HT3786D

Overview:

The HT3786D is a universal charger control chip with built-in reference voltage and power detection.

It has short circuit protection and over temperature protection functions.

Features:

ÿ Battery level detection, driving LCD screen to display battery energy status

ÿ Automatic identification of battery polarity

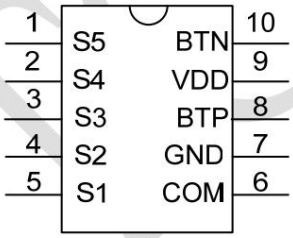
ÿ Built-in reference source, stable output when no-load, no need for external components to adjust no-load voltage

ÿ Short circuit protection function

ÿ Over temperature protection function

ÿ Highly integrated, few peripheral devices

Pinout and description:



Serial number	name	describe
1	S5	LCD Battery Frame S5
2	S4	LCD fourth stage S4
3	S3	LCD third stage S3
4	S2	LCD second segment S2
5	S1	LCD first segment S1
6	WITH	LCD common terminal (COM)
7	GND	Negative pole of power supply (ground)
8	BTP	Battery positive terminal (B+)
9	VDD	Power supply positive terminal
10	BTN	Battery negative

terminal (B-) Table **1 Description of each pin of HT3786D**

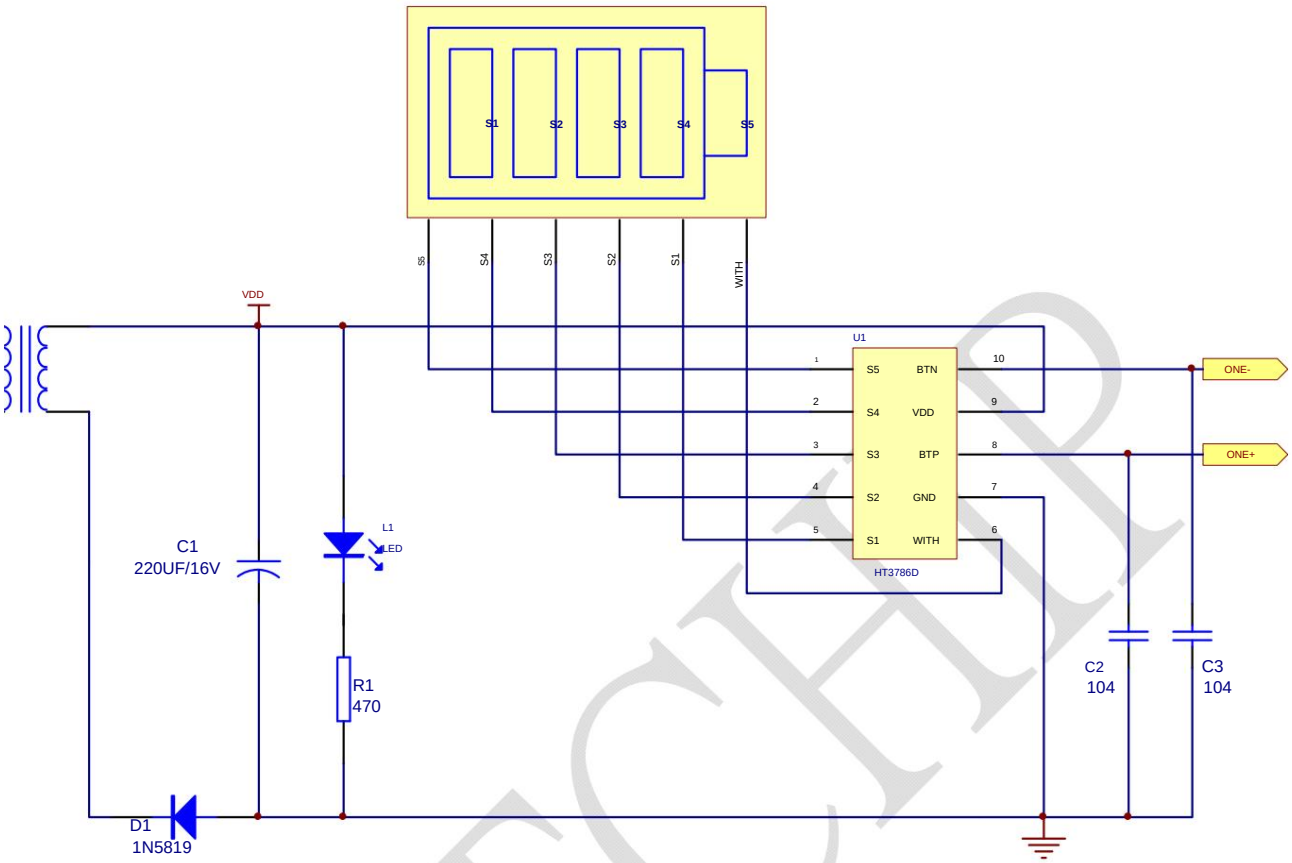


Figure **1 HT3786D application solution**

Working mode Power status Battery status **S1** BAT<3.8V Off Off			**S2**	**S3**	**S4 S5** off on
Battery detection	disconnect	3.8ÿBAT<4.0V On Off 4.0ÿBAT<4.15V			
		On On 4.15ÿBAT<4.25V On On 4.25ÿBAT			Off
		On On Disconnect On On			Off
				off	Off
				off	Liangliang
Battery No Load	Access			off on on	Liangliang
Normal charging access		BAT<3.8V Surge Surge Surge Surge Bright			
		3.8ÿBAT<4.0V Bright Surge Surge Surge Bright			
		4.0ÿBAT<4.15V On On Surge Surge On			
		4.15ÿBAT<4.25V On On On Surge On			
		4.25ÿBAT bright bright bright bright			
Battery short circuit	Access	Short circuit off off off flash			

Table 2 HT3786D working status table

Note: Battery status parameters are typical values

Normal charging LCD display working status diagram

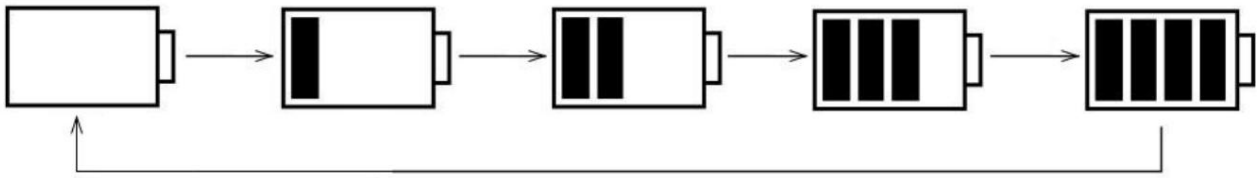
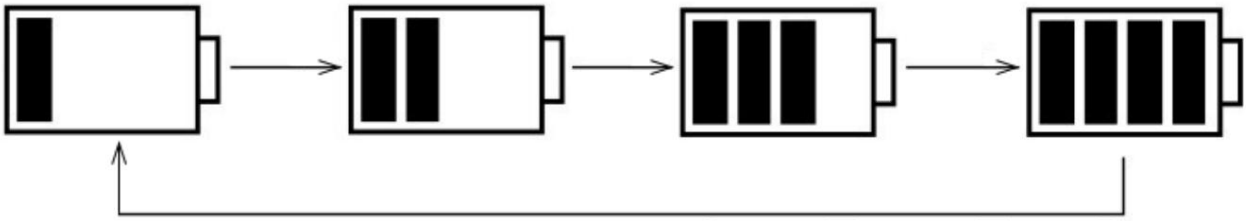
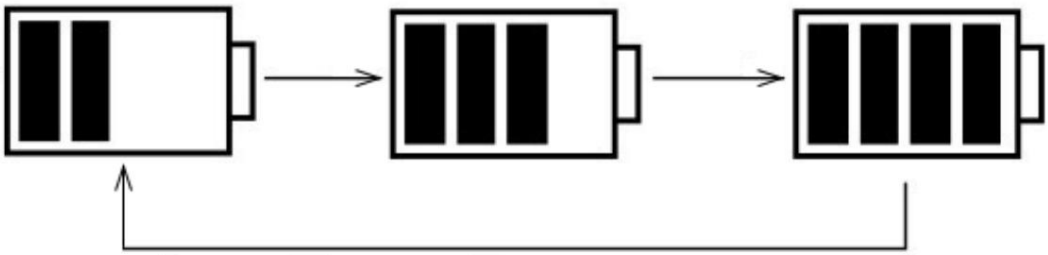


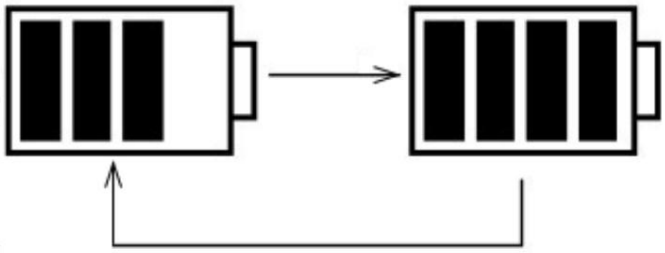
Diagram of sequential cyclic stepping on and off when BAT<3.80V



3.80ÿBAT<4.0V, sequential cyclic stepping on and off diagram



Schematic diagram of cyclic stepping on and off when 4.0ÿBAT<4.15V



Schematic diagram of cyclic stepping on and off when 4.15ÿBAT<4.25V

4.25ÿBAT full light

Note: BAT voltage is a typical value

Battery detection

When the battery is connected while the power is off, the HT3786D will control the battery accordingly through the automatic "polarity recognition" system. The states of LCD S1-S5 (hereinafter referred to as “indication states”) are described in Table 2.

Battery No Load

When the power is connected but the battery is not connected, the voltage difference between BTP and BTN is 4.25V (typical value), indicating the status. Description of Table 2.

Normal charging and saturation detection

When the power supply is connected and a partially charged battery (battery voltage < 4.15V) is connected, the power supply starts to charge the battery through the control of the HT3786D. The current is about 400mA (typical value), and the voltage at both ends of the battery increases slowly. When the battery voltage rises to 4.25V (typical value), the charging process The battery is saturated. For the indication status during this process, please refer to the description in Table 2. When the battery voltage is <4.15V, the battery is recharged.

Short circuit protection

If a battery short circuit occurs after the power supply is connected, the HT3786D internal "short circuit protection" system will automatically reduce the charging current to 25mA (typical value), and a short circuit status indication is given at the same time (see Table 2 for the indication status). Can be recharged.

Over temperature protection

If the chip junction temperature exceeds TO (150 ÿ typical value) during charging, the internal "overtemperature protection" system will automatically reduce the charging current until When the junction temperature drops to TR (130°C typical), the IC resumes normal charging state.

Limit parameters

	symbol	scope	unit
Characteristics	VDD	8	V
Operating Voltage	COME	-0.3ÿVDD+0.3	V
Input Voltage	TOPR	-20ÿ+90	ÿ
Operating Temperature Node Temperature	TJ	150	ÿ

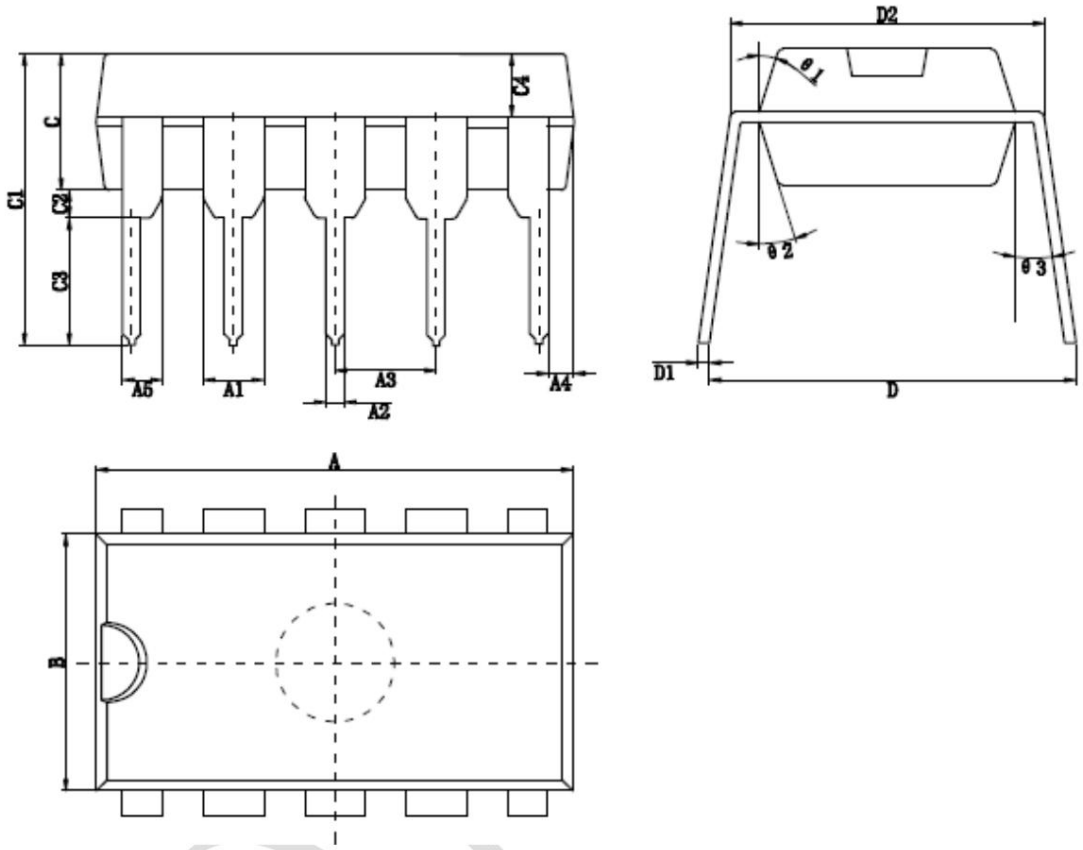
Typical parameters (Unless otherwise specified, all parameters are measured at room temperature and with GND terminal potential as 0 potential)

Parameter Name	Parameter Symbol	Test conditions	Min	Typ	Max	Unit
Input Voltage	VDD No-		5		8	V
load voltage	Vo	VDD=5Vÿ8V	4.18	4.25	4.28	V
Saturation voltage	Vs	VDD=5Vÿ8V	4.20	4.27	4.30	V
Charging current	ICHARGE	VDD=5V, |VBTP-VBTN|=3.6V VDD=5V, |		400	ÿ	mA
Short circuit	VSHORT	VBTP-VBTN|: 1.5Vÿ0.2V ÿ |VBTP-VBTN|ÿ3.7ÿ3.9V |VBTP-	1		ÿ	V
detection 1st grid	Vc1	VBTN|ÿ3.9ÿ4.1V |VBTP-VBTN|ÿ		3.8		V
transition point 2nd grid	Vc2	3.95ÿ4.25V |VBTP-VBTN|ÿ		4.0		V
transition point 3rd grid	Vc3	4.15ÿ4.35V		4.15		V
transition point 4th grid	Vc4			4.25		V
transition point Electrostatic protection	ESD Human Body Mode	Table **2 HT3786D**		4000		V

Typical Parameters

Package size information

DIP10 PACKAGE OUTLINE DIMENSIONS



尺寸 / 标注	最小(mm)	最大(mm)	尺寸 / 标注	最小(mm)	最大(mm)
A	11.75	11.95	C2	0.50TYP	
A1	1.524TYP		C3	3.25	3.35
A2	0.452	0.462	C4	1.47	1.57
A3	2.51	2.52	D	8.10	8.70
A4	0.51TYP		D1	0.249	0.259
A5	0.99TYP		D2	7.60	7.90
B	6.10	6.30	θ1	17° TYP4	
C	3.20	3.40	θ2	17° TYP4	
C1	7.18	7.38	θ3	5° TYP	