

## PSS, PSK Series



## 9...25 A Switching Regulators

Input voltage up to 144 V DC  
Single output of 3.3...48 V DC  
No input to output isolation



- Efficiency up to 97%
- Low input-output differential voltage
- No derating over temperature

### Selection chart

| Output<br>$U_{o \text{ nom}}$<br>[V DC] | $I_{o \text{ nom}}$<br>[A] | Input voltage<br>$U_i$<br>[V DC] | Rated power<br>$P_{o \text{ tot}}$<br>[W] | Efficiency<br>$\eta_{\text{typ}}$<br>[%] | Type       | Options            |
|-----------------------------------------|----------------------------|----------------------------------|-------------------------------------------|------------------------------------------|------------|--------------------|
| 3.3                                     | 25                         | 8...40                           | 82.5                                      | 82                                       | PSK 3E25-7 | -9, E, P, B, B1    |
| 5.1                                     | 12                         | 8...80                           | 61.2                                      | 79                                       | PSS 5A12-7 | -9, E, P, C, B, B1 |
| 5.1                                     | 14                         | 8...40                           | 71.4                                      | 83                                       | PSS 5A14-2 | B, B1              |
| 5.1                                     | 16                         | 8...80                           | 81.6                                      | 79                                       | PSK 5A16-7 | -9, E, P, C, B, B1 |
| 5.1                                     | 18                         | 8...40                           | 91.8                                      | 82                                       | PSK 5A18-2 | B, B1              |
| 5.1                                     | 20                         | 8...80                           | 102                                       | 79                                       | PSK 5A20-7 | -9, E, P, C, B, B1 |
| 5.1                                     | 25                         | 8...40                           | 127.5                                     | 82                                       | PSK 5A25-7 | -9, E, P, C, B, B1 |
| 12 (15)                                 | 9                          | 18...144                         | 108 (135)                                 | 91                                       | PSS 129-7  | -9, E, P, C, B, B1 |
| 12 (15)                                 | 12                         | 15...80                          | 144 (180)                                 | 91                                       | PSS 1212-7 | -9, E, P, C, B, B1 |
| 12 (15)                                 | 12                         | 18...144                         | 144 (180)                                 | 91                                       | PSK 1212-7 | -9, E, P, C, B, B1 |
| 12 (15)                                 | 14                         | 16...40                          | 168 (210)                                 | 90                                       | PSS 1214-2 | B, B1              |
| 12 (15)                                 | 16                         | 15...80                          | 192 (240)                                 | 90                                       | PSK 1216-7 | -9, E, P, C, B, B1 |
| 12 (15)                                 | 18                         | 16...40                          | 216 (270)                                 | 90                                       | PSK 1218-2 | B, B1              |
| 12 (15)                                 | 20                         | 15...80                          | 240 (300)                                 | 90                                       | PSK 1220-7 | -9, E, P, C, B, B1 |
| 24                                      | 9                          | 31...144                         | 216                                       | 94                                       | PSS 249-7  | -9, E, P, C, B, B1 |
| 24                                      | 12                         | 29...80                          | 288                                       | 94                                       | PSS 2412-7 | -9, E, P, C, B, B1 |
| 24                                      | 12                         | 31...144                         | 288                                       | 94                                       | PSK 2412-7 | -9, E, P, C, B, B1 |
| 24                                      | 14                         | 29...60                          | 336                                       | 94                                       | PSS 2414-2 | B, B1              |
| 24                                      | 16                         | 29...80                          | 384                                       | 94                                       | PSK 2416-7 | -9, E, P, C, B, B1 |
| 24                                      | 18                         | 29...60                          | 432                                       | 94                                       | PSK 2418-2 | B, B1              |
| 24                                      | 20                         | 29...80                          | 480                                       | 94                                       | PSK 2420-7 | -9, E, P, C, B, B1 |
| 36                                      | 9                          | 44...144                         | 324                                       | 96                                       | PSS 369-7  | -9, E, P, C, B, B1 |
| 36                                      | 12                         | 42...80                          | 432                                       | 96                                       | PSS 3612-7 | -9, E, P, C, B, B1 |
| 36                                      | 12                         | 44...144                         | 432                                       | 96                                       | PSK 3612-7 | -9, E, P, C, B, B1 |
| 36                                      | 16                         | 42...80                          | 576                                       | 95                                       | PSK 3616-7 | -9, E, P, C, B, B1 |
| 36                                      | 20                         | 42...80                          | 720                                       | 95                                       | PSK 3620-7 | -9, E, P, C, B, B1 |
| 48                                      | 9                          | 58...144                         | 432                                       | 97                                       | PSS 489-7  | -9, E, P, C, B, B1 |
| 48                                      | 12                         | 58...144                         | 576                                       | 97                                       | PSK 4812-7 | -9, E, P, C, B, B1 |

**Input**

|                       |                          |
|-----------------------|--------------------------|
| Input voltage         | refer to selection chart |
| No load input current | ≤50 mA                   |

**Output**

|                                 |                                                                           |                              |
|---------------------------------|---------------------------------------------------------------------------|------------------------------|
| Efficiency                      | $U_{i\text{ nom}}, I_{o\text{ nom}}$                                      | up to 97%                    |
| Output voltage setting accuracy | $U_{i\text{ nom}}, I_{o\text{ nom}}$                                      | ±0.6% $U_{o\text{ nom}}$     |
| Output voltage switching noise  | IEC/EN 61204, total                                                       | typ. 0.2%                    |
| Line regulation                 | $U_{i\text{ min}} \dots U_{i\text{ max}}, I_{o\text{ nom}}$               | typ. ±0.2%                   |
| Load regulation                 | $U_{i\text{ nom}}, 0 \dots I_{o\text{ nom}}$                              | typ. 0.15%                   |
| Minimum load                    | not required                                                              | 0 A                          |
| Current limitation              | rectangular U/I characteristic                                            | typ. 110% $I_{o\text{ nom}}$ |
| Operation in parallel           | current sharing feature (CS)                                              |                              |
| Hold-up time                    | $U_{i\text{ nom}}, I_{o\text{ nom}}$ , with ext. diode in input line, PSS | up to 7 ms                   |

**Protection**

|                            |                                           |                              |
|----------------------------|-------------------------------------------|------------------------------|
| Input reverse polarity     | built-in fuse                             |                              |
| Input undervoltage lockout |                                           | typ. 80% $U_{i\text{ min}}$  |
| Input transient protection | suppressor diode                          |                              |
| Output                     | no-load, overload and short circuit proof |                              |
| Output overvoltage         | suppressor diode in each output           | typ. 150% $U_{o\text{ nom}}$ |
| Overtemperature            | switch-off with auto restart              | $T_C$ typ. 100°C             |

**Control**

|                           |                                                         |                             |
|---------------------------|---------------------------------------------------------|-----------------------------|
| Inhibit                   | TTL input, output enabled if left open                  |                             |
| R control                 | output voltage adjustment, PSS                          | 0...108% $U_{o\text{ nom}}$ |
| Output voltage indication | LED                                                     |                             |
| Sense lines               | compensation of voltage drop across the load lines, PSS |                             |
| Test sockets              | test sockets for check of output voltage                |                             |

**Safety**

|                                |                                      |                   |
|--------------------------------|--------------------------------------|-------------------|
| Approvals                      | EN 60950, UL 1950, CSA C22.2 No. 950 |                   |
| Protection degree              | units without options                | IP 20/30          |
| Electric strength test voltage | I/case and O/case                    | 500/750/1500 V DC |

**EMC**

|                                |                   |  |
|--------------------------------|-------------------|--|
| Electrostatic discharge        | IEC/EN 61000-4-2  |  |
| Electromagnetic field          | IEC/EN 61000-4-3  |  |
| Electr. fast transients/bursts | IEC/EN 61000-4-4  |  |
| Surge                          | IEC/EN 61000-4-5  |  |
| Conducted disturbances         | IEC/EN 61000-4-6  |  |
| Electromagnetic emissions      | CISPR 22/EN 55022 |  |

**Environmental**

|                                  |                                                                 |             |
|----------------------------------|-----------------------------------------------------------------|-------------|
| Operating ambient temperature    | -2, $U_{i\text{ nom}}$ , $I_{o\text{ nom}}$ , convection cooled | -10...50°C  |
| Operating case temperature $T_C$ | -2, $U_{i\text{ nom}}$ , $I_{o\text{ nom}}$                     | -10...80°C  |
| Storage temperature              | -2, non operational                                             | -25...100°C |
| Operating ambient temperature    | -7, $U_{i\text{ nom}}$ , $I_{o\text{ nom}}$ , convection cooled | -25...71°C  |
| Operating case temperature $T_C$ | -7, $U_{i\text{ nom}}$ , $I_{o\text{ nom}}$                     | -25...95°C  |
| Storage temperature              | -7, non operational                                             | -40...100°C |
| Damp heat                        | IEC/EN 60068-2-3                                                |             |
| Vibration, sinusoidal            | IEC/EN 60068-2-6                                                |             |
| Shock                            | IEC/EN 60068-2-27                                               |             |
| Bump                             | IEC/EN 60068-2-29                                               |             |
| Random vibration                 | IEC/EN 60068-2-64                                               |             |
| MTBF                             | MIL-HDBK-217                                                    |             |

**Options**

|                                                            |                                                                  |
|------------------------------------------------------------|------------------------------------------------------------------|
| Large and small cooling plate instead of standard heatsink | B/B1                                                             |
| Extended temperature range                                 | -40...71°C, ambient, operating                                   |
| Electronic inrush current limitation                       | E                                                                |
| Output voltage adjustment                                  | $\pm 8\%$ $U_{o\text{ nom}}$ , excludes feature R and vice versa |
| Thyristor crowbar on output                                | C                                                                |

**Accessories**

|                                                                                    |
|------------------------------------------------------------------------------------|
| Front panels 19" (Schroff/Intermas), 12 und 16 TE                                  |
| Mating H15 or H15 S4 connectors with screw, solder, fast-on or press-fit terminals |
| Connector retention facilities                                                     |
| Adapter kit for DIN-rail                                                           |

**Pin allocation**

| Electrical Determination                          | Type H15 |        | Type H15 S4 |        |
|---------------------------------------------------|----------|--------|-------------|--------|
|                                                   | Pin No.  | Ident. | Pin No.     | Ident. |
| Output voltage (positive)                         | 4        | Vo+    | 4/6         | Vo+    |
| Output voltage (positive)                         | 6        | Vo+    |             |        |
| Output voltage (negative)                         | 8        | Go-    | 8/10        | Go-    |
| Output voltage (negative)                         | 10       | Go-    |             |        |
| Crowbar trigger input (option C)                  | 12       | C      | 12          | C      |
| Inhibit input                                     | 14       | i      | 14          | i      |
| R-input (output voltage programming) <sup>1</sup> | 16       | R      | 16          | R      |
| Sense line (negative)                             | 18       | S-     | 18          | S-     |
| Sense line (positive)                             | 20       | S+     | 20          | S+     |
| Current sharing control input                     | 22       | CS     | 22          | CS     |
| Protective ground (leading pin)                   | 24       | ⊕      | 24          | ⊕      |
| Input voltage (negative)                          | 26       | Gi-    | 26/28       | Gi-    |
| Input voltage (negative)                          | 28       | Gi-    |             |        |
| Input voltage (positive)                          | 30       | Vi+    | 30/32       | Vi+    |
| Input voltage (positive)                          | 32       | Vi+    |             |        |

# Cassette Style

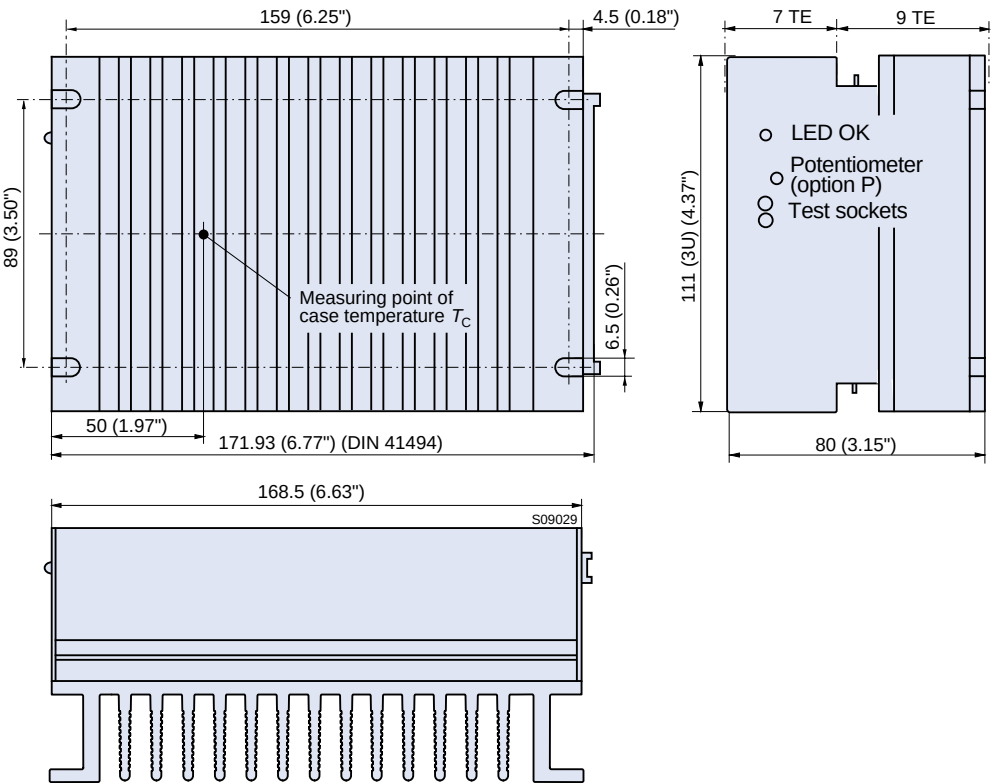
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## Mechanical data

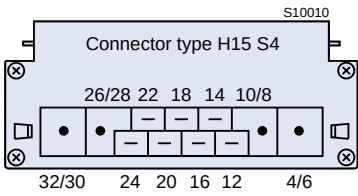
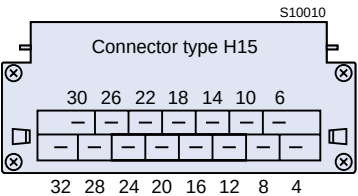
Tolerances  $\pm 0.3$  mm (0.012") unless otherwise indicated.



## PSK



## Pin allocation



H15 S4 connectors for 20 and 25 A types

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## 9...25 A Switching Regulators

### PSS

