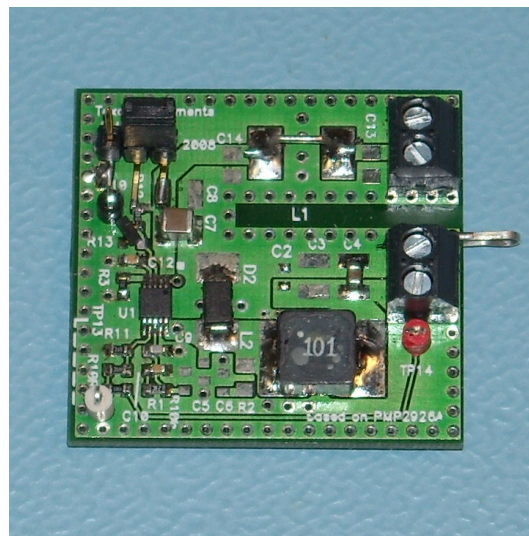


TPS54240 Buck Circuit - 3.3V @ 0.3A

- Input 9..14V DC
 Can withstand up to 40V
- Output 3.3V @ 0.3A
- Working in continuous conduction mode
- Enable/disable by logic signal (3.3V or 5.0V)
- Built on PCB PMP2644 Rev.B



1 Startup

The startup waveform is shown in Figure 1. The input voltage is set at 12.0V, with no load on the 3.3V output.

- Channel C1: **Input voltage**
2V/div, 2ms/div
- Channel C2: **Output voltage**
1V/div, 2ms/div

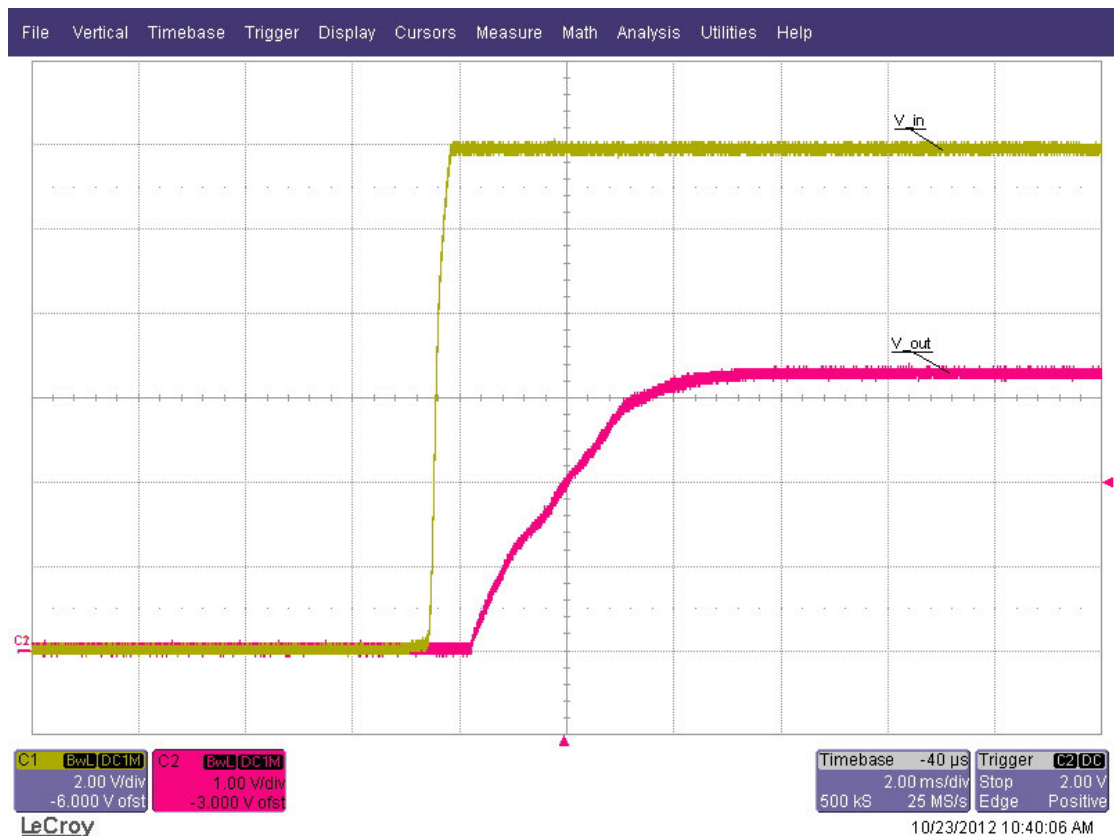


Figure 1

2 Shutdown

The shutdown waveform is shown in Figure 2. The input voltage is set at 12.0V with a 0.3A load on the 3.3V output.

- Channel C1: **Input voltage**
2V/div, 1ms/div
- Channel C2: **Output voltage**
1V/div, 1ms/div



Figure 2

3 Efficiency

The efficiency and load regulation at 9V and 14V input voltage are shown in Figure 3 and Figure 4.

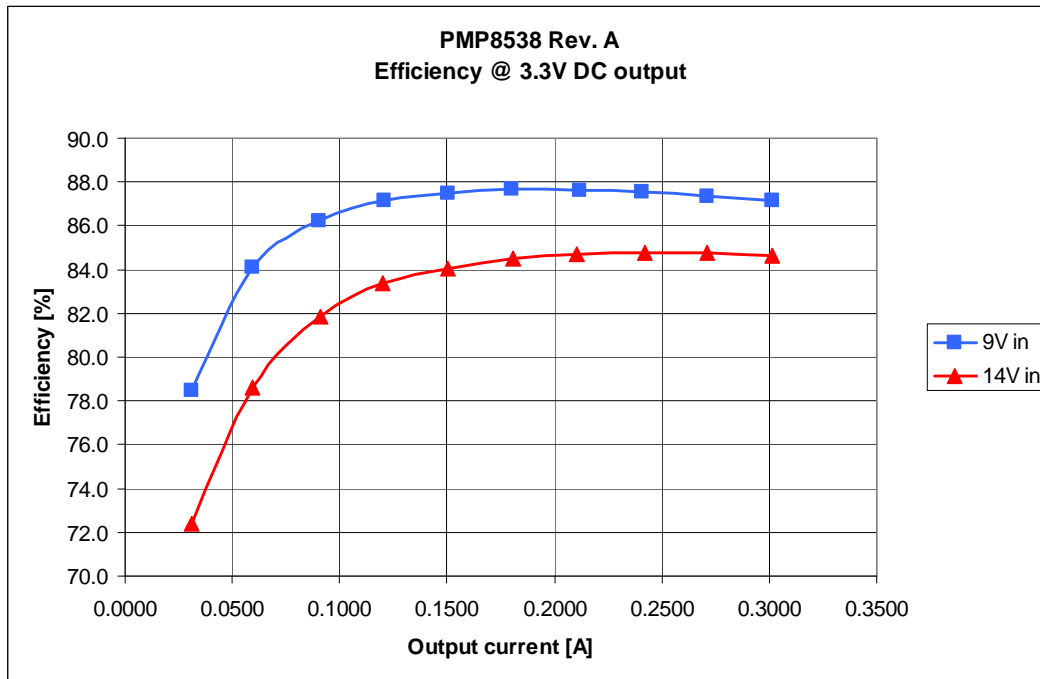


Figure 3

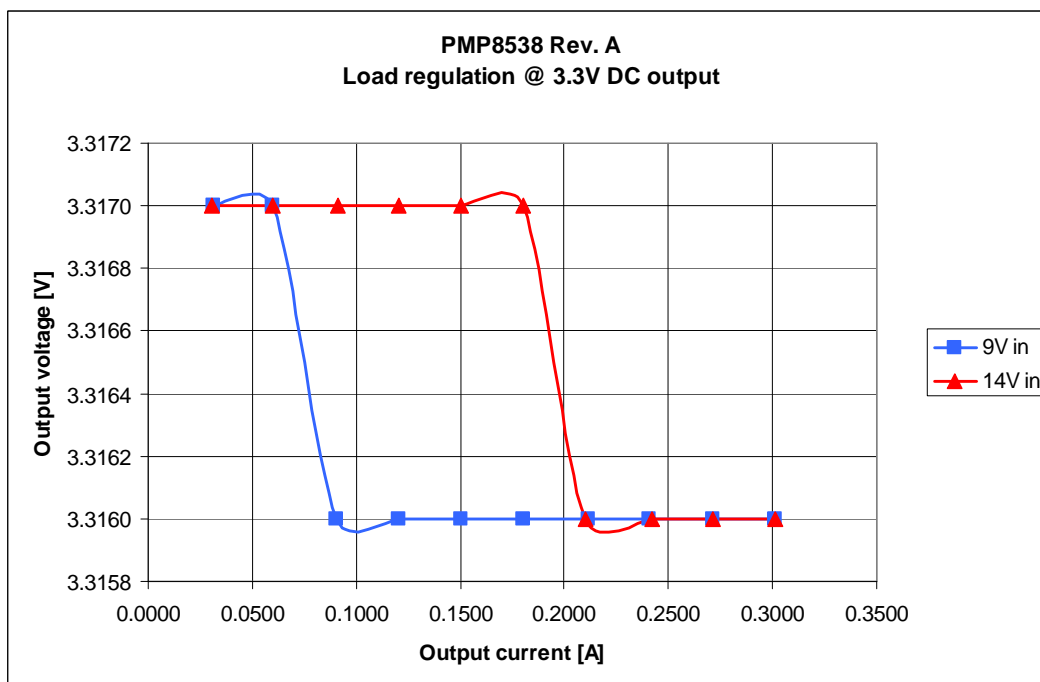


Figure 4

4 Output ripple voltage

The output ripple voltage at 0.3A load and 12.0V input voltage is shown in Figure 5.

Channel C2: **Output voltage**, AC coupled, <8mV
20mV/div, 5us/div

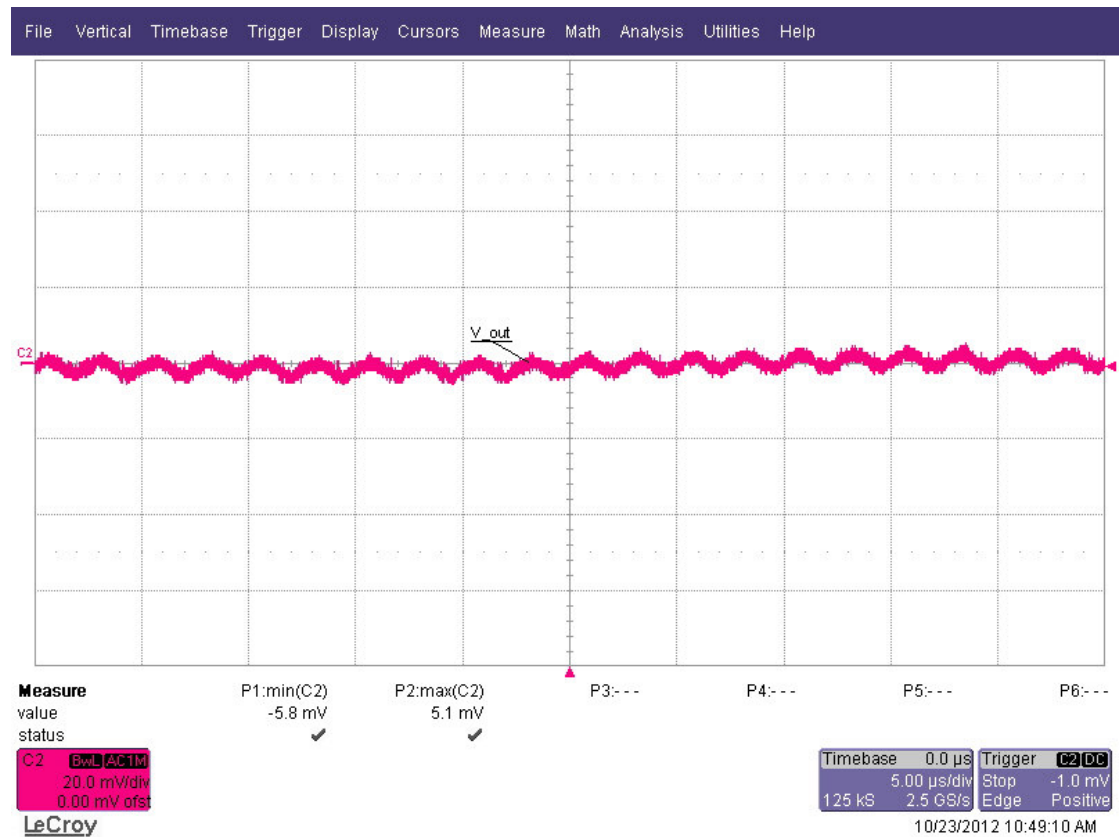


Figure 5

5 Load step

The response to a load step and a load dump at an input voltage of 12.0V is shown in Figure 6.

Channel C2: **Output voltage**, -94mV undershoot, 94mV overshoot
 200mV/div, 1ms/div, AC coupled

Channel C1: **Load current**, load step **0.15A to 0.30A** and vice versa
 200mA/div, 1ms/div

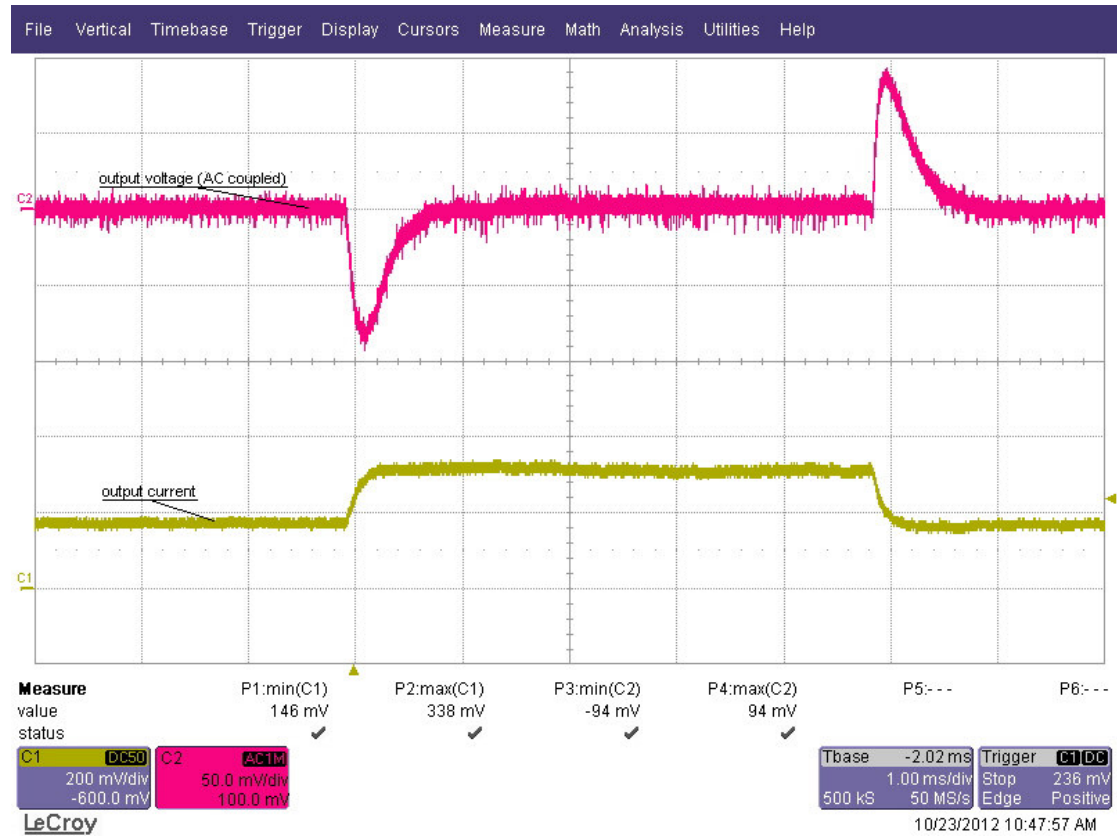


Figure 6

6 Frequency response

Figure 7 shows the loop response of the 3.3V output with 12.0V input voltage and a 0.3A load.

- 65 deg phase margin @ crossover frequency 14.1 kHz
- -21 db gain margin

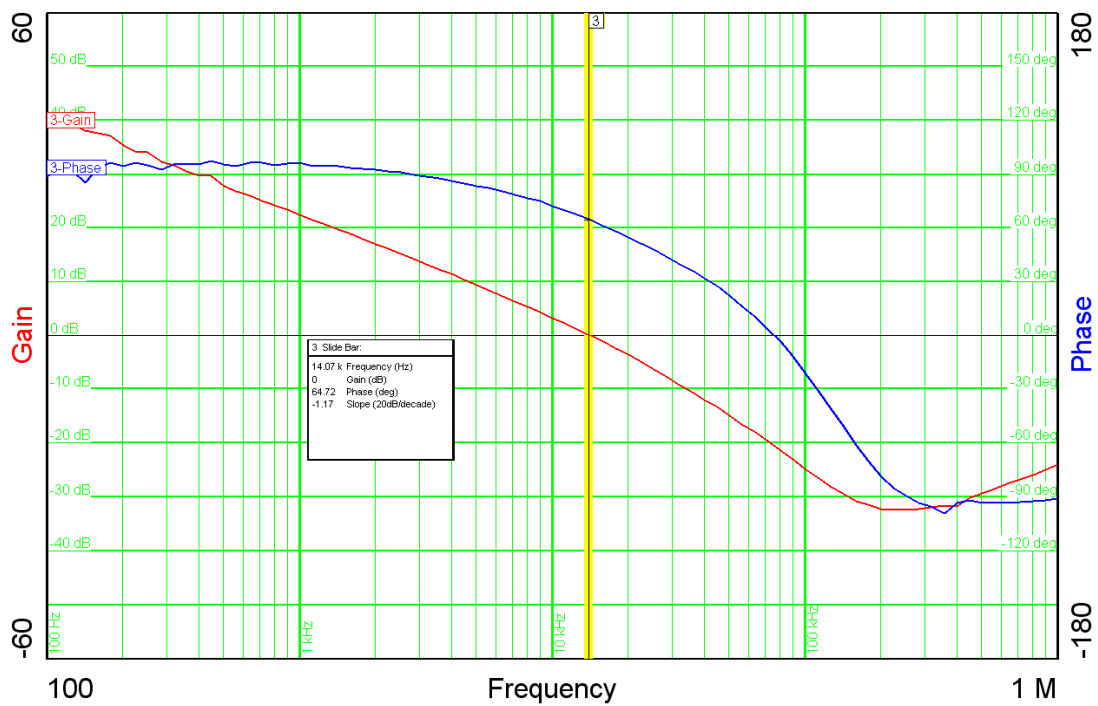


Figure 7

7 Miscellaneous waveforms

The drain-source voltage on the switching node is shown in Figure 8. The image was captured with 12.0V input and a 0.3A load.

Channel C2: **Drain-source voltage**, -1.0V minimum voltage, 12.5V maximum voltage
2V/div, 2us/div

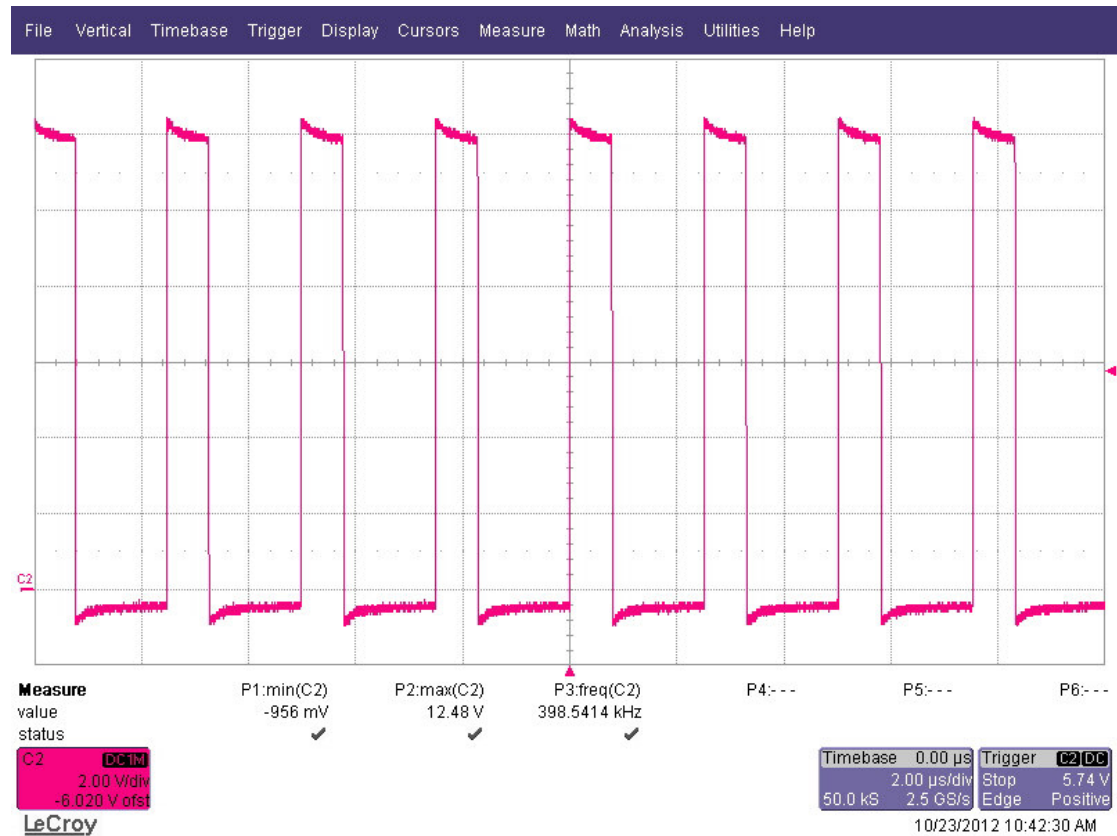


Figure 8

8 Thermal measurement

The thermal image (Figure 9) shows the circuit at an ambient temperature of 21 °C with an input voltage of 12.0V and a load of 0.3A.

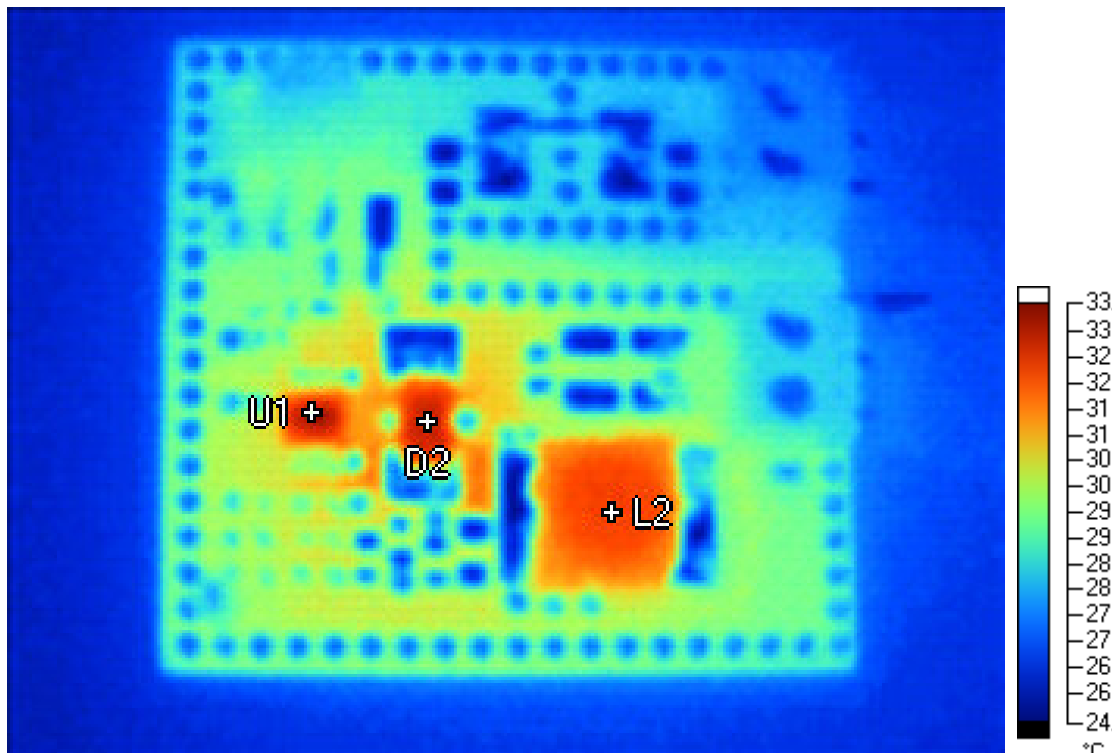


Figure 9

Markers

Label	Temperature	Emissivity	Background
U1	32.8 °C	0.95	21.0 °C
D2	32.4 °C	0.95	21.0 °C
L2	31.9 °C	0.95	21.0 °C

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