



## General Description

The MIC5205 series is a set of low voltage differential (LDO converters) with a wide voltage input range of 3.0V to 20V, low voltage differential, low power consumption, and miniaturized packaging. The output voltage range is 3.0-5.0V, and the MIC5205 has low static current characteristics as low as 4uA. 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.

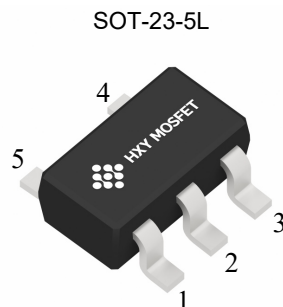
## Features

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 20V
- Quiescent Current 4uA
- Output Voltage Accuracy: tolerance  $\pm 2\%$
- High output current: 350mA

## 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 |
|------------------|-----------|----------------|----------------|
| MIC5205-3.0YM5   | SOT-23-5L | 3.0V           | 3000/Reel      |
| MIC5205-3.3YM5   | SOT-23-5L | 3.3V           | 3000/Reel      |
| MIC5205-5.0YM5   | SOT-23-5L | 5.0V           | 3000/Reel      |



## Absolute Maximum Ratings

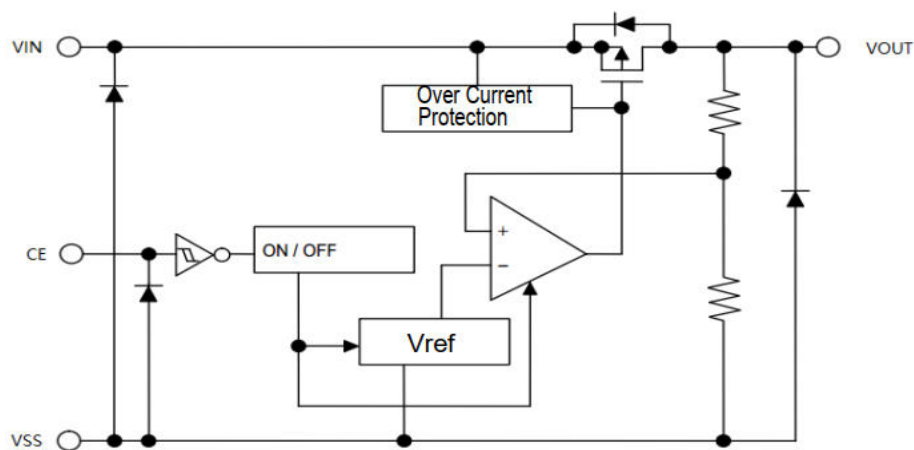
| Description                          | Symbol    | Value Range | Unit |
|--------------------------------------|-----------|-------------|------|
| Limit Power Voltage                  | $V_{IN}$  | -0.3~+22    | V    |
| Storage Temperature Range            | $T_{STG}$ | -50~+125    | °C   |
| Operating 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 | $\theta_{JA}$ | SOT-23-5L | 500         | °C/W |
| Power dissipation  | $P_W$         | SOT-23-5L | 200         | mW   |

## Block Diagram





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

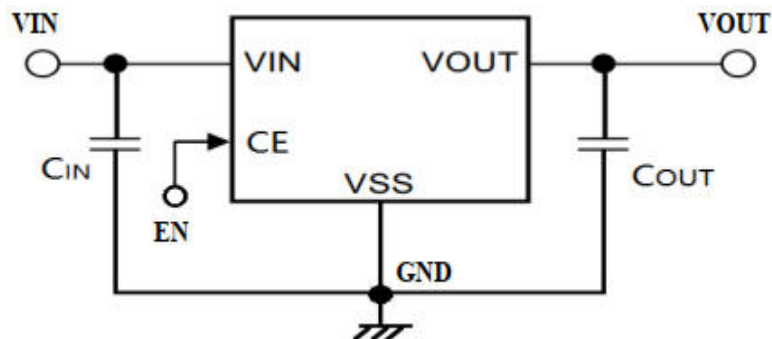
| Parameter               | Symbol                                               | Test Condition                                                                                               | Min | Typ       | Max | Unit                  |
|-------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-----|-----------|-----|-----------------------|
| Input Voltage           | $V_{IN}$                                             |                                                                                                              | 3.0 |           | 20  | V                     |
| Output Voltage          | $V_{OUT}$                                            |                                                                                                              | 3.0 |           | 5.0 | V                     |
| Voltage Accuracy        |                                                      | $I_{OUT}=1\text{mA}$                                                                                         | -2  |           | +2  | %                     |
| Output Current          | $I_{OUT}$                                            | $V_{IN}=V_{OUT}+2.0\text{V}$                                                                                 |     | 350       |     | mA                    |
| Load Regulation         | $\Delta V_{OUT}$                                     | $V_{IN}=V_{OUT}+2.0\text{V}$<br>$1\text{mA} \leq I_{OUT} \leq 150\text{mA}$                                  |     | 20        |     | mV                    |
| Line Regulation         | $\frac{\Delta V_{OUT}}{V_{OUT} \cdot \Delta V_{IN}}$ | $V_{OUT}+1.0\text{V} \leq V_{IN} \leq 18\text{V}$<br>$I_{OUT}=10\text{mA}$                                   |     | 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       | $I_{SS}$                                             | $V_{CE}=V_{IN}$                                                                                              |     | 2.0       | 4.0 | $\mu\text{A}$         |
| 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 |           | 20  | V                     |
|                         | $V_{CEL}$                                            | $V_{IN}=V_{OUT}+2.0\text{V}$                                                                                 | 0   |           | 0.3 | V                     |
| short-circuit current   | $I_{SHORT}$                                          | $V_{IN}=V_{OUT}+2.0\text{V}$                                                                                 |     | 400       |     | mA                    |
| Temperature Coefficient | $\frac{\Delta V_{OUT}}{\Delta T_A \cdot V_{OUT}}$    | $V_{IN}=V_{OUT}+2.0\text{V}$<br>$I_{OUT}=10\text{mA}$<br>$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ |     | $\pm 100$ |     | ppm/ $^\circ\text{C}$ |
| Discharge Resistor      | $R_{DIS}^2$                                          | $V_{CE} < 0.5\text{V}$                                                                                       |     | 300       |     | $\Omega$              |

**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



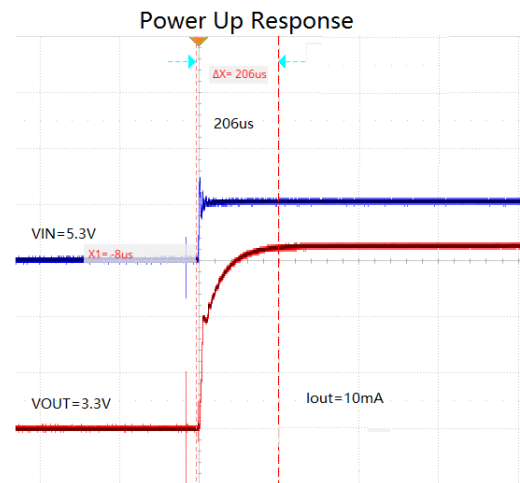
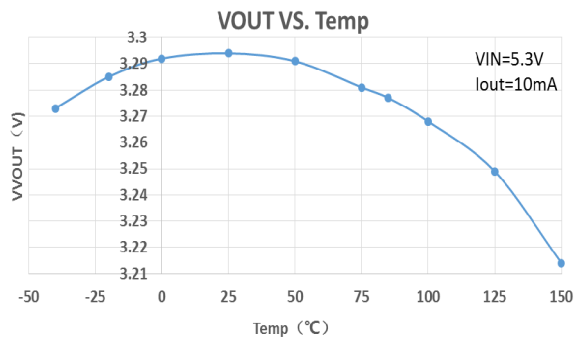
1.  $C_{IN}$  is used to stabilize the input capacitor.
2.  $C_{IN}$  eramic capacitors greater than or equal to 1pF can be used for  $C_{OUT}$ .



## Function Description

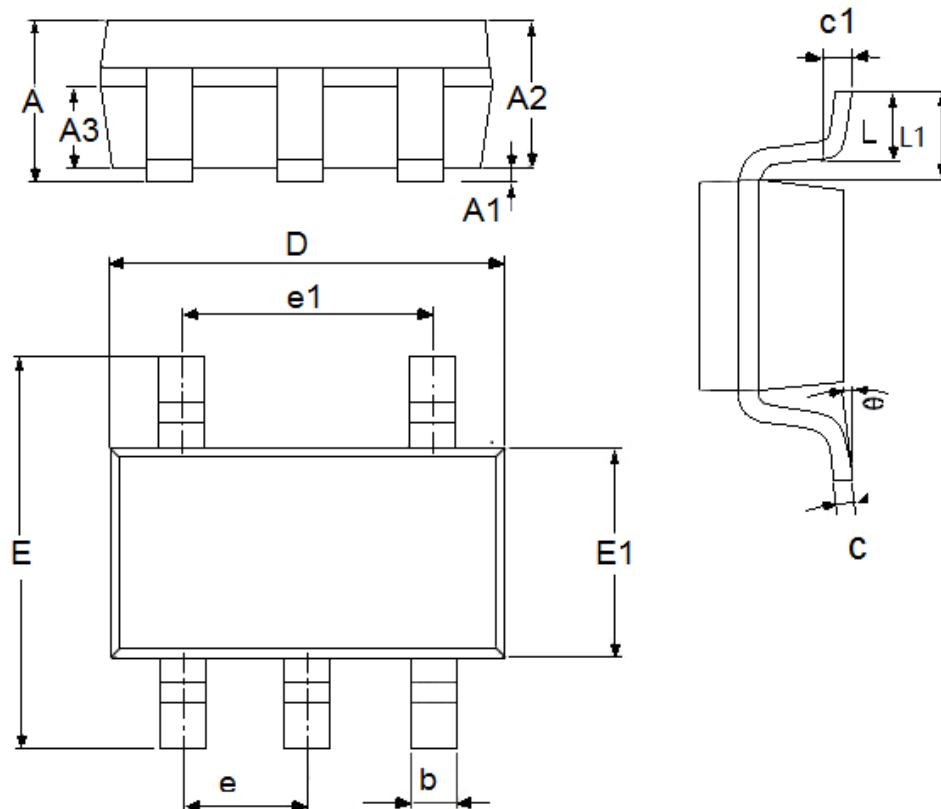
MIC5205 series are linear voltage regulator ICs withstanding 20V voltage. The series IC consists of a voltage reference, an error amplifier, a current limiter and a phase compensation circuit plus a driver transistor. The output stabilization capacitor is also compatible with low ESR ceramic capacitors. 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)          |        |
| $\theta$ | 0                         | 8°   | 0.0000               | 8°     |
| c1       | 0.2(TYP)                  |      | 0.0079(TYP)          |        |



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