Features

Regulated Converter

- Wide input range 85-305VAC
- Operating temperature range: -40°C to +80°C
- High efficiency over entire load range
- No external components necessary
- Household certification IEC/EN60335
- Overvoltage category OVCIII (IEC62477-1)
- 140% Peak load capability

RECOM

AC/DC Converter

RAC10-K/277

10 Watt 2“ x 1“ Single and Dual Output

3 YEAR Warranty

Description

The RAC10-K/277 series are highly efficient PCB-Mount power conversion modules with ultra-low energy losses even in light load conditions. Built for worldwide usage, the AC/DC units cover an enhanced mains input range of 85VAC up to 305VAC and come with international safety certifications for both industrial and household standards. These AC/DC modules offer fully protected single or dual outputs as well as EMC Class B compliance without the need of any external components. The 140% peak power capability makes the RAC10-K/277 series suitable for inductive, high start-up current or nonlinear loads. With a full load temperature range of -40°C to +65°C, they are ideal for always-on and standby mode operations in process automation, IoT and smart building applications.

Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. (1) [%]	Max. Capacitive Load [µF]]
RAC10-3.3SK/277	85-305	3.3	2500	79	10000
RAC10-05SK/277	85-305	5	2000	82	8000
RAC10-12SK/277	85-305	12	840	84	1500
RAC10-15SK/277	85-305	15	670	85	1000
RAC10-18SK/277	85-305	18	560	85	800
RAC10-24SK/277	85-305	24	420	84	330
RAC10-12DK/277	85-305	±12	±420	82	±1200
RAC10-15DK/277	85-305	±15	±340	83	±1000

Notes:

Note1: Efficiency is tested at 25°C with constant resistant mode at full load and 230VAC

UL62368-1 certified
CSA C22.2 No. 62368-1-14 certified
IEC/EN60950-1 certified
IEC/EN60335-1 certified
IEC/EN62368-1 certified
EN62233 certified
EN62477-1 certified
EN61204-3 compliant
CB-Report

Model Numbering

RAC10-__ __K/277

Output Voltage — **S**ingle or **D**ual Output

Ordering Examples:

RAC10-05SK/277	10 Watt	5Vout	Single Output
RAC10-24SK/277	10 Watt	24Vout	Single Output
RAC10-12DK/277	10 Watt	12Vout	Dual Output

Specifications (measured @ Ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

BASIC CHARACTERISTICS

Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter					Pi Type
Input Voltage Range (2,3)	nom. Vin= 277VAC		85VAC 120VDC	277VAC	305VAC 430VDC
Input Current	115VAC 230VAC 277VAC				250mA 210mA 190mA
Inrush Current	115VAC 230VAC 277VAC				15A 30A 36A
No load Power Consumption				150mW	250mW
ErP Standby Mode Conformity (Output Load Capability)	Input Power=	0.5W 1.0W 2.0W			0.3W 0.7W 1.4W
Input Frequency Range			47Hz		63Hz
Overload Capability	peak duty cycle: 10%; T_{AMB} +50°C max.				140%/10s
Minimum Load	Single Dual		0%	 10%	
Power Factor	115VAC 230VAC 277VAC		0.60 0.50 0.45		
Start-up Time				30ms	
Rise Time					25ms
Hold-up time	115VAC 230VAC 277VAC			15ms 90ms 110ms	
Internal Operating Frequency					100kHz
Output Ripple and Noise (4)	20MHz BW	3.3Vout, 5Vout others		60mVp-p	 1% of Vout

Notes:

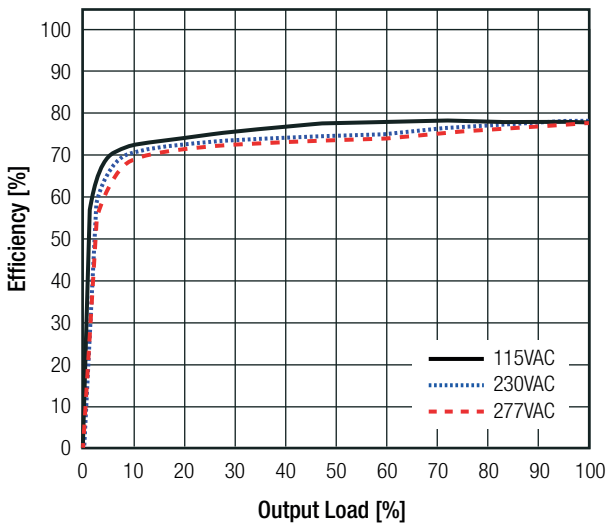
Note2: The products were submitted for safety files at AC-Input operation

Note3: Refer to ***"Line Derating"***

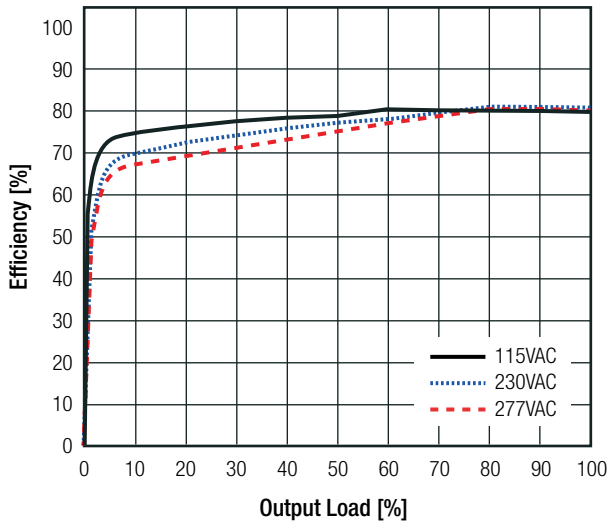
Note4: Measurements are made with a 0.1µF MLCC & 10µF E-cap in parallel across output. (low ESR)

Efficiency vs. Load

RAC10-3.3SK/277



RAC10-05SK/277



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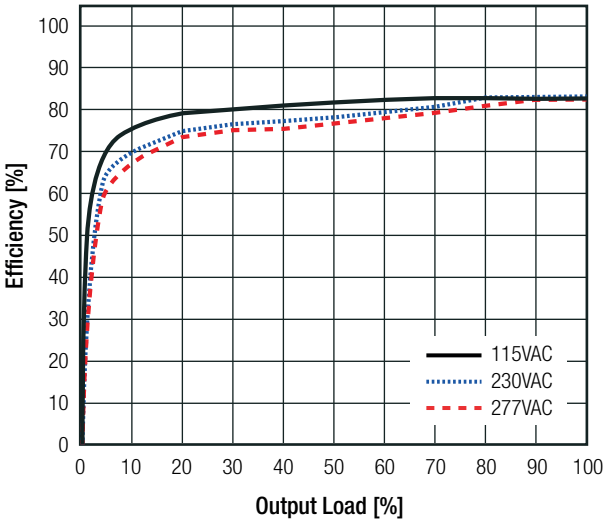
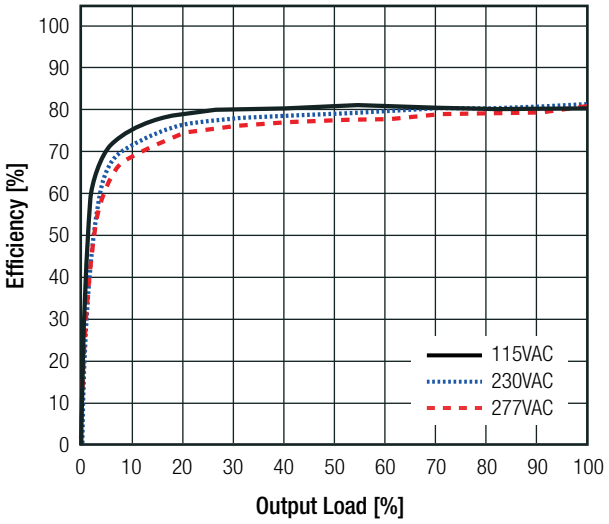
Specifications (measured @ Ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

Efficiency vs. Load

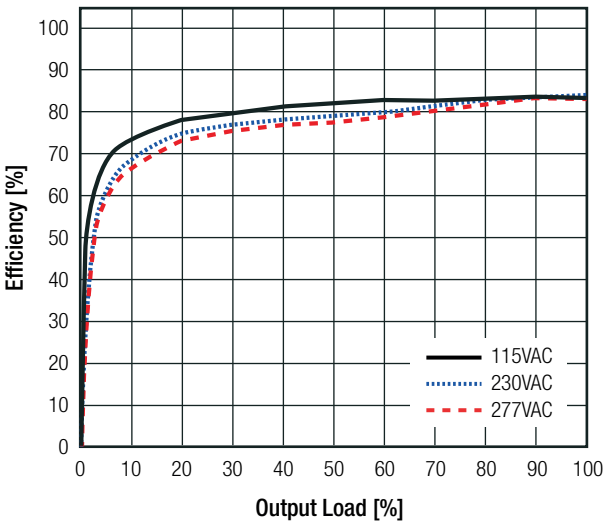
RAC10-12SK/277



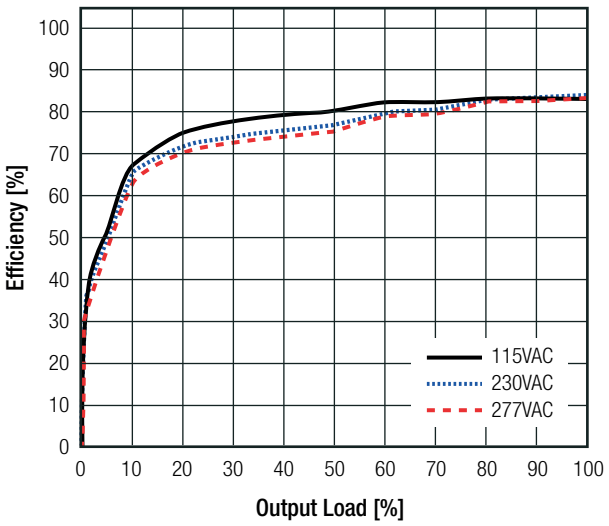
RAC10-12DK/277



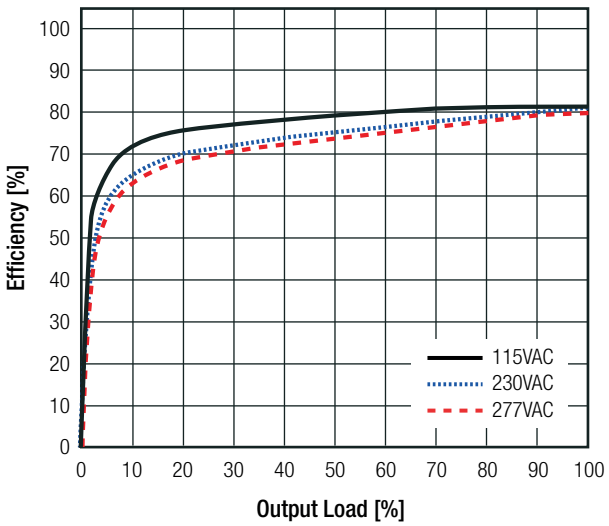
RAC10-15SK/277



RAC10-18SK/277



RAC10-24SK/277



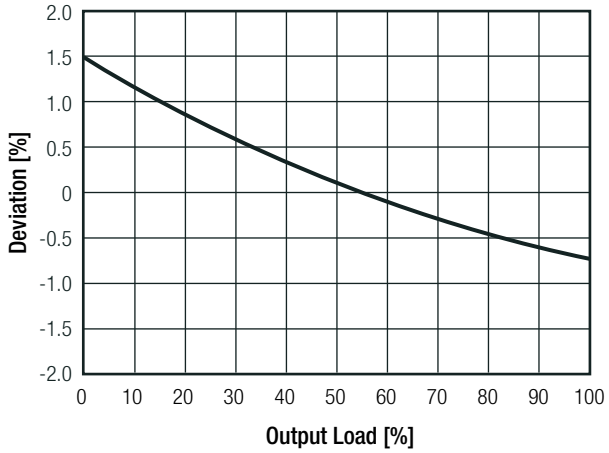
Specifications (measured @ Ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

REGULATIONS

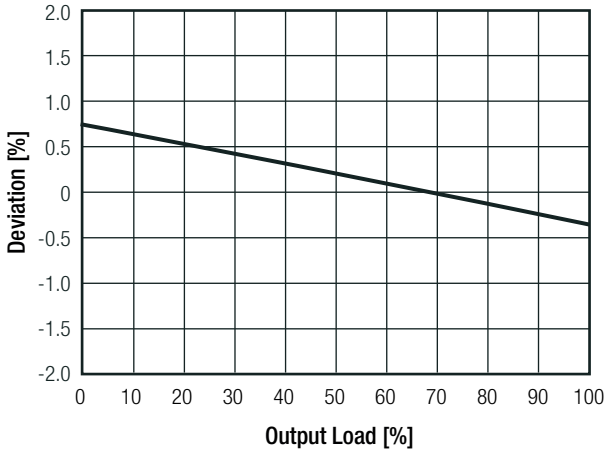
Parameter	Condition		Value
Output Accuracy			±1.0% typ.
Line Regulation	low line to high line		±0.5% typ.
Load Regulation	0-100% load	3.3, 5Vout others	1.5% typ. 1.0% typ.
Cross Regulation	dual output only		±10.0% max.
Transient Response	25% load step change recovery time		4.0% max. 500µs

Deviation vs Load

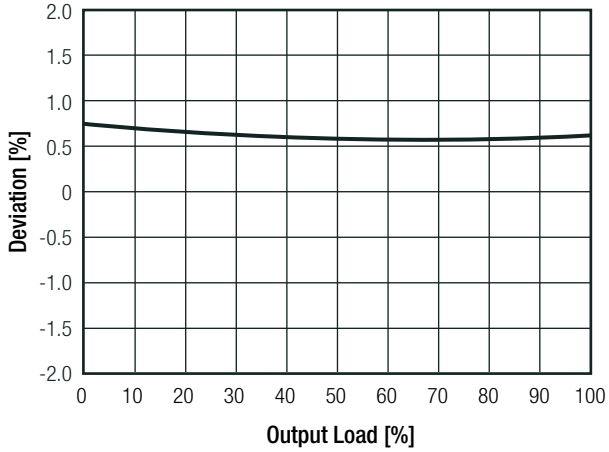
RAC10-3.3SK/277



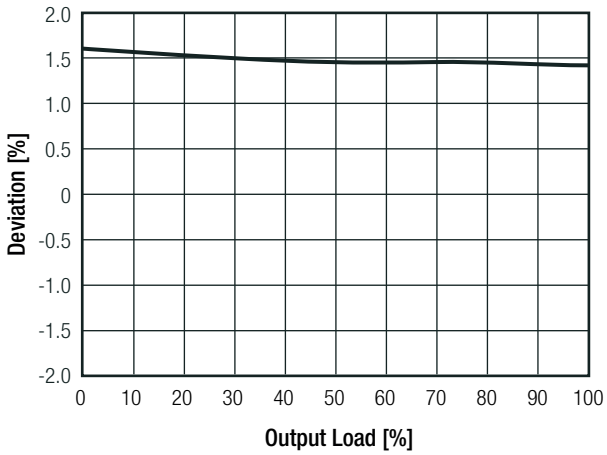
RAC10-05SK/277



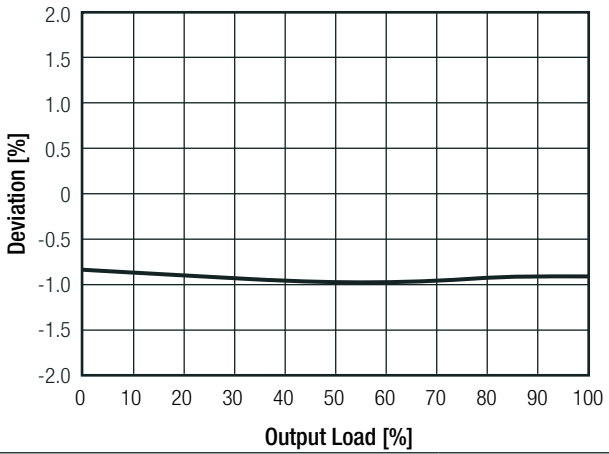
RAC10-12SK/277



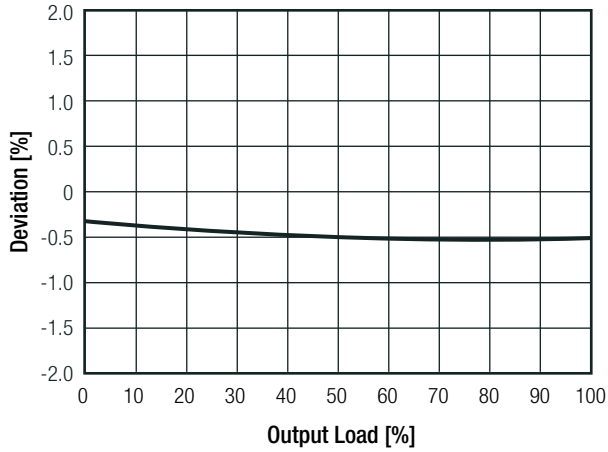
RAC10-15SK/277



RAC10-18SK/277



RAC10-24SK/277



Specifications (measured @ Ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

PROTECTIONS

Parameter	Type		Value
Input Fuse [5]			T2A, slow blow
Short Circuit Protection (SCP)			Hiccup, automatic restart
Over Voltage Protection (OVP)			150% - 195%, latch off mode
Over Load Protection (OLP)			150% - 195%, hiccup mode
Over Voltage Category (OVC)	according to IEC/EN62477-1		OVC III
Class of Equipment			Class II
Isolation Voltage	tested for 1 minute		4kVAC
Isolation Resistance	I/P to O/P	Isolation Voltage 500VDC	1GΩ min.
Isolation Capacitance		100kHz/0.1V	100pF max.
Insulation Grade			reinforced
Leakage Current			0.25mA max.

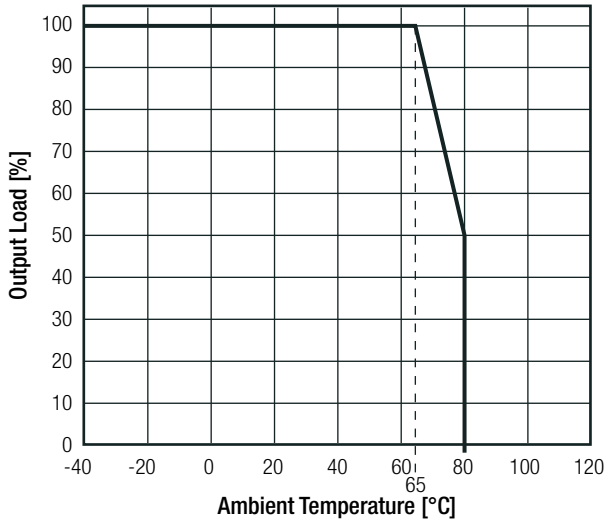
Notes:

Note5: Refer to local safety regulations if input over-current protection is also required

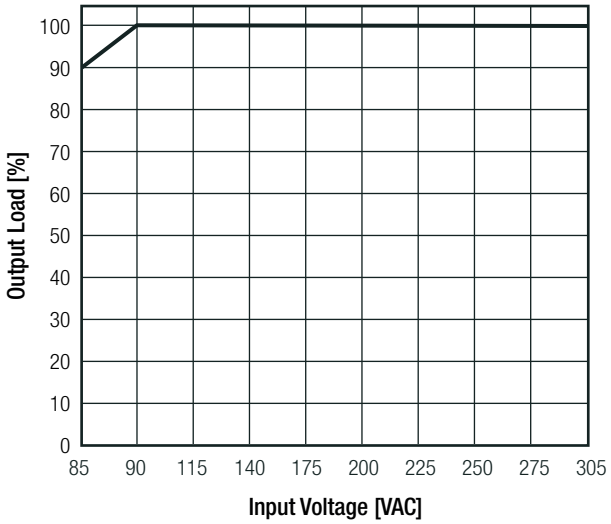
ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s	full load	-40°C to +65°C
		refer to line derating	-40°C to +80°C
Maximum Case Temperature			+100°C
Temperature Coefficient			0.05%/K
Operating Altitude			3000m
Operating Humidity	non-condensing		20% to 90% RH
Design Lifetime	115VAC/60Hz and full load at +25°C		>194 x 10³ hours
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	>1750 x 10³ hours
		+40°C	>1582 x 10³ hours
Pollution Degree			PD2
Vibration			10-500Hz, 2G 10min./1cycle, period 60min. each along x,y,z axes

Derating Graph
(@ Chamber and natural convection 0.1m/s)



Line Derating [6]



Notes:

Note6: No derating required for the specified DC-input range

Specifications (measured @ Ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	**Report / File Number**	**Standard**
Audio/Video, information and communication technology equipment - Safety requirements	E224736	UL62368-1, 2nd Edition, 2014 CAN/CSA C22.2 No. 62368-1-14, 2nd Edition, 2014
Information Technology Equipment, General Requirements for Safety (CB Scheme)	E491408-A4-CB-1	IEC60950-1:2005, 2nd Edition + A2:2013
Information Technology Equipment, General Requirements for Safety (LVD)		EN60950-1:2006 + A2:2013
Household and similar electrical appliances - Safety - Part 1: General requirements	LCS170821028CS	IEC60335-1:2010 + A2:2016 + C1:2016, 5th Edition EN60335-1:2012 + A11:2014
Audio/Video, information and communication technology equipment - Safety requirements (CB Scheme)	16BCS10045 11	IEC62368-1:2014, 2nd Edition
Audio/Video, information and communication technology equipment - Safety requirements (LVD)		EN62368-1:2014 + A11:2017
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	LCS170821028CS	EN62233:2008
Safety requirements for power electronic converter systems and equipment - Part 1: General	LCS181212006CS	IEC62477-1:2012 + A1:2016, 1st Edition EN62477-1: 2012 + A1:2017
EAC Safety of Low Voltage Equipment	RU-AT.03.67361	TP TC 004/020, 2011
RoHS2		RoHS 2011/65/EU + AM2015/863
EMC Compliance (7)	**Conditions**	**Standard / Criterion**
Low-voltage power supplies DC output - Part 3: Electromagnetic compatibility	LCS170821088AE	EN61204-3:2000, Class B
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement		AS/NZS CSPR 22:2009 + A1:2010, Class B
ESD Electrostatic discharge immunity test	±8kV Air; ±4kV Contact	EN61000-4-2: 2009, Criteria B
Radiated, radio-frequency, electromagnetic field immunity test	10V/m, 80MHz-1GHz 3V/m, 1.5GHz-2GHz 1V/m, 2GHz-2.7GHz	EN61000-4-3: 2006 + A2, 2010, Criteria A
Fast Transient and Burst Immunity	AC In Port: ±2.0kV DC Out Port: ±2.0kV	EN61000-4-4:2012, Criteria B
Surge Immunity	AC In Port: ±1.0kV L-PE, N-PE ±2.0kV DC Out Port: ±0.5kV	EN61000-4-5:2014, Criteri B
Immunity to conducted disturbances, induced by radio-frequency fields	10Vrms	EN61000-4-6:2014, Criteria A
Power Magnetic Field Immunity	50Hz, 1A/m	EN61000-4-8:2010, Criteria A
Voltage Dips and Interruptions	Voltages Dips: >95% Voltage Dips: 30% Interruptions: >95%	EN61000-4-11: 2004, Criteria B EN61000-4-11: 2004, Criteria C EN61000-4-11: 2004, Criteria C
Voltage Fluctuations and Flicker in Public Low-Voltage Systems <=16A per phase		EN61000-3-3: 2013

Notes:

Note7: If output is connected to GND, please contact RECOM tech support for advice

DIMENSION and PHYSICAL CHARACTERISTICS		
Parameter	**Type**	**Value**
Material	case potting PCB baseplate	black plastic (UL94V-0) silicone (UL94V-0) FR4 (UL94V-0) plastic (UL94V-0)
Dimension (LxWxH)		52.5 x 27.4 x 23.0mm
Weight		65g typ.

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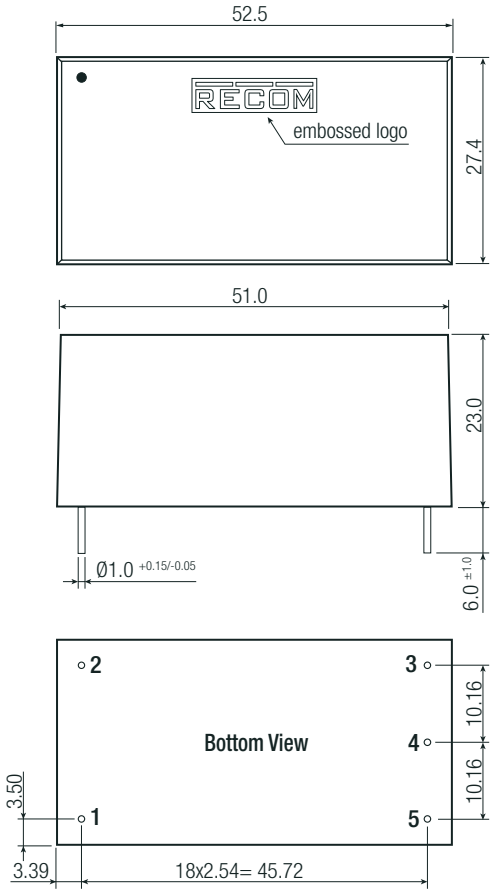
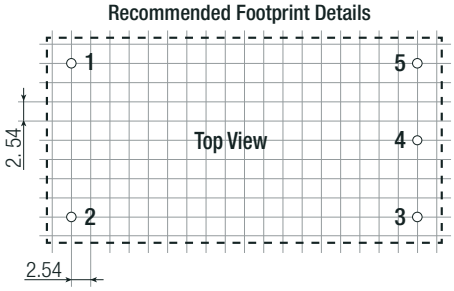
Specifications (measured @ Ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

Dimension Drawing (mm)





Pin Connections

Pin #	Single	Dual
1	VAC in (N)	VAC in (N)
2	VAC in (L)	VAC in (L)
3	No Pin	-Vout
4	-Vout	COM
5	+Vout	+Vout

Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm

PACKAGING INFORMATION		
Parameter	**Type**	**Value**
Packaging Dimension (LxWxH)	tube	490.0 x 56.0 x 40.0mm
Packaging Quantity		15pcs
Storage Temperature Range		-40°C to +85°C
Storage Humidtiy	non-condensing	20% to 90% 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.