Features

- Low power consumption
- · Low voltage drop
- · Low temperature coefficient
- High input voltage (up to 30V)
- Output voltage accuracy: tolerance ±3%
- Package types: 3-pin TO92, 3-pin SOT89 and 5-pin SOT23

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 30V. 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

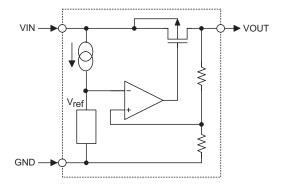
Part No.	Output Voltage	Package	Marking
HT7121-1	2.1V		
HT7123-1	2.3V		
HT7125-1	2.5V		
HT7127-1	2.7V	TO92	71xx-1 (for TO92, 2.1V~2.7V)
HT7130-1	3.0V	SOT89	71xxA-1 (for TO92, 3.0V~5.0V) 71xx-1 (for SOT89)
HT7133-1	3.3V	SOT23-5	1xx1 (for SOT23-5)
HT7136-1	3.6V		, ,
HT7144-1	4.4V		
HT7150-1	5.0V		

Note: "xx" stands for output voltages.

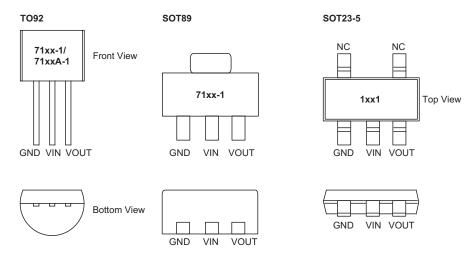
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Block Diagram



Pin Assignment



Absolute Maximum Ratings

Supply Voltage0.3V to 33V	Operating Temperature40°C to 85°C
Storage Temperature50°C to 125°C	Maximum Junction Temperature150°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
θја		SOT23-5	500	°C/W
	Thermal Resistance (Junction to Ambient) (Assume no ambient airflow, no heat sink)	SOT89	200	°C/W
	(A33diffe file difficilit diffiow, file filed 3filk)	TO92	200 °C/W	°C/W
		SOT23-5	0.20	W
PD	Power Dissipation	SOT89	0.50	W
		TO92	0.50	W

Note: P_D is measured at $Ta = 25^{\circ}C$

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Electrical Characteristics

HT7121-1, +2.1V Output Type

Ta=25°C

Counch al	Domonoston		Test Conditions	Min	T	Marr	l limit
Symbol	Parameter	V _{IN}	Conditions	Min.	Тур.	Max.	Unit
Vin	Input Voltage	_	_	_	_	30	V
V _{оит}	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≤I _{OUT} ≤20mA	_	15	45	mV
V _{DIF}	Dropout Voltage (Note)	_	Ι _{ΟυΤ} =1mA, ΔV _{ΟυΤ} =2%	_	35	100	mV
Iss	Quiescent Current	4.1V	No load	_	2.5	4.0	μA
$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	Line Regulation	_	3.1V≤V _{IN} ≤30V, I _{OUT} =1mA	_	0.1	0.2	%/V
ΔV OUT $\Delta T_a \times V$ OUT	Temperature Coefficient	4.1V	I _{оит} =10mA, -40°С<Та<85°С	_	±100	_	ppm/°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 $V_{\rm IN} = V_{\rm OUT} + 2V$ with a fixed load.

HT7123-1, +2.3V Output Type

Ta=25°C

Symbol	Parameter		Test Conditions		Тур.	Max.	Unit
Symbol	Parameter	VIN	Conditions	Min.	Typ.	Wax.	Unit
V _{IN}	Input Voltage	_	_	_	_	30	V
V _{оит}	Output Voltage	4.3V	I _{OUT} =10mA	2.231	2.300	2.369	V
Гоит	Output Current	4.3V	_	20	30	_	mA
ΔV_{OUT}	Load Regulation	4.3V	1mA≤I _{OUT} ≤20mA	_	15	45	mV
V _{DIF}	Dropout Voltage (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	35	100	mV
Iss	Quiescent Current	4.3V	No load	_	2.5	4.0	μΑ
$\frac{\Delta V \text{OUT}}{\Delta V \text{IN} \times V \text{OUT}}$	Line Regulation	_	3.3V≤V _{IN} ≤30V, I _{OUT} =1mA	_	0.1	0.2	%/V
ΔV OUT $\Delta T_a \times V$ OUT	Temperature Coefficient	4.3V	I _{о∪т} =10mA, -40°С<Та<85°С	_	±100	_	ppm/°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 $V_{\rm IN}$ = $V_{\rm OUT}$ +2V with a fixed load.

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HT7125-1, +2.5V Output Type

Ta=25°C

Complete I	Downworton		Test Conditions		T	Max.	Hait
Symbol	Parameter	V _{IN}	Conditions	Min.	Тур.	wax.	Unit
V _{IN}	Input Voltage	_	_	_	_	30	V
Vout	Output Voltage	4.5V	I _{OUT} =10mA	2.425	2.500	2.575	V
Гоит	Output Current	4.5V	_	20	30	_	mA
ΔVουτ	Load Regulation	4.5V	1mA≤I _{OUT} ≤20mA	_	15	45	mV
V _{DIF}	Dropout Voltage (Note)	_	Ι _{ΟυΤ} =1mA, ΔV _{ΟυΤ} =2%	_	35	100	mV
I _{SS}	Quiescent Current	4.5V	No load	_	2.5	4.0	μΑ
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	3.5V≤V _{IN} ≤30V, I _{OUT} =1mA	_	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_{a} \times V_{OUT}}$	Temperature Coefficient	4.5V	I _{оит} =10mA, -40°С<Та<85°С	_	±100	_	ppm/°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 $V_{\rm IN} = V_{\rm OUT} + 2V$ with a fixed load.

HT7127-1, +2.7V Output Type

Ta=25°C

Symbol	Parameter		Test Conditions		Tim	Max.	Unit
Symbol	Parameter	V _{IN}	Conditions	Min.	Тур.	Wax.	Onit
Vin	Input Voltage	_	_	_	_	30	V
V _{OUT}	Output Voltage	4.7V	I _{OUT} =10mA	2.619	2.700	2.781	V
Іоит	Output Current	4.7V	_	20	30	_	mA
ΔVουτ	Load Regulation	4.7V	1mA≤I _{OUT} ≤20mA	_	15	45	mV
V _{DIF}	Dropout Voltage (Note)	_	Ι _{ΟυΤ} =1mA, ΔV _{ΟυΤ} =2%	_	35	100	mV
Iss	Quiescent Current	4.7V	No load	_	2.5	4.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	3.7V≤V _{IN} ≤30V, I _{OUT} =1mA	_	0.1	0.2	%/V
ΔV OUT $\Delta T_a \times V$ OUT	Temperature Coefficient	4.7V	I _{оит} =10mA, -40°С<Та<85°С	_	±100	_	ppm/°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 $V_{\rm IN}$ = $V_{\rm OUT}$ +2V with a fixed load.

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HT7130-1, +3.0V Output Type

Ta=25°C

Completel	Downwater		Test Conditions	BA:	T	Max.	11::4
Symbol	Parameter	V _{IN}	Conditions	Min.	Тур.		Unit
Vout	Output Voltage	5V	I _{OUT} =10mA	2.910	3.00	3.090	V
Іоит	Output Current	5V	_	20	30	_	mA
ΔV_{OUT}	Load Regulation	5V	1mA≤I _{OUT} ≤20mA	_	15	45	mV
V _{DIF}	Dropout Voltage (Note)	_	I _{OUT} =1mA, ΔV _{OUT} =2%	_	35	100	mV
Iss	Quiescent Current	5V	No load	_	2.5	4.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	4V≤V _{IN} ≤30V, I _{OUT} =1mA	_	0.1	0.2	%/V
V _{IN}	Input Voltage	_	_	_	_	30	V
ΔV OUT $\Delta T_a \times V$ OUT	Temperature Coefficient	5V	I _{оит} =10mA, -40°С<Та<85°С	_	±100	_	ppm/°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 $V_{\rm IN} = V_{\rm OUT} + 2V$ with a fixed load.

HT7133-1, +3.3V Output Type

Ta=25°C

Symbol	Parameter		Test Conditions		Тур.	Max.	Unit
Зушьы	Parameter	V _{IN}	Conditions	Min.	тур.	Wax.	Oilit
V _{оит}	Output Voltage	5.3V	I _{OUT} =10mA	3.201	3.300	3.399	V
I _{OUT}	Output Current	5.3V	_	20	30	_	mA
ΔV_OUT	Load Regulation	5.3V	1mA≤I _{OUT} ≤30mA	_	15	45	mV
V _{DIF}	Dropout Voltage (Note)	_	Ι _{Ουτ} =1mA, ΔV _{Ουτ} =2%	_	35	55	mV
Iss	Quiescent Current	5.3V	No load	_	2.5	4.0	μA
$\frac{\Delta V \text{OUT}}{\Delta V \text{IN} \times V \text{OUT}}$	Line Regulation	_	4.3V≤V _{IN} ≤30V, I _{OUT} =1mA	_	0.1	0.2	%/V
V _{IN}	Input Voltage	_	_	_	_	30	V
ΔV OUT $\Delta T_a \times V$ OUT	Temperature Coefficient	5.3V	I _{OUT} =10mA, -40°C <ta<85°c< td=""><td>_</td><td>±100</td><td>_</td><td>ppm/°C</td></ta<85°c<>	_	±100	_	ppm/°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 $V_{\rm IN}$ = $V_{\rm OUT}$ +2V with a fixed load.

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HT7136-1, +3.6V Output Type

Ta=25°C

O make at	Test Conditions	Test Conditions	B.42	T		1114	
Symbol	Parameter	V _{IN}	Conditions	Min.	Тур.	Max.	Unit
V _{IN}	Input Voltage	_	_	_	_	30	V
Vout	Output Voltage	5.6V	I _{OUT} =10mA	3.492	3.600	3.708	V
Гоит	Output Current	5.6V	_	20	30	_	mA
ΔVουτ	Load Regulation	5.6V	1mA≤I _{OUT} ≤30mA	_	15	45	mV
V _{DIF}	Dropout Voltage (Note)	_	Ι _{ΟυΤ} =1mA, ΔV _{ΟυΤ} =2%	_	35	55	mV
I _{SS}	Quiescent Current	5.6V	No load	_	2.5	4.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	4.6V≤V _{IN} ≤30V, I _{OUT} =1mA	_	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_{a} \times V_{OUT}}$	Temperature Coefficient	5.6V	I _{оит} =10mA, -40°С<Та<85°С	_	±100	_	ppm/°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 $V_{\rm IN} = V_{\rm OUT} + 2V$ with a fixed load.

HT7144-1, +4.4V Output Type

Ta=25°C

Cumbal	Parameter		Test Conditions	Min.	Tim	Max.	Unit
Symbol	Parameter	VIN	Conditions	IVIIII.	Тур.	IVIAX.	Oilit
V _{IN}	Input Voltage	_	_	_	_	30	V
V _{OUT}	Output Voltage	6.4V	I _{OUT} =10mA	4.268	4.400	4.532	V
Гоит	Output Current	6.4V	_	20	30	_	mA
ΔVουτ	Load Regulation	6.4V	1mA≤I _{OUT} ≤30mA	_	15	45	mV
V _{DIF}	Dropout Voltage (Note)	_	Ι _{ΟυΤ} =1mA, ΔV _{ΟυΤ} =2%	_	35	55	mV
Iss	Quiescent Current	6.4V	No load	_	2.5	4.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	5.4V≤V _{IN} ≤30V, I _{OUT} =1mA	_	0.1	0.2	%/V
ΔV OUT $\Delta T_a \times V$ OUT	Temperature Coefficient	6.4V	I _{оит} =10mA, -40°С<Та<85°С	_	±100	_	ppm/°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 $V_{\rm IN}$ = $V_{\rm OUT}$ +2V with a fixed load.

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HT7150-1, +5.0V Output Type

Ta=25°C

Comple al	Danamatan		Test Conditions	Min	Tun	Max.	11
Symbol	Parameter	V _{IN}	Conditions	Min.	Тур.		Unit
V _{IN}	Input Voltage	_	_	_	_	30	V
V _{OUT}	Output Voltage	7V	I _{OUT} =10mA	4.850	5.00	5.150	V
I _{OUT}	Output Current	7V	_	20	30	_	mA
ΔV_{OUT}	Load Regulation	7V	1mA≤I _{OUT} ≤30mA	_	15	45	mV
V _{DIF}	Dropout Voltage (Note)	_	Ι _{ΟυΤ} =1mA, ΔV _{ΟυΤ} =2%	_	35	55	mV
I _{SS}	Quiescent Current	7V	No load	_	2.5	4.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	_	6V≤V _{IN} ≤30V, I _{OUT} =1mA	_	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_{a} \times V_{OUT}}$	Temperature Coefficient	7V	I _{оит} =10mA, -40°С<Та<85°С	_	±100	_	ppm/°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.

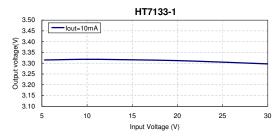
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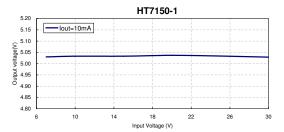


Typical Performance Characteristic

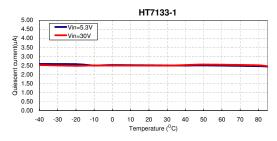
Test Condition: Vin=Vout+2V, Iout=10mA, T_J=25°C, unless otherwise noted

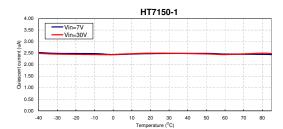
Output Voltage vs Input Voltage



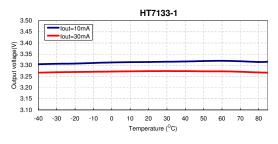


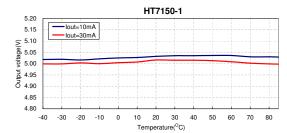
Quiescent Current (lout=0mA) vs Temperature



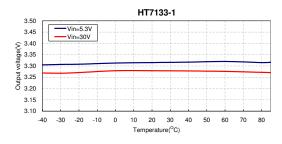


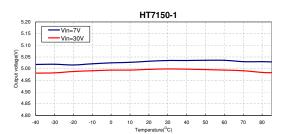
Output Voltage vs Temperature (Vin=Vout+2V)





Output Voltage vs Temperature

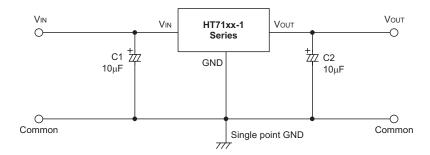




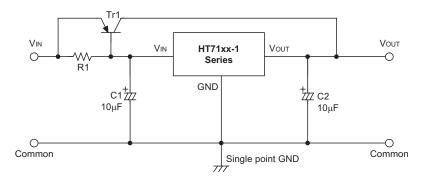


Application Circuits

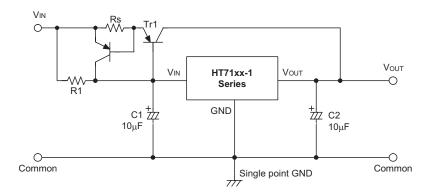
Basic Circuits



High Output Current Positive Voltage Regulator



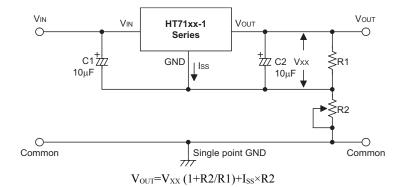
Short-Circuit Protection by Tr1



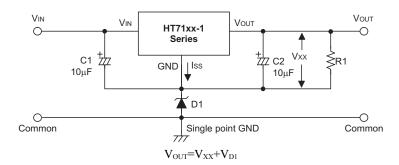
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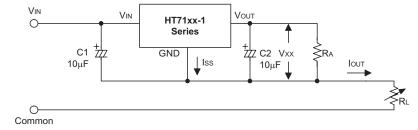
Circuit for Increasing Output Voltage



Circuit for Increasing Output Voltage

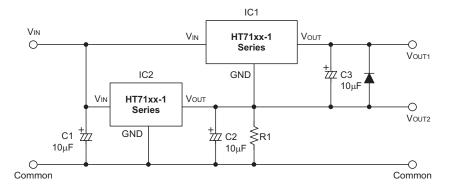


Constant Current Regulator



 $I_{OUT} \!\!=\!\! V_{XX} \!/ R_A \!\!+\!\! I_{SS}$

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 <u>Package/Carton Information</u>.

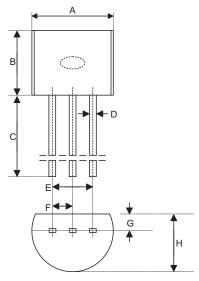
Additional supplementary information with regard to packaging is listed below. Click on the relevant section to be transferred to the relevant website page.

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

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3-pin TO92 Outline Dimensions



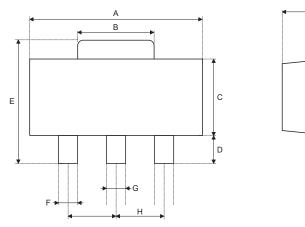
Symbol	Dimensions in inch		
	Min.	Nom.	Max.
A	0.173	0.180	0.205
В	0.170	_	0.210
С	0.500	0.580	_
D	_	0.015 BSC	_
E	_	0.010 BSC	_
F	_	0.050 BSC	_
G	_	0.035 BSC	_
Н	0.125	0.142	0.165

Symbol	Dimensions in mm		
	Min.	Nom.	Max.
Α	4.39	4.57	5.21
В	4.32	_	5.33
С	12.70	14.73	_
D	_	0.38 BSC	_
E	_	2.54 BSC	_
F	_	1.27 BSC	_
G	_	0.89 BSC	_
Н	3.18	3.61	4.19

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3-pin SOT89 Outline Dimensions

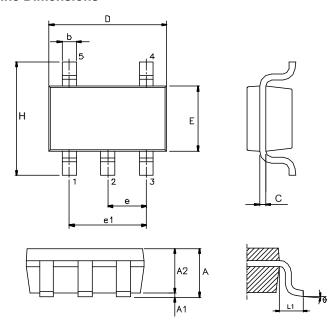


Symbol	Dimensions in inch		
	Min.	Nom.	Max.
А	0.173	_	0.185
В	0.053	_	0.072
С	0.090	_	0.106
D	0.031	_	0.047
Е	0.155	_	0.173
F	0.014	_	0.019
G	0.017	_	0.022
Н	_	0.059 BSC	_
I	0.055	_	0.063
J	0.014	_	0.017

Symbol	Dimensions in mm		
Symbol	Min.	Nom.	Max.
A	4.40	_	4.70
В	1.35	_	1.83
С	2.29	_	2.70
D	0.80	_	1.20
E	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



5-pin SOT23 Outline Dimensions



Symbol	Dimensions in inch		
	Min.	Nom.	Max.
А	_	_	0.057
A1	_	_	0.006
A2	0.035	0.045	0.051
b	0.012	_	0.020
С	0.003	_	0.009
D	_	0.114 BSC	_
Е	_	0.063 BSC	_
е	_	0.037 BSC	_
e1	_	0.075 BSC	_
Н	_	0.110 BSC	_
L1	_	0.024 BSC	_
θ	0°	_	8°

Symbol	Dimensions in mm		
	Min.	Nom.	Max.
A	_	_	1.45
A1	_	_	0.15
A2	0.90	1.15	1.30
b	0.30	_	0.50
С	0.08	_	0.22
D	_	2.90 BSC	_
Е	_	1.60 BSC	_
е	_	0.95 BSC	_
e1	_	1.90 BSC	_
Н	_	2.80 BSC	_
L1	_	0.60 BSC	_
θ	0°	_	8°

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