PWM/PFM Automatic Switching Controlled Synchronous DC-DC Converters

■ General Description

XT1712 series is a group of high efficiency synchronous-rectification type buck regulator using a constant frequency, current mode architecture. The device is available in an adjustable version and fixed output voltages. Automatic PWM/PFM mode operation increases efficiency and decreases output voltage ripple at light loads, further extending battery life. Switching frequency is internally set at 1.4MHz, allowing the use of small surface mount inductors and capacitors. 100% duty cycle provides low dropout operation.

■ Package

- SOT-23-5L
- DFNWB-6L

■ Applications

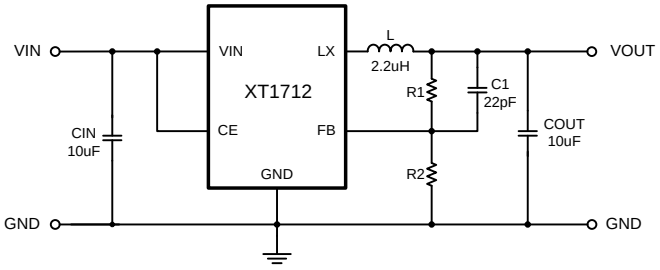
- Cellular and Smart Phones
- PDAs
- MP3/MP4 Player
- Digital Still and Video Cameras
- Microprocessors and DSP Core Supplies
- Portable Instruments

■ Features

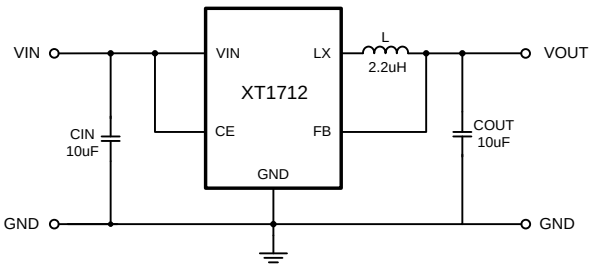
- High Efficiency: 95%
- Input Voltage Range: 1.6V ~ 6.0V
- Output Current: SOT-23-5L 1.2A
- DFNWB-6L 1.5A
- Shutdown Current: <1μA
- Oscillation Frequency: 1.4MHz
- Overcurrent protection : limit inductor current 2A

■ Typical Application Circuit

- **Output voltage is adjustable**



- **Outputvoltage is fixed**

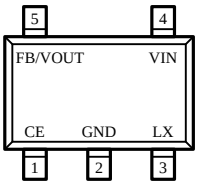


■ Ordering Information

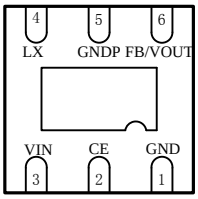
XT1712A ①②③④

Designator	Symbol	Description
①②	Digital	Output Voltage: Eg: 12→1.2V, 33→3.3V Adjustable version: ① ② fixed as AD
③	M	Package Types: SOT-23-5L
	D	Package Types: DFNWB-6L
④	R	Embossed Tape :Standard Feed
	L	Embossed Tape :Reverse Feed

■ Pin Configuration



SOT-23-5L
(TOP VIEW)



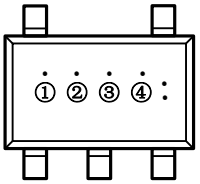
DFNWB-6L
(BOTTOM VIEW)

■ Pin Assignment

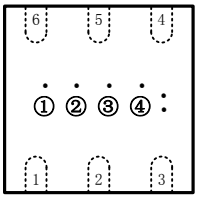
Pin Name	Pin Number		Function
	SOT-23-5	DFNWB-6L	
CE	1	2	Chip Enable Pin
GND	2	1	Common Ground
LX	3	4	Switching Output
VIN	4	3	Power Input
FB/VOUT	5	6	Feedback/Output Voltage Pin
GNDP	-	5	Power Ground

■ Marking Rule

- **SOT-23-5L**



SOT-23-5L
(TOP VIEW)



DFNWB-6L
(TOP VIEW)

① Represent the package information

Symbol	Package Types
B	SOT23-5L
D	DFNWB-6L

②③ Represent the output voltage

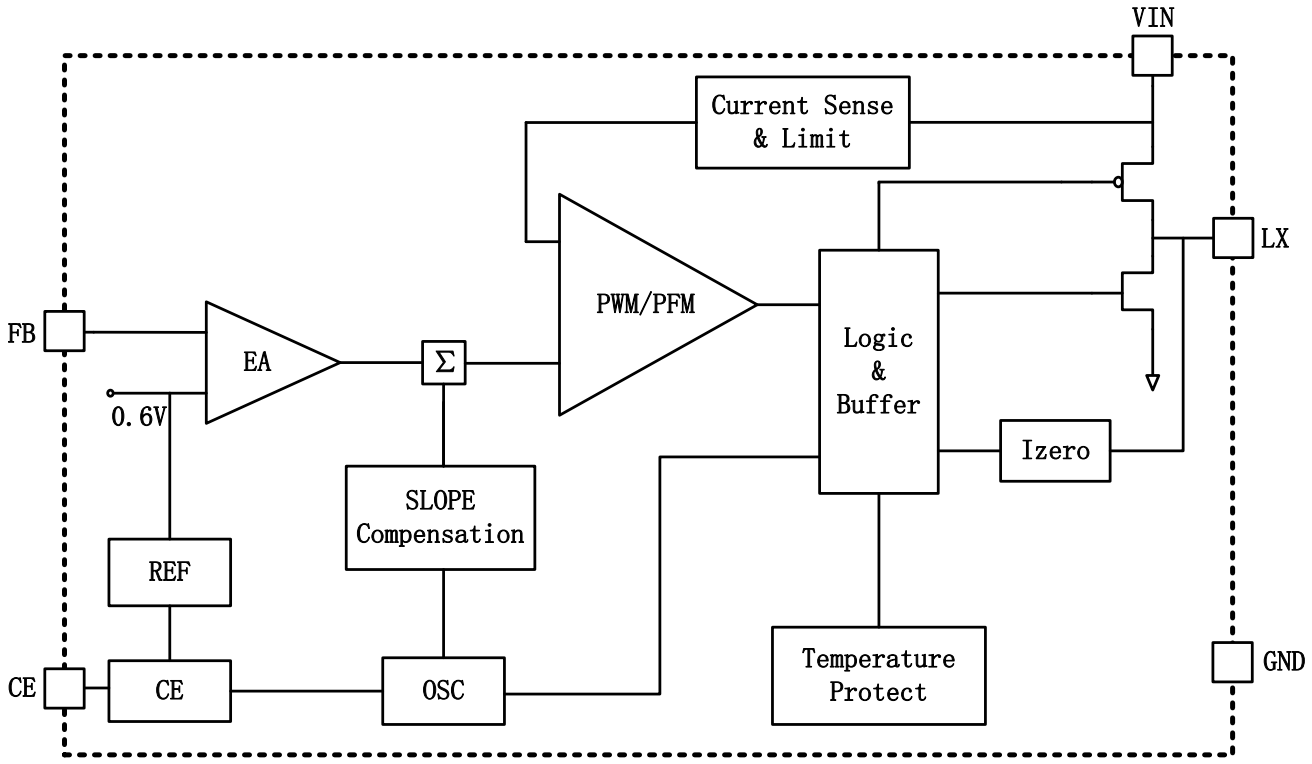
Description	Product Description		
Output voltage	A	D	External feedback
	Two integers		Eg: 12 represent the output voltage is 1.2V; 33 represent the output voltage is 3.3V.

④ Represent the process change

0～9，A～Z repeated (G，I，J，O，Q，W are excepted)

Notes: "• "represents the batch number. "• "says" 1 ", dot not said "0"; For example: dot on the top of the "③", and the top right of the "④", said "010010", used to track the product batch.

■ Function Block Diagram



■ Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
Input Supply Voltage		V_{IN}	-0.3～6.5	V
Output Voltage		V_{OUT}	-0.3～6.5	
		V_{LX}	-0.3～VIN + 0.3	
CE Voltage		V_{CE}	-0.3～VIN + 0.3	V
Peak LX Current		I_{LX}	±2	A
Power Dissipation	SOT-23-5L	P_D	250	mW
	DFNWB-6L		600	
Operating Temperature Range		Topr	-40～＋85	℃
Storage Temperature Range		Tstg	-55～＋125	

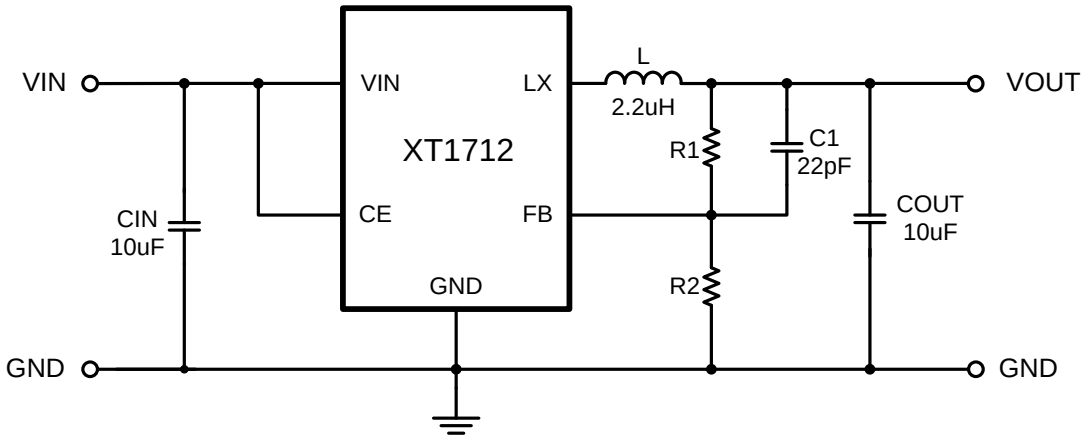
Note: Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

■ Electrical Characteristics

C_{IN}=10μF, Cout=10μF, L=2.2μH (Ta=25℃, unless otherwise noted)

Parameter	Symbol	Cinditons	MIN	TYP	MAX	Units	Test Circuits
Feedback Voltage	V_{FB}	-	0.59	0.6	0.61	V	1
Input Voltage Range	V_{IN}	-	1.6	-	6		
Load regulation	V_{OUT}	IL_{MAX}=0.1A-1.2A	-	0.5	-	%	
Line regulation	Δ V_{OUT}	IL=30mA	-	0.35	-	%	
Efficiency	EFFI	VIN=3.6V, I_L=200mA	-	95	-	%	
Output Current	I_{limt}	Package Types: SOT23-5L	-	1.2	-	A	
		Package Types:DFNWB-6L	-	1.5	-	A	
CE ”Low” voltage	V_{CEL}	-	1.045	-	-	V	
CE ”High” voltage	V_{CEH}	-	-	-	0.995	V	
Stand-by Current	I_{STB}	V_{CE}=0V, V_{IN}=5.0V	0	-	1	μA	3
Quiescent Current	I_{DD}	V_{IN}=CE,V_{OUT}=5.0V	-	210	-	μA	
Output Current Limit	I_{LIM}	-	-	2	-	A	
PFM switching point	I_L	V_{IN}=CE=5.0V	-	120	-	mA	
Oscillation Frequency	F_{OSC}	-	1.1	1.4	1.7	MHz	2
Maximum Duty Circle	M_{AXDTY}	-	-	-	100	%	
Short-circuit current	I_{IN}	VOUT=GND	50	80	120	mA	
Temperature Protection	T_{SHD}	V_{OUT}=3.3V, IL=30mA	-	140	-	℃	
Temperature Protection Hysteresis	-	-	-	18	-	℃	

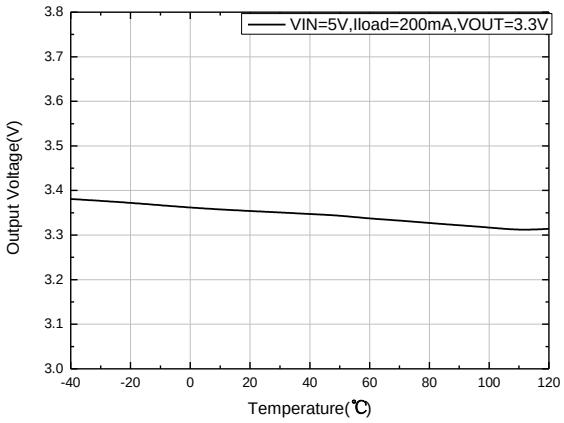
■ Test Circuits



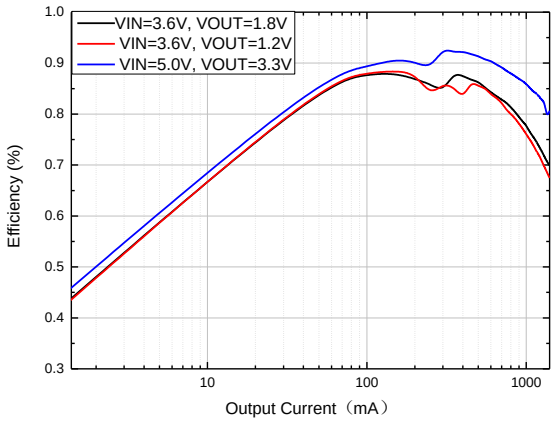
Component parameters: L=2.2uH, CIN =10uF, C1 = 22 pF COUT=10uF; FB =0.6V, according to the required output voltage regulating R1, R2, suggest resistor R1, R2 with KΩ level.

■ Typical Performance Characteristics

1、Output voltage temperature characteristics



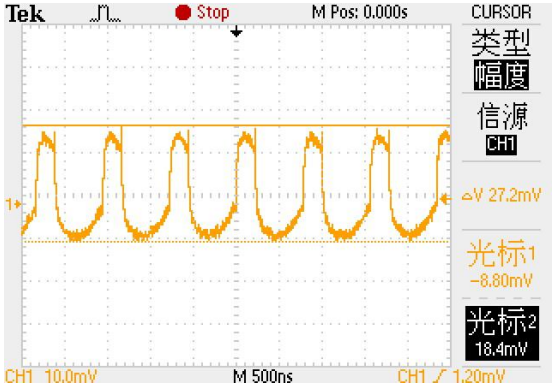
2、Efficiency



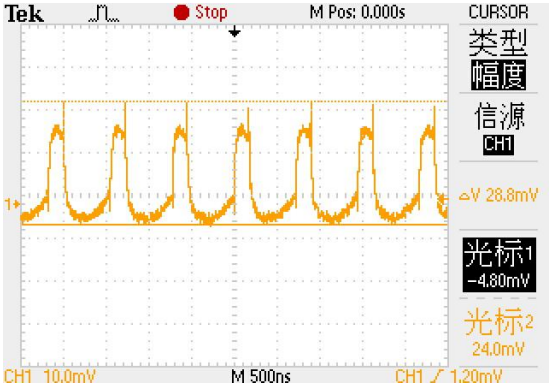
3、The load transient response (Vin=CE=5.0V, Iload=0-300mA)

4、The load transient response (Vin=CE=5.0V, Iload=0-1.2A)

4、The output ripple (Vin=CE=5.0V, Iload=500mA)

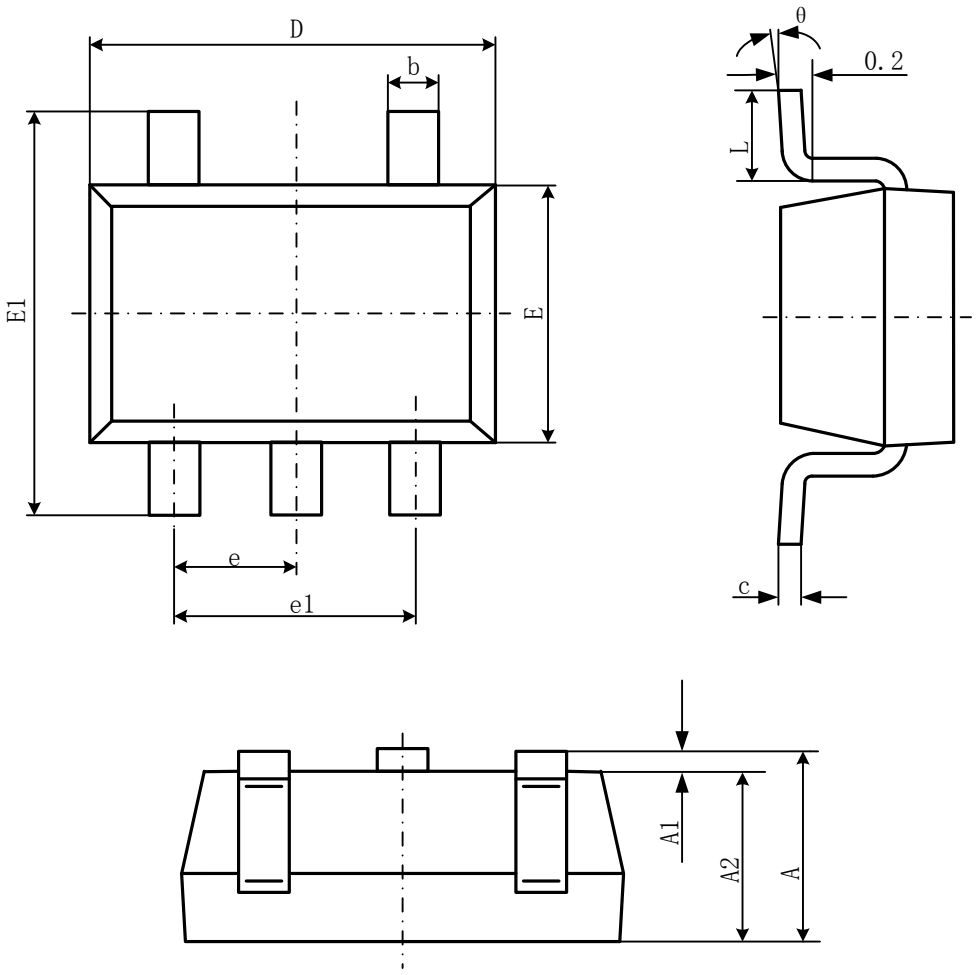


5、The output ripple (Vin=CE=5.0V, Iload=1.2A)



■ Package Information

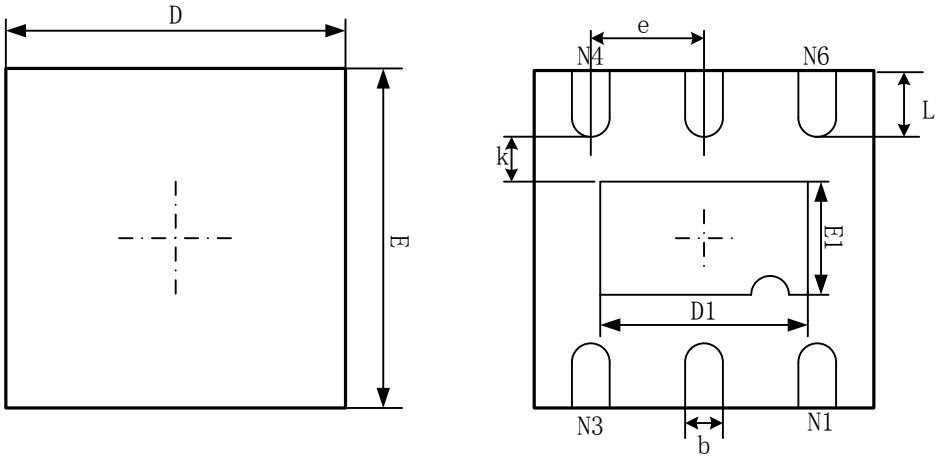
- **SOT-23-5L**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

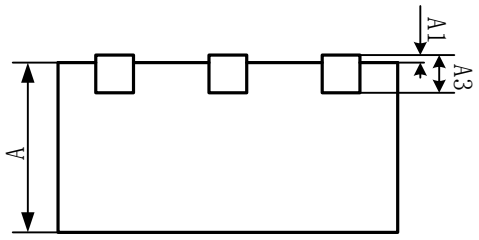
- **DFNWB-6L**

DFNWB2×2-6L(P0.65T0.75/0.85) PACKAGE OUTLINE DIMENSIONS



Top View

Bottom View



Side View

cv

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.700/0.800	0.800/0.900	0.028/0.031	0.031/0.035
A1	0.000	0.050	0.000	0.002
A3	0.203REF.		0.008REF.	
D	1.924	2.076	0.075	0.083
E	1.924	2.076	0.075	0.083
D1	1.100	1.300	0.043	0.051
E1	0.600	0.800	0.024	0.031
k	0.200MIN.		0.008MIN.	
b	0.200	0.300	0.007	0.012
e	0.650TYP.		0.026TYP.	
L	0.274	0.426	0.011	0.017