## Features

- Ultra low quiescent current: 3.5μA (typ.)
- High input voltage (up to 12V)
- Output voltage: 1.8V, 2.5V, 2.7V, 3.0V, 3.3V, 3.5V, 4.15V, 5.0V
- Output voltage accuracy: tolerance ±3%
- Maximum output current: 250mA
- Low dropout voltage
- Low temperature coefficient
- TO-92, SOT-89 package

## Applications

- Battery-powered equipment
- Voltage regulator for microprocessor
- Voltage regulator for LAN cards
- Wireless Communication equipment
- Audio/Video equipment

## General Description

The HT73XX series is a set of three-terminal, low power, high voltage regulators implemented in CMOS technology. The series features extremely low quiescent current which is typically 3.5μA . They allow input voltages as high as 12V. The device provides large current with a significantly small dropout voltage.

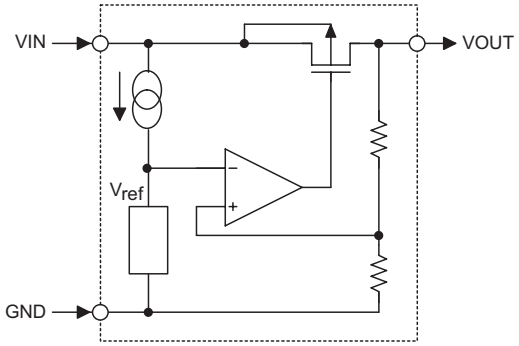
The HT73XX consists of a high-precision voltage reference, an error correction circuit, and a current limited output driver. They are available with several fixed output voltages ranging from 1.8V to 5.0V. CMOS technology ensures low dropout voltage and low current consumption. Although designed primarily as fixed voltage regulators, these devices can be used with external components to generate variable voltages and currents.

## Selection Table

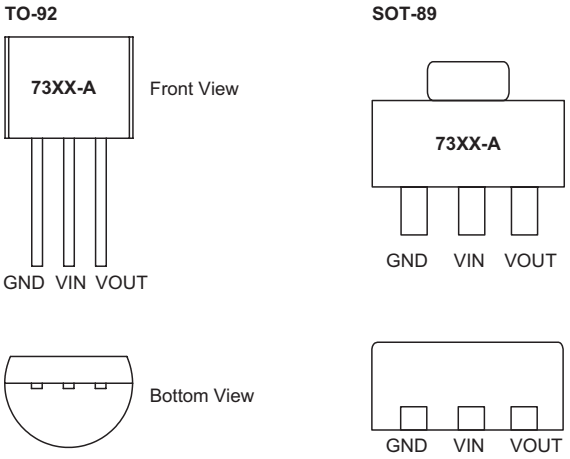
| Part No. | Output Voltage | Package | Marking |
|---|---|---|---|
| HT7318 | 1.8V | SOT89<br>TO92 | 73xx-A (for TO-92)<br>73xx-A (for SOT-89) |
| HT7325 | 2.5V | | |
| HT7327 | 2.7V | | |
| HT7330 | 3.0V | | |
| HT7333 | 3.3V | | |
| HT7335 | 3.5V | | |
| HT7341 | 4.15V | | |
| HT7350 | 5.0V | | |

Note: "xx" stands for output voltages.

## Block Diagram




## Pin Assignment




## Pin Description

| Pin No. | | Pin Name | Description |
|---|---|---|---|
| SOT89 | TO92 | | |
| 1 | 1 | GND | Ground pin |
| 2 | 2 | VIN | Input pin |
| 3 | 3 | VOUT | Output pin |

## Absolute Maximum Ratings*

Supply Voltage ..... $V_{SS}$−0.3V to $V_{SS}$+14V
Storage Temperature .....−50°C to 125°C
Power Consumption (*1) ..... 500mW
Operating Temperature .....−40°C to 85°C
Power Consumption (*2) .....500mW

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.
*1: applied to TO-92
*2: applied to SOT-89
The guaranteed specifications apply only for the test conditions listed.

## Electrical Characteristics

### HT7318, +1.8V Output Type

Ta=25°C

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | | VIN | Conditions | | | | |
| $V_{OUT}$ | Output Voltage | 2.8V | $I_{OUT}$=40mA | 1.746 | 1.800 | 1.854 | V |
| $I_{OUT(MAX)}$ | Maximum Output Current | 2.8V | $V_{OUT}$ ≥ 1.62V | 150 | — | — | mA |
| $\Delta V_{OUT}$* | Load Regulation | 2.8V | 1mA ≤ $I_{OUT}$ ≤ 60mA | — | 45 | 90 | mV |
| $V_{DROP}$** | Dropout Voltage | — | $I_{OUT}$=40mA | — | 170 | — | mV |
| $I_{SS}$ | Quiescent Current | 2.8V | No load | — | 3.5 | 7 | μA |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$ | Line Regulation | — | $I_{OUT}$=40mA<br>2.8V ≤ $V_{IN}$ ≤ 12V | — | 0.2 | 0.3 | %/V |
| $V_{IN}$ | Input Voltage | — | — | — | — | 12 | V |
| $\frac{\Delta V_{OUT}}{\Delta T_a}$ | Temperature Coefficient | 2.8V | $I_{OUT}$=40mA<br>−40°C < Ta < 85°C | — | ±0.7 | — | mV/°C |

### HT7325, +2.5V Output Type

Ta=25°C

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | | VIN | Conditions | | | | |
| $V_{OUT}$ | Output Voltage | 3.5V | $I_{OUT}$=40mA | 2.425 | 2.500 | 2.575 | V |
| $I_{OUT(MAX)}$ | Maximum Output Current | 3.5V | $V_{OUT}$ ≥ 2.25V | 180 | — | — | mA |
| $\Delta V_{OUT}$* | Load Regulation | 3.5V | 1mA ≤ $I_{OUT}$ ≤ 60mA | — | 45 | 90 | mV |
| $V_{DROP}$** | Dropout Voltage | — | $I_{OUT}$=40mA | — | 110 | — | mV |
| $I_{SS}$ | Quiescent Current | 3.5V | No load | — | 3.5 | 7.0 | μA |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$ | Line Regulation | — | $I_{OUT}$=40mA<br>3.5V ≤ $V_{IN}$ ≤ 12V | — | 0.2 | 0.3 | %/V |
| $V_{IN}$ | Input Voltage | — | — | — | — | 12 | V |
| $\frac{\Delta V_{OUT}}{\Delta T_a}$ | Temperature Coefficient | 3.5V | $I_{OUT}$=40mA<br>−40°C < Ta < 85°C | — | ±0.7 | — | mV/°C |

### HT7327, +2.7V Output Type

Ta=25°C

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | | VIN | Conditions | | | | |
| $V_{OUT}$ | Output Voltage | 3.7V | $I_{OUT}$=40mA | 2.619 | 2.700 | 2.781 | V |
| $I_{OUT(MAX)}$ | Maximum Output Current | 3.7V | $V_{OUT}$ ≥ 2.43V | 200 | — | — | mA |
| $\Delta V_{OUT}$* | Load Regulation | 3.7V | 1mA ≤ $I_{OUT}$ ≤ 80mA | — | 45 | 90 | mV |
| $V_{DROP}$** | Dropout Voltage | — | $I_{OUT}$=40mA | — | 100 | — | mV |
| $I_{SS}$ | Quiescent Current | 3.7V | No load | — | 3.5 | 7.0 | μA |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$ | Line Regulation | — | $I_{OUT}$=40mA<br>3.7V ≤ $V_{IN}$ ≤ 12V | — | 0.2 | 0.3 | %/V |
| $V_{IN}$ | Input Voltage | — | — | — | — | 12 | V |
| $\frac{\Delta V_{OUT}}{\Delta T_a}$ | Temperature Coefficient | 3.7V | $I_{OUT}$=40mA<br>−40°C < Ta < 85°C | — | ±0.7 | — | mV/°C |

## HT7330, +3.0V Output Type

Ta=25°C

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | | VIN | Conditions | | | | |
| $V_{OUT}$ | Output Voltage | 4.0V | $I_{OUT}$=40mA | 2.910 | 3.000 | 3.090 | V |
| $I_{OUT(MAX)}$ | Maximum Output Current | 4.0V | $V_{OUT}$ ≥ 2.70V | 250 | — | — | mA |
| $\Delta V_{OUT}$* | Load Regulation | 4.0V | 1mA ≤ $I_{OUT}$ ≤ 80mA | — | 45 | 90 | mV |
| $V_{DROP}$** | Dropout Voltage | — | $I_{OUT}$=40mA | — | 95 | — | mV |
| $I_{SS}$ | Quiescent Current | 4.0V | No load | — | 3.5 | 7.0 | μA |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$ | Line Regulation | — | $I_{OUT}$=40mA<br>4.0V ≤ $V_{IN}$ ≤ 12V | — | 0.2 | 0.3 | %/V |
| $V_{IN}$ | Input Voltage | — | — | — | — | 12 | V |
| $\frac{\Delta V_{OUT}}{\Delta T_a}$ | Temperature Coefficient | 4.0V | $I_{OUT}$=40mA<br>−40°C < Ta < 85°C | — | ±0.7 | — | mV/°C |

## HT7333, +3.3V Output Type

Ta=25°C

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | | VIN | Conditions | | | | |
| $V_{OUT}$ | Output Voltage | 4.3V | $I_{OUT}$=40mA | 3.201 | 3.300 | 3.399 | V |
| $I_{OUT(MAX)}$ | Maximum Output Current | 4.3V | $V_{OUT}$ ≥ 2.97V | 250 | — | — | mA |
| $\Delta V_{OUT}$* | Load Regulation | 4.3V | 1mA ≤ $I_{OUT}$ ≤ 80mA | — | 45 | 90 | mV |
| $V_{DROP}$** | Dropout Voltage | — | $I_{OUT}$=40mA | — | 90 | — | mV |
| $I_{SS}$ | Quiescent Current | 4.3V | No load | — | 3.5 | 7.0 | μA |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$ | Line Regulation | — | $I_{OUT}$=40mA<br>4.3V ≤ $V_{IN}$ ≤ 12V | — | 0.2 | 0.3 | %/V |
| $V_{IN}$ | Input Voltage | — | — | — | — | 12 | V |
| $\frac{\Delta V_{OUT}}{\Delta T_a}$ | Temperature Coefficient | 4.3V | $I_{OUT}$=40mA<br>−40°C < Ta < 85°C | — | ±0.7 | — | mV/°C |

## HT7335, +3.5V Output Type

Ta=25°C

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | | VIN | Conditions | | | | |
| $V_{OUT}$ | Output Voltage | 4.5V | $I_{OUT}$=40mA | 3.395 | 3.500 | 3.605 | V |
| $I_{OUT(MAX)}$ | Maximum Output Current | 4.5V | $V_{OUT}$ ≥ 3.15V | 250 | — | — | mA |
| $\Delta V_{OUT}$* | Load Regulation | 4.5V | 1mA ≤ $I_{OUT}$ ≤ 80mA | — | 45 | 90 | mV |
| $V_{DROP}$** | Dropout Voltage | — | $I_{OUT}$=40mA | — | 80 | — | mV |
| $I_{SS}$ | Quiescent Current | 4.5V | No load | — | 3.5 | 7.0 | μA |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$ | Line Regulation | — | $I_{OUT}$=40mA<br>4.5V ≤ $V_{IN}$ ≤ 12V | — | 0.2 | 0.3 | %/V |
| $V_{IN}$ | Input Voltage | — | — | — | — | 12 | V |
| $\frac{\Delta V_{OUT}}{\Delta T_a}$ | Temperature Coefficient | 4.5V | $I_{OUT}$=80mA<br>−40°C < Ta < 85°C | — | ±0.7 | — | mV/°C |

### HT7341, +4.15V Output Type

Ta=25°C

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | | VIN | Conditions | | | | |
| $V_{OUT}$ | Output Voltage | 5.15V | $I_{OUT}$=40mA | 4.025 | 4.150 | 4.275 | V |
| $I_{OUT(MAX)}$ | Maximum Output Current | 5.15V | $V_{OUT} \geq 3.74V$ | 250 | — | — | mA |
| $\Delta V_{OUT}$* | Load Regulation | 5.15V | $1mA \leq I_{OUT} \leq 80mA$ | — | 45 | 90 | mV |
| $V_{DROP}$** | Dropout Voltage | — | $I_{OUT}$=40mA | — | 60 | — | mV |
| $I_{SS}$ | Quiescent Current | 5.15V | No load | — | 3.5 | 7.0 | μA |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$ | Line Regulation | — | $I_{OUT}$=40mA<br>$6.0V \leq V_{IN} \leq 12.0V$ | — | 0.2 | 0.3 | %/V |
| $V_{IN}$ | Input Voltage | — | — | — | — | 12 | V |
| $\frac{\Delta V_{OUT}}{\Delta T_a}$ | Temperature Coefficient | 5.15V | $I_{OUT}$=80mA<br>−40°C < Ta < 85°C | — | ±0.7 | — | mV/°C |

### HT7350, +5.0V Output Type

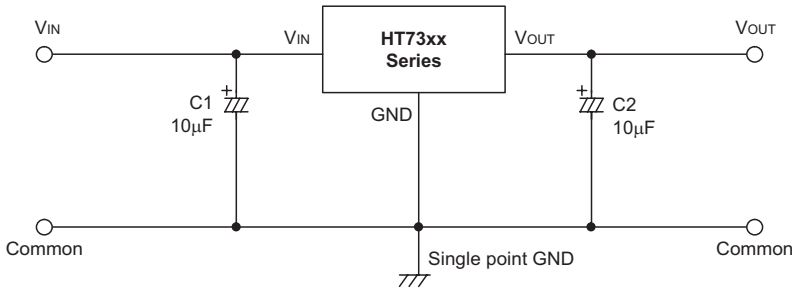
Ta=25°C

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | | VIN | Conditions | | | | |
| $V_{OUT}$ | Output Voltage | 6.0V | $I_{OUT}$=40mA | 4.850 | 5.000 | 5.150 | V |
| $I_{OUT(MAX)}$ | Maximum Output Current | 6.0V | $V_{OUT} \geq 4.50V$ | 250 | — | — | mA |
| $\Delta V_{OUT}$* | Load Regulation | 6.0V | $1mA \leq I_{OUT} \leq 100mA$ | — | 45 | 90 | mV |
| $V_{DROP}$** | Dropout Voltage | — | $I_{OUT}$=40mA | — | 60 | — | mV |
| $I_{SS}$ | Quiescent Current | 6.0V | No load | — | 3.5 | 7.0 | μA |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$ | Line Regulation | — | $I_{OUT}$=40mA<br>$6.0V \leq V_{IN} \leq 12.0V$ | — | 0.2 | 0.3 | %/V |
| $V_{IN}$ | Input Voltage | — | — | — | — | 12 | V |
| $\frac{\Delta V_{OUT}}{\Delta T_a}$ | Temperature Coefficient | 6.0V | $I_{OUT}$=80mA<br>−40°C < Ta < 85°C | — | ±0.7 | — | mV/°C |

Note: "*" Regulation is measured at constant junction temperature, using pulsed ON time.

"**" Dropout is measured at constant junction temperature, using pulsed ON time, and the criterion is $V_{OUT}$ inside target value ±2%.

## Application Circuits



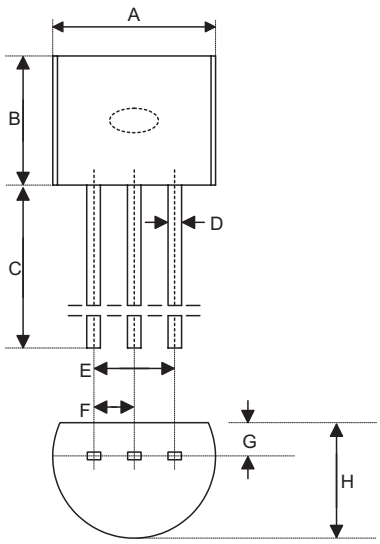
## Package Information

Note that the package information provided here is for consultation purposes only. As this information may be updated at regular intervals users are reminded to consult the Holtek website for the latest version of the Package/Carton Information.

Additional supplementary information with regard to packaging is listed below. Click on the relevant section to be transferred to the relevant website page.

- Package Information (include Outline Dimensions, Product Tape and Reel Specifications)
- The Operation Instruction of Packing Materials
- Carton information

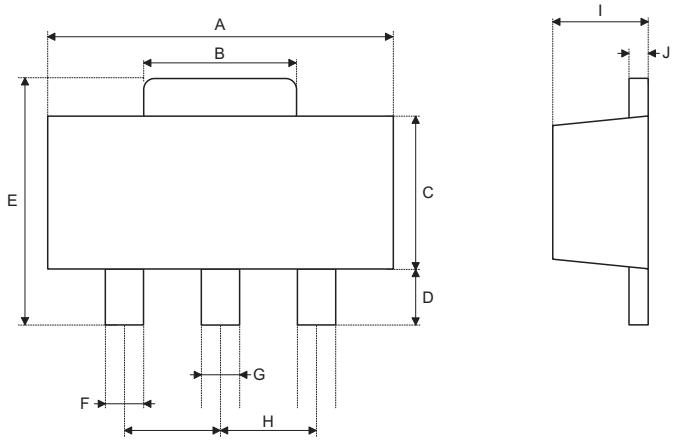
## 3-pin TO92 Outline Dimensions




| Symbol | Dimensions in inch | | |
|---|---|---|---|
| | Min. | Nom. | Max. |
| A | 0.173 | 0.180 | 0.205 |
| B | 0.170 | — | 0.210 |
| C | 0.500 | 0.580 | — |
| D | — | 0.015 BSC | — |
| E | — | 0.010 BSC | — |
| F | — | 0.050 BSC | — |
| G | — | 0.035 BSC | — |
| H | 0.125 | 0.142 | 0.165 |

| Symbol | Dimensions in mm | | |
|---|---|---|---|
| | Min. | Nom. | Max. |
| A | 4.39 | 4.57 | 5.21 |
| B | 4.32 | — | 5.33 |
| C | 12.70 | 14.73 | — |
| D | — | 0.38 BSC | — |
| E | — | 2.54 BSC | — |
| F | — | 1.27 BSC | — |
| G | — | 0.89 BSC | — |
| H | 3.18 | 3.61 | 4.19 |

## 3-pin SOT89 Outline Dimensions




| Symbol | Dimensions in inch | | |
|---|---|---|---|
| | Min. | Nom. | Max. |
| A | 0.173 | — | 0.181 |
| B | 0.053 | — | 0.072 |
| C | 0.090 | — | 0.102 |
| D | 0.035 | — | 0.047 |
| E | 0.155 | — | 0.167 |
| F | 0.014 | — | 0.019 |
| G | 0.017 | — | 0.022 |
| H | — | 0.059 BSC | — |
| I | 0.055 | — | 0.063 |
| J | 0.014 | — | 0.017 |

| Symbol | Dimensions in mm | | |
|---|---|---|---|
| | Min. | Nom. | Max. |
| A | 4.40 | — | 4.60 |
| B | 1.35 | — | 1.83 |
| C | 2.29 | — | 2.60 |
| D | 0.89 | — | 1.20 |
| E | 3.94 | — | 4.25 |
| F | 0.36 | — | 0.48 |
| G | 0.44 | — | 0.56 |
| H | — | 1.50 BSC | — |
| I | 1.40 | — | 1.60 |
| J | 0.35 | — | 0.44 |

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