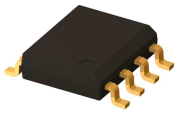
C5183 Datasheet

Primary Sensing Controller with Active Start-Up for Media Tablet Chargers

KEY FEATURES AND ADVANTAGES



C5183
SOP-8

- Advanced primary sensing control circuitry achieves accurate voltage and current (CV and CC) regulation without an opto-coupler
- Integrated start-up device enables application designs with
  - Very fast start-up
  - No-load power < 30 mW
  - Low component count
- Optimised PWM/PFM with quasi-resonant switching enables efficiency standards compliance with margin
- Enables fully compliant solutions for “MoU” universal USB chargers
  - Switching frequency dither and edge rate control of primary switch gate drive ease design for low EMI and compliance to EN 301 489-34 with margin
  - Inherently low ripple and low EMI enable compliance with the interoperability standard, IEC 62684
- Best in class load-transient performance *and* no-load power less than 30 mW for five-star chargers
- Full featured protection includes
  - Single fault and over-temperature
  - Output over-voltage and short-circuit
  - Input over-voltage and under-voltage
- Convenient surface mount SOP-8 package for small size and low cost manufacture

APPLICATIONS

C5183 is aimed at universal input USB chargers up to 18 W for media tablets and similar applications.

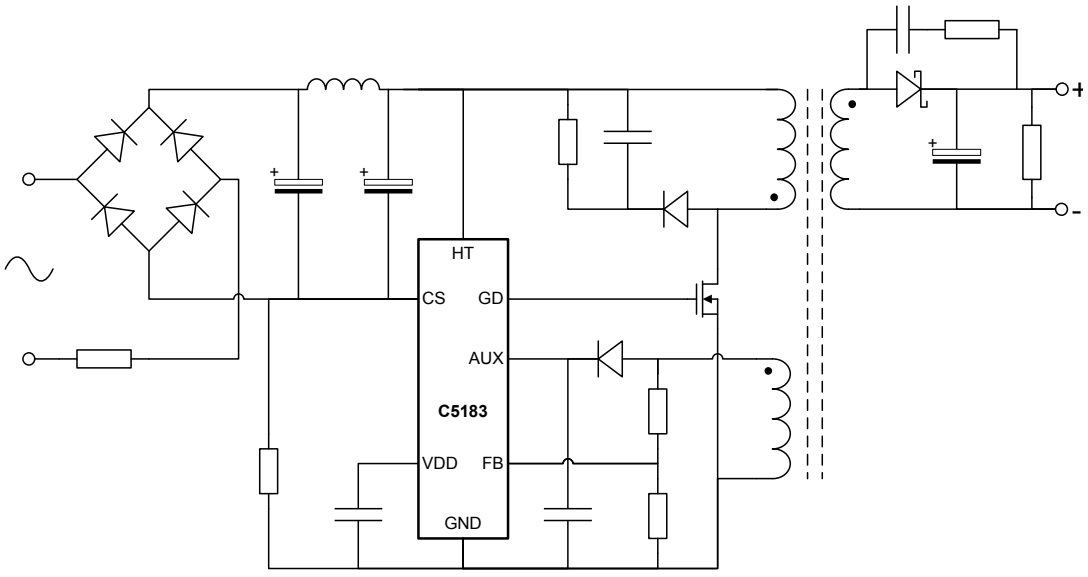


Figure 1: Typical Application Circuit

BLOCK DIAGRAM

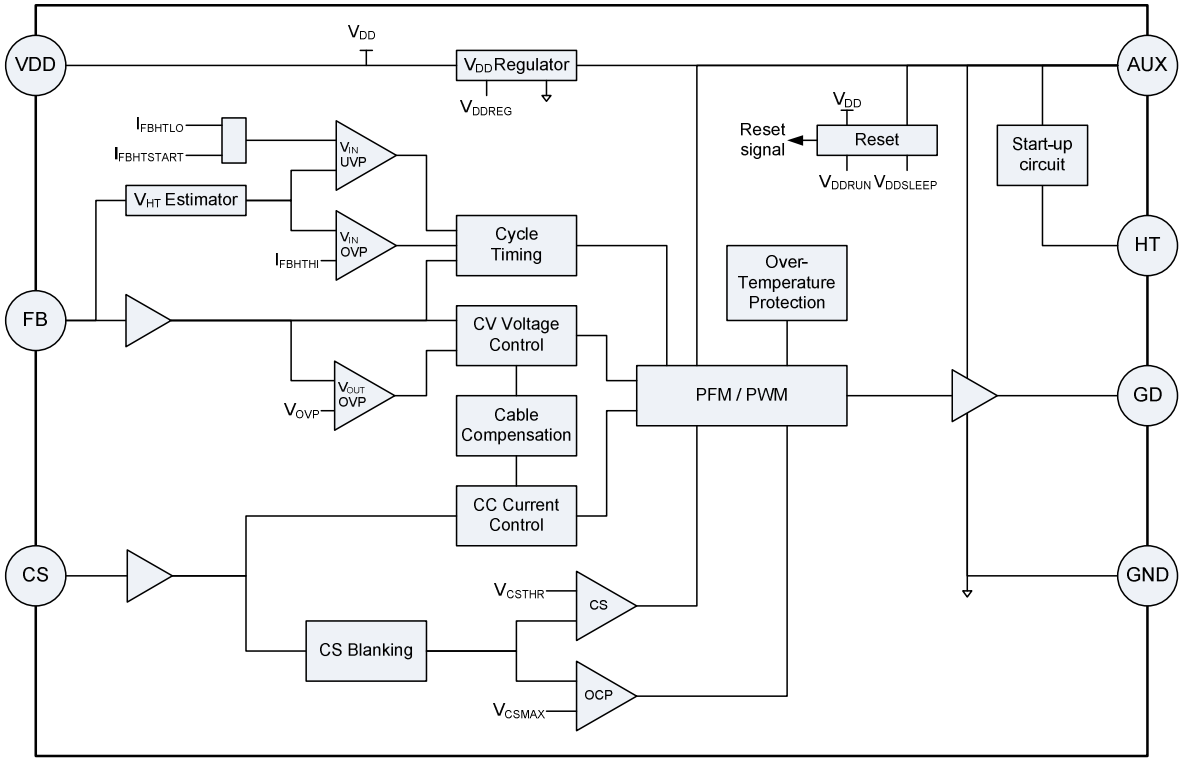


Figure 2: C5183 Block Diagram

PIN DEFINITIONS

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

GD Gate drive for an external MOSFET.

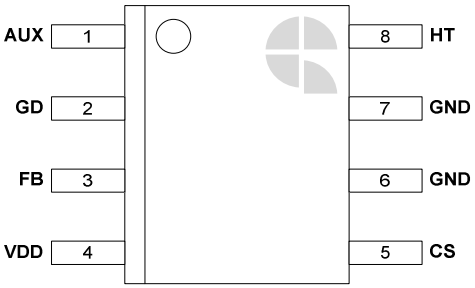
FB The FB input provides feedback to the control circuitry by monitoring the transformer voltage waveform.

VDD Connection for capacitive decoupling of the C5183 internal power supply.

CS Primary current sense, via Rcs (see Figure 1).

GND Power and signal ground.

HT Connection to V_{HT} (rectified mains input) for the start-up device.



SOP-8

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 mode, at the load
Output current	I_{OUTCC}	2.0 – 2.3	A	Constant current mode
Transformer	T1	EPC17	-	
Switching frequency at full load	f_{MAX}	80	kHz	Fixed by the C5183
Output ripple	V_{RIPPLE}	60	mV	Peak to peak, switching frequency
Output cable resistance	R_{CAB}	0.2	Ω	Typical of a 1 m, 26 AWG output cable
Cable compensation	G_{CAB}	8.0	%	Fixed by the C5183
No-load power	P_{NL}	25	mW	
Average efficiency	η	> 75	%	Energy Star test method (minimum is 68.2%)
Start-up delay	T_{ON}	< 0.3	s	Enabled by active start-up device
Undershoot voltage	$V_{UNDERSHT}$	> 4.3	V	Load step from 0 to 0.5 A

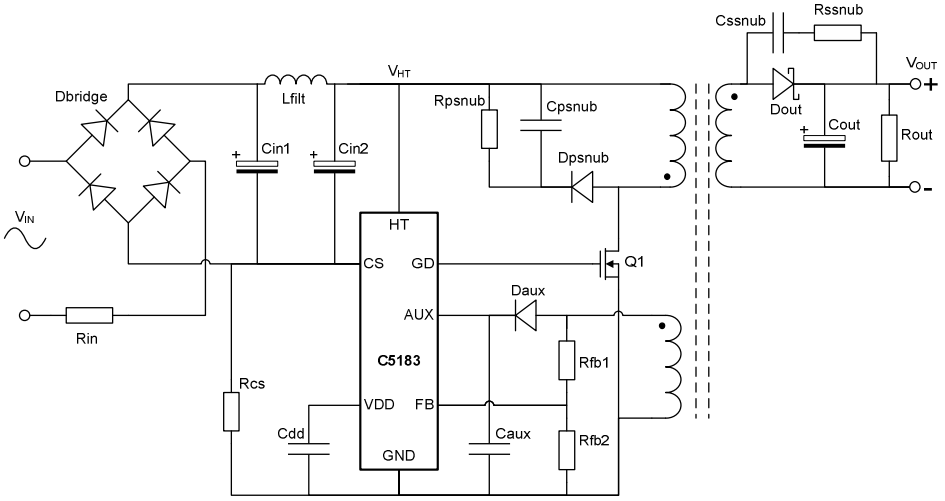


Figure 3: Typical Universal Input 10 W, Five Star Media Tablet USB Charger

By sensing the primary-side waveforms of transformer voltage and primary current, the C5183 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 implemented with the C5183.

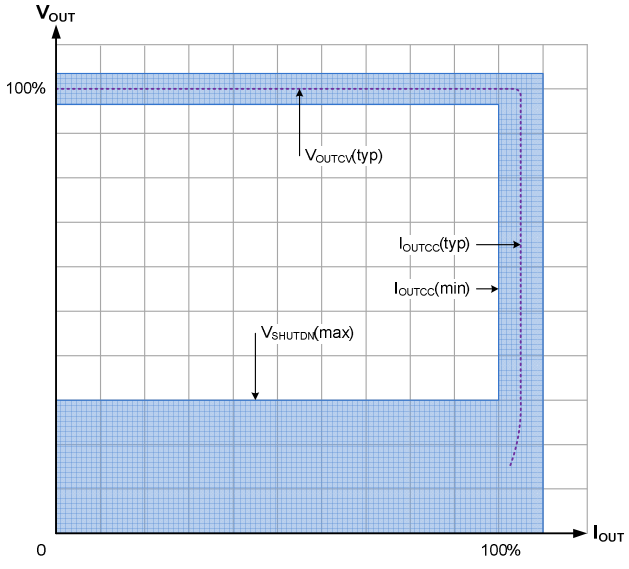


Figure 4: Typical CV/CC Output Characteristic Achieved Using C5183

DATASHEET STATUS

The status of this Datasheet is shown in the footer.

Datasheet Status	Product Status	Nature of Datasheet Content
Product preview	In definition and design	Target specifications for design and development of the described product.
Preliminary	In prototyping and pre-qualification	Preliminary specifications of functionality and performance which are supported by results from testing of initial prototypes.
Pre-production	In pre-production and qualification	Specifications of functionality and performance which are supported by results from testing of pre-production units.
Product data	In production	Specifications relating to functionality and performance which are supported by results from testing of pre-production and production units.

CONTACT DETAILS

Cambridge Semiconductor Ltd
St Andrew's House
St Andrew's Road
Cambridge
CB4 1DL
United Kingdom

Phone: +44 (0)1223 446450
Fax: +44 (0)1223 446451
Email: sales.enquiries@camsemi.com
Web: www.camsemi.com

DISCLAIMER