HT75XX

High Driver Regulator

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

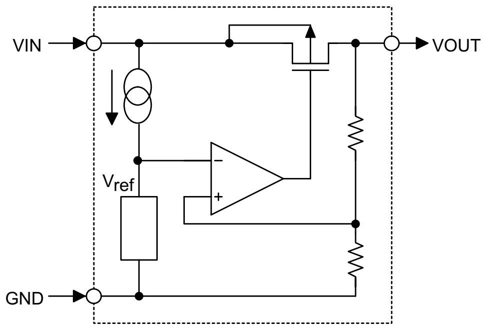
The HT75XX series is a set of three-terminal high current low voltage regulator implemented in CMOS technology. They can deliver 100mA output current and allow an input voltage as high as 24V. They are available with several fixed output voltages ranging from 3.0V to 8V. CMOS technology ensures low voltage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

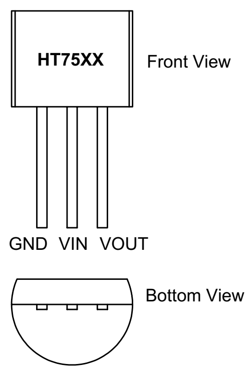
Part No.	Output Voltage	Tolerance
HT7530	3.0V	±5%
HT7533	3.3V	±5%
HT7536	3.6V	±5%
HT7544	4.4V	±5%
HT7550	5.0V	±5%
HT7580	8.0V	±5%

Block Diagram

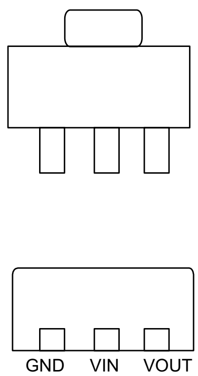


Pin Assignment

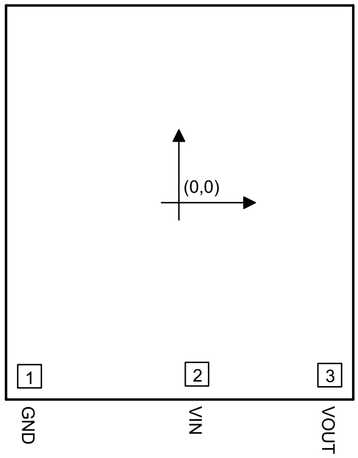
TO-92



SOT-89



Pad Assignment



Chip size: 1390 × 1530 $(\mu m)^2$

*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

Power Consumption............................. 250mW

Storage Temperature.................–50°C to 125°C

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_{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<Ta<70°C	—	±0.45	—	mV/°C

HT7533, +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 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<Ta<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

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}≤15V I_{OUT}=1mA	—	0.2	—	%/V
V_{IN}	Input Voltage	—	—	—	—	24	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	7V	I_{OUT}=10mA 0°C<Ta<70°C	—	±0.75	—	mV/°C

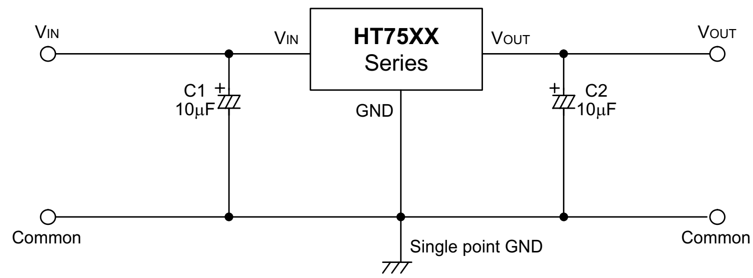
HT7580, +8.0V output type

Ta=25°C

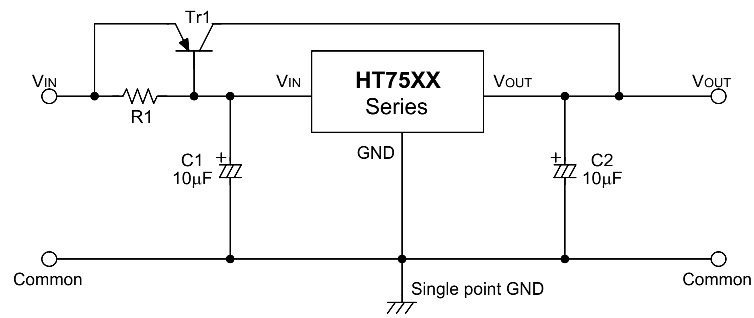
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage Tolerance	10V	I_{OUT}=10mA	7.61	8.0	8.4	V
I_{OUT}	Output Current	10V	—	100	150	—	mA
ΔV_{OUT}	Load Regulation	10V	1mA≤I_{OUT}≤70mA	—	60	150	mV
V_{DIF}	Voltage Drop	—	I_{OUT}=1mA	—	100	—	mV
I_{SS}	Current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

Application Circuits

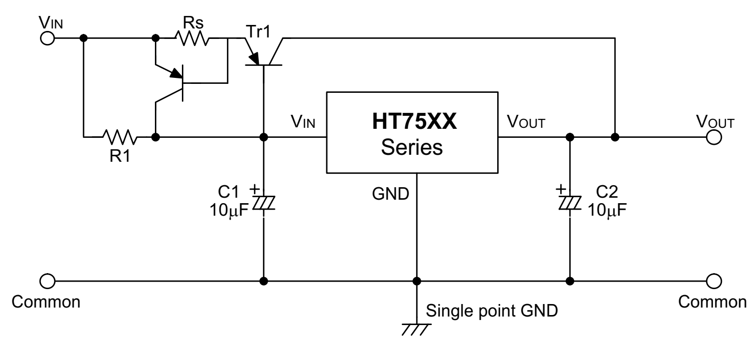
Basic circuit



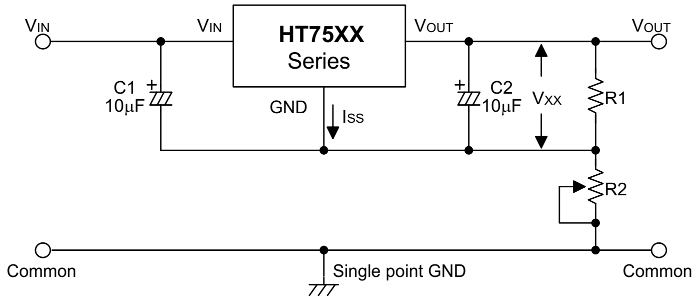
High output current positive voltage regulator



Short-Circuit protection for Tr1

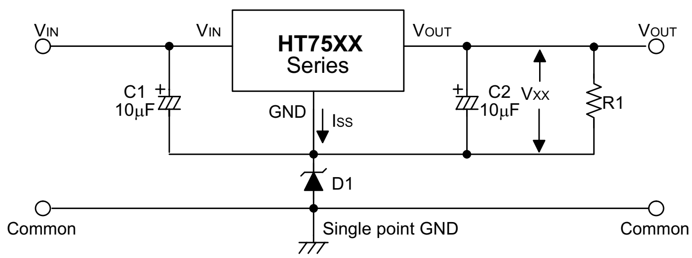


Circuit for increasing output voltage



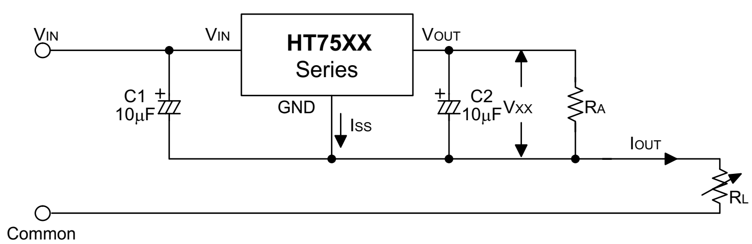
$$V_{OUT} = V_{XX} \left(1 + \frac{R2}{R1} \right) + I_{SS}\, R2$$

Circuit for increasing output voltage



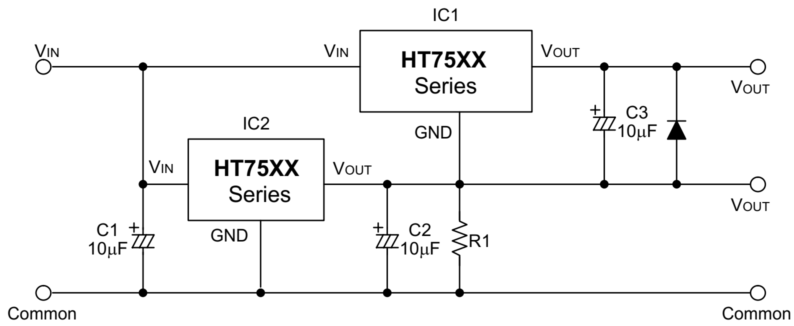
$$V_{OUT} = V_{XX} + V_{D1}$$

Constant current regulator



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

Dual supply


IC1
VIN
VIN
HT75XX
Series
VOUT
VOUT
GND
C3
10µF
IC2
VIN
HT75XX
Series
VOUT
VOUT
GND
C1
10µF
C2
10µF
R1
Common
Common

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