Differences Between UCC3817A/18A/19A and UCC3817/18/19

Mike O'Loughlin   *System Power*

ABSTRACT

The UCC3817A/18A/19A family of PFC controllers (UCC3817A family) is pin for pin compatible with the UCC3817/18/19 family of devices (UCC3817 family). The output stage of UCC3817A family has been updated to allow use of a smaller external gate drive resistor values. For some power supply designs where an adequately high enough gate drive resistor can not be used, the UCC3817A family offers a more robust output stage at the cost of increasing the internal gate resistances. The gate drive of the UC3817A family however remains strong at 1.2 A of peak current capability (I_{MAX}).

This paper highlights the differences in the gate drives of the two device families.

Gate Drive Changes

- The high side (sourcing) DMOS output structure used in the original UCC3817 family is replaced with a high voltage PMOS structure. A small series resistor RLS (2 Ω) has also been added to low side DMOS structure.

- The pull up resistance (R_{pullup}) on the gate drive (DRVOUT) was increased from 5 Ω to 9 Ω.

- The pull down resistance ($R_{pulldown}$) on DRVOUT was increased from 2 Ω to 4 Ω.

Effects in the Application

In a typical application it is required to use a current limiting/damping resistance for the gate drive of the MOSFET.

- This resistor needs to be sized based on the pull down resistance ($R_{pulldown}$) and the maximum gate drive current (I_{MAX}); as well as, the maximum VCC voltage (VCC).

$$R_{GATE} = \frac{VCC - \left(I_{MAX} \times R_{pulldown}\right)}{I_{MAX}} \tag{1}$$

- In the case of the UCC3817A with a maximum VCC voltage of 18 V this would require a resistance of roughly 11 Ω.

- This 11-Ω resistor would limit the source current to roughly 900 mA and the sink current to roughly 1.2 A.

- In comparison, R_{GATE} for the UCC3817 device in this application would be roughly 18 Ω.

Summary

The changes in gate drive circuitry have little effect in a typical application except allowing the designer to decrease the size of the gate drive resistor. The equation above for selecting a gate drive resistor is only for the UCC3817A family of devices. When selecting the gate drive resistor for the standard UCC3817 family please use the resistor selection graph that is published in the UCC3817/UCC3818 data sheet.

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