

## HT72XX LOW DROPOUT LINEAR REGULATOR

### GENERAL DESCRIPTION

HT72XX series are a set of Low Dropout Linear Regulator ICs implemented in CMOS technology. They can withstand voltage 10V. And they are available with low voltage drop and low quiescent current, widely used in audio, video and communication appliances.

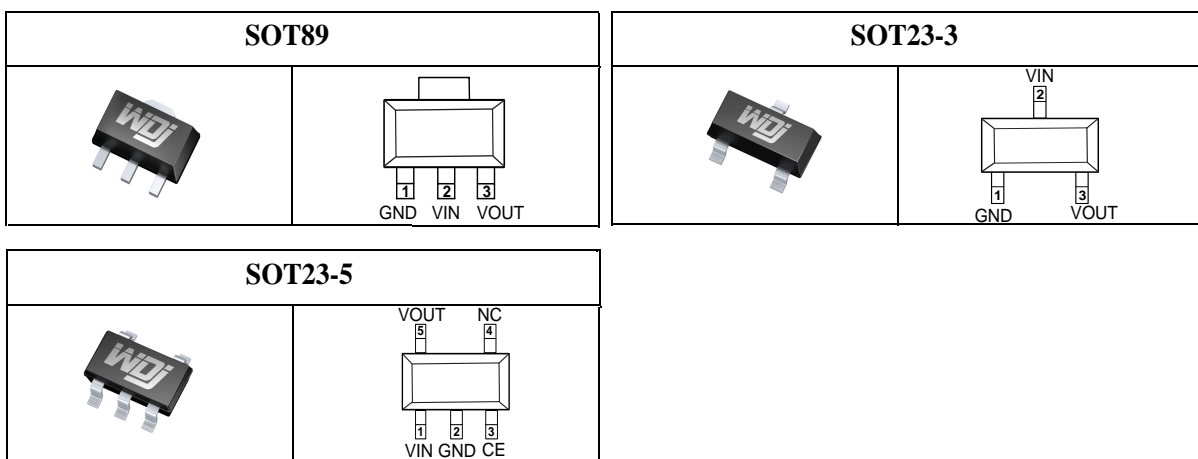
### FEATURES

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 10V
- Quiescent Current 2.0 $\mu$ A
- Output Voltage Accuracy: tolerance  $\pm 2\%$
- High output current: 300mA

### TYPICAL APPLICATIONS

- Battery-powered Equipments
- Communication Equipments
- Audio/Video Equipments

### PIN CONFIGURATION



## OUTPUT

| Series | Output | Package                  |
|--------|--------|--------------------------|
| HT7221 | 2.1V   | SOT89<br>TO92<br>SOT23-3 |
| HT7223 | 2.3V   |                          |
| HT7225 | 2.5V   |                          |
| HT7228 | 2.8V   |                          |
| HT7230 | 3.0V   |                          |
| HT7233 | 3.3V   |                          |
| HT7236 | 3.6V   |                          |
| HT7240 | 4.0V   |                          |
| HT7244 | 4.4V   |                          |
| HT7250 | 5.0V   |                          |
| HT7290 | 9.0V   |                          |

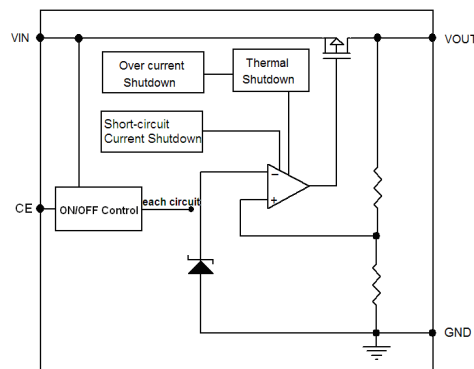
**NOTE:** “XX” is output voltage.

## PIN DESCRIPTION

| Pin Number | Pin Name         | Functions        |
|------------|------------------|------------------|
| SOT23-5    |                  |                  |
| 1          | V <sub>IN</sub>  | Power Input      |
| 2          | V <sub>SS</sub>  | Ground           |
| 3          | CE               | ON / OFF Control |
| 4          | NC               | No Connect       |
| 5          | V <sub>OUT</sub> | Output           |

| Pin Number | Pin Name         | Functions   |
|------------|------------------|-------------|
| SOT89-3    |                  |             |
| 1          | V <sub>SS</sub>  | Ground      |
| 2          | V <sub>IN</sub>  | Power Input |
| 3          | V <sub>OUT</sub> | Output      |

## FUNCTIONAL BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Description                          | Symbol           | Value range | Unit |
|--------------------------------------|------------------|-------------|------|
| Limit Power Voltage                  | V <sub>IN</sub>  | -0.3~+12    | V    |
| Storage Temperature Range            | T <sub>STG</sub> | -50~+125    | °C   |
| Operating Free-air Temperature Range | T <sub>A</sub>   | -40~+85     | °C   |

**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.

## HEAT DISSIPATION

| Description        | Symbol         | Package            | Value range | Unit |
|--------------------|----------------|--------------------|-------------|------|
| Thermal resistance | $\theta_{JA}$  | SOT89              | 200         | °C/W |
|                    |                | SOT23-5<br>SOT23-3 | 500         | °C/W |
| Power dissipation  | P <sub>W</sub> | SOT89              | 500         | mW   |
|                    |                | SOT23-5<br>SOT23-3 | 200         | mW   |

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

( $V_{IN} = V_{OUT} + 2\text{V}$ ,  $V_{CE} = V_{IN}$ ,  $C_{IN} = C_L = 10\mu\text{F}$ ,  $T_a = 25^\circ\text{C}$ , unless otherwise noted)

| Parameter                   | Symbol                   | Conditions   | Min.   | Typ.                     | Max.   | Units            |
|-----------------------------|--------------------------|--|--------|--------------------------|--------|------------------|
| Output Voltage              | $V_{OUT(E)}$<br>(Note 2) | $I_{OUT} = 10\text{mA}$ ,<br>$V_{IN} = V_{OUT} + 2\text{V}$                  | X 0.98 | $V_{OUT(T)}$<br>(Note 1) | X 1.02 | V                |
| Maximum Output Current      | $I_{OUTMAX}$             | $V_{IN} = V_{OUT} + 2\text{V}$   |        | 300                      |        | mA               |
| Load Regulation             | $\Delta V_{OUT}$         | $V_{IN} = V_{OUT} + 2\text{V}$ , $1\text{mA} \leq I_{OUT} \leq 300\text{mA}$ |        | 37                       |        | mV               |
| Dropout Voltage<br>(Note 1) | $V_{DIF1}$               | $I_{OUT} = 100\text{mA}$   |        | 180                      |        | mV               |
|                             | $V_{DIF2}$               | $I_{OUT} = 200\text{mA}$   |        | 260                      |        | mV               |
| Supply Current              | $I_{SS}$                 | $V_{IN} = V_{OUT} + 2\text{V}$   |        | 2                        |        | $\mu\text{A}$    |
| Stand-by Current            | $I_{CEL}$                | $V_{CE} = 0\text{V}$   |        | 0                        |        | $\mu\text{A}$    |
| Line Regulation             | $\Delta V_{OUT}$         | $I_{OUT} = 30\text{mA}$<br>$V_{OUT} + 2\text{V} \leq V_{IN} \leq 10\text{V}$ |        | 0.2                      |        | %/V              |
| CE "High" Voltage           | $V_{CEH}$                | Start up   | 1.20   |                          |        | V                |
| CE "Low" Voltage            | $V_{CEL}$                | Shut down  |        |                          | 0.8    | V                |
| Short-circuit Current       | $I_{SHORT}$              | $V_{OUT} = 0\text{V}$  |        | 200                      |        | mA               |
| Thermal Shutdown Protection | $T_{sd}$                 | $I_{OUT} = 10\text{mA}$ ,<br>$V_{IN} = V_{OUT} + 2\text{V}$                  |        | 100                      |        | $^\circ\text{C}$ |

## FUNCTIONAL DESCRIPTION

### 1. Input Bypass Capacitor

An input capacitor is recommended. A 10uF tantalum on the input is a suitable input bypassing for almost all applications.

### 2. Output Capacitor

The output capacitor is critical in maintaining regulator stability, and must meet the required conditions for both minimum amount of capacitance and ESR (Equivalent Series Resistance). The minimum output capacitance required by the WD6119 is 10µF, if a tantalum capacitor is used. Any increase of the output capacitance will merely improve the loop stability and transient response. The ESR of the output capacitor should be less than 0.5Ω .

### 3. Load Regulation

The HT72XX regulates the voltage that appears between its output and ground pins, or between its output and adjust pins. In some cases, line resistances can introduce errors to the voltage across the load. To obtain the best load regulation, a few precautions are needed. Figure1, shows a typical application using a fixed output regulator. The  $R_{t1}$  and  $R_{t2}$  are the line resistances. It is obvious that the  $V_{LOAD}$  is less than the  $V_{OUT}$  by the sum of

the voltage drops along the line resistances. In this case, the load regulation seen at the  $R_{LOAD}$  would be degraded from the datasheet specification. To improve this , the load should be tied directly to the output terminal on the positive side and directly tied to the ground terminal on the negative side.

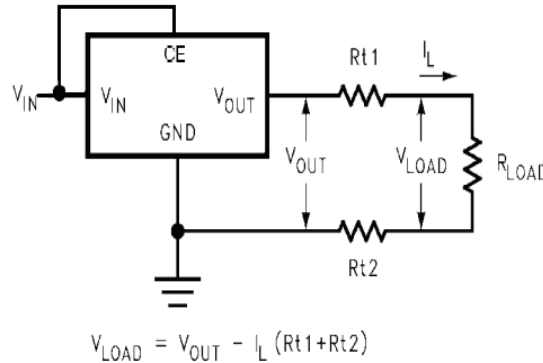
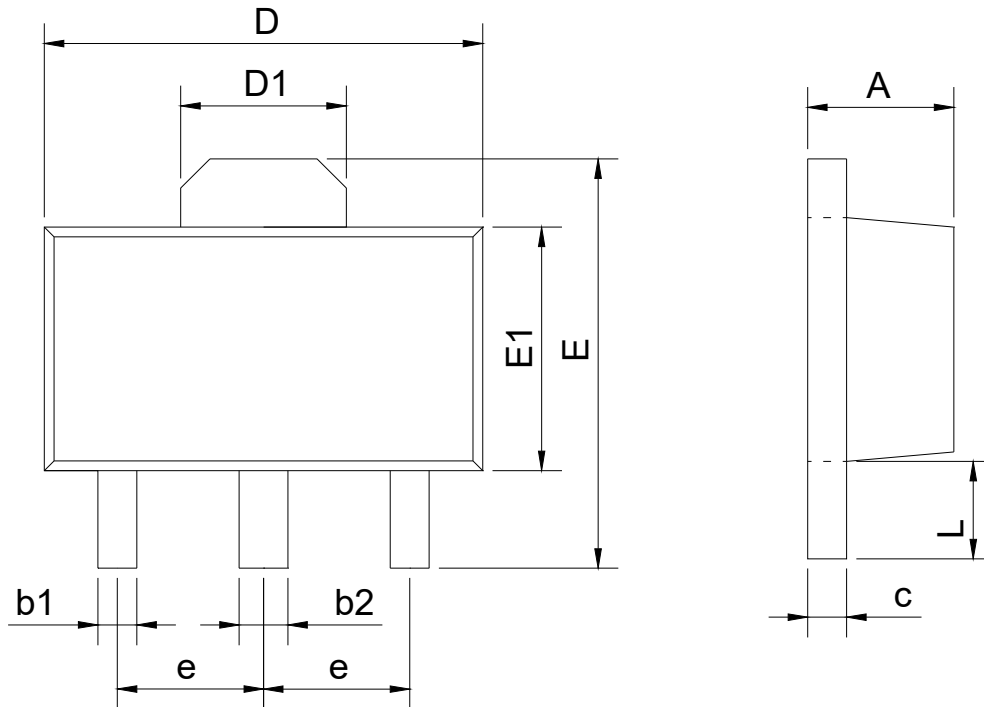


FIGURE 1. Typical Application using Fixed Output Regulator

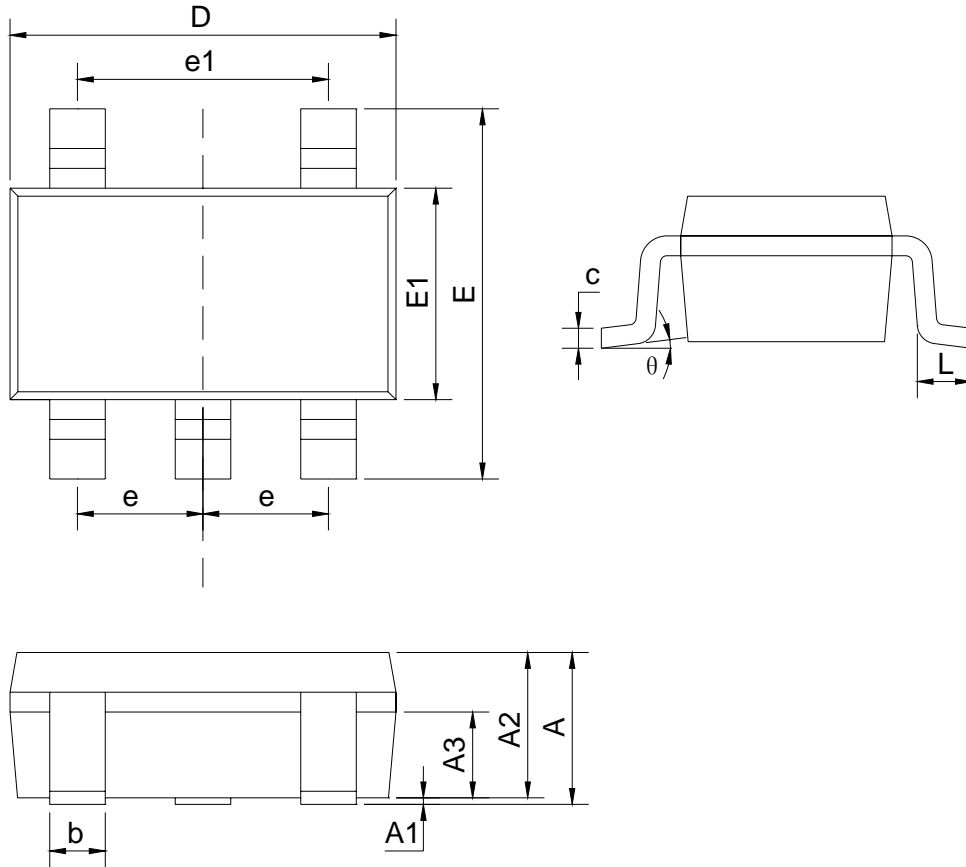
## PACKAGE INFORMATION

### SOT89



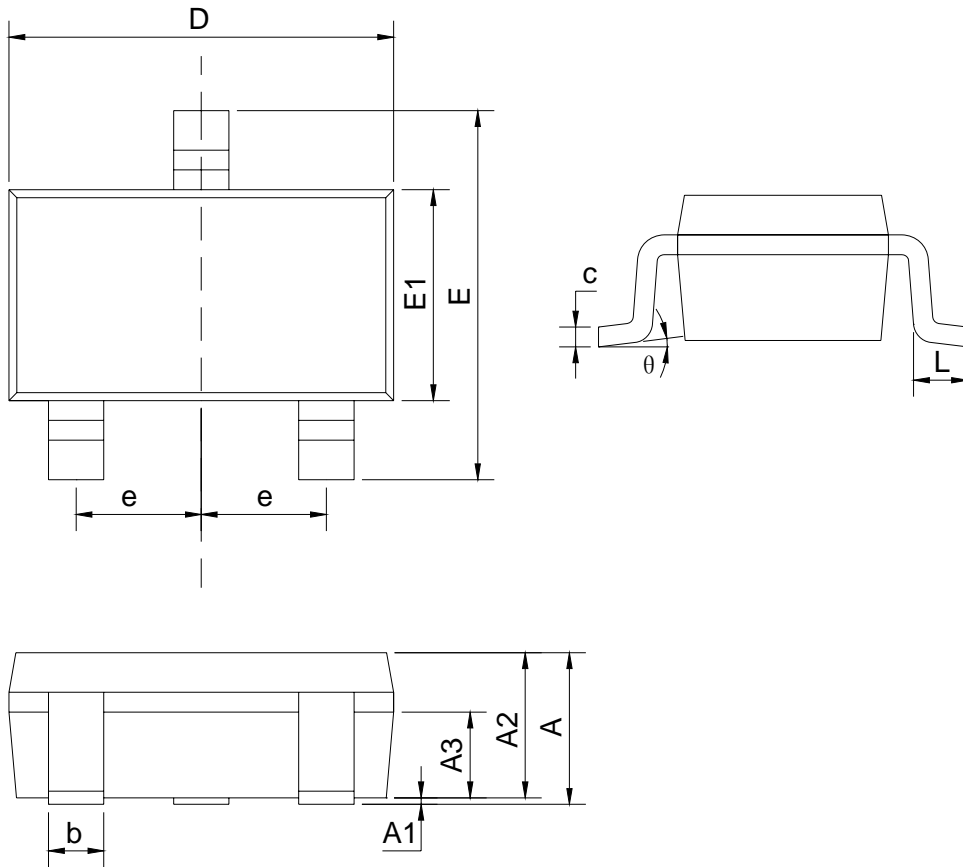
| SYMBOL | mm      |      |
|--------|---------|------|
|        | min     | max  |
| A      | 1.40    | 1.60 |
| b1     | 0.35    | 0.50 |
| b2     | 0.45    | 0.60 |
| c      | 0.36    | 0.46 |
| D      | 4.30    | 4.70 |
| D1     | 1.40    | 1.80 |
| E      | 4.00    | 4.40 |
| E1     | 2.30    | 2.70 |
| e      | 1.50BSC |      |
| L      | 0.80    | 1.20 |

## SOT23-5



| SYMBOL   | mm      |      |
|----------|---------|------|
|          | min     | max  |
| A        |         | 1.35 |
| A1       | 0.04    | 0.15 |
| A2       | 1.00    | 1.20 |
| A3       | 0.55    | 0.75 |
| b        | 0.38    | 0.48 |
| c        | 0.10    | 0.25 |
| D        | 2.72    | 3.12 |
| E        | 2.60    | 3.00 |
| E1       | 1.40    | 1.80 |
| e        | 0.95BSC |      |
| e1       | 1.90BSC |      |
| L        | 0.30    | 0.60 |
| $\theta$ | 0       | 8°   |

## SOT23-3



| SYMBOL   | mm      |      |
|----------|---------|------|
|          | min     | max  |
| A        |         | 1.35 |
| A1       | 0.04    | 0.15 |
| A2       | 1.00    | 1.20 |
| A3       | 0.55    | 0.75 |
| b        | 0.38    | 0.48 |
| c        | 0.10    | 0.25 |
| D        | 2.72    | 3.12 |
| E        | 2.60    | 3.00 |
| E1       | 1.20    | 1.80 |
| e        | 0.95BSC |      |
| L        | 0.30    | 0.60 |
| $\theta$ | 0       | 8°   |



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[>>WDJ\(微电晶\)](#)