

**Features**

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 24V)
- 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**

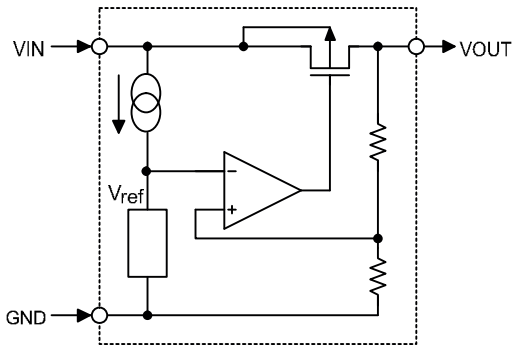
The HT75XX series is a set of three-terminal high current low voltage regulator implemented in CMOS technology. They can deliver 100mA output current and allow an input voltage as high as 24V. They are available with several fixed output voltages ranging from 3.0V to 8V. CMOS technology ensures low voltage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

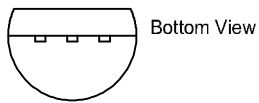
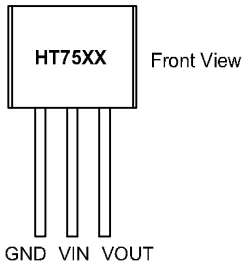
<b>Part No.</b>	<b>Output Voltage</b>	<b>Tolerance</b>
HT7530	3.0V	±5%
HT7533	3.3V	±5%
HT7536	3.6V	±5%
HT7544	4.4V	±5%
HT7550	5.0V	±5%
HT7580	8.0V	±5%

**Block Diagram**

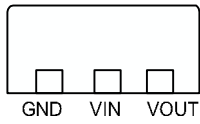
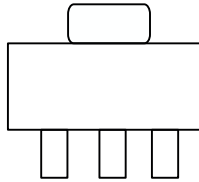


**Pin Assignment**

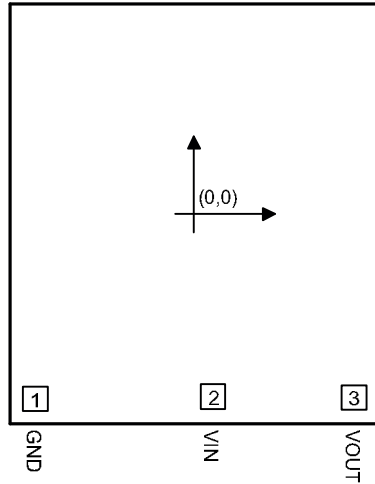
**TO-92**



**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:  $\mu\text{m}$

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**

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V <sub>IN</sub>	Conditions				
V <sub>OUT</sub>	Output Voltage Tolerance	5V	I <sub>OUT</sub> =10mA	2.85	3.0	3.15	V
I <sub>OUT</sub>	Output Current	5V	—	60	100	—	mA
ΔV <sub>OUT</sub>	Load Regulation	5V	1mA ≤ I <sub>OUT</sub> ≤ 50mA	—	60	150	mV
V <sub>DIF</sub>	Voltage Drop	—	I <sub>OUT</sub> =1mA	—	100	—	mV
I <sub>SS</sub>	Current Consumption	5V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	4V ≤ V <sub>IN</sub> ≤ 12V I <sub>OUT</sub> =1mA	—	0.2	—	%/V
V <sub>IN</sub>	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5V	I <sub>OUT</sub> =10mA 0°C < Ta < 70°C	—	±0.45	—	mV/°C

**HT7533, +3.3V output type**

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V <sub>IN</sub>	Conditions				
V <sub>OUT</sub>	Output Voltage Tolerance	5.5V	I <sub>OUT</sub> =10mA	3.14	3.3	3.47	V
I <sub>OUT</sub>	Output Current	5.5V	—	60	100	—	mA
ΔV <sub>OUT</sub>	Load Regulation	5.5V	1mA ≤ I <sub>OUT</sub> ≤ 50mA	—	60	150	mV
V <sub>DIF</sub>	Voltage Drop	—	I <sub>OUT</sub> =1mA	—	100	—	mV
I <sub>SS</sub>	Current Consumption	5.5V	No load	—	10	20	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	4.5V ≤ V <sub>IN</sub> ≤ 12V I <sub>OUT</sub> =1mA	—	0.2	—	%/V
V <sub>IN</sub>	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.5V	I <sub>OUT</sub> =10mA 0°C < Ta < 70°C	—	±0.5	—	mV/°C

**HT7536, +3.6V output type**
 $T_a=25^{\circ}\text{C}$ 

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		$V_{IN}$	Conditions				
$V_{OUT}$	Output Voltage Tolerance	5.6V	$I_{OUT}=10\text{mA}$	3.42	3.6	3.78	V
$I_{OUT}$	Output Current	5.6V	—	60	100	—	mA
$\Delta V_{OUT}$	Load Regulation	5.6V	$1\text{mA} \leq I_{OUT} \leq 50\text{mA}$	—	60	150	mV
$V_{DIF}$	Voltage Drop	—	$I_{OUT}=1\text{mA}$	—	100	—	mV
$I_{SS}$	Current Consumption	5.6V	No load	—	10	20	$\mu\text{A}$
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	$4.6\text{V} \leq V_{IN} \leq 12\text{V}$ $I_{OUT}=1\text{mA}$	—	0.2	—	%/V
$V_{IN}$	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.6V	$I_{OUT}=10\text{mA}$ $0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$	—	$\pm 0.6$	—	mV/ $^{\circ}\text{C}$

**HT7544, +4.4V output type**
 $T_a=25^{\circ}\text{C}$ 

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		$V_{IN}$	Conditions				
$V_{OUT}$	Output Voltage Tolerance	6.4V	$I_{OUT}=10\text{mA}$	4.18	4.4	4.62	V
$I_{OUT}$	Output Current	6.4V	—	60	100	—	mA
$\Delta V_{OUT}$	Load Regulation	6.4V	$1\text{mA} \leq I_{OUT} \leq 50\text{mA}$	—	60	150	mV
$V_{DIF}$	Voltage Drop	—	$I_{OUT}=1\text{mA}$	—	100	—	mV
$I_{SS}$	Current Consumption	6.4V	No load	—	10	20	$\mu\text{A}$
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	—	$5.4\text{V} \leq V_{IN} \leq 12\text{V}$ $I_{OUT}=1\text{mA}$	—	0.2	—	%/V
$V_{IN}$	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	6.4V	$I_{OUT}=10\text{mA}$ $0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$	—	$\pm 0.7$	—	mV/ $^{\circ}\text{C}$

**HT7550, +5.0V output type**
 $T_a=25^{\circ}\text{C}$ 

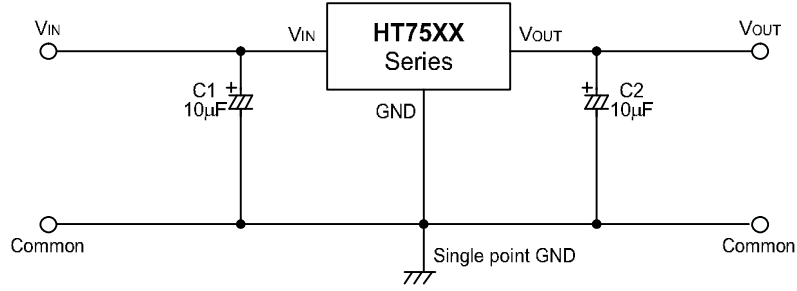
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		$V_{IN}$	Conditions				
$V_{OUT}$	Output Voltage Tolerance	7V	$I_{OUT}=10\text{mA}$	4.75	5.0	5.25	V
$I_{OUT}$	Output Current	7V	—	100	150	—	mA
$\Delta V_{OUT}$	Load Regulation	7V	$1\text{mA} \leq I_{OUT} \leq 70\text{mA}$	—	60	150	mV
$V_{DIF}$	Voltage Drop	—	$I_{OUT}=1\text{mA}$	—	100	—	mV
$I_{SS}$	Current Consumption	7V	No load	—	10	20	$\mu\text{A}$
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	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	$I_{OUT}=10\text{mA}$ $0^{\circ}\text{C} < T_a < 70^{\circ}\text{C}$	—	$\pm 0.75$	—	mV/ $^{\circ}\text{C}$

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

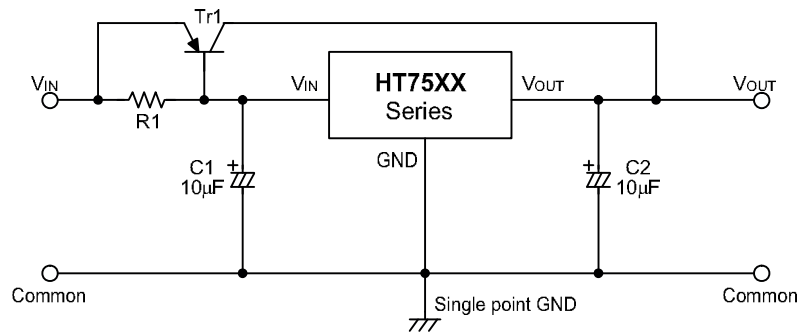
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		$V_{IN}$	Conditions				
$V_{OUT}$	Output Voltage Tolerance	10V	$I_{OUT}=10\text{mA}$	7.61	8.0	8.4	V
$I_{OUT}$	Output Current	10V	—	100	150	—	mA
$\Delta V_{OUT}$	Load Regulation	10V	$1\text{mA} \leq I_{OUT} \leq 70\text{mA}$	—	60	150	mV
$V_{DIF}$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

## Application Circuits

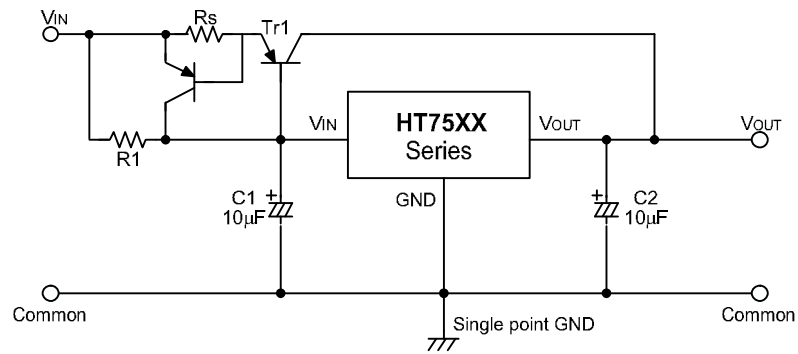
### Basic circuit



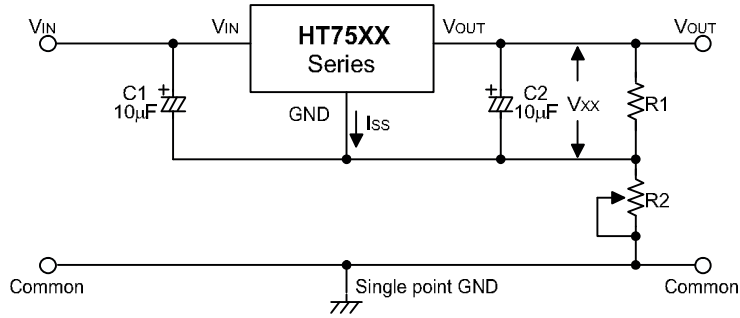
### High output current positive voltage regulator



### Short-Circuit protection for $Tr1$

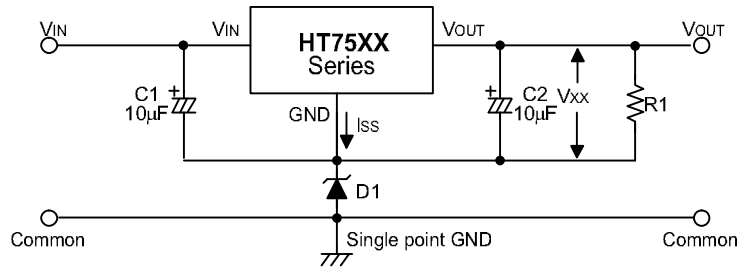


**Circuit for increasing output voltage**



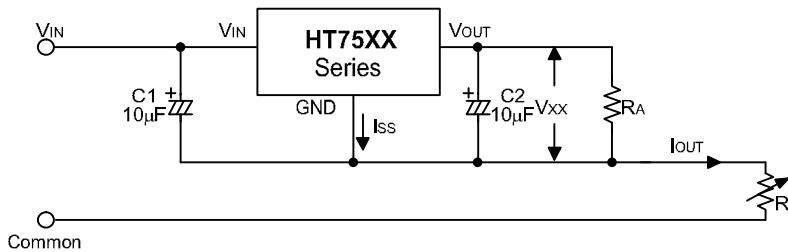
$$V_{OUT} = V_{XX} \left( 1 + \frac{R2}{R1} \right) + I_{SS} R2$$

**Circuit for increasing output voltage**



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

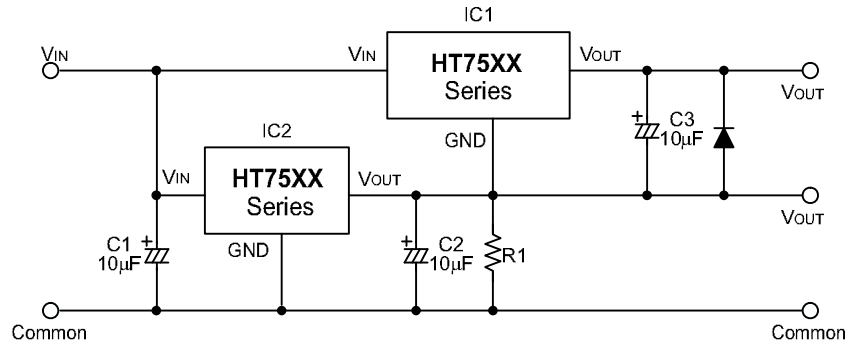
**Constant current regulator**



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



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>.