AnDAPT

Low-Dropout (LDO) Regulator

Features

- Linear, constant voltage, low-dropout regulator
- Adjustable V_{OUT} up to 1.8V with down to 1.2 mV steps
- Maximum output current: Defined by selected device 0.62A=AmP8D1, 1.25A=AmP8D3, 2.5A=AmP8D6
- 1% typical line and load regulation
- 100 mV dropout
- Low noise
- Integrated current sense
- Short-circuit protection (SCP)
- Additional capabilities – see I710, P710
- Adjustable protection: Under-Voltage Lockout, (UVLO), Overcurrent (OCP), and Over Temperature (OTP)
- Power-good flag output and Enable input
- Soft start/stop, sequencing
- 74-pin VQFN package
- –40°C to +125°C operating junction temperature
- One SIM element; integrate up to twelve C710 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 C710 Power Component when integrated with other power rails in an AmP application.

Figure 1: C710 application schematic
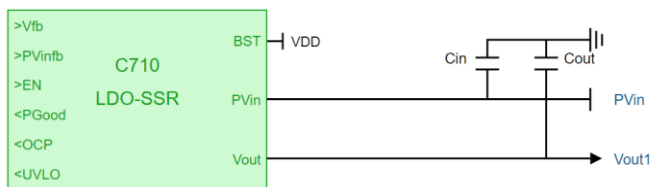
Description

The C710 Power Component is a customizable Low-Dropout Voltage Regulator with standard source-side regulation. Combine the C710 component with other Power Components to create a highly-integrated, custom-defined, AnDAPT AmP™ on-demand power management device.

The integrated linear Scalable Integrated MOSFET (SIM) provides up to 6A, source-side output current. The maximum current is defined by the AmP device selected. The LDO provides user-controlled current limit fold-back. The integrated current sense provides over-current protection (OCP) and a programmable current limit.

The customizable output voltage is specified by the power engineer during customization using AnDAPT's cloud-based WebAmp development software. The C710 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 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, OCP, UVLO, to provide customizable dependencies and customizable delays between each sequence step, ranging 0.25 to 4 ms.

Customizable Options

Table 1 lists the various customizable options available for the C710 Power Component. These options are set graphically in the WebAmp development software.

Table 1: C710 Customizable Options

Option	Units
Input voltage	V
Output voltage	V
Output Current	A
Enable OCP output to signal when overcurrent protection is triggered	On/Off
Overcurrent protection level	A
Enable input UVLO to signal when undervoltage lockout protection is triggered	On/Off
Undervoltage lockout sense level	V
UVLO sense	Ext/Int
Enable soft start	On/Off
Soft start current	A
Use optional PGood output to signal "power good"	On/Off
"Power good" threshold, percentage of output	%

Package Options

lists the package options available for the C710 Power Component.

Table 2: Package Options for C710

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

Advanced Capabilities and Options

lists derivatives of the C710 component with additional capabilities plus other similar components potentially suitable for this application.

Table 3: C710 Advanced Capabilities Options

Description	Part Number
Standard version (this component)	C710
Add external control via I^{2}C bus interface	I710
Add telemetry and dynamic voltage scaling via DVS interface	P710
LDO with drain-side regulation for battery power path applications	C720
LDO with push-pull regulation for DDR memory applications	C730

System Characteristics

lists the system characteristics for the C710 Power Component when implemented in an AnDAPT AmP device. "Prog" column specifies parameters that are user selectable.

Table 4: C710 System Characteristics

Parameters		Min	Typ	Max	Units	Prog
Input Drain Voltage (V_{IN})		V_{OUT}+ V_{DO}		20	V	
Output Voltage (V_{OUT})		0.6		1.8*	V	√
Output Current (I_{OUT})	D6			2.5	A	√
	D3			1.25		
	D1			0.62		
Dropout Voltage (V_{DO}) (V_{OUT}=1.8V. I_{DS}=1A)			100		mV	
Voltage regulation			1		%/V	
Current Limit – OCP		0.2		3.25	A	√
Undervoltage lockout start threshold (Vin UVLO)		0		5.5	V	√

* Consult factory for higher voltages up to 5.5V.

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

Additional Resources

- AnDAPT AmP Platform datasheet