

PWM/PFM Automatic Switching Controlled Synchronous DC-DC Converters

General Description

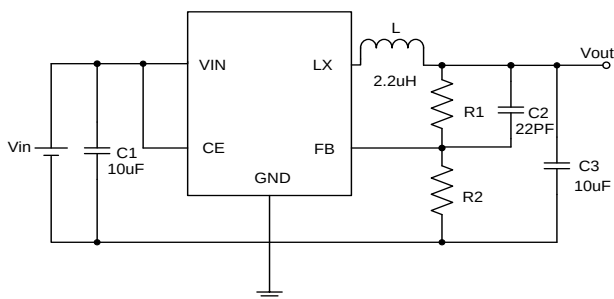
XT1708 series is a group of high efficiency synchronous-rectification type buck regulator using a constant frequency, current mode architecture. The device is available in an adjustable version and fixed output voltages. Automatic PWM/PFM mode operation increases efficiency and decreases output voltage 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.

Features

- High Efficiency: 95%
- Input Voltage Range: 1.8V ~ 6.0V
- Output Current: 800mA
- Shutdown Current: <1uA
- Oscillation Frequency: 1.4MHz
- Overcurrent protection : limit inductor current 1.3A

Typical Application Circuit

- Output voltage is adjustable

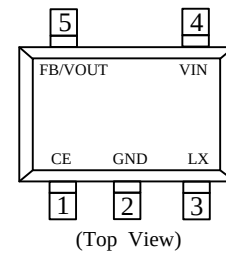


Applications

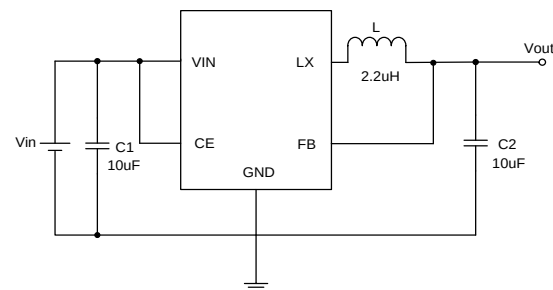
- Cellular and Smart Phones
- PDAs
- MP3/MP4 Player
- Digital Still and Video Cameras
- Microprocessors and DSP Core Supplies
- Portable Instruments

Package

- SOT-23-5L



- Output voltage is fixed

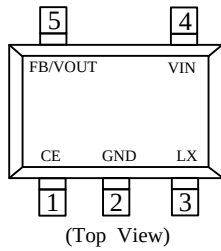


Ordering Information

XT1708 ①②③④⑤

Designator	Symbol				Description
①	1	1	3	4	Output Voltage: 1.2V、1.8V、3.3V、4.2V
②	2	8	3	2	Adjustable version: ① ② fixed as AD
③	F				Oscillation Frequency 1.4MHz
④	M				Package Types: SOT-23-5
⑤	S				Embossed Tape :Standard Feed
	R				Embossed Tape :Reverse Feed

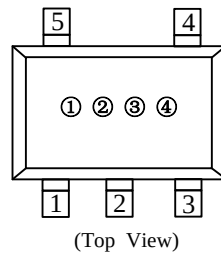
Functional Pin Description



Pin Number	Pin Name	Function
1	CE	Chip Enable Pin
2	GND	Common Ground
3	LX	Switching Output
4	VIN	Power Input
5	FB/VOUT	Feedback/Output Voltage Pin

Marking Rule

- SOT-23-5L



- ① Represents the product name

Symbol	Product Name
8	XT1708◆◆◆◆M◆

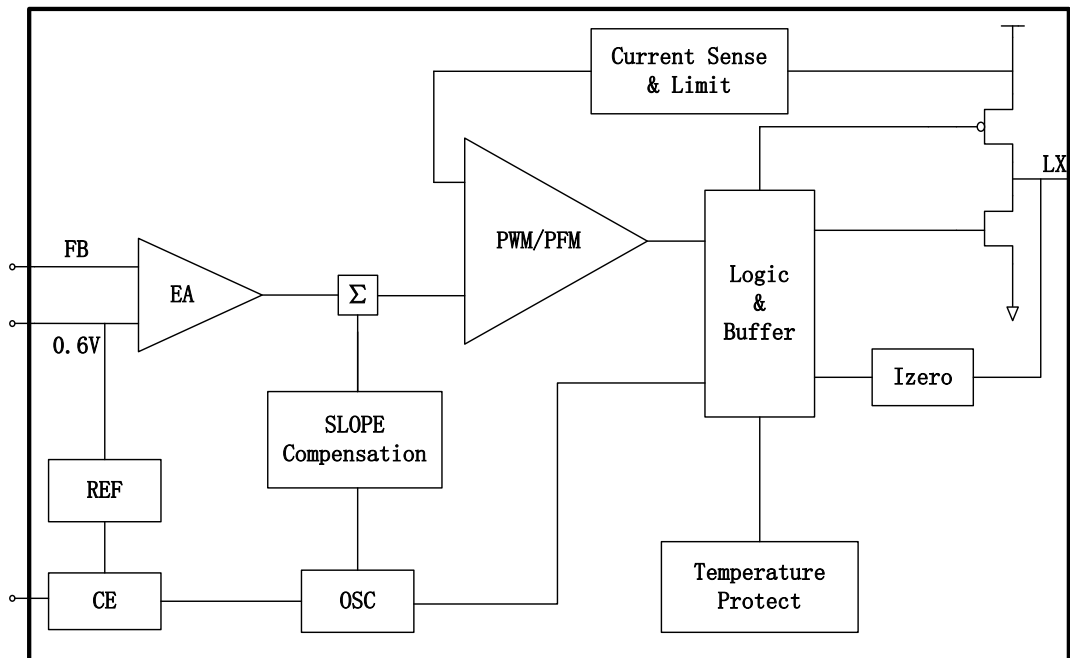
- ② ③ Represents the output voltage

Symbol	Description	Example		Represent
②③	Feedback mode	0	0	Adjustable
		1	2	1.2V
		1	8	1.8V
		3	3	3.3V
		4	2	4.2V

- ④ Represents the assembly lot No.

0-9, A-Z; 0-9, A-Z mirror writing, repeated (G, I, J, O, Q, W exception)

■ 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~ $V_{IN} + 0.3$	
CE Voltage		V_{CE}	-0.3~ $V_{IN} + 0.3$	V
Peak LX Current		I_{LX}	±1300	mA
Power Dissipation	SOT-23-5L	P_D	250	mW
Operating Temperature Range		T_{opr}	-40~+85	°C
Storage Temperature Range		T_{stg}	-55~+125	

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

Electrical Characteristics

$C_{IN}=10\mu F$, $C_{out}=10\mu F$, $L=2.2\mu H$

($T_a=25^\circ C$, unless otherwise noted)

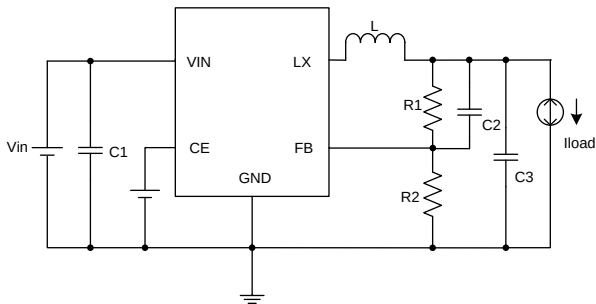
Parameter	Symbol	Conditions	MIN	TYP	MAX	Units	Test Circuits
Feedback Voltage	V_{FB}	-	0.59	0.6	0.61	V	1
Input Voltage Range	V_{IN}	-	1.8	-	6		
Load regulation	V_{OUT}	$I_{L_MAX}=800mA$		0.45			
Line regulation	ΔV_{OUT}	$I_L=30mA$		0.50			
Efficiency	EFFI	$V_{IN}=2.7V$; $I_L=200mA$	—	95	—		
CE "Low" voltage	V_{CEL}	-	1.025			V	
CE "High" voltage	V_{CEH}	-			1.015	V	
Stand-by Current	I_{STB}	$V_{CE}=0V$, $V_{IN}=3.6V$	0	-	1	μA	3
Quiescent Current	I_{DD}	$V_{IN}=CE$, $V_{OUT}=5.0V$	—	210	-	μA	
Output Current Limit	I_{LIM}	-	-	1300	-	mA	
PFM switching point	I_L	$V_{IN}=CE=5.0V$		120		mA	
Oscillation Frequency	F_{OSC}	-	-	1.4	-	MHz	2
Maximum Duty Circle	MAXDTY	-	100	-	-	%	

Test Circuits

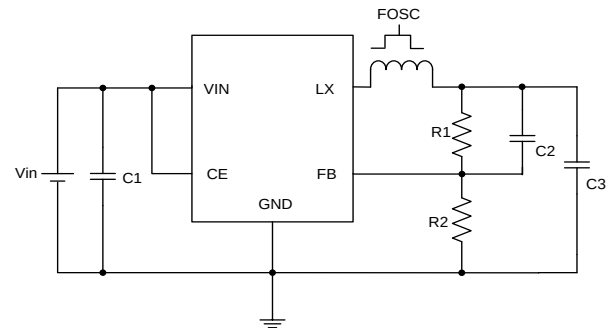
Parameters: $L_X=2.2\mu H$, $C_1=4.7\mu F$, $C_2=22pF$, $C_3=10\mu F$.

According to the required output voltage regulate R_1 , R_2 , so $V_{FB} = 0.6V$.

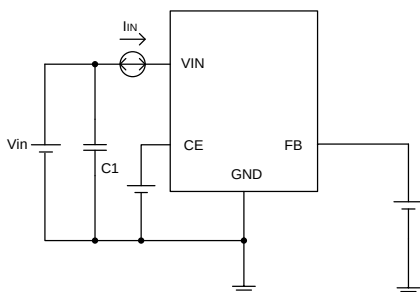
Circuit 1



Circuit 2



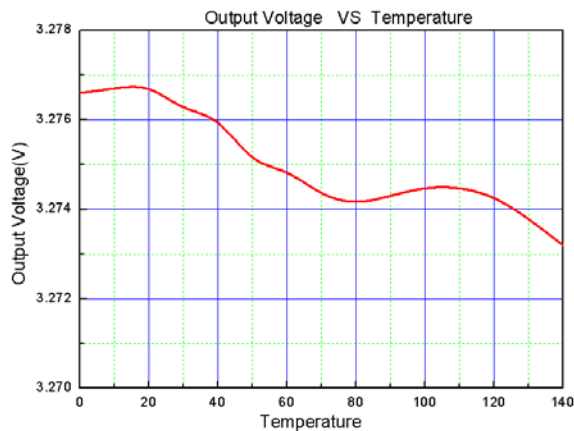
Circuit3



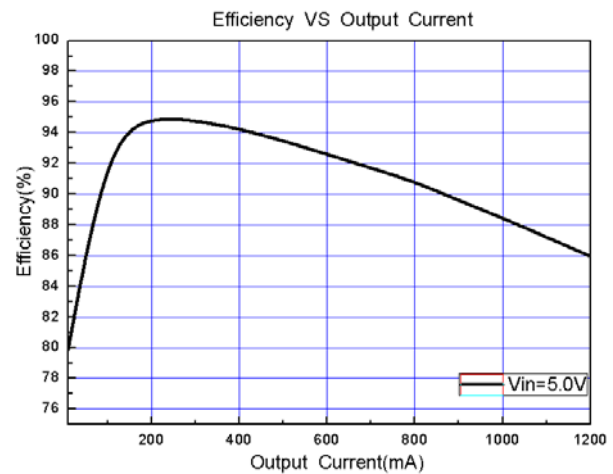
Typical Performance Characteristics

1、Output voltage temperature characteristics

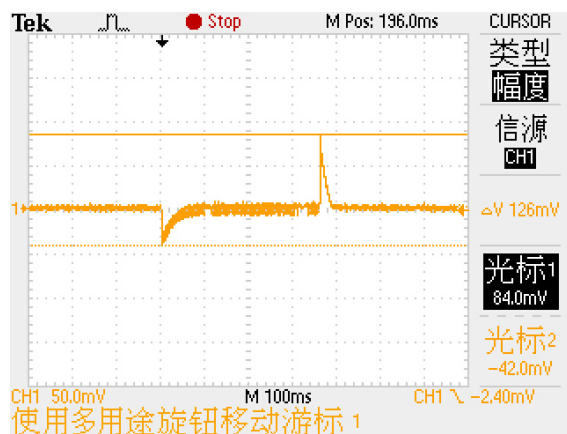
($V_{in}=5.0V$, $I_{load}=30mA$)



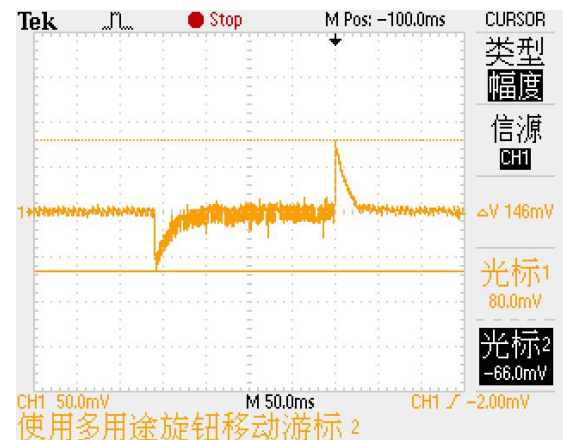
2、Efficiency



3、The load transient response ($V_{in} = CE = 5.0V$)

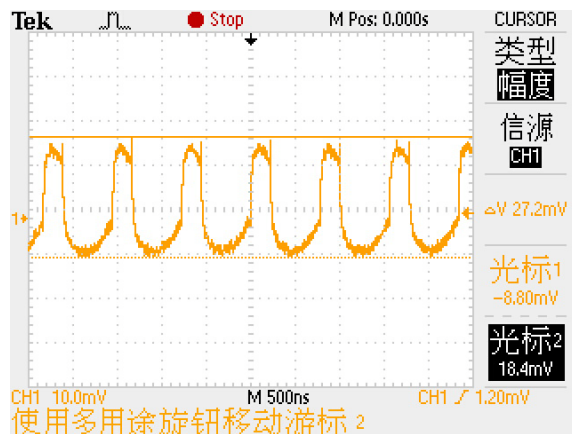


$I_{load}=0-300mA$

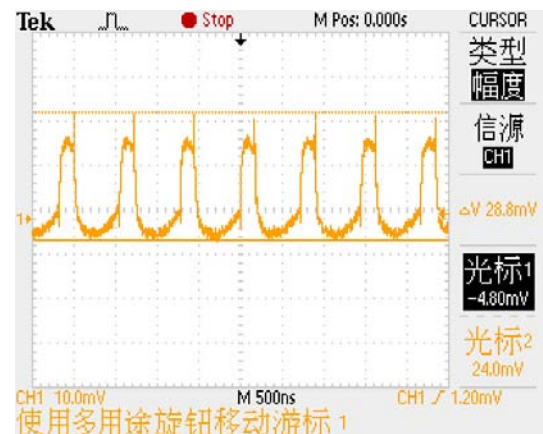


$I_{load}=0-1.1A$

4、The output ripple ($V_{in}=CE=5.0V$)



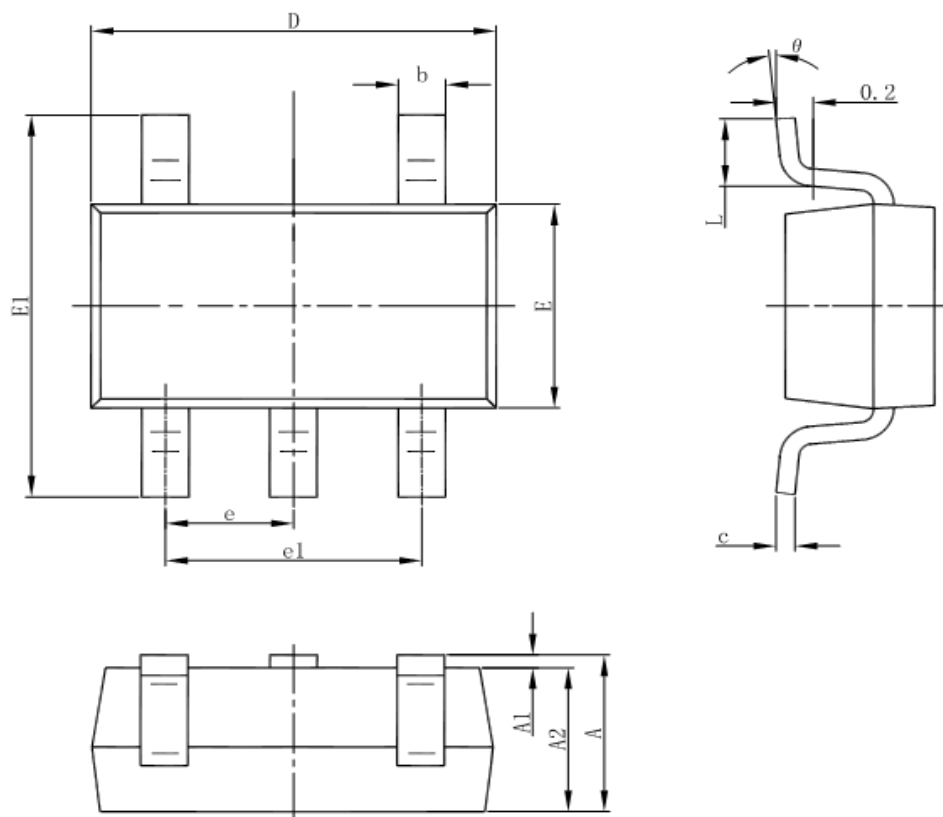
$I_{load} = 500\text{ mA}$



$I_{load} = 1A$

■ 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°