

Features

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

Applications

- Battery-powered equipment
- Communication equipment
- Audio/Video equipment

General Description

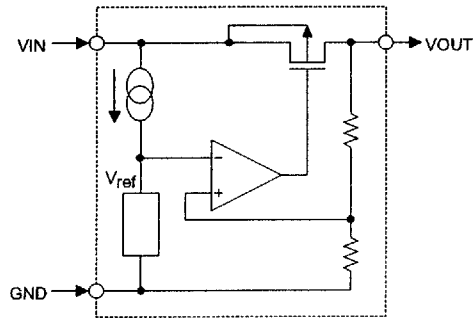
The HT75XX series is a set of three-terminal high current low voltage regulator implemented in CMOS technology. They can deliver 100mA output current and allow an input voltage as high as 12V. They are available with several fixed output voltages ranging from 2.4V to 9V. CMOS technology ensures low voltage 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

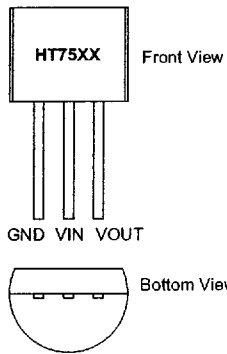
Part No.	Output Voltage	Tolerance
HT7530	3.0V	±5%
HT7533	3.3V	±5%
HT7536	3.6V	±5%
HT7538	3.8V	±5%
HT7544	4.4V	±5%
HT7550	5.0V	±5%
HT7560	6.0V	±5%
HT7570	7.0V	±5%
HT7580	8.0V	±5%
HT7590	9.0V	±5%

Block Diagram

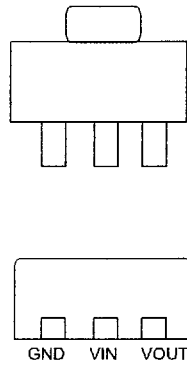


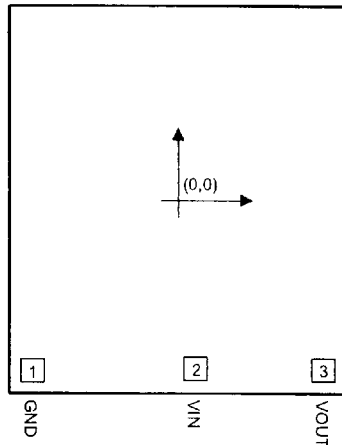
Pin Assignment

TO-92



SOT-89



Pad Assignment


Chip size: $1390 \times 1530 (\mu\text{m})^2$

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

Pad Coordinates

Unit: μm

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

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: 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
HT7530, +3.0V output type
T_a=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 Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	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<T _a <70°C	—	±0.45	—	mV/°C

HT7533, +3.3V output type
T_a=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 Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5.5V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	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<T _a <70°C	—	±0.5	—	mV/°C

HT7536, +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 Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5.6V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	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

HT7538, +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 Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	5.8V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	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

HT7544, +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 Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	6.4V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	5.4V≤V _{IN} ≤12V I _{OUT} =1mA	—	0.2	—	%/V
V _{IN}	Input Voltage	—	—	—	—	12	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	6.4V	I _{OUT} =10mA 0°C<Ta<70°C	—	±0.7	—	mV/°C

HT7550, +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 Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	7V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	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

HT7560, +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 Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	9V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	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	9V	I _{OUT} =10mA 0°C<Ta<70°C	—	±0.9	—	mV/°C

HT7570, +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 Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	9V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	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

HT7580, +8.0V output type
Ta=25°C

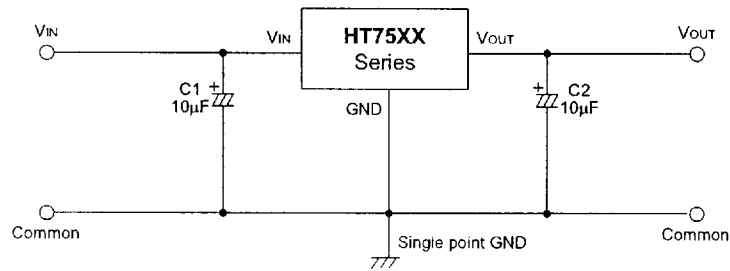
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	10V	I _{OUT} =10mA	7.61	8.0	8.4	V
I _{OUT}	Output Current	10V	—	100	150	—	mA
ΔV _{OUT}	Load Regulation	10V	1mA≤I _{OUT} ≤70mA	—	60	150	mV
V _{DIF}	Voltage Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	10V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	9V≤V _{IN} ≤12V 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

HT7590, +9.0V output type
Ta=25°C

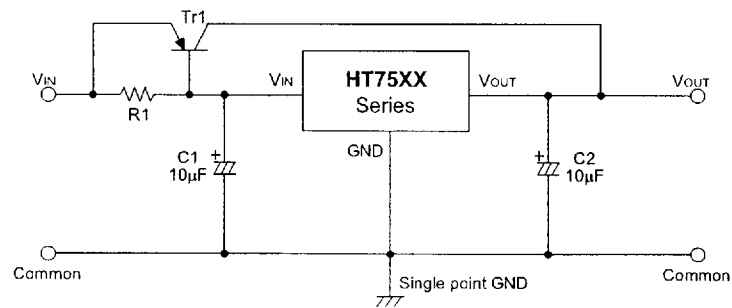
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage Tolerance	12V	I _{OUT} =10mA	8.55	9.0	9.45	V
I _{OUT}	Output Current	12V	—	100	150	—	mA
ΔV _{OUT}	Load Regulation	12V	1mA≤I _{OUT} ≤70mA	—	60	150	mV
V _{DIF}	Voltage Drop	—	I _{OUT} =1mA	—	100	—	mV
I _{SS}	Current Consumption	12V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	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 Circuits

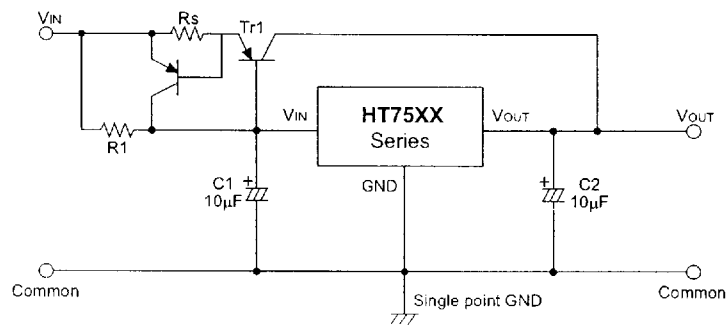
Basic circuit



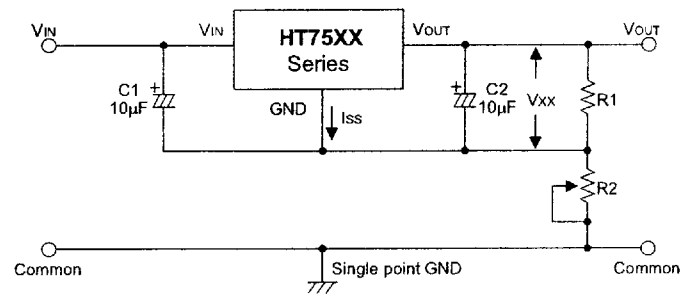
High output current positive voltage regulator



Short-Circuit protection for $Tr1$

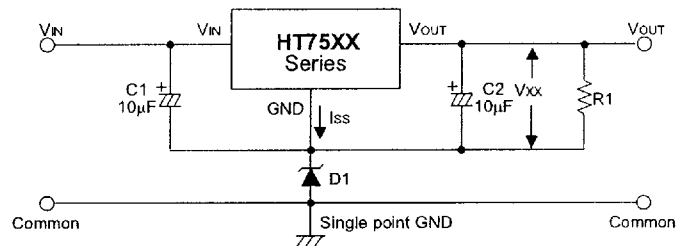


Circuit for increasing output voltage



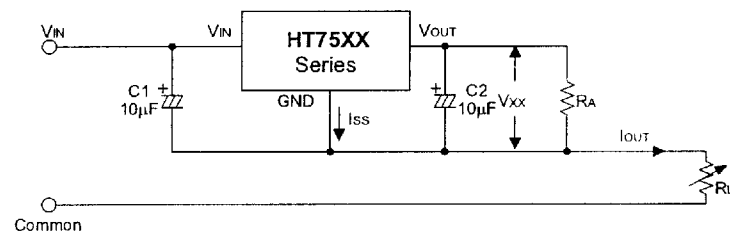
$$V_{OUT} = V_{XX} \left(1 + \frac{R_2}{R_1} \right) + I_{SS} R_2$$

Circuit for increasing output voltage



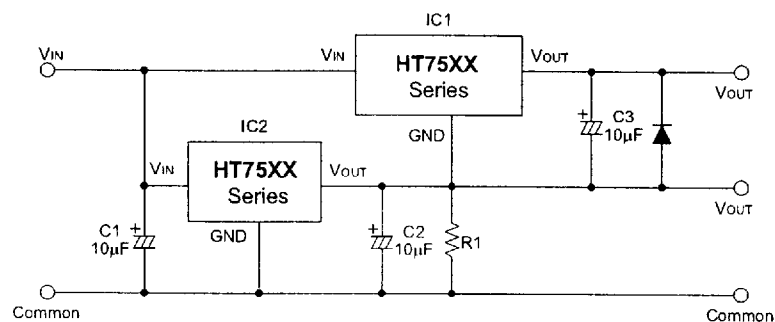
$$V_{OUT} = V_{XX} + V_{D1}$$

Constant current regulator



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

Dual supply



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