Over voltage and over current protection IC

Description

HCP4801 is an Over-Voltage-Protection (OVP) IC. The device will switch off internal MOSFET to disconnect VIN to OUT to protect load when any of input voltage, input current over the threshold. The Over temperature protection (OTP) function monitors chip temperature to protect the device.

Application

- PND
- Tablet
- HD Player
- OTT
- Digital Cameras
- Digital Videos

Features

- High voltage technology
- Maximum input voltage :40V
- Output power ON time :8ms(Typ)
- OVP threshold :Used Pin PROADJ Options
- OVP response time :<1us
- Output auto discharge
- Small Package :DFN8L（0203-0.75-0.50）

Ordering information

XX YY：Date code

XXXXX.1：Wafer batch

Fig.1 Top view

Table 1

Package	DFN8L（0203-0.75-0.50）
MOQ	3000 pcs

Typical Application

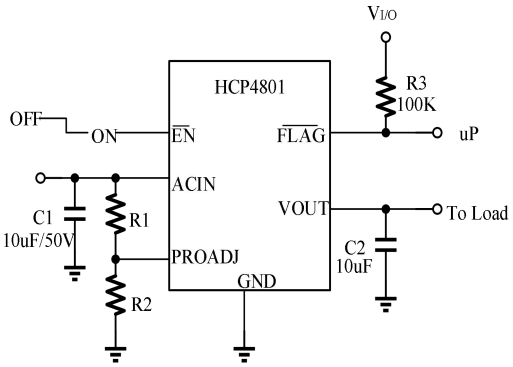

Fig.2

Pin Configuration and Function

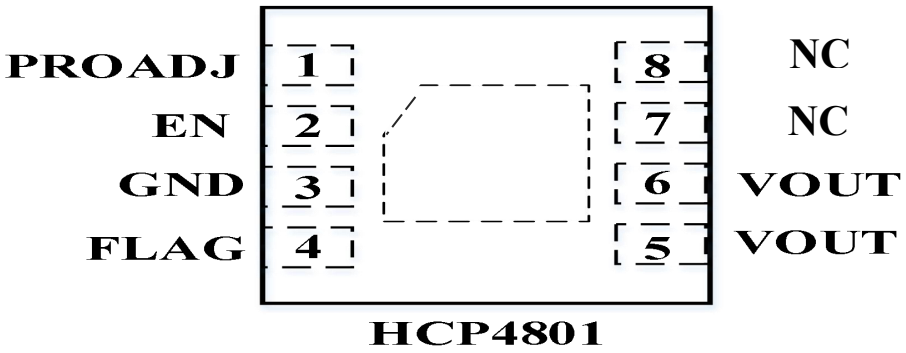

Fig.3 Pin configuration (Top view)

Table 2

NO.	Symbol	Type	Description
1	PROADJ	INPUT	Over voltage options pin
2	EN	INPUT	Enable pin. Active Low.
3	GND	GROUND	Ground
4	FLAG	OUTPUT	Flag Pin. Open-Drain, Active low if any OVP, OTP occur.
5\6	VOUT	OUTPUT	Output pin. Connect to load.
7/8	NC		
Bottom pad	VIN	POWER	Input pin. A 10uF low ESR ceramic capacitor or larger must be connected as close as to this pin. It is recommended to use 50V capacitor or according to application.

Functional Block Diagram

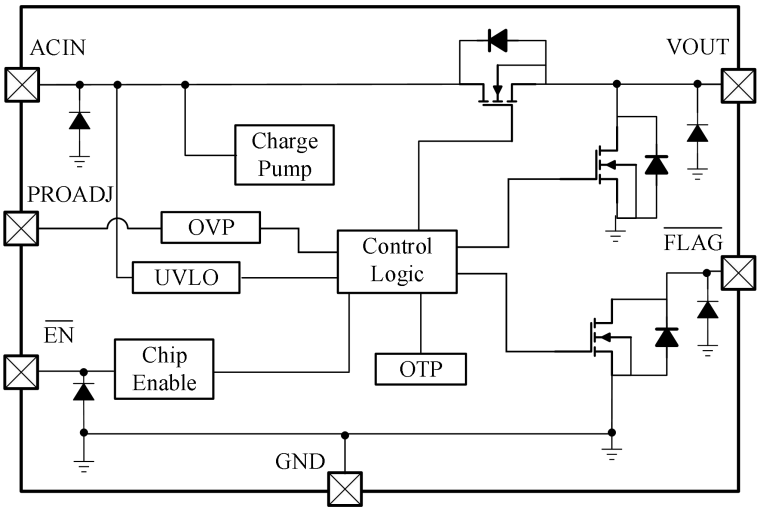

Fig.4

Absolute Maximum Ratings

Table 3

Parameter	Symbol	Value	Unit
Input voltage (ACIN pin)	V_{IN}	-0.3 ~ 40	V
Output voltage (VOUT pin)	V_{OUT}	-0.3 ~ 40	V
Junction temperature	T_J	150	℃
Storage temperature	Tstg	-55 ~ 150	℃
ESD Ratings	HBM	±3000	V
	MM	±200	V

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Recommend Operating Conditions

Table 4(Ta=25℃, unless otherwise noted)

Parameter	Symbol	Value	Unit
Input voltage	V_{IN}	3.5 ~ 40	V
Output current	I_{OUT}	5	A
Ambient operating temperature	Topr	-40 ~ 85	℃

Electrical Characteristics

Table 5

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
DC characteristics and Power-ON-Reset						
Input quiescent current	IQ	VACIN=5V,Iout=0A		120	200	uA
IN-to-OUT ON resistance	RON	VACIN=5V,Iout=3A		35@4.5V		mΩ
Output auto discharge resistance	RDISCHARGE			500		Ω
Under voltage lock out threshold	UVLO	VACIN increasing from 0~3.5V		3.4		V
Under voltage lock out hysteresis	VHYS-UVLO	VACIN decreasing from 3.5~0V		300		mV
Output power-on time	TON	VACIN=0 -> 5V to output ON	6	8	10	ms
EN Threshold Voltage	VENL				0.4	V
	VENH		1.2			V
EN to GND current	IEN				2	uA
Input Over-Voltage-Protection (OVP)						
PROADJ threshold	V_{PROADJ}	VACIN increasing from 5~7V		1.21		V
PROADJ hysteresis	$V_{HYS-PROADJ}$	VACIN decreasing from 7~5V		70		mV
OVP active time	T_{OVP}	VACIN= 5 -> 10V			1	us
OVP recovery time	$T_{ON(OVP)}$	VACIN=10 -> 5V to output ON	6	8	10	ms
Over-Temperature-Protection (OTP)						
OTP threshold				155		℃
OTP hysteresis				40		℃
Power Switch Body Diode						
Forward peak surge current	IFSM	Pulse Width=10ms			15	A
		Pulse Width=20us			50	A

The formula for over voltage:

$$OVP = 1.21 * (\frac{R1}{R2} + 1)$$

Typical characteristic

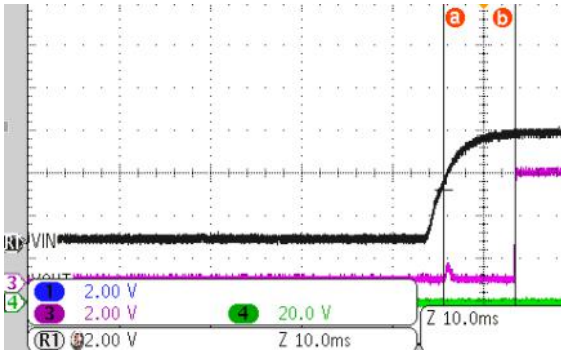

Fig. 6 Power ON

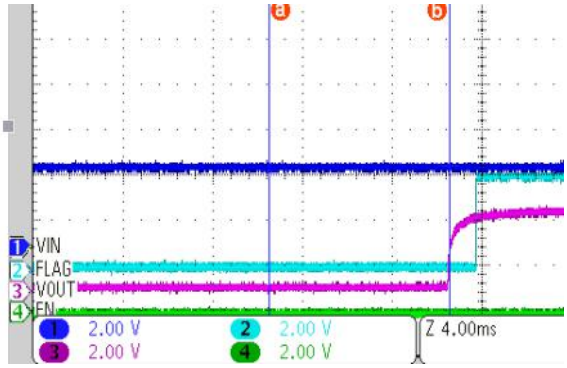

Fig .7 UVLO_H

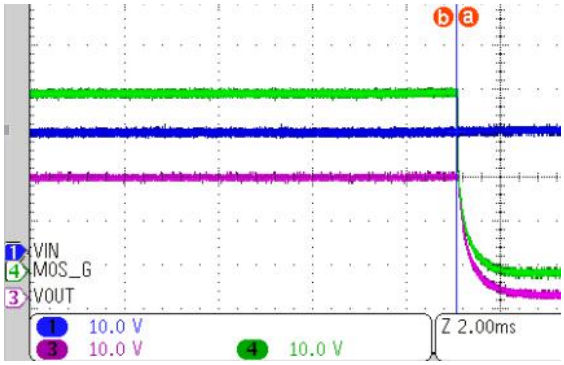

Fig .8 PROADJ_OVP

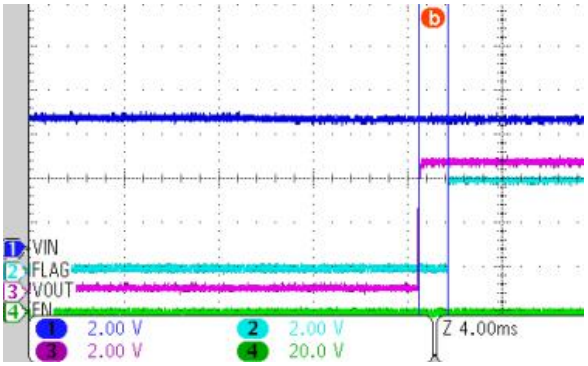

Fig.9 FLAG_DELAY

Temperature Stability

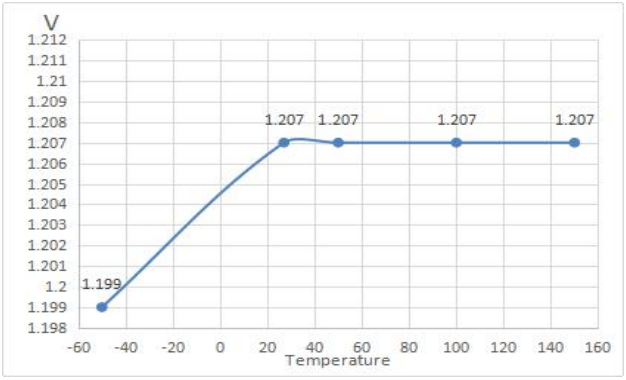

Fig .11 OVP threshold V-PROADJ & Temperature

Package Outline

DFN8L（0203-0.75-0.50）

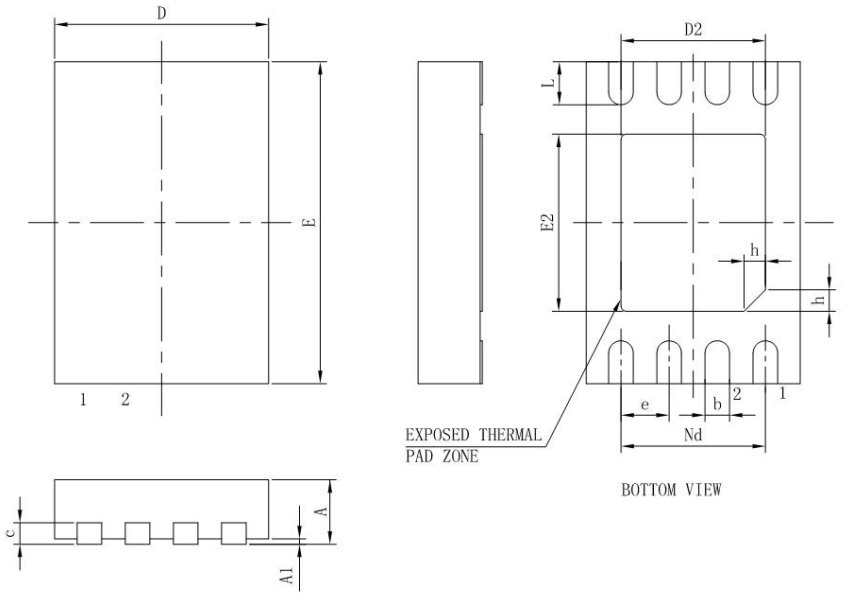

Fig. 12 Package outline

Table 6（Unit：mm）

Symbol	Min	Type	Max
A	0.70	0.75	0.80
A1	-	0.02	0.05
b	0.20	0.25	0.30
c	0.18	0.20	0.25
D	1.90	2.00	2.10
D2	1.40	1.50	1.60
E	2.90	3.00	3.10
E2	1.50	1.60	1.70
e	0.50BSC		
Nd	1.50BSC		
L	0.30	0.40	0.50
h	0.20	0.25	0.30