IP6831

2W Wireless Charging and Receiving Chip
Conforming to QI Standard

1 Features

- **High integration single chip wireless charging and receiving scheme**
- ✧ Conform to WPC Qi BPP control standards
- ✧ Built-in efficient synchronous rectifier circuit
- **Dynamic rectifier voltage control**
- ✧ Enhanced transient performance
- ✧ Optimize on-load efficiency
- **Minimalist peripheral circuit, simple application, low cost**
- **Specially optimized for small and irregular coils to enhance coil compatibility**
- **Support 18V overvoltage protection**
- **Perfect over temperature, over voltage and over current protection**
- **super-low reverse leakage current**
- **Package:QFN16 (3mm*3mm)**

2 Applications

- TWS Earphone, Mouse
- Smart Wearable Products
- Health Medical Equipment Such As Hearing AIDS
- Low Power Handheld Device
- WPC Qi Compatible Wireless Charging Receiving Device

3 Description

IP6831 is a wireless charging receiver chip with high integration, high efficiency and Conforming to WPC Qi standard. Due to the internal integration of efficient synchronous rectifier circuit, power output circuit, reverse protection circuit, IP6831 provides extremely low heat loss and good application experience. The integrated dynamic rectifier voltage control of IP6831 effectively improves the transient response and system efficiency of the chip.

IP6831 adopts QFN16 (3mm*3mm) package and compact peripheral circuit, which greatly saves PCB board area and can be easily integrated into compact products. At the same time, the chip optimizes the overall impedance, greatly reduces the heat of the chip, and improves the charging performance of small-space product applications. In addition, the chip can change the output voltage through the external resistance, increasing the flexibility of the chip application, while the design does not add extra heat to the chip.

The design of IP6831 is optimized for the application of small coil and irregular coil, which enhances the support for all kinds of coil and improves the freedom experience of customer concern.

Contents

4 Reversion History

Note: Page numbers of previous editions may differ from those of the current edition.

5 Simplify application
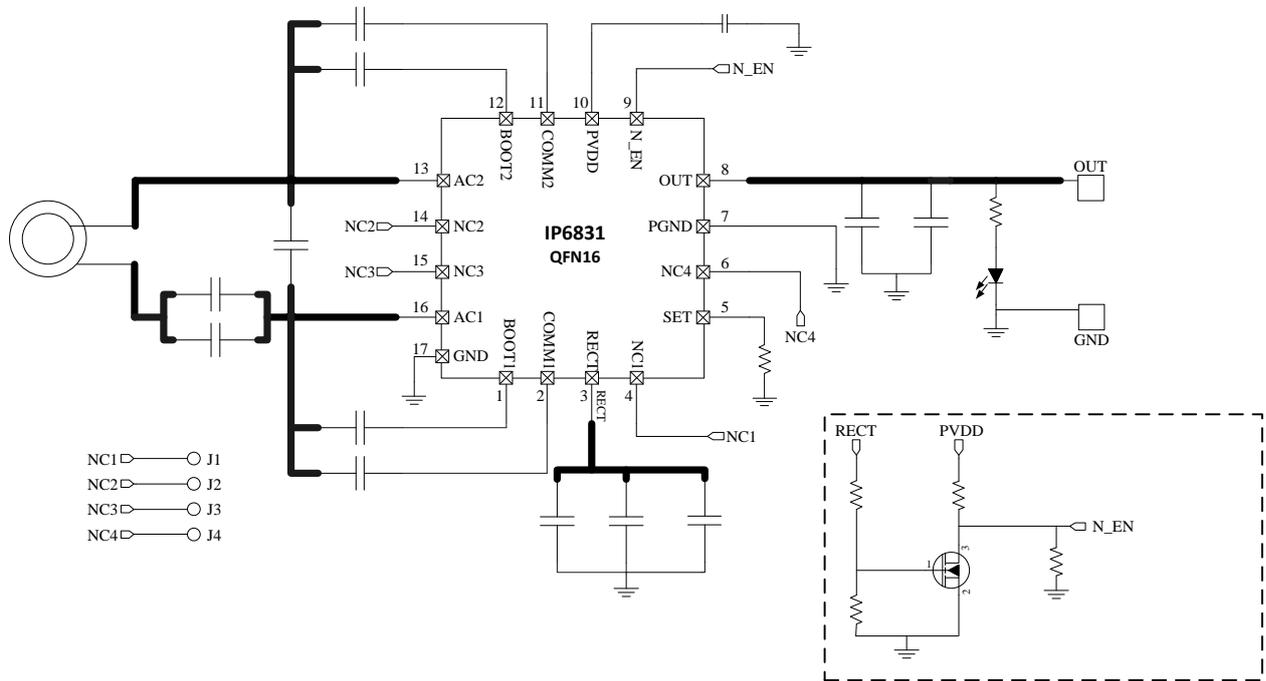
Figure 1   IP6831 Simplified Application Diagram

6 Pin Configuration And Function
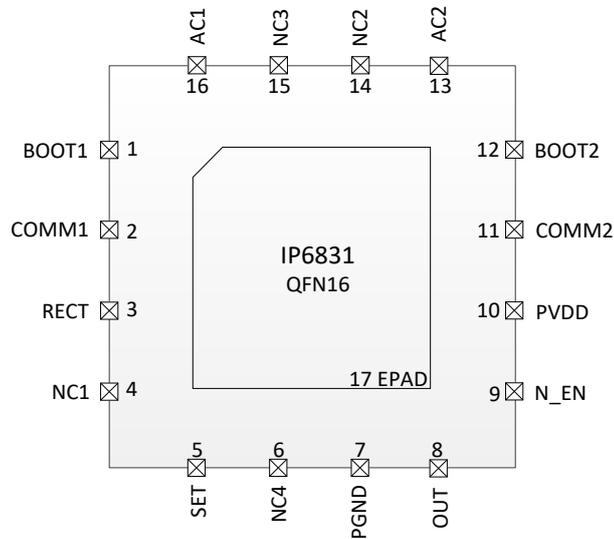
Figure 2   IP6831 Pin Assignments

Num	Name	I/O	Description
1	BOOT1	O	External bootstrap 10nf capacitor pin of synchronous rectifier circuit
2	COMM1	O	Communication signal modulation pin, connect an external modulation capacitor 22nF
3	RECT	O	Rectifier circuit output, connect an external filter capacitor
4	NC1	-	NC
5	SET	I	Internal setting pin, connect an external 100 kΩ resistor to GND
6	NC4	-	NC
7	PGND	-	Power ground
8	OUT	O	Power output pin, external filter capacitor
9	N_EN	I	Chip enable signal, active low
10	PVDD	O	Internal power supply, connect an external 1μF capacitor to GND
11	COMM2	O	Communication signal modulation pin, connect an external modulation capacitor 22nF
12	BOOT2	O	External bootstrap 10nf capacitor pin of synchronous rectifier circuit
13	AC2	I	Receive coil input
14	NC2	-	NC

15	NC3	-	NC
16	AC1	I	Receive coil input

7 Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted)

Parameter	Symbol	Min	Typ	Unit
Input Voltage	AC1/2	-0.8	20	V
	RECT, COMM1/2	-0.3	20	V
	BOOT1/2	-0.3	25	V
	SET, N_EN, OUT	-0.3	7	V
Input Current	AC1/2		1	A
Output Current	OUT		500	mA
Pull-down Current	COMM1/2		500	mA

*Device performance cannot be guaranteed when working beyond these Recommended Operating Conditions.

7.1 Thermal parameters

Parameter	Description	Vaule	Unit
TOP	operating temperature	0 to +85	℃
TSTG	Storage temperature	-55 to +150	℃

*Stresses beyond these listed parameter may cause permanent damage to the device.

Exposure to Absolute Maximum Rated conditions for extended periods may affect device reliability.

8 Electrical Characteristics

Unless otherwise specified，TA=0°C ~85°C

Parameter		Test Conditions	Min	Typ	Max	Unit
Rectifier circuit parameters						
$V_{RECT-UV}$	RECT Low voltage protection	V_{RECT}: 0V→3.3V	2.5		2.7	V
	Hysteresis voltage			0.25		
$V_{RECT-OVP}$	RECT Overvoltage protection	V_{RECT}: 5V→20V		18		V
	Hysteresis voltage			2		
Static current						
I_{RECT*}	Active IC, RECT Static current	I_{LOAD}=0	5	8	12	mA
		I_{LOAD}=200mA	1,4	2	3	
RECT DPM						

Parameter		Test Conditions	Min	Typ	Max	Unit
$V_{RECT-DPM}$	Rectifier low voltage protection		3.5		4.5	V
Output parameters						
V_{OUT*}	Output voltage		5.0		5.1	V
I_{OUT_Max}	Maximum load current				400	mA
Digital level						
N_EN	VIH		1.5			V
	VIL				0.6	
Communication frequency						
F_{COM}	Communication frequency between RX and TX			2		kHz
Thermal Protection						
T_{J-OFF}	Overheat protection temperature			155		℃
	Overheat hysteresis temperature			40		

1. I_{RECT*} : When there is no load, the system has a Dummy Loading stability loop to avoid oscillation, improve communication quality and stabilize packet sending.

9 Typical Application Diagram
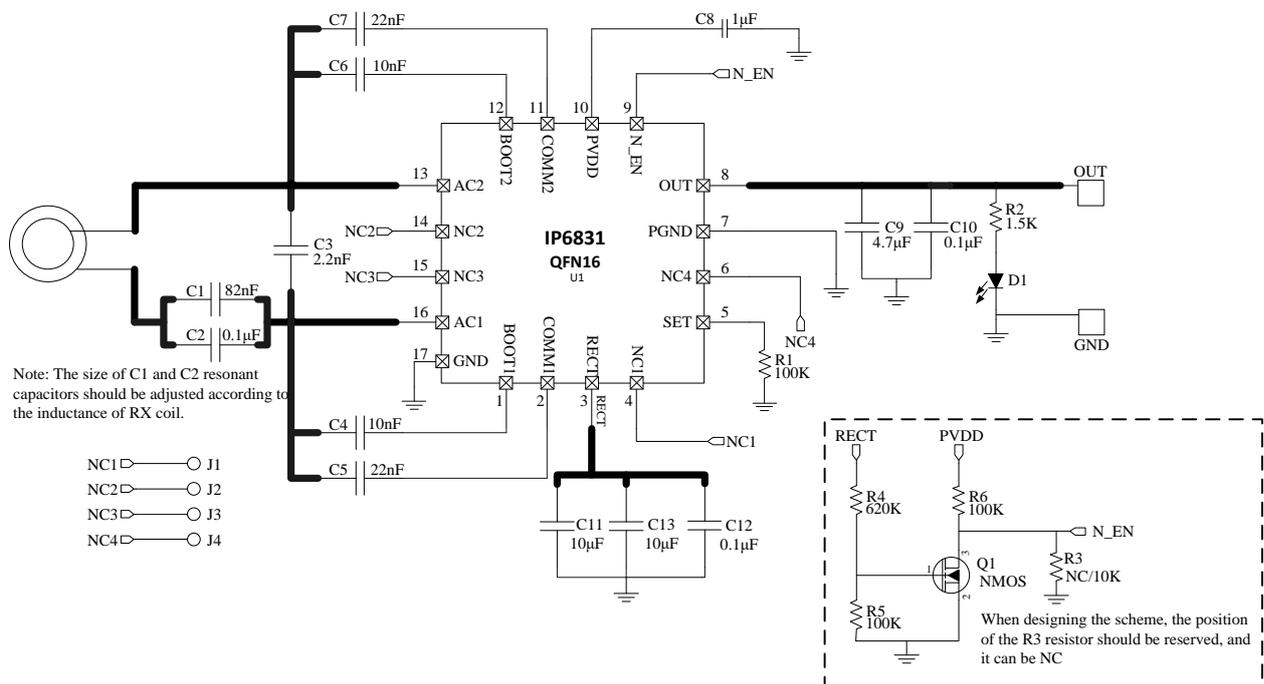
Figure 3   IP6831 Typical Application Diagram

10 Package

QFNWB3x3-16L (P0.50T0.60) Package Outline Dimensions
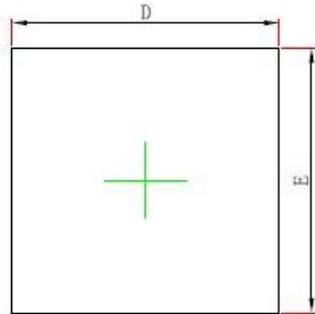
Top View
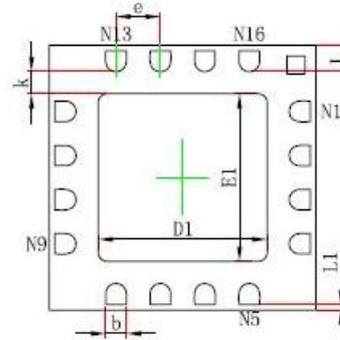
Bottom View
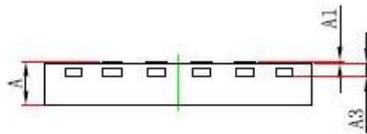
Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.450/0.500/0.550	0.550/0.600/0.650	0.018/0.020/0.022	0.022/0.024/0.026
A1	0.000	0.050	0.000	0.002
A3	0.152REF.		0.006REF.	
D	2.924	3.076	0.115	0.121
E	2.924	3.076	0.115	0.121
D1	1.800	2.000	0.071	0.079
E1	1.800	2.000	0.071	0.079
k	0.200MIN.		0.008MIN.	
b	0.230	0.330	0.009	0.013
e	0.500TYP.		0.020TYP.	
L	0.250	0.350	0.010	0.014
L1	0.013	0.113	0.000	0.004

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