

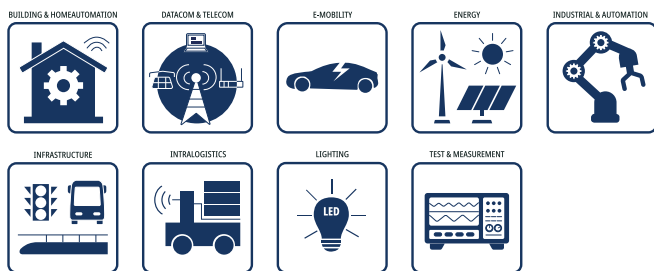
### FEATURES

- Extended input: 90-305VAC
- 65 watts with 11 W/in<sup>3</sup> or 20 W/in<sup>3</sup> density
- OVC III up to 3000 or 5000m altitude
- Thermally effective basplate on 1.5 x 3 inch footprint
- THT solder module on 1.5 x 2 inch; P12+ pinning
- No-load power <100mW; Efficiency: 90% plus
- Safety ratings up to 90 °C operating temperature
- Print module EMI: EN55032 “B” @ floating loads only
- Open brick: EN55032 “B” incl. earth referenced load
- 3 year warranty



THT: 52.5 x 40.0 x 25.5mm (2.06 x 1.57 x 1.0 inch)  
 OIB: 79.0 x 40.8 x 31.0mm (3.11 x 1.60 x 1.22 inch)

### APPLICATIONS



### SAFETY & EMC



### DESCRIPTION

RACM65S-K/277 are the new benchmark in power density for low power AC-DC power supplies with over 90% efficiency over a load range of 6 to 65 watts. Two different mounting options as encapsulated solder mount modules on industry standard P12+ pinning at 20 W/in<sup>3</sup> or in an open chassis mount structure with optional cover on a 1.5”x3” footprint with 31 mm overall height. International safety approvals according to medical, household and industrial standards with OVC III rating up to 5000m operating altitude ensure worldwide use in ambient temperatures from -40 °C to 90 °C. The integrated EMC filter according to EN55032 Class “B” for floating loads only in the solder modules and additionally for grounded load connections in the chassis mount modules simplify system implementation.

### SELECTION GUIDE

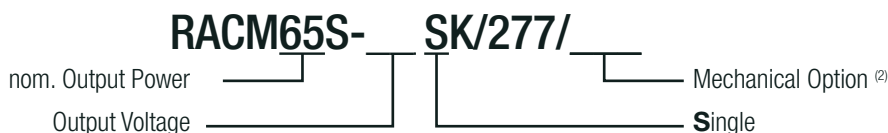
| Part Number                     | Input Voltage Range [VAC] | Output Voltage nom. [VDC] | Output Current nom. [A] | Efficiency <sup>(1)</sup> typ. [%] | Output Power continuous [W] |
|---------------------------------|---------------------------|---------------------------|-------------------------|------------------------------------|-----------------------------|
| RACM65S-05SK/277 <sup>(2)</sup> | 90-305                    | 5                         | 8                       | 88                                 | 40                          |
| RACM65S-12SK/277 <sup>(2)</sup> | 90-305                    | 12                        | 5.42                    | 91                                 | 65                          |
| RACM65S-15SK/277 <sup>(2)</sup> | 90-305                    | 15                        | 4.34                    | 91                                 | 65                          |
| RACM65S-24SK/277 <sup>(2)</sup> | 90-305                    | 24                        | 2.71                    | 90                                 | 65                          |
| RACM65S-36SK/277 <sup>(2)</sup> | 90-305                    | 36                        | 1.81                    | 91                                 | 65                          |
| RACM65S-48SK/277 <sup>(2)</sup> | 90-305                    | 48                        | 1.35                    | 91                                 | 65                          |
| RACM65S-52SK/277 <sup>(2)</sup> | 90-305                    | 52                        | 1.25                    | 91                                 | 65                          |

Note1: Efficiency is tested at 230VAC and full load at +25°C ambient

# RACM65S-K/277 Series $\diamond$ AC/DC Power Supply

65W  $\diamond$  Input: 100V-277VAC

## MODEL NUMBERING



Note2: "/277" only= THT-solder mount, encapsulated, potted  
add suffix "/OIB" open frame with integrated base

## ORDERING INFORMATION

| Model            | Output Voltage | Package Type                      |  |
|------------------|----------------|-----------------------------------|--|
|                  |                | 2.06" x 1.57"<br>THT-solder mount | 3.11" x 1.6"<br>open frame with integrated base "/OIB" |
| RACM65S-05SK/277 | 5VDC           | y                                 | y  |
| RACM65S-12SK/277 | 12VDC          | y                                 | y  |
| RACM65S-15SK/277 | 15VDC          | y                                 | y  |
| RACM65S-24SK/277 | 24VDC          | y                                 | y  |
| RACM65S-36SK/277 | 36VDC          | y                                 | y  |
| RACM65S-48SK/277 | 48VDC          | y                                 | y  |
| RACM65S-52SK/277 | 52VDC          | y                                 | y  |

y= standard portfolio; on request= MOQ may apply on project base

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

| Parameter   | Condition              | Min.   | Typ.  | Max.       |
|---|------------------------|--------|-------|------------|
| Nominal Input Voltage   | 50/60Hz                | 100VAC |       | 277VAC     |
| Operating Range <sup>(3)</sup>  | 47-63Hz                | 90VAC  |       | 305VAC     |
| Input Current   | 5Vout                  |        |       | 1.2A       |
|   | others                 |        |       | 1.5A       |
| Inrush Current  | cold start at 25°C     | 120VAC |       | 25A        |
|   |                        | 230VAC |       | 50A        |
|   |                        | 277VAC |       | 60A        |
| No Load Power Consumption   | 5Vout                  |        | 100mW | 200mW      |
|   | others                 |        | 60mW  | 100mW      |
| Ecodesign Standby Mode Use<br>(Available output power for stated input power) | $P_{IN} = 0.3\text{W}$ | 150mW  |       |            |
|   | $P_{IN} = 0.5\text{W}$ | 300mW  |       |            |
| Input Frequency Range   | AC Input               | 47Hz   |       | 63Hz       |
| Minimum Load  |                        | 0%     |       |            |
| Power Factor  | 120VAC                 |        | 0.6   |            |
|   | 230/277VAC             |        | 0.5   |            |
| Start-up time   |                        |        |       | 200ms      |
| Rise time   |                        |        |       | 25ms       |
| Hold-up time  | 230VAC                 | 5Vout  | 50ms  |            |
|   |                        | others | 20ms  |            |
| Internal Operating Frequency  |                        |        |       | 100kHz     |
| Output Ripple and Noise <sup>(4)</sup>  | 20MHz BW               | 5Vout  |       | 100mVp-p   |
|   |                        | others |       | 1% of Vout |

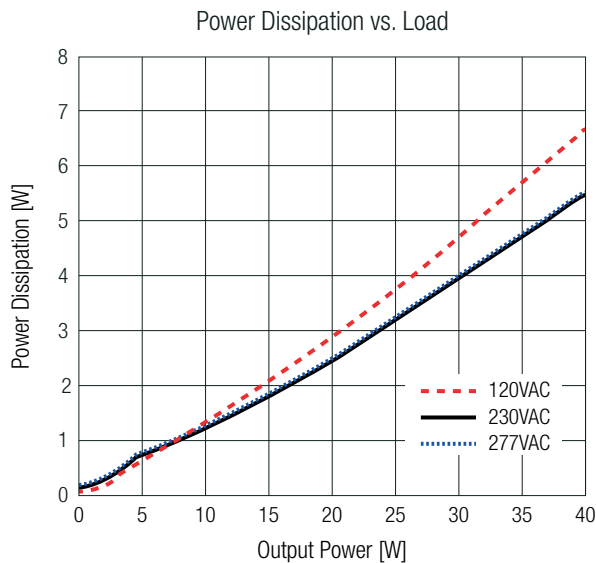
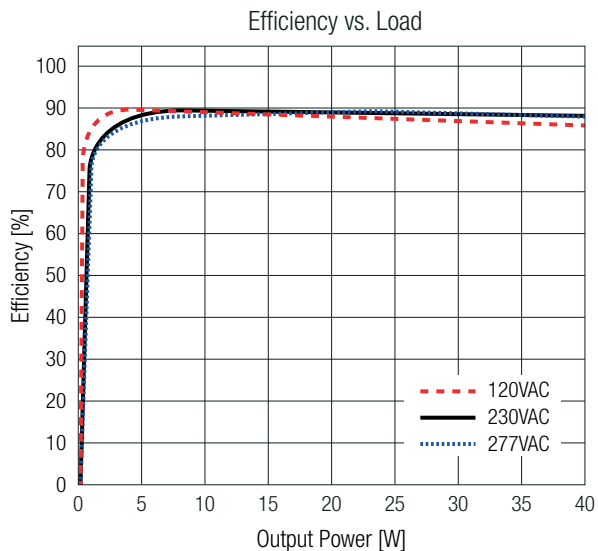
Note3: The products were submitted for safety files at AC-Input operation. (90V-305VAC)

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

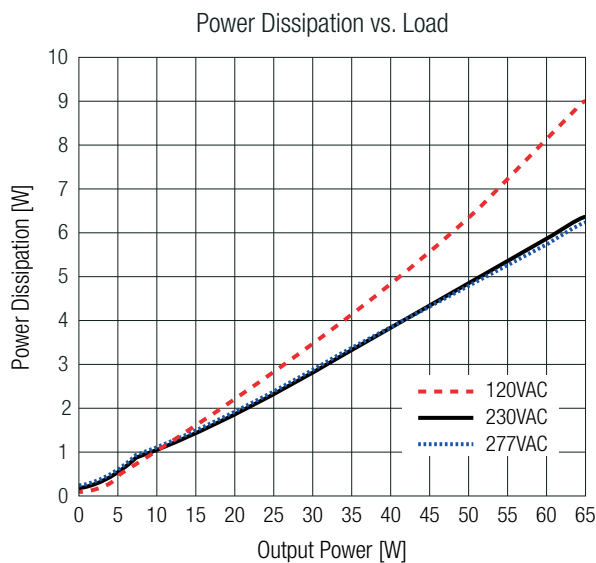
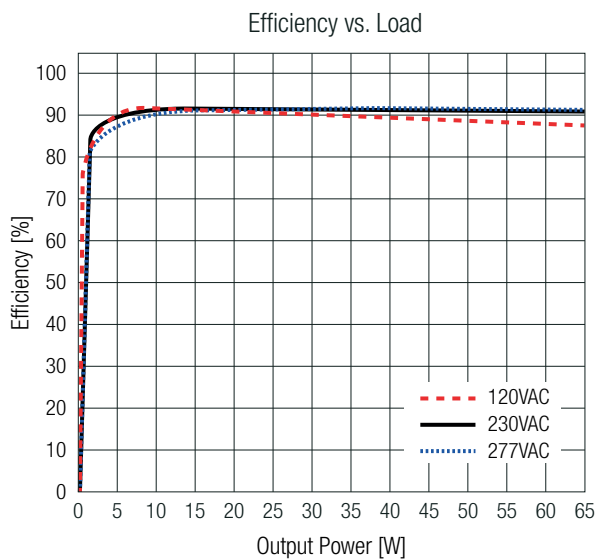
The test setup can have an impact on ripple noise values (placement of scope probe, capacitors, it's specifications, wires, PCB tracks, distances, etc.)

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

**5Vout**



**others**



**REGULATIONS** (measured @  $T_{AMB}= 25^{\circ}\text{C}$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

| Parameter                      | Condition             | Value            |
|--------------------------------|-----------------------|------------------|
| Output Accuracy                |                       | $\pm 3.0\%$ max. |
| Line Regulation                | low line to high line | $\pm 1.0\%$ max. |
| Load Regulation <sup>(5)</sup> | 10% to 100% load      | 2.5% max.        |
| Transient Response             | 25% load step change  | 1.0V max.        |
|                                | recovery time         | 3ms max.         |

Note5: Operation below 10% load will not harm the converter, but specifications may not be met

# RACM65S-K/277 Series $\diamond$ AC/DC Power Supply

65W  $\diamond$  Input: 100V-277VAC

**PROTECTIONS** (measured @  $T_{AMB} = 25^{\circ}\text{C}$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

| Parameter                                  | Type                           |                | Value                                    |
|--|--------------------------------|----------------|--|
| Internal Input Fuse                        |                                |                | T3.15A, slow blow type                   |
| Short Circuit Protection (SCP)             |                                |                | hiccup mode, auto recovery               |
| Over Voltage Protection (OVP)              |                                |                | 105%-150%, hiccup mode                   |
| Over Current Protection (OCP)              |                                |                | 110%-150%, hiccup mode                   |
| Over Voltage Category (OVC)                | according to<br>62368-1, 61558 | all versions   | OVC II (5000m)                           |
|  |                                | "/277" version | OVC III (5000m)                          |
|  |                                | "/OIB" version | OVC III (3000m)                          |
| DC ON LED                                  | "/OIB" version only            |                | green light, output voltage present      |
| Class of Equipment                         |                                |                | Class II                                 |
| Isolation Voltage <sup>(6)</sup>           | I/P to O/P                     | 1 minute       | 4kVAC                                    |
| Insulation Grade                           |                                |                | reinforced                               |
| Isolation Resistance                       |                                |                | 1G $\Omega$ min.                         |
| Isolation Capacitance                      |                                |                | 100pF typ.                               |
| Means of Protection                        |                                |                | 2MOPP                                    |
| Suitable For Medical Device Classification |                                |                | designed to support type BF applications |

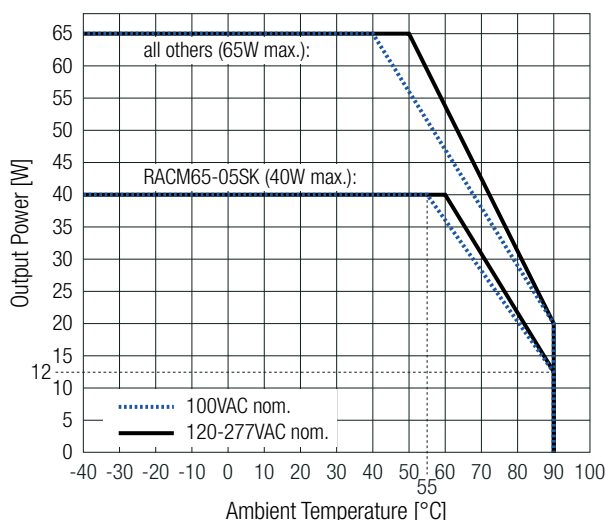
Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

**ENVIRONMENTAL** (measured @  $T_{AMB} = 25^{\circ}\text{C}$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

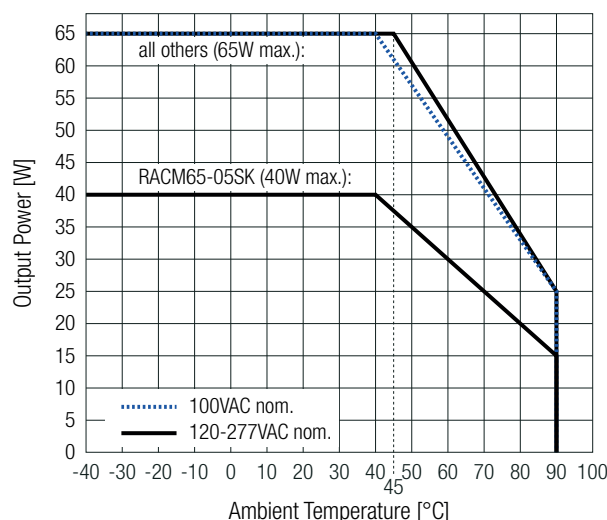
| Parameter                           | Condition                       |                                 | Value  |
|-------------------------------------|---------------------------------|---------------------------------|--|
| Operating Ambient Temperature Range |                                 |                                 | -40°C to +90°C                                   |
| Maximum Case Temperature            |                                 |                                 | +110°C   |
| Temperature Coefficient             |                                 |                                 | $\pm 0.03\%/K$                                   |
| Operating Altitude                  | according to 62368-1, 61558     | all versions                    | 5000m  |
| Operating Humidity                  | non-condensing                  |                                 | 90% RH max.                                      |
| Pollution Degree                    |                                 |                                 | PD2  |
| Shock                               |                                 |                                 | 5-500Hz, 20m/s <sup>2</sup> 15 min for each axis |
| MTBF                                | according to MIL-HDBK-217, G.B. | $T_{AMB} = +25^{\circ}\text{C}$ | 450 x 10 <sup>3</sup> hours                      |
| Design Lifetime                     | 230VAC and full load            | $T_{AMB} = +25^{\circ}\text{C}$ | 10 x 10 <sup>3</sup> hours                       |

**Convection cooled rating @ still air <0.1m/s<sup>(7)</sup>**

THT-solder mount Versions



"/OIB" Version

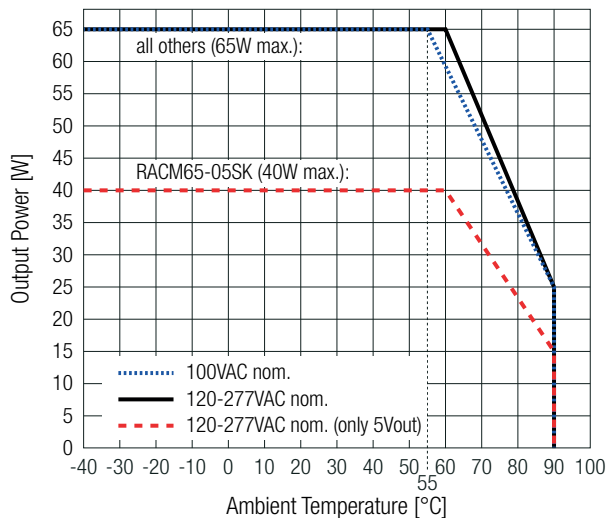


# RACM65S-K/277 Series $\diamond$ AC/DC Power Supply

65W  $\diamond$  Input: 100V-277VAC

**ENVIRONMENTAL** (measured @  $T_{AMB} = 25^{\circ}\text{C}$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

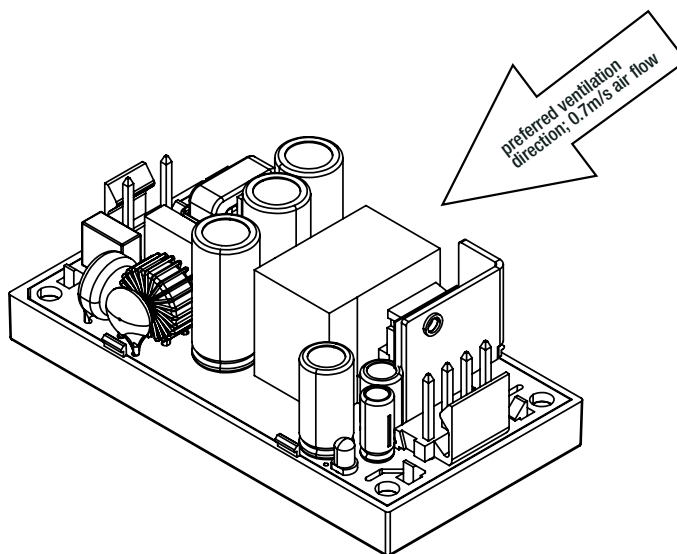
Air flow rating @ 0.7m/s<sup>(7)</sup>



Note7: "VAC nom." values include  $\pm 10\%$  tolerance

**ENVIRONMENTAL** (measured @  $T_{AMB} = 25^{\circ}\text{C}$ , nom.  $V_{IN}$ , full load and after warm-up unless otherwise stated)

Preferred ventilation direction  
valid for "/OIB"



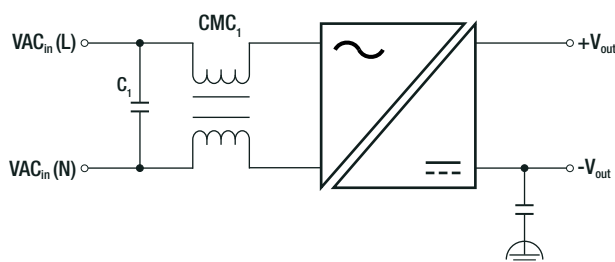
## SAFETY & CERTIFICATIONS

| Certificate Type (Safety)  | Report Number      | Standard   |
|--|--------------------|--|
| Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition                                     | E491408-A6044-UL   | UL62368-1:2019 3rd Edition<br>CAN/CSA-C22.2 No. 62368-1-19 3rd Edition |
| Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition                                     | 241213015          | IEC62368-1:2018 3rd Edition<br>EN IEC 62368-1:2020+A11:2020            |
| Medical electrical equipment Part 1: General requirements for basic safety and essential performance   | 241213014          | IEC60601-1:2005+AM2:2020 Edition 3.2                                   |
| Household and similar electrical appliances – Safety – Part 1: General requirements  | 64.110.24.06952.01 | IEC60335-1:2010 + C1:2016 5th Edition<br>EN60335-1:2012+ A15:2021      |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V 3rd Edition                     | 085-240695101-000  | IEC61558-1:2017 3rd Edition  |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements |                    | IEC61558-2-16:2009+A1:2013 1st Edition                                 |
| RoHS2  |                    | RoHS-2011/65/EU + AM-2015/863  |

### SAFETY & CERTIFICATIONS

| EMC Compliance according to EN55032   | Condition   | Standard  |
|---|---|---|
| Electromagnetic compatibility of multimedia equipment – Emission Requirements       | All Versions without external filter under floating load<br>THT-print-mount version plus „external filter“ under earth coupled load | EN55032:2015+A11:2020   |
| EMC Compliance according to EN61204-3   | Condition   | Standard  |
| Low voltage power supplies, d.c. output Part 3: Electromagnetic compatibility (EMC) |   | EN IEC 61204-3:2018   |
| ESD Electrostatic discharge immunity test   | Air: $\pm 2, 4, 8\text{kV}$<br>Contact: $\pm 4\text{kV}$  | IEC61000-4-2:2008, Criteria A<br>EN61000-4-2:2009, Criteria A |
| Radiated, radio-frequency, electromagnetic field immunity test                      | 10V/m (80-1000MHz),<br>3V/m (1400-2000MHz),<br>1V/m (2000-2700MHz)  | IEC/EN61000-4-3:2006 + A2:2010, Criteria A                    |
| Fast Transient and Burst Immunity   | AC Port: L, N, L-N: $\pm 2\text{kV}$  | IEC/EN61000-4-4:2012, Criteria A                              |
| Surge Immunity  | valid for THT versions:<br>AC Port without Filter:<br>$\pm 1\text{kV}$ L-N; $\pm 2\text{kV}$ L-PE & N-PE                            | IEC/EN61000-4-5:2014 + A1:2017, Criteria A                    |
|   | valid for THT versions:<br>AC Port with Filter:<br>$\pm 2\text{kV}$ L-N; $\pm 4\text{kV}$ L-PE & N-PE                               |   |
| Immunity to conducted disturbances, induced by radio-frequency fields               | 10Vrms (0.15-80MHz)   | IEC61000-4-6:2013, Criteria A<br>EN61000-4-6:2014, Criteria A |
| Power Magnetic Field Immunity   | 30A/m   | IEC61000-4-8:2009, Criteria A<br>EN61000-4-8:2010, Criteria A |
| Voltage Dips  | 100% (0.5P, 1.0P); 20%, 30%, 60%  | EN61000-4-11:2004 + A1:2017, Criteria A                       |
| Voltage Interruptions   | 100%  | EN61000-4-11:2004 + A1:2017, Criteria B                       |
| Limits of Voltage Fluctuations & Flicker  |   | EN61000-3-3:2013  |

### Suggested external filter to comply with EN55032 “B” for loads coupled to earth or GND and PELV circuits



#### Component List

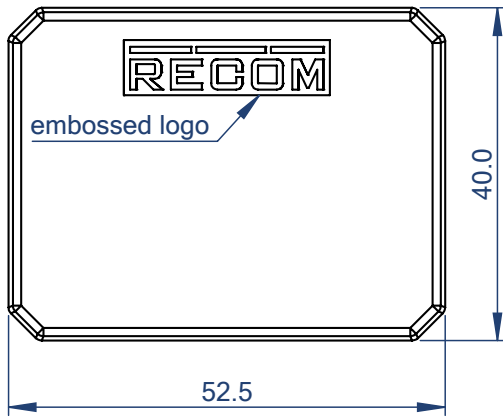
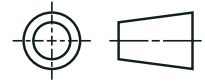
| C <sub>1</sub> | CMC <sub>1</sub> |
|----------------|------------------|
| 0.22 $\mu$ F   | 25mH             |

### DIMENSION & PHYSICAL CHARACTERISTICS

| Parameter         | Type                            | Value   |
|-------------------|---------------------------------|---|
| Materials         | case/baseplate (isolated)       | plastic, (UL94 V-0)                             |
|                   | potting (THT-solder mount only) | silicone, (UL94 V-0)                            |
|                   | PCB                             | FR4, (UL94 V-0)                                 |
| Dimension (LxWxH) | THT versions                    | 52.5 x 40.0 x 25.5mm<br>2.06 x 1.57 x 1.0 inch  |
|                   | “/OIB”                          | 79.0 x 40.8 x 31.0mm<br>3.11 x 1.60 x 1.22 inch |
| Weight            | THT-solder mount                | 122g typ.<br>0.27 lbs                           |
|                   | “/OIB”                          | 81g typ.<br>0.18 lbs                            |

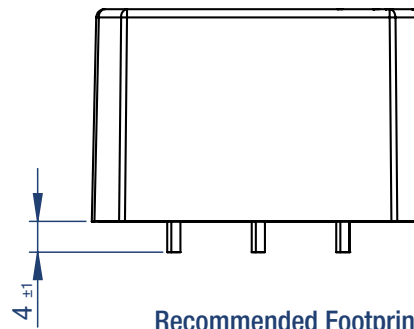
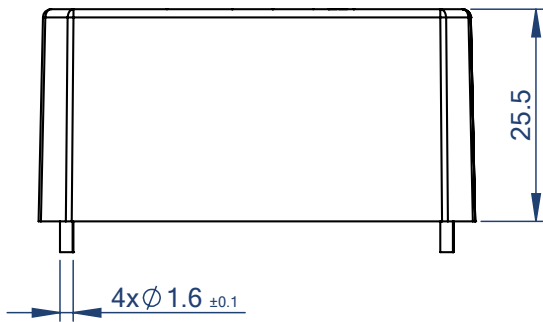
### DIMENSION & PHYSICAL CHARACTERISTICS

Dimension Drawing THT-solder mount (mm)

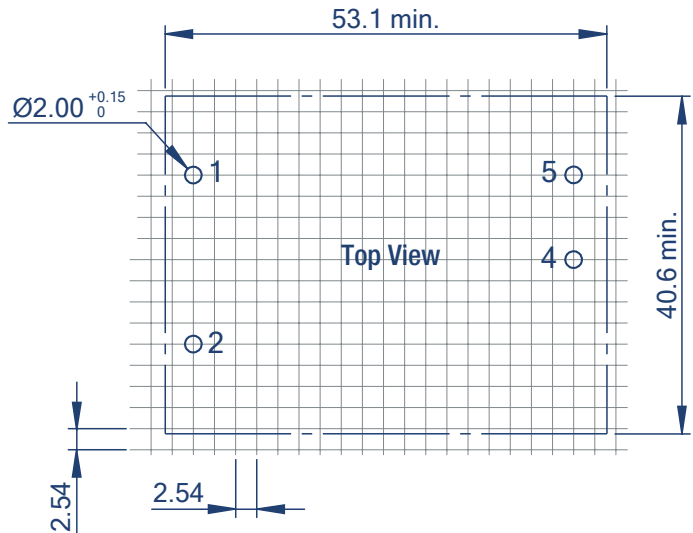
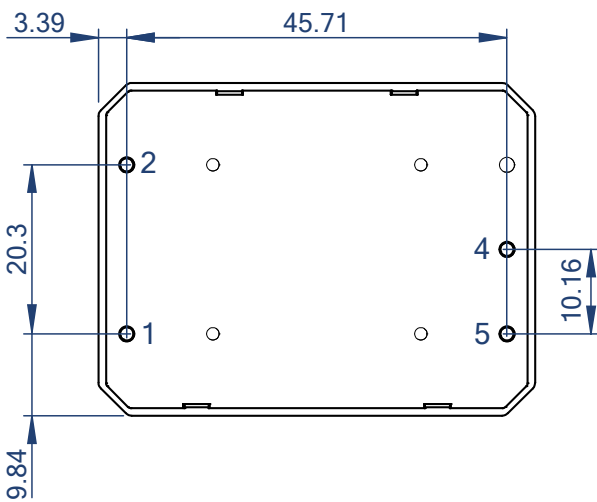


#### Pinning information [P12]

| Pin # | Single     |
|-------|------------|
| 1     | VAC in (N) |
| 2     | VAC in (L) |
| 4     | -Vout      |
| 5     | +Vout      |



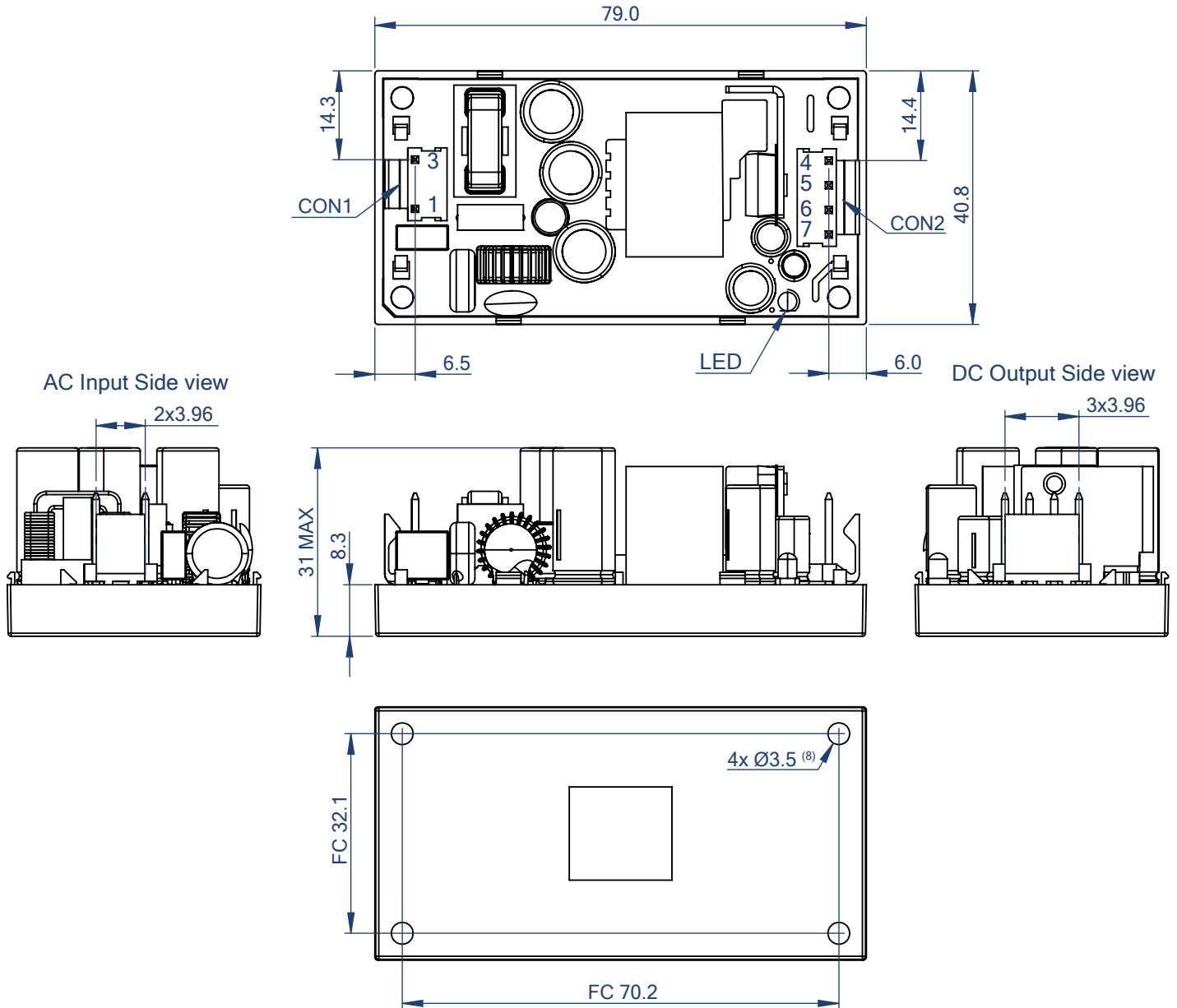
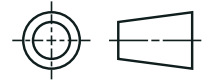
#### Recommended Footprint Deltas



Tolerance: xx.x=  $\pm 0.5$ mm  
 xx.xx=  $\pm 0.25$ mm

### DIMENSION & PHYSICAL CHARACTERISTICS

Dimension Drawing "/0IB" (mm)



Note8: Secure the device to the mounting surface using two M3 screws. Use cylinder head screws only. Countersunk screws are not permitted. Recommended tightening torque= 0.7Nm

#### Connector Information

| AC Input (CON1) |            |                       |
|-----------------|------------|-----------------------|
| #               | Function   | Connector             |
| 1               | VAC in (L) | 3 Pins (Pin2 removed) |
| 3               | VAC in (N) | with 3.96mm pitch     |

#### Compatible Connector CON1 & CON2

| Housing                          | Crimp Terminal                  |
|----------------------------------|---------------------------------|
| Molex 41695 Series or equivalent | Molex 2478 Series or equivalent |

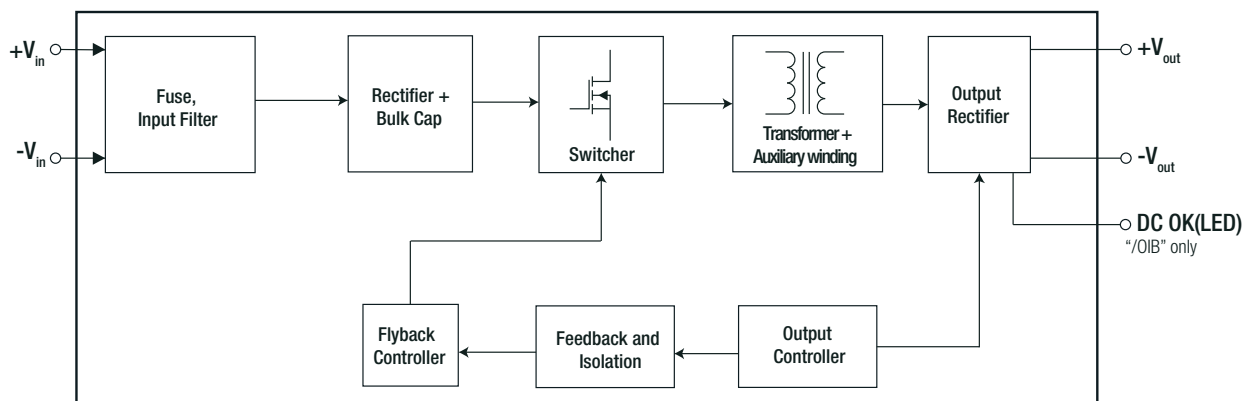
#### DC Output (CON2)

| #    | Function | Connector         |
|------|----------|-------------------|
| 4, 5 | -Vout    | 4 Pins            |
| 6, 7 | +Vout    | with 3.96mm pitch |

FC= Fixing centers

Tolerance: xx.x=  $\pm 0.5$ mm  
xx.xx=  $\pm 0.25$ mm

### BLOCK DIAGRAMM



### PACKAGING INFORMATION

| Parameter                 | Type                        |                | Value                  |
|---------------------------|-----------------------------|----------------|------------------------|
|                           | Packaging Dimension (LxWxH) | tube           |                        |
|                           | tray                        | "/OIB" version | 365.0 x 210.0 x 56.0mm |
| Packaging Quantity        | THT version                 |                | 11pcs                  |
|                           | "/OIB" version              |                | 12pcs                  |
| Storage Temperature Range |                             |                | -40°C to +90°C         |
| Storage Humidity          | non-condensing              |                | 90% RH max.            |

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