Description

HCP40101 is a constant-current & constant-voltage charger IC with over-voltage protection function integrated. The input voltage can operate from 3V to 40V. Its package is ESOP8 or DFN2*3 _8L. VIN can withstand ESD (HMB) pressure up to 3kV.

Features

- High voltage technology
- Very low quiescent operating current: <5uA
- Maximum input voltage : 40V
- Output power-on time : 8ms (Typical)
- OVP threshold voltage: : 6.1V
- Output auto discharge
- Small Package : DFN2*3-8L or ESOP8
- Built-in DW01 function.

Ordering information

Fig.1 Top view

Table 1

Package	DFN2*3-8L
MOQ	3000 pcs

Typical Application

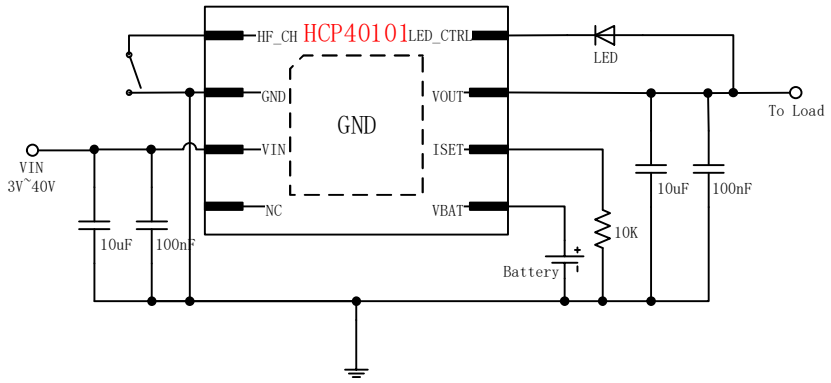


Fig.2

Pin Configuration and Function

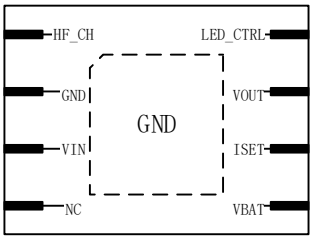


Fig.3 Pin configuration (Top view)

NO.	Name	Symbol	Description
1	Half charging current set	HF_CH	Input pin with TTL compatible. When it is pulled down, the charging current is half of the set current.
2	Ground	GND	Ground, the lowest voltage input pin.
3	Input voltage	VIN	Power input pin (3~40V)
4	NC		
5	Battery	VBAT	Connect with Battery anode.
6	Charging current set	ISET	Connect resistor to ground to setting charging current.
7	Output	VOUT	Output Pin. It outputs VIN if VIN<over-voltage threshold.
8	Charging indication	LED_CTRL	Open-drain output pin. In normal charging model, it can sink the current of 1mA.

Functional Block Diagram

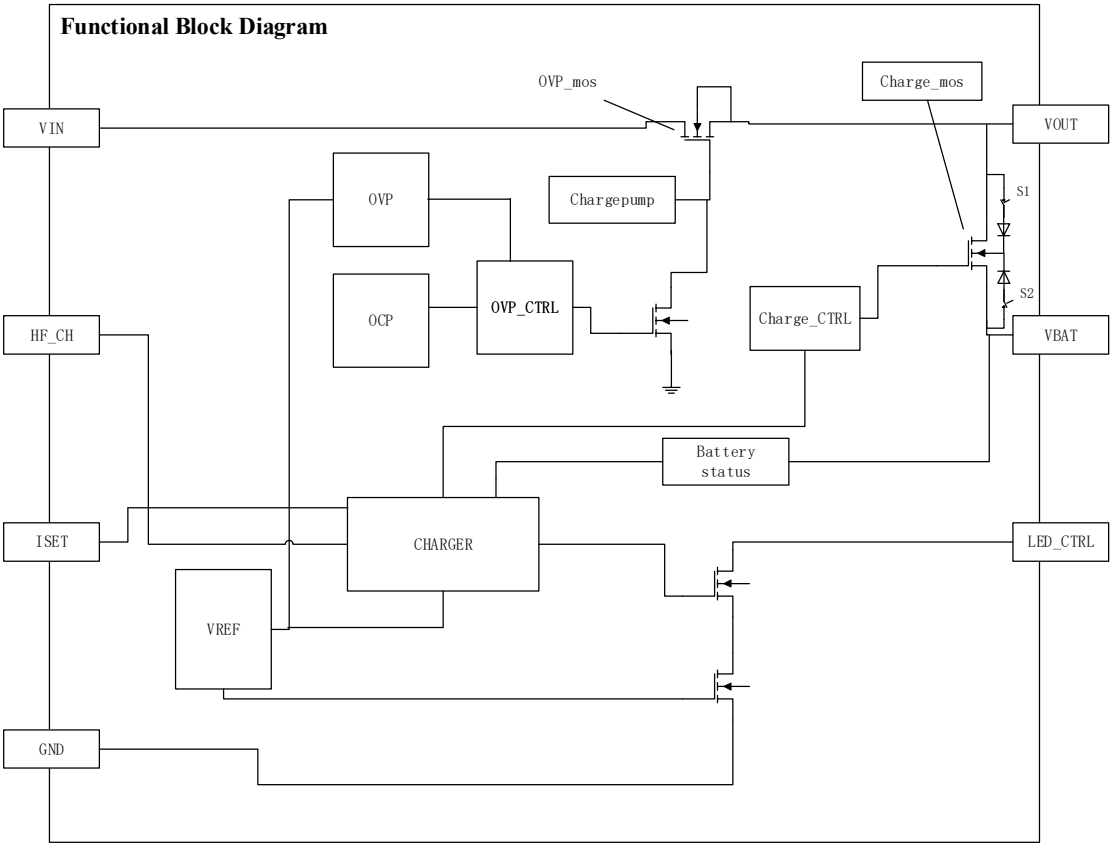


Fig.4

Absolute Maximum Ratings

Table 3

Parameter	Symbol	Value	Unit
Input voltage (IN pin)	V_{IN}	-0.3 ~ 40	V
Output voltage (OUT pin)	V_{OUT}	-0.3 ~ 6.1	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=25oC, unless otherwise noted)

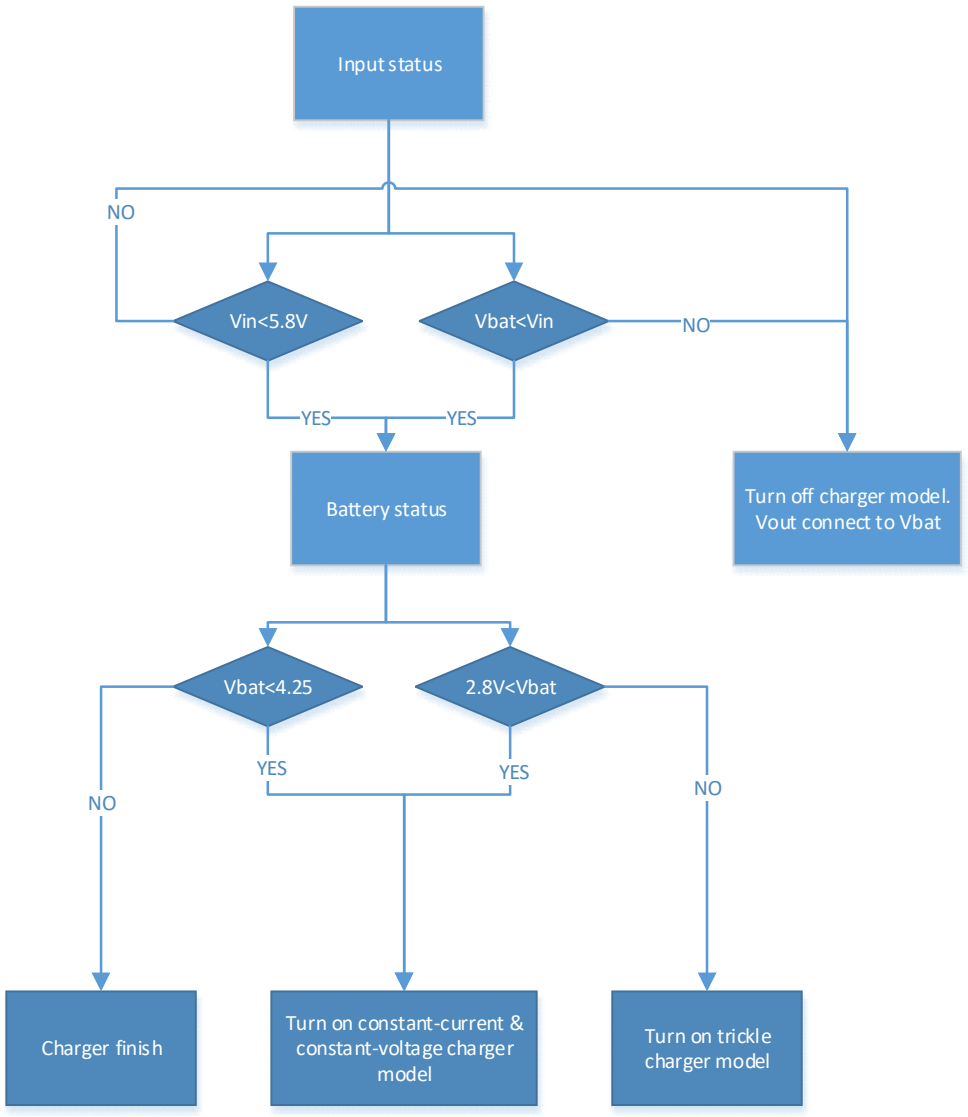
Parameter	Symbol	Value	Unit
Input voltage	V_{IN}	3 ~ 40	V
Output current	I_{OUT}	3	A
Output voltage (OUT pin)	V_{OUT}	0 ~ 6.1	V
Ambient operating temperature	Topr	-40 ~ 85	℃

Electrical Characteristics

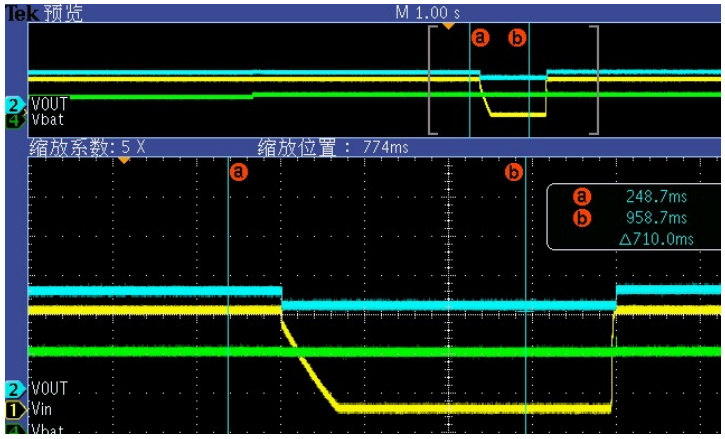
Table 5

Parameter	Symbo	Test conditions	Min	Typ	Max	Unit
Linear Charger						
Max Charger Current	$I_{charger\_max}$	V_{bat}>2.8V		1		A
Trickle charger Current	$I_{Trickle\ charger}$	V_{bat}<2.8V		100		mA
Charger finish	V_{bat_full}		4.21	4.25	4.29	V
Charger enable		Vin>Vbat				
Input Over-Voltage-Protection (OVP)						
Output current	I_{out}			3		A
IN-to-OUT ON resistance	R_{ON}			100		mΩ
Input Continue Current	$I_{in\_continue}$			3		A
OVP threshold	V_{ovp}	VIN increasing from 5~7V		6.1		V
OVP hysteresis	V_{hys}	VIN decreasing from 7~5V		200		mV
OVP enable time	T_{ovp}	Disable Power mos time			200	nS
Over-Temperature-Protection (OTP)						
OTP threshold				160		℃
OTP hysteresis				40		℃

Functional Flowchart



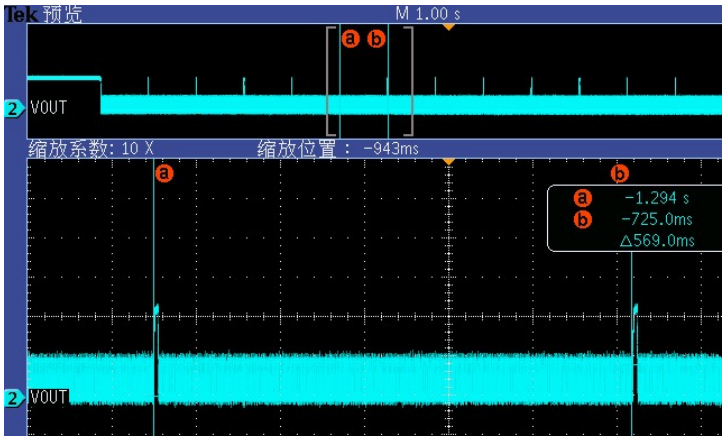
Power Path Management



(Yellow Line : VIN Green Line : VBAT Blue Line : VOUT)

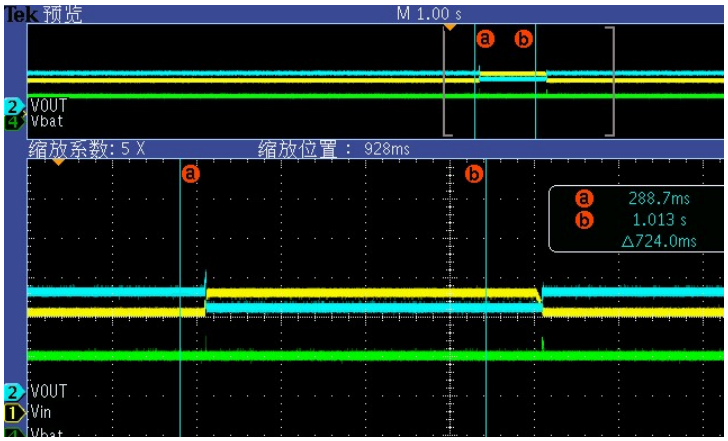
Vout is connected to Vbat when Vin turns off, and Vout is re-connected to Vin when Vin turns on.

Over Current Protection



When OCP occurs, Vout is disabled. After 600ms, Vout is trying to recover.

Over Voltage Protection

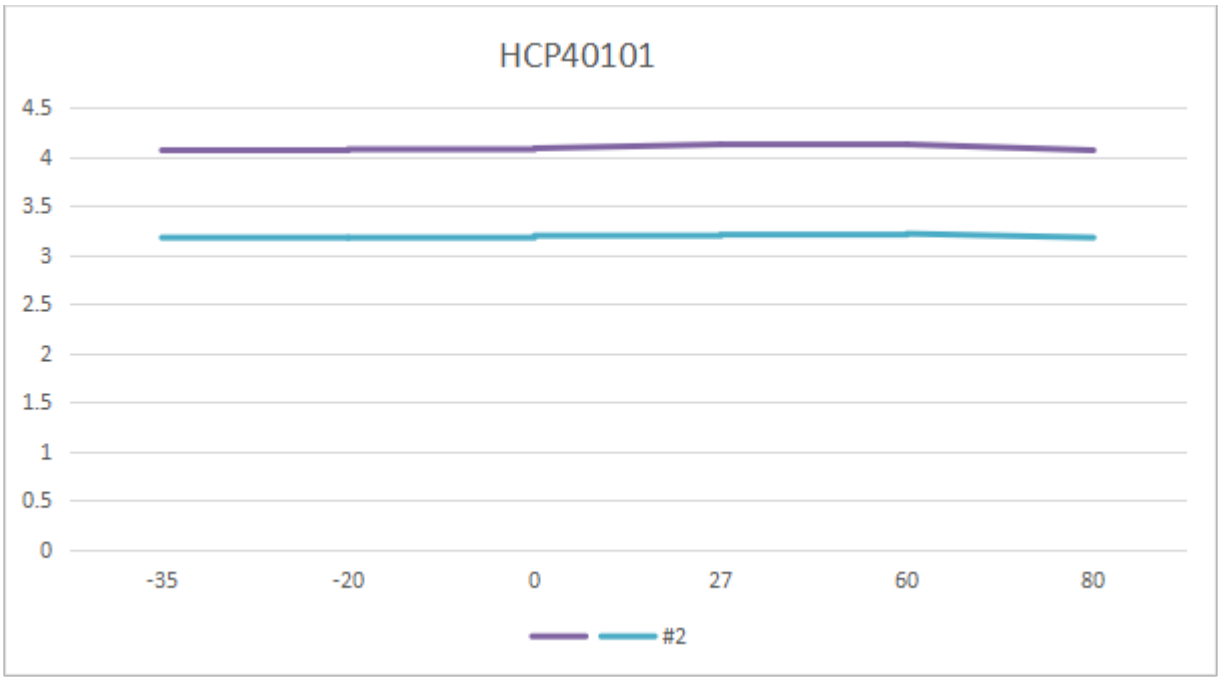


(Yellow Line : VIN Green Line : VBAT Blue Line : VOUT)

Vout is connected to Vbat when Vin greater than 6.1V. Vout is re-connected to it when Vin is normal.

Temperature Profile

Blue Line = tc to cc Purple Line = cc to cv



Temperature Profile

Package Outline

DFN2*3-8L

Symbol	Min	Type	Max
A	0.70	0.75	0.80
A1	-	0.02	0.05
b	0.25	0.30	0.35
c	0.18	0.20	0.25
D	2.90	3.00	3.10
E	1.90	2.00	2.10
e	0.65		
Nd	1.95		
L	0.28	0.35	0.42
h	0.15×45°		

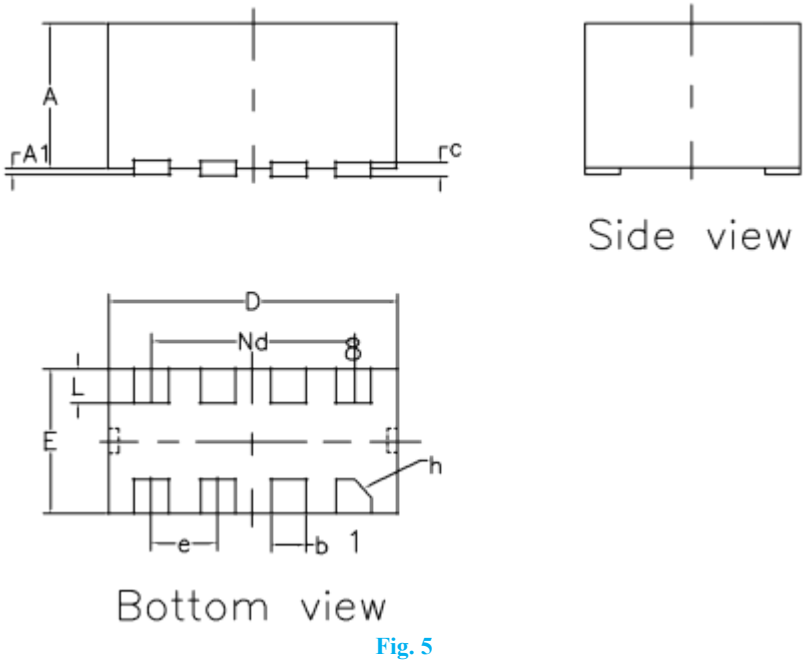
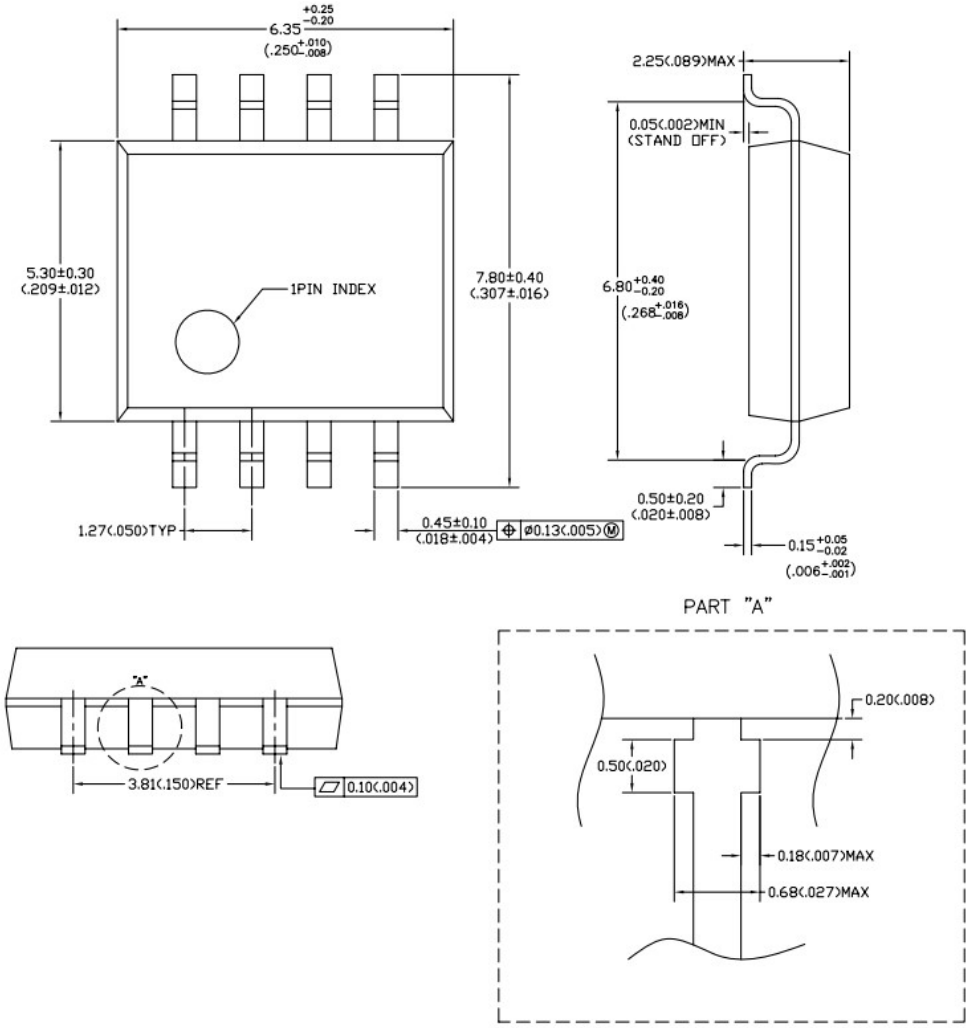


Fig. 5

ESOP8


6.35 +0.25 −0.20
(.250 +.010 −.008)
2.25(.089)MAX
0.05(.002)MIN
(STAND OFF)
5.30±0.30
(.209±.012)
1PIN INDEX
7.80±0.40
(.307±.016)
6.80 +0.40 −0.20
(.268 +.016 −.008)
1.27(.050)TYP
0.45±0.10
(.018±.004)
Ø0.13(.005)M
0.50±0.20
(.020±.008)
0.15 +0.05 −0.02
(.006 +.002 −.001)
PART "A"
"A"
3.81(.150)REF
0.10(.004)
0.20(.008)
0.50(.020)
0.18(.007)MAX
0.68(.027)MAX