



### Features

Input voltage up to 150 VDC, surges up to 168 V

1 to 4 isolated outputs 3.3 to 96 VDC

Class I equipment



- RoHS lead solder exemption compliant
- Extremely slim case (4 TE), fully enclosed
- Extremely low inrush current, hot swappable
- Operating ambient temperature range  
-40 to 71 °C with convection cooling

### Model Selection

| Output 1            |                     |                     | Output 2            |                     |                     | Output 3            |                     |                     | Output 4            |                     |                     | Type          | Type          |
|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------|---------------|
| $V_{o \text{ nom}}$ | $P_{o \text{ nom}}$ | $P_{o \text{ max}}$ | $V_{o \text{ nom}}$ | $P_{o \text{ nom}}$ | $P_{o \text{ max}}$ | $V_{o \text{ nom}}$ | $P_{o \text{ nom}}$ | $P_{o \text{ max}}$ | $V_{o \text{ nom}}$ | $P_{o \text{ nom}}$ | $P_{o \text{ max}}$ | Input voltage | Input voltage |
| [VDC]               | [W]                 | [W]                 | [VDC]               | [W]                 | [W]                 | [VDC]               | [W]                 | [W]                 | [VDC]               | [W]                 | [W]                 | 16 - 36 VDC   | 33.6 - 75 VDC |
| 3.3                 | 100                 | 132                 | -                   | -                   | -                   | -                   | -                   | -                   | -                   | -                   | -                   | BP 1101-7R    | CP 1101-7R    |
| 5.1                 | 122                 | 183                 | -                   | -                   | -                   | -                   | -                   | -                   | -                   | -                   | -                   | BP 1001-7R    | CP 1001-7R    |
| 3.3                 | 50                  | 66                  | 5.1                 | 61                  | 91                  | -                   | -                   | -                   | -                   | -                   | -                   | BP 2101-7R    | CP 2101-7R    |
| 5.1                 | 61                  | 91                  | 5.1                 | 61                  | 91                  | -                   | -                   | -                   | -                   | -                   | -                   | BP 2001-7R    | CP 2001-7R    |
| 12                  | 60                  | 96                  | 12                  | 60                  | 96                  | -                   | -                   | -                   | -                   | -                   | -                   | BP 2320-7R    | CP 2320-7R    |
| 15                  | 60                  | 97                  | 15                  | 60                  | 97                  | -                   | -                   | -                   | -                   | -                   | -                   | BP 2540-7R    | CP 2540-7R    |
| 24                  | 60                  | 96                  | 24                  | 60                  | 96                  | -                   | -                   | -                   | -                   | -                   | -                   | BP 2660-7R    | CP 2660-7R    |
| 5.1                 | 61                  | 91                  | 12                  | 30                  | 48                  | 12                  | 30                  | 48                  | -                   | -                   | -                   | BP 3020-7R    | CP 3020-7R    |
| 5.1                 | 61                  | 91                  | 15                  | 30                  | 48                  | 15                  | 30                  | 48                  | -                   | -                   | -                   | BP 3040-7R    | CP 3040-7R    |
| 5.1                 | 61                  | 91                  | 24                  | 30                  | 48                  | 24                  | 30                  | 48                  | -                   | -                   | -                   | BP 3060-7R    | CP 3060-7R    |
| 5.1                 | 20                  | 30                  | 12                  | 30                  | 48                  | 12                  | 30                  | 48                  | 3.3                 | 10                  | 20                  | BP 4720-7R    | CP 4720-7R    |
| 12                  | 30                  | 48                  | 12                  | 30                  | 48                  | 12                  | 30                  | 48                  | 12                  | 30                  | 48                  | BP 4320-7R    | CP 4320-7R    |
| 15                  | 30                  | 48                  | 15                  | 30                  | 48                  | 15                  | 30                  | 48                  | 15                  | 30                  | 48                  | BP 4540-7R    | CP 4540-7R    |
| 24                  | 30                  | 48                  | 24                  | 30                  | 48                  | 24                  | 30                  | 48                  | 24                  | 30                  | 48                  | BP 4660-7R    | CP 4660-7R    |

| Output 1            |                     |                     | Output 2            |                     |                     | Output 3            |                     |                     | Output 4            |                     |                     | Type           | Type          |
|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------|---------------|
| $V_{o \text{ nom}}$ | $P_{o \text{ nom}}$ | $P_{o \text{ max}}$ | $V_{o \text{ nom}}$ | $P_{o \text{ nom}}$ | $P_{o \text{ max}}$ | $V_{o \text{ nom}}$ | $P_{o \text{ nom}}$ | $P_{o \text{ max}}$ | $V_{o \text{ nom}}$ | $P_{o \text{ nom}}$ | $P_{o \text{ max}}$ | Input voltage  | Input voltage |
| [VDC]               | [W]                 | [W]                 | [VDC]               | [W]                 | [W]                 | [VDC]               | [W]                 | [W]                 | [VDC]               | [W]                 | [W]                 | 40 - 100.8 VDC | 66 - 150 VDC  |
| 3.3                 | 100                 | 132                 | -                   | -                   | -                   | -                   | -                   | -                   | -                   | -                   | -                   | DP 1101-7R     | EP 1101-7R    |
| 5.1                 | 122                 | 183                 | -                   | -                   | -                   | -                   | -                   | -                   | -                   | -                   | -                   | DP 1001-7R     | EP 1001-7R    |
| 3.3                 | 50                  | 66                  | 5.1                 | 61                  | 91                  | -                   | -                   | -                   | -                   | -                   | -                   | DP 2101-7R     | EP 2101-7R    |
| 5.1                 | 61                  | 91                  | 5.1                 | 61                  | 91                  | -                   | -                   | -                   | -                   | -                   | -                   | DP 2001-7R     | EP 2001-7R    |
| 12                  | 60                  | 96                  | 12                  | 60                  | 96                  | -                   | -                   | -                   | -                   | -                   | -                   | DP 2320-7R     | EP 2320-7R    |
| 15                  | 60                  | 97                  | 15                  | 60                  | 97                  | -                   | -                   | -                   | -                   | -                   | -                   | DP 2540-7R     | EP 2540-7R    |
| 24                  | 60                  | 96                  | 24                  | 60                  | 96                  | -                   | -                   | -                   | -                   | -                   | -                   | DP 2660-7R     | EP 2660-7R    |
| 5.1                 | 61                  | 91                  | 12                  | 30                  | 48                  | 12                  | 30                  | 48                  | -                   | -                   | -                   | DP 3020-7R     | EP 3020-7R    |
| 5.1                 | 61                  | 91                  | 15                  | 30                  | 48                  | 15                  | 30                  | 48                  | -                   | -                   | -                   | DP 3040-7R     | EP 3040-7R    |
| 5.1                 | 61                  | 91                  | 24                  | 30                  | 48                  | 24                  | 30                  | 48                  | -                   | -                   | -                   | DP 3060-7R     | EP 3060-7R    |
| 5.1                 | 20                  | 30                  | 12                  | 30                  | 48                  | 12                  | 30                  | 48                  | 3.3                 | 10                  | 20                  | DP 4720-7R     | EP 4720-7R    |
| 12                  | 30                  | 48                  | 12                  | 30                  | 48                  | 12                  | 30                  | 48                  | 12                  | 30                  | 48                  | DP 4320-7R     | EP 4320-7R    |
| 15                  | 30                  | 48                  | 15                  | 30                  | 48                  | 15                  | 30                  | 48                  | 15                  | 30                  | 48                  | DP 4540-7R     | EP 4540-7R    |
| 24                  | 30                  | 48                  | 24                  | 30                  | 48                  | 24                  | 30                  | 48                  | 24                  | 30                  | 48                  | DP 4660-7R     | EP 4660-7R    |

| Output 1              |                     |                     | Output 2              |                     |                     | Output 3              |                     |                     | Output 4              |                     |                     | Type                             |
|-----------------------|---------------------|---------------------|-----------------------|---------------------|---------------------|-----------------------|---------------------|---------------------|-----------------------|---------------------|---------------------|----------------------------------|
| $V_{o\ nom}$<br>[VDC] | $P_{o\ nom}$<br>[W] | $P_{o\ max}$<br>[W] | $V_{o\ nom}$<br>[VDC] | $P_{o\ nom}$<br>[W] | $P_{o\ max}$<br>[W] | $V_{o\ nom}$<br>[VDC] | $P_{o\ nom}$<br>[W] | $P_{o\ max}$<br>[W] | $V_{o\ nom}$<br>[VDC] | $P_{o\ nom}$<br>[W] | $P_{o\ max}$<br>[W] | Input voltage<br>21.6 - 50.4 VDC |
| 3.3                   | 100                 | 132                 | -                     | -                   | -                   | -                     | -                   | -                   | -                     | -                   | -                   | GP 1101-7R                       |
| 5.1                   | 122                 | 183                 | -                     | -                   | -                   | -                     | -                   | -                   | -                     | -                   | -                   | GP 1001-7R                       |
| 3.3                   | 50                  | 66                  | 5.1                   | 61                  | 91                  | -                     | -                   | -                   | -                     | -                   | -                   | GP 2101-7R                       |
| 5.1                   | 61                  | 91                  | 5.1                   | 61                  | 91                  | -                     | -                   | -                   | -                     | -                   | -                   | GP 2001-7R                       |
| 12                    | 60                  | 96                  | 12                    | 60                  | 96                  | -                     | -                   | -                   | -                     | -                   | -                   | GP 2320-7R                       |
| 15                    | 60                  | 97                  | 15                    | 60                  | 97                  | -                     | -                   | -                   | -                     | -                   | -                   | GP 2540-7R                       |
| 24                    | 60                  | 96                  | 24                    | 60                  | 96                  | -                     | -                   | -                   | -                     | -                   | -                   | GP 2660-7R                       |
| 5.1                   | 61                  | 91                  | 12                    | 30                  | 48                  | 12                    | 30                  | 48                  | -                     | -                   | -                   | GP 3020-7R                       |
| 5.1                   | 61                  | 91                  | 15                    | 30                  | 48                  | 15                    | 30                  | 48                  | -                     | -                   | -                   | GP 3040-7R                       |
| 5.1                   | 61                  | 91                  | 24                    | 30                  | 48                  | 24                    | 30                  | 48                  | -                     | -                   | -                   | GP 3060-7R                       |
| 5.1                   | 20                  | 30                  | 12                    | 30                  | 48                  | 12                    | 30                  | 48                  | 3.3                   | 10                  | 20                  | GP 4720-7R                       |
| 12                    | 30                  | 48                  | 12                    | 30                  | 48                  | 12                    | 30                  | 48                  | 12                    | 30                  | 48                  | GP 4320-7R                       |
| 15                    | 30                  | 48                  | 15                    | 30                  | 48                  | 15                    | 30                  | 48                  | 15                    | 30                  | 48                  | GP 4540-7R                       |
| 24                    | 30                  | 48                  | 24                    | 30                  | 48                  | 24                    | 30                  | 48                  | 24                    | 30                  | 48                  | GP 4660-7R                       |

## Input

|               |                          |
|---------------|--------------------------|
| Input voltage | refer to selection chart |
|---------------|--------------------------|

## Output

|                                            |                                                                                |                                     |
|--------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------|
| Efficiency                                 | $V_{i\ nom}, I_{o\ nom}$                                                       | up to 92%                           |
| Nominal output current $I_{o1,2,3,4\ nom}$ | $P_{o1,2,3,4\ nom}/V_{o1,2,3,4\ nom}$                                          |                                     |
| Maximal output current $I_{o1,2,3,4\ max}$ | $P_{o1,2,3,4\ max}/V_{o1,2,3,4}$                                               |                                     |
| Voltage setting accuracy 1, 2              | $V_{i\ nom}, I_{o\ nom}$                                                       | up to $\pm 0.6\% V_{o1,2\ nom}$     |
| Voltage setting accuracy 3, 4              | $V_{i\ nom}, I_{o\ nom}$                                                       | $\pm 2\% V_{o3,4\ nom}$             |
| Worst case output voltage 1, 2             | $V_{i\ min}$ to $V_{i\ max}$ , 0 to $I_{o1,2\ max}$ , $T_C\ min$ to $T_C\ max$ | $\pm 1.6\% V_{o\ nom}$              |
| Minimum output current 1, 4                | in parallel configuration not required                                         | 0 A                                 |
|                                            | in individual or series configuration                                          | 5% $I_{o1,4\ nom}$                  |
| Minimum output current 2, 3                | in parallel configuration not required                                         | 0 A                                 |
|                                            | in individual or series configuration                                          | 5% $I_{o2,3\ nom}$                  |
| Cross load reg. output 4                   | $I_{o1,4\ min}$ to $I_{o1,4\ max}$                                             | typ. 100 mΩ • ( $I_{o1} - I_{o4}$ ) |
| Cross load reg. output 3                   | $I_{o2,3\ min}$ to $I_{o2,3\ max}$                                             | typ. 100 mΩ • ( $I_{o2} - I_{o3}$ ) |
| Output voltage switching noise             | IEC/EN 61204, total, peak-peak                                                 | typ. 0.4% $V_{o\ nom}$              |
| Common power limitation                    | ( $P_{o1} + P_{o4}$ ) rectangular U/I characteristic                           | typ. 130% $P_{o\ max}/2$            |
|                                            | ( $P_{o2} + P_{o3}$ ) rectangular U/I characteristic                           | typ. 130% $P_{o\ max}/2$            |

## Protection

|                            |                                                      |                        |
|----------------------------|------------------------------------------------------|------------------------|
| Input reverse polarity     | built-in fuse                                        |                        |
| Input undervoltage lockout |                                                      | typ. 90% $V_{i\ min}$  |
| Input overvoltage lockout  |                                                      | typ. 110% $V_{i\ max}$ |
| Input transient protection | varistor                                             |                        |
| Output                     | no-load, overload and short-circuit proof            |                        |
| Output overvoltage         | transient suppressor or 2 <sup>nd</sup> control loop | typ. 125% $V_{o\ nom}$ |
| Overtemperature            | switch-off with auto restart                         | $T_C$ typ. 100°C       |

## Control

|                             |                                                 |                        |
|-----------------------------|-------------------------------------------------|------------------------|
| Output voltage adjustment   | output 1, 4 (with feature R)                    | 60 - 110% $V_{o\ nom}$ |
| Inhibit on primary side     | TTL input, output disabled if left open-circuit |                        |
| Status indication           | LEDs: In OK, Out OK                             |                        |
| Output good signal (Out OK) | isolated open-collector signal                  |                        |

## Safety

|                                |                                      |          |
|--------------------------------|--------------------------------------|----------|
| Approvals                      | EN 60950, UL 1950, CSA C22.2 No. 950 |          |
| Class of equipment             |                                      | class I  |
| Protection degree              |                                      | IP 40    |
| Electric strength test voltage | I/case, I/O, I/aux                   | 2100 VDC |
|                                | O/case, aux/case                     | 2100 VDC |
|                                | O/O, O/aux                           | 500 V DC |

## EMC

|                                |                                                    |             |
|--------------------------------|----------------------------------------------------|-------------|
| Electrostatic discharge        | IEC/EN 61000-4-2, level 4 (8/15 kV)                | criterion B |
| Electromagnetic field          | IEC/EN 61000-4-3, level 3 (10 V/m)                 | criterion A |
| Electr. fast transients/bursts | IEC/EN 61000-4-4, input/output, level 3/4 (2/4 kV) | criterion B |
| Surge                          | IEC/EN 61000-4-5, input, level 2/3 (1/2 kV)        | criterion B |
| Conducted disturbances         | IEC/EN 61000-4-6, level 2/3 (3/10 V)               | criterion A |
| Electromagnetic emissions      | CISPR 22/EN 55022, conducted                       | class B     |

## Environmental

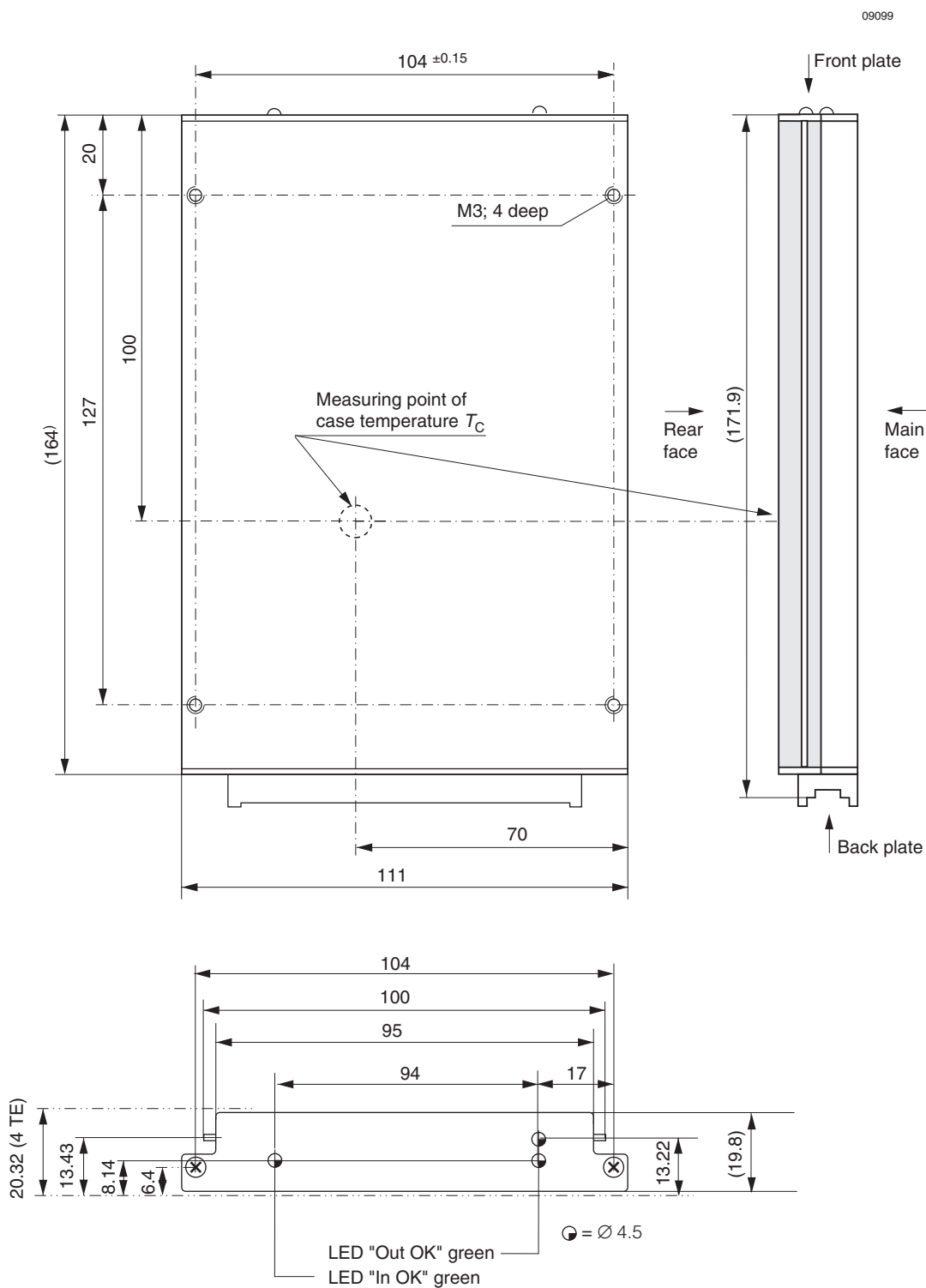
|                              |                                                          |                        |
|------------------------------|----------------------------------------------------------|------------------------|
| Operating ambient temp. (-7) | $V_{i\text{ nom}}, P_{o\text{ nom}}$ , convection cooled | -25 to 71 °C           |
| Operating case temp. (-7)    | $V_{i\text{ nom}}, P_{o\text{ nom}}/P_{o\text{ max}}$    | -25 to 95 °C           |
| Storage temperature          | non operational                                          | -40 to 100 °C          |
| Damp heat                    | IEC/EN 60068-2-3, 93%, 40 °C                             | 56 days                |
| Vibration, sinusoidal        | IEC/EN 60068-2-6, 10 - 60/60 - 2000 Hz                   | 0.35 mm/5 $g_n$        |
| Shock                        | IEC/EN 60068-2-27, 11 ms                                 | 50 $g_n$               |
| Bump                         | IEC/EN 60068-2-29, 11 ms                                 | 25 $g_n$               |
| Random vibration             | IEC/EN 60068-2-64, 20 - 500 Hz                           | 4.9 $g_{n\text{ rms}}$ |

## Options

|                            |                                  |          |
|----------------------------|----------------------------------|----------|
| Extended temperature range | -40 to 71 °C, ambient, operating | -9       |
| Out OK output              | excludes option i                | D        |
| Current sharing            |                                  | T        |
| Inhibit on output side     | excludes option D                | i        |
| Synchronisation            |                                  | W        |
| Heat Sink                  | height 20 mm or 30 mm            | B1 or B3 |

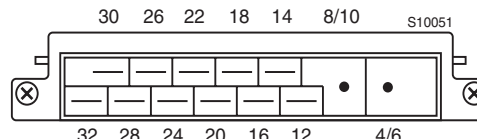
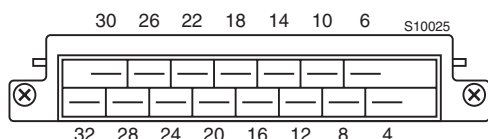
### Mechanical data

The converters are designed to be inserted into a 19" rack according to IEC 60297-3.



## Pinout Information

| Pin | P 1000  |                  | P 2000  |                     | P 3000  |                     | P 4000  |                       |
|-----|---------|------------------|---------|---------------------|---------|---------------------|---------|-----------------------|
| 4   | Vo1+    | Output 1         | Vo1+    | Output 1            | Vo1+    | Output 1            | Vo1+    | Output 1              |
| 6   |         |                  | Vo2+    | Output 2            | Vo2+    | Output 2            | Vo2+    | Output 2              |
| 8   | Vo1-    | Output 1         | Vo1-    | Output 1            | Vo1-    | Output 1            | Vo1-    | Output 1              |
| 10  |         |                  | Vo2-    | Output 2            | Vo2-    | Output 2            | Vo2-    | Output 2              |
| 12  | S+      | Sense            | S1+     | Sense 1             | S1+     | Sense 1             | Vo4+    | Output 4              |
| 14  | S-      | Sense            | S1-     | Sense 1             | S1-     | Sense 1             | Vo4-    | Output 4              |
| 16  | R       | Control of $V_o$ | R1      | Control of $V_{o1}$ | R1      | Control of $V_{o1}$ | R1/4    | Control of $V_{o1/4}$ |
|     |         |                  | T1      | Current sharing     | T1      | Current sharing     |         |                       |
| 18  | T       | Current sharing  | S2+     | Sense 2             | Vo3+    | Output 3            | Vo3+    | Output 3              |
| 20  | n.c.    | Not connected    | S2-     | Sense 2             | Vo3+    | Output 3            | Vo3+    | Output 3              |
| 22  | Out OK+ | Output good      | Out OK+ | Output good         | Out OK+ | Output good         | Out OK+ | Output good           |
|     | i+      | Inhibit second.  | i+      | Inhibit second.     | i+      | Inhibit second.     | i+      | Inhibit second.       |
| 24  | Out OK- | Output good      | Out OK- | Output good         | Out OK- | Output good         | Out OK- | Output good           |
|     | i-      | Inhibit second.  | i-      | Inhibit second.     | i-      | Inhibit second.     | i-      | Inhibit second.       |
| 26  | ⊕       | Prot. ground     | ⊕       | Prot. ground        | ⊕       | Prot. ground        | ⊕       | Prot. ground          |
| 28  | i       | Inhibit          | i       | Inhibit             | i       | Inhibit             | i       | Inhibit               |
|     | W       | Synchronizat.    | W       | Synchronizat.       | W       | Synchronizat.       | W       | Synchronizat.         |
| 30  | Vi+     | Input            | Vi+     | Input               | Vi+     | Input               | Vi+     | Input                 |
| 32  | Vi-     | Input            | Vi-     | Input               | Vi-     | Input               | Vi-     | Input                 |



## Accessories

Additional external heat sinks for operation above  $P_{o\text{ nom}}$  or  $T_{A\text{ max}}$  (option B1, B3)

Front panels for 19" rack mounting in 3U or 6U configuration (Schroff/Intermas)

Mating H15 connectors with screw, solder, fast-on or press-fit terminals

Mechanical mounting supports for chassis, DIN-rail and PCB mounting

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