

Features

- High input voltage (up to 12V)
- Low power consumption
- High output current : 100mA ($P_d \leq 250\text{mW}$)
- Low voltage dropout
- Low temperature coefficient
- TO-92 & SOT-89 package

Applications

- Battery-Powered equipment
- Communication equipment
- Audio/Video equipment

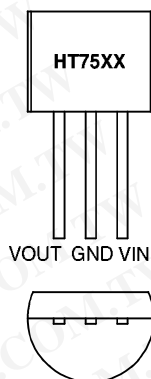
General Description

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 12V. They are available with several fixed output voltages ranging from 2.4V to 9V. The advantages of CMOS technology give

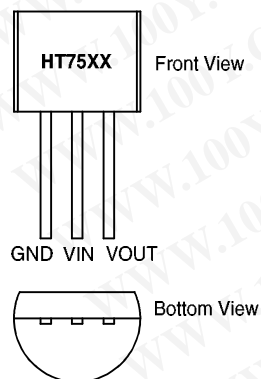
low voltage dropout and low quiescent current. Although designed primarily as fixed voltage regulator, these devices can be used with external components to obtain variable voltages and currents.

Pin Assignment

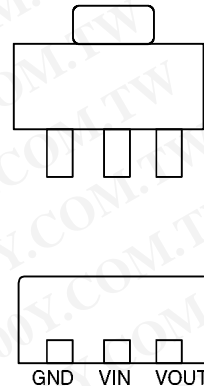
A. TO-92



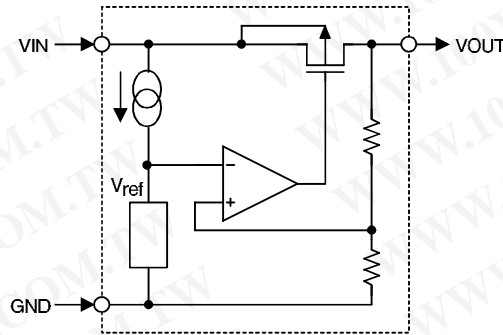
B. TO-92



C. SOT-89



Block Diagram



Selection Guide

Item	Pin Assignment	Output Voltage	Tolerance
HT7530 HT7531	B, C A	3.0V	±2.4%, ±5%
HT7533 HT7534	B, C A	3.3V	±2.4%, ±5%
HT7536 HT7537	B, C A	3.6V	±2.4%, ±5%
HT7538 HT7539	B, C A	3.8V	±2.4%, ±5%
HT7544 HT7545	B, C A	4.4V	±2.4%, ±5%
HT7550 HT7551	B, C A	5.0V	±2.4%, ±5%
HT7560 HT7561	B, C A	6.0V	±2.4%, ±5%
HT7570 HT7571	B, C A	7.0V	±2.4%, ±5%
HT7580 HT7581	B, C A	8.0V	±2.4%, ±5%
HT7590 HT7591	B, C A	9.0V	±2.4%, ±5%

Note: Selectable regulation voltage range from 2.4V to 9V in 0.1V increments. If custom first order 100K piece. (semi-custom parts)

Absolute Maximum Ratings*

Supply Voltage -0.3V to 13V Storage Temperature..... -50°C to 125°C
 Power Consumption 250mW Operating Temperature..... 0°C to 70°C

*Note: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Electrical Characteristics

HT75XX series (HT7530, HT7531, +3.0V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		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
ΔV _{OUT}	Load Regulation	5V	1mA ≤ I _{OUT} ≤ 50mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	4V ≤ V _{IN} ≤ 12V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±0.45	—	mV/°C

HT75XX series (HT7533, HT7534, +3.3V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
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
ΔV _{OUT}	Load Regulation	5.5V	1mA≤I _{OUT} ≤50mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5.5V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	4.5V≤V _{IN} ≤12V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.5V	I _{OUT} =10mA 0°C<Ta<70°C	—	±0.5	—	mV/°C

HT75XX series (HT7536, HT7537, +3.6V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		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
ΔV _{OUT}	Load Regulation	5.6V	1mA≤I _{OUT} ≤50mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5.6V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	4.6V≤V _{IN} ≤12V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.6V	I _{OUT} =10mA 0°C<Ta<70°C	—	±0.6	—	mV/°C

HT75XX series (HT7538, HT7539, +3.8V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	5.8V	I _{OUT} =10mA	3.61	3.8	3.99	V
I _{OUT}	Output Current	5.8V	—	60	100	—	mA
ΔV _{OUT}	Load Regulation	5.8V	1mA≤I _{OUT} ≤50mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5.8V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	4.8V≤V _{IN} ≤12V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.8V	I _{OUT} =10mA 0°C<Ta<70°C	—	±0.6	—	mV/°C

HT75XX series (HT7544, HT7545, +4.4V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
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
ΔV _{OUT}	Load Regulation	6.4V	1mA≤I _{OUT} ≤50mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	6.4V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	5.4V≤V _{IN} ≤20V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	6.4V	I _{OUT} =10mA 0°C<Ta<70°C	—	±0.7	—	mV/°C

HT75XX series (HT7550, HT7551, +5.0V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	7V	I _{OUT} =10mA	4.75	5.0	5.25	V
I _{OUT}	Output Current	7V	—	100	150	—	mA
ΔV _{OUT}	Load Regulation	7V	1mA ≤ I _{OUT} ≤ 70mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	7V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	6V ≤ V _{IN} ≤ 12V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	7V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±0.75	—	mV/°C

HT75XX series (HT7560, HT7561, +6.0V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	9V	I _{OUT} =10mA	5.7	6.0	6.3	V
I _{OUT}	Output Current	9V	—	100	150	—	mA
ΔV _{OUT}	Load Regulation	9V	1mA ≤ I _{OUT} ≤ 70mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	9V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	6V ≤ V _{IN} ≤ 15V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	9V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±0.9	—	mV/°C

HT75XX series (HT7570, HT7571, +7.0V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	9V	I _{OUT} =10mA	6.65	7.0	7.35	V
I _{OUT}	Output Current	9V	—	100	150	—	mA
ΔV _{OUT}	Load Regulation	9V	1mA ≤ I _{OUT} ≤ 70mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	9V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	8V ≤ V _{IN} ≤ 12V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	9V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±1.05	—	mV/°C

HT75XX series (HT7580, HT7581, +8.0V output type)

(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	10V	I _{OUT} =10mA	7.61	8.0	8.4	V
I _{OUT}	Output Current	10V	—	100	150	—	mA
ΔV _{OUT}	Load Regulation	10V	1mA ≤ I _{OUT} ≤ 70mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	10V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	9V ≤ V _{IN} ≤ 20V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	10V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±1.2	—	mV/°C

HT75XX series (HT7590, HT7591, +9.0V output type)

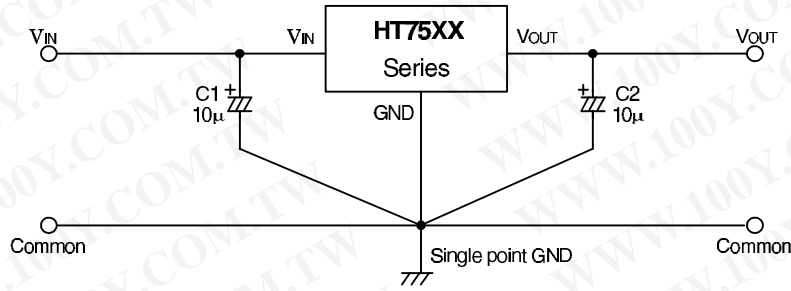
(Ta=25°C)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	12V	I _{OUT} =10mA	8.55	9.0	9.45	V
I _{OUT}	Output Current	12V	—	100	150	—	mA
ΔV _{OUT}	Load Regulation	12V	1mA ≤ I _{OUT} ≤ 70mA	—	60	150	mV
V _{DIF}	Voltage Dropout	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	12V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	Line Regulation	—	10V ≤ V _{IN} ≤ 12V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	12V	I _{OUT} =10mA 0°C < Ta < 70°C	—	±1.35	—	mV/°C

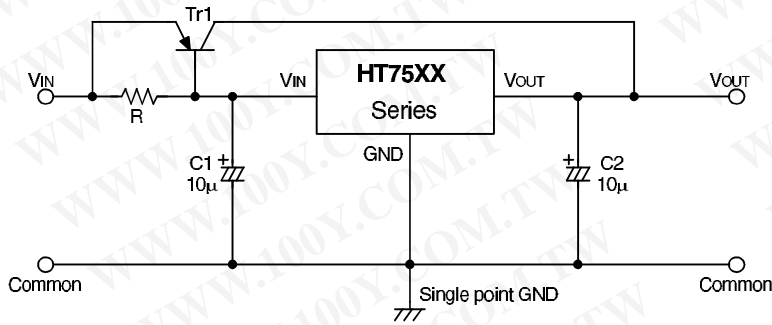


Application Circuit

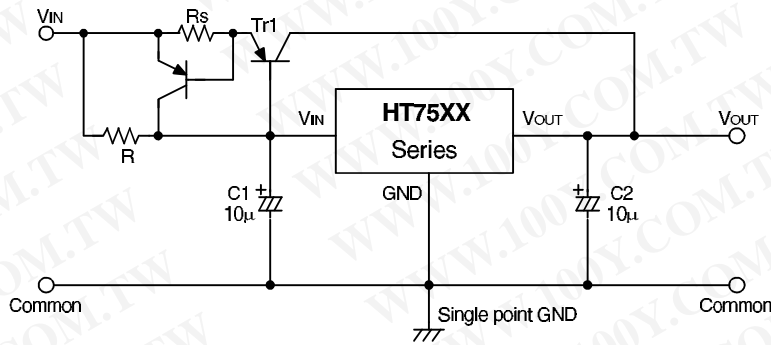
Basic circuit



High output current positive voltage regulator

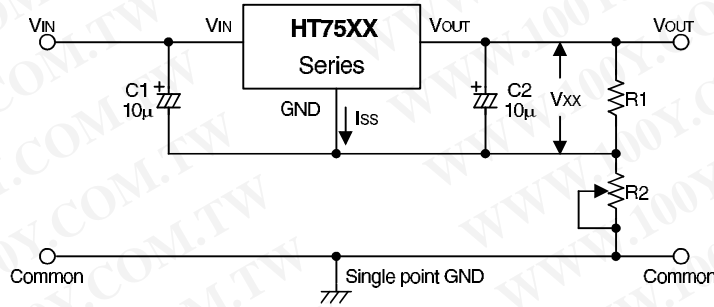


Short-Circuit protection for Tr1



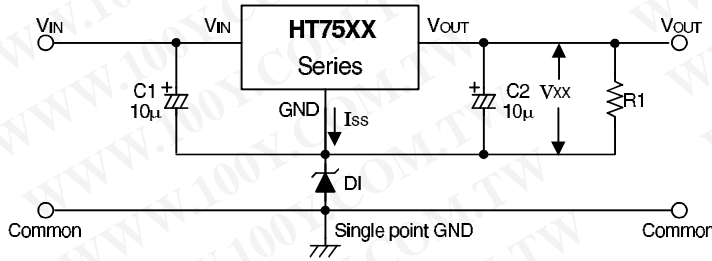


Circuit for increasing output voltage



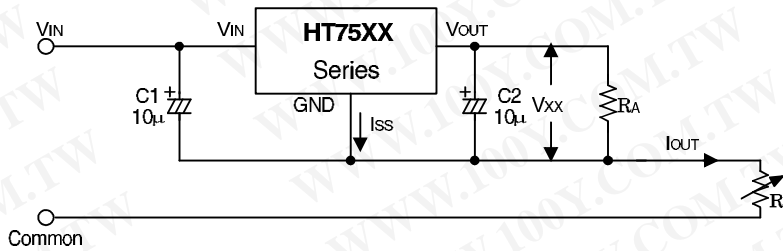
$$V_{OUT} = V_{XX} \left(1 + \frac{R_2}{R_1} \right) + I_{SS} R_2$$

Circuit for increasing output voltage



$$V_{OUT} = V_{XX} + V_{DI}$$

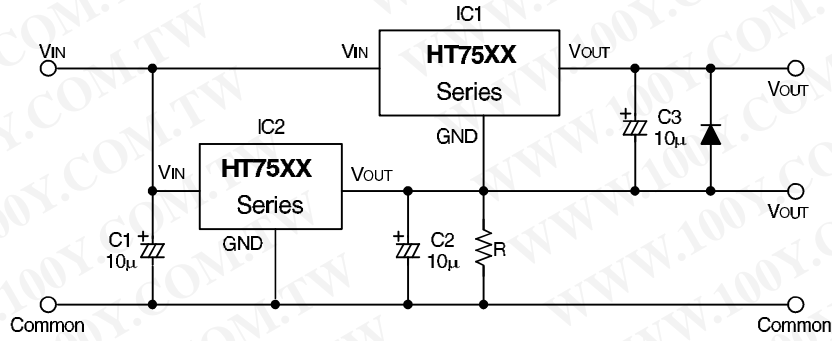
Constant current regulator



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



Dual supply

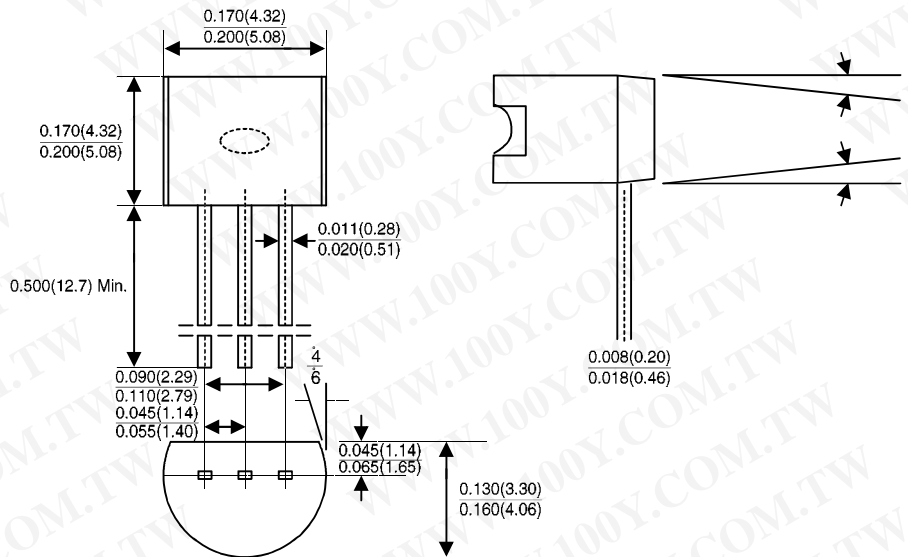


Package Outlines

Dimension

All linear dimensions are in inches and parenthetically in millimeters ($\frac{\text{Min.}}{\text{Max.}}$)

3-pin TO-92 package



3-pin SOT-89 package

