**Feature**

Small size and high efficiency non-isolated DC-DC converter.
Wide input voltage 3.0V to 14.4V.
Adjustment of the gain control depending on external capacitor is unnecessary.
Built-in remote ON/OFF, Power good, Frequency synchronization.
Built-in overcurrent and thermal protection (auto recovery type) functions.

**CE marking**

RoHS Directive

**Safety agency approvals**

UL60950-1, C-UL, EN60950-1

**5-year warranty**
DC-DC Converters POL Type

BRNS

Ordering information

BRNS 20 -

1 Series name
2 Single output
3 Output current
   6: 6A
   12: 12A
   20: 20A
4 Optional
   R: Positive logic remote on/off
   I: No clock output for frequency synchronization
Y1: Suitable control for external capacitor over 470 μF

SPECIFICATIONS

MODEL | BRNS6 | BRNS12 | BRNS20
--- | --- | --- | ---
MAX OUTPUT CURRENT[A] | 6.0 | 12.0 | 20.0
DC OUTPUT | 0.6 - 5.5

MODEL | BRNS6 | BRNS12 | BRNS20
--- | --- | --- | ---
INPUT VOLTAGE[V] | DC3.0 - 14.4
CURRENT[A] | 0.70 typ | 1.40 typ | 2.30 typ
EFFICIENCY[%] | 86 typ | 86 typ | 87 typ
VOLTAGE[V] | 0.6 - 5.5 | 0.6 - 5.5 | 0.6 - 5.5
CURRENT[A] | 6 | 12 | 20
LINE REGULATION1[mV] | 10
Vo ≤ 1.8V
LINE REGULATION2[%Vo]| 0.5
Vo ≥ 1.8V
LOAD REGULATION1[mV] | 10
Vo ≤ 1.8V
LOAD REGULATION2[%Vo]| 0.5
Vo ≥ 1.8V
OUTPUT VOLTAGE SETTING [%Vo]| ±1.0
RIPPLE[mVp-p]| 25
RIPPLE NOISE[mVp-p]| 50
DRIFT[%Vo]| ±0.5
START-UP TIME[ms]| 4.5 typ
OUTPUT VOLTAGE ADJUSTMENT RANGE [V]| Adjustable by external resistor
OUTPUT VOLTAGE REGULATION [%Vo]| ±3.0

PROTECTION CIRCUIT AND OTHERS

OVERCURRENT PROTECTION: Works over 105% of rating (auto recovery type)
REMOTE SENSING: Available (+S only)
REMOTE ON/OFF: Available Negative logic L:ON, H:OFF

ENVIRONMENT

OPERATING TEMP., HUMID. AND ALTITUDE: -40 to +85°C, 20-95%RH (Non condensing) (Refer to “Derating”) 3,000m (10,000feet) max
STORAGE TEMP., HUMID. AND ALTITUDE: -40 to +100°C, 20-95%RH (Non condensing), 9,000m (30,000feet) max
VIBRATION: 10-55Hz, 49.0m/s² (5G), 3minutes period, 60minutes each along X, Y and Z axis
IMPACT: 196.1m/s² (20G), 11ms, once each along X, Y and Z axis

SAFETY AGENCY APPROVALS: UL60950-1, C-UL(CSA60950-1), EN60950

OTHERS

CASE SIZE/WEIGHT: 12.2 X 7.2 X 12.2mm [0.48 X 0.28 X 0.48 inches] (W X H X D) / 4g max
20.3 X 8.5 X 11.4mm [0.80 X 0.35 X 0.45 inches] (W X H X D) / 6g max

COOLING METHOD: Convection / Forced air

*1 At rated input (DC12V) and rated output (1.2V) Ta=25°C.
*2 Output voltage is adjusted to the minimum when TRM is open.
*3 Ripple and ripple noise is measured by using measuring board with ceramic capacitor at 25mm from output pin.
*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held.
*5 Output voltage setting is added line regulation and load regulation and temperature regulation used resistance of the 0.5% tolerance.

July 03, 2020
**Implementation • Mounting Method**

**Mounting method**
- The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. The temperature around each power supply should not exceed the temperature range shown in “Derating”.

**Automatic Mounting**
- To mount BRNS series automatically, use the coil area near the center of the PCB as an adsorption point. Please see the External View for details of the adsorption point.

**Soldering**
- Right figure shows condition for reflow of BRNS series. Please make sure that the temperature of board’s pattern near by +VOUT and GND terminal.
- While soldering, having vibration or impact on the unit should be avoided, because of solder melting.
- Please do not do the implementation except the reflow.
- Because some parts drops, please do not do reflow of the back side.

---

**Pin Configuration**

- **BRNS6/12**

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Pin Connection</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>RC</td>
<td>Remote ON/OFF</td>
</tr>
<tr>
<td>②</td>
<td>+VIN</td>
<td>+DC input</td>
</tr>
<tr>
<td>③</td>
<td>GND</td>
<td>GND(-DC input, -DC output)</td>
</tr>
<tr>
<td>④</td>
<td>+VOUT</td>
<td>+DC output</td>
</tr>
<tr>
<td>⑤</td>
<td>+S</td>
<td>+Remote sensing</td>
</tr>
<tr>
<td>⑥</td>
<td>TRM</td>
<td>Adjustment of output voltage</td>
</tr>
<tr>
<td>⑦</td>
<td>SGND</td>
<td>Signal GND</td>
</tr>
<tr>
<td>⑧</td>
<td>CLK(NC)</td>
<td>Clock output</td>
</tr>
<tr>
<td>⑨</td>
<td>SEQ</td>
<td>Control of Start up time and turn</td>
</tr>
<tr>
<td>10</td>
<td>PGOOD</td>
<td>Power good</td>
</tr>
<tr>
<td>11</td>
<td>SYNC</td>
<td>Input for frequency synchronization</td>
</tr>
<tr>
<td>12</td>
<td>-S</td>
<td>NC: BRNS6/12 -Remote sensing: BRNS20</td>
</tr>
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</table>

**BRNS20**

<table>
<thead>
<tr>
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<tbody>
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<td>GND(-DC input, -DC output)</td>
</tr>
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<td>+DC output</td>
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<td>+S</td>
<td>+Remote sensing</td>
</tr>
<tr>
<td>⑥</td>
<td>TRM</td>
<td>Adjustment of output voltage</td>
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<td>⑦</td>
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<td>NC: BRNS6/12 -Remote sensing: BRNS20</td>
</tr>
</tbody>
</table>

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**Implementation**

**Pin No.**

**BRNS 6/12**

**BRNS 20**

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<tr>
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<tr>
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<tr>
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<td>-S</td>
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**Implementation**

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Derating

Make sure the temperatures measurement locations shown from Instruction Manual 8 are on or under the derating curve in right figure. Ambient temperature must be kept at 85°C or under.

Instruction Manual

◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Before using our product  https://en.cosel.co.jp/technical/caution/index.html

Basic Characteristics Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Circuit method</th>
<th>Switching frequency [kHz] (reference)</th>
<th>Input current [A]</th>
<th>Inrush current protection</th>
<th>PCB/Pattern</th>
<th>Series/Parallel operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRNS6</td>
<td>Buck Converter</td>
<td>600</td>
<td>*1</td>
<td>-</td>
<td>glass fabric base, epoxy resin</td>
<td>Single sided</td>
</tr>
<tr>
<td>BRNS12</td>
<td>Buck Converter</td>
<td>600</td>
<td>*1</td>
<td>-</td>
<td>glass fabric base, epoxy resin</td>
<td>Double sided</td>
</tr>
<tr>
<td>BRNS20</td>
<td>Buck Converter</td>
<td>600</td>
<td>*1</td>
<td>-</td>
<td>glass fabric base, epoxy resin</td>
<td>Multiplier</td>
</tr>
</tbody>
</table>

*1 Refer to Specification.

July 03, 2020