

# HT73xx Series Low Power Consumption LDO

#### **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

• 3-pin SOT89 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  $3.5\mu A$ . 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**

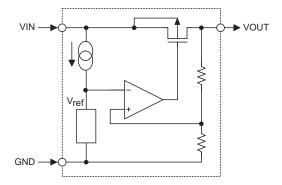
Part No.	Output Voltage	Package	Marking		
HT7318	1.8V				
HT7325	2.5V				
HT7327	2.7V				
HT7330	3.0V	SOT89	72vv A (for COT90)		
HT7333	3.3V	50169	73xx-A (for SOT89)		
HT7335	3.5V				
HT7341	4.15V				
HT7350	5.0V				

Note: "xx" stands for output voltages.

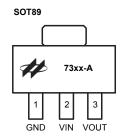
Rev. 1.80 1 March 19, 2019



## **Block Diagram**



# **Pin Assignment**



# **Pin Description**

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

# **Absolute Maximum Ratings\***

Supply VoltageV <sub>SS</sub> -0.3V to V <sub>SS</sub> +14V	Power Consumption500mW
Storage Temperature50°C to 125°C	Maximum Junction Temperature
Operating Temperature40°C to 85°C	

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.

The guaranteed specifications apply only for the test conditions listed.

Rev. 1.80 2 March 19, 2019



## **Electrical Characteristics**

## HT7318, +1.8V Output Type

Ta=25°C

Cymphol	Davamatav	Т	est Conditions	Min	Trees	May	l lmi4
Symbol	Parameter	VIN	Conditions	Min.	Тур.	Max.	Unit
V <sub>оит</sub>	Output Voltage	2.8V	I <sub>OUT</sub> =40mA	1.746	1.800	1.854	V
I <sub>OUT(MAX)</sub>	Maximum Output Current	2.8V	V <sub>OUT</sub> ≥ 1.62V	150	_	_	mA
$\Delta V_{\text{OUT}}^*$	Load Regulation	2.8V	1mA ≤ I <sub>OUT</sub> ≤ 60mA	_	45	90	mV
V <sub>DROP</sub> **	Dropout Voltage	_	I <sub>OUT</sub> =40mA	_	170	_	mV
I <sub>SS</sub>	Quiescent Current	2.8V	No load	_	3.5	7	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	I <sub>OUT</sub> =40mA 2.8V ≤ V <sub>IN</sub> ≤ 12V	_	0.2	0.3	%/V
VIN	Input Voltage	_	_	_	_	12	V
<u>Δ</u> Vουτ <u>Δ</u> Τ <sub>a</sub>	Temperature Coefficient	2.8V	I <sub>оит</sub> =40mA -40°С < Та < 85°С	_	±0.7	_	mV/°C

## HT7325, +2.5V Output Type

Ta=25°C

Cumbal	Parameter	Т	est Conditions	Min.	Trees	Typ. Max.	l lmi4
Symbol	Parameter	VIN	Conditions	IVIII.	Тур.	wax.	Unit
V <sub>оит</sub>	Output Voltage	3.5V	I <sub>OUT</sub> =40mA	2.425	2.500	2.575	V
I <sub>OUT(MAX)</sub>	Maximum Output Current	3.5V	V <sub>OUT</sub> ≥ 2.25V	180	_	_	mA
$\Delta V_{\text{OUT}}^*$	Load Regulation	3.5V	1mA ≤ I <sub>OUT</sub> ≤ 60mA	_	45	90	mV
V <sub>DROP</sub> **	Dropout Voltage	_	I <sub>OUT</sub> =40mA	_	110	_	mV
Iss	Quiescent Current	3.5V	No load	_	3.5	7.0	μΑ
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	I <sub>OUT</sub> =40mA 3.5V ≤ V <sub>IN</sub> ≤ 12V	_	0.2	0.3	%/V
V <sub>IN</sub>	Input Voltage	_	_	_	_	12	V
$\frac{\Delta V_{OUT}}{\Delta T_{a}}$	Temperature Coefficient	3.5V	I <sub>оит</sub> =40mA -40°С < Та < 85°С	_	±0.7	_	mV/°C

# HT7327, +2.7V Output Type

Ta=25°C

Symphol	Parameter	T	est Conditions	Min.	Trees	May	Unit
Symbol	Parameter	VIN	Conditions	IVIII.	Тур.	Max.	Unit
V <sub>OUT</sub>	Output Voltage	3.7V	I <sub>OUT</sub> =40mA	2.619	2.700	2.781	V
I <sub>OUT(MAX)</sub>	Maximum Output Current	3.7V	V <sub>OUT</sub> ≥ 2.43V	200	_	_	mA
$\Delta V_{\text{OUT}}^*$	Load Regulation	3.7V	1mA ≤ I <sub>OUT</sub> ≤ 80mA	_	45	90	mV
V <sub>DROP</sub> **	Dropout Voltage	_	I <sub>OUT</sub> =40mA	_	100	_	mV
Iss	Quiescent Current	3.7V	No load	_	3.5	7.0	μΑ
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	I <sub>OUT</sub> =40mA 3.7V ≤ V <sub>IN</sub> ≤ 12V	_	0.2	0.3	%/V
V <sub>IN</sub>	Input Voltage	_	_	_	_	12	V
$\frac{\Delta V_{OUT}}{\Delta T_{a}}$	Temperature Coefficient	3.7V	I <sub>оит</sub> =40mA -40°С < Та < 85°С	_	±0.7	_	mV/°C

Rev. 1.80 3 March 19, 2019



## HT7330, +3.0V Output Type

Ta=25°C

Symbol	Parameter	Т	est Conditions	Min.	Turn	Max.	Unit
Syllibol	Farameter	VIN	Conditions	IVIIII.	Тур.	IVIAX.	Ollit
V <sub>OUT</sub>	Output Voltage	4.0V	I <sub>OUT</sub> =40mA	2.910	3.000	3.090	V
I <sub>OUT(MAX)</sub>	Maximum Output Current	4.0V	V <sub>OUT</sub> ≥ 2.70V	250	_	_	mA
$\Delta V_{OUT}^*$	Load Regulation	4.0V	1mA ≤ I <sub>OUT</sub> ≤ 80mA	_	45	90	mV
V <sub>DROP</sub> **	Dropout Voltage	_	I <sub>OUT</sub> =40mA	_	95	_	mV
Iss	Quiescent Current	4.0V	No load	_	3.5	7.0	μΑ
$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	Line Regulation	_	I <sub>OUT</sub> =40mA 4.0V ≤ V <sub>IN</sub> ≤ 12V	_	0.2	0.3	%/V
V <sub>IN</sub>	Input Voltage	_	_	_	_	12	V
$\frac{\Delta V_{OUT}}{\Delta T_{a}}$	Temperature Coefficient	4.0V	I <sub>оит</sub> =40mA -40°С < Та < 85°С	_	±0.7	_	mV/°C

# HT7333, +3.3V Output Type

Ta=25°C

Cumbal	Dovernator	Т	est Conditions	Min.	Trees	Mey	Unit
Symbol	Parameter	VIN	Conditions	iviin.	Тур.	Max.	Unit
V <sub>OUT</sub>	Output Voltage	4.3V	I <sub>OUT</sub> =40mA	3.201	3.300	3.399	V
I <sub>OUT(MAX)</sub>	Maximum Output Current	4.3V	V <sub>OUT</sub> ≥ 2.97V	250	_	_	mA
$\Delta V_{\text{OUT}}^*$	Load Regulation	4.3V	1mA ≤ I <sub>OUT</sub> ≤ 80mA	_	45	90	mV
V <sub>DROP</sub> **	Dropout Voltage	_	I <sub>OUT</sub> =40mA	_	90	_	mV
I <sub>SS</sub>	Quiescent Current	4.3V	No load	_	3.5	7.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	I <sub>OUT</sub> =40mA 4.3V ≤ V <sub>IN</sub> ≤ 12V	_	0.2	0.3	%/V
VIN	Input Voltage	_	_	_	_	12	V
<u>Δ</u> V <sub>OUT</sub> <u>Δ</u> T <sub>a</sub>	Temperature Coefficient	4.3V	I <sub>OUT</sub> =40mA -40°C < Ta < 85°C	_	±0.7	_	mV/°C

# HT7335, +3.5V Output Type

Ta=25°C

Cumbal	Parameter	Т	est Conditions	Min.	Tren	Max.	Unit
Symbol	Parameter	VIN	Conditions	IVIII.	Тур.	wax.	Unit
Vout	Output Voltage	4.5V	I <sub>OUT</sub> =40mA	3.395	3.500	3.605	V
I <sub>OUT(MAX)</sub>	Maximum Output Current	4.5V	V <sub>OUT</sub> ≥ 3.15V	250	_	_	mA
$\Delta V_{\text{OUT}}^*$	Load Regulation	4.5V	1mA ≤ I <sub>OUT</sub> ≤ 80mA	_	45	90	mV
V <sub>DROP</sub> **	Dropout Voltage	_	I <sub>OUT</sub> =40mA	_	80	_	mV
Iss	Quiescent Current	4.5V	No load	_	3.5	7.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	I <sub>OUT</sub> =40mA 4.5V ≤ V <sub>IN</sub> ≤ 12V	_	0.2	0.3	%/V
Vin	Input Voltage	_	_	_	_	12	V
$\Delta V_{OUT} \over \Delta T_{a}$	Temperature Coefficient	4.5V	I <sub>ОUT</sub> =80mA -40°С < Та < 85°С	_	±0.7	_	mV/°C

Rev. 1.80 4 March 19, 2019



#### HT7341, +4.15V Output Type

Ta=25°C

Symbol	Parameter	Т	est Conditions	Min.	Turn	vp. Max.	Unit
Syllibol	rarameter	VIN	Conditions	IVIIII.	Тур.	IVIAX.	Ullit
V <sub>оит</sub>	Output Voltage	5.15V	I <sub>OUT</sub> =40mA	4.025	4.150	4.275	V
I <sub>OUT(MAX)</sub>	Maximum Output Current	5.15V	V <sub>OUT</sub> ≥ 3.74V	250	_	_	mA
$\Delta V_{OUT}^*$	Load Regulation	5.15V	1mA ≤ I <sub>OUT</sub> ≤ 80mA	_	45	90	mV
V <sub>DROP</sub> **	Dropout Voltage	_	I <sub>OUT</sub> =40mA	_	60	_	mV
I <sub>SS</sub>	Quiescent Current	5.15V	No load	_	3.5	7.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	I <sub>OUT</sub> =40mA 6.0V ≤ V <sub>IN</sub> ≤ 12.0V	_	0.2	0.3	%/V
V <sub>IN</sub>	Input Voltage	_	_	_	_	12	V
<u>Δ</u> Vουτ <u>Δ</u> Τα	Temperature Coefficient	5.15V	I <sub>OUT</sub> =80mA -40°C < Ta < 85°C	_	±0.7	_	mV/°C

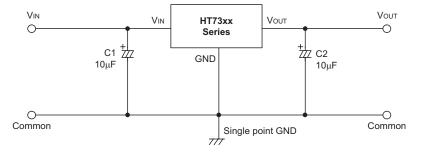
#### HT7350, +5.0V Output Type

Ta=25°C

Cumbal	Parameter	Т	est Conditions	Min.	Trees	Max	l lmi4
Symbol	Parameter	VIN	Conditions	IVIIII.	Тур.	Max.	Unit
V <sub>оит</sub>	Output Voltage	6.0V	I <sub>OUT</sub> =40mA	4.850	5.000	5.150	V
I <sub>OUT(MAX)</sub>	Maximum Output Current	6.0V	V <sub>OUT</sub> ≥ 4.50V	250	_	_	mA
$\Delta V_{\text{OUT}}^*$	Load Regulation	6.0V	1mA ≤ I <sub>OUT</sub> ≤ 100mA	_	45	90	mV
V <sub>DROP</sub> **	Dropout Voltage	_	I <sub>OUT</sub> =40mA	_	60	_	mV
Iss	Quiescent Current	6.0V	No load	_	3.5	7.0	μΑ
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	I <sub>OUT</sub> =40mA 6.0V ≤ V <sub>IN</sub> ≤ 12.0V	_	0.2	0.3	%/V
V <sub>IN</sub>	Input Voltage	_	_	_	_	12	V
$\Delta V_{OUT} \over \Delta T_{a}$	Temperature Coefficient	6.0V	I <sub>ОUT</sub> =80mA -40°С < Та < 85°С	_	±0.7	_	mV/°C

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

# **Application Circuits**



Rev. 1.80 5 March 19, 2019

<sup>&</sup>quot;\*\*" Dropout is measured at constant junction temperature, using pulsed ON time, and the criterion is  $V_{\text{OUT}}$  inside target value  $\pm 2\%$ .



## **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 <u>Holtek website</u> for the latest version of the <u>Package/Carton Information</u>.

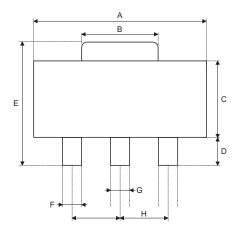
Additional supplementary information with regard to packaging is listed below. Click on the relevant section to be transferred to the relevant website page.

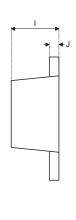
- Package Information (include Outline Dimensions, Product Tape and Reel Specifications)
- The Operation Instruction of Packing Materials
- Carton information

Rev. 1.80 6 March 19, 2019



# 3-pin SOT89 Outline Dimensions





Cymphol		Dimensions in inch	
Symbol	Min.	Nom.	Max.
A	0.173	_	0.185
В	0.053	_	0.072
С	0.090	_	0.106
D	0.031	_	0.047
E	0.155	_	0.173
F	0.014	_	0.019
G	0.017	_	0.022
Н	_	0.059 BSC	_
I	0.055	_	0.063
J	0.014	_	0.017

Symbol	Dimensions in mm		
	Min.	Nom.	Max.
A	4.40	_	4.70
В	1.35	_	1.83
С	2.29	_	2.70
D	0.80	_	1.20
Е	3.94	_	4.40
F	0.36	_	0.48
G	0.44	_	0.56
Н	_	1.50 BSC	_
I	1.40	_	1.60
J	0.35	_	0.44

Rev. 1.80 7 March 19, 2019



#### Copyright<sup>©</sup> 2019 by HOLTEK SEMICONDUCTOR INC.

The information appearing in this Data Sheet is believed to be accurate at the time of publication. However, Holtek assumes no responsibility arising from the use of the specifications described. The applications mentioned herein are used solely for the purpose of illustration and Holtek makes no warranty or representation that such applications will be suitable without further modification, nor recommends the use of its products for application that may present a risk to human life due to malfunction or otherwise. Holtek's products are not authorized for use as critical components in life support devices or systems. Holtek reserves the right to alter its products without prior notification. For the most up-to-date information, please visit our web site at http://www.holtek.com.

Rev. 1.80 8 March 19, 2019