!NOT RECOMMENDED FOR NEW DESIGNS!

Features

Regulated Converter

- 50mW max. no load power consumption
- High efficiency up to 79%
- Isolated Output 3.75kVAC / 1 minute
- SCP, OVP protection
- Wide operating temperature range -40°C to +80°C (only with suffix „-E“)
- Universal input 80-305VAC

RECOM
AC/DC Converter

RAC04-C/277

4 Watt Single and Dual Output

3 YEAR warranty

Description

The RAC04-xxS_DC/277 series are fully certified single and dual regulated AC/DC converters in an encapsulated PCB-mount package style with 3.75kVAC isolation and very low stand-by power consumption. The modules are suitable for worldwide use due to their wide input voltage range from 80VAC to 305VAC. Possible uses include home automation, standby applications and industrial controls.

Selection Guide

Part Number	Input Voltage Range [(VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. [%]	Max. Capacitive Load (1,2) [µF]
RAC04-3.3SC/277(3)	80-305	3.3	1200	72	10000
RAC04-05SC/277 (3)	80-305	5	800	75	7200
RAC04-12SC/277 (3)	80-305	12	333	78	1000
RAC04-15SC/277 (3)	80-305	15	267	79	820
RAC04-24SC/277 (3)	80-305	24	167	79	220
RAC04-0512DC/277 (3)	80-305	5/12	720/33	75	4700/100
RAC04-05DC/277 (3)	80-305	±5	±400	76	±3300
RAC04-12DC/277 (3)	80-305	±12	±166	78	±680

Notes:

Note1: Measured @ 230VAC/50Hz/Ta 25°C with constant resistant mode at full load

Note2: If used @115VAC/60Hz with full load, max. capacitive load is less, please contact RECOM Tech Support for detailed information

Model Numbering

RAC04-__ __C/277 -__

Output Voltage

Single or **D**ual

Temperature (3)

Ordering Examples:

e.g. RAC04-3.3SC/277-E, Single Output, with -40° to +80°C operating temperature range

e.g. RAC04-05DC/277, Dual Output with standard operating temperature range

Notes:

Note3: with suffix “-E” for -40°C to +80°C operating temperature range
without suffix standard operating temperature range (-25°C to +80°C)

PREFERRED ALTERNATIVES

Please consider these alternatives:

RAC04-K/277 Series

RAC10-K/277 Series

IEC/EN60950-1 certified
IEC/EN62368-1 certified
UL60950-1 certified
CSA/CAN 22.2 60950-1-07 certified
CB Report
EN55032 compliance
EN55024 compliance

RECOM

AC/DC Converter

RAC04-C/277 Series

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

BASIC CHARACTERISTICS					
Parameter	**Condition**		**Min.**	**Typ.**	**Max.**
Input Voltage Range (4)			80VAC 113VDC	277VAC 390VDC	305VAC 430VDC
Input Current	115VAC 230VAC				98mA 64mA
Inrush Current	cold start at +25°C	115VAC 230VAC			15A 30A
No load Power Consumption	80-305VAC, 50/60Hz				50mW
Input Frequency Range	AC input		47Hz		440Hz
Minimum Load	RAC04-0512DC/277(-E) all others			±5% / ±0% 0%	
Hold-up time	115VAC		15ms		
Internal Operating Frequency	full load			67kHz	
Output Ripple and Noise (5)				200mVp-p	

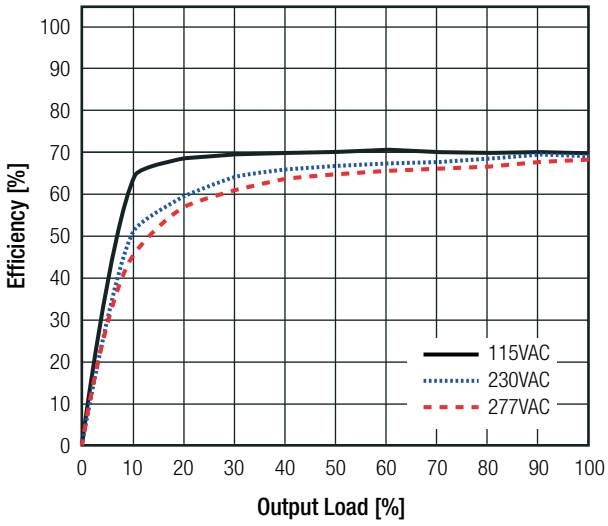
Notes:

Note4: Refer to line derating graph on page PA-5

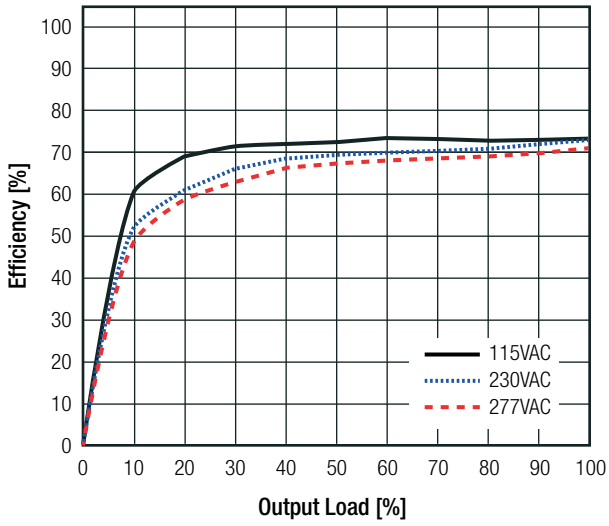
Note5: Ripple and Noise is measured at 20MHz bandwidth and with a 47µF low-ESR electrolytic capacitor in parallel with a 0.1µF ceramic capacitor across output

Efficiency vs. Load

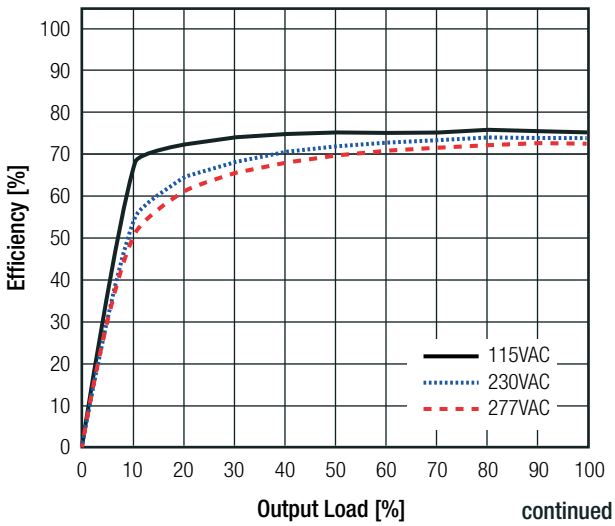
RAC04-3.3SC/277 (-E)



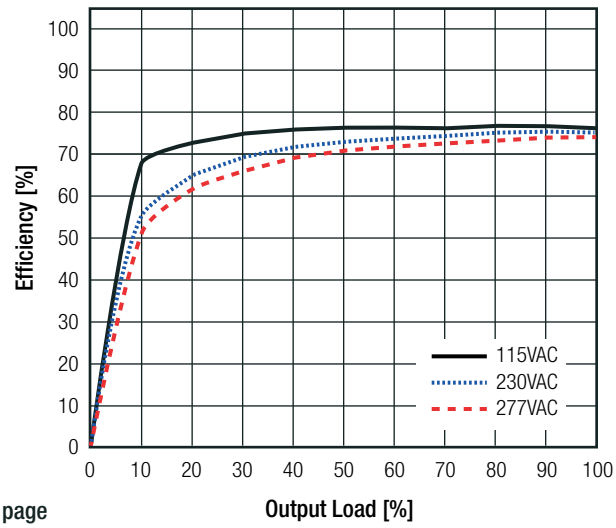
RAC04-05SC/277 (-E)



RAC04-12SC/277 (-E)



RAC04-15SC/277 (-E)



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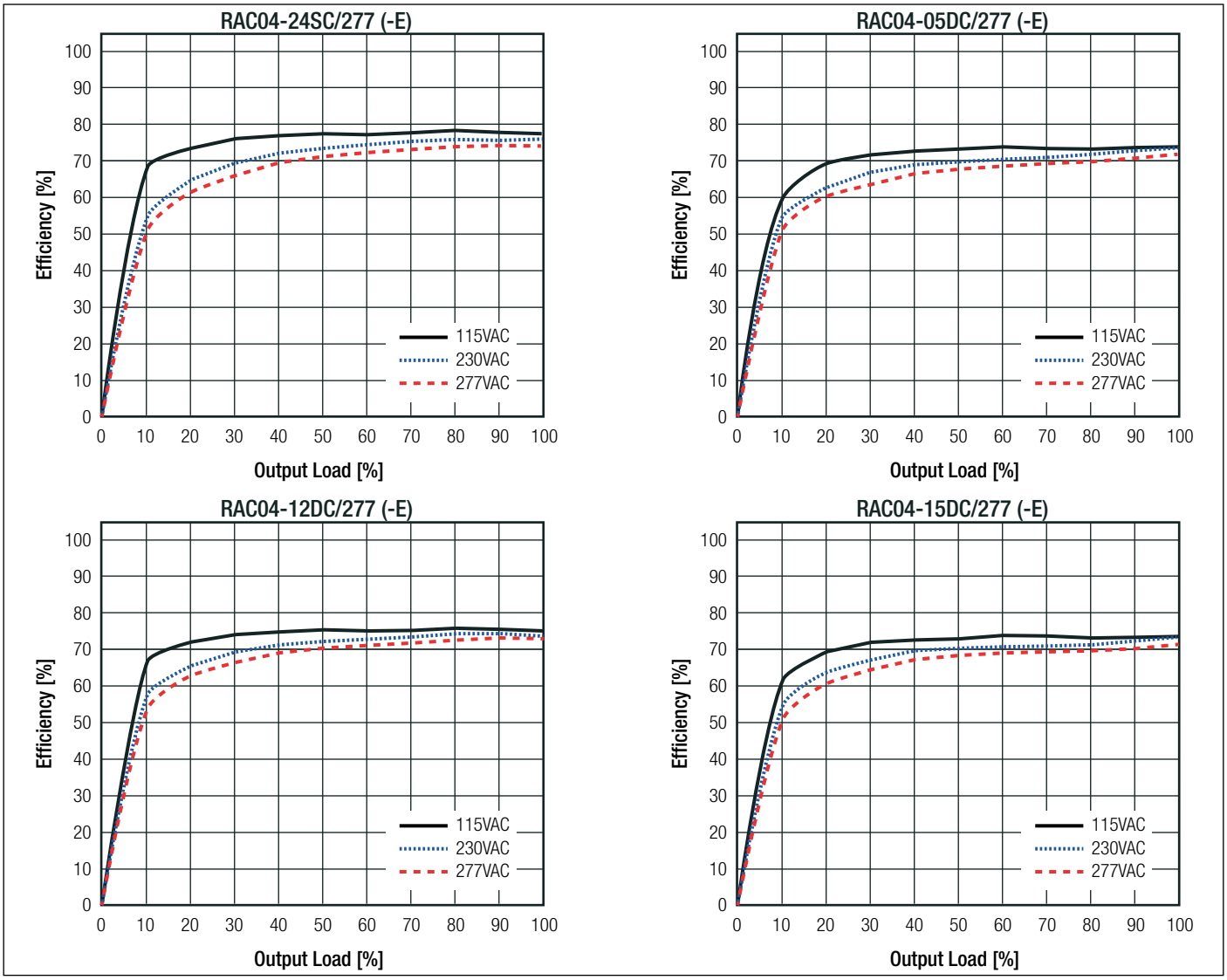
RECOM

AC/DC Converter

RAC04-C/277 Series

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



REGULATIONS

Parameter	Condition		Value
Output Accuracy	single and dual 5V/12V dual assymetrical		±2.0% typ. ±2.0% / ±10.0% typ.
Line Regulation	90-264VAC	single and dual 5V/12V dual assymetrical	±0.2% typ. ±0.2% / ±1.0% typ.
Load Regulation (5V minimum load 5% @12V full load)v	10% to 100% load	3.3V, 5V output all others 5V/12V dual assymetrical	1.0% typ. 0.5% typ. 1.0% / 5.0% typ.

PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)			automatic recovery
Over Voltage Category			OVC II
Isolation Voltage	I/P to O/P	tested for 1 minute	3.75kVAC
Isolation Resistance			100MΩ min.
Insulation Grade			reinforced
Leakage Current	277VAC / 50Hz		0.25mA max.

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RECOM

AC/DC Converter

RAC04-C/277 Series

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

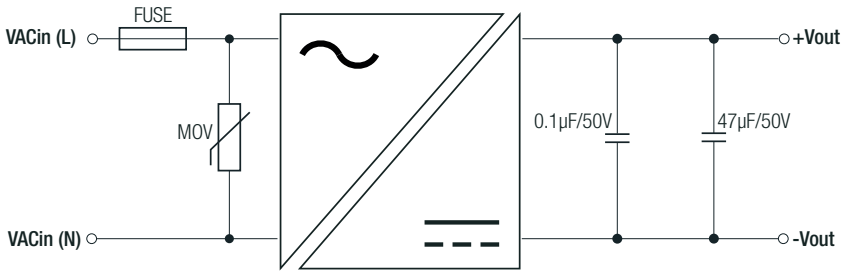
Notes:

Note6: Refer to local safety regulations if input over-current protection is also required

Note7: To measure the output ripple and noise short runs by 0.1µF/50V & 47µF/50V @20MHz, nominal input and full load

Note8: An external MOV is required for 230VAC operation. (MOV model: shall comply with IEC 61051-2) e.g. Epcos S14 Series

Protection Circuit



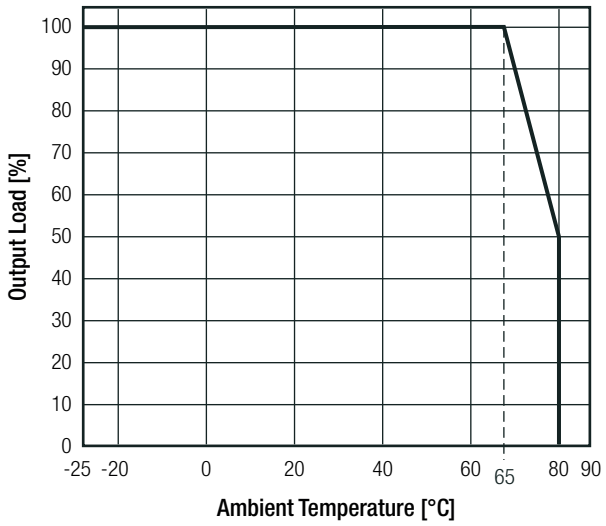
ENVIRONMENTAL

Parameter	Condition			Value
Operating Temperature Range	230VAC	@ natural convection 0.1m/s	full load	-25°C to +65°C
			refer to derating graph	-25°C to +80°C
	with suffix "-E"		full load	-40°C to +65°C
			refer to derating graph	-40°C to +80°C
Maximum Case Temperature				+90°C
Thermal Impedance				10°C/W
Operating Altitude				2000m
Operating Humidity	non-condensing			95%, RH max.
Pollution Degree				PD2
Vibration				MIL-STD-202G
MTBF	according to MIL-HDBK-217F, G.B		+25°C	500 x 10^3 hours

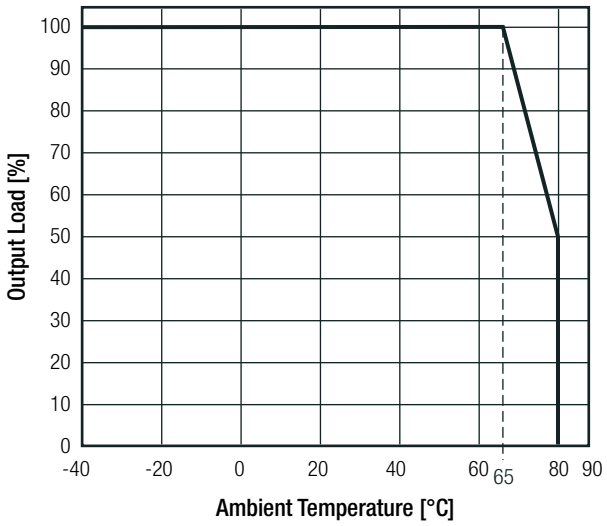
Derating Graph

(@ Chamber and natural convection 0.1m/s)

RAC04-xxS(D)C/277



RAC04-xxS(D)C/277-E



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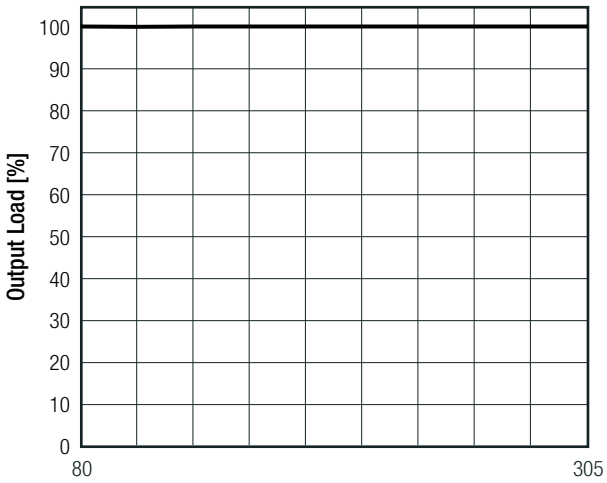
RECOM

AC/DC Converter

RAC04-C/277 Series

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

Line Derating



SAFETY AND CERTIFICATIONS		
Certificate Type	**Report / File Number**	**Standard**
Information Technology Equipment, General Requirements for Safety (CB Scheme)	1310055-1-CB-M1	IEC60950-1:2005, 2nd Edition + A1:2009
Information Technology Equipment, General Requirements for Safety (LVD)	SPCLVD1605077-04	EN60950-1:2006 + A2:2013 IEC60950-1:2005 2nd Edition + A2:2013
Information Technology Equipment, General Requirements for Safety	E224736-A18	UL No. 60950-1, 2nd Edition, 2011 CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2011
Audio/video, information and communication technology equipment - Safety requirements	AL106051	EN62368-1:2014 IEC62368-1:2014 2nd Edition
EAC	RU-AT.03.67361	TP TC 004/020, 2011
RoHS2+		RoHs-2011/65/EU + AM-2015/863

EMC Compliance	**Report / File Number**	**Standard / Criterion**
Electromagnetic compatibility of multimedia equipment - Emission requirements	T160225D10-E	EN55032, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010
ESD Electrostatic discharge immunity test	Air: ±2, 4, 8kV Contact: ±4kV	IEC61000-4-2:2008, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3V/m	IEC61000-4-3:2010, Criteria A
Fast Transient and Burst Immunity	AC Power Port: ±1kV	IEC61000-4-4:2004 + A1:2010, Criteria A
Surge Immunity	AC Power Port: L-N ±1kV	IEC61000-4-5:2005, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	AC Power Port: 3V	IEC61000-4-6:2008, Criteria A
Power Magnetic Field Immunity	50Hz, 1A/m	IEC61000-4-8:2009, Criteria A
Voltage Dips and Interruptions	Voltage Dips: >95% Voltage Dips: 30% Interruptions: >95%	IEC61000-4-11:2004, Criteria A IEC61000-4-11:2004, Criteria A IEC61000-4-11:2004, Criteria B

DIMENSION and PHYSICAL CHARACTERISTICS		
Parameter	**Type**	**Value**
Material	case potting PCB	black plastic (UL94 V-0) silicone (UL94 V-0) FR4 (UL94 V-0)
Dimension (LxWxH)		36.7 x 27.2 x 17.1mm
Weight		41g typ.

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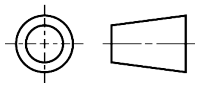
RECOM

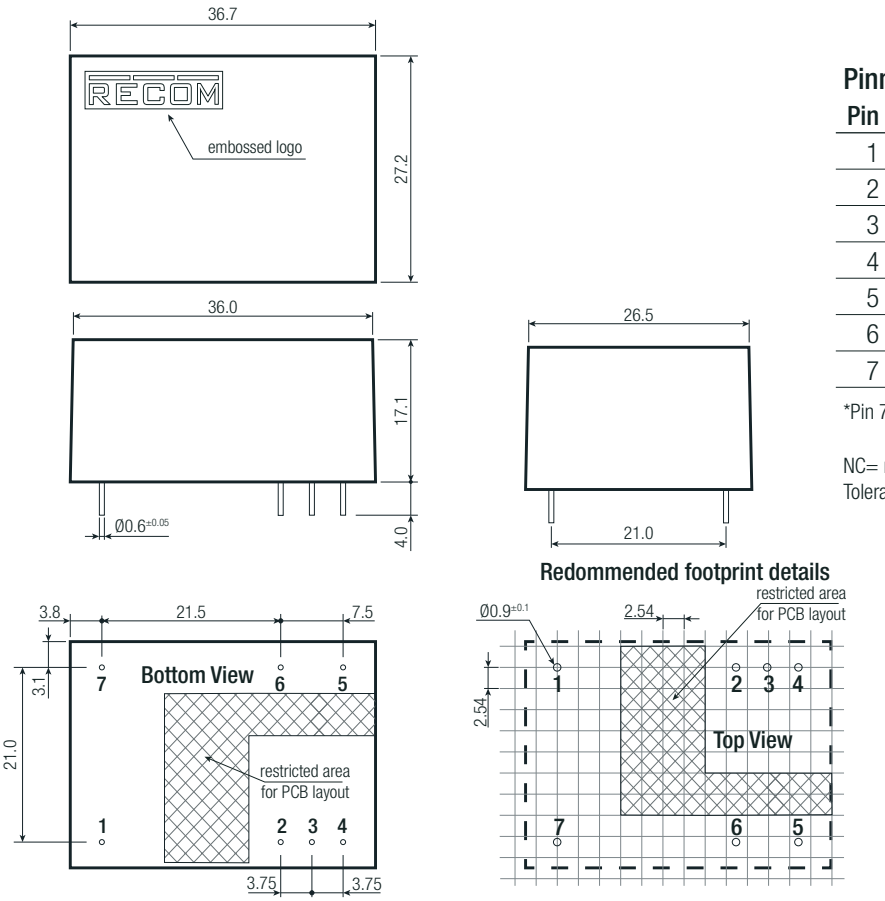
AC/DC Converter

RAC04-C/277 Series

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

Dimension Drawing (mm)





Pinning information

Pin #	Single	Dual	Dual (assymetric)
1	No Pin	No Pin	No Pin
2	+Vout	+Vout	+5Vout
3	-Vout	Com	Com
4	NC	-Vout	+12Vout
5	VAC in (L)	VAC in (L)	VAC in (L)
6	VAC in (N)	VAC in (N)	VAC in (N)
7	NC*	NC*	NC*

*Pin 7 is NC but need 4mm minimum clearence to ground for safety

NC= no connection
Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 32.0 x 27.0mm
Packaging Quantity		12pcs
Storage Temperature Range		-40°C to +100°C