



### GENERAL DESCRIPTION

The HLP2992AIM5X series is a set of low voltage differential (LDO) converters with a wide voltage input range of 3.0V to 16V, low voltage differential, low power consumption, and miniaturized packaging. The output voltage range is 3.0-5.0V, and the HLP2992AIM5X has low static current characteristics as low as 5.0uA. The circuit also has a CE enable controlport, 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.

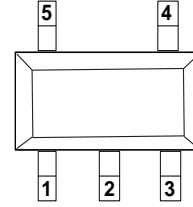
### FEATURES

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 16V
- Quiescent Current 8.0μA
- Output Voltage Accuracy: tolerance ±2%
- High output current: 250mA

### TYPICAL APPLICATIONS

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

### PIN CONFIGURATION



SOT-23-5L

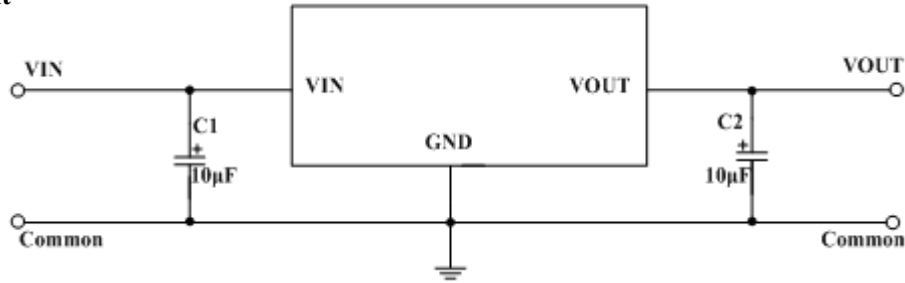
### PIN DESCRIPTION

| PIN No.   | Name             | Functions Description |
|-----------|------------------|-----------------------|
| SOT-23-5L |                  |                       |
| 1         | V <sub>IN</sub>  | input                 |
| 2         | GND              | ground                |
| 3         | CE               | ON / OFF              |
| 4         | NC               | No Connect            |
| 5         | V <sub>OUT</sub> | output                |

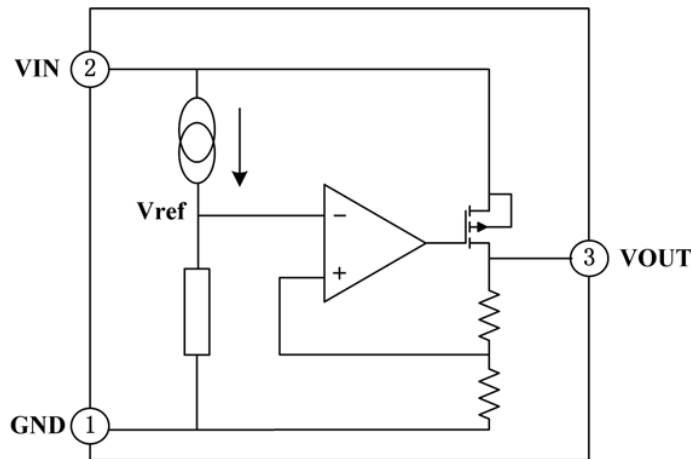


## TYPICAL APPLICATION CIRCUIT

### Basic Circuit



## FUNCTIONAL BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Description                          | Symbol        | Value range | Unit |
|--------------------------------------|---------------|-------------|------|
| Limit Power Voltage                  | $V_{IN}$      | -0.3~+18    | V    |
| Storage Temperature Range            | $T_{STG}$     | -50~+125    | °C   |
| Operating Free-air Temperature Range | $T_A$         | -30~+85     | °C   |
| Thermal resistance                   | $\theta_{JA}$ | 500         | °C/W |
| Power dissipation                    | $P_W$         | 200         | mW   |

**Note :** Stresses greater than those listed under “Absolute Maximum Ratings” may 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.



**DC CHARACTERISTICS** (unless otherwise noted  $T_A = +25^\circ\text{C}$ )

( $V_{IN} = V_{OUT} + 2.0\text{V}$ ,  $C_{IN} = C_L = 10\mu\text{F}$ ,  $T_A = 25^\circ\text{C}$ , unless otherwise noted)

**Series +3.0V OUTPUT**

| Parameter               | Symbol  | Test Condition  | Min. | Typ. | Max. | Unit                  |
|-------------------------|---|---|------|------|------|-----------------------|
| Output Voltage          | $V_{OUT}$   | $V_{IN} = V_{OUT} + 2.0\text{V}$ ,<br>$I_{OUT} = 10\text{mA}$   | 2.94 | 3.00 | 3.06 | V                     |
| Output Current          | $I_{OUT}$   | $V_{IN} = V_{OUT} + 2.0\text{V}$  | —    | 250  | —    | mA                    |
| Load Regulation         | $\Delta V_{OUT}$  | $V_{IN} = V_{OUT} + 2.0\text{V}$<br>$1\text{mA} \leq I_{OUT} \leq 50\text{mA}$  | —    | 25   | 100  | mV                    |
| Voltage Drop            | $V_{DIF}$   | $I_{OUT} = 1\text{mA}$ , $\Delta V_{OUT} = 2\%$   | —    | 30   | 100  | mV                    |
| Quiescent Current       | $I_{SS}$  | No Load   | —    | 8.0  | 10   | $\mu\text{A}$         |
| Line Regulation         | $\frac{\Delta V_{OUT}}{V_{OUT}} / \frac{\Delta V_{IN}}{V_{IN}}$ | $V_{OUT} + 1.0\text{V} \leq V_{IN} \leq 16\text{V}$ ,<br>$I_{OUT} = 1\text{mA}$                                       | —    | —    | 0.2  | %/V                   |
| Input Voltage           | $V_{IN}$  | —   | —    | —    | 16   | V                     |
| Temperature Coefficient | $\frac{\Delta V_{OUT}}{\Delta T_A} / V_{OUT}$                   | $V_{IN} = V_{OUT} + 2.0\text{V}$ ,<br>$I_{OUT} = 10\text{mA}$ ,<br>$-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$ | —    | 100  | —    | ppm/ $^\circ\text{C}$ |

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

**Series +3.3V OUTPUT**

| Parameter               | Symbol  | Test Condition  | Min.  | Typ. | Max.  | Unit                  |
|-------------------------|---|---|-------|------|-------|-----------------------|
| Output Voltage          | $V_{OUT}$   | $V_{IN} = V_{OUT} + 2.0\text{V}$ ,<br>$I_{OUT} = 10\text{mA}$   | 3.234 | 3.30 | 3.366 | V                     |
| Output Current          | $I_{OUT}$   | $V_{IN} = V_{OUT} + 2.0\text{V}$  | —     | 250  | —     | mA                    |
| Load Regulation         | $\Delta V_{OUT}$  | $V_{IN} = V_{OUT} + 2.0\text{V}$<br>$1\text{mA} \leq I_{OUT} \leq 50\text{mA}$  | —     | 25   | 100   | mV                    |
| Voltage Drop            | $V_{DIF}$   | $I_{OUT} = 1\text{mA}$ , $\Delta V_{OUT} = 2\%$   | —     | 30   | 80    | mV                    |
| Quiescent Current       | $I_{SS}$  | No Load   | —     | 8.0  | 10    | $\mu\text{A}$         |
| Line Regulation         | $\frac{\Delta V_{OUT}}{V_{OUT}} / \frac{\Delta V_{IN}}{V_{IN}}$ | $V_{OUT} + 1.0\text{V} \leq V_{IN} \leq 16\text{V}$ ,<br>$I_{OUT} = 1\text{mA}$                                       | —     | —    | 0.2   | %/V                   |
| Input Voltage           | $V_{IN}$  | —   | —     | —    | 16    | V                     |
| Temperature Coefficient | $\frac{\Delta V_{OUT}}{\Delta T_A} / V_{OUT}$                   | $V_{IN} = V_{OUT} + 2.0\text{V}$ ,<br>$I_{OUT} = 10\text{mA}$ ,<br>$-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$ | —     | 100  | —     | ppm/ $^\circ\text{C}$ |

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



Series +5.0V OUTPUT

| Parameter               | Symbol  | Test Condition  | Min. | Typ. | Max. | Unit            |
|-------------------------|---|---|------|------|------|-----------------|
| Output Voltage          | $V_{OUT}$   | $V_{IN}=V_{OUT}+2.0V$ ,<br>$I_{OUT}=10mA$   | 4.9  | 5.0  | 5.1  | V               |
| Output Current          | $I_{OUT}$   | $V_{IN}=V_{OUT}+2.0V$   | —    | 250  | —    | mA              |
| Load Regulation         | $\Delta V_{OUT}$  | $V_{IN}=V_{OUT}+2.0V$<br>$1mA \leq I_{OUT} \leq 70mA$                                 | —    | 25   | 85   | mV              |
| Voltage Drop            | $V_{DIF}$   | $I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$  | —    | 25   | 60   | mV              |
| Quiescent Current       | $I_{SS}$  | No Load   | —    | 8.0  | 10   | $\mu A$         |
| Line Regulation         | $\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \frac{\Delta V_{IN}}{V_{IN}}$ | $V_{OUT}+1.0V \leq V_{IN} \leq 16V$ ,<br>$I_{OUT}=1mA$                                | —    | —    | 0.2  | %/V             |
| Input Voltage           | $V_{IN}$  | —   | —    | —    | 16   | V               |
| Temperature Coefficient | $\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$                   | $V_{IN}=V_{OUT}+2.0V$ ,<br>$I_{OUT}=10mA$ ,<br>$-40^\circ C \leq T_A \leq 85^\circ C$ | —    | 100  | —    | ppm/ $^\circ C$ |

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

## FUNCTIONAL DESCRIPTION

LP2992IM5X series are linear voltage regulator ICs withstanding 16V 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.

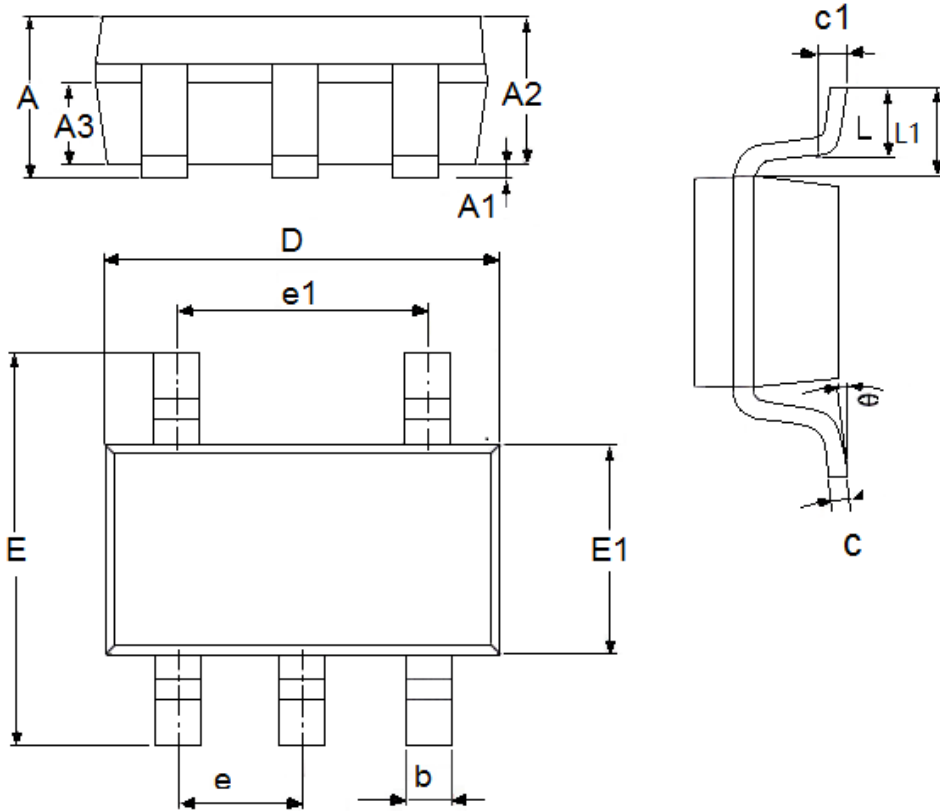
The over current protection circuit and the over voltage protection circuit are built-in.

The protection circuit will operate when the output current or input voltage reaches limit level.



**PACKAGEIN FORMATION**

- 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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