

# Features

- 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

# Regulated Converter

## RAC04-C/277

4 Watt  
Single and  
Dual Output



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

### 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.

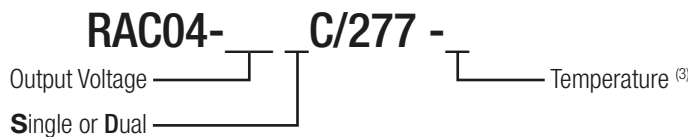
### Selection Guide

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



#### 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)

**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 <sup>(4)</sup>		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 <sup>(5)</sup>			200mVp-p	

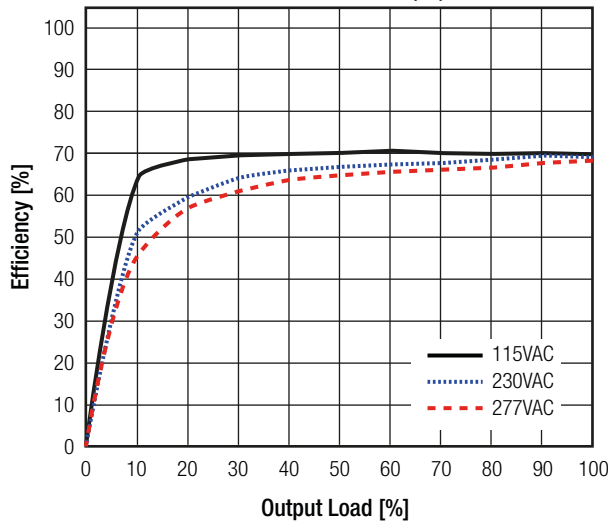
**Notes:**

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

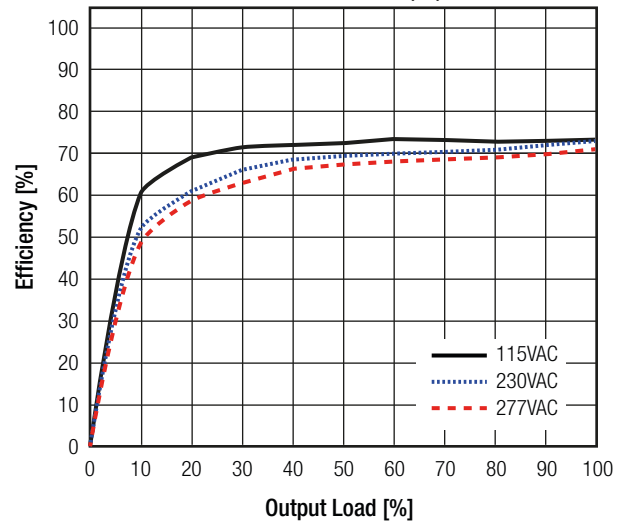
Note5: Ripple and Noise is measured at 20MHz bandwidth and with a 47µF low-ESR electrolytic capacitor in parallel with a 0.1µF ceramic capacitor across output

**Efficiency vs. Load**

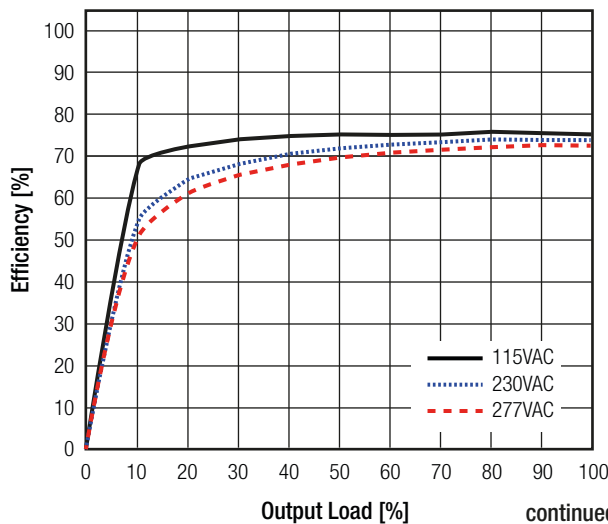
**RAC04-3.3SC/277 (-E)**



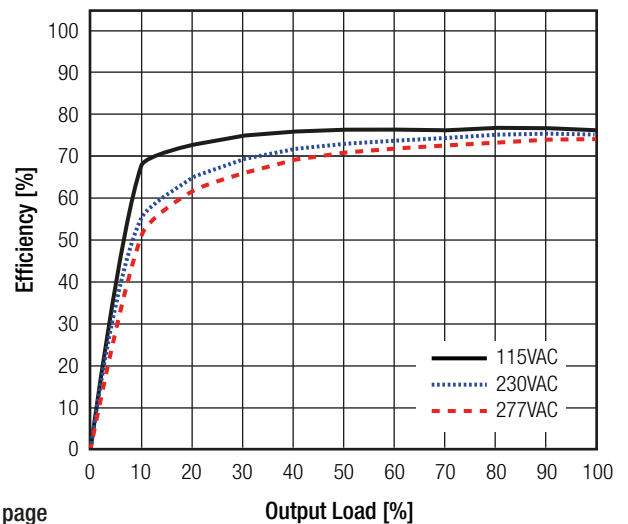
**RAC04-05SC/277 (-E)**



**RAC04-12SC/277 (-E)**

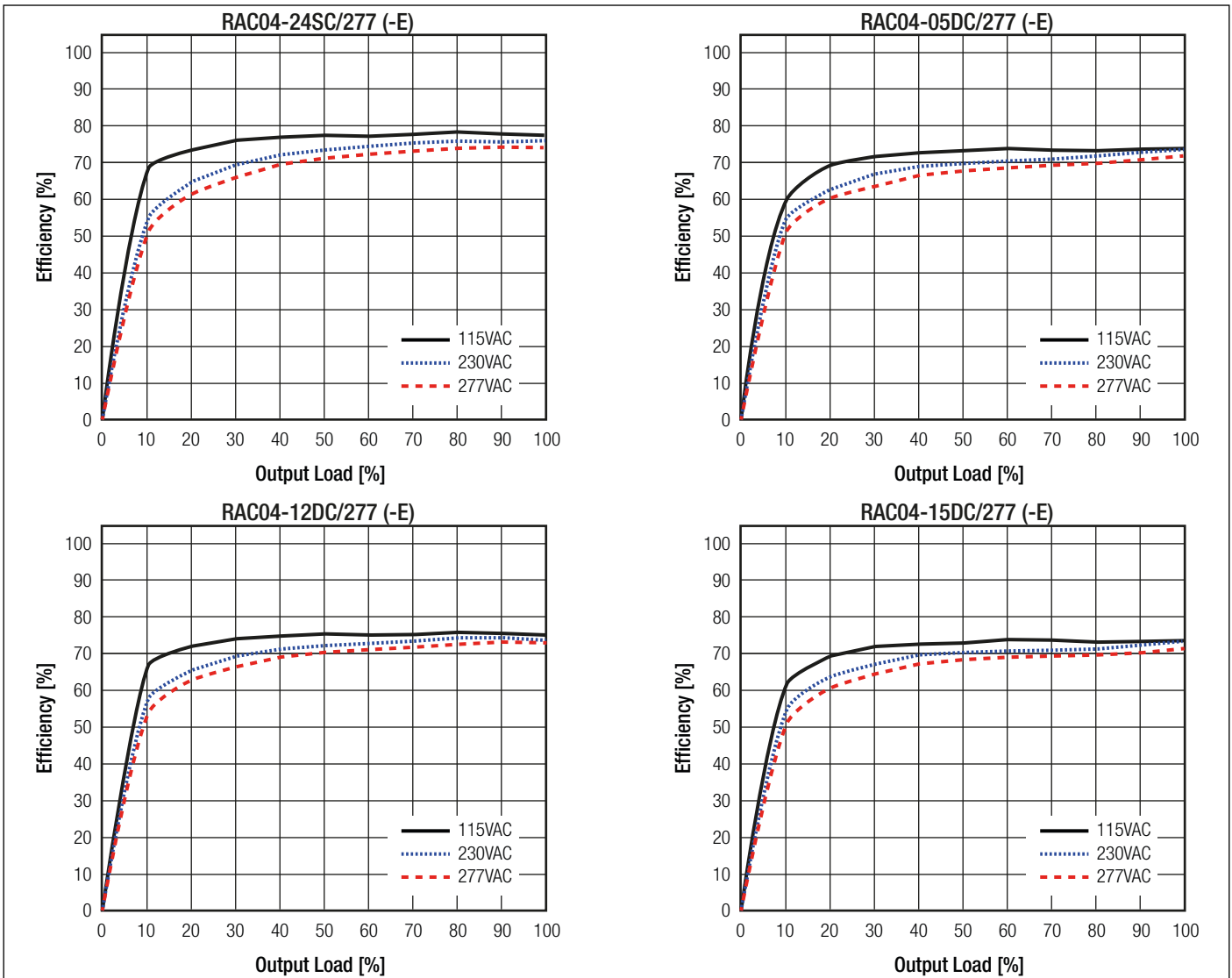


**RAC04-15SC/277 (-E)**



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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.

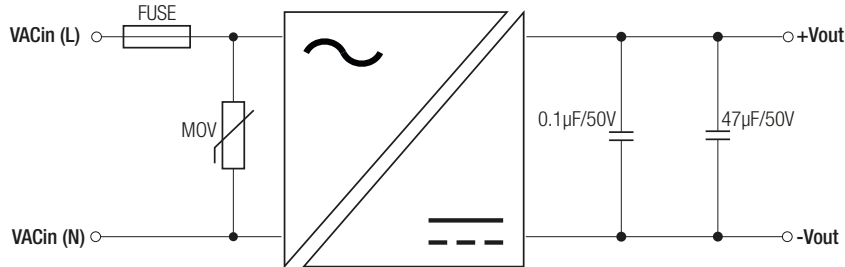
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**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

**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**

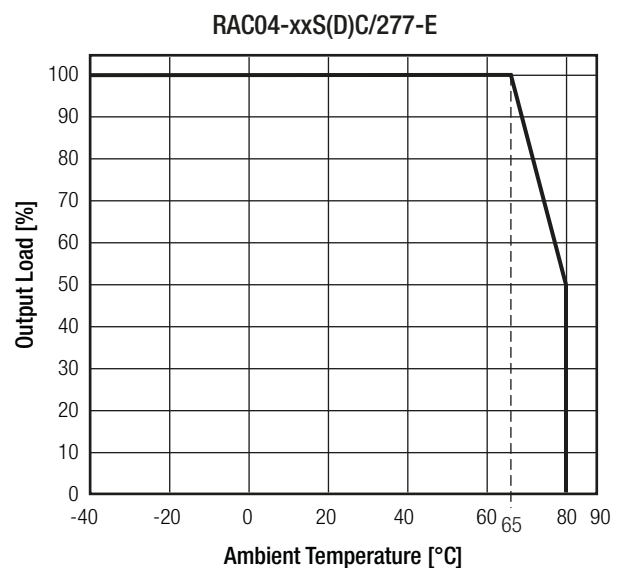
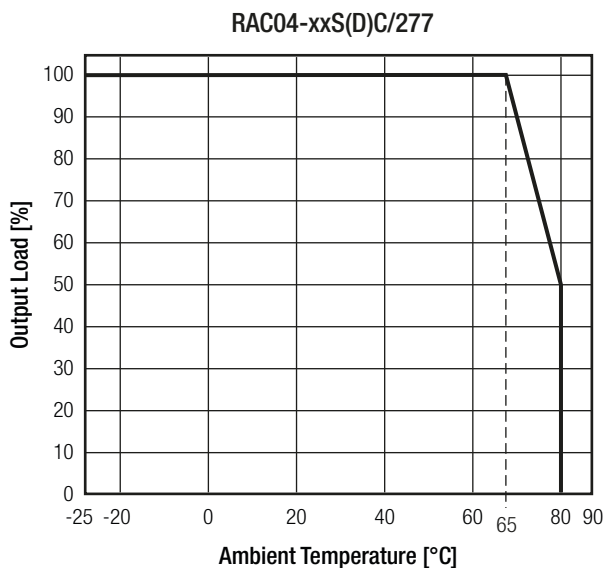


**ENVIRONMENTAL**

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 <sup>3</sup> hours	

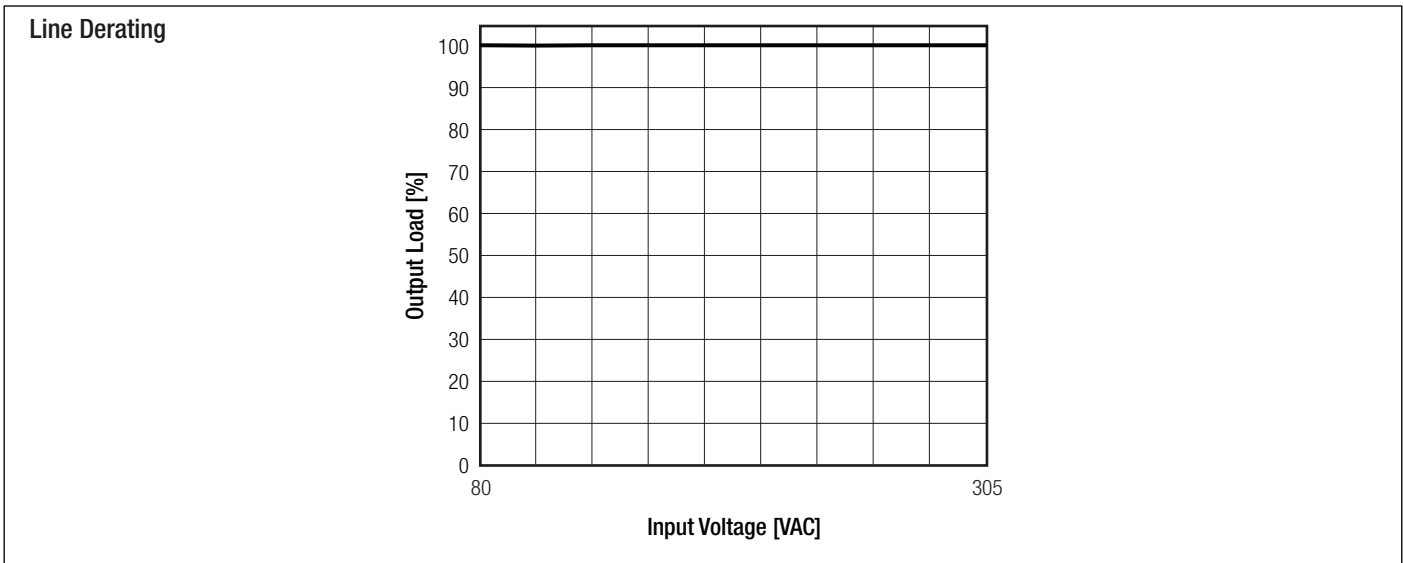
**Derating Graph**

(@ Chamber and natural convection 0.1m/s)



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



**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

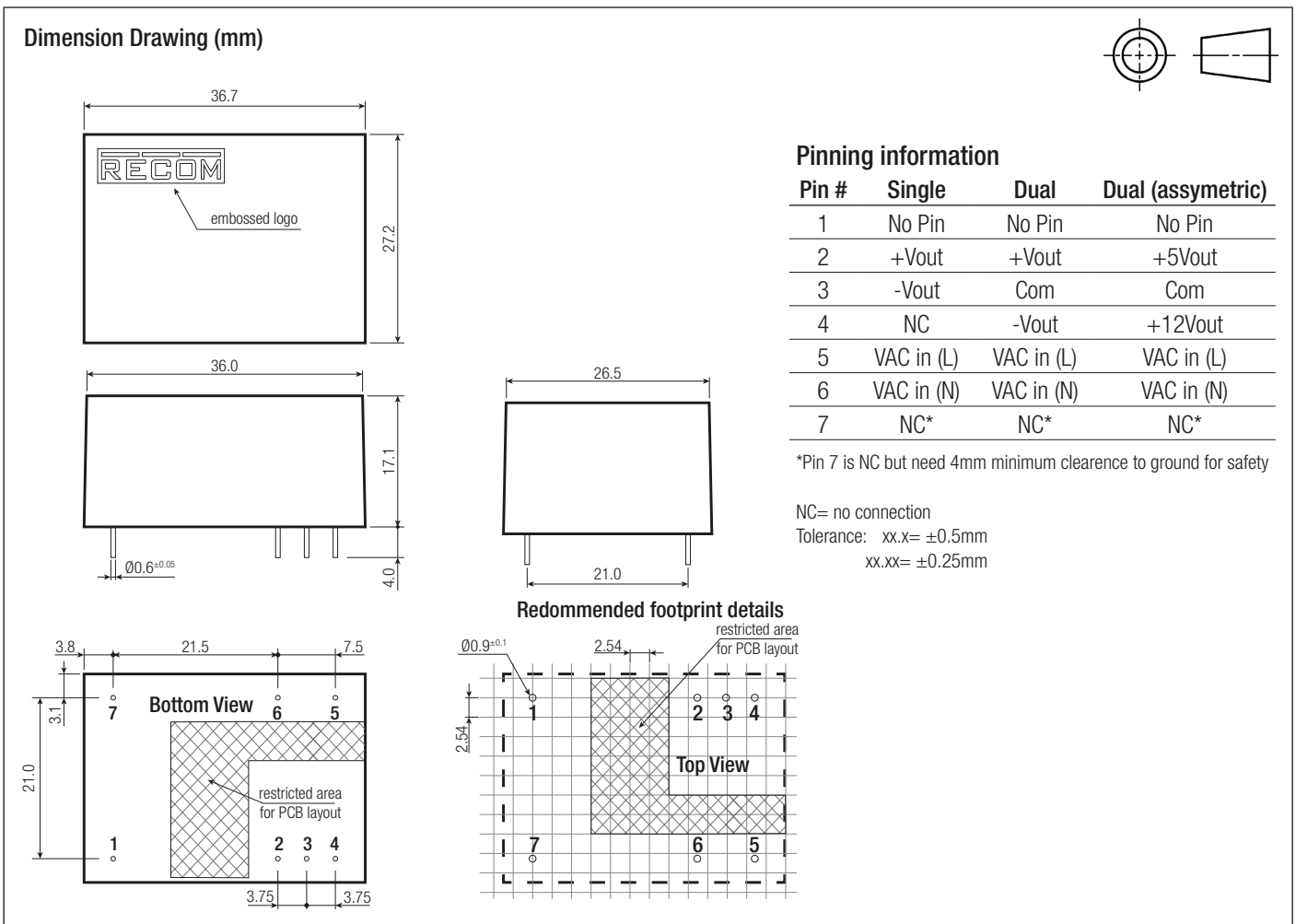
EMC Compliance	Report / File Number	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	T160225D10-E	EN55032, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010
ESD Electrostatic discharge 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	black plastic (UL94 V-0)
	potting	silicone (UL94 V-0)
	PCB	FR4 (UL94 V-0)
Dimension (LxWxH)		36.7 x 27.2 x 17.1mm
Weight		41g typ.

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



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

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