

Features

- PWM, voltage mode, point-of-load (POL) regulator
- Maximum output current: Defined by selected device
1A=AmP8DS1, 3A=AmP8DS3, 6A=AmP8DS6
- PV_{IN} : 3 to 13.2 V
- V_{IN} : 4.5 to 13.2 V
- V_{OUT} : 0.6V to 5.5V
- Adjustable output voltage with down to 1.2 mV resolution
- Integrated MOSFETs, $R_{DS(on)}$: 40m Ω
- 1% typical voltage regulation
- Efficiency up to 95%
- Internal single pole compensator minimizes external part count
- Additional capabilities – see I250S, P250S
- Adaptable stability, bandwidth, gain & phase margin
- Switching frequency: adjustable up to 2000 kHz
- Adjustable protection: Undervoltage Lockout, (UVLO), Overcurrent (OCP), Overvoltage (OVP), and Over Temperature (OTP)
- Short-circuit protection (SCP)
- Power-good flag output and Enable input
- Soft start/stop, sequencing, pre-bias startup
- 74-pin VQFN packages
- -40°C to +125°C operating junction temperature
- One SIM element; integrate up to twelve C250S Power Components in one AmP platform
- Included free with WebAmP™ development tool

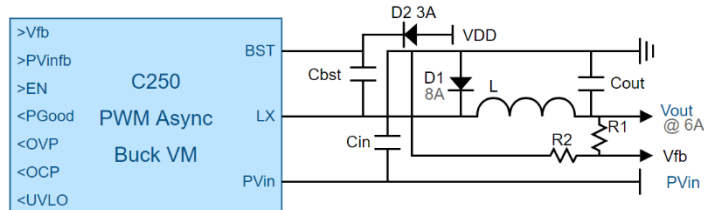
Applications

- On-demand power management, multi-rail power integration
- Powering server, processor, memory, storage, network switcher and router platforms
- FPGA, processor, SSD, subsystem power control & sequencing

Typical Application Circuit

Figure 1 provides a typical schematic for the C250S Power Component when integrated with other power rails in an AmP application.

Figure 1: C250S application schematic



Description

The C250S Power Component is a customizable, high-output-current PWM Asynchronous Buck, Voltage Mode Switching Regulator. Combine the C250S component with other Power Components to create a custom-defined, AnDAPT AmP on-demand power management device.

The integrated, low-resistance switching Scalable Integrated MOSFETs (SIM) provide up to 6A output current. The maximum current is defined by the AmP device selected.

Output voltage feedback is compared against an internal reference using a high-performance, voltage-error amplifier that provides tight voltage regulation accuracy under transient conditions. Pulse-width modulated (PWM), voltage-mode regulation is implemented with PID compensation. The switching frequency is either generated internally via an oscillator with selectable frequencies or provided via an external pin. The C250S component has a customizable current switchover point between pulse-width modulation (PWM) for higher-current loads.

The customizable output voltage is specified by the power engineer during customization using AnDAPT's cloud-based WebAmP development software. The C250S component has customizable control and status pins including an optional enable input, an optional power-good output, and optional output flags to signal when the system triggers an overvoltage (OVP), overcurrent (OCP), or undervoltage lockout (UVLO) condition. The threshold values are specified by the power engineer using the WebAmP tool.

The customizable soft-start and soft-stop slew rates plus ramp timing are also specified by the power engineer using the WebAmP tool. Additional sequencing options are available when used in conjunction with the C410 customizable Sequencer, by interconnecting signals EN, PGood, OVP, OCP, UVLO, to provide customizable dependencies and customizable delays between each sequence step.

Customizable Options

[Table 1](#) lists the various customizable options available for the C250S Power Component. These options are set graphically in the WebAmp development software.

Table 1: C250S Customizable Options

Option	Units
Switching frequency	MHz
Input voltage*	V
Output voltage	V
Output Current	A
Output Current Delta*	A
Output UVLO voltage	V
LC Component Manual/Auto select	On/Off
Inductor*	μH
Inductor DCR*	mΩ
Capacitor*	μF
Capacitor ESR*	mΩ
PID regulation coefficients (Gain, Fz1, Fz2)	
Enable OVP, Over Voltage Protection	On/Off
Overvoltage protection level	V
Enable input UVLO Protection	On/Off
Undervoltage lockout sense level	V
UVLO sense	Ext/Int
Enable soft start	On/Off
Soft start rise time after enable	ms
Use optional PGood output to signal “power good”	On/Off
“Power good” threshold, percentage of output	%

* to generate passive component recommendations and to calculate dynamic performance

Package Options

[Table 2](#) lists the package options available for the C250S Power Component. Typically, multiple AnDAPT power components are integrated into a single package.

Table 2: Package Options for C250S

Pins	Dimension	SIM Bonding	Package
74	8 x 8 mm	Single	QF74

Advanced Capabilities and Options

[Table 3](#) lists derivatives of the C250S component with additional capabilities plus other similar components potentially suitable for this application.

Table 3: C250S Advanced Capabilities Options

Description	Part Number
Standard Pro Series version (this component)	C250S
Add external control via I ² C bus interface	I250S
Add telemetry and dynamic voltage scaling via DVS interface	P250S
Single-phase buck regulator, synchronous, PWM, current mode regulation	C100
Single-phase buck regulator, synchronous, PWM, voltage mode regulation	C200
Multi-phase buck regulator, synchronous, PWM, current mode regulation	C510

System Characteristics

[Table 4](#) lists the system characteristics for the C250S Power Component when implemented in an AnDAPT AmP device.

Table 4: C250S System Characteristics

Parameters	Min	Typ	Max	Units
Input Drain Voltage (V _{IN})	3		13.2	V
Bias Supply Voltage (V _{IN})	4.5		13.2	V
Output Voltage (V _{OUT})	0.6		5.5	V
Output Current (I _{OUT})	DS6		6	A
	DS3		3	
	DS1		1	
Switching frequency (F _{SW})			2	MHz
Output MOSFET switch (R _{DS(on)})		40		mΩ
Voltage regulation		1		%/V
Peak efficiency (V _{IN} =5V, V _{OUT} =3.3V, F _{SW} =500kHz)		95		%

For other device specifications, see the AnDAPT AmP Platform datasheet.

Additional Resources

- AnDAPT AmP Platform datasheet