C2173 Datasheet

Primary Side Sensing SMPS Controller

KEY FEATURES AND ADVANTAGES

C2173
SOT23-6

- Advanced primary sensing control circuitry achieves accurate voltage and current (CV and CC) regulation
- Bipolar junction transistor (BJT) primary switch enables ultra low BOM cost design solutions
- Fast start-up performance without additional active components for low BOM cost
- Adaptive base and emitter switching extends RBSOA
- Less than 30 mW no-load power with less than one second turn-on delay and class leading load-transient performance
- Output transient detection (TD) function for very low no-load power applications
- Optimised PWM/PFM with quasi resonant switching enables efficiency standards compliance with margin
- Frequency dithering algorithm allows EMI compliance with margin
- Enables fully compliant solutions for “MoU” universal USB chargers
    - Optimised control of the primary switch drive for low EMI and compliance to EN 301 489-34
    - Inherently low ripple and low EMI enable compliance with the interoperability standard, IEC 62684
- Full featured protection includes
    - Single fault
    - Output over-voltage and short-circuit
    - Input under-voltage
- Convenient SOT23-6 surface mount package for small size and low cost manufacture

APPLICATIONS

Universal input mobile phones chargers typically to 8 W, including “universal” USB and all major OEM specifications.

Universal input adapters and standby/auxiliary power supplies typically to 8 W.

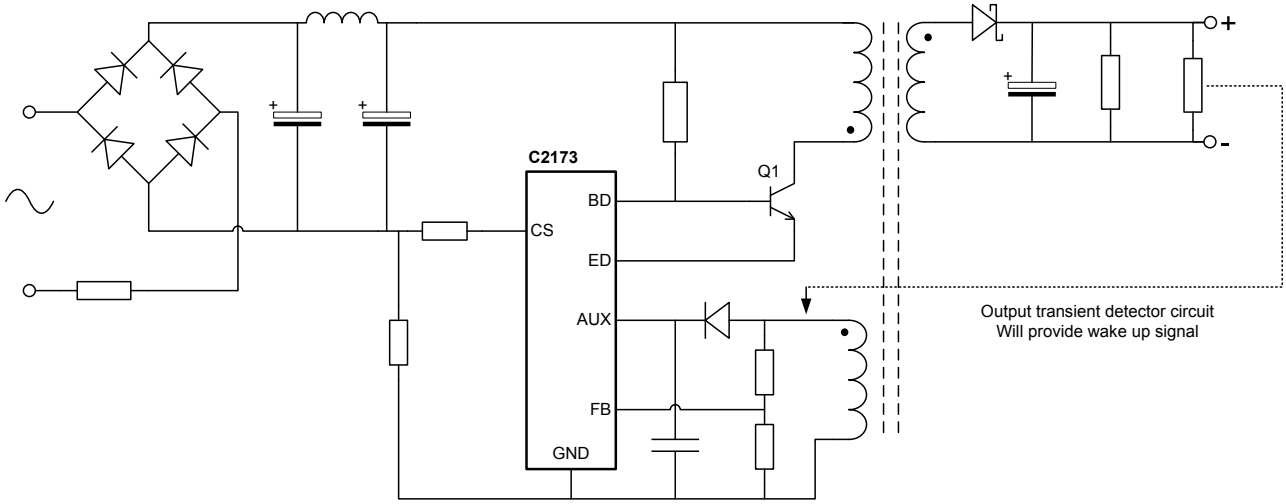


Figure 1: Typical Charger Application Circuit with C2173

BLOCK DIAGRAM

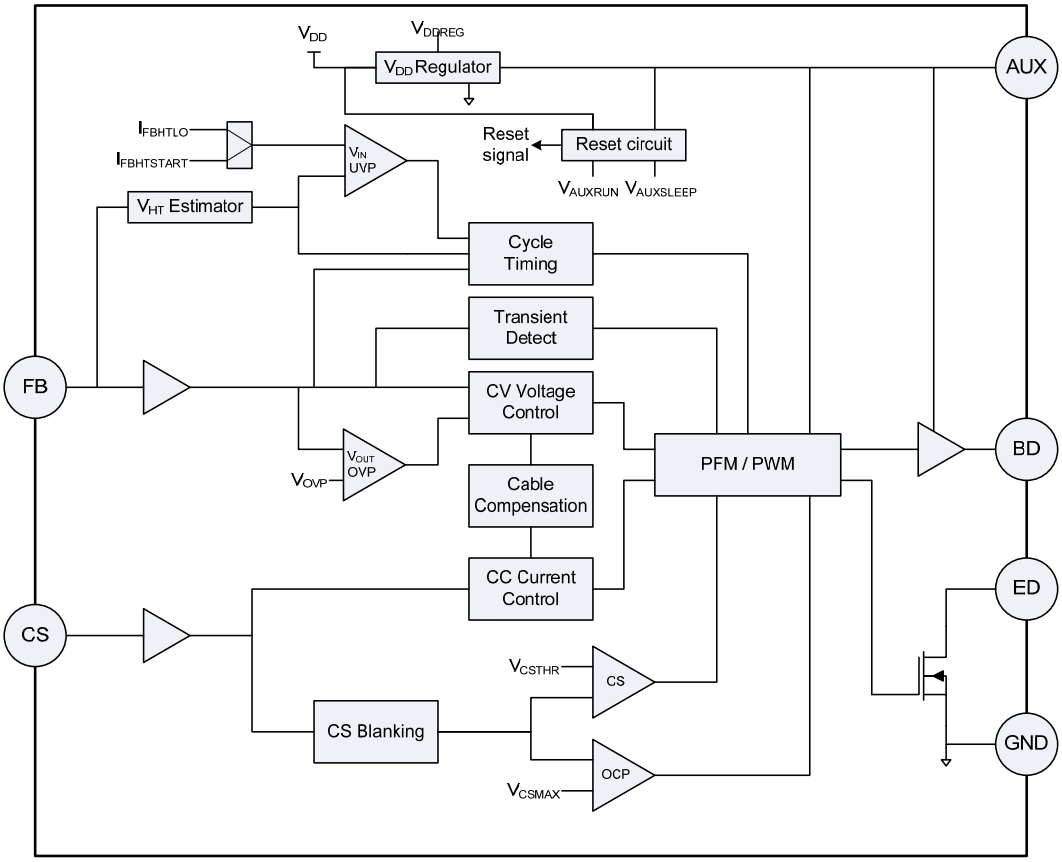


Figure 2: C2173 Block Diagram

PIN DEFINITIONS

AUX During Run mode, power derived from the transformer auxiliary winding is fed to the control circuitry via the AUX pin.

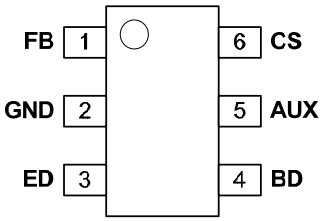
BD Base drive for BJT.

ED Emitter drive for BJT.

FB The FB input provides feedback to the control circuitry by monitoring the transformer voltage waveform, and is the input for the transient detect signal.

GND Power and signal ground.

CS Primary current sense, via Rcs.



TYPICAL APPLICATION

Parameter	Symbol	Range or Value	Units	Comment
Supply voltage	V_{IN}	90 - 264	Vac	Universal mains
Output voltage	V_{OUTCV}	5 ± 5%	V	Constant voltage (CV) mode, at the load
Output current	I_{OUTCC}	1.6 +10%	A	Constant current (CC) mode
Switching frequency at full load	f_{MAX}	65	kHz	Determined by the chosen variant
Cable compensation	G_{CAB}	4	%	Determined by the chosen variant
No-load power	P_{NL}	< 30	mW	Without transient detect circuit
Average efficiency	η	> 81	%	Energy Star test method
Turn-on delay	T_{ON}	< 1	s	
Undershoot voltage	$V_{UNDERSHT}$	> 4	V	Load step from 0 to full load

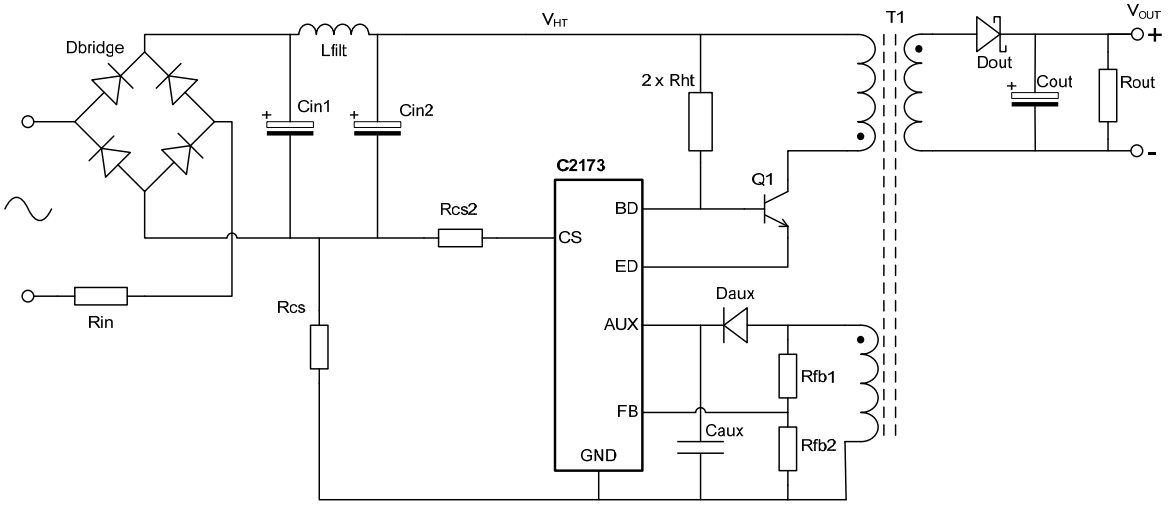


Figure 3: Typical Universal Input, 8 W Charger

By sensing the primary-side waveforms of transformer voltage and primary current, the C2173 achieves constant voltage and constant current output within tight limits without the need for any secondary-side sensing components. Figure 4 shows the output characteristics of a typical charger implementation.

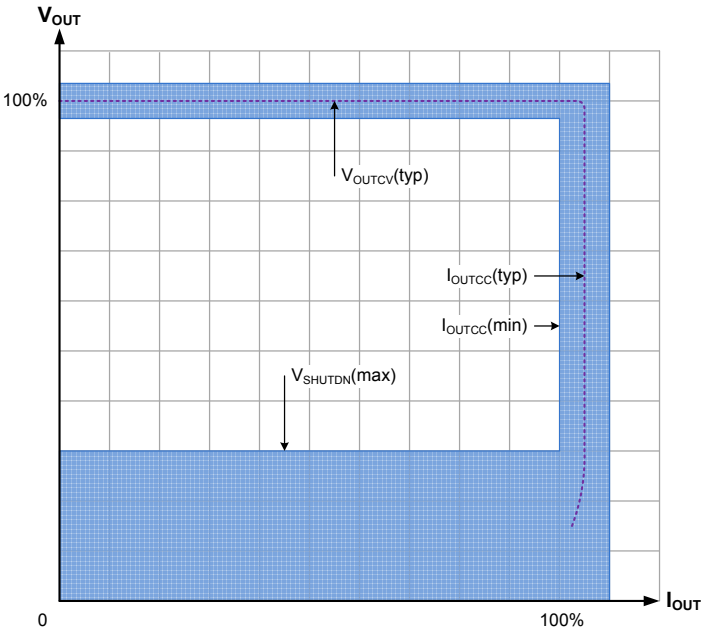


Figure 4: Typical CV/CC output characteristic achieved using C2173

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