supportPDFive-port multi-protocol two-way fast charging mobile power solution

1．overview

SW6206It is a highly integrated multi-protocol two-way fast charging mobile power dedicated all-in-one chip, supportingA+A+B+C+L Any port for fast charging. which integrates 5 AHigh efficiency switching charging, 2 2 .5WEfficient synchronous boost output, PPS/PD/QC/AFC/FCP/SCP/PE/SFCPand other fast charging protocols, power metering,ledLight display and corresponding control management logic. Only a small number of peripheral components are needed to form a complete high-performance bidirectional fast charging mobile power solution.

2 .Application field

- mobile power
- Other battery powered equipment

3 .Specification

- **switch charging**
  - ➤ Current up to 5 A, the efficiency is as high as 9 6 %
  - ➤ support 4 .2/4.35/4.4/4.5VBattery Type
  - ➤ supportJEITAspecification
  - ➤ Support temperature loop control
- **synchronous boost**
  - ➤ output power up to 2 2 .5W, the efficiency is as high as 9 5 %
  - ➤ Automatic Load Detection/Light Load Detection
  - ➤ Support wireless charging mode
  - ➤ Support low current mode
- **Output fast charging protocol**
  - ➤ supportPPS/PD3.0/PD2.0
  - ➤ supportQC4+/QC4/QC3.0/QC2.0
  - ➤ supportAFC
  - ➤ supportFCP
  - ➤ supportSCP
  - ➤ supportPE2.0/PE1.1
  - ➤ supportSFCP
- **Enter the fast charging protocol**
  - ➤ supportPD3.0/PD2.0
  - ➤ supportAFC
  - ➤ supportFCP
  - ➤ supportSCP
  - ➤ supportPE1.1

- **Type-Cinterface**
  - ➤ built-inUSB Type-Cinterface logic
  - ➤ supportTry. SRCFunction
- **BC1.2module**
  - ➤ supportBC1.2 DCPmodel
  - ➤ Support Apple/Samsung mode
- **Lightningdecrypt**
  - ➤ built-inLightningdecryption function
- **Power metering and display**
  - ➤ built-in 1 2 bit ADC
  - ➤ Built-in coulomb meter for accurate power
  - ➤ support 3 -5indivualledlight display
- **Fast charge indicator**
  - ➤ Built-in fast charging indicator driver
- **lighting driver**
  - ➤ built-in lightingleddrive
- **button**
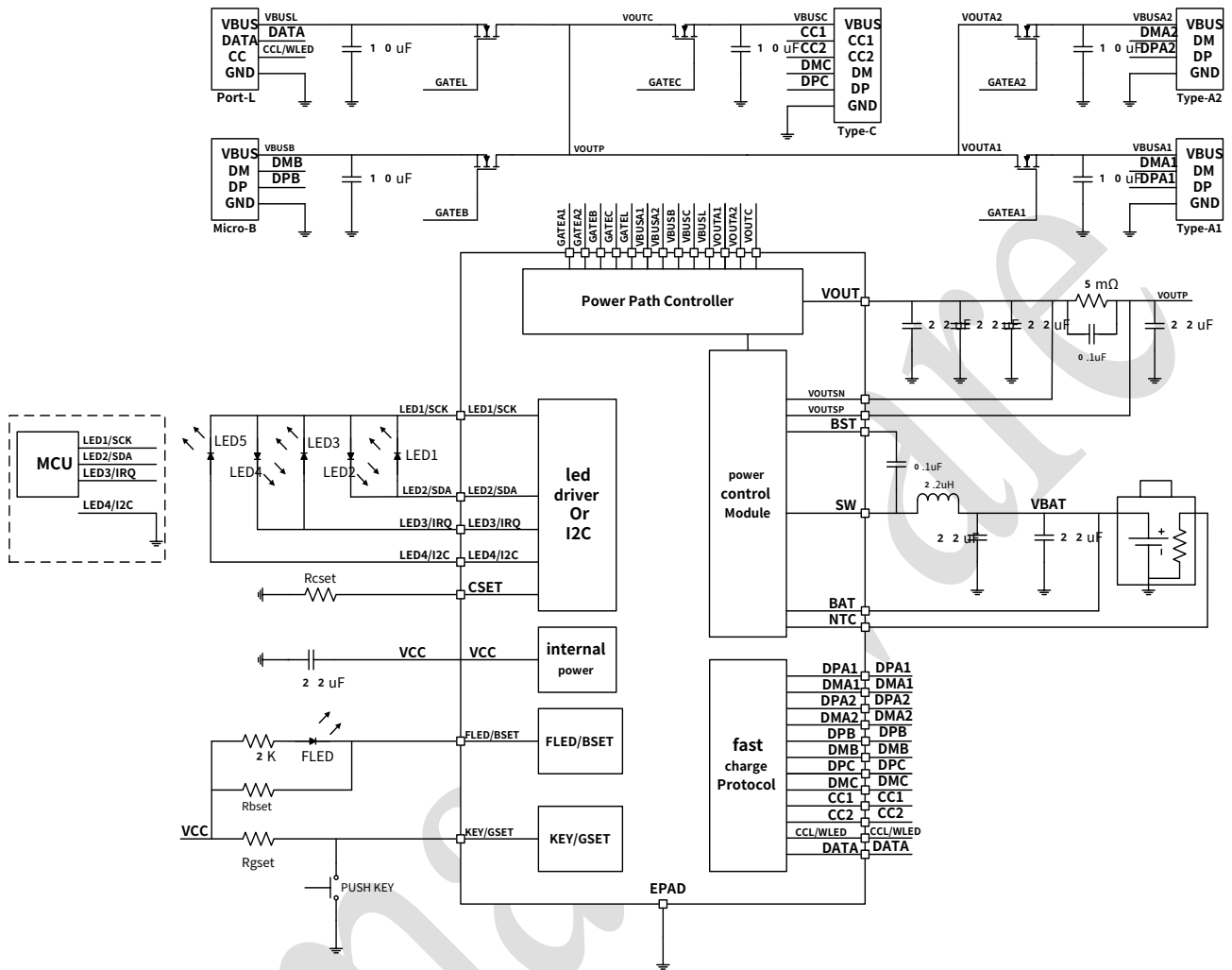 - ➤ Support mechanical keys
- **protection mechanism**
  - ➤ Input Overvoltage Protection
  - ➤ Output overcurrent/short circuit protection
  - ➤ Charging overtime/overvoltage protection
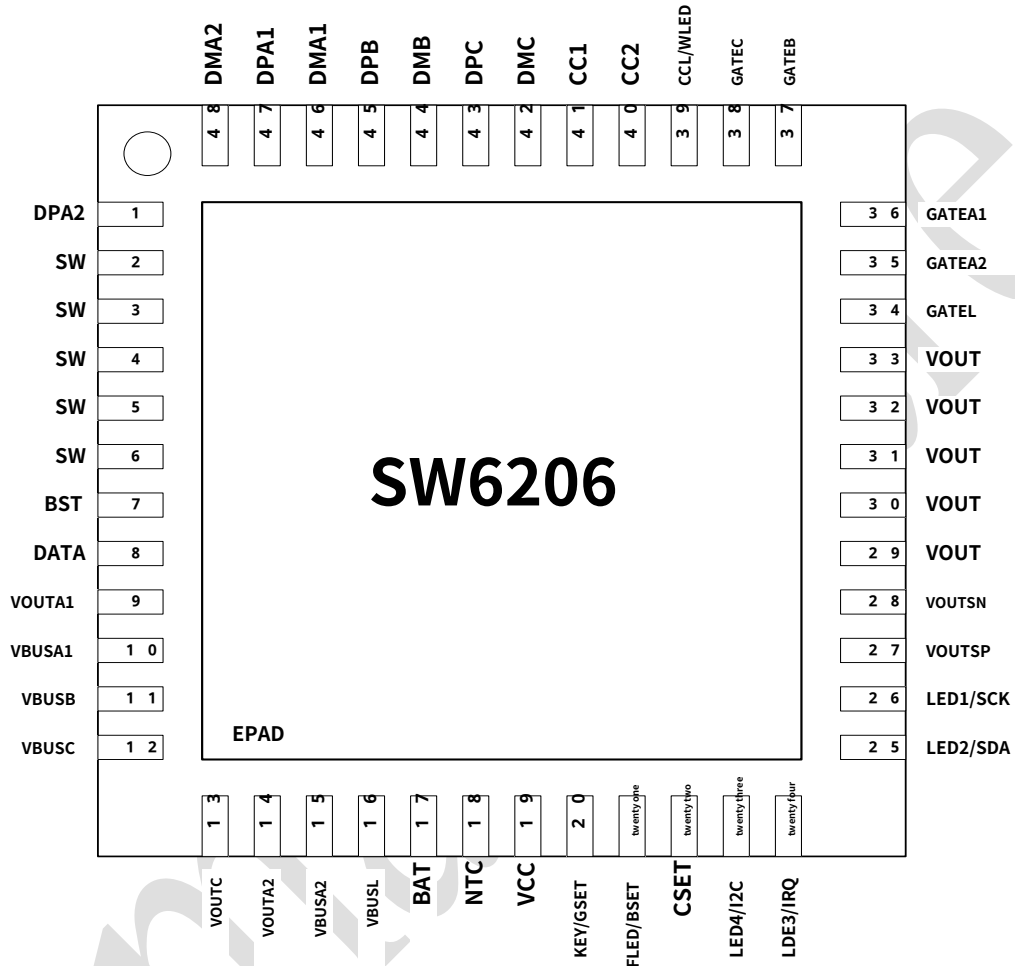 - ➤ temperature protection
- **I2Cinterface**
- **QFN-48(6x6mm)encapsulation**

4 .Functional block diagram

Power Path Controller

Port-L — VBUS / DATA / CC / GND — VBUSL / DATA / CCL/WLED

Micro-B — VBUS / DM / DP / GND — VBUSB / DMB / DPB

Type-C — VBUS / CC1 / CC2 / DM / DP / GND — VBUSC / CC1 / CC2 / DMC / DPC

Type-A2 — VBUS / DM / DP / GND — VBUSA2 / DMA2 / DPA2

Type-A1 — VBUS / DM / DP / GND — VBUSA1 / DMA1 / DPA1

GATEA1 GATEA2 GATEB GATEC GATEL VBUSA1 VBUSA2 VBUSB VBUSC VBUSL VOUTA1 VOUTA2 VOUTC

MCU — LED1/SCK / LED2/SDA / LED3/IRQ / LED4/I2C

led driver Or I2C — LED1/SCK / LED2/SDA / LED3/IRQ / LED4/I2C / CSET

internal power — VCC

FLED/BSET

KEY/GSET

power control Module — VOUT / VOUTSN / VOUTSP / BST / SW / BAT / NTC

fast charge Protocol — DPA1 / DMA1 / DPA2 / DMA2 / DPB / DMB / DPC / DMC / CC1 / CC2 / CCL/WLED / DATA

EPAD

Rcset, VCC 2 2 uF, 2 K, FLED, Rbset, Rgset, PUSH KEY

5 mΩ, VOUTP, 2 2 uF, 0 .1uF, 0 .1uF, 2.2uH, VBAT, 10 uF

5 .Pin definition and function description

5 .1.pin definition

5 .2.Pin description

Pin	name	Function Description
1	DPA2	Type-A2mouthDPpin.
2 , 3 , 4 , 5 , 6	SW	switch node.
7	BST	superiorNtube driveBootstrappin.
8	DATA	LightningmouthDATApin.
9	VOUTA1	Type-A1Port light load current sense pin.
1 0	VBUSA1	Type-A1Port output voltage detection pin.
1 1	VBUSB	Micro-BPort input voltage detection pin.

Pin	Name	Description
1 2	VBUSC	Type-CPort input and output voltage detection pin.
1 3	VOUTC	Type-CPort light load current sense pin.
1 4	VOUTA2	Type-A2Port light load current sense pin.
1 5	VBUSA2	Type-A2Port output voltage detection pin.
1 6	VBUSL	LightningPort input voltage detection pin.
1 7	BAT	Battery voltage detection pin.
1 8	NTC	Battery temperature detection pin.
1 9	VCC	Internal working power supply.
2 0	KEY/GSET	Mechanical button input, fuel meter constant current charging time parameter setting.
twenty one	FLED/BSET	Fast charge indication, battery target voltage setting.
twenty two	CSET	Battery capacity setting.
twenty three	LED4/I2C	ledlight interface 4 ,andI2CSet the signal.
twenty four	LED3/IRQ	ledlight interface 3 , can be multiplexed as an interrupt signal.
2 5	LED2/SDA	ledlight interface 2 , which can be reused asI2Cdata signal.
2 6	LED1/SCK	ledlight interface 1 , which can be reused asI2Cclock signal.
2 7	VOUTSP	Input and output current sense positive terminal.
2 8	VOUTSN	Input and output current sense negative terminal.
2 9 , 3 0 , 3 1 , 3 2 , 3 3	VOUT	Charging circuit input, boost circuit output pin.
3 4	GATEL	LightningOral access control.
3 5	GATEA2	Type-A2Oral access control.
3 6	GATEA1	Type-A1Oral access control.
3 7	GATEB	Micro-BOral access control.
3 8	GATEC	Type-COral access control.
3 9	CCL/WLED	LightningmouthCCpin, configurable as an illumination output.
4 0	CC2	Type-Cconfigure channel 2 .
4 1	CC1	Type-Cconfigure channel 1 .
4 2	DMC	Type-CmouthDMpin.
4 3	DPC	Type-CmouthDPpin.
4 4	DMB	Micro-BmouthDMpin.
4 5	DPB	Micro-BmouthDPpin.
4 6	DMA1	Type-A1mouthDMpin.
4 7	DPA1	Type-A1mouthDPpin.
4 8	DMA2	Type-A2mouthDMpin.
	EPAD	coolingPAD, to ground.

6 .Limit parameter

Parameters	Symbol	MIN	MAX	UNIT
Input voltage	VBUSB/VBUSC/VBUSL	- 0 .3	1 6	V
The output voltage	VOUT/VOUTSP/VOUTSN/ VOUTA1/VOUTA2/VOUTC/ VBUSA1/VBUSA2/VBUSC	- 0 .3	1 6	V
SWpin voltage	SW	- 0 .3	1 6	V
BSTpin voltage	BST-SW	- 0 .3	6	V
access control voltage	GATEA1/GATEA2/GATEB/ GATEC/GATEL	- 0 .3	twenty one	V
CC1/CC2/CCLpin Voltage	CC1/CC2/CCL	- 0 .3	1 6	V
Other pin voltage		- 0 .3	6	V
junction temperature		- 4 0	+ 1 5 0	°C
storage temperature		- 6 0	+ 1 5 0	°C
ESD(HBM)		- 4	+ 4	KV

【Remarks】Conditions such as voltage, current and temperature exceeding this range may cause permanent damage to the device.

7 .Recommended parameters

Parameters	Symbol	MIN	Typical	MAX	UNIT
Input voltage	VBUSB/VBUSC/VBUSL	4 .5		1 3 .5	V
battery voltage	BAT	2 .8		4 .5	V

8 .electrical characteristics

(V$_{IN}$= 5 V,V$_{BAT}$= 3 .7V, T$_A$= 2 5 °C,Unless otherwise specified.)

Parameters	Symbol	Test Conditions	MIN	TYP	MAX	UNIT
Power supply						
VBUSB/VBUSC/VBUSL input power	V$_{BUSB/C/L}$	V$_{BUSB}$/V$_{BUSC}$/V$_{BUSL}$	4		1 3 .5	V
VBUSB/VBUSC/VBUSL Input Undervoltage Threshold	V$_{BUSB/C/L\_UVLO}$	VBUSB/VBUSC/VBUSL Input voltage drop	3 .9	4	4 .1	V
VBUSB/VBUSC/VBUSL Input Undervoltage Threshold Hysteresis	V$_{BUSB/C/L\_UVLO\_}$ HYS	VBUSB/VBUSC/VBUSL Input voltage rises	3 0 0	4 0 0	5 0 0	mV

Parameter	Symbol	Condition	Min	Typ	Max	Unit
VBUSB/VBUSC/VBUSL Input Overvoltage Threshold	$V_{BUSB/C/L\_OVP}$	VBUSB/VBUSC/VBUSL Input voltage rises	1 3 .4	1 3 .7	1 4	V
VBUSB/VBUSC/VBUSL Input Overvoltage Threshold Hysteresis	$V_{BUSB/C/L\_OVP\_HYS}$	VBUSB/VBUSC/VBUSL Input voltage drop	6 0 0	8 0 0	1 0 0 0	mV
VCC The output voltage	V_{CC}	Boostor VBUSB/VBUSC/VBUSL catch enter	4 .9	5	5 .1	V
		shutdown		V_{BAT}		V
VCC Output current	I_{CC}	Boostor VBUSB/VBUSC/VBUSL catch enter	4 0	6 0	8 0	mA
		shutdown	4 0	6 0	8 0	mA

Internal resistance of power tube

Parameter	Symbol	Condition	Min	Typ	Max	Unit
NMOS top tube	R_{DSON_H}		1 7	2 0	twenty four	mΩ
NMOS down tube	R_{DSON_L}		9	1 1	1 4	mΩ
NMOS Upper tube peak current limit	I_{PEAK_H}	charging mode	6	8	1 0	A
NMOS Lower leg peak current limit	I_{PEAK_L}	boost mode	8	1 0	1 2	A

charging mode

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Trickle cut-off voltage	V_{TC}		2 .9	3	3 .1	V
Trickle charge current (battery terminal current)	I_{TC}	$V_{BAT}<$ 0 .5V	3 0	6 0	1 0 0	mA
		0 .5V$<V_{BAT}<$ 3 V	2 0 0	3 0 0	4 0 0	mA
Constant charging current	I_{CC}	$V_{BUSB}/V_{BUSL}=$ 5 V,I_{CCSET}=2A	1 .8	2	2 .1	A
		$V_{BUSC}=$ 5 V,I_{CCSET}=3A	2 .7	3	3 .2	A
		$V_{BUSB}/V_{BUSC}/V_{BUSL}=$ 9 V, I_{CCSET}=2A	1 .8	2	2 .1	A
		$V_{BUSB}/V_{BUSC}/V_{BUSL}$=12V, I_{CCSET}=1.5A	1 .3	1 .5	1 .6	A
cut-off charging current	I_{END}	$V_{BUSB}/V_{BUSC}/V_{BUSL}=$ 5 V	2 0 0	2 3 0	2 6 0	mA
		$V_{BUSB}/V_{BUSC}/V_{BUSL}=$ 9 V	1 0 0	1 3 0	1 6 0	mA
		$V_{BUSB}/V_{BUSC}/V_{BUSL}=$ 1 2 V	8 0	1 0 0	1 2 0	mA
Charging target voltage	V_{BAT_FULL}		4 .16	4 .2	4 .24	V
Recharge voltage	V_{BAT_RECH}		4 .06	4 .1	4 .14	V
On-off level	f_{CHG}		3 5 0	4 0 0	4 5 0	KHz
Trickle charge timeout	t_{TC_OT}		3 6	4 0	4 4	Min
Constant current and constant voltage charging timeout	t_{CC_OT}		3 0	3 3	3 6	hours
constant temperature value	T_{REGU_CHG}		1 0 0	1 1 5	1 3 0	°C

Pressure limiter threshold	V$_{HOLD}$	V$_{BUSB}$/V$_{BUSC}$/V$_{BUSL}$= **5** V	**4** .4	**4** .5	**4** .6	V
		V$_{BUSB}$/V$_{BUSC}$/V$_{BUSL}$= **9** V	**8** .4	**8** .5	**8** .6	V
		V$_{BUSB}$/V$_{BUSC}$/V$_{BUSL}$= **1 2** V	1 1.35	1 1.45	1 1.55	V

boost mode

VBATInput voltage	V$_{BAT}$		**2** .9		**4** .5	V
VBATInput Undervoltage Threshold	V$_{BAT\_UVLO}$	VBATInput voltage drop	**2** .8	**2** .9	**3** .0	V
VBATInput Undervoltage Threshold Hysteresis	V$_{BAT\_UVLO\_HYS}$	VBATInput voltage rises	**4 0 0**	**5 0 0**	**6 0 0**	mV
VOUTThe output voltage	V$_{out}$	V$_{out}$=5V, I$_{out}$=0A	**5**	**5** .1	**5** .2	V
		V$_{out}$=9V, I$_{out}$=0A	**8** .9	**9** .1	**9** .3	V
		V$_{out}$=12V, I$_{out}$=0A	**1 1** .8	**1 2** .1	**1 2** .4	V
Full load output current	I$_{out}$	V$_{out}$=5V, I$_{OUTSET}$=3A	**3**		**3** .4	A
		V$_{out}$=9V,I$_{OUTSET}$=2A	**2**		**2** .3	A
		V$_{out}$=12V, I$_{OUTSET}$=1.5A	**1** .5		**1** .8	A
Light load current detection threshold	I$_{LIGHT\_LOAD}$	R$_{DS\_PATH}$=10mΩ, V$_{out}$=5V	**4 0**	**6 0**	**8 0**	mA
		R$_{DS\_PATH}$=10mΩ, V$_{out}$=9V/ **1 2** V	**2 0**	**4 0**	**6 0**	mA
Light load detection shutdown time	t$_{LIGHT\_LOAD}$	single port output	**2 8**	**3 2**	**4 0**	S
		Multi-port output or discharge while charging	**1 2**	**1 6**	**2 0**	S
Quiescent Current	I$_Q$	V$_{BAT}$=3.7V	**4 0**	**5 0**	**6 5**	uA
Line Loss Compensation	V$_{OUT\_WDC}$	**0** A<I$_{out}$<1A		**0**		mV
		1 A<I$_{out}$<2A	**3 0**	**5 0**	**7 0**	mV
		I$_{out}$>2A	**8 0**	**1 0 0**	**1 2 0**	mV
On-off level	f$_{BST}$		**3 5 0**	**4 0 0**	**4 5 0**	KHz
Thermal Control Loop Threshold	T$_{REGU\_BST}$		**1 0 0**	**1 1 5**	**1 3 0**	℃

Type-Cinterface

CCPin output current	I$_{CC\_SOURCE}$	Power Level=3.0A	**3 1 0**	**3 3 0**	**3 5 0**	uA
CCPin Termination Resistor	R$_D$.		**4** .9	**5** .1	**5** .3	kΩ

BC1.2

DP/DMVoltage	DP	Apple **2** .4A Mode	**2** .55	**2** .7	**2** .85	V
	DM	Apple **2** .4A Mode	**2** .55	**2** .7	**2** .85	V

PE

current threshold	I$_{REF}$		**1 5 0**	**2 5 0**	**3 5 0**	mA

exit time	t$_{PLUG\_OUT}$		1 6 0	2 0 0	2 4 0	M
ledbattery indicator						
battery indicatorleddrive current	I$_{led}$		2	4	6	mA
ledFlashing frequency	f$_{led}$		0 .8	1	1 .2	Hz
ledillumination						
WLEDresistance	R$_{WLED}$		1 0	2 0	3 0	Ω
KEY						
short key	T$_{SHORT}$		twenty four	3 2	5 0 0	M
Long key	T$_{long}$		1 .5	2	3	S
double click	T$_{DOUBLE}$	Maximum time between two short key presses	1 .2	1 .5	1 .8	S
I2C						
rate	f$_{CLK}$			1 0 0	4 0 0	Kbit/S
Thermal Shutdown Protection						
Thermal Shutdown Threshold	T$_{SHDT}$	The temperature rises	1 3 5	1 5 0	1 6 5	°C
Thermal Shutdown Hysteresis	T$_{SHDT\_HYS}$	Temperature drop	5 5	7 0	8 5	°C

9 .Functional description

9 .1.charging mode

SW6206Integrates the highest efficiency up to 9 6 %A switch charging module that supports 4 .2V/ 4 .35V/ 4 .4V/ 4 .5Vand other battery types, switching frequency 4 0 0 KHz, you can use a small volume 2 .2uHinductance.

The charging process is divided into the following three processes: trickle mode, constant current mode, and constant voltage mode. When the battery voltage is lower than 3 VWhen , the charging module is in the trickle current mode, and the charging current is the trickle charging current; when the battery voltage is greater than 3 V, the charging module enters the constant current mode and charges at full speed according to the set target current; when the battery voltage rises to the charging target voltage (such as 4 .2V), the charging module enters the constant voltage mode, at this time the current gradually decreases, while the battery terminal voltage remains unchanged; when the charging current decreases to the charging cut-off current, the charging ends. If the battery voltage drops below the target voltage after being fully charged 0 .1V, charging will restart automatically.
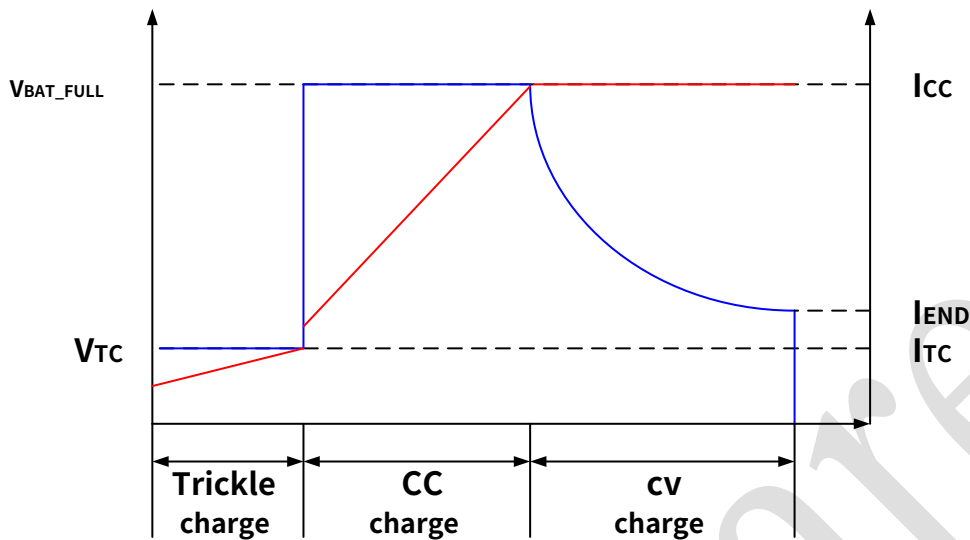
The battery type can beFLED/BSET Pinset up. rightVCCpull up **1 0** KΩresistor, set the **4** .2Vbattery; right VCCpull up **1 5** KΩresistor, set the **4** .35Vbattery; rightVCCpull up **5** .6KΩresistor, set the **4** .4Vbattery; right VCC pull up **3** KΩresistor, set the **4** .5VBattery.

The constant current charging current is set according to the fast charging input voltage, which is the constant current at the input terminal, and the maximum current at the battery terminal can reach **5** A. when in normal **5** Vinput voltage, forMicro-BandLightningport, the charging current is set to **2** A;forType-C port, the charging current is set to **3** A; When in fast charge **9** Vinput voltage, the charging current is set to **2** A; When in fast charge **1 2** V input voltage, the charging current is set to **1** .5A.

Charging module supportNTCprotection andJEITAspecification,NTCThe temperature protection module will always monitor the battery temperature, typically, make it in **0** ~50Charge within the normal temperature range of °C. When the temperature is abnormal, reduce the charging current, lower the charging target voltage or turn off charging. Typical application uses **1 0 3** AT NTCresistance, when the temperature is below **5** °C, the charging current is reduced by half, if the temperature continues to drop below **0** °C, the charging is turned off, and the temperature rises to **5** °C, it will be recharged automatically, the charging current will be reduced by half, and the temperature will continue to rise to **1 0** °C, restore the normal charging current. When the temperature is higher than **4 5** °C, the charging target voltage decreases **0** .1V, if the temperature continues to rise above **5 0** °C, the charging is turned off, and the temperature drops to **4 5** Automatically recharge after °C, the charging target voltage is lowered **0** .1V, the temperature continues to drop to **4 0** °C, restore the normal charging target voltage.JEITASpecifications can be enabled or disabled as required.

The charging module also contains a temperature control loop, when the die temperature exceeds **1 1 5** °C, the charging current begins to drop, if the over-temperature continues to exceed **1 5 0** °C, the chip enters the over-temperature shutdown mode.

The charging module also contains a timeout mechanism, when the constant current charging time exceeds **3 3** hours or trickle charging over **4 0** After **1 0** minutes, charging stops, and this state can be released by plugging and unplugging the adapter.

9 .2.boost mode

SW6206Integrated **2 2** .5Wof the boost module, the switching frequency **4 0 0** KHz, the highest efficiency can reach **9 5** %. The boost module containsPSM/PWMBoth modes, under light load, work inPSMmode; under heavy load, work inPWMmodel. When the load is connected, the system automatically detects and starts the booster module; when the load is removed, the system detects that after a certain period of time,

Turn off boost output.

Boost module supportCC/CVmodel. When the load current is less thanCCWhen the current is limited, the step-down circuit outputs the set voltage. When the load reachesCCcurrent limit value, will limit the output current atCCcurrent limit value, the output voltage will drop. The output current limit value is configured according to the output voltage, the higher the output voltage, the lower the current limit value.

Boost module supportNTCProtect,NTCThe protection module will monitor the battery temperature all the time, making it in- 2 0 ~60Discharge within the normal temperature range of ℃, and stop discharging when the temperature is abnormal. Typical application uses 1 0 3 AT NTCresistance, when the temperature is higher than 6 0 or below - 2 0 ℃, stop discharging. After the discharge is stopped, even if the temperature returns to the normal temperature, the chip will not automatically start up, but needs to detect the load insertion or short key action.

The boost module also contains a temperature control loop, when the die temperature exceeds 1 1 5 ℃, the output voltage begins to drop; if the over-temperature continues to exceed 1 5 0 ℃, the chip enters the over-temperature shutdown mode. After entering the over-temperature shutdown mode, even if the temperature drops below the over-temperature threshold, the chip will not automatically start up, but needs to detect load insertion or short key action.

The boost module includes protections such as input undervoltage/output overvoltage/output overload/output short circuit.

9 .3.access control

SW6206supportType-A1+Type-A2+Micro-B+Type-C+Lightningfive of themType-A1andType-A2 supportQC3.0/QC2.0/AFC/FCP/SCP/PE2.0/PE1.1/SFCPfast charge output;Type-Csupport PPS/PD3.0/ PD2.0/QC4+/QC3.0/QC2.0/AFC/FCP/SCP/PE2.0/PE1.1/SFCPFast charge output, support PD3.0/PD2.0/ AFC/FCP/SCP/PE1.1fast charge input;Micro-BsupportAFC/FCP/SCP/PE1.1fast charge input; Lightning supportPD3.0/PD2.0Fast charging input, and supports cable decryption.

Short key and load access can be openedType-A1/Type-A2The port discharges to the outside, and the light load detection will be closedType-A1/Type-A2/Type-C Output port, the light load detection current threshold is related to the internal resistance of the access tube, and the internal resistance of the access tube 1 0 mΩhour, 5 V The light load current corresponding to output and high voltage output is about 6 0 mA/ 4 0 mA;DFPAccess can be openedType-Cport for charging,UFPaccess will openType-C The port discharges externally, and the otherType-Cport supports light load detection, theUFPWhen the device is lightly loaded, it will also shut down Type-Cport, enter low power consumption mode; adapter access can be openedMicro-B/Lightningport for charging.

SW6206Support charging while discharging. Support fast charging input and output when working with a single port, support when working with multiple ports 5 Vinput Output. When charging while discharging, the power supply at the input port also discharges to the output port while charging the battery. The function of charging and discharging can be disabled according to demand. When charging while discharging, the output port is given priority to discharge, and the threshold of the voltage limiting ring of the charging module is set to 4 .8V, when the input port power is drawn by the output port device, if the input power supply is insufficient and the input voltage is lower than 4 .8VWhen , the charging module will reduce the charging current so that the input port voltage remains at 4 .8V, the power supply of the input port gives priority to the power supply of the output port device.

SW6206supportType-A1/Type-A2/Type-CThe port discharges to the outside at the same time, and the output voltage at this time is 5 V.

9 .4.mode setting

SW6206Supports wireless charging, low current and lighting drive modes. existI2CIn mode, three modes are set by registers. existledIn display mode, three modes passPinset up.

SW6206Support wireless charging mode,Type-A2The port is connected to the wireless charging module, which is specially optimized for the power supply of the wireless charging module, such as a short key to openType-A2mouth, **5** VOutput and high voltage output, the light load detection current is set to **2 4 0** mA/ **1 1 5** mA, the light load detection time is fixed at **3 2** S. Wireless charging mode throughLED1/SCK Pinsetting, to ground **1 0 0** KResistance, set to wireless charging mode; otherwise, set to non-wireless charging mode.

SW6206Support low-current mode, which can charge low-current devices such as Bluetooth headsets and wristbands. After setting to low current mode, long press to enter or exit low current mode. After entering the low current mode, the power display will also change, indicating that it is in the low current mode. In low current mode, the **2** No light-load detection is performed within one hour, and the low-current mode can also be exited when double-clicking to shut down. low current mode throughLED2/SDA Pinsetting, to ground **1 0 0** KResistor, set to low current mode; otherwise, set to non-small current mode.

SW6206Supports lighting drive mode.CCL/WLEDCan be configured as a lighting driver function orLightningMouthPDQuick charge input function. Lighting drive mode viaLED3/IRQ Pinsetting, to ground **1 0 0** KResistor, set to lighting drive mode; otherwise, set toLightningMouthPDFast charge input mode.

9 .5. Type-Cinterface

SW6206IntegratedType-CThe interface controller not only supports bidirectional input and output, but also supportstry.SRCRole. When the adapter is connected, the chip will automatically power on and charge; when the adapter is removed, it will automatically stop charging. When the electrical equipment is connected, the booster module is turned on to work, and if the electrical equipment is unplugged, the booster module is automatically turned off.

When the electrical equipment is connected and the boost function is turned on,SW6206will be atCCbroadcast on pin **3** Acurrent capability. if VBUSB/Lightningaccess, will also be inCCon the radio **3** Acurrent capability.

9 .6. PDsfast charge

SW6206IntegratedPPS/PD3.0/PD2.0Fast charge protocol, support input and output two-way fast charge. Output supports three gears configurableFIX PDOand two fixedAPDO. in **5** V FIX PDOcan be configured as **5** V: **3** A/ **2** A/ **2** .4A/ **2** .5A; **9** V FIX PDOcan be configured as **9** V: **2** A/ **2** .22A/ **2** .33A/ **2** .4A; **1 2** V FIX PDOcan be configured as **1 2** V: **1** .5A/ **1** .6A/ **1** .67A/ **1** .75A. PPS0 APDOfor **5** .0~5.9V@3A;PPS1 APDOfor **5** .0~11V@2A. input support **5** V/ **9** V/ **1 2** VVoltage.

9 .7. QC3.0/QC2.0fast charge

SW6206IntegratedQCFast charging protocol, supportQC4+/QC4/QC3.0/QC2.0,supportClass A.QC2.0support **5** V/ **9** V/ **1 2** VThe output voltage.QC3.0support **5** V~12VThe output voltage, **2 0 0** mV/Step.

QC2.0/QC3.0according toDP/DMThe corresponding output voltage of the voltage request is as follows:

access device	SW6206

DP	DM	VOUT	note
3 .3V	**3** .3V	keep the original voltage	not responding
0 .6V	**0** .6V	**1 2** V	
3 .3V	**0** .6V	**9** V	
0 .6V	**3** .3V	continuous mode	**0** .2V/Step
0 .6V	GND	**5** V	

9 .8. AFCsfast charge

SW6206IntegratedAFCFast charging protocol, output support **5** V/ **9** V/ **1 2** V. input support **5** V/ **9** VVoltage.

9 .9. FCPsfast charge

SW6206IntegratedFCPFast charging protocol, support **5** V/ **9** V/ **1 2** VThe output voltage. input support **5** V/ **9** VVoltage.

9 .10. SCPsfast charge

SW6206IntegratedSCPFast charging protocol, output support **5** V@4.5A. input support **5** .5V/ **3** A.

9 .11. PEfast charge

SW6206IntegratedPE2.0andPE1.1fast charge protocol,PE2.0support **5** V~12VThe output voltage, **5 0 0** mV/Step. PE1.1 support **5** V/ **7** V/ **9** V/ **1 2** VThe output voltage. input support **5** V/ **9** VVoltage.

9 .12. SFCPsfast charge

SW6206IntegratedSFCPFast charging protocol, support **5** V/ **9** V/ **1 2** VThe output voltage.

9.13. BC1.2Function

SW6206containsUSBIntelligent adaptive function module, which not only supportsBC1.2Function, as well as the Chinese mobile phone charger standard, can also be well compatible with Apple and Samsung's high-current output identification:

Apple 2.4A mode: DP=2.7V, DM=2.7V;

Samsung 2 A mode: DP=1.2V, DM=1.2V;

9.14. LightningMouth decryption

SW6206supportLightningPort decryption function, support internal decryption or external decryption mode. When the internal decryption mode is selected, theDATAdirect connectionLightningMouthDATA Pinterminal; when the external decryption mode is selected,DATAconnect directly toVCC, and then use the external decryption chip toLightningMouth for decryption.

9.15.Power metering

SW6206Integrated high-precision power metering system, built-in coulomb counter, can accurately obtain battery power.

The fuel gauge supports battery capacity self-learning function, and the current battery capacity can be learned after a complete charging process.

The initial capacity of the battery can beCSET Pinresistance to ground setting. initial capacityCsetwith resistanceRcsetThe relationship is:

$$Rset=(Cset +2000)*5/3$$

inCsetUnit ismAh,RsetThe unit is Ω.

The constant current charging time parameters of the fuel gauge can be passedKEY/GSETarriveVCCpull-up resistor setting.

9.16. ADCs

SW6206internally integrated 12 bit ADC, can collectVOUTVoltage/IOUTcurrent/battery voltage/NTCVoltage. Specifically:

ADCpath	scope	step
VOUTVoltage	0 ~16.384V	4 mV
IOUTelectric current	0 ~9.309A	25/11mA
battery voltage	0 ~4.915V	1.2mV

NTCVoltage	0 ~4.505V	1 .1mV
chip temperature	- 1 0 0 ~200℃	1 /6.82℃

9 .17. NTCsFunction

SW6206integratedNTCThe function can monitor the battery temperature in real time, and protect it when the temperature is abnormal.NTC Pin By discharging a certain current toNTCresistor, then collect theNTCvoltage to calculate the current battery temperature. NTCfunction support 1 0 3 ATresistor, at low resistance values, the discharge 8 0 uA, to ensure the detection accuracy; when the resistance is high, release 4 0 uA, to ensure the detection range. release by default 8 0 uAcurrent, inNTCvoltage higher than 2 .712V, switch to 4 0 uA ;release 4 0 uA atNTCvoltage below 0 .718V, switch to 8 0 uA.

use typical 1 0 3 ATResistance, discharge, protection threshold and correspondingNTCThe parameters are as follows:

Threshold description	NTCtemperature/℃	NTCVoltage/V	NTCCurrent/uA
dischargeNTClow temperature protection	- 2 0	2 .711	4 0
dischargeNTCHigh temperature constant temperature control	5 5	0 .283	8 0
dischargeNTCHigh temperature protection	6 0	0 .242	8 0

When charging, the protection threshold and correspondingNTCThe parameters are as follows:

| Threshold description	NTCtemperature/℃	NTCVoltage/V	NTCCurrent/uA
ChargeNTClow temperature protection	0	2 .182	8 0
ChargeNTC JEITALow temperature drop current	5	1 .764	8 0
ChargeNTC JEITALow temperature recovery current	1 0	1 .437	8 0
ChargeNTC JEITAHigh temperature recovery voltage	4 0	0 .466	8 0
ChargeNTC JEITAHigh temperature voltage drop	4 5	0 .393	8 0
ChargeNTCHigh temperature protection	5 0	0 .333	8 0

In practical applications, the temperature range can be changed by means of series/parallel resistors. if not requiredNTCprotection function, the

NTC Pingrounded.

9 .18. LEDslight display

SW6206supportledlight display.ledLamp driver support **3** ~5lights, can automatically identifyledNumber of lights.

**5** In the light state, the connection method is as follows:
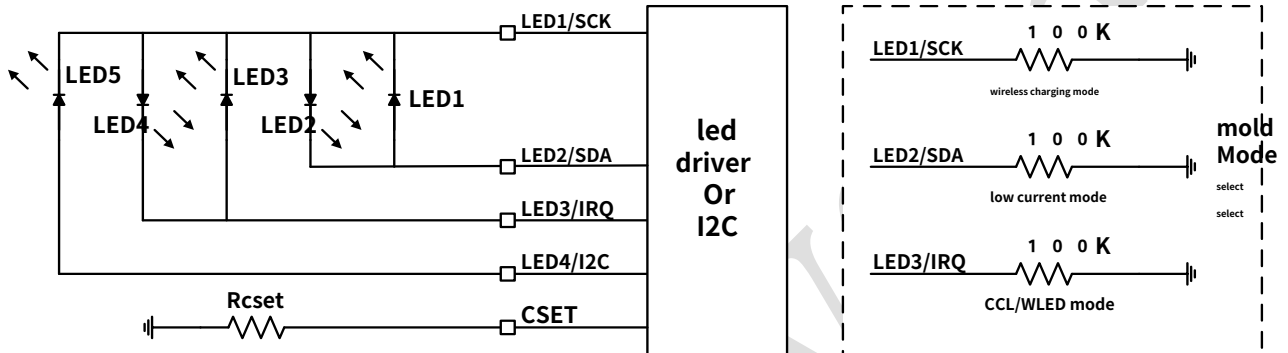
5 Under lamp discharge stateledInstruction table:

Capacity	LED1	LED2	LED3	LED4	LED5
8 0 ~100%	On	On	On	On	On
6 0 ~80%	On	On	On	On	Off
4 0 ~60%	On	On	On	Off	Off
2 0 ~40%	On	On	Off	Off	Off
5 ~20%	On	Off	Off	Off	Off
1 ~5%	flicker	Off	Off	Off	Off
0 %	Off	Off	Off	Off	Off

5 When the lamp is chargingledInstruction table:

Capacity	LED1	LED2	LED3	LED4	LED5
1 0 0 %	On	On	On	On	On
8 0 ~99%	On	On	On	On	flicker
6 0 ~80%	On	On	On	flicker	Off
4 0 ~60%	On	On	flicker	Off	Off
2 0 ~40%	On	flicker	Off	Off	Off
0 ~20%	flicker	Off	Off	Off	Off

4 Connection method in light state:
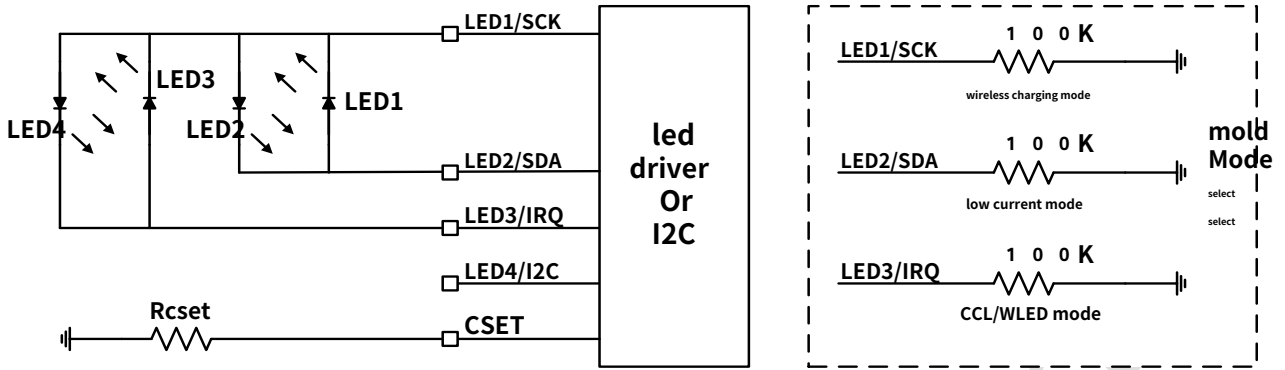
4 Battery power indicator when the lamp is in discharge state:

Capacity	LED1	LED2	LED3	LED4
7 5 ~100%	On	On	On	On
5 0 ~75%	On	On	On	Off
2 5 ~50%	On	On	Off	Off
5 ~25%	On	Off	Off	Off
1 ~5%	flicker	Off	Off	Off
0 %	Off	Off	Off	Off

4 Battery level indicator under charging status:

Capacity	LED1	LED2	LED3	LED4
1 0 0 %	On	On	On	On
7 5 ~99%	On	On	On	flicker
5 0 ~75%	On	On	flicker	Off
2 5 ~50%	On	flicker	Off	Off
0 ~25%	flicker	Off	Off	Off

3 Connection method in light state:
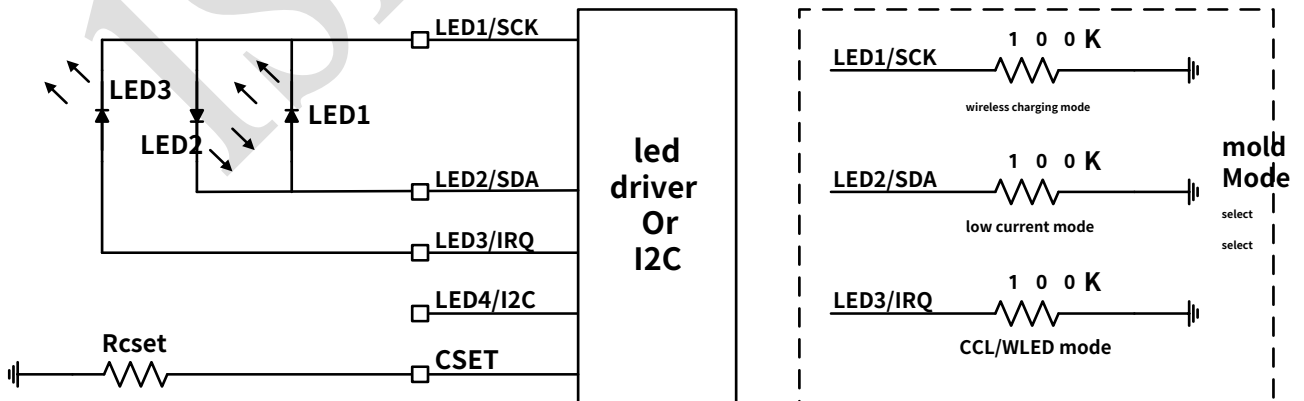
3 Indicator table in lamp discharge state:

May, 2 0 2 2 - DS035_v1.5

Capacity	LED1	LED2	LED3
6 6 ~100%	On	On	On
3 3 ~66%	On	On	Off
5 ~33%	On	Off	Off
1 ~5%	flicker	Off	Off
0 %	Off	Off	Off

3 Indication meter for lamp charging status:

Capacity	LED1	LED2	LED3
1 0 0 %	On	On	On
6 6 ~99%	On	On	flicker
3 3 ~66%	On	flicker	Off
0 ~33%	flicker	Off	Off

In low power state,LED1flashing 5 The system shuts down after this time.

Abnormal, such as output overcurrent, output short circuit, input overvoltage, chip overtemperature,NTCprotection etc. allledfull flash 5 The system shuts down after an abnormality is displayed for the first time.

9 .19.lighting driver

SW6206Integrated lighting insideledDrive, turn on and off by long pressing the button. lighting driver withLightning Mouth CCLreuse, throughLED3/IRQ Pinset up.

9 .20.Fast charge indicator

SW6206Internally integrated fast charging indicator driverFLED/BSET Pin, during fast charge input or output,FLED/BSETPull low to turn on the fast charge indicator.

9 .21.button

SW6206Support mechanical buttons, internal weak pull-up, support short press, long press and double click.

When short press action, openType-A1mouth and light loadType-CThe output port is used for external discharge and power display.

When the action is long pressed, the lighting driver is turned on or off; when in the low current mode, it enters or exits the low current mode.

On double click action, closeType-A1/Type-A2Mouth andType-COutput port, power display; if there is an external power supply,

Then only the output port is closed.

９.22. I2Cinterface

SW6206supportI2Cinterface, support １０ ０ K/ ４ ０ ０ Kcommunication rate.MasteraccessibleI2CThe interface reads the status information of the chip.I2CThe interface is multiplexed with the power display module, when set toI2Cinterface, theLED4/I2Cgrounded. existI2CIn the mode, the wireless charging, low current and lighting driving modes are set by registers.
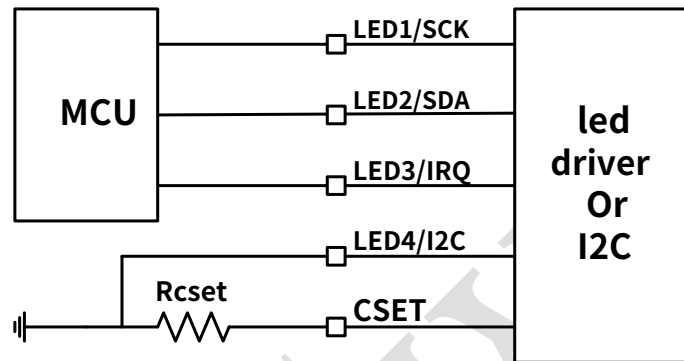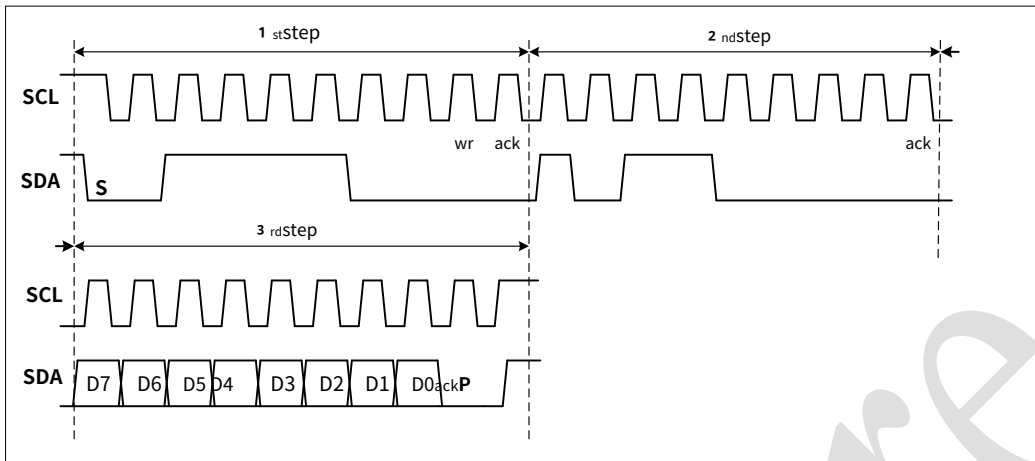

Read operation:

Slave address: ０ x3C
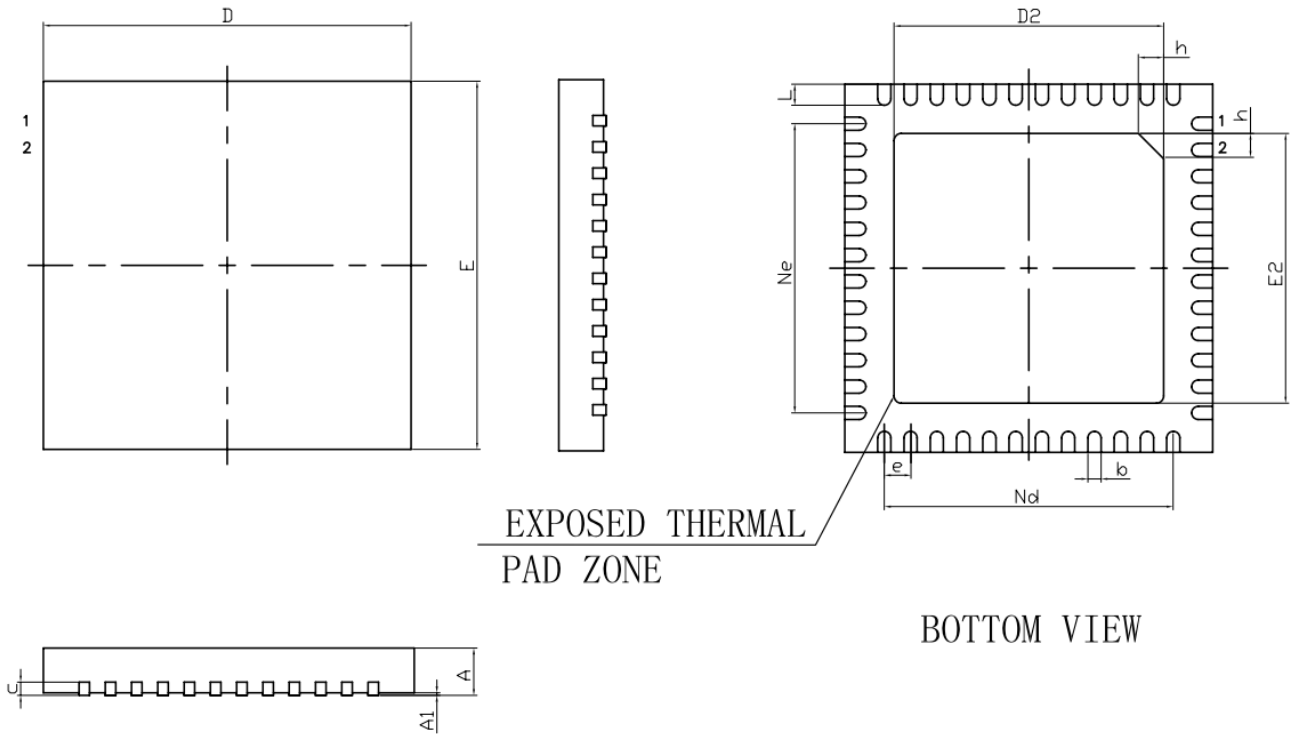# Register address: ０ xB0
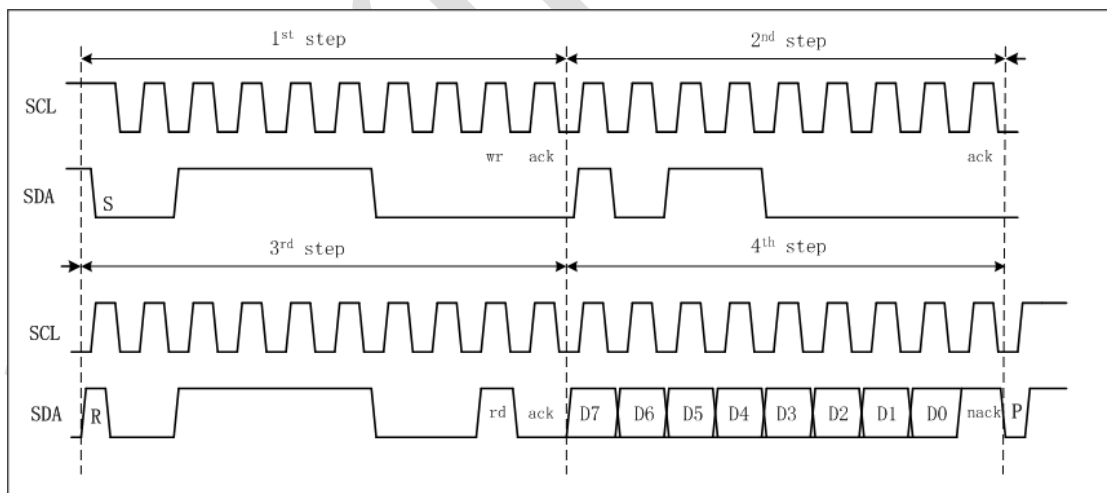
Write operation:

Slave address: ０ x3C
Register address: ０ xB0

1 0 .Typical application circuit diagram

１１.Mechanical Dimensions

１１.1.Package diagram

EXPOSED THERMAL PAD ZONE

BOTTOM VIEW

１１.2.package size

Symbol	Dimension in Millimeters		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	-	0.02	0.05
b	0.15	0.20	0.25
c	0.18	0.20	0.23
D.	5.90	6.00	6.10
D2	4.10	4.20	4.30
e	0.40BSC		
Ne	4.40BSC		
Nd	4.40BSC		
E.	5.90	6.00	6.10
E2	4.10	4.20	4.30
L	0.35	0.40	0.45
h	0.30	0.35	0.40

1 2 .version history

V1.0　initial version;

V1.1　Modified some electrical characteristic parameters;

V1.2　Modified boost moduleNTCa description of the protection;

V1.3　modify companylogo;

V1.4　RevisePD PDOand other parameters;

V1.5　Update document templates;

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