

TP6836

USB 2.4G RF Dongle

Data Sheet

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AMENDMENT HISTORY

Version	Date	Description
V1.0	Nov, 2011	New release

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1. GENERAL DESCRIPTION

The TP6836 is an 8051 embedded device tailored to the USB full speed Game Pad controller application. TP6836 is designed for connecting to PC. It also supports powerful functions and interfaces, such as USB Keyboard, USB Mouse, USB Joystick, USB HID, PWM 2 channels of Pulse Width Modulation, master/slave SPI and RF 2.4G and Bluetooth control interface, G-sensor control interface.

2. FEATURES

(1). Operation Frequency

- FAST mode: 24 MHz crystal oscillation with internal 48 MHz PLL at 5.0V for USB mode
- SLOW mode: Adjustable ext. R/C, RC oscillator at 2.0V~3.6V for battery system (optional)
- STOP mode

(2). On-Chip Memory

- 16k x 8 internal program OTP-ROM
- Internal RAM 256 bytes and external XRAM up to 384 bytes

(3). PWM

- Support 2 channels of Pulse Width Modulation (PWM) function with 8-bit resolution

(4). Reset Controller

- Power On Reset, Low Voltage Reset, Watch-Dog Timer, USB Plug-out Reset

(5). SPI interface

- Support Mode 0, 1, 2, 3
- 1x Master/Slave (Tx FIFO 8*8 bytes, Rx FIFO 8*8 bytes)
- Clock rate up to 6 Mbps

(6). Keep SRAM data when USB un-plug (need battery)

(7). I/O Ports

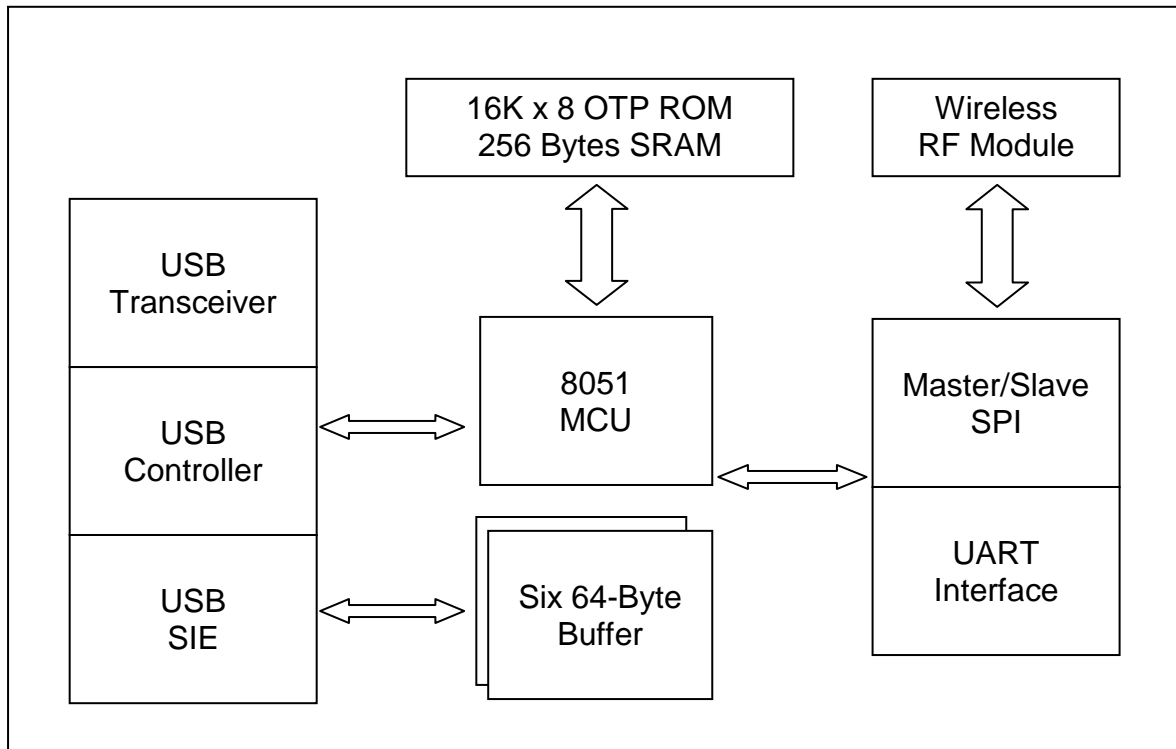
- 4 external Interrupts with wakeup function

(8). LQFP48/ Die Form

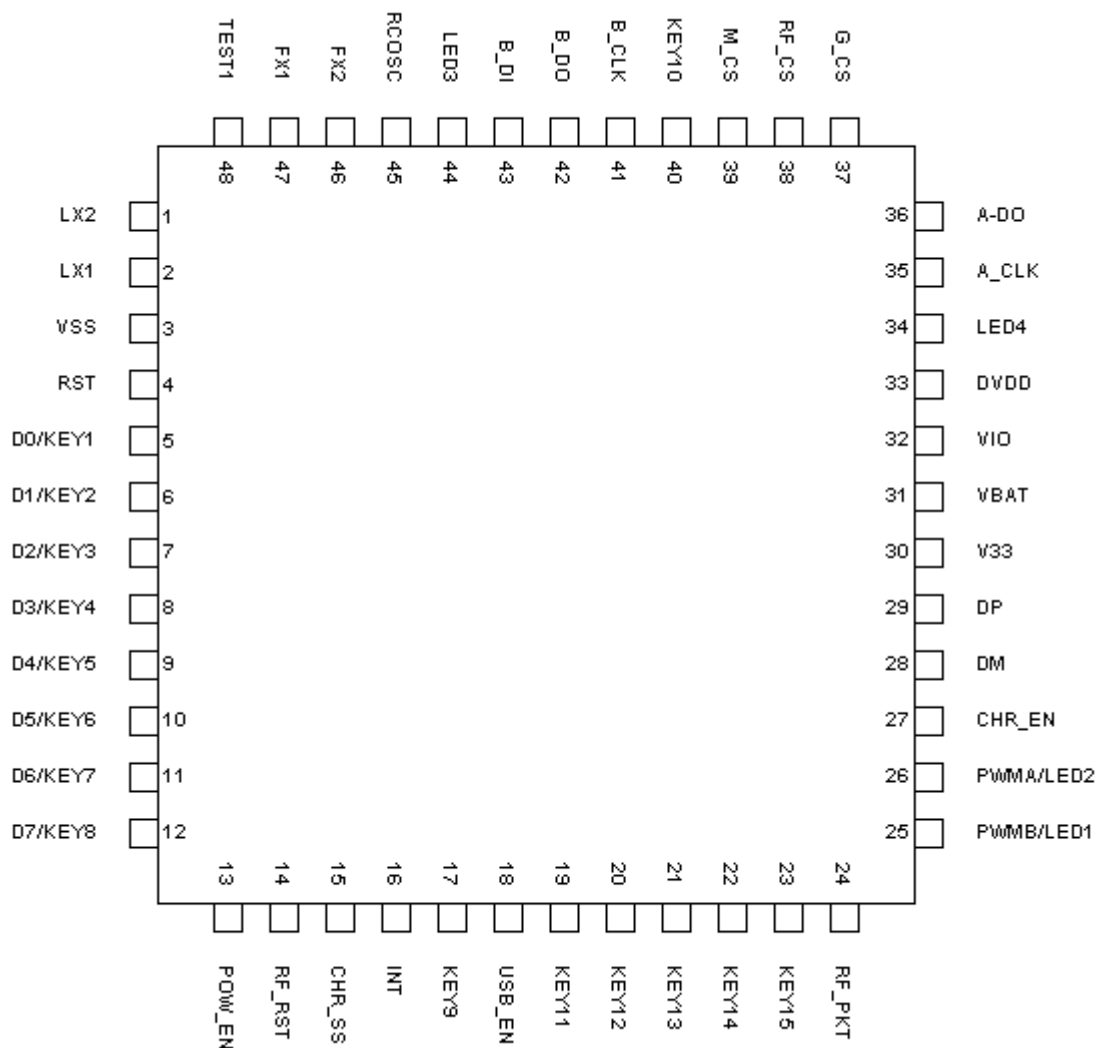
(9). Application

- Keyboard Dongle application
- Mouse Dongle application
- Presenter Dongle application
- Game Pad Dongle application
- RF 2.4G wireless Dongle application

3. Function Block Diagram



4. PIN Assignment



PIN Description

Name	I/O	Description
VDD	P	5V Power from USB cable
VSS	P	Ground
VBAT	P	Battery power
VIO	O	Chip I/O voltage (1.8V/3.0V/3.3V/5V/VBAT by chip configuration)
FX1	I	Crystal in (24 MHz)
FX2	O	Crystal out
LX1	I	Crystal in (32 KHz)
LX2	O	Crystal out
OSCI	I	RC clock, external capacitor and resistor
VPP/RESETn	I	OTP programming power/Chip reset pin
TESTn[1:0]	I	Test Mode control
V33	O	3.3V regulator output
DP	I/O	USB positive data signal
DM	I/O	USB negative data signal
D[7:0]	I/O	8051's D[0..7]
	I/O	KEY[1..19] Keys
CHR_EN	O	Battery charge enable
CHR_SS		Battery charge state
USB_EN	O	USB enable
RF_PKT	I	RF Packet flag
RF_RST	O	RF Reset
RF_CS	O	RF Chip enable
B_CLK		SPI DATA Clock
B_DO		SPI DATA Output
B_DI		SPI DATA In
RF_CS	O	RF Chip enable
G_CS	O	G-Sensor enable
M_CS	O	Memory enable
POW_EN	O	Low power mode enable
PWMA	O	LED2 and PWMA Output
PWMB	O	LED1 and PWMB Output

All I/O ports are pseudo-open drain type.

I/O voltage fixes 3.3V, unless otherwise specified.

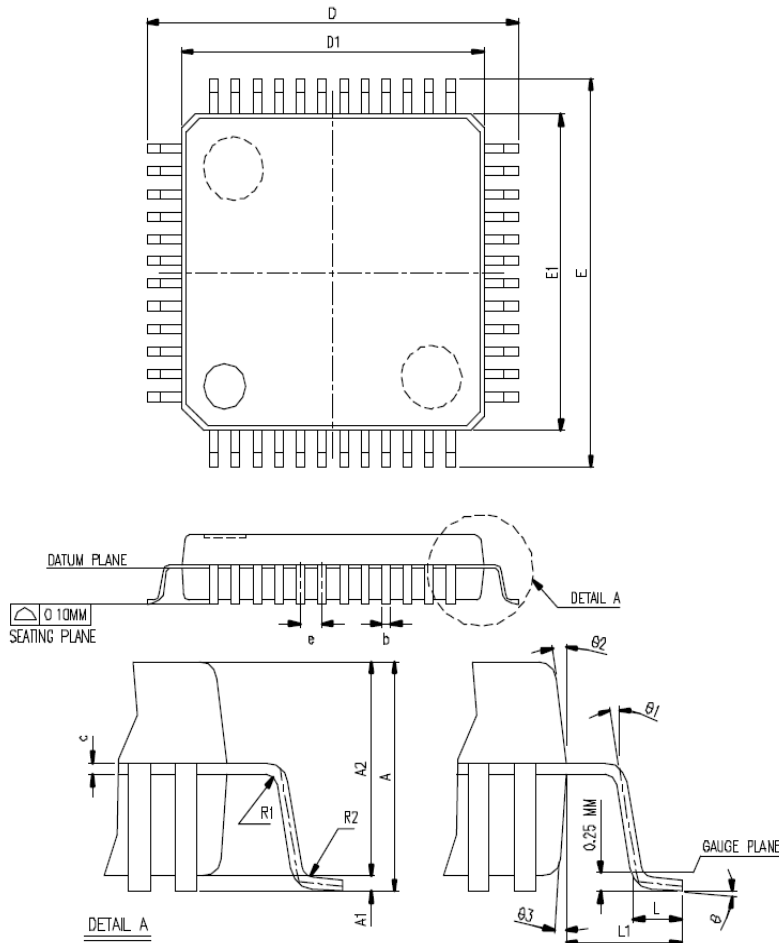
5. CPU Operation Mode vs. Peripheral Clock

	DUAL MODE (Note-1)		SIGNLE MODE(1)	NOTE
	SLOW (Note-2)	FAST (Note-2)		
CPUCLK(CPU51)	RC osc	24 MHz	24 MHz	
USB function	N/A	48 MHz	48 MHz	
UART	N/A	48 MHz	48 MHz	
SPI	CPUCLK	CPUCLK	CPUCLK	
WDT	CPUCLK	CPUCLK	CPUCLK	
Smart Card	CPUCLK	CPUCLK	CPUCLK	
PWM	CPUCLK	CPUCLK	CPUCLK	
0.5 sec timer wakeup Interrupt	0.5 sec	0.5 sec	0.5 sec	If 32 KHz Xtal (Note-3) is available

Note: 1. & 3. function enable/disable control by FUSE option.
2. CPU clock mode switching control by firmware.

6. Package

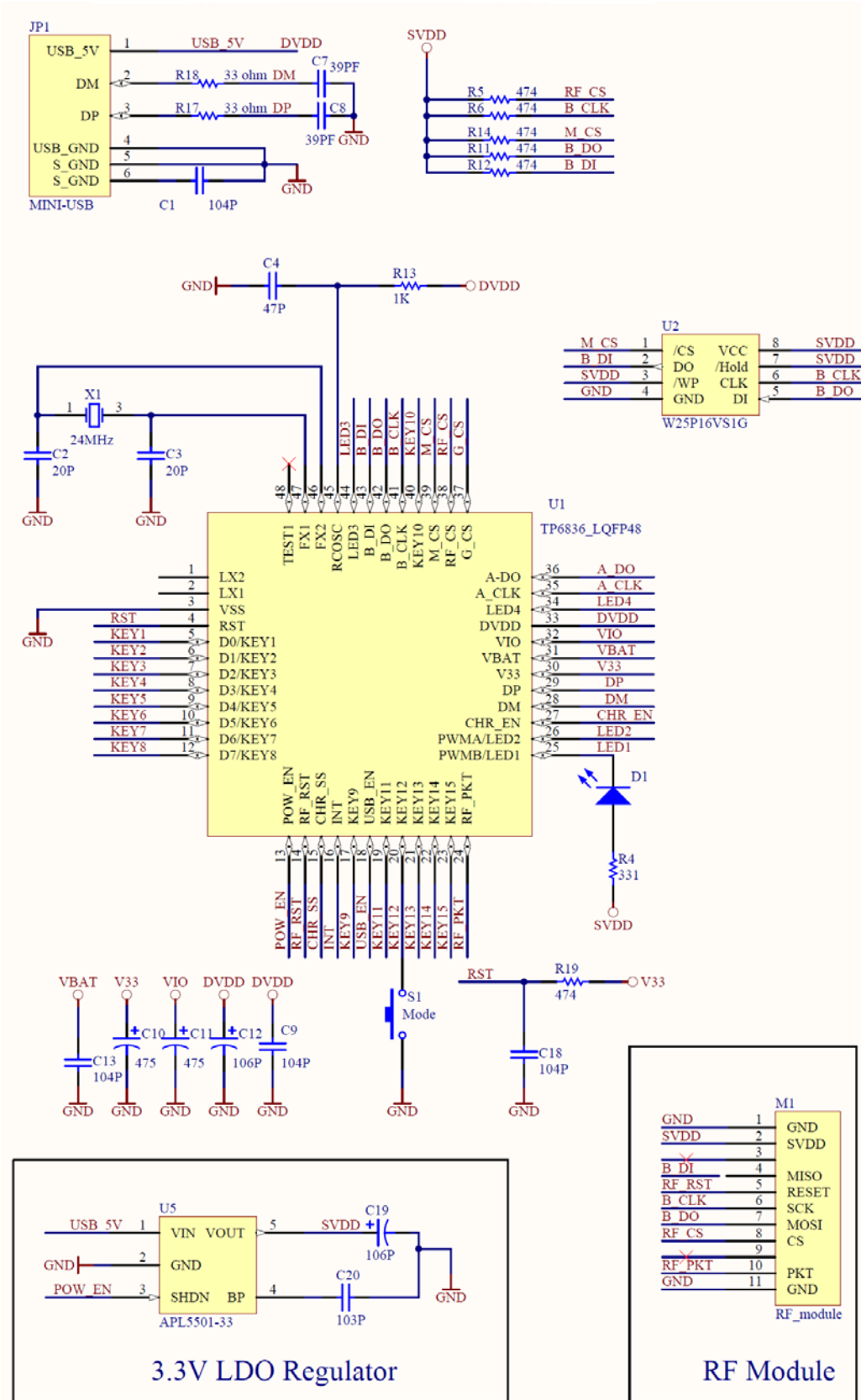
LQFP48:



SYMBOL	DIMENSION IN MM			DIMENSION IN INCH		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A			1.60			0.063
A1	0.05		0.15	0.001		0.006
A2	1.36	1.40	1.45	0.053	0.065	0.057
b	0.17	0.22	0.27	0.007	0.009	0.011
c	0.09		0.20	0.004		0.008
e	0.50 BASIC			0.020 BASIC		
D	9.00 BASIC			0.354 BASIC		
D1	7.00 BASIC			0.276 BASIC		
E	9.00 BASIC			0.354 BASIC		
E1	7.00 BASIC			0.276 BASIC		
L	0.45	0.60	0.75	0.018	0.024	0.030
L1	1.00 REF.			0.039 REF.		
R1	0.08			0.003		
R2	0.08		0.20	0.003		0.008
θ	0°	3.5°	7°	0°	3.5°	7°
θ1	0°			0°		
θ2	11°	12°	13°	11°	12°	13°
θ3	11°	12°	13°	11°	12°	13°
JEDEC	MS-026 (BBC)					

*NOTES: DIMENSIONS "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSION ALLOWABLE PROTRUSION IS 0.25 mm PER SIDE
"D1" AND "E1" ARE MAXIMUM PLASTIC BODY SIZE DIMENSIONS INCLUDING MOLD MISMATCH.

7. Application Circuit



8. Electrical Characteristics

(1). ABSOLUTE MAXIMUM RATINGS (GND= 0V)

Name	Symbol	Range	Unit
Maximum Supply Voltage	VDD	-0.3 to 5.5	V
Maximum Input Voltage	Vin	-0.3 to VDD+0.3	V
Maximum output Voltage	Vout	-0.3 to VDD+0.3	V
Maximum Operating Temperature	Topg	-5 to +70	°C
Maximum Storage Temperature	Tstg	-25 to +125	°C

(2). RECOMMENDED OPERATING CONDITION (at Ta=-20°C to 70°C, GND= 0V)

Name	Symb.	Min.	Max.	Unit
Supply Voltage(USB mode)	VDD	4.5	5.5	V
Battery Voltage(battery mode)	Vbat	2.1	4.1	V
Chip I/O Voltage	Vio	1.8	5.5	V
Input "L" Voltage	Vil1	0	0.3xVio	V

(3). DC CHARACTERISTICS (at Ta=25 °C, VDD=5.0V, VSS= 0V, Fosc=24 MHz)

Name	Symb.	Min.	Typ.	Max.	Unit	Condition	Note
FAST clock	fclk		24		MHz		
SLOW clock	sclk	-30%	1	+30%	MHz	VBAT=3.0V, VDD=NC ExtC=750 pF, ExtR=1K	
Threshold voltage of USB detection	Vdet		4.2		V		
Operating current	lcc1	-	16	-	mA	Fosc=24 MHz	No load
	lcc2		1.4		mA	24 MHz off, Fosc=1 MHz VBAT=3.0V, VDD=N.C.	No load
Suspend current	lsus	-	340	500	uA	USB mode	No load
Power down current	lpd1			1	uA	RC mode, no 32 KHz	No load
	lpd2		3	5	uA	RC mode with 0.5s wakeup, disable Wakeup Int	No load
Port Output High Current	loh1	6			mA	Voh=Vio-0.4V, Vio>=3.0V	One clk time
	loh2	8			uA		
	loh3	2.6			mA	Voh=Vio-0.4V, Vio =1.8V	One clk time
	loh4	4			uA		
Port Output Low Current	lol1	8			mA	Vol=VSS+0.2V, Vio >=3.0V	
	lol2	4			mA	Vol=VSS+0.06V, Vio =1.8V	
VIO pin voltage	Vio1	1.7		1.9	V	I=40 mA	Vio set 1.8V
	Vio2	2.9		3.1	V	I=80 mA	Vio set 3V
	Vio3	3.2		3.4	V	I=120 mA	Vio tie to V33
	Vio4	VDD-0.1		VDD	V		Vio set 5V
	Vio5	Vbat-0.1		Vbat	V	No PC5V, battery only	
Port Input High Voltage	Vih	0.55Vio			V	Schmitt trigger	

(4). AC CHARACTERISTICS (at Ta=25 °C, VDD5V=5.0V, VSS= 0V, Fosc=24 MHz)

Name	Symb.	Min.	Typ.	Max.	Unit	Note
DP/DM rising time	Trise	4		20	ns	
DP/DM falling time	Tfall	4		20	ns	
DP, DM cross point	Vx	1.3		2.0	V	
V33 output voltage	Vreg	3.2	3.3	3.4	V	

Note: All USB transceiver characteristics can meet USB1.1 spec.