

HT71xx-1 30mA Low Power LDO

Features

- Low power consumption
- · Low voltage drop
- Low temperature coefficient

- High input voltage (up to 24V)
- Output voltage accuracy: tolerance ±3%
- TO92, SOT89 and SOT23-5 package

Applications

- · Battery-powered equipment
- Communication equipment

• Audio/Video equipment

General Description

The HT71xx-1 series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 24V. They are available with several fixed output voltages ranging from 2.1V to 5.0V. CMOS technology ensures low voltage drop and low quiescent current.

Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

Selection Table

Part No.	Output Voltage	Package	Marking
HT7121-1	2.1V		
HT7123-1	2.3V		
HT7125-1	2.5V		71xx-1 (for TO92, 2.1V~2.7V) 71xxA-1 (for TO92, 3.0V~5.0V)
HT7127-1	2.7V	TO92	71xx-1 (for SOT89)
HT7130-1	3.0V	SOT89	71xx-1# (for SOT89) 71xx-1+ (for SOT89)
HT7133-1	3.3V	SOT23-5	1xx1 (for SOT23-5)
HT7136-1	3.6V		1xx1# (for SOT23-5) 1xx1+ (for SOT23-5)
HT7144-1	4.4V		(= = : = : -,
HT7150-1	5.0V		

Note: "xx" stands for output voltages.

Both lead free and green compound devices are available. Note the symbol marks below:

"#" stands for lead free devices.

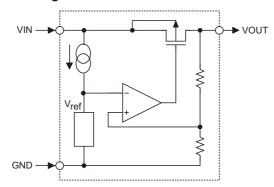
Blank and "+" stands for green compound devices, which are Lead-free and Halogen-free.

For the TO92 package, the symbol mark will be at the end of the date code. Whereas for the SOT89 and SOT23-5, the symbol mask will be located at the end of IC marking.

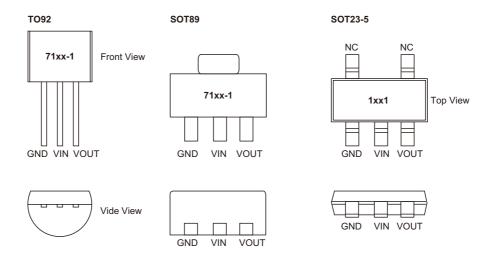
Rev. 2.10 1 April 30, 2013



Block Diagram



Pin Assignment



Absolute Maximum Ratings

Supply Voltage0.3V to 26V	Storage Temperature50°C to 125°C
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.

Thermal Information

Symbol	Parameter	Package	Max.	Unit
	Thermal Resistance	SOT23-5	500	°C/W
θ_{JA}	θ _{JA} (Junction to Ambient) (Assume no ambient airflow, no heat sink)	SOT89	200	°C/W
		TO92	200	°C/W
		SOT23-5	0.20	W
P _D	Power Dissipation	SOT89	0.50	W
		TO92	0.50	W

Note: P_D is measured at Ta= 25°C



Electrical Characteristics

HT7121-1, +2.1V Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Trees	May	Unit
Symbol	Parameter	V _{IN}	Conditions	WIII.	Тур.	Max.	Oilit
V _{OUT}	Output Voltage	4.1V	I _{OUT} =10mA	2.037	2.100	2.163	V
I _{OUT}	Output Current	4.1V	_	20	30	_	mA
ΔV_{OUT}	Load Regulation	4.1V	1mA≤l _{OUT} ≤20mA	_	60	100	mV
V _{DIF}	Voltage Drop (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	100	_	mV
I _{SS}	Current Consumption	4.1V	No load	_	2.5	4.0	μА
$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	Line Regulation	_	3.1V≤V _{IN} ≤24V I _{OUT} =1mA	_	0.2	_	%/V
V _{IN}	Input Voltage	_	_	_	_	24	V
<u>Δ</u> Vουτ <u>Δ</u> Τa	Temperature Coefficient	4.1V	I _{OUT} =10mA -40°C <ta<85°c< td=""><td>_</td><td>±0.37</td><td>_</td><td>mV/°C</td></ta<85°c<>	_	±0.37	_	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT} + 2V$ with a fixed load.

HT7123-1, +2.3V Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Trees	Max.	Unit
Symbol	Parameter	V _{IN}	Conditions	wiin.	Тур.	IVIAX.	Onit
V _{OUT}	Output Voltage	4.3V	I _{OUT} =10mA	2.231	2.300	2.369	V
I _{OUT}	Output Current	4.3V	_	20	30	_	mA
ΔV_{OUT}	Load Regulation	4.3V	1mA≤l _{OUT} ≤20mA	_	60	100	mV
V _{DIF}	Voltage Drop (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	100	_	mV
I _{SS}	Current Consumption	4.3V	No load	_	2.5	4.0	μА
$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	Line Regulation	_	$3.3V \le V_{IN} \le 24V$ $I_{OUT} = 1mA$	_	0.2	_	%/V
V _{IN}	Input Voltage	_	_	_	_	24	V
<u>Δ</u> Vουτ ΔΤα	Temperature Coefficient	4.3V	I _{OUT} =10mA -40°C <ta<85°c< td=""><td>_</td><td>±0.39</td><td>_</td><td>mV/°C</td></ta<85°c<>	_	±0.39	_	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT} + 2V$ with a fixed load.

Rev. 2.10 3 April 30, 2013



HT7125-1, +2.5V Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Trees	May	Unit
Symbol	Parameter	V _{IN}	Conditions	WIII.	Тур.	Max.	Onit
V _{OUT}	Output Voltage	4.5V	I _{OUT} =10mA	2.425	2.500	2.575	V
I _{OUT}	Output Current	4.5V	_	20	30	_	mA
ΔV_{OUT}	Load Regulation	4.5V	1mA≤l _{OUT} ≤20mA	_	60	100	mV
V _{DIF}	Voltage Drop (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	100	_	mV
I _{SS}	Current Consumption	4.5V	No load	_	2.5	4.0	μА
$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	Line Regulation	_	3.5V≤V _{IN} ≤24V I _{OUT} =1mA	_	0.2	_	%/V
V _{IN}	Input Voltage	_	_	_	_	24	V
<u>Δ</u> Vουτ ΔΤα	Temperature Coefficient	4.5V	I _{OUT} =10mA -40°C <ta<85°c< td=""><td>_</td><td>±0.41</td><td>_</td><td>mV/°C</td></ta<85°c<>	_	±0.41	_	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT} + 2V$ with a fixed load.

HT7127-1, +2.7V Output Type

Ta=25°C

Symbol	Parameter		Test Conditions		Turn	Max.	Unit
Symbol	Parameter	V _{IN}	Conditions	Min.	Тур.	IVIAX.	Oilit
V _{OUT}	Output Voltage	4.7V	I _{OUT} =10mA	2.619	2.700	2.781	V
I _{OUT}	Output Current	4.7V	_	20	30	_	mA
ΔV_{OUT}	Load Regulation	4.7V	1mA≤I _{OUT} ≤20mA	_	60	100	mV
V _{DIF}	Voltage Drop (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	100	_	mV
I _{SS}	Current Consumption	4.7V	No load	_	2.5	4.0	μА
$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	Line Regulation	_	3.7V≤V _{IN} ≤24V I _{OUT} =1mA	_	0.2	_	%/V
V _{IN}	Input Voltage	_	_	_	_	24	V
$\frac{\Delta V_{OUT}}{\Delta T_{a}}$	Temperature Coefficient	4.7V	I _{OUT} =10mA -40°C <ta<85°c< td=""><td>_</td><td>±0.43</td><td>_</td><td>mV/°C</td></ta<85°c<>	_	±0.43	_	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT} + 2V$ with a fixed load.



HT7130-1, +3.0V Output Type

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Trees	Max.	Unit
Symbol	Parameter	V _{IN}	Conditions	WIII.	Тур.	IVIAX.	Unit
V _{OUT}	Output Voltage	5V	I _{OUT} =10mA	2.91	3.00	3.09	V
I _{OUT}	Output Current	5V	_	20	30	_	mA
ΔV_{OUT}	Load Regulation	5V	1mA≤I _{OUT} ≤20mA	_	60	100	mV
V _{DIF}	Voltage Drop (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	100	_	mV
I _{SS}	Current Consumption	5V	No load	_	2.5	4.0	μА
$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	Line Regulation	_	4V≤V _{IN} ≤24V I _{OUT} =1mA	_	0.2	_	%/V
V _{IN}	Input Voltage	_	_	_	_	24	V
<u>Δ</u> Vουτ ΔΤα	Temperature Coefficient	5V	I _{OUT} =10mA -40°C <ta<85°c< td=""><td>_</td><td>±0.45</td><td>_</td><td>mV/°C</td></ta<85°c<>	_	±0.45	_	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT} + 2V$ with a fixed load.

HT7133-1, +3.3V Output Type

Ta=25°C

Symbol	Parameter		Test Conditions	Min.	Turn	Max.	Unit
Symbol	Parameter	V _{IN}	Conditions	IVIIII.	Тур.	IVIAX.	Offic
V _{OUT}	Output Voltage	5.5V	I _{OUT} =10mA	3.201	3.300	3.399	V
I _{OUT}	Output Current	5.5V	_	20	30	_	mA
ΔV _{OUT}	Load Regulation	5.5V	1mA≤l _{OUT} ≤30mA	_	60	100	mV
V _{DIF}	Voltage Drop (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	100	_	mV
I _{SS}	Current Consumption	5.5V	No load	_	2.5	4.0	μΑ
$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	Line Regulation	_	4.5V≤V _{IN} ≤24V I _{OUT} =1mA	_	0.2	_	%/V
V _{IN}	Input Voltage	_	_	_	_	24	V
<u>Δ</u> Vουτ ΔΤα	Temperature Coefficient	5.5V	I _{OUT} =10mA -40°C <ta<85°c< td=""><td>_</td><td>±0.5</td><td>_</td><td>mV/°C</td></ta<85°c<>	_	±0.5	_	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT} + 2V$ with a fixed load.

Rev. 2.10 5 April 30, 2013



HT7136-1, +3.6V Output Type

Ta=25°C

Sumb al	Parameter	Test Conditions		Min.	Trees	Max.	Unit
Symbol	Parameter	V _{IN}	Conditions	WIII.	Тур.	wax.	Unit
V _{OUT}	Output Voltage	5.6V	I _{OUT} =10mA	3.492	3.600	3.708	V
I _{OUT}	Output Current	5.6V	_	20	30	_	mA
ΔV _{OUT}	Load Regulation	5.6V	1mA≤I _{OUT} ≤30mA	_	60	100	mV
V _{DIF}	Voltage Drop (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	60	_	mV
I _{SS}	Current Consumption	5.6V	No load	_	2.5	4.0	μА
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	4.6V≤V _{IN} ≤24V I _{OUT} =1mA	_	0.2	_	%/V
V _{IN}	Input Voltage	_	_	_	_	24	V
<u>Δ</u> Vουτ ΔΤα	Temperature Coefficient	5.6V	I _{OUT} =10mA -40°C <ta<85°c< td=""><td>_</td><td>±0.6</td><td>_</td><td>mV/°C</td></ta<85°c<>	_	±0.6	_	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT} + 2V$ with a fixed load.

HT7144-1, +4.4V Output Type

Ta=25°C

Symbol	Parameter		Test Conditions	Min.	Turn	Max.	Unit
Symbol	Parameter	V _{IN}	Conditions	IVIIII.	Тур.	WIGA.	
V _{OUT}	Output Voltage	6.4V	I _{OUT} =10mA	4.268	4.400	4.532	V
I _{OUT}	Output Current	6.4V	_	20	30	_	mA
ΔV_{OUT}	Load Regulation	6.4V	1mA≤I _{OUT} ≤30mA	_	60	100	mV
V _{DIF}	Voltage Drop (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	100	_	mV
I _{SS}	Current Consumption	6.4V	No load	_	2.5	4.0	μΑ
$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	Line Regulation	_	5.4V≤V _{IN} ≤24V I _{OUT} =1mA	_	0.2	_	%/V
V _{IN}	Input Voltage	_	_	_	_	24	V
<u>Δ</u> Vουτ ΔΤ _a	Temperature Coefficient	6.4V	I _{OUT} =10mA -40°C <ta<85°c< td=""><td>_</td><td>±0.7</td><td>_</td><td>mV/°C</td></ta<85°c<>	_	±0.7	_	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT} + 2V$ with a fixed load.



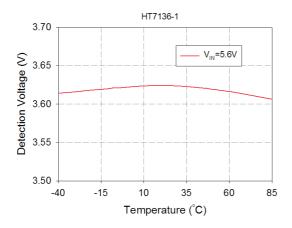
HT7150-1, +5.0V Output Type

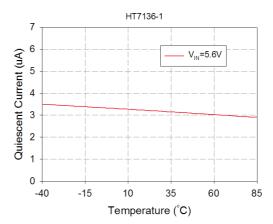
Ta=25°C

Symbol	Parameter -	Test Conditions		Min.	T	Man	Unit
Symbol	Parameter	V _{IN}	Conditions	WIII.	Тур.	Max.	Unit
V _{OUT}	Output Voltage	7V	I _{OUT} =10mA	4.85	5.00	5.15	V
I _{OUT}	Output Current	7V	_	20	30	_	mA
ΔV _{OUT}	Load Regulation	7V	1mA≤l _{OUT} ≤30mA	_	60	100	mV
V _{DIF}	Voltage Drop (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	100	_	mV
I _{SS}	Current Consumption	7V	No load	_	2.5	4.0	μА
$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	Line Regulation	_	6V≤V _{IN} ≤24V I _{OUT} =1mA	_	0.2	_	%/V
V _{IN}	Input Voltage	_	_	_	_	24	V
<u>Δ</u> Vουτ ΔΤα	Temperature Coefficient	7V	I _{OUT} =10mA -40°C <ta<85°c< td=""><td></td><td>±0.75</td><td>_</td><td>mV/°C</td></ta<85°c<>		±0.75	_	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT} + 2V$ with a fixed load.

Typical Performance Characteristics

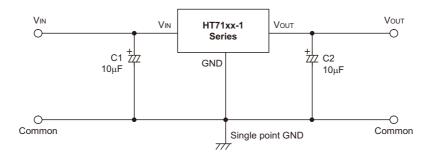




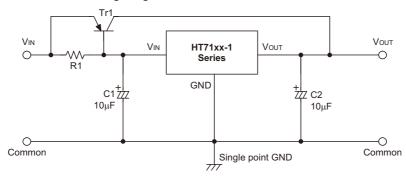


Application Circuits

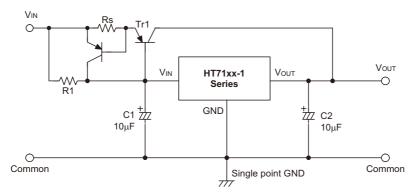
Basic Circuits



High Output Current Positive Voltage Regulator



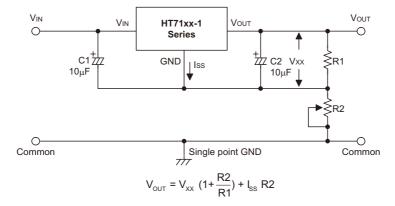
Short-Circuit Protection by Tr1



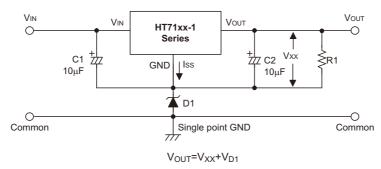
Rev. 2.10 8 April 30, 2013



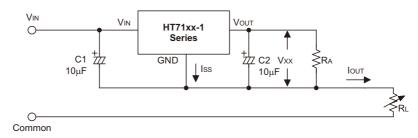
Circuit for Increasing Output Voltage



Circuit for Increasing Output Voltage

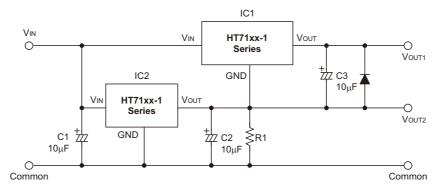


Constant Current Regulator



$$I_{OUT} = \frac{V_{XX}}{R_{A}} + I_{SS}$$

Dual Supply





Package Information

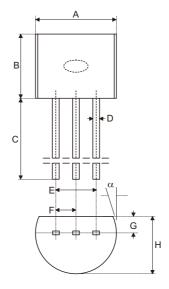
Note that the package information provided here is for consultation purposes only. As this information may be updated at regular intervals users are reminded to consult the <u>Holtek website</u> for the latest version of the package information.

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

- Further Package Information (include Outline Dimensions, Product Tape and Reel Specifications)
- Packing Meterials Information
- Carton information
- PB FREE Products
- Green Packages Products



3-pin TO92 Outline Dimensions



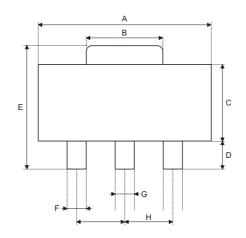
Symbol	Dimensions in inch		
	Min.	Nom.	Max.
А	0.170	_	0.200
В	0.170	_	0.200
С	0.500	_	_
D	0.011	_	0.020
E	0.090	_	0.110
F	0.045	_	0.055
G	0.045	_	0.065
Н	0.130	_	0.160
α	0°	_	10°

Symbol	Dimensions in mm		
	Min.	Nom.	Max.
A	4.32	_	5.08
В	4.32	_	5.08
С	12.70	_	
D	0.28	_	0.51
E	2.29	_	2.79
F	1.14	_	1.40
G	1.14	_	1.65
Н	3.30	_	4.06
α	0°	_	10°

Rev. 2.10 11 April 30, 2013



3-pin SOT89 Outline Dimensions



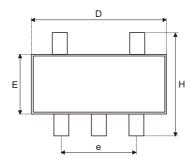


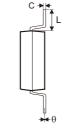
Symbol	Dimensions in inch		
	Min.	Nom.	Max.
Α	0.173	_	0.181
В	0.059	_	0.072
С	0.090	_	0.102
D	0.035	_	0.047
E	0.155	_	0.167
F	0.014	_	0.019
G	0.017	_	0.022
Н	_	0.059	_
I	55	_	63
J	14	_	17

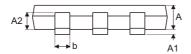
Symbol	Dimensions in mm		
	Min.	Nom.	Max.
Α	4.39	_	4.60
В	1.50	_	1.83
С	2.29	_	2.59
D	0.89	_	1.19
E	3.94	_	4.24
F	0.36	_	0.48
G	0.43	_	0.56
Н	_	1.50	_
I	1.40	_	1.60
J	0.36	_	0.43



5-pin SOT23-5 Outline Dimensions







Symbol	Dimensions in inch		
	Min.	Nom.	Max.
Α	0.039	_	0.051
A1	_	_	0.004
A2	0.028	_	0.035
b	0.014	_	0.020
С	0.004	_	0.010
D	0.106	_	0.122
E	0.055	_	0.071
е	_	0.075	_
Н	0.102	_	0.118
L	0.015	_	_
θ	0°	_	9°

Symbol	Dimensions in mm		
	Min.	Nom.	Max.
А	1.00	_	1.30
A1	_	_	0.10
A2	0.70	_	0.90
b	0.35	_	0.50
С	0.10	_	0.25
D	2.70	_	3.10
E	1.40	_	1.80
е	_	1.90	_
Н	2.60		3.0
L	0.37	_	_
θ	0°	_	9°



Copyright © 2013 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.tw.