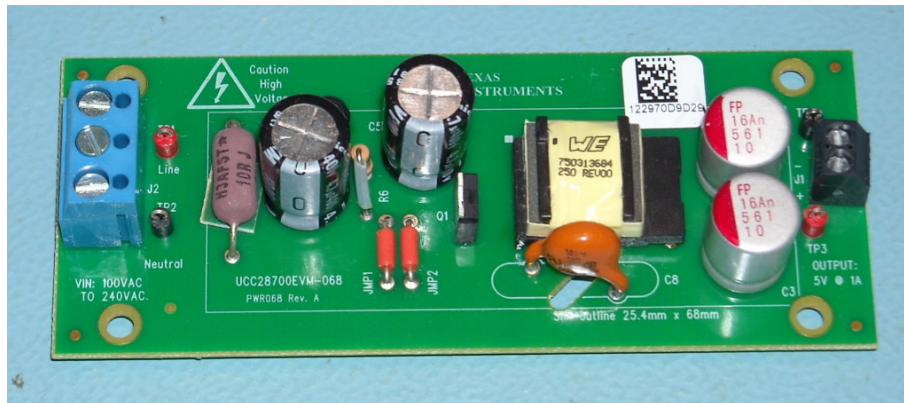


## Universal Input AC/DC Power Supply with UCC28700

- Input 85..265V AC / 120..375V DC
- Output 3.3V @ 1.5A
- Optocoupler-less with primary-side regulation
- Modified UCC28700EVM-068



## 1 Startup

The startup waveform is shown in Figure 1. The input voltage is set to 325V DC with no load on the 3.3V output.

- Channel C1: **Input Voltage**  
50V/div, 20ms/div
- Channel C2: **Output Voltage**  
1V/div, 20ms/div

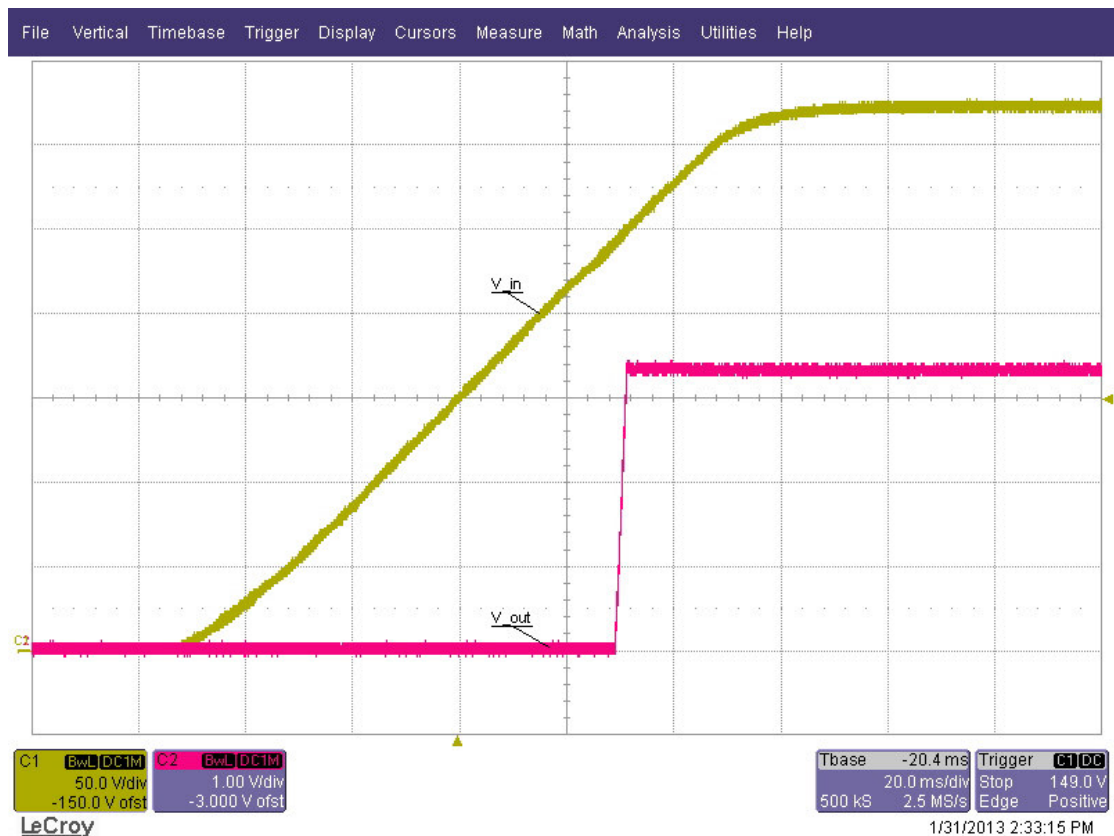


Figure 1

## 2 Shutdown

The shutdown waveform is shown in Figure 2. The input voltage is set to 325V DC with a 1.0A load on the 3.3V output.

Channel C1: **Input Voltage**  
50V/div, 200ms/div

Channel C2: **Output Voltage**  
1V/div, 200ms/div

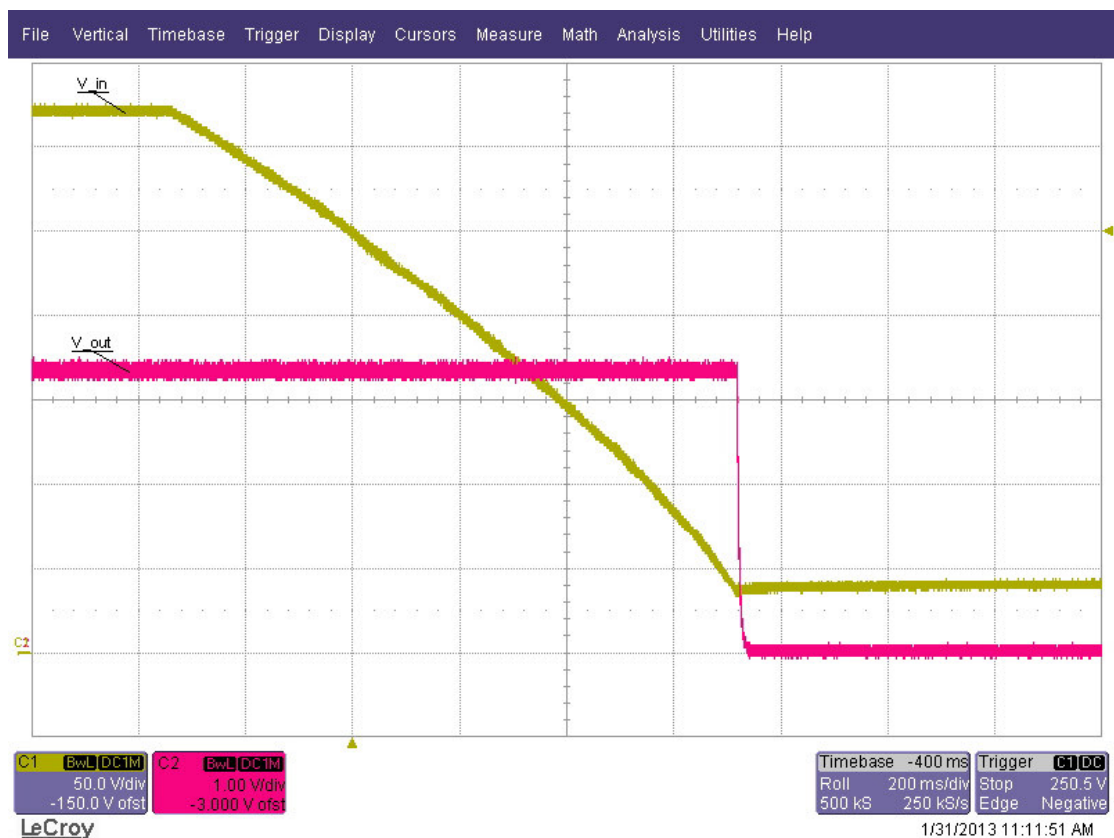


Figure 2

### 3 Efficiency

The efficiency and load regulation at 120V, 325V and 375V DC is shown in Figure 3.

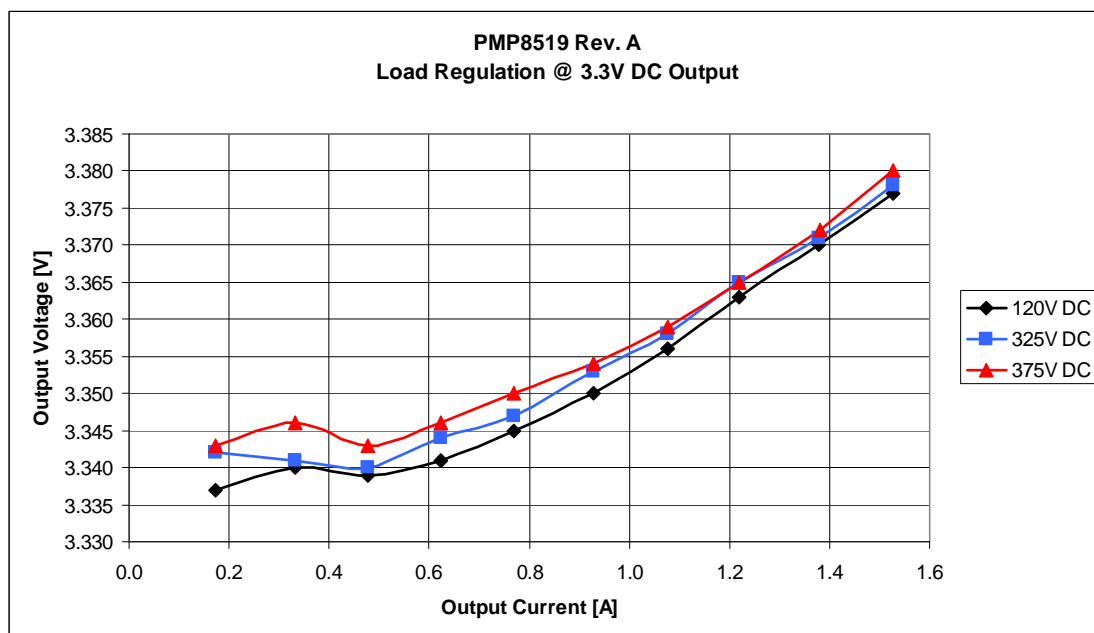
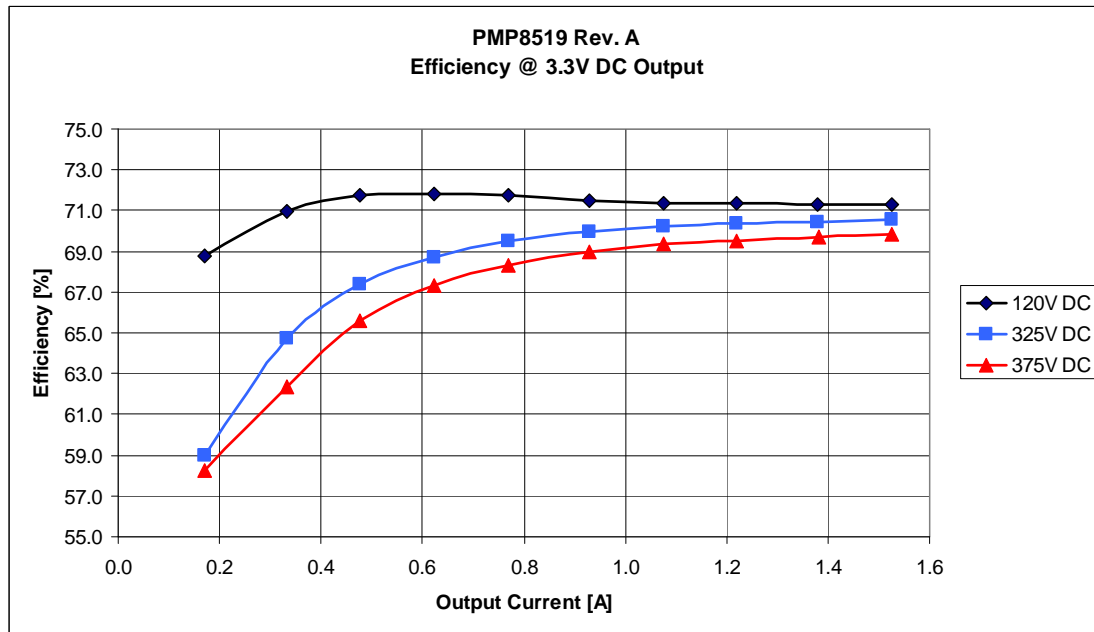


Figure 3

## 4 Output Ripple

The output voltage ripple at 120V, 325V and 375V DC are shown in Figure 4.

Channel M1: **Output Voltage, AC coupled, 120V DC, 50mV peak-peak, 200mV spikes**  
100mV/div, 5us/div

Channel M2: **Output Voltage, AC coupled, 325V DC, 50mV peak-peak, 200mV spikes**  
100mV/div, 5us/div

Channel M3: **Output Voltage, AC coupled, 120V DC, 50mV peak-peak, 200mV spikes**  
100mV/div, 5us/div

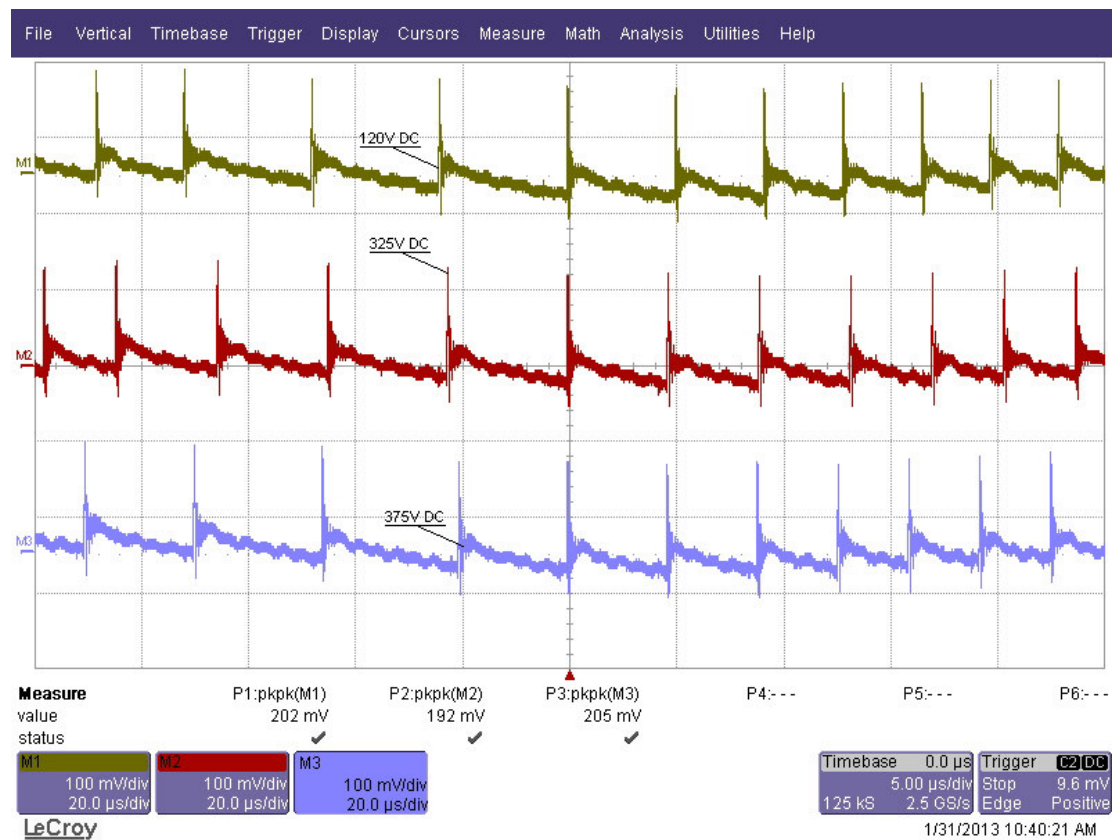


Figure 4

## 5 Load Step Response

Figure 5 shows the response to a load step from 0.75A to 1.5A and vice versa at 325V DC input.

Channel C1: **Output Current**  
1A/div, 1ms/div

Channel C2: **Output Voltage, AC coupled, -58mV min / 110mV max**  
100mV/div, 1ms/div

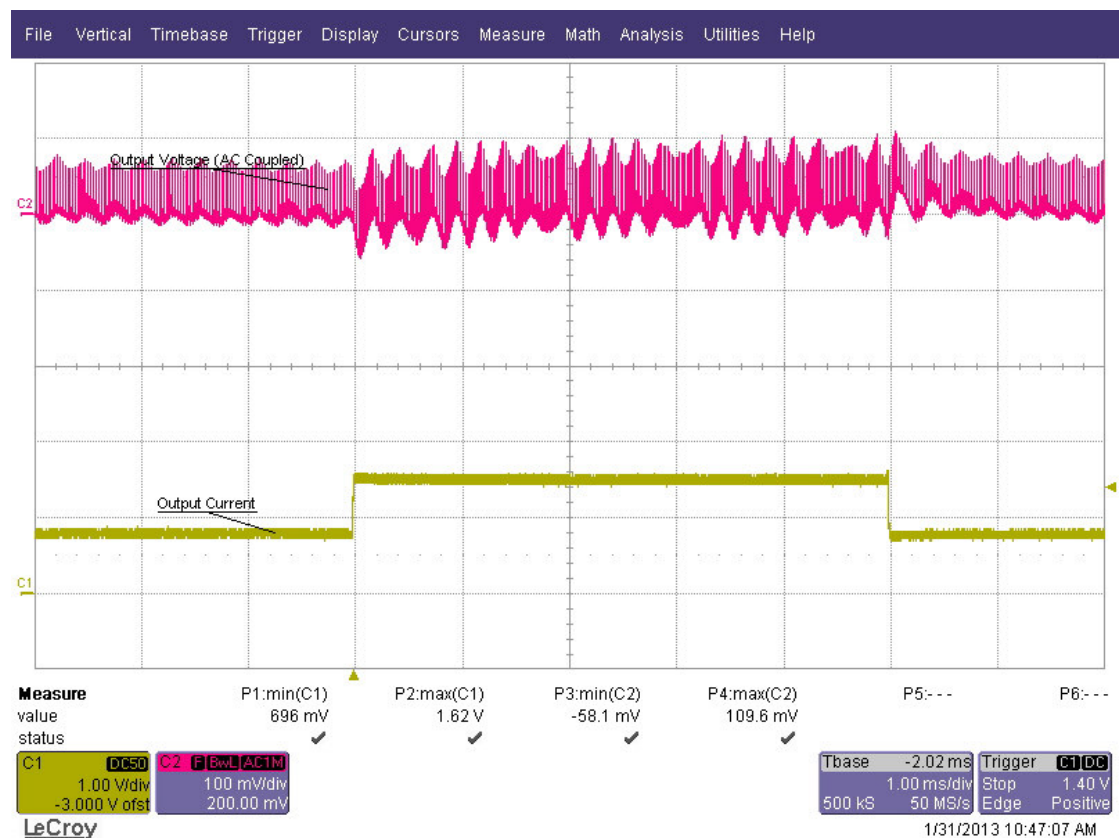


Figure 5

## 6 Switching Node

The drain-source voltage on the switching node is shown in Figure 6. The image was captured with 375V DC input and a 1.5A load on the 3.3V output.

Channel C2: **Drain-source voltage**, -17V minimum voltage, 604V maximum voltage  
100V/div, 10us/div

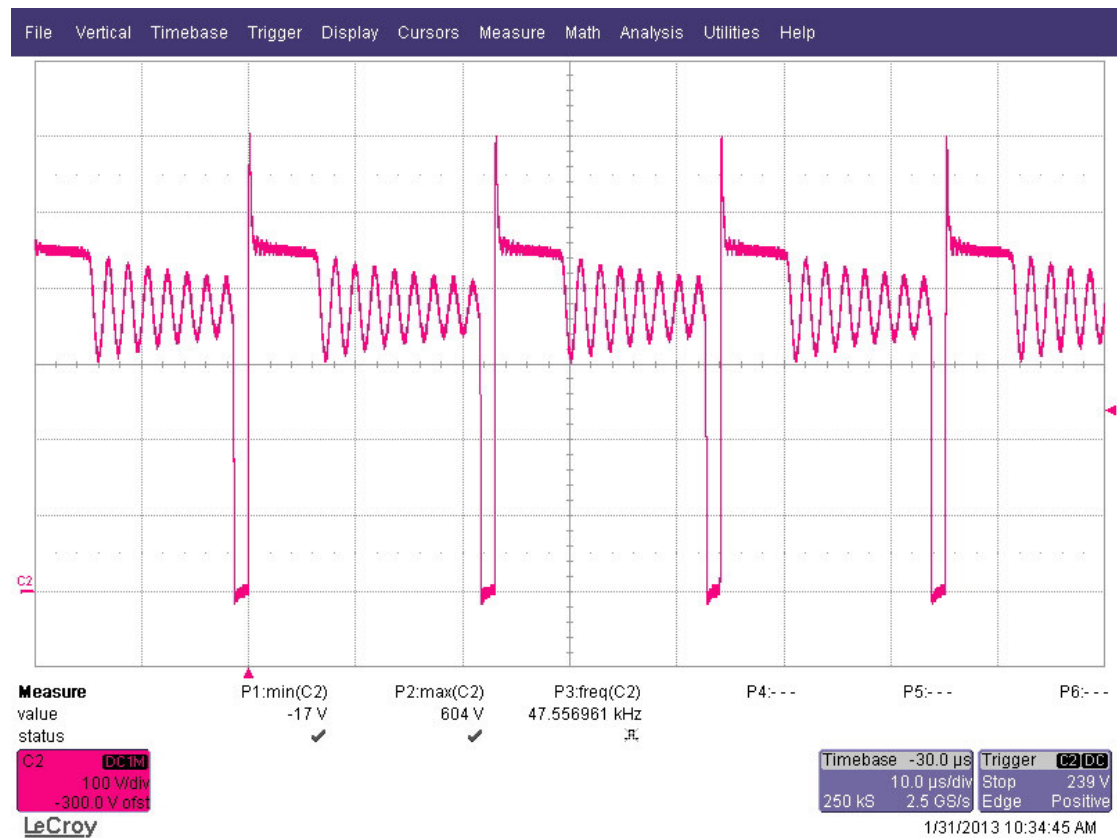
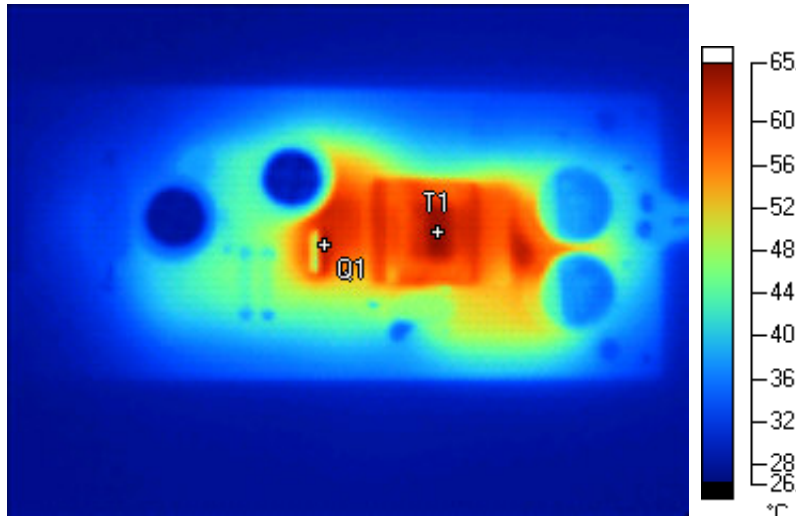


Figure 6



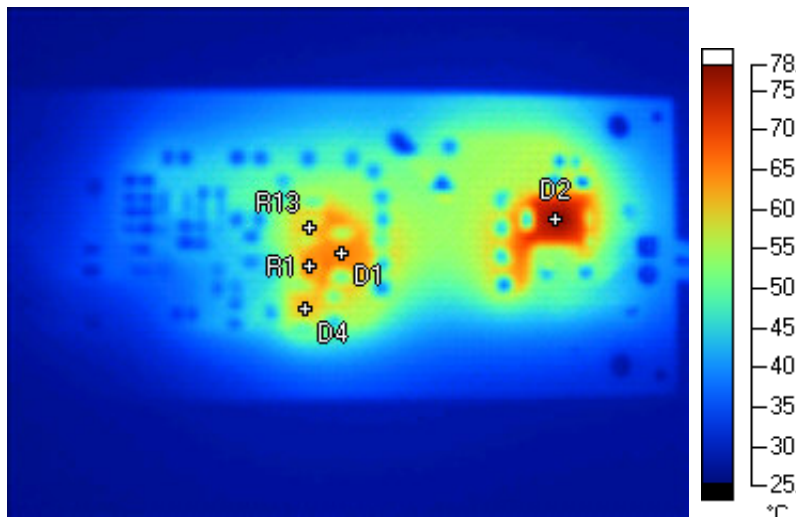
## 7 Thermal measurement

The thermal images below show the circuit at an ambient temperature of 21 °C with an input voltage of 325V and a load of 1.5A on the 3.3V output.



### Top Side

Label	Temperature	Emissivity	Background
T1	65.3 °C	0.95	21.0 °C
Q1	63.1 °C	0.95	21.0 °C



### Bottom Side

Label	Temperature	Emissivity	Background
D2	77.2 °C	0.95	21.0 °C
D1	64.7 °C	0.95	21.0 °C
D4	60.4 °C	0.95	21.0 °C
R1	67.3 °C	0.95	21.0 °C
R13	57.9 °C	0.95	21.0 °C



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