The LP8758 device is a flexible DC-DC regulator which consists of four configurable regulator cores. This application note can be used as a reference for different LP8758 device configuration options (Quad, Triple, Dual, Single Outputs).

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## 1 LP8758 Regulator Configurations

The LP8758 device supports the following regulator configurations:

- Single output 4-phase regulator with maximum 16-A load current (LP8758-B0).
- One 3-phase and one single-phase regulator with maximum 12-A and 4-A load currents (LP8758-C0).
- Two 2-phase regulators with maximum 8-A load currents (LP8758-D0).
- One 2-phase and two single-phase regulators with maximum 8-A and 4-A load currents (LP8758-E0).
- Four single-phase regulators with maximum 4-A load current at each output (LP8758-F0).

Parametrics for the different configurations are summarized in Table 1.
### Table 1. Parametrics

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>LP8758-B0</th>
<th>LP8758-C0</th>
<th>LP8758-D0</th>
<th>LP8758-E0</th>
<th>LP8758-F0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>4-phase</td>
<td>3+1-phase</td>
<td>2+1+1-phase</td>
<td>1+1+1+1-phase</td>
<td>2+2-phase</td>
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<tr>
<td>Input voltage range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.5 V to 5.5 V</td>
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<tr>
<td>Minimum dropout voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.7 V</td>
</tr>
<tr>
<td>Switching frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 MHz</td>
</tr>
<tr>
<td>Output voltage slew-rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Programmable 0.47 mV/µs to 30 mV/µs, default 10 mV/µs</td>
</tr>
<tr>
<td>Converter operating mode</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Programmable PFM-PWM / Forced PWM / Forced multi-phase, default PFM-PWM</td>
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<tr>
<td>Output voltage range</td>
<td></td>
<td></td>
<td></td>
<td>Programmable 0.5 V to 3.36 V</td>
<td></td>
</tr>
<tr>
<td>Default output voltage</td>
<td>Buck0/1/2/3: 1.1 V</td>
<td>Buck0/1: 0.9 V</td>
<td>Buck0/1: 0.9 V</td>
<td>Buck0/1: 0.9 V</td>
<td>Buck0/1: 0.9 V</td>
</tr>
<tr>
<td>Maximum load current</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 A / phase</td>
</tr>
<tr>
<td>Inductor current limit / phase</td>
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<td></td>
<td></td>
<td></td>
<td>Programmable 1.5 A to 5 A</td>
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<tr>
<td>Default Inductor current limit / phase</td>
<td>5 A</td>
<td>5 A</td>
<td>5 A</td>
<td>4.5 A</td>
<td></td>
</tr>
<tr>
<td>Default control pin</td>
<td>EN1</td>
<td>EN1</td>
<td>EN1</td>
<td>EN1</td>
<td>EN1, EN2</td>
</tr>
<tr>
<td>Start-up and shutdown delays</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Programmable 0 ms to 15 ms</td>
</tr>
<tr>
<td>Default start-up / shutdown delay</td>
<td>Buck0/1/2: 0 ms / 0 ms</td>
<td>Buck0/1/2: 0 ms / 0 ms</td>
<td>Buck0/1: 0 ms / 0 ms</td>
<td>Buck0/1: 2 ms / 4 ms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Buck2: 0 ms / 0 ms</td>
<td>Buck2: 0 ms / 0 ms</td>
<td>Buck2: 0 ms / 0 ms</td>
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<td>Intermits unmasked by default</td>
<td>- Thermal warning - Load current measurement - Powergood - Current Limit</td>
<td>- Thermal warning - Load current measurement</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2 Typical Applications

The following sections show the typical functional block diagrams for the different configurations.

2.1 LP8758-B0: 4-Phase Regulator Configuration

Figure 1. 4-Phase Configuration

The output voltage is sensed with differential feedback, VOUT sense, and Ground sense.

The LP8758-B0 device is described in the data sheet (SNVSA06).

2.2 LP8758-C0: 3-Phase and 1-Phase Regulators Configuration

Figure 2. 3-Phase and 1-Phase Configuration

The output voltage of 3-phase output is sensed with differential feedback, VOUT1 sense, and Ground sense.

The output voltage of 1-phase output is sensed with single-ended feedback and VOUT2 sense.
2.3 LP8758-D0: 2-Phase and Two 1-Phase Regulators Configuration

The output voltage of 2-phase output is sensed with differential feedback, VOUT1 sense, and Ground sense.

The output voltages of 1-phase outputs are sensed with single-ended feedbacks, VOUT2 sense, and VOUT3 sense.

2.4 LP8758-E0: Four 1-Phase Regulators Configuration

The output voltages are sensed with single-ended feedbacks.
2.5 LP8758-F0: Two 2-Phase Regulators Configuration

The output voltages are sensed with differential feedbacks, VOUT sense, and Ground sense.
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- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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