

HT75XX High Driver Regulator

Features

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

- High input voltage (up to 24V)
- High output current : $100 \text{mA} (P_d \le 250 \text{mW})$
- TO-92 and SOT-89 package

Applications

- Battery-powered equipment
- Communication equipment

Audio/Video equipment

General Description

The HT75XX series is a set of three-terminal high current low voltage regulator implemented in CMOS technology. They can deliver 100mA output current and allow an input voltage as high as 24V. They are available with several fixed output voltages ranging from 3.0V to 8V. CMOS technology ensures low voltage drop and low quiescent current.

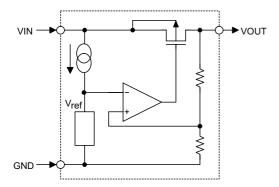
Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

Selection Table

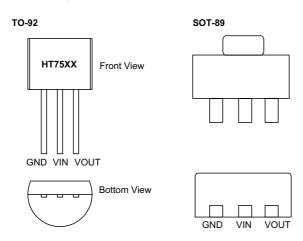
Part No.	Output Voltage	Tolerance
HT7530	3.0V	±5%
HT7533	3.3V	±5%
HT7536	3.6V	±5%
HT7544	4.4V	±5%
HT7550	5.0V	±5%
HT7580	8.0V	±5%



Block Diagram



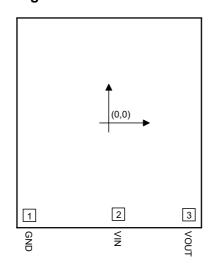
Pin Assignment



Unit: µm



Pad Assignment



Pad Coordinates

Pad No.	X	Y
1	-506.50	-589.50
2	61.00	-582.50
3	510.50	-585.50

Chip size: $1390\times1530~(\mu\text{m})^2$

Absolute Maximum Ratings

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

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



Electrical Characteristics

HT7530, +3.0V output type

 $Ta=25^{\circ}C$

Symbol	Parameter	Te	est Conditions	Min.	Тур.	Max.	Unit
Symbol	Parameter	V_{IN}	Conditions				
V_{OUT}	Output Voltage Tolerance	5V	I _{OUT} =10mA	2.85	3.0	3.15	V
I_{OUT}	Output Current	5V		60	100	_	mA
$\Delta V_{ m OUT}$	Load Regulation	5V	1mA≤I _{OUT} ≤50mA		60	150	mV
$V_{ m DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	5V	No load		10	20	μA
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	Line Regulation	_	$ \begin{array}{c} 4V \leq V_{IN} \leq 12V \\ I_{OUT} = 1mA \end{array} $		0.2	_	%/V
V _{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

HT7533, +3.3V output type

 $Ta=25^{\circ}C$

Symbol	Donomoton	Test Conditions		ъл:	m	M	TT:4
	Parameter	V _{IN}	Conditions	Min.	Тур.	Max.	Unit
V_{OUT}	Output Voltage Tolerance	5.5V	I _{OUT} =10mA	3.14	3.3	3.47	V
I_{OUT}	Output Current	5.5V	_	60	100	_	mA
$\Delta V_{ m OUT}$	Load Regulation	5.5V	1mA≤I _{OUT} ≤50mA	_	60	150	mV
$ m V_{DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	5.5V	No load	_	10	20	μΑ
$\boxed{\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}}$	Line Regulation	_	$\begin{array}{c} 4.5 \text{V} \leq \text{V}_{\text{IN}} \leq 12 \text{V} \\ \text{I}_{\text{OUT}} = 1 \text{mA} \end{array}$	_	0.2	_	%/V
$V_{\rm IN}$	Input Voltage	_	_	_	_	24	V
$\frac{\Delta V_{\rm OUT}}{\Delta T_{\rm a}}$	Temperature Coefficient	5.5V	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



HT7536, +3.6V output type

Ta=25°C

Complete 1	Donomoton	Te	est Conditions	Min.	Тур.	Max.	Unit
Symbol	Parameter	V _{IN}	Conditions				
V_{OUT}	Output Voltage Tolerance	5.6V	I _{OUT} =10mA	3.42	3.6	3.78	V
I_{OUT}	Output Current	5.6V		60	100		mA
$\Delta V_{ m OUT}$	Load Regulation	5.6V	1mA≤I _{OUT} ≤50mA	_	60	150	mV
$V_{ m DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	5.6V	No load	_	10	20	μA
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	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_{IN}	Input Voltage	_	_	_	_	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	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

HT7544, +4.4V output type

Ta=25°C

Symbol	Donomoton	Test Conditions		Min.	Т	Max.	Unit
Symbol	Parameter	V_{IN}	Conditions	Wiin.	Тур.	max.	Onit
V_{OUT}	Output Voltage Tolerance	6.4V	I _{OUT} =10mA	4.18	4.4	4.62	V
I_{OUT}	Output Current	6.4V	_	60	100	_	mA
$\Delta V_{ m OUT}$	Load Regulation	6.4V	1mA≤I _{OUT} ≤50mA	_	60	150	mV
$V_{ m DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	6.4V	No load	_	10	20	μΑ
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	Line Regulation	_	$\begin{array}{c} 5.4\text{V}{\leq}\text{V}_{\text{IN}}{\leq}12\text{V} \\ \text{I}_{\text{OUT}}{=}1\text{mA} \end{array}$		0.2	_	%/V
V _{IN}	Input Voltage		_	_	_	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	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



HT7550, +5.0V output type

Ta=25°C

Symbol	Parameter	Te	est Conditions	Min.	Т	Max.	Unit
Symbol	rarameter	V_{IN}	Conditions		Тур.		
V_{OUT}	Output Voltage Tolerance	7V	I _{OUT} =10mA	4.75	5.0	5.25	V
I_{OUT}	Output Current	7V		100	150	_	mA
$\Delta V_{ m OUT}$	Load Regulation	7V	1mA≤I _{OUT} ≤70mA	_	60	150	mV
$ m V_{DIF}$	Voltage Drop		I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	7V	No load	_	10	20	$_{\mu}A$
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	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

HT7580, +8.0V output type

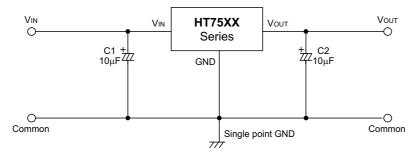
Ta=25°C

Symbol	Donomoton	Test Conditions		Min.	т	Max.	Unit
Symbol	Parameter	V_{IN}	Conditions	Wiin.	Тур.	max.	Onit
V_{OUT}	Output Voltage Tolerance	10V	I _{OUT} =10mA	7.61	8.0	8.4	V
I_{OUT}	Output Current	10V		100	150	_	mA
$\Delta V_{ m OUT}$	Load Regulation	10V	1mA≤I _{OUT} ≤70mA	_	60	150	mV
$V_{ m DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	10V	No load	_	10	20	μΑ
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	Line Regulation	_	$\begin{array}{c} 9V \leq V_{IN} \leq 20V \\ I_{OUT} = 1mA \end{array}$		0.2	_	%/V
V _{IN}	Input Voltage		_	_	_	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	10V	I _{OUT} =10mA 0°C <ta<70°c< td=""><td></td><td>±1.2</td><td>_</td><td>mV/°C</td></ta<70°c<>		±1.2	_	mV/°C

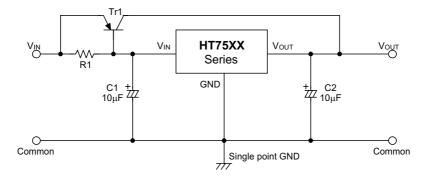


Application Circuits

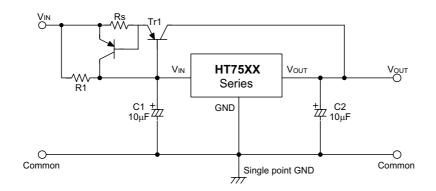
Basic circuit



High output current positive voltage regulator

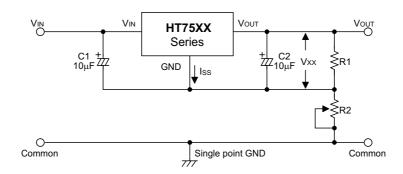


Short-Circuit protection for Tr1



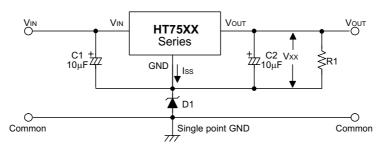


Circuit for increasing output voltage



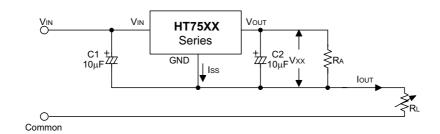
$$V_{\text{OUT}} \ = \ V_{\text{XX}} \ (\ 1 + \frac{\text{R2}}{\text{R1}}\) \ + \ I_{\text{SS}} \ \text{R2}$$

Circuit for increasing output voltage



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

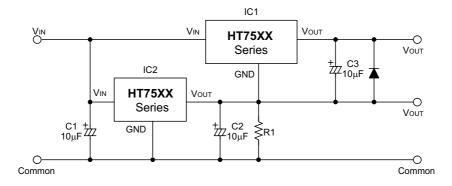
Constant current regulator



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



Dual supply





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