



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.

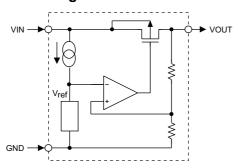
Selection Table

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

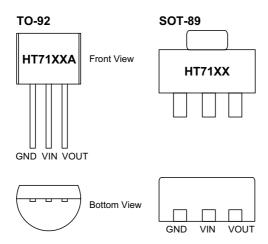




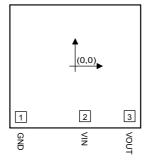
Block Diagram



Pin Assignment



Pad Assignment



Pad Coordinates

Unit: μm

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

Chip size: $1374 \times 1294 \; (\mu m)^2$

 $[\]ensuremath{^{*}}$ The IC substrate should be connected to VDD in the PCB layout artwork.





Absolute Maximum Ratings

Supply Voltage	0.3V to 28V	Storage Temperature50°C to 12	5°C
Power Consumption	200mW	Operating Temperature0°C to 7	0°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	Parameter	Test Conditions		Min.	Tem	Max.	Unit
Symbol	Parameter	V_{IN}	Conditions	WIIII.	Тур.	wax.	Onit
$V_{ m OUT}$	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	$1 mA \le I_{OUT} \le 20 mA$	_	60	100	mV
$ m V_{DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	5V	No load	_	4	6.0	μΑ
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	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
$\frac{\Delta V_{\rm OUT}}{\Delta T_{\rm a}}$	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

Symbol	Damamatan	Parameter		ъ л:	Т	Max.	Unit
	Parameter	V_{IN}	Conditions	Min.	Тур.	max.	Omi
V_{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
$\boxed{\frac{\Delta V_{OUT}}{\Delta T_a}}$	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

Symbol	Domonoston	Test Conditions		7./C*		ъл	T7 *4
	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
$V_{ m DIF}$	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	_	$\begin{array}{c} 4.6V \leq V_{IN} \leq 12V \\ I_{OUT} = 1mA \end{array}$	_	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°C

Symbol	Parameter		Test Conditions		Т	Max.	Unit
Symbol	Parameter	V _{IN}	Conditions	Min.	Тур.	Max.	
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
$ m V_{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
$V_{\rm IN}$	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





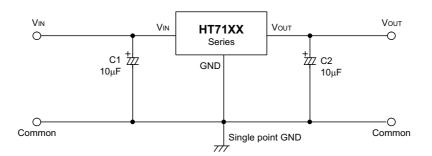
HT7150, +5.0V output type

Ta=25°C

G11	D	Test Conditions		ъл:	m	М	Unit
Symbol	Parameter	V _{IN}	Conditions	Min.	Тур.	Max.	Unit
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	μΑ
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	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

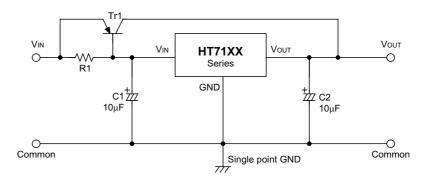
Basic circuits



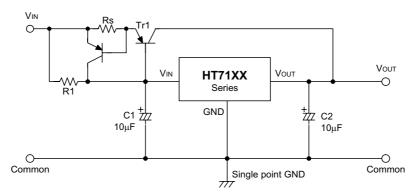




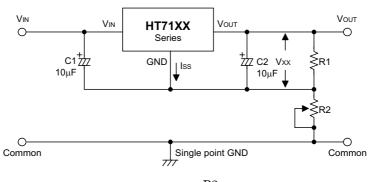
High output current positive voltage regulator



Short-Circuit protection by Tr1



Circuit for increasing output voltage

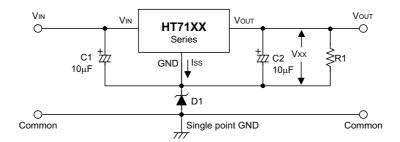


$$V_{\rm OUT} = V_{\rm XX} \ (1 + \frac{R2}{R1}) + \ I_{\rm SS} \ R2$$



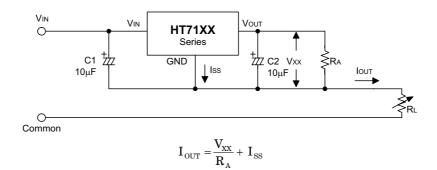


Circuit for increasing output voltage

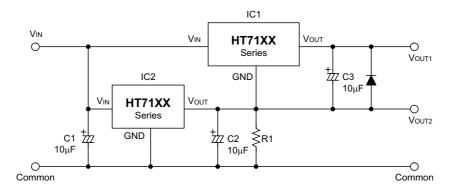


 $V_{\rm OUT} = V_{\rm XX} + V_{\rm D1}$

Constant current regulator



Dual supply







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