

MR16 LED replacement with TPS40211

- 5...12V DC / 12V +/-20% AC input voltage range
- 18V @ 350mA
- Built on PMP5541RevA
- **Efficiency @ 12V DC input: 88.4% (without rectifier)**

1 Startup

The startup waveform is shown in Figure 1. The input voltage is set at 12.0V AC with a electronic load on the output (18V @ 350mA).

Channel C1: **output current**
200mA/div, 10ms/div

Channel C2: **input voltage**
10V/div, 10ms/div

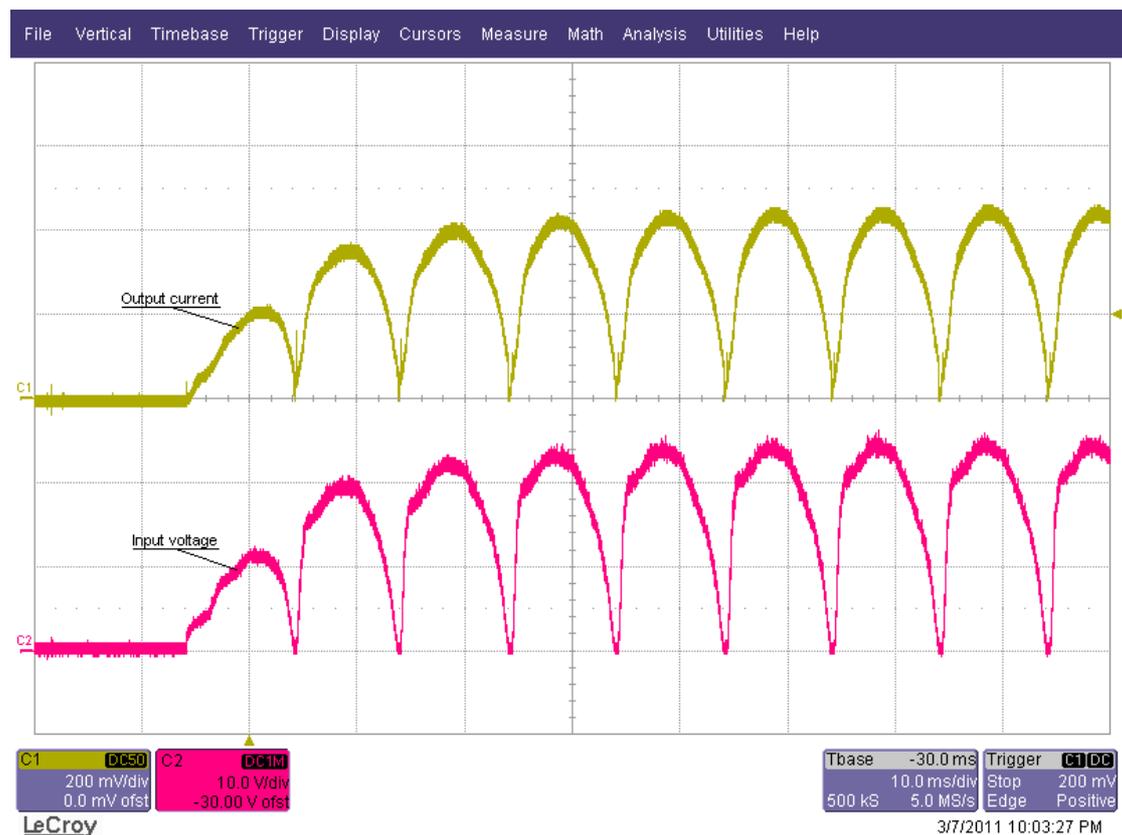


Figure 1

2 Output overvoltage protection

With no load attached on the output the output voltage is limited to approximately 40V.

Channel C2: **output voltage, 40V peak**
10V/div, 200ms/div

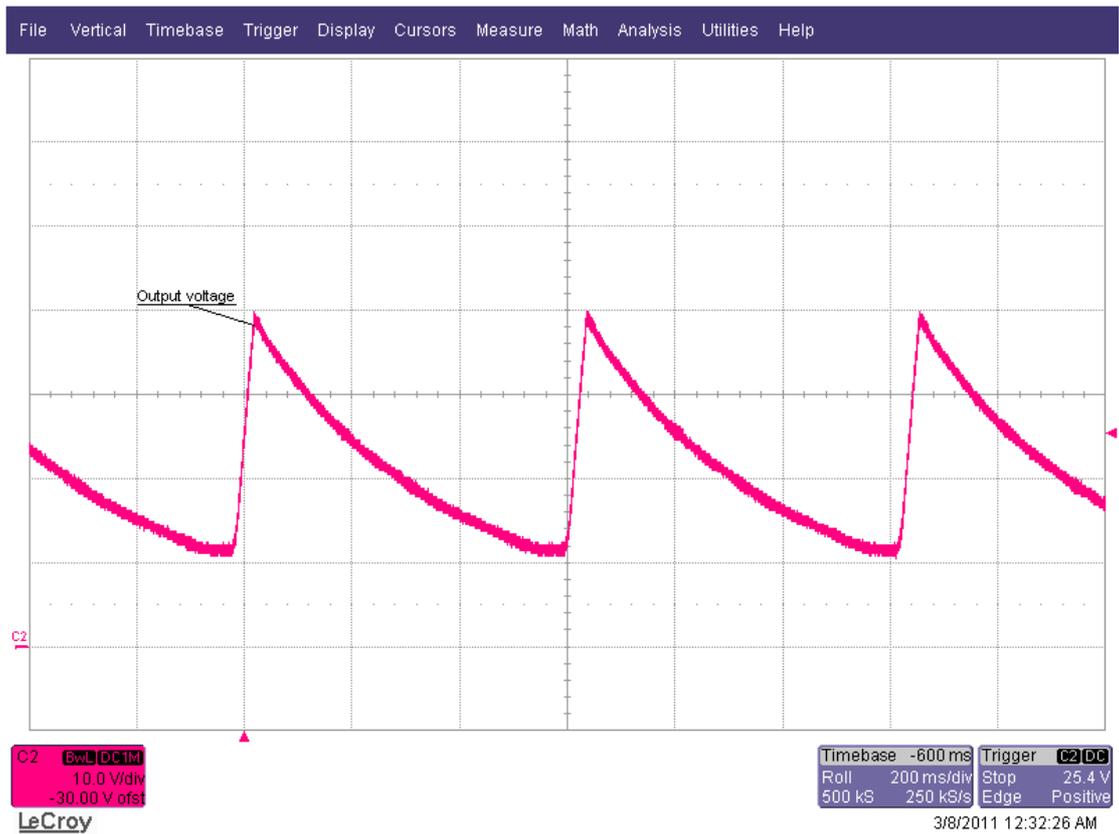


Figure 2

3 Frequency response

Figure 3 shows the loop response with 12.0 DC input and 350mA load @ 18V.

89 deg phase margin @ crossover frequency 3.5 Hz

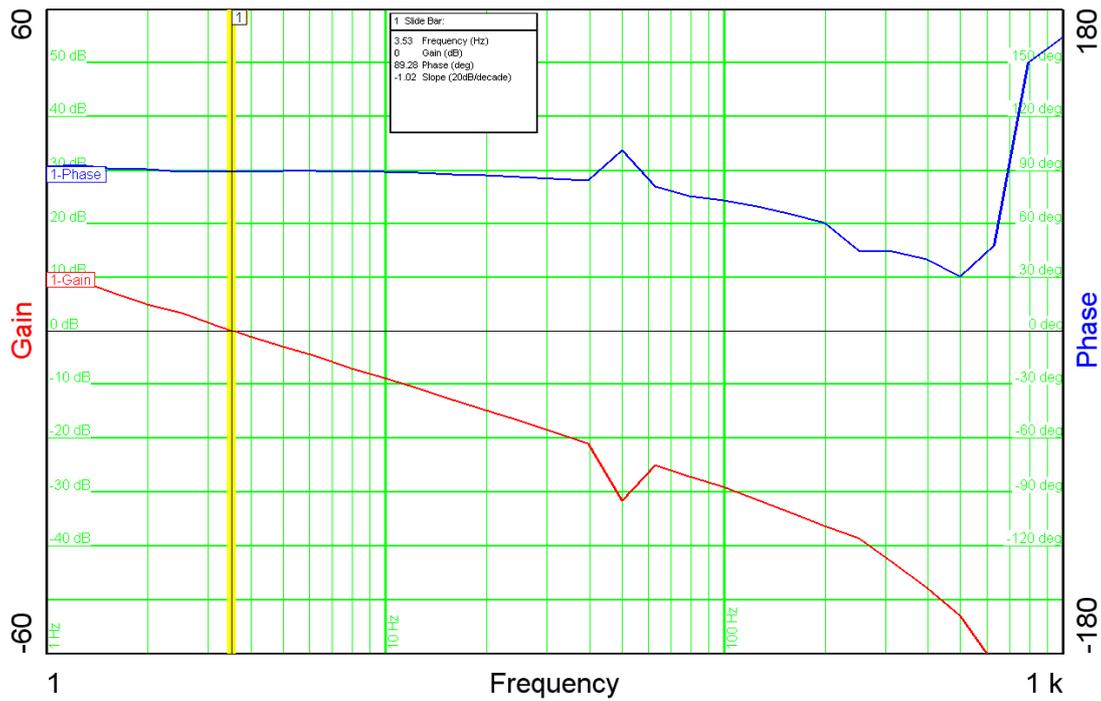


Figure 3

4 Input voltage and output current

Figure 4 shows the input voltage and the output current at normal operation.

Channel C1: **output current**
200mA/div, 5ms/div

Channel C2: **input voltage, AC coupled**
20V/div, 5ms/div

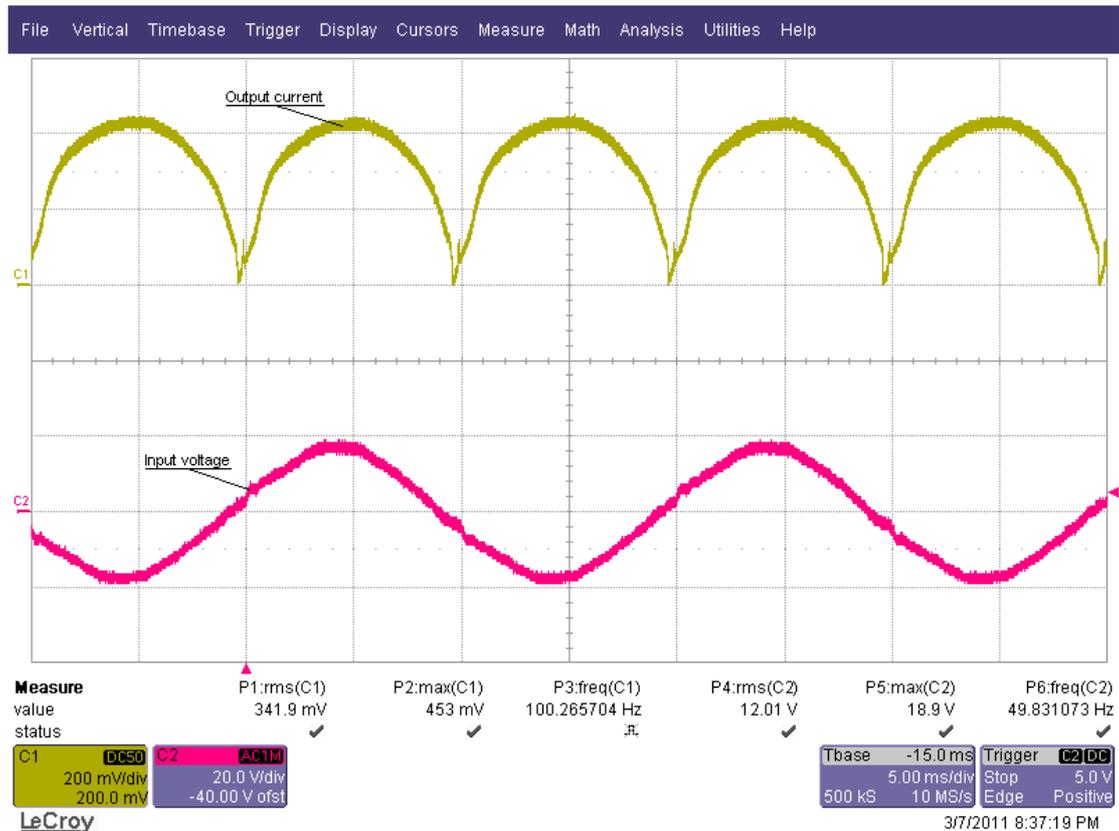


Figure 4

5 Output voltage and output current

Figure 5 shows the output voltage and the output current at normal operation.

- Channel C1: **output current**
200mA/div, 5ms/div
- Channel C2: **output voltage**
10V/div, 5ms/div

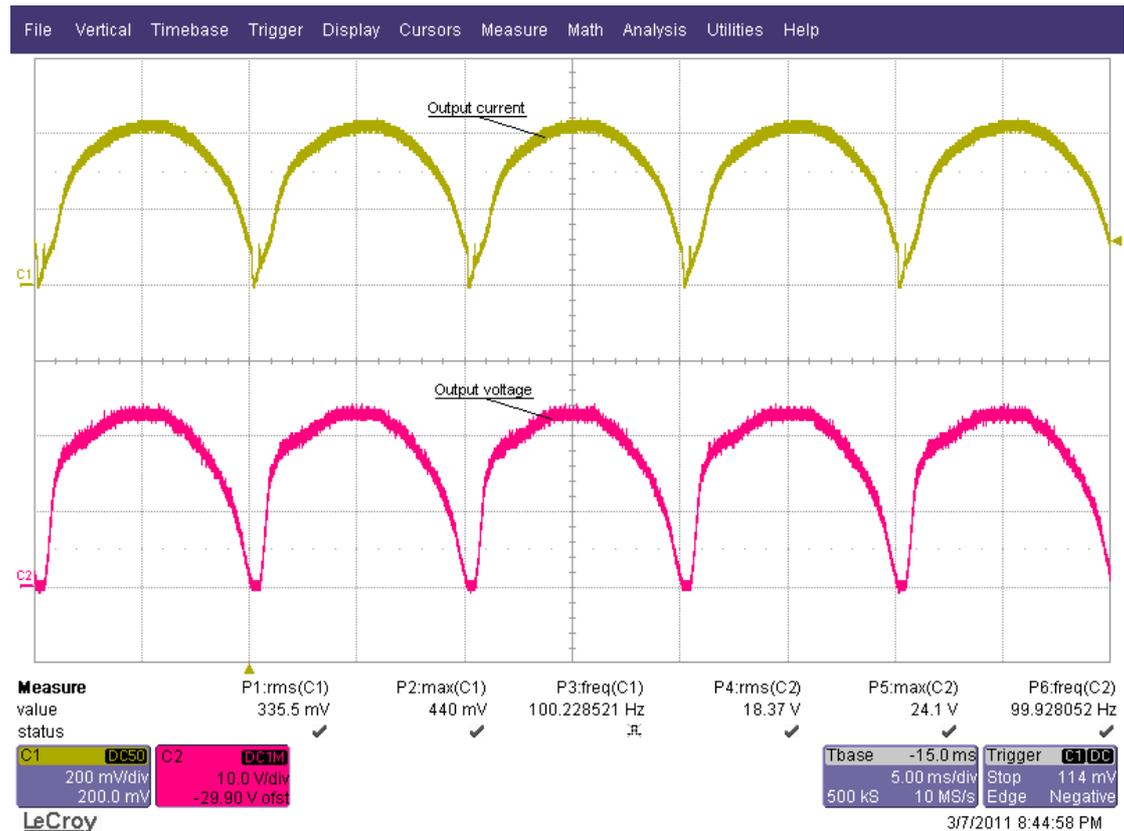


Figure 5

7 Thermal measurement

The thermal image (Figure 7) shows the circuit at an ambient temperature of 21 °C with an input voltage of 12.0V AC and an output current of 350mA @ 18V.

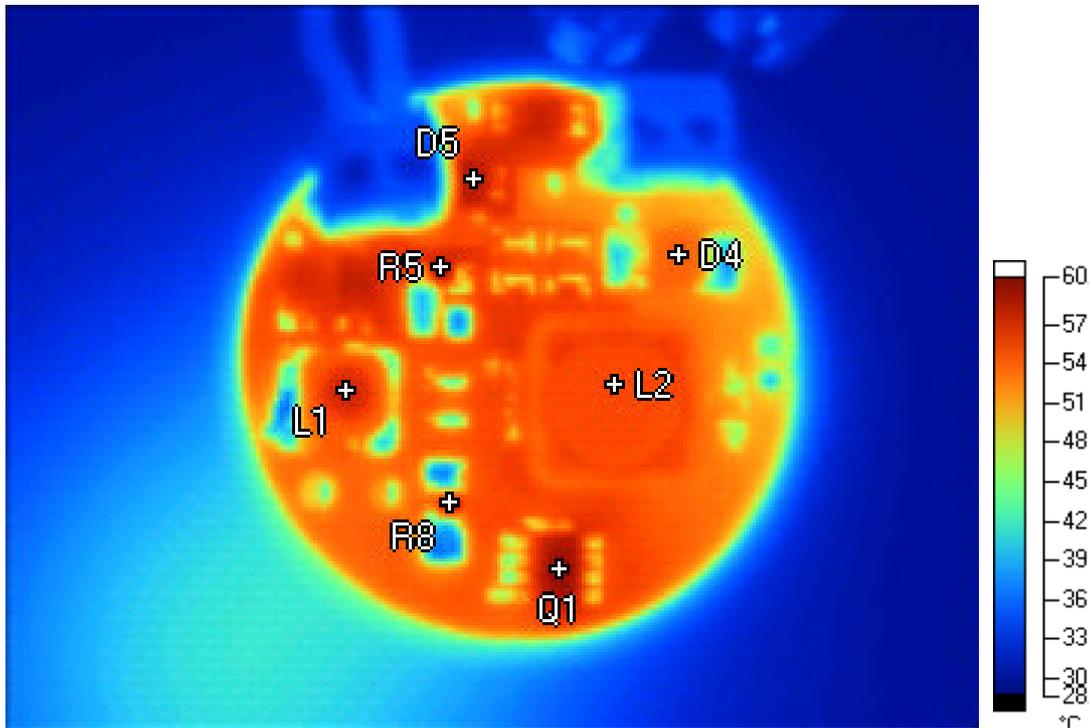


Figure 7

Markers

Label	Temperature	Emissivity	Background
Q1	60.3 °C	0.95	21.0 °C
L2	55.4 °C	0.95	21.0 °C
L1	57.4 °C	0.95	21.0 °C
D4	54.2 °C	0.95	21.0 °C
D5	58.9 °C	0.95	21.0 °C
R8	57.4 °C	0.95	21.0 °C
R5	58.7 °C	0.95	21.0 °C

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