

# Tiny Package, High Efficiency,

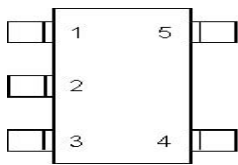
# Step-up DC/DC Converter

## General Description

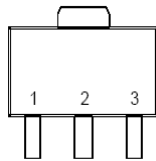
The LP6201 Series are VFM Step-up DC/DC ICs with ultra low supply current by CMOS process and suitable for use with battery-powered instruments.

The LP6201 IC consists of an oscillator, a VFM control circuit, a driver transistor (LX switch), a reference voltage unit, an error amplifier, resistors for voltage detection, and a LX switch protection circuit. A low ripple and high efficiency step-up DC/DC converter can be constructed of this LP6201 IC with only three external components.

## Pin Configurations



SOT-23-5



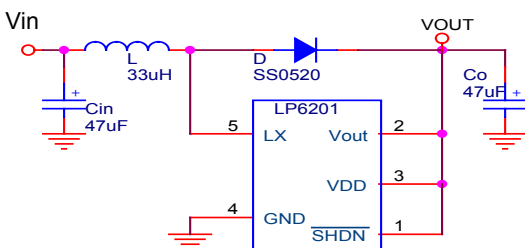
SOT-89

Pin	1	2	3	4	5
SOT-23-5	SHDN	Vout	Vdd	GND	LX
SOT-89	GND	Vout	LX		

## Application

- ✧ MP3/MP4
- ✧ Alk. /Li-ion products
- ✧ PDA/DSC

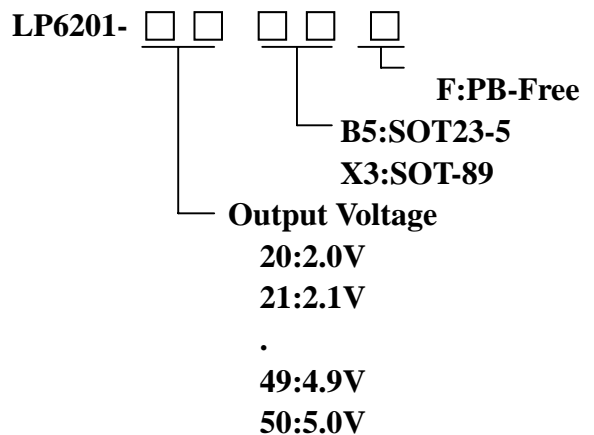
## Typical Application Circuit



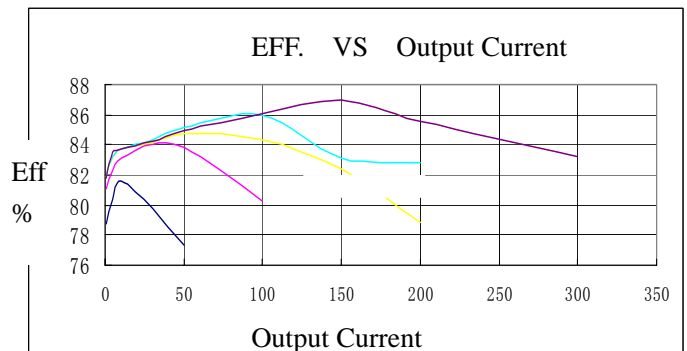
## Features

- ◆ 0.85V Low Start-up Input Voltage
- ◆ Minimal Number of External Components (Only an Inductor, a Diode, and a Capacitor)
- ◆ Zero Shutdown Mode Supply Current
- ◆ 500kHz Fixed Switching Frequency
- ◆ 2% High Output Voltage Accuracy
- ◆ Providing Flexibility for Using Internal and External

## Ordering Information



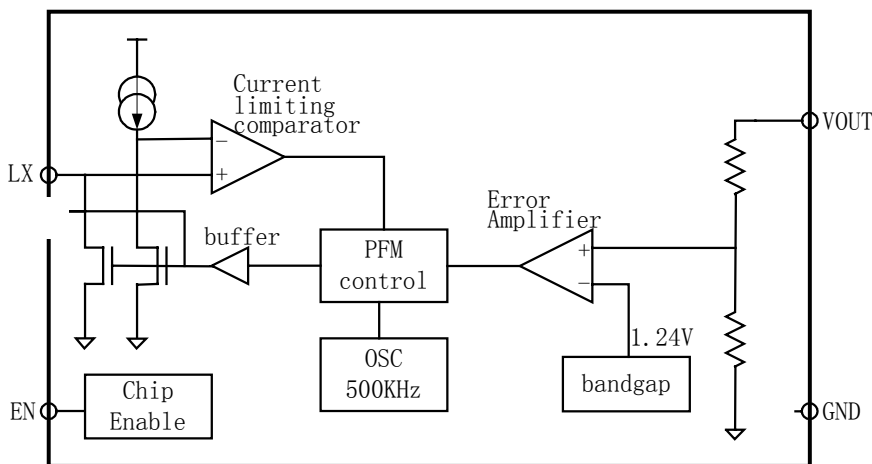
## Typical Characteristics



## Functional Pin Description

Pin No.		Pin Name	Pin Function
SO-23-5	SOT-89		
1	X	SHDN	Chip EN(Active High)
2	2	Vout	Voltage output pin
3	X	VDD	Chip Power VDD
4	1	GND	Chip Power Ground
5	3	LX	Pin of switch

## Function Block Diagram



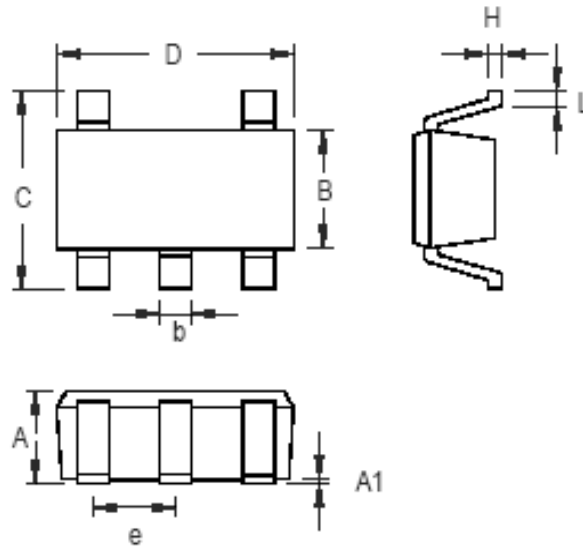
## Absolute Maximum Ratings

- Output Voltage ----- 8V
- LX Pin Voltage ----- 8V
- EN Pin Voltage<sup>(1)</sup> ----- - 0.3 to V<sub>OUT</sub> +0.3V
- LX Pin Output Current ----- **1000mA**
- Power Dissipation, P<sub>D</sub> @ T<sub>A</sub> = 25° C
  - SOT-89 ----- 0.5W
  - SOT-25 ----- 0.25W
- Package Thermal Resistance
  - SOT-89, θ<sub>JC</sub> ----- 100° C/W
  - SOT-89, θ<sub>JA</sub> ----- 300° C/W
  - SOT-25, θ<sub>JA</sub> ----- 250° C/W
- Operating Temperature Range ----- - 20 to +85° C
- Storage Temperature Range ----- - 65° C to 150° C
- Lead Temperature (Soldering, 10 sec.) ----- 260° C

**Electrical Characteristics** (Refer to Figure 1)

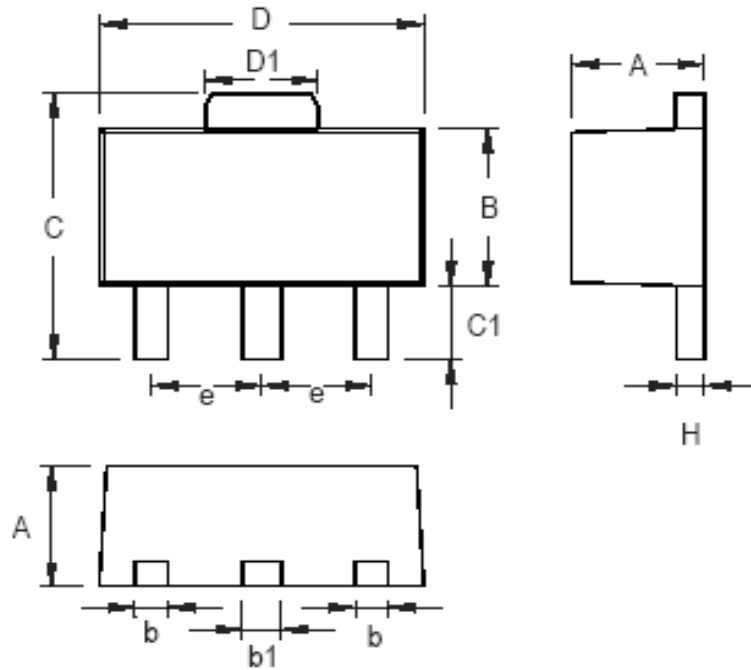
Parameter		Symbol	Test Conditions	Min	Typ	Max	Units
Output Voltage Accuracy		$\Delta V_{OUT}$		-2		+2	%
Input Voltage		$V_{IN}$		--		7	V
Start-up Voltage		$V_{ST}$	$I_{OUT} = 1\text{mA}$ , $V_{IN}: 0 \rightarrow 2\text{V}$		0.8	1.0	V
Hold-on Voltage		$V_{HO}$	$I_{OUT} = 1\text{mA}$ , $V_{IN}: 2 \rightarrow 0\text{V}$	0.6	--		V
Input Current 1	$V_{OUT} \leq 3.5\text{V}$ <sup>(1)</sup>		To be measured at $V_{IN}$ at no load		20		$\mu\text{A}$
	$3.5\text{V} < V_{OUT} \leq 5\text{V}$ <sup>(2)</sup>				25		
Input Current 2			To be measured at $V_{OUT}$ in switch off condition		5	8	$\mu\text{A}$
LX Switching Current	$V_{OUT} \leq 3.5\text{V}$ <sup>(1)</sup>	ISWITCHING	$V_{LX} = 0.4\text{V}$	800	--		mA
	$3.5\text{V} < V_{OUT} \leq 5\text{V}$ <sup>(2)</sup>			1000	--		
LX Leakage Current		ILEAKAGE	$V_{LX} = 6\text{V}$		--	0.5	$\mu\text{A}$
Maximum Oscillator		FMAX		400	500	560	kHz
Oscillator Duty Cycle		DOSC	On ( $V_{LX}$ " L " ) side	75	80	85	%
Efficiency					84	87	%
$V_{LX}$ Voltage Limit			Lx switch on	0.65	0.8	1.0	V

Packing Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.559	0.014	0.022
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	0.838	1.041	0.033	0.041
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024

SOT- 25 Surface Mount Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.397	1.600	0.055	0.063
b	0.356	0.483	0.014	0.019
B	2.388	2.591	0.094	0.102
b1	0.406	0.533	0.016	0.021
C	3.937	4.242	0.155	0.167
C1	0.787	1.194	0.031	0.047
D	4.394	4.597	0.173	0.181
D1	1.397	1.753	0.055	0.069
e	1.448	1.549	0.057	0.061
H	0.356	0.432	0.014	0.017

**3-Lead SOT-89 Surface Mount**