



## General Description

The SPX5205 series is a set of low voltage differential (LDO converters) with a wide voltage input range of 3.0V to 18V, low voltage differential, low power consumption, and miniaturized packaging. The output voltage range is 3.0-5.0V, and the SPX5205 has low static current characteristics as low as 20uA. The circuit also has a CE enable control port, which can put the circuit into sleep mode. It is particularly suitable for battery powered and long-term standby system equipment applications, helping to reduce standby power consumption of system equipment, effectively extending standby time and battery life.

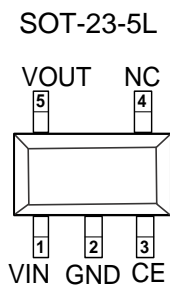
## Features

- Low Power Consumption
- Low Voltage Drop
- 0.2uA Max IQ in Shutdown Mode
- Withstanding Voltage 18V
- Quiescent Current 20uA
- Output Voltage Accuracy: tolerance  $\pm 2\%$
- High output current: 200mA

## Application

- Battery-powered Equipments
- Communication Equipments
- Audio/Video Equipments
- Smart Battery Packs
- Smoke Detectors
- CO2 DETECTORS

## Pin Configuration And Descriptions



PIN No.	Name	Functions Description
SOT-23-5L		
1	V <sub>IN</sub>	Input
2	GND	Ground
3	CE	ON/OFF Control
4	NC	No Connect
5	V <sub>OUT</sub>	Output

## Order Information

Orderable Device	Package	Output Voltage	Packing Option
SPX5205M5-L-3-0	SOT-23-5L	3.0V	3000/Reel
SPX5205M5-L-3-3	SOT-23-5L	3.3V	3000/Reel
SPX5205M5-L-5-0	SOT-23-5L	5.0V	3000/Reel



## Absolute Maximum Ratings

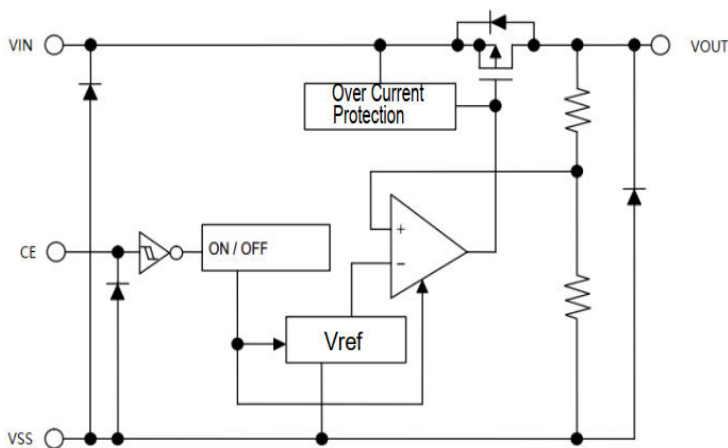
Description	Symbol	Value Range	Unit
Limit Power Voltage	$V_{IN}$	-0.3~+22	V
Storage Temperature Range	$T_{STG}$	-50~+125	°C
Operating Free-air Temperature Range	$T_A$	-40~+85	°C

Note: Stresses greater than those listed under “Absolute Maximum Ratings” cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

## Heat Dissipation

Description	Symbol	Package	Value Range	Unit
Thermal resistance	$J_A$	SOT-23-5L	500	°C/W
Power dissipation	$P_W$	SOT-23-5L	200	mW

## Block Diagram





### DC Characteristics (unless otherwise noted $T_A=25^{\circ}\text{C}$ )

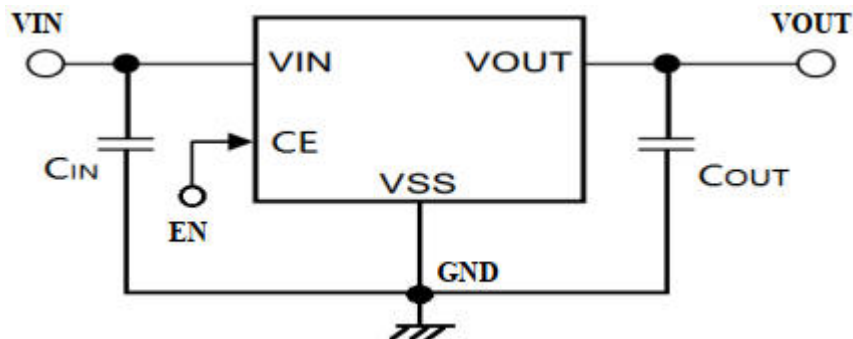
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Input Voltage	$V_{IN}$		3.0		18	V
Output Voltage	$V_{OUT}$		3.0		5.0	V
Voltage Accuracy		$I_{OUT}=1\text{mA}$	-2		+2	%
Output Current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0\text{V}$		100		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0\text{V}$ $1\text{mA}\leq I_{OUT}\leq 150\text{mA}$		20		mV
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \Delta V_{IN}$	$V_{OUT}+1.0\text{V}\leq V_{IN}\leq 18\text{V}$ $I_{OUT}=10\text{mA}$		0.015	0.2	%/V
Voltage Drop	$V_{DIF}^1$	$I_{OUT}=100\text{mA}, V_{OUT}=3.3\text{V}$		200		mV
Quiescent Current	$I_{SS}$	$V_{CE}=V_{IN}$		20	50	$\mu\text{A}$
Standby Current	$I_{STANDBY}$	$V_{CE}=V_{SS}$			0.1	$\mu\text{A}$
	$V_{CEH}$	$V_{IN}=V_{OUT}+2.0\text{V}$	1.7		18	V
	$V_{CEL}$	$V_{IN}=V_{OUT}+2.0\text{V}$	0		0.3	V
short-circuit current	$I_{SHORT}$	$V_{IN}=V_{OUT}+2.0\text{V}$		300		mA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$	$V_{IN}=V_{OUT}+2.0\text{V}$ $I_{OUT}=10\text{mA}$ $-40^{\circ}\text{C}\leq T_A\leq 125^{\circ}\text{C}$		$\pm 100$		ppm/ $^{\circ}\text{C}$
Discharge Resistor	$R_{DIS}^2$	$V_{CE}<0.5\text{V}$		300		

**Note:** 1. When  $V_{IN}=V_{OUT}+2.0\text{V}$ , as the output voltage declined 2%, the  $V_{DIF}=V_{IN}-V_{OUT}$ .

2. Output active discharge resistor  $R_{DIS}$ , As the input voltage increases, it decreases.

## Application Circuit

### Basic Circuits



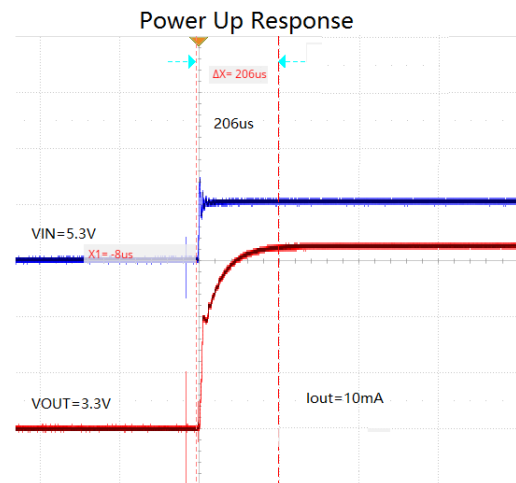
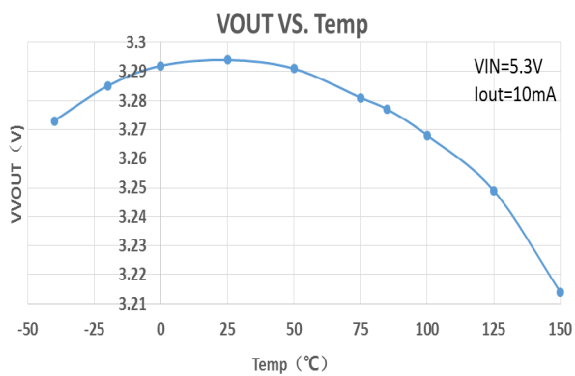
1.  $C_{IN}$  is used to stabilize the input capacitor.
2.  $C_{IN}$  eramic capacitors greater than or equal to 1pF can be used for  $C_{OUT}$ .



## Function Description

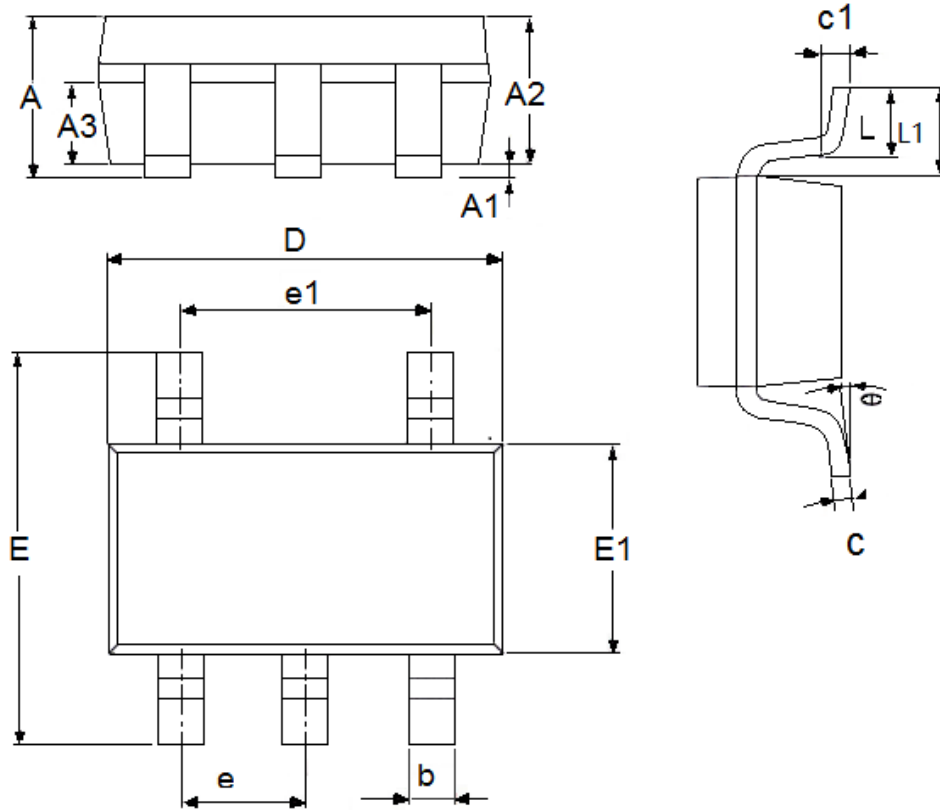
SPX5205 series are linear voltage regulator ICs withstanding 20V voltage. The series IC consists of a voltage reference, an error amplifier, a current limiter and a phase compensation circuit plus a driver transistor. The output stabilization capacitor is also compatible with low ESR ceramic capacitors. The over current protection circuit and the over voltage protection circuit are built-in. The protection circuit will operate when the output current or input voltage reaches limit level.

## Typical Characteristics





Package Outline Dimensions  
SOT-23-5L



Symbol	Dimensions in Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.23	0.0039	0.0091
D	2.82	3.05	0.1110	0.1201
e1	1.9(TYP)		0.0748(TYP)	
E	2.6	3.05	0.1024	0.1201
E1	1.5	1.75	0.0512	0.0689
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	



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