

Product Description

The C150 Power Component is a customizable, PWM Asynchronous Buck, Current Mode Switching Regulator. Combine the C150 component with other Power Components to create a custom-defined, AnDAPT AmP on-demand power management integrated circuit (PMIC).

Features

- PWM, Current Mode, point-of-load (POL) regulator
- Maximum output current: 6A
- PV_{IN} : 3 to 17V, V_{OUT} : 0.6V to 5.5V
- Adjustable output voltage with down to 2.4 mV resolution
- Integrated MOSFETs, $R_{DS(on)}$: 30m Ω
- 1% load regulation
- Efficiency up to 88%
- Internal compensator minimizes external part count
- Adjustable switching frequency from 300 kHz to 1.1 MHz
- Adaptable compensation, bandwidth, gain & phase margin
- Adjustable protection: Input Undervoltage Lockout, (ViUVLO), Output Undervoltage Lockout, (VoUVLO), Overcurrent (OCP), Overvoltage (OVP)
- Over Temperature Protection (OTP) (part of platform)
- Short-circuit protection (SCP)
- Power-good flag output and Enable input
- Soft start/stop, sequencing, pre-bias startup
- -40°C to +125°C operating junction temperature
- One SIM elements; integrate up to four C150 Power Components in one AmP Platform

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

Product Detail

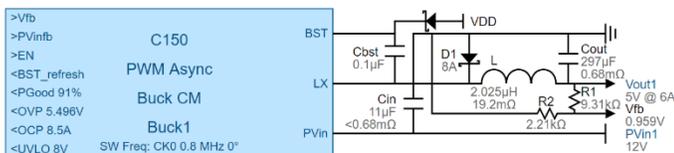
The C150 Asynchronous Buck Regulator includes an integrated MOSFETs, customizable PWM controller and various protection circuits.

The integrated, low-resistance switching Scalable Integrated MOSFETs-(SIM) provide up to 6A output current. Output voltage feedback is compared against an internal reference using a high-performance, voltage-error digitizer that provides tight voltage regulation accuracy under transient conditions. MOSFET current is sensed through an internal current mirror and compared with a current reference using digital compensation. The switching frequency is either generated internally via an oscillator with selectable frequencies or provided via an external pin.

The customizable output voltage is specified by the power engineer during customization using AnDAPT's cloud-based WebAmp development software. The C150 component has customizable control and status pins including enable input, an optional power-good output, and optional output flags to signal when the system triggers an overvoltage (OVP), overcurrent (OCP), or input undervoltage lockout (ViUVLO) condition. The threshold values are specified by the power engineer using the WebAmp tool.

The customizable soft-start and soft-stop slew rates are also specified by the power engineer using the WebAmp tool. Additional sequencing options are available when used in conjunction with the C420 customizable Sequencer, by interconnecting signals EN and PGood to provide customizable dependencies and customizable delays between each sequence step.

Figure 1: C150 application schematic



Recommended Operating Conditions

over operating free-air temperature range

Symbol	Parameter	Min	Typ	Max	Unit
PV_{IN}	Power Input Voltage	3		17	V
I_{OUT}	I_{OUT} Output Current Maximum	6			A

Electrical Characteristics Buck Converters

$PV_{IN}=V_{IN}=12V$, $T_A=25^{\circ}C$, $C_{vdd}=10\mu F$, $C_{vcc}=1\mu F$, unless otherwise specified

Parameters	Test Conditions	Min	Typ	Max	Units
Output Voltage (V_{OUT})		0.6		5.5	V
Voltage Regulation	Including load line and temperature variation				
	V_{IN} range: 4.5V to 6V	-2		+1	%
	V_{IN} range: 6V to 14V	-1		+1	%
Switching frequency (F_{SW})		300		1143	kHz
Switching frequency accuracy		-5		+5	%
MOSFET switch on-resistance ($R_{DS(on)}$)			30		m Ω
Peak efficiency	$V_{IN}=5V$, $V_{OUT}=3.3V$, $F_{SW}=571kHz$ $I_{OUT}=3A$		88		%
Efficiency	$V_{IN}=12V$, $V_{OUT}=1.8V$, $F_{SW}=571kHz$, $I_{OUT}=4A$		80		%
Input Shutdown current (V_{IN})	EN = 0V		TBD		mA
Input quiescent current (PV_{IN})			TBD		mA
PROTECTION					
V_{iUVLO} , input Undervoltage Lockout		2.5		10	V
OCP, Over Current Protection (% I_{OUT})			142		%
OTP, Over Temperature Protection	Shutdown (Power Good goes low) Hysteresis	125			$^{\circ}C$
OVP, Overvoltage Protection trip point range (relative to Parameter Setting)		+100		+432	mV
V_{oUVLO} , output Undervoltage Lockout threshold range (relative to Parameter Setting)		-100		-432	mV
Power Good threshold (relative to Parameter Setting)		-100		-432	mV

* Parameters shaded in green are user customizable as set in WebAmP development software