

HT74XX Negative Voltage 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 HT74XX series is a set of three-terminal high current high 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 -2.4V to -15V. 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.

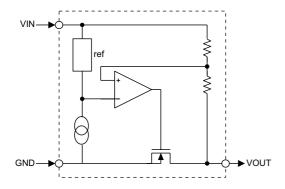
Selection Table

Part No.	Output Voltage	Tolerance
HT7430	-3.0V	±5%
HT7450	-5.0V	±5%

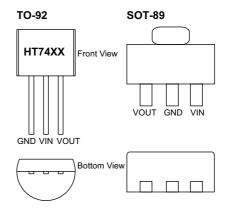
Unit: µm



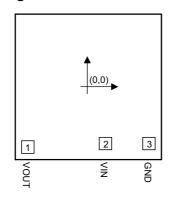
Block Diagram



Pin Assignment



Pad Assignment



Pad Coordinates

Pad No.	X	Y
1	-571.75	-578.00
2	175.75	-545.50
3	592.25	-545.50

Chip size: $1550\times1562~(\mu\text{m})^2$

Absolute Maximum Ratings

Supply Voltage+0.3V to -26V	Storage Temperature $-50^{\circ}\mathrm{C}$ to $125^{\circ}\mathrm{C}$
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.

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



Electrical Characteristics

$HT7430,\,-3.0V\;output\;type$

Ta=25°C

Symbol	Parameter	Test Conditions		ъл:	TD.	3.4	TT *4
		V _{IN}	Conditions	Min.	Тур.	Max.	Unit
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	120	mV
$ m V_{DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100		mV
I_{SS}	Current Consumption	-5V	No load	_	200	350	μΑ
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	Line Regulation	_	$ \begin{array}{c} -4V \leq V_{IN} \leq -12V \\ I_{OUT} = 1mA \end{array} $	_	0.2	_	%/V
$V_{\rm IN}$	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

HT7450, -5.0V output type

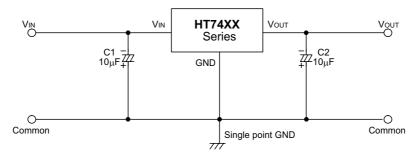
 $Ta=25^{\circ}C$

Symbol	Parameter	Test Conditions		Min.	T	Man	Unit
		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		100	150	_	mA
$\Delta V_{ m OUT}$	Load Regulation	-7V	$1 \text{mA} \le I_{OUT} \le 30 \text{mA}$	_	60	150	mV
$V_{ m DIF}$	Voltage Drop	_	I _{OUT} =1mA	_	100	_	mV
I_{SS}	Current Consumption	-7V	No load	_	330	500	μΑ
$\frac{\Delta V_{\rm OUT}}{\Delta V_{\rm IN} \times V_{\rm OUT}}$	Line Regulation	_	$\begin{array}{c} -6V \leq V_{IN} \leq -15V \\ I_{OUT} = 1mA \end{array}$	_	0.2	_	%/V
$V_{\rm IN}$	Input Voltage	_	_	_	_	-24	V
$\frac{\Delta V_{\rm OUT}}{\Delta T_{\rm a}}$	Temperature Coefficient	-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

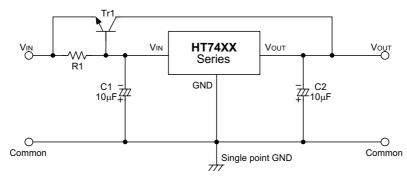


Application Circuits

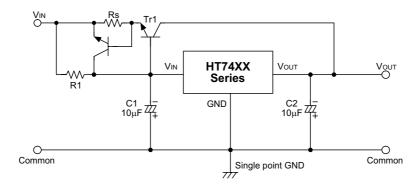
Basic circuit



High output current positive voltage regulator

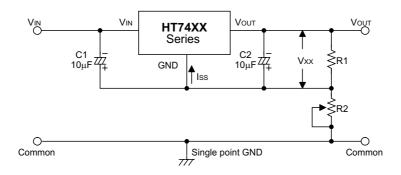


Short-Circuit protection by Tr1



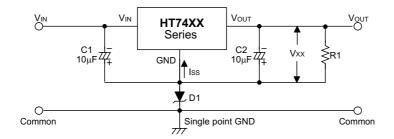


Circuit for increasing output voltage



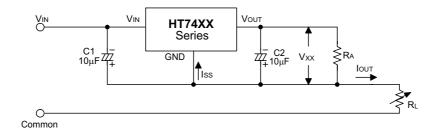
$$V_{\text{OUT}} \ = \ V_{\text{XX}} \ (\ 1 + \frac{\text{R2}}{\text{R1}}\) \ + \ I_{\text{SS}} \ \text{R2}$$

Circuit for increasing output voltage



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

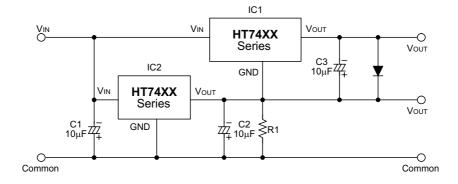
Constant current regulator



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



Dual supply





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