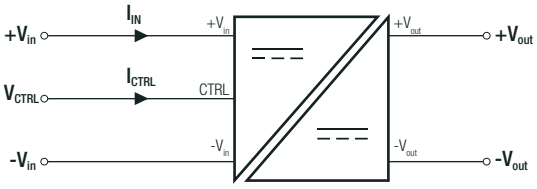
Efficiency vs. Output Load



Power Dissipation vs. Output Load



ON/OFF CTRL

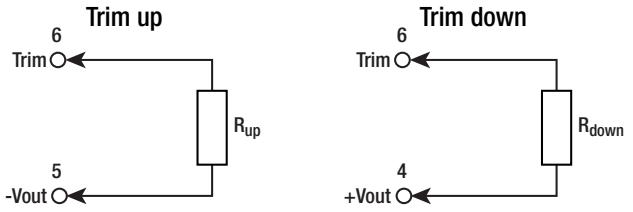


Positive Logic	DC-DC ON	Open or 3VDC - 12VDC
	DC-DC OFF	Short or 0VDC - 1.2VDC
Negative Logic	DC-DC ON	Short or 0VDC - 1.2VDC
	DC-DC OFF	Open or 3VDC - 12VDC

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OUTPUT VOLTAGE TRIMMING

This module allows the user to increase or decrease the output voltage. This is accomplished by connecting an external resistor between the Trim pin and either the +Vout or -Vout pins.
With the resistor between Trim and -Vout pin, output voltage increases.
With the resistor between Trim and +Vout pin, output voltage decreases.
The external trim resistor must be rated for at least 1/8 W. Resistor values in the trim tables below follow standard E96 series; actual voltage may vary slightly



$VOUT_{nom}$= 5VDC

Trim up	1	2	3	4	5	6	7	8	9	10	[%]
$Vout_{set}$ =	5.05	5.1	5.15	5.2	5.25	5.3	5.35	5.4	5.45	5.5	[VDC]
R_{up} (E96) ≈	33k2	15k8	9k53	6k34	4k42	3k16	2k21	1k5	976	536	[Ω]

Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	[%]
$Vout_{set}$ =	4.95	4.9	4.85	4.8	4.75	4.7	4.65	4.6	4.55	4.5	[VDC]
R_{down} (E96) ≈	49k9	21k5	12k7	8k25	5k76	4k02	2k87	1k96	1k24	685	[Ω]

$VOUT_{nom}$= 12VDC

Trim up	1	2	3	4	5	6	7	8	9	10	[%]
$Vout_{set}$ =	12.12	12.24	12.36	12.48	12.60	12.72	12.84	12.96	13.08	13.2	[VDC]
R_{up} (E96) ≈	412k	174k	102k	68k1	46k4	32k4	22k6	15k	9k31	4k87	[Ω]

Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	[%]
$Vout_{set}$ =	11.88	11.76	11.64	11.52	11.4	11.28	11.16	11.04	10.92	10.8	[VDC]
R_{down} (E96) ≈	422k	196k	118k	78k7	53k6	38k3	26k1	17k4	10k5	4k99	[Ω]

$VOUT_{nom}$= 15VDC

Trim up	1	2	3	4	5	6	7	8	9	10	[%]
$Vout_{set}$ =	15.15	15.3	15.45	15.6	15.75	15.9	16.05	16.2	16.35	16.5	[VDC]
R_{up} (E96) ≈	453k	210k	130k	93k1	69k8	54k9	43k2	35k7	29k4	24k3	[Ω]

Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	[%]
$Vout_{set}$ =	14.85	14.7	14.55	14.4	14.25	14.1	13.95	13.8	13.65	13.5	[VDC]
R_{down} (E96) ≈	261k	124k	75k	48k7	34k	23k7	16k9	11k3	6k98	3k57	[Ω]

$VOUT_{nom}$= 24VDC

Trim up	1	2	3	4	5	6	7	8	9	10	[%]
$Vout_{set}$ =	24.24	24.48	24.72	24.96	25.2	25.44	25.68	25.92	26.16	26.4	[VDC]
R_{up} (E96) ≈	1240k	549k	340k	237k	174k	137k	110k	88k7	71k5	59k	[Ω]

Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	[%]
$Vout_{set}$ =	23.76	23.52	23.28	23.04	22.8	22.56	22.32	22.08	21.84	21.6	[VDC]
R_{down} (E96) ≈	619k	294k	179k	118k	80k6	56k2	38k3	24k3	13k7	5k23	[Ω]

$VOUT_{nom}$= 28VDC

Trim up	1	2	3	4	5	6	7	8	9	10	[%]
$Vout_{set}$ =	28.28	28.56	28.84	29.12	29.4	29.68	29.96	30.24	30.52	30.8	[VDC]
R_{up} (E96) ≈	1740k	715k	432k	301k	226k	179k	147k	118k	100k	84k5	[Ω]

Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	[%]
$Vout_{set}$ =	27.72	27.44	27.16	26.88	26.6	26.32	26.04	25.76	25.48	25.2	[VDC]
R_{down} (E96) ≈	1000k	511k	332k	232k	174k	133k	105k	82k5	63k4	49k9	[Ω]

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OUTPUT VOLTAGE TRIMMING

$VOUT_{nom}$= 48VDC

Trim up	1	2	3	4	5	6	7	8	9	10	[%]
$Vout_{set}$ =	48.48	48.96	49.44	49.92	50.4	50.88	51.36	51.84	52.32	52.8	[VDC]
R_{up} (E96) ≈	619k	243k	140k	90k9	61k9	42k2	29k4	19k6	12k1	6k04	[Ω]

Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	[%]
$Vout_{set}$ =	47.52	47.04	46.56	46.08	45.6	45.12	44.64	44.16	43.68	43.2	[VDC]
R_{down} (E96) ≈	475k	232k	143k	95k3	64k9	45k3	30k9	20k5	11k8	4k48	[Ω]

$VOUT_{nom}$= 54VDC

Trim up	1	2	3	4	5	6	7	8	9	10	[%]
$Vout_{set}$ =	54.54	55.08	55.62	56.16	56.7	57.24	57.78	58.32	58.86	59.4	[VDC]
R_{up} (E96) ≈	634k	267k	158k	102k	69k8	48k7	33k2	22k1	13k3	6k34	[Ω]

Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	[%]
$Vout_{set}$ =	53.46	52.92	52.38	51.84	51.3	50.76	50.22	49.68	49.14	48.6	[VDC]
R_{down} (E96) ≈	634k	301k	182k	121k	82k5	57k6	40k2	26k1	15k8	7k15	[Ω]

REGULATIONS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

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	25% load step change	250µs typ.

PROTECTIONS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

Parameter	Condition		Value
Short Circuit Protection (SCP)	below 100mΩ		continuous, automatic recovery
Over Voltage Protection (OVP)	zener diode clamp	nom. V_{OUT}= 5VDC	6.5VDC typ.
		nom. V_{OUT}= 12VDC	15VDC typ.
		nom. V_{OUT}= 15VDC	20VDC typ.
		nom. V_{OUT}= 24VDC	30VDC typ.
		nom. V_{OUT}= 28VDC	35VDC typ.
		nom. V_{OUT}= 48VDC	60VDC typ.
		nom. V_{OUT}= 54VDC	66VDC typ.
Over Load Protection (OLP)			135% of rated I_{OUT}, hiccup mode
Over Temperature Protection (OTP)	internal temperature sensor		116°C typ.
Isolation Voltage (7)	I/P to O/P	1 minute	2.25kVDC
	I/P (O/P) to case		1.6kVDC
Isolation Resistance	V_{ISO}= 500VDC		1GΩ min.
Isolation Capacitance			2200pF max.
Insulation Grade			functional

Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage.
Note8: Refer to local safety regulations if input over-current protection is also required.
Note9: This power module is not internally fused. An input line fuse must always be used.
Recom suggests:
- For nom. V_{IN}= 24VDC, fuse rating 20A, fast acting type
- For nom. V_{IN}= 48VDC, fuse rating 12A, fast acting type

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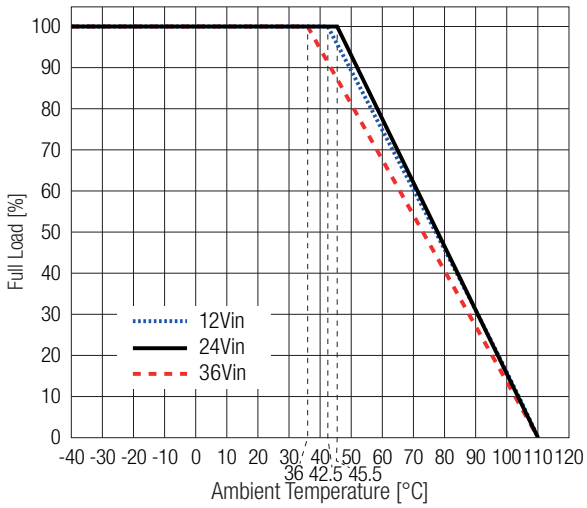
ENVIRONMENTAL (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

Parameter	Condition			Value
Operating Temperature Range	with derating, refer to **„Derating Graph“**			-40°C to +110°C
Maximum Case Temperature				+110°C
Thermal Impedance	natural convection (0.1m/s)	with 5"x3" evaluation board	without heat sink	8°K/W typ.
			with heat sink	4.8°K/W typ.
Operating Altitude				5000m
Operating Humidity				5%-95% RH
Pollution Degree				PD2
Shock				according to MIL-STD-810F
Thermal Shock				according to MIL-STD-810F
Vibration				according to MIL-STD-810F
MTBF	according to MIL-HDBK-217F, G.B.	@ full load	T_{AMB}= +25°C	743.1 x 10^3 hours

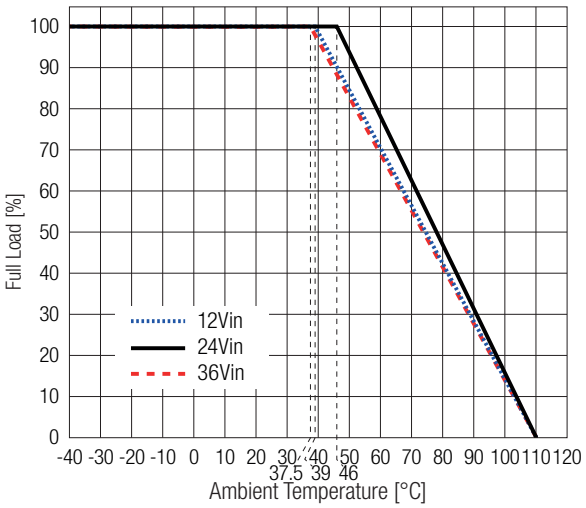
Derating Graph

(Mount on 5"x3" evaluation board)

RP100-2412SFW



RP100-2424SFW



SAFETY AND CERTIFICATION

Certificate Type (Safety)	Report / File Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements	E196683	UL62368-1:2014 2nd Edition CAN/CSA-C22.2 No. 62368-1-14 2nd Edition
RoHS2		RoHS 2011/65/EU + AM2015/863

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SAFETY AND CERTIFICATION

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	with external components (11)	EN55032, Class A
Electromagnetic compatibility of multimedia equipment - Immunity requirements		EN55035
ESD Electrostatic discharge immunity test	Air: ±8kV, Contact: ±6kV	EN61000-4-2, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	20V/m	EN61000-4-3, Criteria A
Fast Transient and Burst Immunity (12)	DC Power Port: ±2kV	EN61000-4-4, Criteria A
Surge Immunity (12)	DC Power Port: ±2kV	EN61000-4-5, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	DC Power Port: 10Vrm	EN61000-4-6, Criteria A
Power Magnetic Field Immunity	100A/m continuous, 1000A/m 1 second	EN61000-4-8, Criteria A

Note10: The power module operates to specification without external components, assuming a low-impedance source with stable voltage regulation. Highly inductive input sources may impact stability—add an external filter capacitor for real voltage sources.

Note11: For the EMI guidelines refer to RECOM Website/RP100-FW/Documentation

Note12: Nom. V_{IN}= 24VDC models tested with 2pcs of aluminum electrolytic capacitors (470µF/50V) and a TVS (58V, 3000W peak pulse power) in parallel. Nom. V_{IN}= 48VDC models tested with 2pcs of aluminum electrolytic capacitors (220µF/100V) and a TVS (120V, 3000W peak pulse power) in parallel.

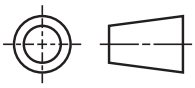
DIMENSION & PHYSICAL CHARACTERISTICS

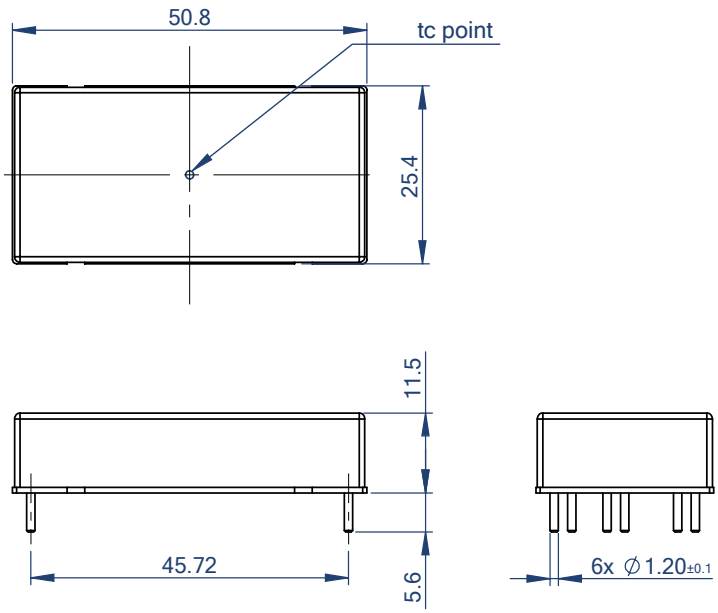
Parameter	Type	Value
Material	case	copper
	potting	silicone, (UL94 V-0)
	baseplate	FR4
Dimension (LxWxH)	without heat sink	50.8 x 25.4 x 11.5mm 2.00 x 1.00 x 0.45inch
	with heat sink ("-HC")	50.8 x 26.5 x 33.0mm 2.00 x 1.04 x 1.29inch
Weight	without heat sink	47.2g typ 0.1lbs
	with heat sink ("-HC")	67.6g typ 0.15 lbs

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DIMENSION & PHYSICAL CHARACTERISTICS

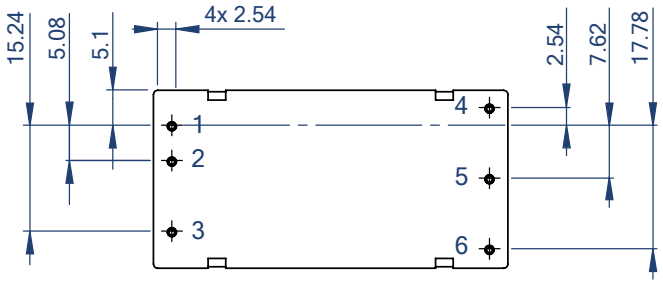
Dimension Drawing (mm)



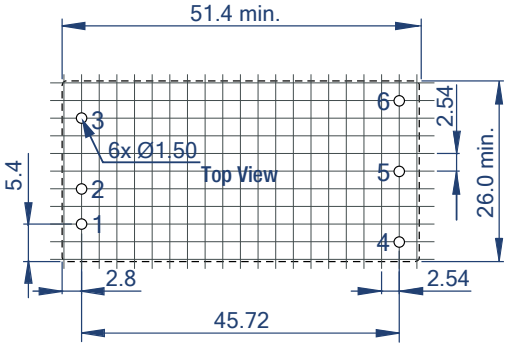


Pinning Information

Pin #	Single
1	+Vin
2	-Vin
3	CTRL
4	+Vout
5	-Vout
6	Trim



Recommended Footprint Detail



Tolerances:
x.x= ±0.5mm
x.xx= ±0.25mm

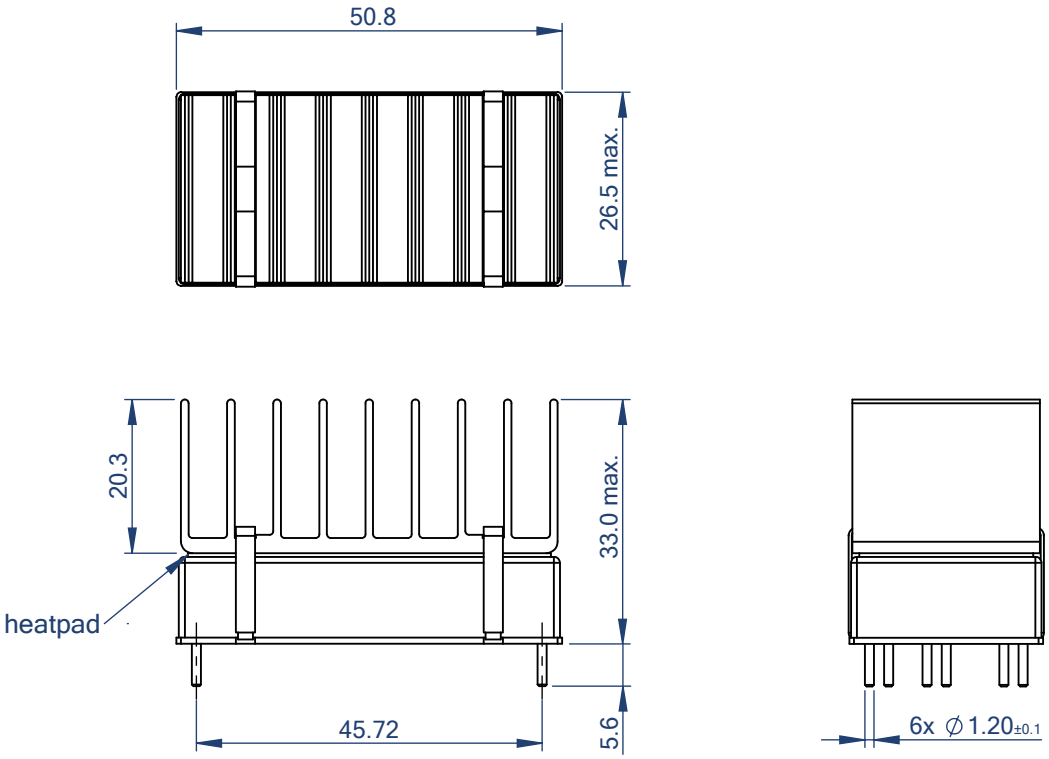
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RP100-FW Series ◊ DC-DC Converter

100W ◊ 4:1 Wide Input: 9V-36VDC / 18V-75VDC

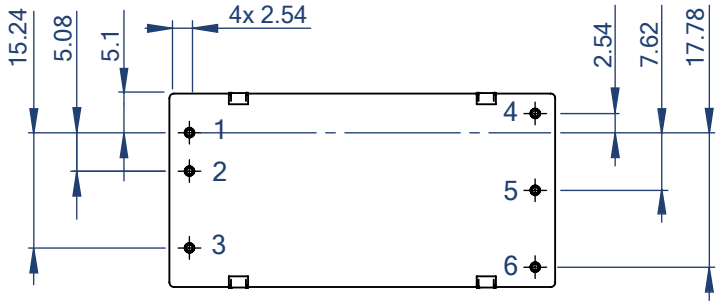
DIMENSION & PHYSICAL CHARACTERISTICS

Dimension Drawing (mm)
Heat sink version "/-HC"

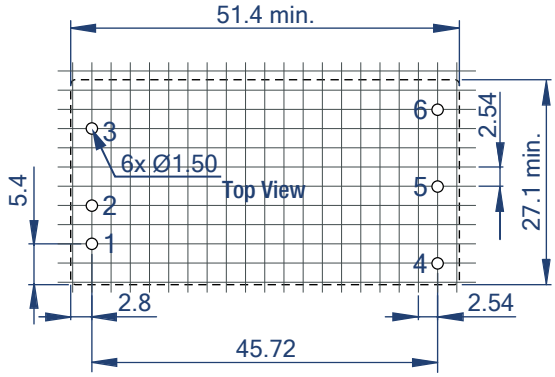


Pinning Information

Pin #	Single
1	+Vin
2	-Vin
3	CTRL
4	+Vout
5	-Vout
6	Trim



Recommended Footprint Detail



Tolerances:
x.x= ±0.5mm
x.xx= ±0.25mm

PACKAGING INFORMATION

Parameter	Type		Value
Packaging Dimension (LxWxH)	tube	without heat sink	255.0 x 55.0 x 21.5mm
	tray	with heat sink ("-HC")	306.0 x 223.0 x 35.0mm
Packaging Quantity	tube	without heat sink	9pcs
	tray	with heat sink ("-HC")	15pcs
Storage Temperature Range			-55°C to +125°C
Storage Humidity	non-condensing		5% - 95% RH

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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