Texas Instruments

AC Requirements for Power Factor Correction Circuits

Technology Brief

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ABSTRACT

This technical brief identifies the recommended range of I_{AC} for each of the devices within the UCC3854 family of PFC controllers.

The family of UC3854, UC3854A/B, and UC3855A/B power factor correction controllers use three parameters to control the power drawn from the AC power lines; the output voltage of the converter, the input RMS voltage, and the instantaneous input voltage as represented by the instantaneous current into the control chip (I_{AC}). These inputs generate a current at the output of the arithmetic (multiplier) unit that represents the desired input current.

There are many documents describing these devices written by several different authors but because the designers/authors do not use the same criteria for selecting the I_{AC} levels, there is some level of confusion. For example, the design of the UC3854A multiplier is optimized for a peak I_{AC} of 250 μA, but in order to get a better signal to noise ratio, it is sometimes desireable to increase the current as high as 500 μA.

The values listed in Table 1 are intended to clear up any confusion and has been expanded to included other PFC controllers including some soon-to-be-released devices.

Table 1. Recommended Device Family Current Settings

DEVICE FAMILY	MINIMUM I_{AC} (μA) AT MAXIMUM V_{IN}	MAXIMUM I_{AC} (μA) AT MAXIMUM V_{IN}	"NOT TO EXCEED" LEVEL (μA)
UC3854	250	500	750
UC3854A/B	250	500	750
UC3855A/B	250	500	700
UCC3817/18/19	250	500	700
UCC38500/1/2/3	250	500	700
UC3853	250	500	750
UCC38510–517	250	500	750

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