

HT71XX High Voltage Regulator

Features

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

- High input voltage (up to 24V)
- TO-92 and SOT-89 packages

Applications

- Battery-powered equipment
- Communication equipment

Audio/Video equipment

General Description

The HT71XX 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 3.0V 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.

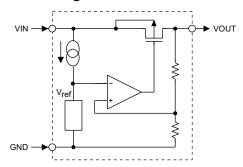
Selection Table

Part No.	Output Voltage	Tolerance
HT7130	3.0V	$\pm 5\%$
HT7133	3.3V	±5%
HT7136	3.6V	±5%
HT7144	4.4V	±5%
HT7150	5.0V	±5%

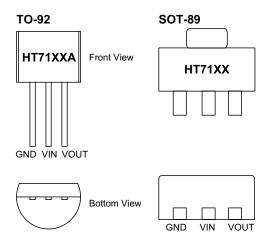
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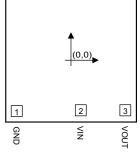
Block Diagram



Pin Assignment



Pad Assignment



Pad Coordinates

Pad No.	X	Y
1	-480.00	-451.50
2	87.50	-444.50
3	482.00	-444.50

Chip size: 1374×1294 $(\mu m)^2$

Unit: µm

^{*} The IC substrate should be connected to VDD in the PCB layout artwork.



Absolute Maximum Ratings

Supply Voltage0.3V to 28V	Storage Temperature -50° C to 125° C
Power Consumption 200mW	Operating Temperature0°C to 70°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.

Electrical Characteristics

HT7130, +3.0V output type

Ta=25°C

Symbol	D	Test Conditions		7.4.	/D	3.6	TT
	Parameter	V_{IN}	Conditions	Min.	Тур.	Max.	Unit
V_{OUT}	Output Voltage	5V	I _{OUT} =10mA	2.85	3.0	3.15	V
I _{OUT}	Output Current	5V	_	20	30	_	mA
$\Delta V_{ m OUT}$	Load Regulation	5V	1mA≤I _{OUT} ≤20mA	_	60	100	mV
$V_{ m DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	5V	No load	_	4	6.0	μА
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	Line Regulation	_	$\begin{array}{c} 4V \leq V_{IN} \leq 24V \\ I_{OUT} = 1mA \end{array}$	_	0.2	_	%/V
$V_{\rm IN}$	Input Voltage	_	_	_	_	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5V	I _{OUT} =10mA 0°C <ta<70°c< td=""><td>_</td><td>±0.45</td><td>_</td><td>mV/°C</td></ta<70°c<>	_	±0.45	_	mV/°C

HT7133, +3.3V output type

Ta=25°C

Cl1	Domonoton	Test Conditions		M:	/D	ъл	Unit
Symbol	Parameter	V_{IN}	Conditions	Min.	Тур.	Max.	Onit
$V_{ m OUT}$	Output Voltage	5.5V	I _{OUT} =10mA	3.135	3.3	3.465	V
I_{OUT}	Output Current	5.5V		20	30	_	mA
$\Delta V_{ m OUT}$	Load Regulation	5.5V	$1 \text{mA} \le I_{OUT} \le 30 \text{mA}$	_	60	100	mV
$ m V_{DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	5.5V	No load	_	4	6	μΑ
$\boxed{\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}}$	Line Regulation		$\begin{array}{c} 4.5V \leq V_{IN} \leq 24V \\ I_{OUT} = 1mA \end{array}$	_	0.2		%/V
$V_{\rm IN}$	Input Voltage		_	_	_	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.5V	I _{OUT} =10mA 0°C <ta<70°c< td=""><td></td><td>±0.5</td><td></td><td>mV/°C</td></ta<70°c<>		±0.5		mV/°C

HT7136, +3.6V output type

Ta=25°C

Sb al	Domonoston	Test Conditions		ъл:	Т	Ъ/Г	Unit
Symbol	Parameter	V_{IN}	Conditions	Min.	Тур.	Max.	Unit
V_{OUT}	Output Voltage	5.6V	I _{OUT} =10mA	3.42	3.6	3.78	V
I_{OUT}	Output Current	5.6V		20	30	_	mA
$\Delta V_{ m OUT}$	Load Regulation	5.6V	1mA≤I _{OUT} ≤30mA	_	60	100	mV
$ m V_{DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	60	_	mV
I_{SS}	Current Consumption	5.6V	No load		3.0	7.0	μΑ
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	Line Regulation	_	$\begin{array}{c} 4.6V \hspace{-0.1cm} \leq \hspace{-0.1cm} V_{IN} \hspace{-0.1cm} \leq \hspace{-0.1cm} 12V \\ I_{OUT} \hspace{-0.1cm} = \hspace{-0.1cm} 1 mA \end{array}$	_	0.2	_	%/V
$V_{\rm IN}$	Input Voltage		_		_	24	V
$\frac{\Delta V_{\rm OUT}}{\Delta T_{\rm a}}$	Temperature Coefficient	5.6V	I _{OUT} =10mA 0°C <ta<70°c< td=""><td>_</td><td>±0.6</td><td>_</td><td>mV/°C</td></ta<70°c<>	_	±0.6	_	mV/°C

HT7144, +4.4V output type

 $Ta=25^{\circ}C$

G11	Domonoston	Test Conditions		N/:		3.6	Unit
Symbol	Parameter	V_{IN}	Conditions	Min.	Тур.	Max.	Unit
V_{OUT}	Output Voltage	6.4V	I _{OUT} =10mA	4.18	4.4	4.62	V
I_{OUT}	Output Current	6.4V	_	20	30	_	mA
$\Delta V_{ m OUT}$	Load Regulation	6.4V	1mA≤I _{OUT} ≤30mA	_	60	100	mV
$V_{ m DIF}$	Voltage Drop		I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	6.4V	No load	_	4	7.5	μΑ
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	Line Regulation	_	$\begin{array}{c} 5.4V \!\!\leq\!\! V_{IN} \!\!\leq\!\! 24V \\ I_{OUT} \!\!=\! 1mA \end{array}$	_	0.2	_	%/V
V _{IN}	Input Voltage	_	_	_	_	24	V
$\frac{\Delta V_{\rm OUT}}{\Delta T_{\rm a}}$	Temperature Coefficient	6.4V	I _{OUT} =10mA 0°C <ta<70°c< td=""><td>_</td><td>±0.7</td><td>_</td><td>mV/°C</td></ta<70°c<>	_	±0.7	_	mV/°C

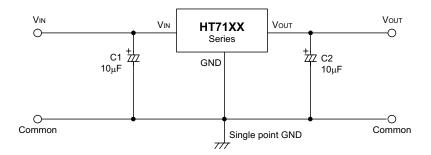
HT7150, +5.0V output type

 $Ta=25^{\circ}C$

Complete I	Damamatan	Test Conditions		M:	T	М	Unit
Symbol	Parameter	$\mathbf{v_{in}}$	Conditions	Min.	Тур.	Max.	Onit
V_{OUT}	Output Voltage	7V	I _{OUT} =10mA	4.75	5.0	5.25	V
I_{OUT}	Output Current	7V		20	30	_	mA
$\Delta V_{ m OUT}$	Load Regulation	7V	1mA≤I _{OUT} ≤30mA	_	60	100	mV
$ m V_{DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	7V	No load		5	9	μА
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	Line Regulation	_		_	0.2	_	%/V
$V_{\rm IN}$	Input Voltage		_		_	24	V
$\frac{\Delta V_{\rm OUT}}{\Delta T_{\rm a}}$	Temperature Coefficient	7V	I _{OUT} =10mA 0°C <ta<70°c< td=""><td>_</td><td>±0.75</td><td>_</td><td>mV/°C</td></ta<70°c<>	_	±0.75	_	mV/°C

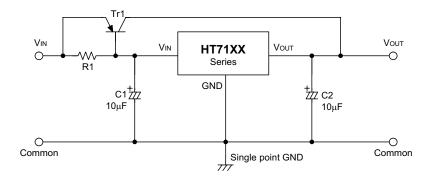
Application Circuits

Basic circuits

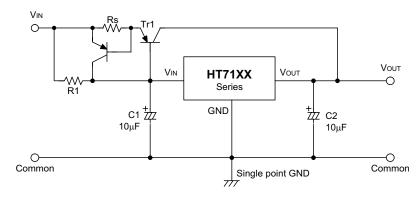




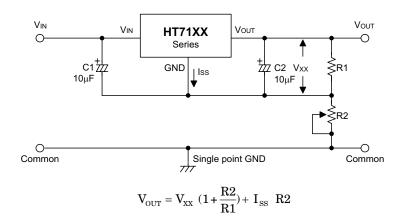
High output current positive voltage regulator



Short-Circuit protection by Tr1

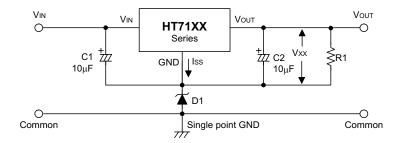


Circuit for increasing output voltage



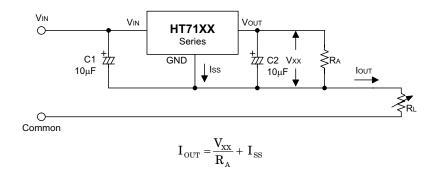


Circuit for increasing output voltage

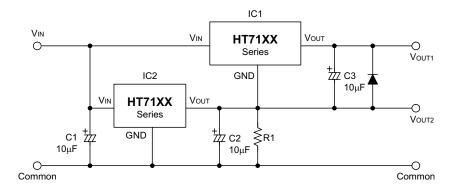


$$V_{\rm OUT} = V_{\rm XX} + V_{\rm D1}$$

Constant current regulator



Dual supply



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