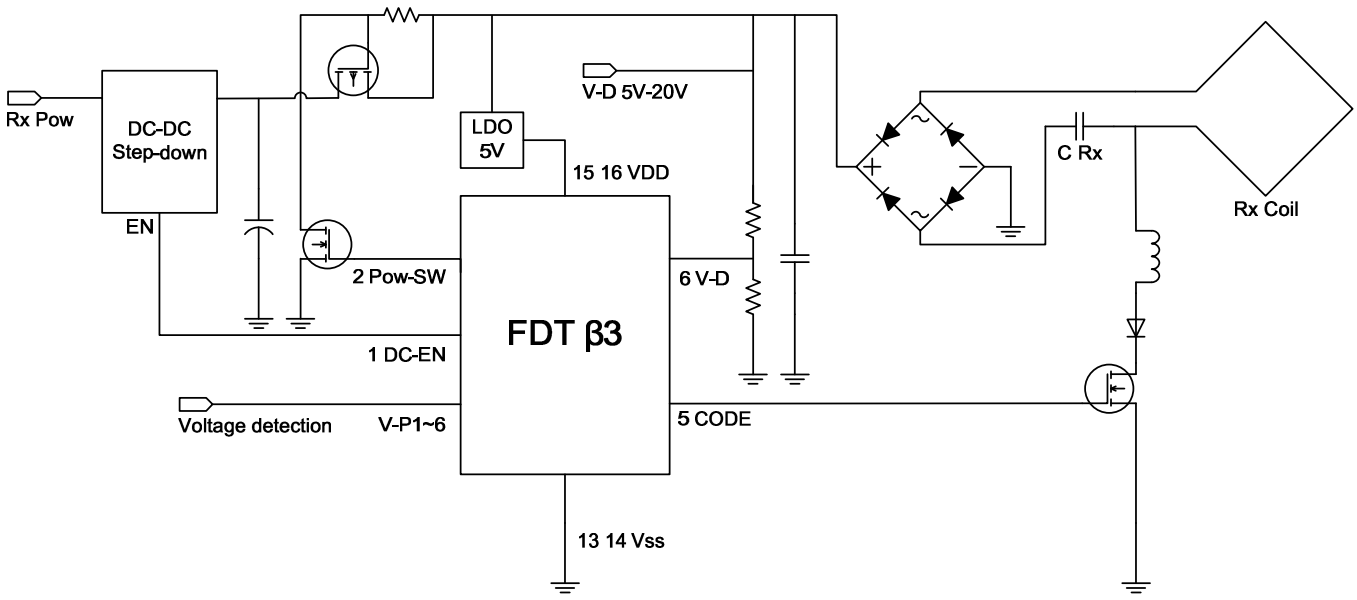
FEATURES

- Signal receiving IC of wireless power supply system.
- Operation power subject to the transmits signal from α3 Tx.
- Signal feedback when system is activated.
- Signal feedback when power efficiency automatic justification.
- Prevent from power overload by multi-detective points.
- Provided the code mechanism by advanced technology and several patent protections.
- Micro package of QFN-16.
- Function along with α3 transmission IC.

APPLICATIONS

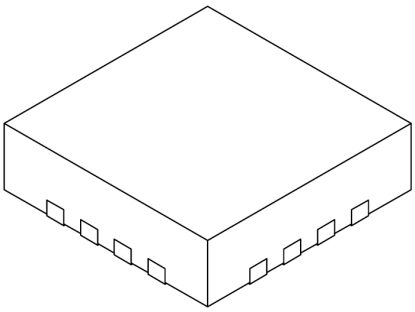
- Wireless power supply system for under 40W.
- Effective sensing distances less than 20mm between transmission & receiving.
- Wireless power supply system for smart phone and e-book application products.
- Easily mass-produced by provided application circuit.

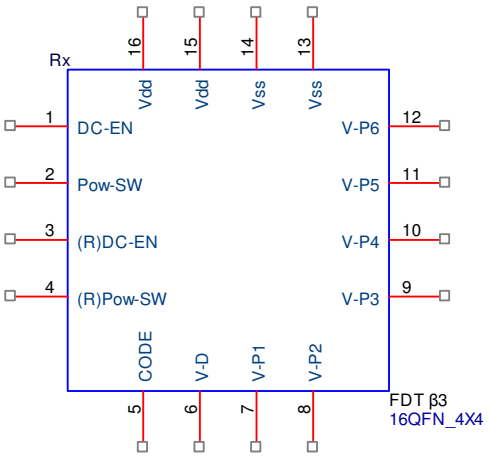
TYPICAL APPLICATION CIRCUIT



IC PACKAGE and PIN FUNCTION

QFN-16 , 4X4X0.9mm





PIN FUNCTIONS

Pin #	Name	Description
1	DC-EN	Control initiation signal of back-end DC-DC step-down IC.
2	Pow-SW	Control switch signal of back-end power supply channel.
3	(R)DC-EN	Control positive and negative signals of DC-EN. When this pin is GND, DC-EN outputs Hi potential to initiate back-end DC-DC step-down IC. This pin is typical GND.
4	(R) Pow-SW	Control positive and negative signals of Pow-SW. When this pin is GND, Pow-SW outputs Hi potential with the need to lead the back-end power supply. This pin is typical GND.
5	CODE	Output pin of the feedback signal from Rx to Tx.
6	V-D	Detecting signal of voltage in primary stage after coil sensing for Tx to analyze and adjust.
7-11	V-P1 ~ V-P5	Detecting voltages of other pins in the system. When the voltage is more than 1/2, Vdd will cut off. Rx outputs power, and Tx still transmits power. If this pin is not used, please connect it to GND.
12	V-P6	Detection pin of stopping power supply. If this pin is GND, it notifies Tx to stop supplying power and leads Tx LED to keep bright. Under regular power supply mode, this pin is not connected to any objects.
13 14	Vss	System Ground
15 16	Vdd	Operating power supply of IC. Standard voltage is 5V.

ABSOLUTE MAXIMUM RATINGS

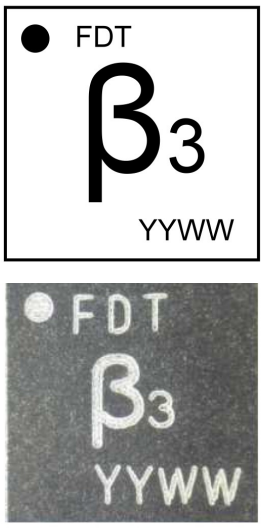
Parameter	Value		Units
	Min	Max	
Working environment temperature	-40	+85	℃
Storage temperature	-65	+150	℃
Relative voltage of Vdd pin to Vss pin	-0.3	+6.5	V
Relative voltage of other pins to Vss pin	-0.3	Vdd+0.3	V
Largest input current of Vdd		80	mA
Largest output current of Vss		80	mA
Largest output current of other pins		25	mA

ELECTRICAL CHARACTERISTICS

Parameters	Symbol	Condition	Min	Typ	Max	Units
Operating Voltage	Vdd	Standard (1)	4.5	5	5.5	V
Supply Current (In operation)	I	Standard (1)		1.5	2	mA

(1) Design for typical use of circuit

Marking Details



● ： **Pin 1 indicator**

FDT ：Fa Da Tong Technology

β3 ：B3RX, Product Name

YYWW：Date code

ORDERING INFORMATION

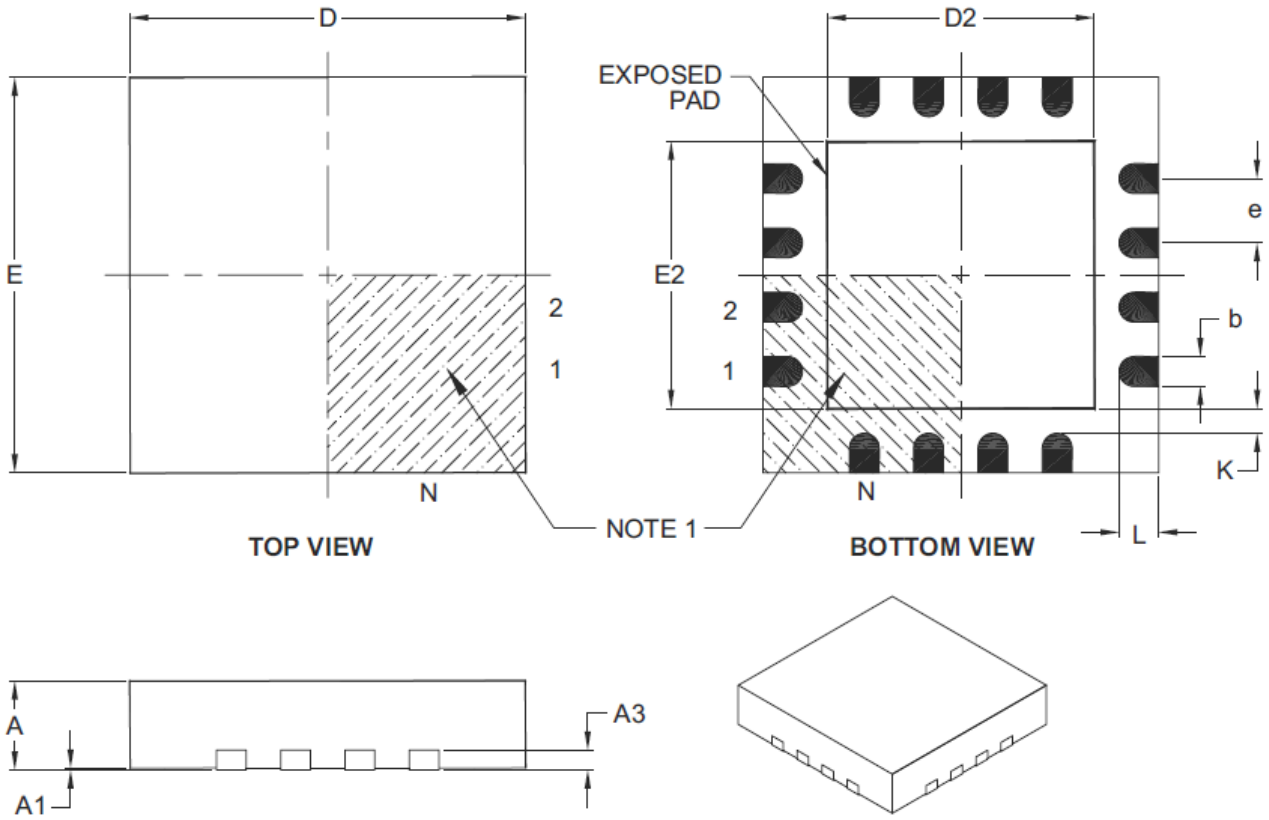
Part Number	Package	Top Marking	Free Air Temperature (TA)
FDT-B3RX-QFN16	QFN16	FDT β3	- 40℃ TO + 85 ℃

PACKING INFORMATION

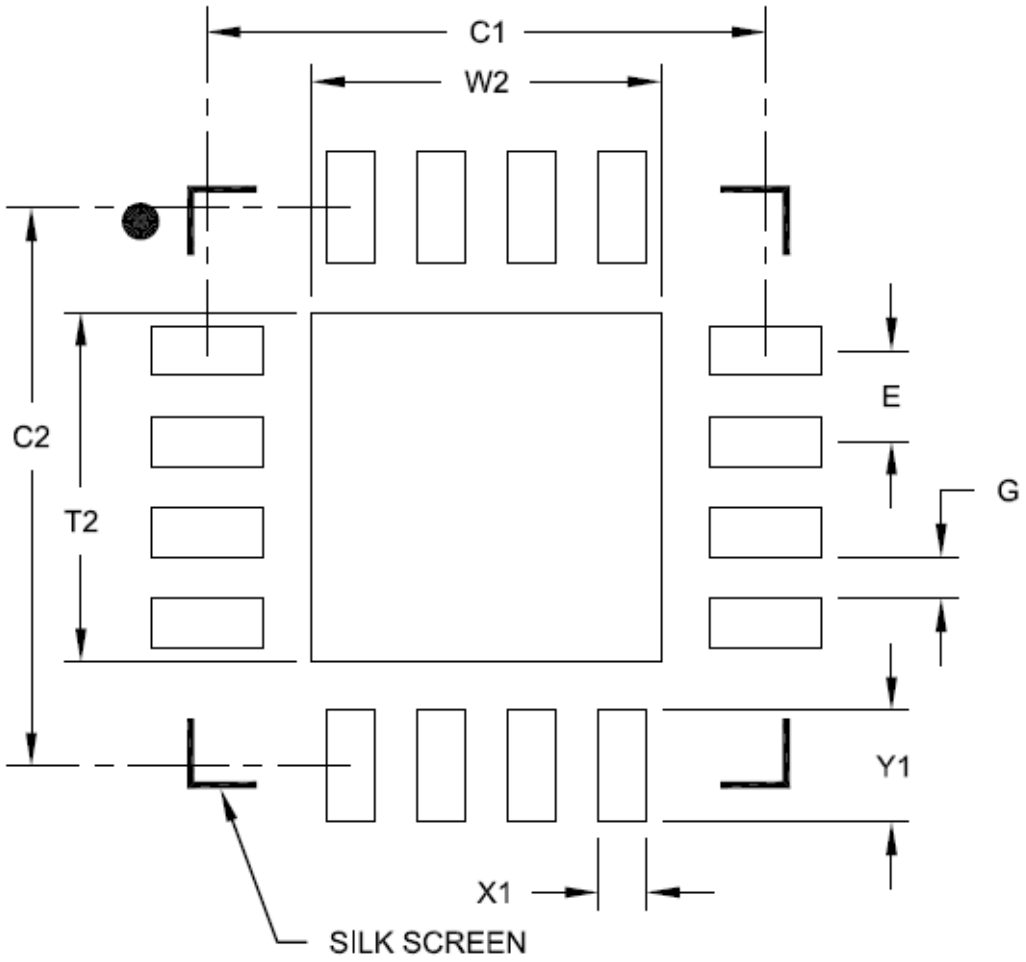
Part Number	Package	Packing	Single Purchase Quantity
FDT-B3RX-QFN16	QFN16	TUBE	91 PCS
FDT-B3RX-QFN16	QFN16	TAPE & REEL	3000 PCS

PACKAGE INFORMATION

4X4X0.9mm Body QFN16



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N		16	
Pitch	e		0.65 BSC	
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Contact Thickness	A3		0.20 REF	
Overall Width	E		4.00 BSC	
Exposed Pad Width	E2	2.50	2.65	2.80
Overall Length	D		4.00 BSC	
Exposed Pad Length	D2	2.50	2.65	2.80
Contact Width	b	0.25	0.30	0.35
Contact Length	L	0.30	0.40	0.50
Contact-to-Exposed Pad	K	0.20	–	–



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E		0.65 BSC	
Optional Center Pad Width	W2			2.50
Optional Center Pad Length	T2			2.50
Contact Pad Spacing	C1		4.00	
Contact Pad Spacing	C2		4.00	
Contact Pad Width (X16)	X1			0.35
Contact Pad Length (X16)	Y1			0.80
Distance Between Pads	G	0.30		

Recommended coil design and capacitance

The theory of wireless charging system transmitting and receiving wireless charging power is based on the coil inductance and capacitance resonance. The resonant frequency is been decided by both coil and capacitance, which are the key to the system operation. IC α 3 has been designed by advanced technology of adjusting resonant frequency automatically. However, when designing products, developers still need to set resonant frequency in reasonable range to let the system work.

At the start of designing wireless charging system, coil design is the first step. Next, with the setting of capacitance, the operating frequency should be in appropriate range.

Capacitor is common product, and its capacity increases or decreases fractionally. Hence, the suggested selection of capacitance is shown in the table below. The specification is common in the market. As shown in the table, the recommended resonant frequency is between 90KHz and 110KHz since the system will be most stable.

There may be different inductances between Tx coil and Rx coils, but the resonant frequencies of Tx and Rx can be set the same by fitting various capacitances. With this design, the system will work at best efficiency.

The technique of automatic adjusting of IC α 3 will allow system working under the condition of 20% differences of resonant frequencies between Tx and Rx. Nonetheless, the optimal design is still the same resonant frequencies of these two coils.

The table below is coil and capacitance cross-reference. After the completion and inductance measurement of coil, please refer to the table finding suitable capacitance. The best value of coil inductance will be between 10μH and 30μH.

Coil Inductance μH	Capacitor μF	Resonant Frequency	Design Suggestion
1	2.200	107.3 KHz	Inappropriate section: the sensibility of coil below 5μ is poor.
2	1.000	112.5 KHz	
3	0.680	111.4 KHz	
4	0.680	96.5 KHz	
5	0.470	103.8 KHz	
6	0.470	94.8 KHz	Feasible section: however, it is not the best system design.
7	0.330	104.7 KHz	
8	0.330	98.0 KHz	
9	0.330	92.4 KHz	
10	0.220	107.3 KHz	
11	0.220	102.3 KHz	Best section: system will operate most

12	0.220	98.0 KHz	efficiently.
13	0.220	94.1 KHz	
14	0.150	109.8 KHz	
15	0.150	106.1 KHz	
16	0.150	102.7 KHz	
17	0.150	99.7 KHz	
18	0.150	96.9 KHz	
19	0.100	115.5 KHz	
20	0.100	112.5 KHz	
21	0.100	109.8 KHz	
22	0.100	107.3 KHz	
23	0.100	104.9 KHz	
24	0.100	102.7 KHz	
25	0.100	100.7 KHz	
26	0.100	98.7 KHz	
27	0.100	96.9 KHz	
28	0.100	95.1 KHz	
29	0.082	103.2 KHz	
30	0.082	101.5 KHz	
31	0.082	99.8 KHz	
32	0.082	98.3 KHz	
33	0.082	96.8 KHz	
34	0.082	95.3 KHz	
35	0.068	103.2 KHz	Feasible section: however, it is not the
36	0.068	101.7 KHz	best system design.
37	0.068	100.3 KHz	
38	0.068	99.0 KHz	
39	0.068	97.7 KHz	
40	0.068	96.5 KHz	

Fu DA Tong (FDT) Technology
WWW.RFIDPOWER.COM.TW
10F-5, No.880, Chung-Cheng Rd.,
Chung-Ho City (235), Taipei County, Taiwan
Mail: rd-01@rfidpower.com.tw

