

Supports multiple fast charging input and output protocols such as PD3.1, and supports 2~6 series batteries

Integrated buck-boost driver with a maximum charge and discharge power of 140W power management chip

1 Characteristic

- **Charge and discharge specifications**
 - integrated BUCK-BOOST Buck-boost power MOS drive
 - Maximum charge and discharge power 140W
- **Adaptive charging current regulation**
 - The external resistor can set the battery type, and the full voltage is 3.65V/4.1V/4.2V/4.35V/4.4V. External resistors set the number of batteries in series: 2/3/4/5/6. External resistor can set the maximum charge and discharge power.
 - hold 140W Charge and Discharge
- **Fast charging specifications**
 - integrated FCP Input and output fast charging protocol
 - integrated AFC Input and output fast charging protocol
 - integrated SCP Input and output fast charging protocol
 - integrated DRP Try.SRC protocol, PD3.1 Input and output fast charging protocol
 - integrated QC2.0/QC3.0/QC3.0+ Output fast charge protocol
- **Other Features**
 - 4/2/1 LED Battery indicator
 - Custom support I2C Function
 - Standby power consumption 5μA
 - EN Wake-up function
- **Multiple protections, high reliability**
 - Input overvoltage and undervoltage protection
 - Output overcurrent and short circuit protection
 - Battery overcharge, over discharge, over current protection
 - ICH over temperature protection
 - Rechargeable battery temperature NTC protect
 - ESD 4KV, input (including GND, CC2 Pin) Withstand Voltage 30V
- **Packaging specifications:** 5mm × 5mm 0.4pitch QFN40

2 Application Products

2~6 Lithium battery/lithium iron phosphate battery charging and discharging

3 Introduction

IP2366 is an integrated AFC/FCP/PD2.0/ PD3.0/PD3.1 Lithium battery charge and discharge management chip with equal input and output fast charging protocol and synchronous buck-boost converter, with charge and discharge power up to 140W;

The high integration and rich functions of the MOS only require one inductor to achieve synchronous buck-boost function, and only a few peripheral devices are required in the application. components, effectively reducing the size of the solution and reducing BOM cost.

IP2366 support 2/3/4/5/6 The number of cells in series can be selected by setting the external resistor; IP2366 Support external resistor to set battery type, full charge voltage 3.65V/4.1V/4.2V/4.35V/4.4V

IP2366 built-in ICTemperature, battery NTC The temperature and input voltage control detection loop can detect the charger power according to the identification. intelligent adjust charging current.

IP2366 Support low power mode. After entering low power mode, the standby current is reduced to 5μA. After entering low power mode, plug in a charger to automatically wake up the charger. You need to press the button to wake up the speaker.

electricity;

IP2366 built-in 14-bit ADC, can accurately measure input voltage and current, battery voltage and current, etc. I2C Get IP2366 Charge and discharge voltage, charge current and other information.

IP2366 support 4A power indicator light that can display the power level and charging and discharging status.

Table of contents

1Characteristic.....	1
2Application Products.....	1
3Introduction.....	1
4Modification Record.....	3
5Simplified Application Schematic.....	4
6Pin Definition.....	5
6.1Pin Description.....	5
7Chip internal block diagram.....	7
8Limit Parameters.....	8
9Recommended operating conditions.....	8
10Electrical Characteristics.....	9
11Functional Description.....	12
11.1Charging function.....	12
11.2Discharge function.....	13
11.3State Transition Description.....	14
11.4Maximum input and output power settings.....	15
11.5Setting the number of batteries in series.....	15
11.6Battery Type Setting.....	15
11.7 NTCFunction.....	15
11.8Light display function.....	16
11.9 CC_BDOset up.....	18
11.10Key Functions.....	18
12Application Schematic	19
13 BOM.....	twenty one
14Packaging Information.....	twenty two
15Silkscreen Description.....	twenty three
16Liability and Copyright Statement.....	twenty four

4 Modification Record

Note: Page numbers in previous versions may differ from those in the current version.

Change version V1.00 to V1.10 (2023 Year 3 month)

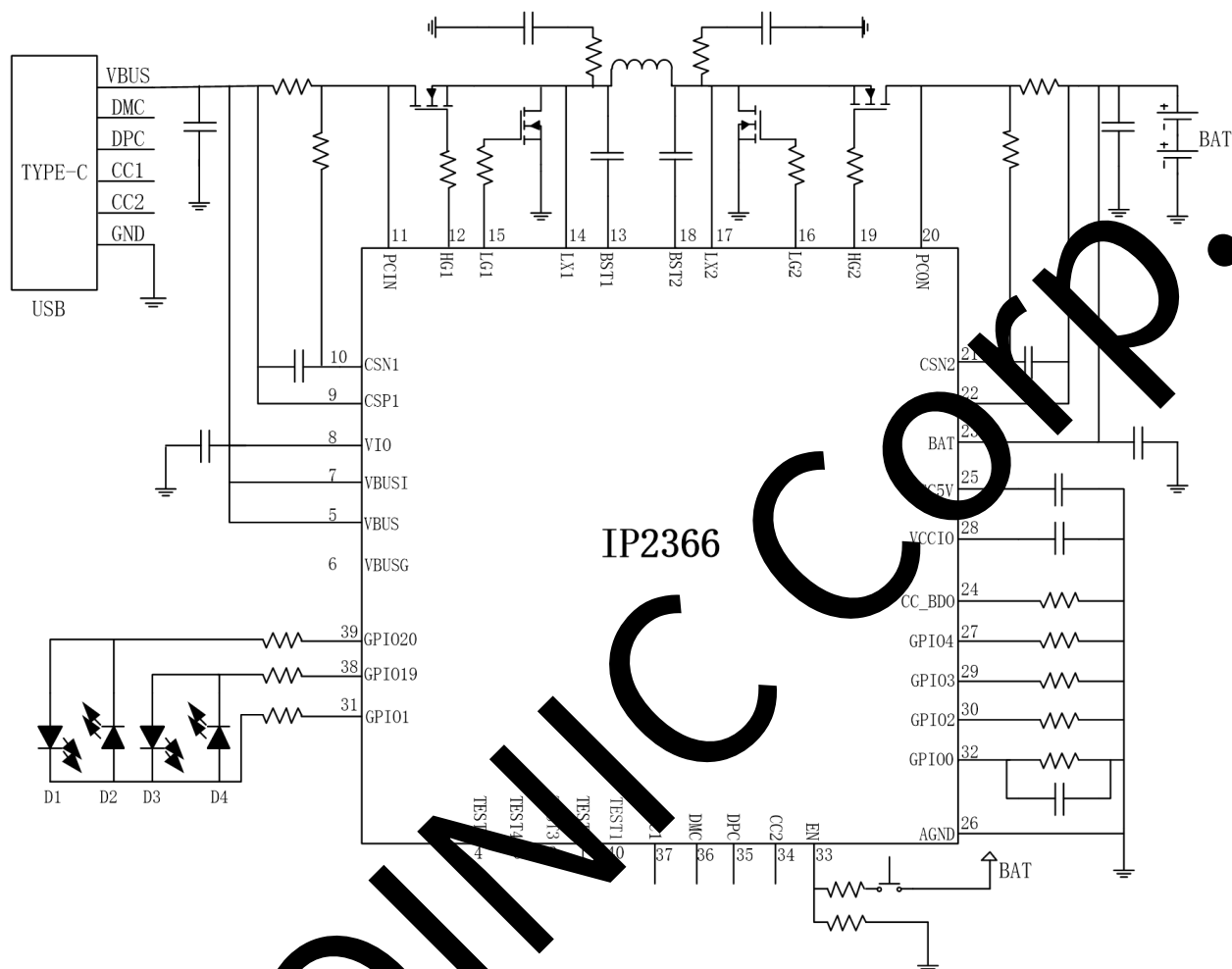
page number

- Increase PIN Select function to set maximum power, number of battery strings, battery type description.....15
- Add lights, NTC, Button Function Description..... 16 Add standard
- models and I2C Model Application Schematic.....19

First edition released V1.00 (2022 Year 11 month)

INJOINIC Corp.

5Simplified Application Schematic



picture1 IP2366Simplified Application Schematic

6Pin Definition

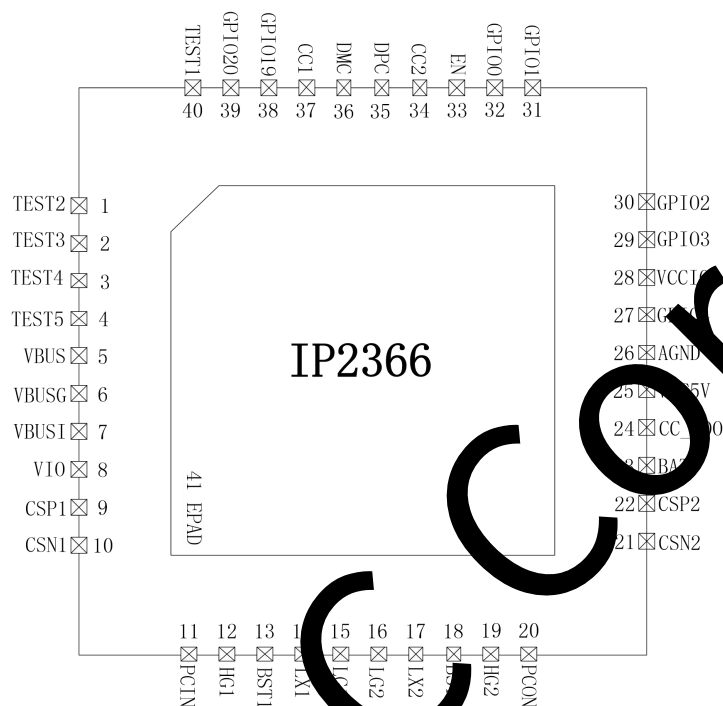


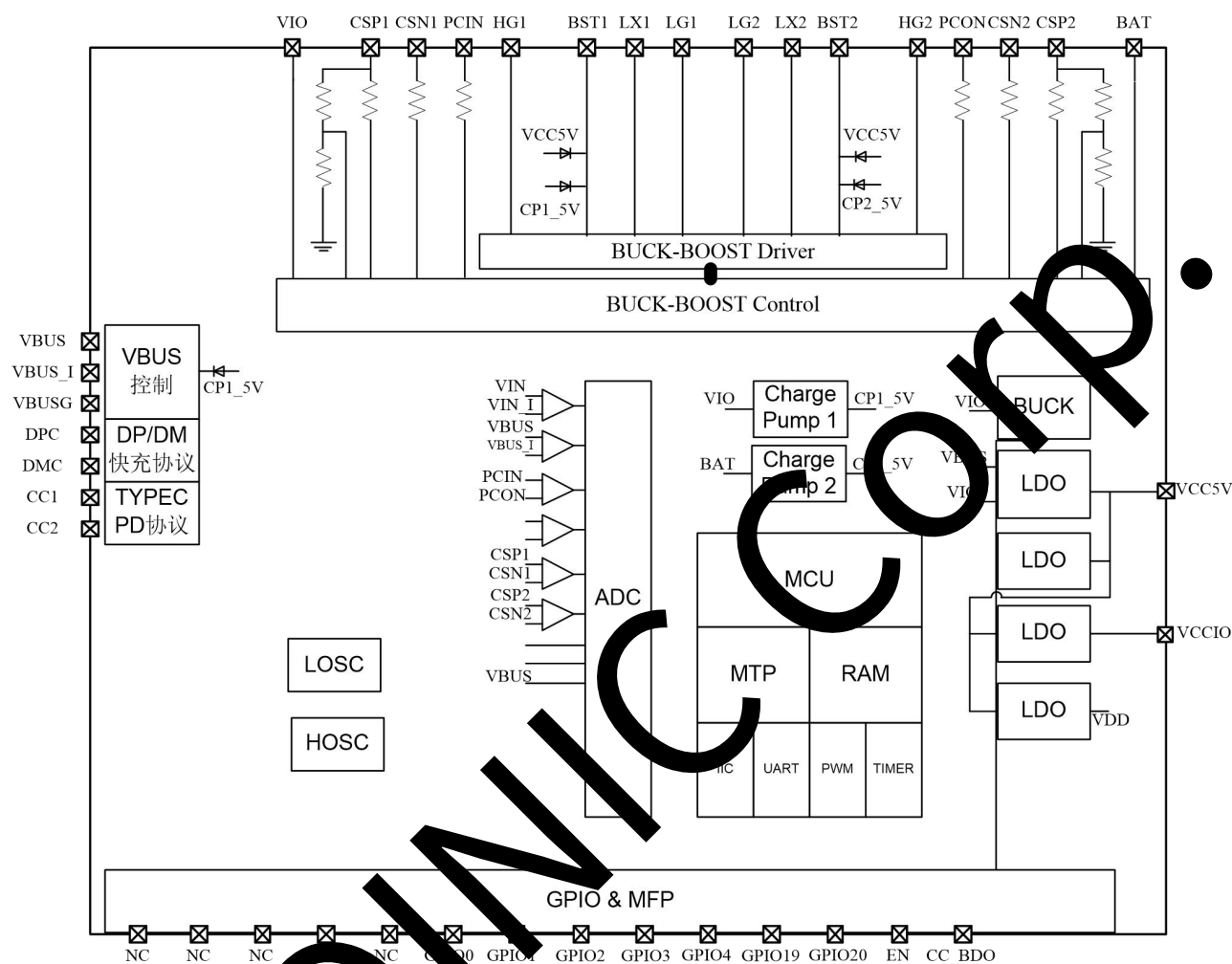
Figure 2 IP2366Pin Diagram

6.1Pin Description

Pin Number	Pin Name	PINDefinition
1	TEST2	Test point, floatingNC
2	TEST3	Test point, floatingNC
3	TEST4	Test point, floatingNC
4	TEST5	Test point, floatingNC
5	VBUS	VBUSInput detection pin
6	V B	VBUSInput PathNMOSControl pin
7	VBUSI	VBUSInput path current sense pin
8	VIO	Power input pin
9	CSP1	Input current sampling positive terminal
10	CSN1	Input current sampling negative terminal
11	PCIN	Input peak current sensing pin
12	HG1	HBridge power tube input end upper tube control pin

13	BST1	HBootstrap voltage pin for bridge power tube input
14	LX1	Input inductor connection pin
15	LG1	HBridge power tube input lower tube control pin
16	LG2	HBridge power tube output battery end lower tube control pin
17	LX2	Battery terminal inductor connection pin
18	BST2	HBridge power tube battery end bootstrap voltage pin
19	HG2	HBridge power tube battery end upper tube control pin
20	PCON	Battery terminal peak current sampling pin
twenty one	CSN2	Battery terminal average current sampling negative terminal
twenty two	CSP2	Battery current sampling positive terminal
twenty three	BAT	Battery power supply pin
twenty four	CC_BDO	In standby modeTYPECMode selection, grounding default discharging, floating connected to high default chargingUFP;
25	VCC5V	system5VPower supply, toICInternal analog circuit power supply
26	AGND	Analog Ground
27	GPIO4	BAT_NUMSet the number of batteries in series and connect the resistor to ground
28	VCCIO	system3.3VPower supply, toICInternal digital circuit power supply
29	GPIO3	PSETSet the maximum charging and discharge power of the system and connect the resistor to the ground
30	GPIO2	VSETSet the fully charged voltage of a single battery string and connect the resistor to ground
31	GPIO1	LED1 (I2CModel asI2C_INT)
32	GPIO0	NTCSet the protection temperature,NTCresistance
33	EN	ENWake up pin, connect to a button to wake up and shut down the device
34	CC2	USB-CPort detection and fast charge communication pinCC2
35	DMC	USB-CFast charging intelligent identificationDP
36	DMC	USB-CFast charging intelligent identificationDM
37	CC1	USB-CPort detection and fast charge communication pinCC1
38	GPIO19	LED2 (I2CModel asI2C_SDA)
39	GPIO20	LED1 (I2CModel asI2C_SCL)
40	TEST1	Test point, floatingNC
41	GND	The system ground and heat sink ground need to be kept consistent withGNDGood contact

7Chip internal block diagram



picture3 Chip internal block diagram

8 Limit parameters

parameter	symbol	value	unit
BATVoltage range	V _{BAT}	- 0.3 ~ 35	V
VBUSVoltage range	V _{VBUS}	- 0.3 ~ 30	V
BST1/HG1-LX1Voltage range	V _{BST1/HG1-LX1}	- 0.3 ~ 6	V
BST2/HG2-LX2Voltage range	V _{BST2/HG2-LX2}	- 0.3 ~ 6	V
VIOVoltage range	V _{VIO}	- 0.3 ~ 30	V
LX1/BST1/HG1/LX2/BST2/HG2 Voltage range	V _{LX1/BST1/HG1} V _{LX2/BST2/HG2}	- 0.3 ~ 50	V
CSP2/CSN2/PCIN Voltage range	V _{CSP2/CSN2/PCIN}	- 0.3 ~ 35	V
CSP1/CSN1/PCON Voltage range	V _{CSP1/CSN1/PCON}	- 0.3 ~ 35	V
CC1/CC2 Voltage range	V _{CC1/CC2}	0.3 ~ 30	V
DMC/DPC Voltage range	V _{DMC/DPC}	- 0.3 ~ 22	V
numberGPIOVoltage range	V _{GPIO}	- 0.3 ~ 8	V
Junction temperature range	T _J	- 40 ~ 125	°C
Storage temperature range	T _s	- 60 ~ 150	°C
Thermal resistance (junction to ambient)	θ _{JA}	45	°C/W
Human body model (HBM)	ESD	4	KV

*Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device.

Excessive exposure time may affect the reliability and service life of the device

9 Recommended operating conditions

parameter	symbol	Minimum	Typical Value	Maximum	unit
Input and output voltage	VBUS	4.5		28	V
Battery voltage	VBAT			32	V
Operating temperature	T _A	- 40		85	°C

* Device operational characteristics are not guaranteed outside these operating conditions.

10 Electrical Characteristics

Unless otherwise specified, TA=25°C, L=10μH

parameter	symbol	Test conditions	Minimum	Typical Value	Maximum	unit
Charging System						
Input voltage	V _{BUS}		4.5	5/9/12/15/ 20/28	30	V
Input overvoltage	V _{BUS}	Rising voltage	28.5	29	30	V
Peak current	I _{L_PK}	Inductor peak current limit			15	A
Trickle charge current	I _{TRKL}	V _{BUS} =5V, V _{BAT} <2.5V	30	50	70	mA
		V _{BUS} =5V, 2.5V≤V _{BAT} <V _{TRKL}	100	200	300	mA
Trickle cut-off voltage	V _{TRKL}	The number of battery cells is N, V _{TRGT} No 3.65V	N*2.9	N*3	N*3.1	V
		The number of battery cells is N, V _{TRGT} =3.65V	N*2.9	N*2.95	N*2.85	V
Charging constant voltage	V _{CV}	The number of battery cells is N, R _{VSET} = 18K	N*4.36	N*4.40	N*4.44	V
		The number of battery cells is N, R _{VSET} = 13K	N*4.25	N*4.35	N*4.39	V
		The number of battery cells is N, R _{VSET} = 9.1K	N*4.16	N*4.20	N*4.24	V
		The number of battery cells is N, R _{VSET} = 6.2K	N*4.06	N*4.10	N*4.14	V
		The number of battery cells is N, R _{VSET} = 3.6K	N*3.6	N*3.65	N*3.7	V
Charging Current	I _{CHG}	V _{BUS} =5V, input current	2.7	3.0	3.3	A
		V _{BUS} =9V, PD quick charge, Input Current P _{MAX} ≥30W	2.7	3.0	3.3	A
		V _{BUS} =9V, No PD, not charging, Input Current	1.8	2.0	2.2	A
		V _{BUS} =12V, PD Fast charging, Input Current P _{MAX} =30W	2.0	2.25	2.5	A
		V _{BUS} =12V, PD Fast charging, Input Current P _{MAX} ≥45W	2.7	3.0	3.3	A
		V _{BUS} =12V, No PD Fast charging, Input Current P _{MAX} ≥27W	1.3	1.5	1.7	A
		V _{BUS} =15V, PD and nonPD, input power flow P _{MAX} =30W	1.8	2.0	2.2	A
		V _{BUS} =15V, PD and nonPD, input power flow P _{MAX} ≥45W	2.7	3.0	3.3	A
		V _{BUS} =20V, PD Fast charge, input current P _{MAX} =30W	1.3	1.5	1.7	A
		V _{BUS} =20V, PD Fast charge, input current P _{MAX} =45W	2.0	2.25	2.5	A
		V _{BUS} =20V, PD Fast charge, input current P _{MAX} =60W	2.7	3.0	3.3	A
		V _{BUS} =20V, PD Fast charge, input current P _{MAX} =65W	3.0	3.25	3.6	A
		V _{BUS} =20V, PD Fast charge, input current P _{MAX} ≥100W	4.3	4.7	5.1	A
		V _{BUS} =20V, No PD Fast charging, input power P _{MAX} =30W	1.3	1.5	1.7	A
		V _{BUS} =20V, No PD Fast charging, input power P _{MAX} =45W	2.0	2.25	2.5	A

		flow	PMAX>=60W	2.7	3.0	3.3	A
		VBUS=28V,No PDFast charging, input power flow	PMAX=140W	4.3	5.0	5.3	A
Charging and stopping current	I _{STOP}				100		mA
Recharge Threshold	V _{RCH}	The number of battery cells isN			V _{TRGT} – N*0.1		V
Charging deadline	T _{END}				48		Hour
Discharge system							
Battery operating voltage	V _{BAT}	The number of battery cells isN		N*2.75		N*4.5	V
Switch working battery Input Current	I _{BAT}	VBAT=6*3.7V, VOUT=5.0V, fs=250kHz, Iout=0mA					mA
DCOutput voltage	QC2.0 V _{OUT}	V _{OUT} =5V@1A		4.7	5.00	5.25	V
		V _{OUT} =9V@1A		8.7	9	9.30	V
		V _{OUT} =12V@1A		11.60	12	12.40	V
	QC3.0/ QC3+ V _{OUT}	@1A		3.6		12	V
	QC3.0 Step				200		mV
	QC3+ Step				20		mV
Output voltage ripple	ΔV _{OUT}	VBAT=6*3.7V, VOUT=5.0V, fs=250kHz, Iout=1A			150		mV
		VBAT=6*3.7V, VOUT=9.0V , fs=250KHz, Iout=1A			150		mV
Output voltage ripple	ΔV _{OUT}	VBAT=6*3.7V, VOUT=12V,fs=250KHz, Iout=1A			150		mV
		VBAT=6*3.7V, VOUT=15V,fs=250KHz, Iout=1A			150		mV
		VBAT=6*3.7V, VOUT=20V,fs=250KHz, Iout=1A			150		mV
		VBAT=6*3.7V, VOUT=28V,fs=250KHz, Iout=1A			200		mV
Discharge system maximum Output Power	P _{max}	PDUnder the Agreement				140	W
Discharge system efficiency	η _{out}	V _{IN} =6*3.0 V, V _{OUT} =28V, I _{OUT} =5A			96.0		%

		V _{BAT} =6*3.7V, V _{OUT} =28V, I _{OUT} =5A		96.5		%
		V _{BAT} =6*4.2V, V _{OUT} =28V, I _{OUT} =5A		96.5		%
		V _{BAT} =6*3.0V, V _{OUT} =20V, I _{OUT} =5A		96.0		%
		V _{BAT} =6*3.7V, V _{OUT} =20V, I _{OUT} =5A		96.5		%
		V _{BAT} =6*4.2V, V _{OUT} =20V, I _{OUT} =5A		96.5		%
Discharge system overcurrent Shutdown current	I _{shut}	V _{BAT} =N*3.7V, Output5V	3.0	3.3	3.6	A
		V _{BAT} = N*3.7V, Output9V, NoPDstate	2.4	2.7	3.0	A
		V _{BAT} = N*3.7V, Output12V, NoPDstate	1.8	2.0	2.2	A
		V _{BAT} = N*3.7V, OutputPDstate		1.0*1.1		A
Load overcurrent detection time	T _{UVD}	The output voltage is continuously lower than2.4V		30		ms
Load short circuit detection time	T _{OCd}	The output voltage is continuously lower than2.2V		40		μs
Control System						
Switching frequency	fs	Discharge switching frequency		250		kHz
		Charging switching frequency		250		kHz
VCC5VOutput Voltage	V _{CC5V}		4.75	5	5.25	V
VCC5VOutput Current					30	mA
VCCI0Output Voltage	V _{CCI0}		3.15	3.3	3.45	V
VCCI0Output Current					30	mA
Battery standby power flow	I _{STB}	V _{BAT} =22V, shut down1Average current after minutes		5	10	μA
ledDisplay Drive current	I _{L1} I _{L2}	Voltage drop10%	5	7	10	mA
Thermal shutdown temperature	T _{OTP}	Rising temperature	110	125	140	°C
Thermal shutdown delay Hysteresis	ΔT _{OTP}			40		°C

11 Functional Description

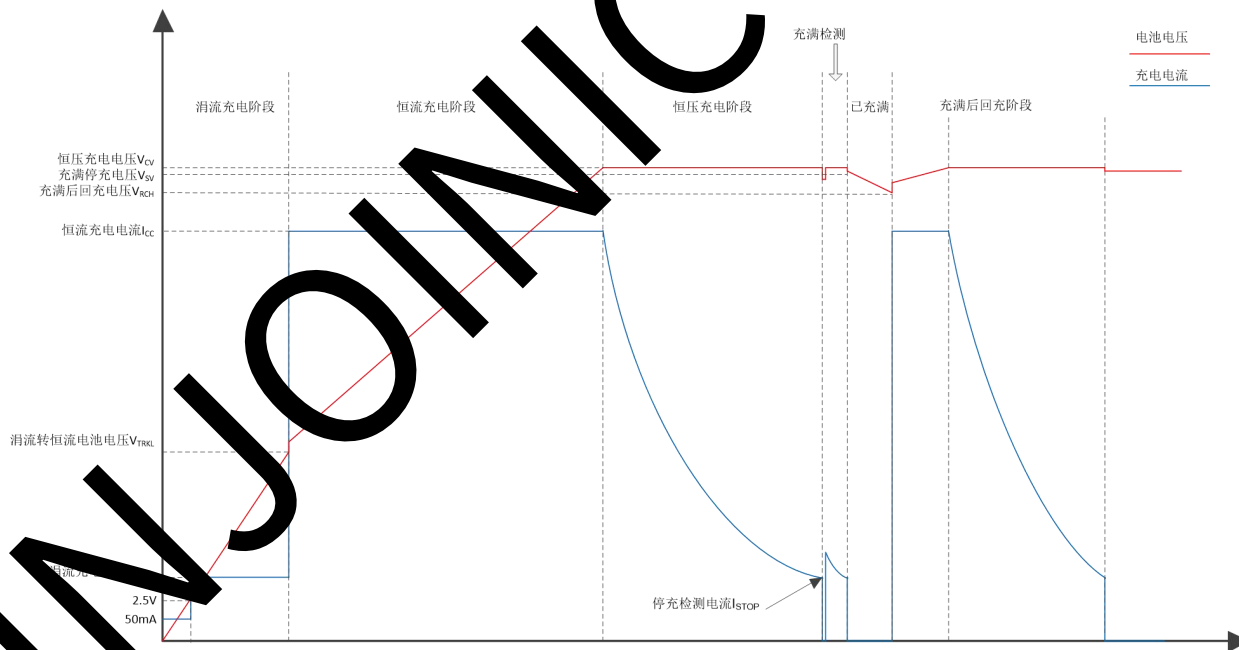
11.1 Charging function

IP2366 It has a constant current and constant voltage lithium battery charging management system that supports synchronous buck-boost switching structure. IP2366 Using switching charging technology, the switching frequency 250kHz.

IP2366 Different battery types, full voltage and charging power can be set through external resistors. 2/3/4/5/6/ The battery string setting can support a full charge voltage of 3.65V/4.1V/4.2V/4.35V/4.4V Different types of batteries; the maximum input charging power can reach 28V/5A(140W), the charging efficiency is the highest 96%;

IP2366 Support trickle-constant current-constant voltage charging process:

When the battery voltage $V_{BAT} \leq 2.5V$ When the battery is charged, it is a small current trickle charge. 50mA When the battery voltage $2.5V < V_{BAT} \leq V_{TRKL}$ When it is trickle charging, the battery charging current 200mA When the battery voltage $V_{TRKL} < V_{BAT} < V_{CV}$ When the battery voltage is $V_{BAT} = V_{CV}$ When the battery voltage rises to close to the full voltage, the charging current will slowly decrease and enter constant voltage charging; After entering constant voltage charging, when the battery charging current is less than I_{STOP} When the battery voltage is close to the constant voltage, charging stops and the battery enters the full charge state. After entering the full charge state, the battery voltage will continue to be detected. $V_{BAT} < V_{RCH}$ After that, it will restart charging;



picture4 Schematic diagram of battery charging process

IP2366 Integrated AFC/FCP/PD2.0/PD3.0/PD3.1 Enter the fast charge protocol, you can Type-Coral DPC/DMC/CC1/CC2 Apply for fast charging voltage from the fast charging charger, and it will automatically adjust the charging current to adapt to chargers with different load capacities.

When charging with a charger without fast charging or DC power supply, IP2366 The charging current is set according to the input voltage:

Input voltage	Maximum input current during constant current charging
$4.5 < V_{BUS} \leq 6.5V$	3A
$6.5 < V_{BUS} \leq 9.5V$	2A
$9.5 < V_{BUS} \leq 13.5V$	1.5A
$13.5 < V_{BUS} \leq 16.5V$	5A
$16.5 < V_{BUS} \leq 24V$	5A
$24 < V_{BUS} \leq 29V$	5A

Note: When the actual charging power is greater than the set maximum input power limit, the charging current will also be reduced;

IP2366 Support Huawei FCP, SCP and Samsung AFC Fast charging input protocol, when using support Huawei FCP, SCP and Samsung AFC When charging the charger input, IP2366 The highest input voltage will be applied, and the constant current charging current will be set according to the above input voltage level;

IP2366 support PD2.0/PD3.0/PD3.1 Enter the protocol, when using PD When charging with a fast charging adapter, IP2366 Will read the adapter sent PD information packet, and then based on the received PD information packet to apply charging voltage and set charging current; when received PD When the packet power is less than the set charging demand power, the charging current will be automatically reduced to make the maximum power at the input end less than or equal to the power given by the adapter. PD Broadcast power;

11.2 Discharge function

IP2366 integrated USB Type_C input and output identification interface, automatically switch built-in pull-up and pull-down resistors, and automatically identifying the charge and discharge properties of the inserted device. Try SRC function, when connected to the other party DRP, when the device is connected, it can give priority to discharging externally and charging the other party.

IP2366 Supports various fast charging protocols: PD2.0/PD3.0/PD3.1, QC2.0/QC3.0/QC3+, FCP, AFC, SCP, Apple.

IP2366 support EMARK Identification of cables.

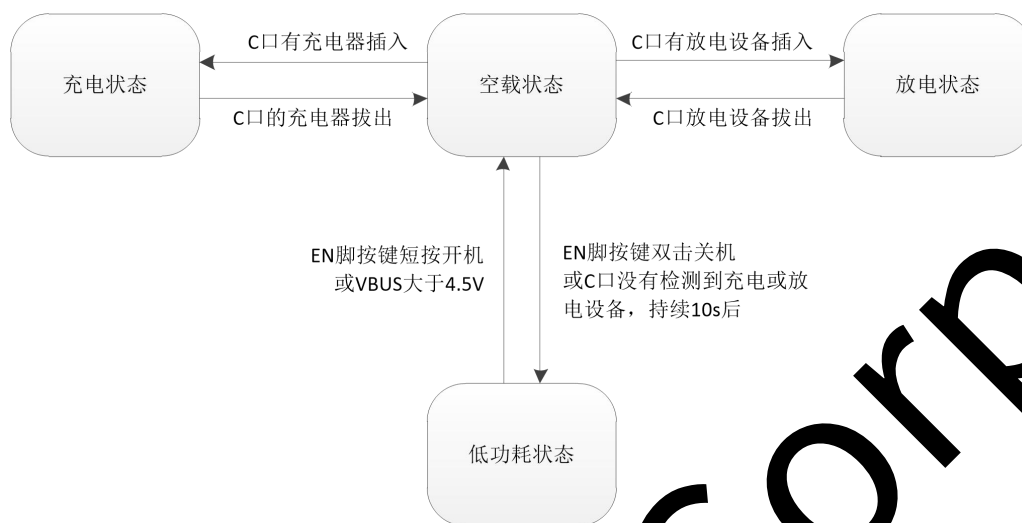
IP2366 support PD2.0/PD3.0/PD3.1 Output protocol, maximum supported 140W Power output;

IP2366 support EMARK Cable identification will broadcast different PD information packets, broadcast externally at different power settings PD The information packet is as follows:

The most set Large output power Rate	Not recognized EMARK Cables	Identify MARK After the cable
140W	5V/3A, 9V/3A, 12V/3A, 15V/3A, 20V/3A	5V/3A, 9V/3A, 12V/3A, 15V/3A, 20V/5A, 28V/5A
100W	5V/3A, 9V/3A, 12V/3A, 15V/3A, 20V/3A	5V/3A, 9V/3A, 12V/3A, 15V/3A, 20V/5A
75W	5V/3A, 9V/3A, 12V/3A, 15V/3A, 20V/3A	5V/3A, 9V/3A, 12V/3A, 15V/3A, 20V/3.25A
60W	5V/3A, 9V/3A, 12V/3A, 15V/3A, 20V/3A	
45W	5V/3A, 9V/3A, 12V/3A, 15V/3A, 20V/2.25A	
30W	5V/3A, 9V/3A, 12V/2.5A, 15V/2A, 20V/1.5A	

IP2366 Available through DP/DMPin support QC2.0/QC3.0/QC3+, FCP, AFC, SCP, and Apple phones 2.4A model, BC1.2 ordinary Android cell phone 1A model.

11.3 State Transition Description



picture5 System state transition diag

11.4 Input and output maximum power setting

IP2366 By judging PSET The resistance value connected to the pin sets the maximum input and output power of the system.

RPSET	Corresponding to the set maximum power P _{MAX}
27k	140W
18k	100W
13k	65W
9.1k	60W
6.2k	45W
3.6k	30W

11.5 Setting the number of batteries in series

IP2366 By judging RBAT_NUM The resistance value connected to the pin sets the number of batteries in series.

RBAT_NUM	Corresponding to the set number of batteries connected in series
27k	7string
18k	6string
13k	5string
9.1k	4string
6.2k	3string
3.6k	2string

11.6 Battery type setting

IP2366 By judging RVSET The resistor value connected to the pin sets the battery type.

RVSET	Corresponding battery type (single battery full voltage)
27k	4.2V(Print)
18k	4.4V
13k	4.35V
9.1k	4.2V
6.2k	4.1V
3.6k	3.65V

Note: When RVSET is less than 27k After the resistor, RVSET The foot will enable the print output function.

11.7 NTC Function

IP2366 Integrated NTC Function to detect battery temperature. IP2368 After power on NTC PIN Output at high temperature 80uA The current output at low temperature 20uA Current, through external NTC Resistors generate voltage, IC Internal testing NTC PIN The voltage on the pin is used to determine the current battery temperature.

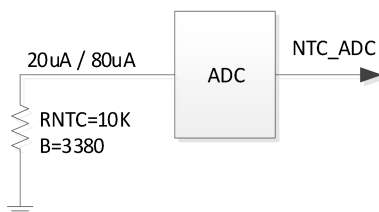


Figure 6 Battery NTC comparison

When charging: NTC Temperature below 0°C (0.55V) stops charging, 0~45°C Normal charging between degrees, the temperature exceeds 45°C (0.39V) to stop charging.

In discharge state: the temperature is lower than -20°C (1.39V), stop discharging, -20°C to 60°C Normal discharge between degrees, higher than 60°C (0.24V) stop discharging;

exist NTC After detecting temperature abnormality, the temperature is restored to the protection temperature $\pm 5^\circ\text{C}$. The above brackets are corresponding to VCCPin voltage, calculated as: $\text{NTC} \times \text{The current discharged by the foot} \times \text{NTC Resistor value}$.

The above temperature range is referenced NTC. The resistance parameters are $10\text{K}@25^\circ\text{C}$, $B=3380$, other models have differences and need to be adjusted. If the solution does not require NTC, need to NTC pin to ground 10k. The resistor cannot be floating or directly grounded.

11.8 Light display function

IP2366 support 4, 2, 1. The power indicator solution is as follows.

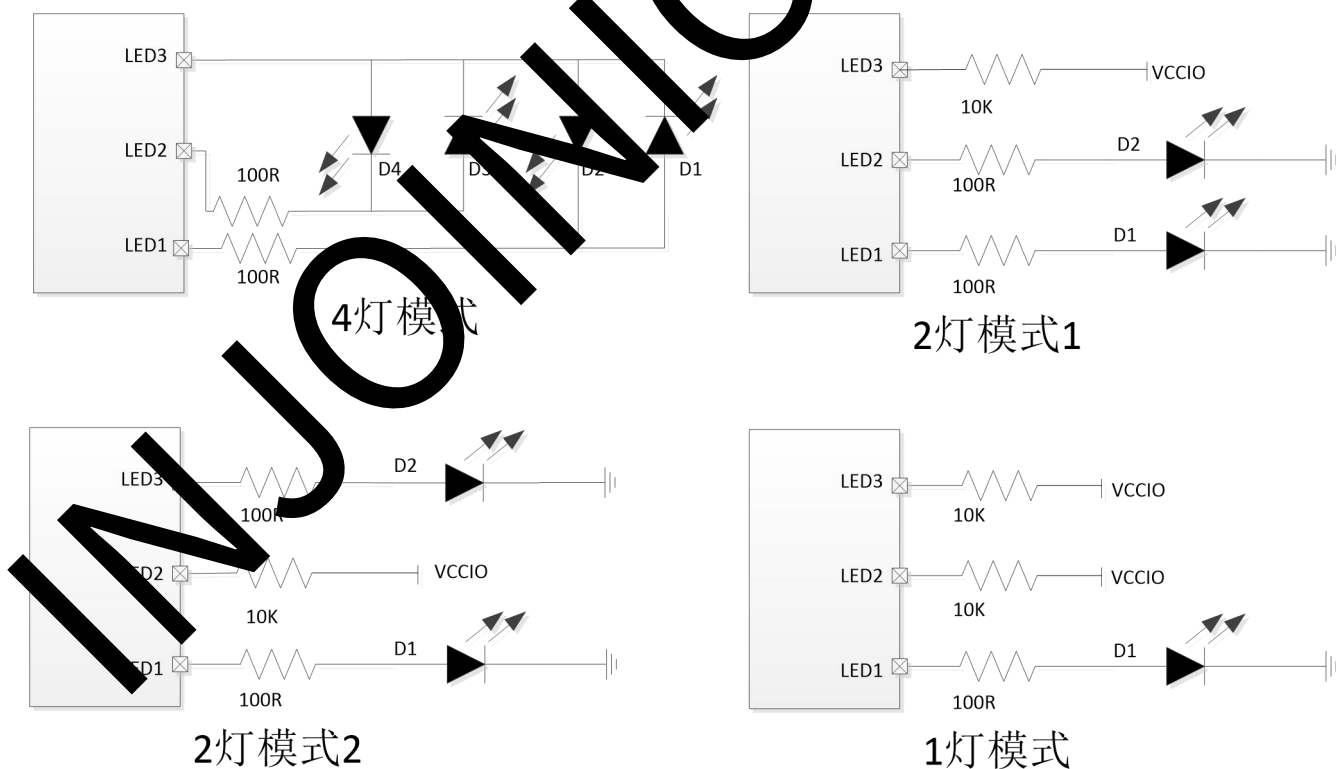


Figure 7

4.2.1 LED connection method

4The lights are displayed as follows:

During normal charging

PowerC(%)	D1	D2	D3	D4
full	Bright	Bright	Bright	Bright
$75\% \leq C$	Bright	Bright	Bright	0.5HzFlash
$50\% \leq C < 75\%$	Bright	Bright	0.5HzFlash	Destroy
$25\% \leq C < 50\%$	Bright	0.5HzFlash	Destroy	Destroy
$C < 25\%$	0.5HzFlash	Destroy	Destroy	Destroy

During normal discharge

PowerC(%)	D1	D2	D3	D4
$75\% \leq C$	Bright	Bright	Bright	Bright
$50\% \leq C < 75\%$	Bright	Bright	Bright	Destroy
$25\% \leq C < 50\%$	Bright	Bright	Destroy	Destroy
$C < 25\%$	Bright	Destroy	Destroy	Destroy
$C = 0$	Flash4Second-rate	Destroy	Destroy	Destroy

Flash4Second-rate(250msBright250msThe discharge stops after the battery is turned off.

2Light Mode1The display mode is two-color light:

Normal charging

PowerC(%)	D1	D2
full	Destroy	Bright
$66\% \leq C < 100\%$	Destroy	0.5HzFlash
$33\% \leq C < 66\%$	0.5HzFlash	0.5HzFlash
$C < 33\%$	0.5HzFlash	Destroy

During normal discharge

PowerC(%)	D1	D2
$66\% \leq C < 100\%$	Destroy	Bright
$33\% \leq C < 66\%$	Bright	Bright
$C < 33\%$	Bright	Destroy
$C = 0$	Flash4Second-rate	Destroy

Flash4Second-rate(250msBright250msThe discharge stops after the battery is turned off.

2Light Mode2The display mode is:

ChargingD1BrightD2After the fullD1DestroyD2On; abnormal chargingD1andD2Flashing simultaneously (250msBright250msDestroy)

Discharging D1 Always on, C=0hour D1 Flash 4 Second-rate (250ms Bright 250ms Off) The discharge stops after the battery is turned off.

1 The light modes are displayed as follows:

Charging D1 Flashing (1s on, 1s off), after full charge, D1 is always on; abnormal charging D1 Fast flashing (250ms Bright 250ms Off) Discharging D1

Always on, C=0hour D1 Flash 4 Second-rate (250ms Bright 250ms Off) The discharge stops after the battery is turned off.

11.9 CC_BDO set up

IP2366 of CC_BDO Pin used to set the low power state CC1/CC2. The default state: CC_BDO. When the pin is floating or at a high level, CC1/CC2 Default drop-down, IP2366 As SINK equipment; CC_BDO Pin connection 1K. When the resistor is connected to ground, CC1/CC2 Default pull-up, IP2366 As SOURCE equipment.

11.10 Key functions

IP2366 Supports key function, the key connection method is as shown in the figure 8 As shown.

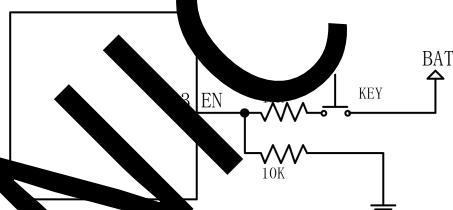


Figure 8 EN button connection method

EN The pin voltage is greater than 1.2V, lasting longer than 100ms, less than 2s, which is a short press action; after entering the low power mode, a short press will turn on the power indicator light and enter the no-load state. If a charging and discharging device is detected, it will enter the corresponding charging and discharging state; in the no-load state, continue 10s. If no charging or discharging device is detected, it will enter a low power consumption state. 1s Continuous 2A short press will also shut down the device and enter low power consumption mode, turning off the battery indicator and discharge output.

EN The pin voltage is greater than 1.2V, lasting longer than 10s, the system will reset.

12 Application Schematic

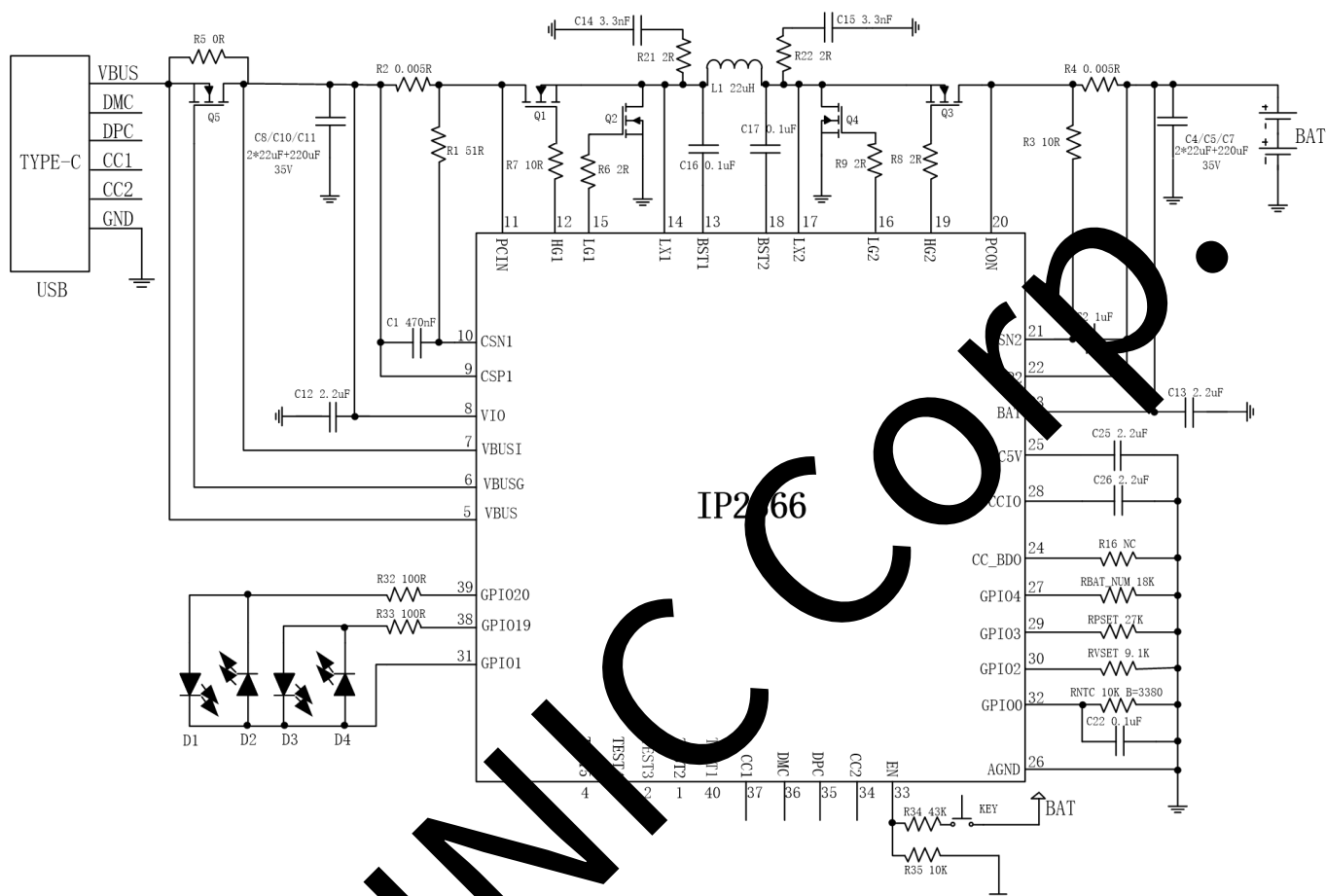


Figure 9 Standard Model Application Schematic

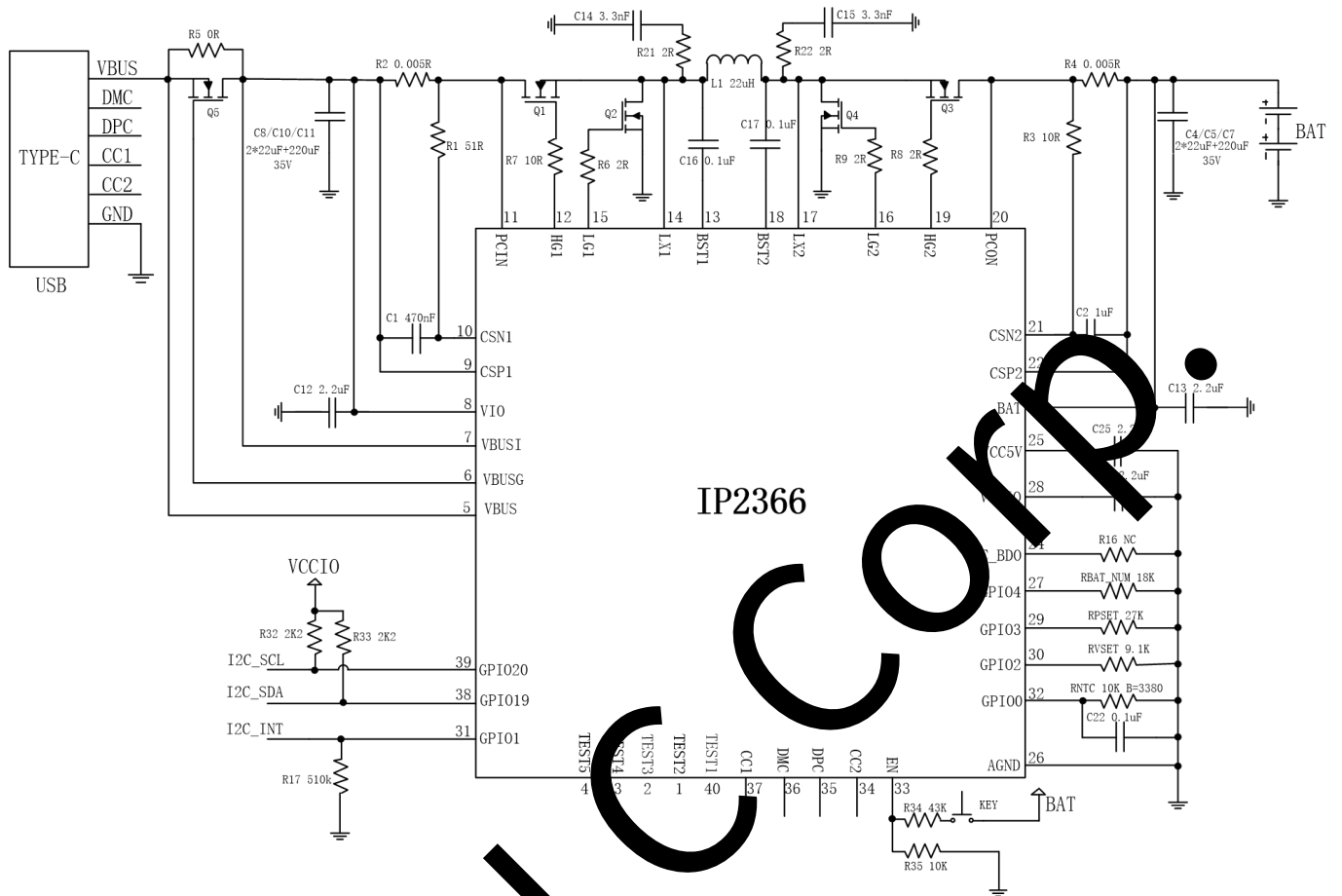


Fig.10 Application Schematic

13 BOM

Serial number	Component Name	Models & Specifications	Location	use quantity	Remark
1	PatchesIC	QFN40 IP2366	U1	1	
2	Chip Capacitors	0603 100nF 10% 50V	C3,C16,C17	3	
3	Chip Capacitors	0603 1μF 10% 35V	C1,C2,	2	
4	Chip Capacitors	0603 2.2μF 10% 35V	C12,C13	2	
5	Chip Capacitors	1210 22μF 10% 35V	C4,C5,C10,C11	4	
6	Solid state capacitors	220μF 35V 10%	C7,C8	2	
7	Chip resistors	1206 0.005R 1%	R2,R4	2	Sampling resistor, high precision low temperature floating metal film resistance
8	Chip resistors	0603 100R 5%	R32,R33,R17	3	I2CmodelR32,R33for 2K2Pull up toVCCIO, R17for510KPull down to land
9	Patchesled	0603 LEDlamp	D1,D2,D3,D4	4	I2CModel omitted
10	Chip resistors	0603 10R 1%	R1,R3	2	
11	Buck-boost inductor	22μH 15A R _{DC} <0.01R	L1	1	
12	USB-CSeat	USB-CSeat	USB	1	
13	PatchesMOSTube	AER4061BE	Q2,Q3,Q4,Q5	4	
14	Chip resistors	0603 43K	R34	1	
15	Chip resistors	0603 10K	R35	1	
16	Chip resistors	0603 2R	R6, R8, R9, R21, R22	5	
17	Chip resistors	0603 51R	R1	2	
18	PatchesMOSTube	RU3030-12	Q5	1	NC, Pass certification stickerQ5,
19	Chip resistors	1206 0R	R5	1	When certifiedNC

14Packaging information

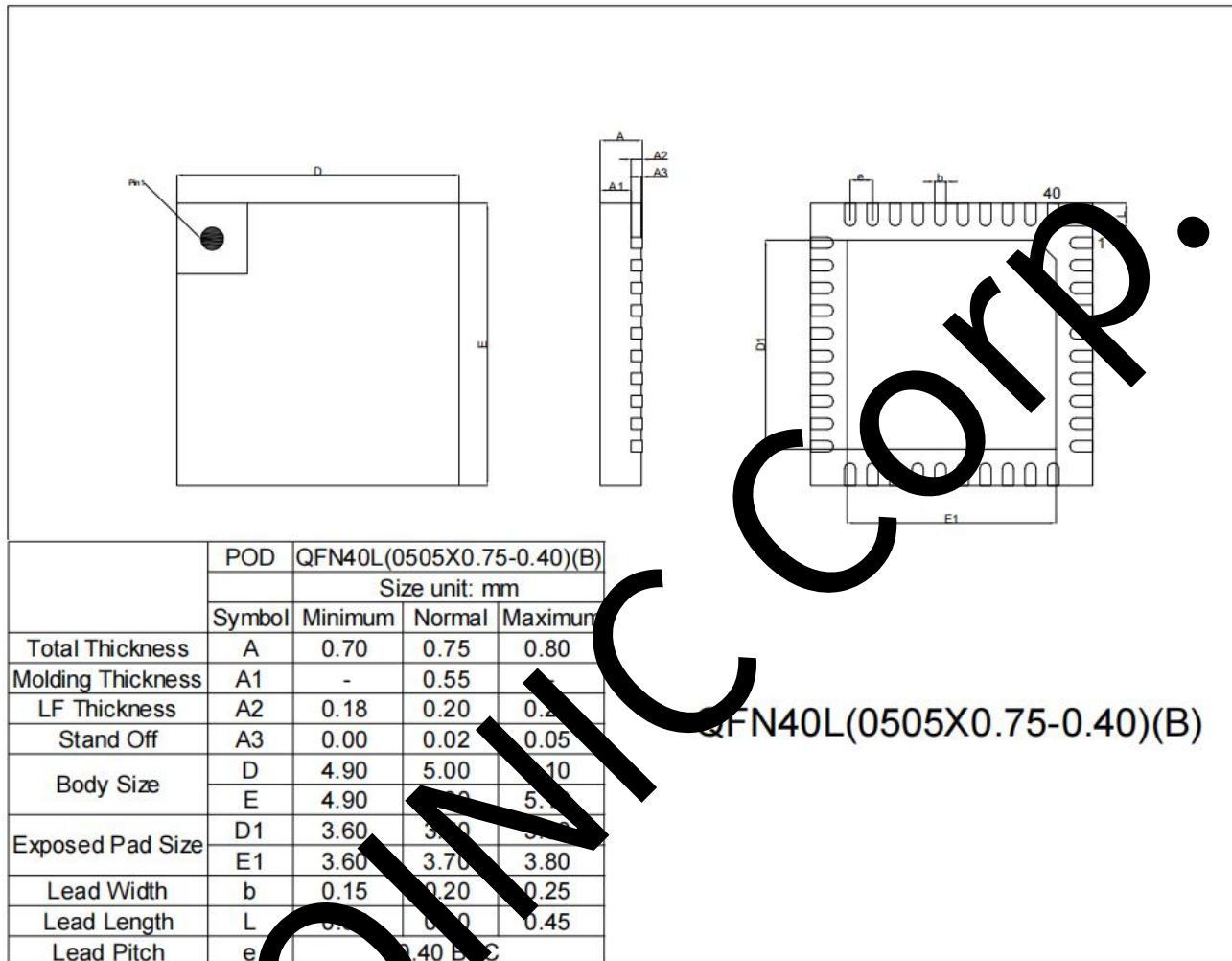


Fig.11 Package Diagram

15Silk screen instructions



Fig.12 Silk screen

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