CH1018

DC-dc buck 100V 2.1A power management IC

Overview

CH1018 is a switching step-down DC-DC with wide voltage inputs and a built-in 100V/2A power MOS with a maximum input voltage of 95V. features low standby power consumption, high efficiency, low ripple, excellent bus voltage regulation, and load regulation.supports both output constant voltage and output constant current functions.

CH1018uses fixed frequency PWM control with a typical switching frequency of 140KHz. At light loads, the switching frequency is automatically reduced for high conversion efficiency.

CH1018 integrates soft-start and over-temperature protection circuits, output short-circuit protection, current limit protection and other functions to improve system reliability.

CH1018 is available in an ESOP8 package with a heatsink with a VIN pin inside.

Features

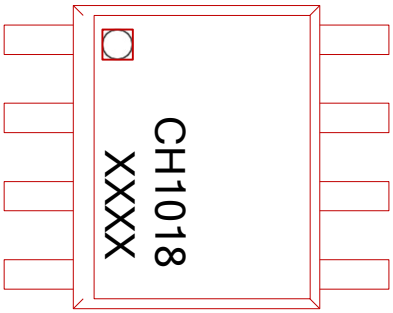
- Wide input voltage range: 8V to 95V
- The output voltage is adjustable from 4.2V to 25V
- Support output constant voltage and constant current
- Support output 12V/1.5A, 5V/2A
- High efficiency: up to 95%
- Operating frequency: 140KHz
- Low standby power consumption
- Built-in over-temperature protection, output short-circuit protection
- Built-in soft-start

Apply

Electric vehicles, electric bicycles, battery cars

Trucks, home appliances

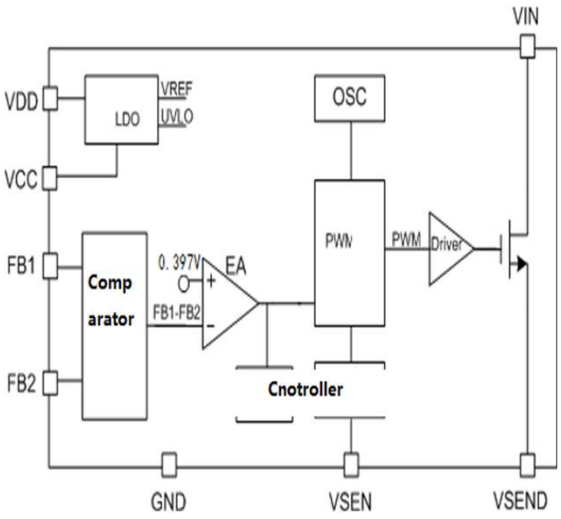
Encapsulation and pin assignment



ESOP8

Heat sink built-in VIN pin

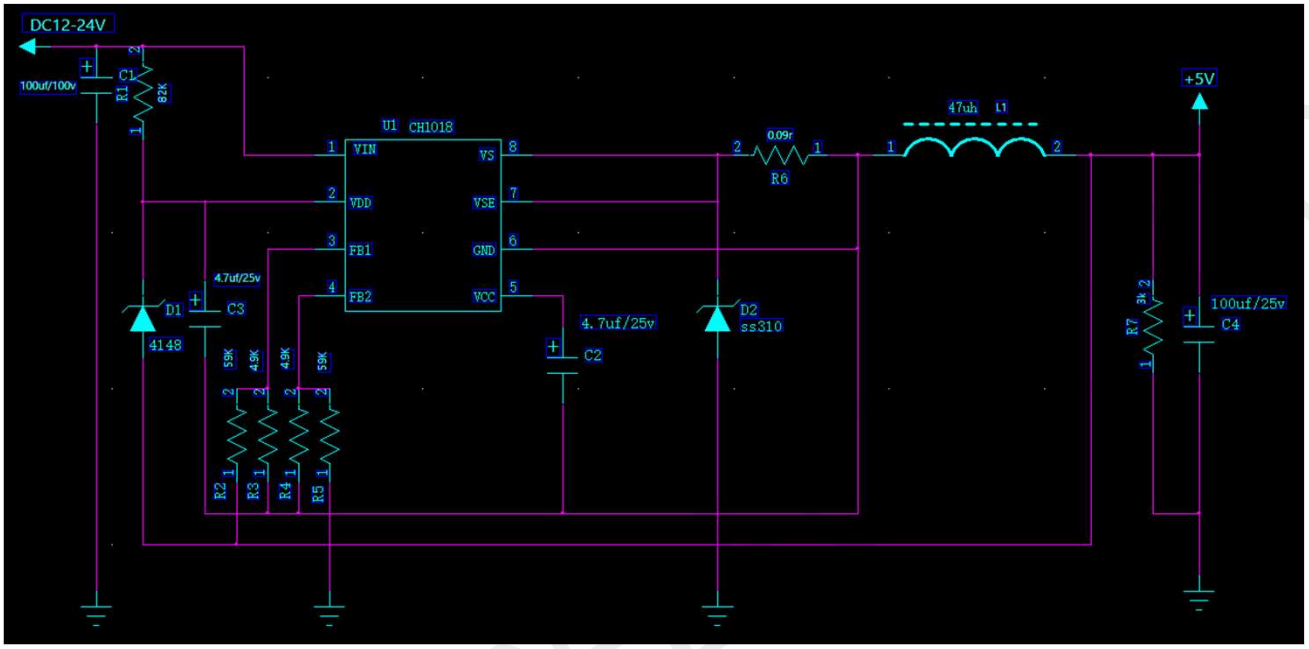
Block diagram of the internal circuit



Pin definition

Pin number	Pin name	Description
1	VIN	Built-in MOS drain for input power
2	VDD	Chip power supply
3	FB1	Positive sampling of the output feedback voltage
4	FB2	Output feedback voltage is sampled negatively
5	VCC	Internal 5V LDO output with capacitor.
6	GND	Chip ground
7	VSEN	Inductor current detection pin
8	VSEND	Built-in MOS source
-	Heat sink	Built-in connector VIN pin

Typical application lines



Limit parameters Note 1

Symbol	description	P-range	unit
VIN	Maximum voltage at the VIN side	100	V
VDD	Maximum voltage at VDD	20	V
Vmax	FB1,FB2,VCC,VSEN,VSEND Pin voltage	-0.3~6	V
P_{ESOP8}	Maximum power consumption in the ESOP8 package	1	W
T_A	Operating temperature range	-40~85	°C
T_{STG}	Storage temperature range	-40~120	°C
T_{SD}	Welding temperature range (time less than 30 seconds.)）	250	°C
V_{ESD}	Electrostatic withstand voltage value (mannequin)	2000	V

Parameter	Symbol	Test con	mini	Typical	max	unit
Supply Voltage						
VDD Clamp Voltage	VDD	IVDD<10mA		20		V
Under voltage Protection ON/0FF	VDD_ON	VDD rises		4.75		V
	VDD-OFF	VDD Decreases		3.3		V
Supple current(Operating)						
Current	Iop			1		mA
Start –UP-Current	Istart	VDD-5V		40	100	uA
Power tube Current Limiting						
Over Current protection	Vcs_LMT			268		mV
Output Current and output Voltage Sampling						
Vsen Voltage drop	VCS		130	137.5	145	mV
FB1,FB2 Voltage difference	VFB		385	397	408	mV
Switching Frequency						
Sw-Frequency	FS			140		KHz
Over temperature Protection						
Over –TEMP-Protection	OTP_TH			150		°C
Over _TEMP-Protection Hysteresis	OTP_HYS			25		°C
VCC Voltage	VCC			5.5		V

Application Guide

Overview

The CH1018 is a switched step-down DC-DC compatible with wide input voltage ranges. The chip has a built-in 100V/2A power MOS. The CH1018 adopts fixed frequency PWM peak current mode control mode, with low standby power consumption and fast response speedand excellent bus voltage and load regulation. The typical switching frequency is 140KHz.

The switching frequency is automatically reduced at light loads to achieve high conversion efficiency.

The CH1018 supports both output constant voltage and output constant current. CH1018L internally integrates soft-start and over-temperature protection circuits, output short-circuit protection, current limit protection and other functions to improve system reliability。

Maximum output current setting

The maximum output current is set by a resistor connected between VSEN and GND (see Figure 1 application circuit diagram):

$$IOUT\_MAX = \frac{VCS}{R5}$$

The VCS is typically 137.5mV. For example, R6=137.5mOhm has an output current limit of 1A.
Output voltage setting
The output voltage is set by the divider resistors R1, R3, R2, R4 connected to the FB1, FB2 pins. The resistor selection should meet R1=R2
R3=R4。

$$VOUT = \frac{R3 + R1}{R1} * VFB$$

where VFB is typically 397mV.

Inductance value

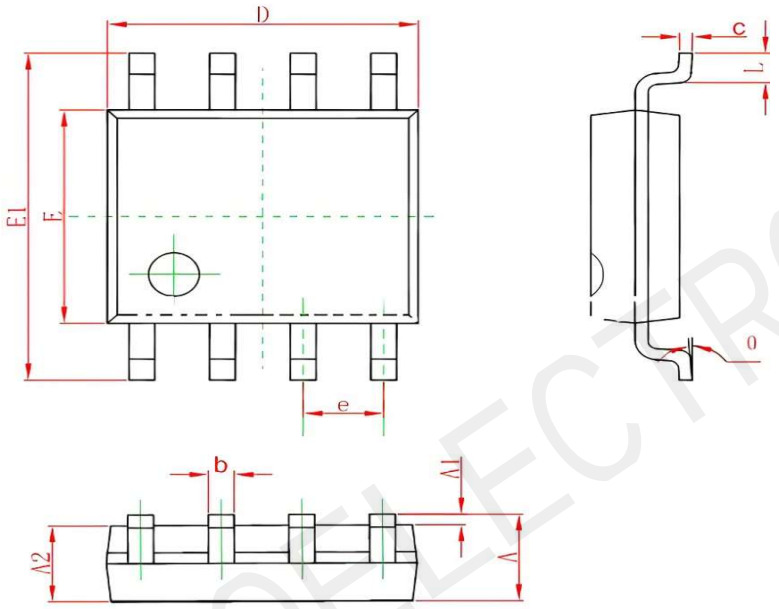
Inductors typically range from 33uH to 100uH, and large inductor values result in small ripple currents that help improve efficiency. On the other hand, it is necessary to pay attention to the ESR of the inductor, which reduces the efficiency by overcrowding.

Over-temperature protection

The chip has integrated overtemperature protection, and when the chip temperature is high and the overtemperature protection point (typically 150 degrees), the system shuts down the power tube, thereby limiting the input power and enhancing system reliability.

Encapsulation information

ESOP8



Character	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.050	0.150	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
D1	3.202	3.402	0.126	0.134
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
E2	2.313	2.513	0.091	0.099
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°