Low-Cost, 3A, 4.5V to 24V Input, 360kHz, PWM Step-Down Synchronous Rectified DC-DC Regulator

■ General Description

The OCP2183 is a low-cost, synchronous DC-DC converter with internal switches delivers an output current up to 3A. The OCP2183 operates from an input voltage of 4.5V to 24V and provides an adjustable output voltage from 0.920V to 20V, set with two external resistors. The OCP2183 is idea for distributed power systems, pre-regulation, set-top boxes, television, and other consumer application.

The OCP2183 features a peak-current-mode PWM controller with internally fixed 390kHz switching frequency and a 90% maximum duty cycle. The current-mode control architecture simplifies compensation design, and ensures a cycle-by-cycle current limit and fast response to line and load transients.

This synchronous buck regulator features internal MOSFETs that provide better efficiency than asynchronous solutions, while simplifying the design relative to discrete controller solutions. In addition to simplifying the design, the integrated MOSFETs minimize EMI, reduce board space, and provide higher reliability by minimizing the number of external components.

Fault protection includes cycle-by-cycle current limit, input UVLO, output over voltage protection and thermal shutdown. Besides, adjustable soft-start function prevents inrush current at turn-on. This device uses current mode control scheme that provides fast transient response. In shutdown mode, the supply current is about 1uA.

The OCP2183 is available in an SOP8L-EP package, and it is RoHS compliant. It provides a very compact system solution and good thermal conductance, with minimum number of readily available standard external components. Operating temperature range of the OCP2183 is from -40°C to 85°C.

■ Features

- Wide Supply Voltage Range: 4.5V ~ 24V
- Up to 3A of Continuous Output Current
- Adjustable Output Voltage Range from 0.920V to 20V
- Current Mode Control
- Integrated 85mΩ Power MOS Switches
- Fixed 390kHz Switching Frequency
- Up to 95% Efficiency
- Programmable Soft-Start
- Stable with Low-ESR Ceramic Output Capacitors
- Safe Startup into Pre-biased Output
- Fully Protected Against OCP, OVP and OTP
- Cycle-By-Cycle Over-current Protection
- Input Under-voltage Lock-out
- Output Over-Voltage Protection
- Short Circuit Frequency 130KHz
- Low Standby current
- T_A= -40 ~ 85 ℃
- Available in SOP-8L-EP Package
- RoHS Compliant and Pb-free

■ Applications

- Industrial and Commercial Low Power Systems
- LCD Monitors and TVs
- Green Electronics/applications
- Notebook Computers
- Point of load regulation of high-performance DSP, FPGAs and ASICs
- Set Top Boxes
- DVD, LCD Displays
- Distributed Power System
- Datacom, XDSL
- Consumer Products

■ Pin Configuration

SOP-8L-EP (Top View)

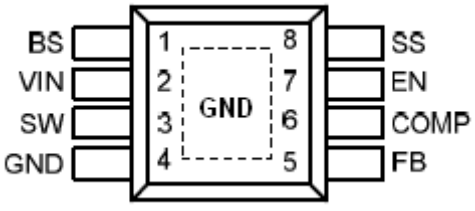


Figure 1, Pin Assignments of OCP2183

Pin Name	Pin No. SOP8L-EP	I/O	Pin Function
BS	1	I/O	High-side MOSFET Drive Supply. Bypass BS to SW with a 10nF or greater capacitor to power the high side switch.
VIN	2	P	Input Power. Input supply range is from 4.5V to 24V. About the bypass capacitor, see *Input Capacitor.*
SW	3	O	Power Switching Output. SW is the switching node that supplies power to the output. Connect the output LC filter from SW to the output load. Note that a capacitor is required from SW to BS to power the high-side switch. SW is high impedance when the IC is in shut-down mode, thermal shutdown mode, or VIN is below the UVLO threshold.
GND	4, 9 (EP)	P	Ground (Connect the exposed pad to Pin 4)
FB	5	I	Feedback Input. FB senses the output voltage and regulates it. Drive FB with a resistive voltage divider connected to it from the output voltage. The feedback threshold is 0.920V typically. See *Setting the Output Voltage*. When the FB pin voltage exceeds 20% of the nominal regulation value of 0.920V, the over voltage comparator is tripped and the COMP pin and the SS pin are discharged to GND, forcing the high-side switch off.
COMP	6	O	Compensation Node, Voltage Error-Amplifier Output. COMP is used to compensate the regulation control loop. Connect a series RC network from COMP to GND. In some cases, an additional capacitor from COMP to GND is required. See *Compensation Components.*
EN	7	I	Enable Input. A logic high enable the converter, a logic low forces the converter into shutdown mode reducing the supply current to less than 3uA. For automatic startup, connect this pin to VIN with a 100kΩ pull up resistor.
SS	8	I	Soft-Start Control Input. SS controls the soft-start period. Connect a capacitor from SS to GND to set the soft-start period. A 0.1μF capacitor sets the soft-start period to 15ms. To disable the soft-start feature, leave SS unconnected.

■ Typical Application Circuit

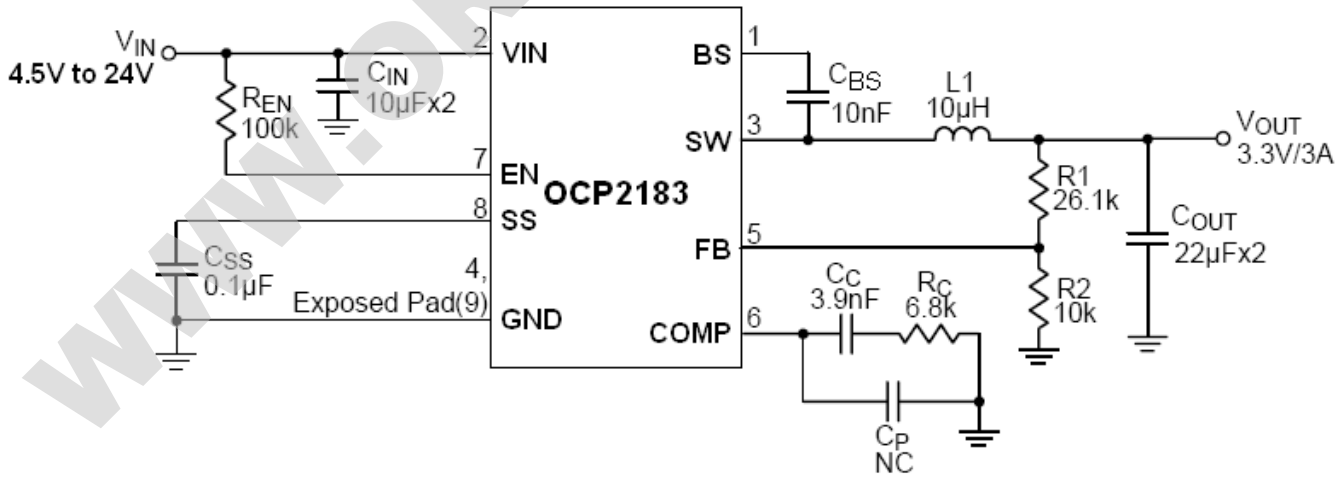
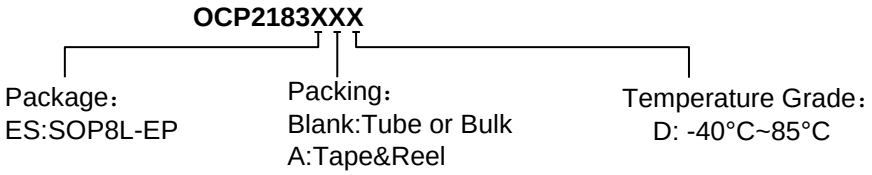


Figure 2, Typical Application Circuit of OCP2183

■ Ordering Information



Part Number	Package Type	Package Qty	Temperature	Eco Plan	Lead
OCP2183ESD	SOP-8L	13-in reel 2500pcs/reel	-40～85℃	Green	Cu

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