

Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 24V)
- High output current : 100mA ($P_d \leq 250\text{mW}$)
- TO-92 and SOT-89 package

Applications

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

General Description

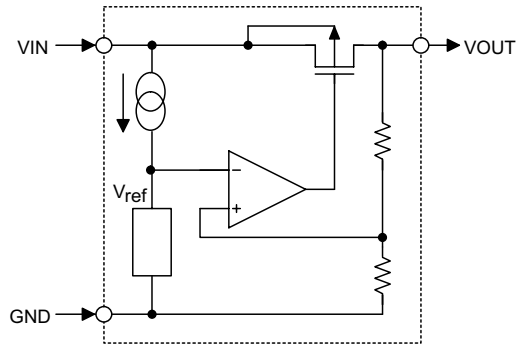
The HT75XX series is a set of three-terminal high current low voltage regulator implemented in CMOS technology. They can deliver 100mA output current and allow an input voltage as high as 24V. They are available with several fixed output voltages ranging from 3.0V to 8V. CMOS technology ensures low voltage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

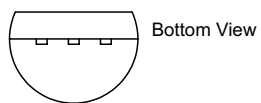
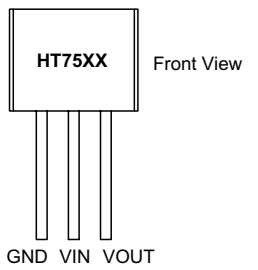
Part No.	Output Voltage	Tolerance
HT7530	3.0V	$\pm 5\%$
HT7533	3.3V	$\pm 5\%$
HT7536	3.6V	$\pm 5\%$
HT7544	4.4V	$\pm 5\%$
HT7550	5.0V	$\pm 5\%$
HT7580	8.0V	$\pm 5\%$

Block Diagram

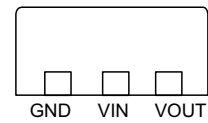
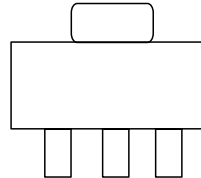


Pin Assignment

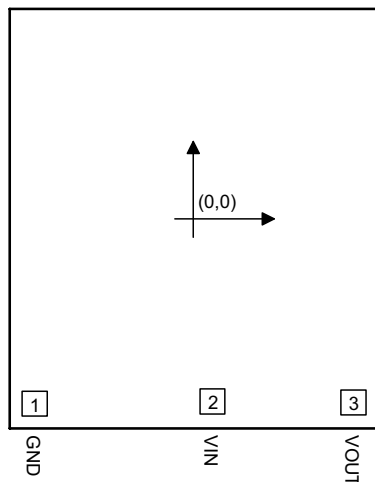
TO-92



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 26V	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	—	—	—	—	24	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	—	—	—	—	24	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	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.6V	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	—	—	—	—	24	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
 $T_a=25^{\circ}\text{C}$

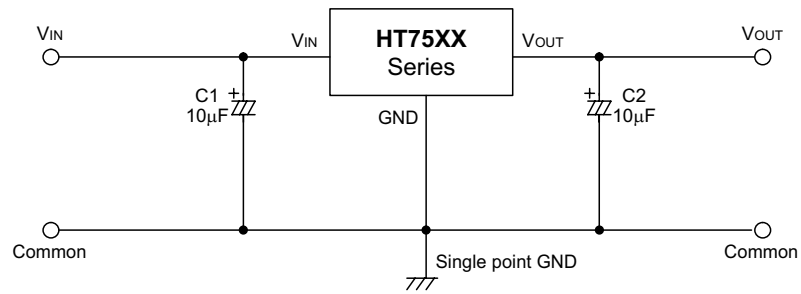
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage Tolerance	7V	$I_{OUT}=10\text{mA}$	4.75	5.0	5.25	V
I_{OUT}	Output Current	7V	—	100	150	—	mA
ΔV_{OUT}	Load Regulation	7V	$1\text{mA} \leq I_{OUT} \leq 70\text{mA}$	—	60	150	mV
V_{DIF}	Voltage Drop	—	$I_{OUT}=1\text{mA}$	—	100	—	mV
I_{SS}	Current Consumption	7V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	$6\text{V} \leq V_{IN} \leq 15\text{V}$ $I_{OUT}=1\text{mA}$	—	0.2	—	%/V
V_{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	7V	$I_{OUT}=10\text{mA}$ $0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$	—	± 0.75	—	$\text{mV}/^{\circ}\text{C}$

HT7580, +8.0V output type
 $T_a=25^{\circ}\text{C}$

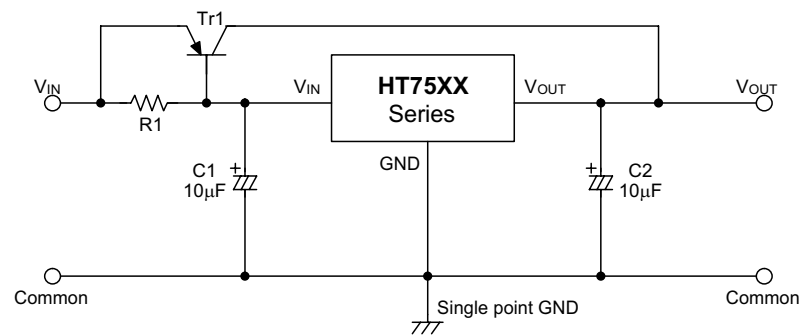
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage Tolerance	10V	$I_{OUT}=10\text{mA}$	7.61	8.0	8.4	V
I_{OUT}	Output Current	10V	—	100	150	—	mA
ΔV_{OUT}	Load Regulation	10V	$1\text{mA} \leq I_{OUT} \leq 70\text{mA}$	—	60	150	mV
V_{DIF}	Voltage Drop	—	$I_{OUT}=1\text{mA}$	—	100	—	mV
I_{SS}	Current Consumption	10V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	$9\text{V} \leq V_{IN} \leq 20\text{V}$ $I_{OUT}=1\text{mA}$	—	0.2	—	%/V
V_{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	10V	$I_{OUT}=10\text{mA}$ $0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$	—	± 1.2	—	$\text{mV}/^{\circ}\text{C}$

Application Circuits

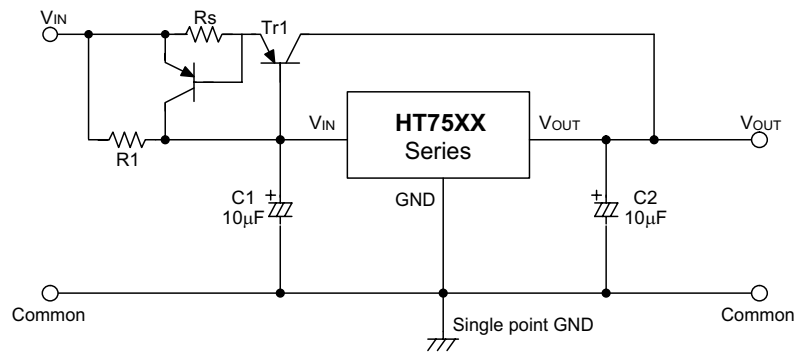
Basic circuit



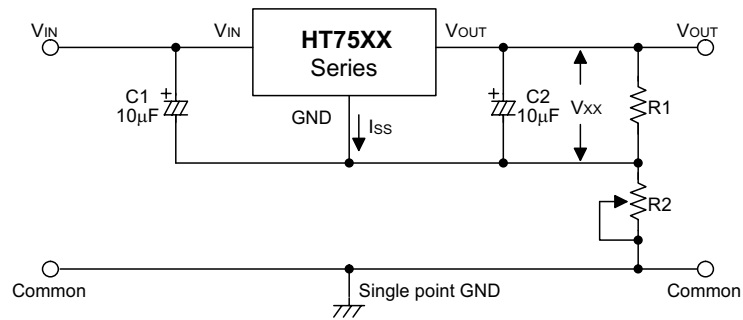
High output current positive voltage regulator



Short-Circuit protection for $Tr1$

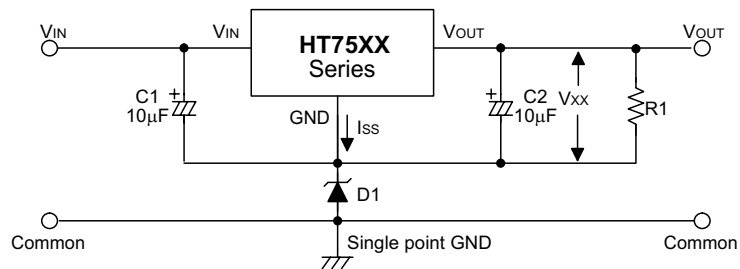


Circuit for increasing output voltage



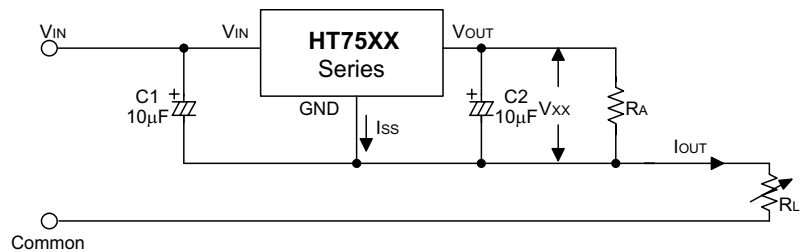
$$V_{OUT} = V_{XX} \left(1 + \frac{R_2}{R_1} \right) + I_{SS} R_2$$

Circuit for increasing output voltage



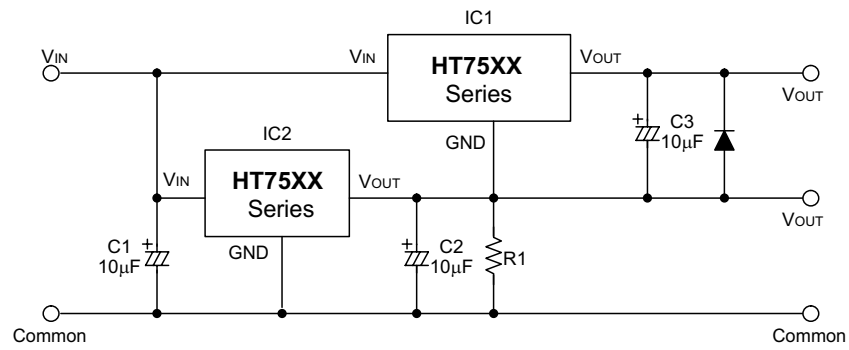
$$V_{OUT} = V_{XX} + V_{D1}$$

Constant current regulator



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

Dual supply



Holtek Semiconductor Inc. (Headquarters)

No.3 Creation Rd. II, Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.

Tel: 886-3-563-1999

Fax: 886-3-563-1189

Holtek Semiconductor Inc. (Taipei Office)

5F, No.576, Sec.7 Chung Hsiao E. Rd., Taipei, Taiwan, R.O.C.

Tel: 886-2-2782-9635

Fax: 886-2-2782-9636

Fax: 886-2-2782-7128 (International sales hotline)

Holtek Semiconductor (Hong Kong) Ltd.

RM.711, Tower 2, Cheung Sha Wan Plaza, 833 Cheung Sha Wan Rd., Kowloon, Hong Kong

Tel: 852-2-745-8288

Fax: 852-2-742-8657

Copyright © 2000 by HOLTEK SEMICONDUCTOR INC.

The information appearing in this Data Sheet is believed to be accurate at the time of publication. However, Holtek assumes no responsibility arising from the use of the specifications described. The applications mentioned herein are used solely for the purpose of illustration and Holtek makes no warranty or representation that such applications will be suitable without further modification, nor recommends the use of its products for application that may present a risk to human life due to malfunction or otherwise. Holtek reserves the right to alter its products without prior notification. For the most up-to-date information, please visit our web site at <http://www.holtek.com.tw>.