

Features

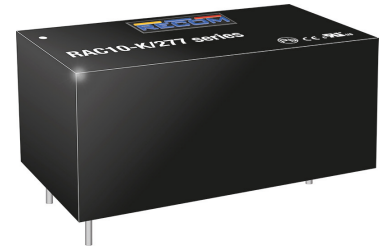
Regulated Converter

- Wide input range 85-305Vac
- Operating temperature range: -40°C to +80°C
- Ultra-high efficiency over entire load range
- No external components necessary
- Household certification IEC/EN60335
- Class II installations (without FG)
- 140% Peak load capability

RECOM AC/DC Converter

RAC10-K/277

10 Watt
2" x 1"
Single and
Dual Output



UL/IEC/EN62368-1 certified
IEC/EN60950-1 certified
IEC/EN60335-1 certified
CSA C22.2 No. 62368-1-14 certified
EN62233 certified
EN61204-3 certified

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.

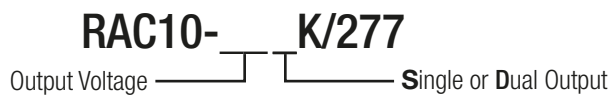
Selection Guide

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
RAC10-24SK/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 resistive mode at full load and 230VAC

Model Numbering



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	230VAC				0.06A²s
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			0%		
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	20MHz BW	3.3Vout, 5Vout others		60mVp-p	1% of Vout

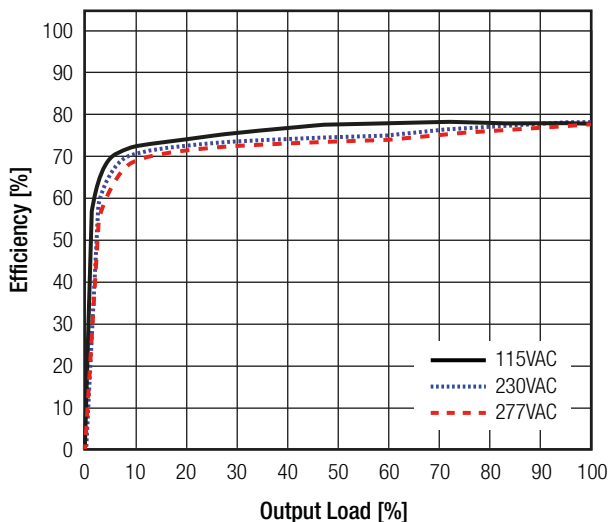
Notes:

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

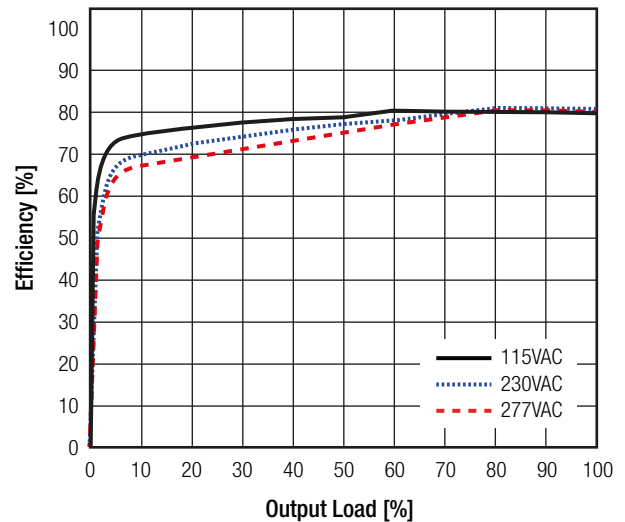
Note3: Refer to line derating graph on page 5

Efficiency vs. Load

RAC10-3.3SK/277



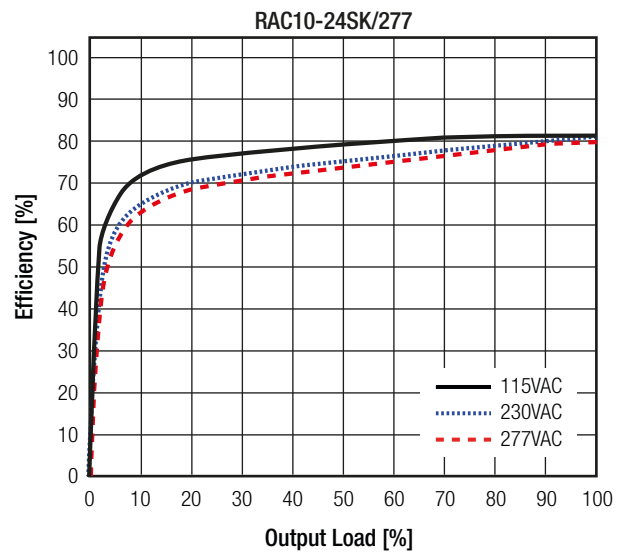
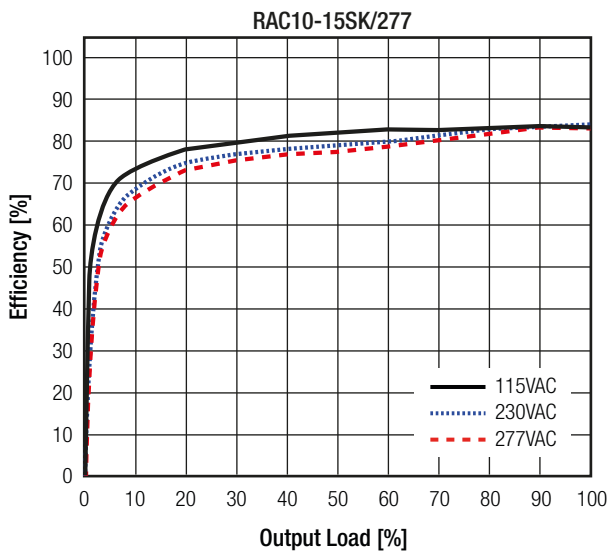
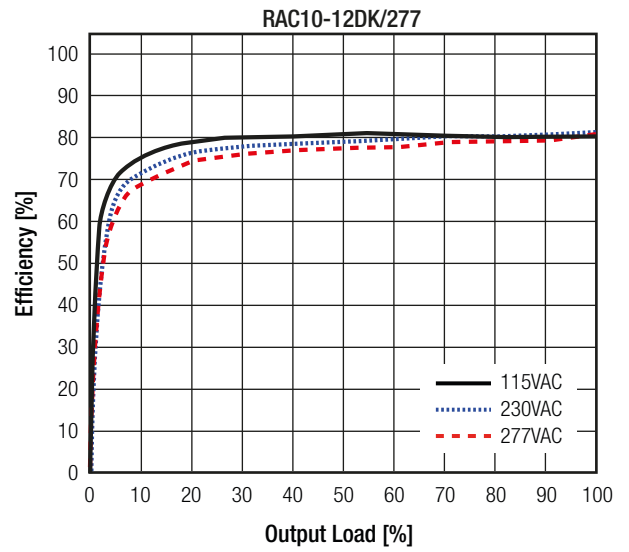
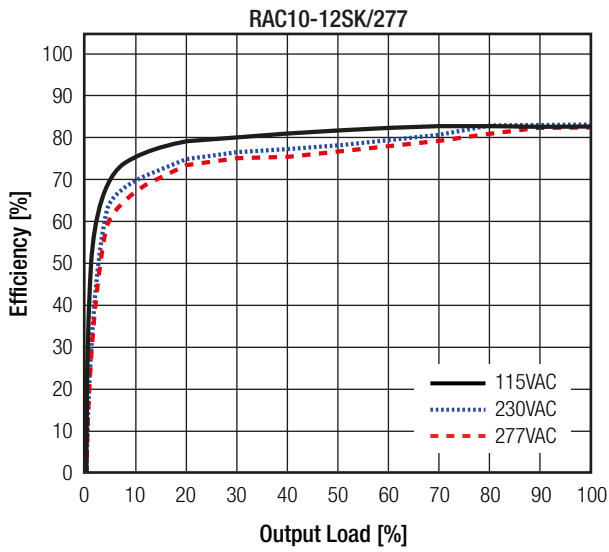
RAC10-05SK/277



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

Efficiency vs. Load

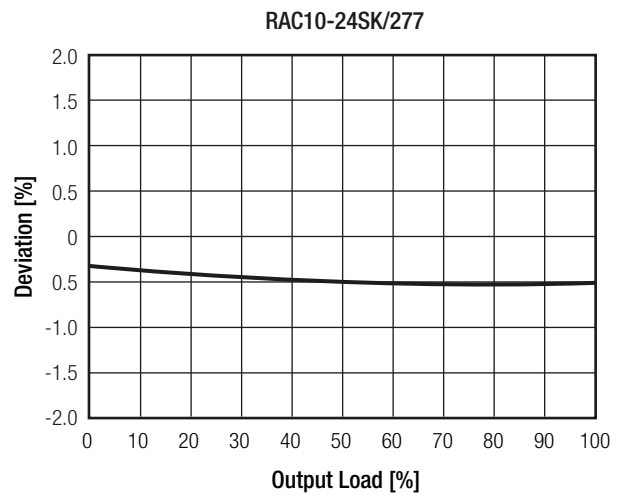
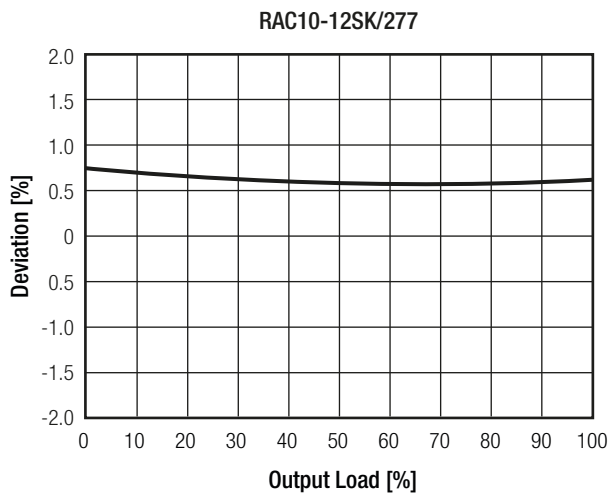
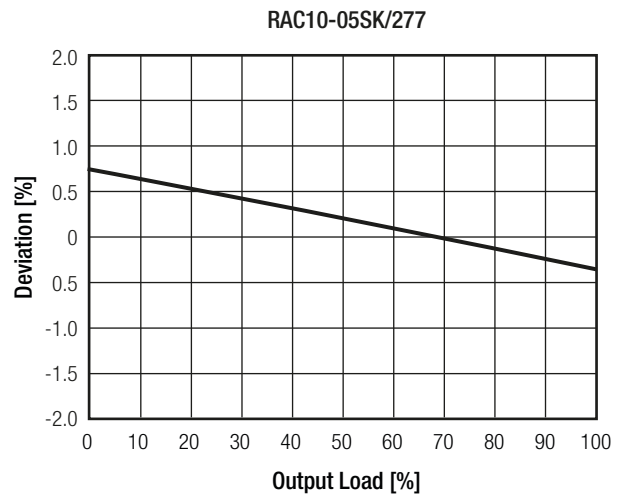
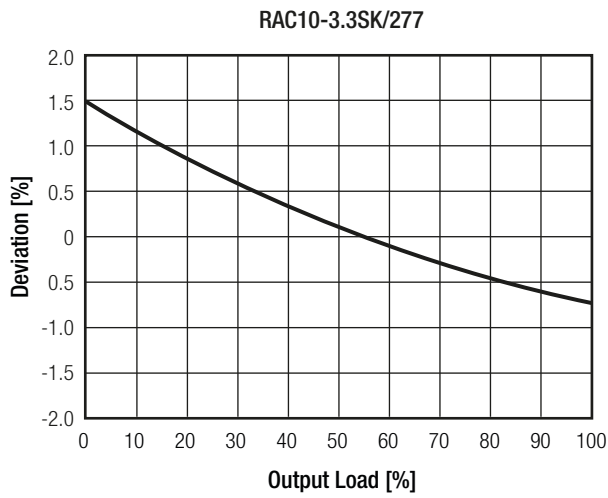


REGULATIONS			
Parameter	Condition		Value
Output Accuracy			±1.0% typ.
Line Regulation	low line to high line		±0.5% typ.
Load Regulation	0-100% load	3.3, 5Vout	1.5% typ.
		others	1.0% typ.
Transient Response	25% load step change recovery time		4.0% max. 500µs

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

Deviation vs Load



PROTECTIONS		
Parameter	Type	Value
Input Fuse ⁽⁴⁾		T2A, slow blow
Short Circuit Protection (SCP)		Hiccup, automatic restart
Over Voltage Protection (OVP)		150% - 195%, hiccup mode
Over Load Protection (OLP)		150% - 195%, hiccup mode
Over Voltage Category (OVC)		OVC II
Class of Equipment		Class II
Isolation Voltage	tested for 1 minute	
Isolation Resistance	I/P to O/P	Isolation Voltage 500VDC
Isolation Capacitance		100kHz/0.1V
Insulation Grade		reinforced
Leakage Current		0.25mA max.
<p>Notes:</p> <p>Note4: Refer to local safety regulations if input over-current protection is also required</p>		

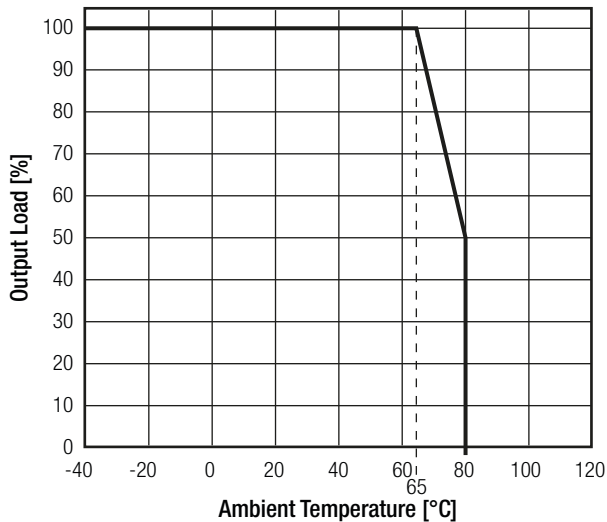
Specifications (measured @ Ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

ENVIRONMENTAL

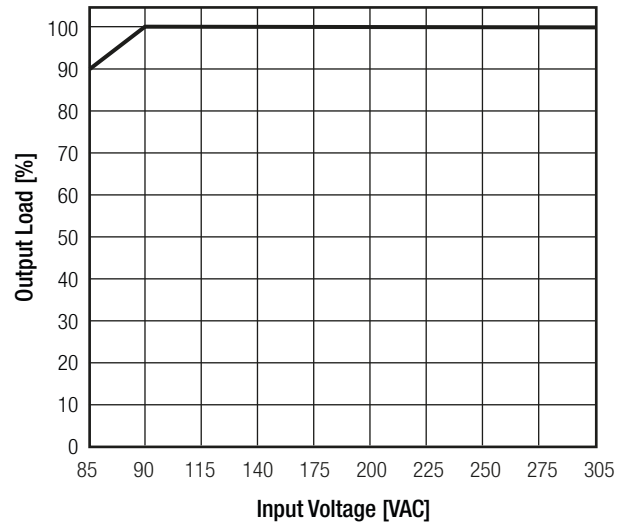
Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s	full load	-40°C to +65°C
		refer to line derating	-40°C to +80°C
Maximum Case Temperature			+100°C
Temperature Coefficient			0.05%/K
Operating Altitude			3000m
Operating Humidity	non-condensing		20% to 90% RH
Design Lifetime	115VAC/60Hz and full load at +25°C		>194 x 10 ³ hours
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	>450 x 10 ³ hours
		+65°C	>28 x 10 ³ 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 ⁽⁵⁾



Notes:

Note5: No derating required for the specified DC-input range

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 Nr. 62368-1-14, 2nd Ed. 2014
Information Technology Equipment, General Requirements for Safety (CB)	E491408-A4-CB-1	IEC60950-1:2005, 2nd Edition + 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
Information Technology Equipment, General Requirements for Safety (LVD)	E491408-A4-CB-1	EN60950-1:2006 + A2:2013
Audio/Video, information and communication technology equipment - Safety requirements (CB)	16BECS10045 11	IEC62368-1:2014, 2nd Edition EN62368-1:2014 + A11:2017
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	LCS170821028CS	EN62233:2008
EAC Safety of Low Voltage Equipment	RU-AT.03.67361	TP TC 004/020, 2011
RoHS2+		RoHS 2011/65/EU + AM2015/863

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

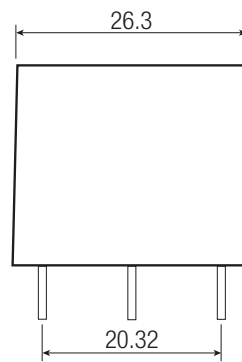
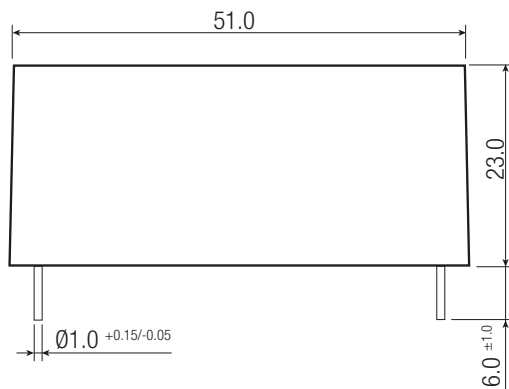
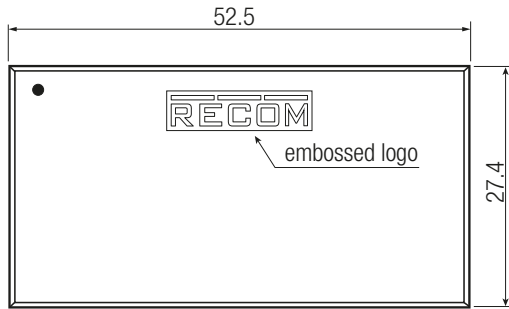
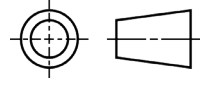
EMC Compliance	Conditions	Standard / Criterion
Low-voltage power supplies DC output - Part 3: Electromagnetic compatibility	LCS170821088AE	EN61204-3:2000, Class B
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement		AS/NZS CSPR 22:2009 + A1:2010, Class B
ESD Electrostatic discharge immunity test	Air: ±8, 4, 2kV Contact: ±4, 2kV	EN61000-4-2:2009, Criteria B
Radiated, radio-frequency, electromagnetic field immunity test	10V/m (80-1000MHz) 3V/m 1.4-2.0GHz 1V/m (2.0-2.7GHz)	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, Criteria 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	Voltage Dips 30% Voltage Dips 60%	EN61000-4-11:2004, Criteria B EN61000-4-11:2004, Criteria C
Voltage Interruptions	>95%	EN61000-4-11:2004, Criteria C
Voltage Fluctuations and Flicker in Public Low-Voltage Systems ≤16A per phase		EN61000-3-3:2013

DIMENSION and PHYSICAL CHARACTERISTICS		
Parameter	Type	Value
Material	case	black plastic (UL94V-0)
	potting	silicone (UL94V-0)
	PCB	FR4 (UL94V-0)
	baseplate	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)

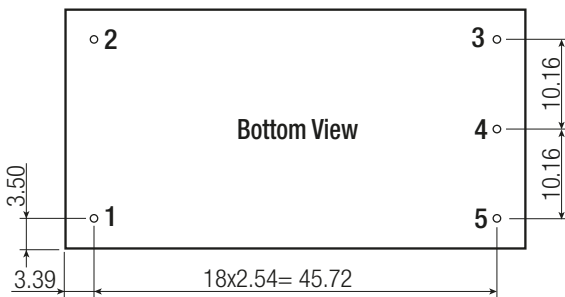
Dimension Drawing (mm)



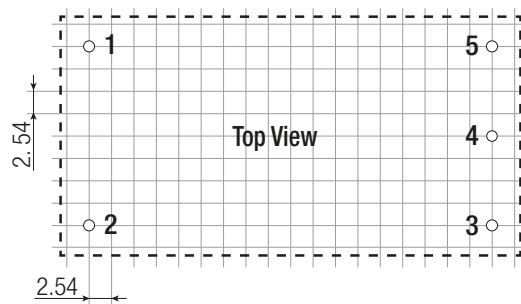
Pin Connections

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



Recommended Footprint Details



PACKAGING INFORMATION

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

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