HT75XXS

PUOLOP 迪浦

150mA Low Power LDO

Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 15V)
- Output voltage accuracy: tolerance ±2%
- SOT89 , SOT23-3 and SOT23 package

Applications

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

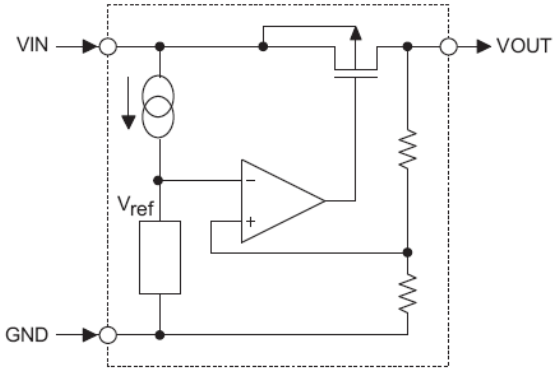
General Description

The HT75XXS series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 15V. They are available with several fixed output voltages ranging from 2.1V to 6.0V. 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.

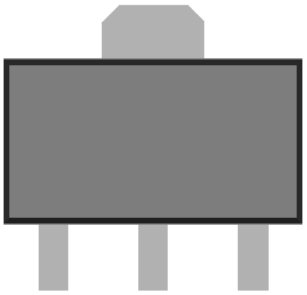
Selection Table

Part No.	Output Voltage	Package
HT7521S	2.1V	SOT89 SOT23-3 SOT23
HT7523S	2.3V	
HT7525S	2.5V	
HT7527S	2.7V	
HT7530S	3.0V	
HT7533S	3.3V	
HT7536S	3.6V	
HT7540S	4.0V	
HT7544S	4.4V	
HT7545S	4.5V	
HT7550S	5.0V	

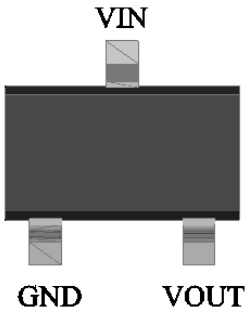
Block Diagram



SOT89 (Top view)



SOT23-3 and SOT23 (Top view)



Absolute Maximum Ratings

Supply Voltage .....-0.3V to 18V

Storage Temperature .....-50℃ to 125℃

Operating Temperature .....-40℃ to 85℃

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.

Thermal Information

Symbol	Parameter	Package	Max.	Unit
θ_{JA}	Thermal Resistance (Junction to Ambient) (Assume no ambient airflow, no heat sink)	SOT89	200	℃/W
		SOT23-3	500	℃/W
P_D	Power Dissipation	SOT89	0.50	W
		SOT23-3	0.20	W

Note: P_D is measured at Ta= 25℃

Electrical Characteristics

HT7521S , +2.1V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.1V	I_{OUT}=10mA	2.058	2.100	2.142	V
I_{OUT}	Output Current	4.1V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	4.1V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	4.1V	No load	-	1.5	2	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.1V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	4.1V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.37	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7523S , +2.3V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.3V	I_{OUT}=10mA	2.254	2.300	2.346	V
I_{OUT}	Output Current	4.3V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	4.3V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	4.3V	No load	-	1.5	2	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.3V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	4.3V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.39	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7525S , +2.5V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.5V	I_{OUT}=10mA	2.45	2.500	2.55	V
I_{OUT}	Output Current	4.5V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	4.5V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	4.5V	No load	-	1.5	2	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.5V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	4.5V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.41	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7527S , +2.7V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.7V	I_{OUT}=10mA	2.646	2.700	2.754	V
I_{OUT}	Output Current	4.7V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	4.7V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	4.7V	No load	-	1.5	2	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.7V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	4.7V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.43	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7530S , +3.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5V	I_{OUT}=10mA	2.94	3.00	3.06	V
I_{OUT}	Output Current	5V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	5V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	5V	No load	-	1.5	2	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	5V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.45	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7533S , +3.3V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5.3V	I_{OUT}=10mA	3.234	3.300	3.366	V
I_{OUT}	Output Current	5.3V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	5.3V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	5.3V	No load	-	1.5	2	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4.5V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	5.3V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.5	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7536S，+3.6V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5.6V	I_{OUT}=10mA	3.528	3.600	3.672	V
I_{OUT}	Output Current	5.6V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	5.6V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	5.6V	No load	-	1.5	2.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4.6V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	5.6V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.6	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7540S，+4.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	6.0V	I_{OUT}=10mA	3.920	4.000	4.080	V
I_{OUT}	Output Current	6.0V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	6.0V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	6.0V	No load	-	1.5	2.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	5V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	6.0V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.6	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7544S , +4.4V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	6.4V	I_{OUT}=10mA	4.312	4.400	4.488	V
I_{OUT}	Output Current	6.4V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	6.4V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	6.4V	No load	-	1.5	2.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	5.4V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	6.4V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.7	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7545S , +4.5V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	6.5V	I_{OUT}=10mA	4.410	4.500	4.590	V
I_{OUT}	Output Current	6.5V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	6.5V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	6.5V	No load	-	1.5	2.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	5.5V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	6.5V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.7	-	mV/℃

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

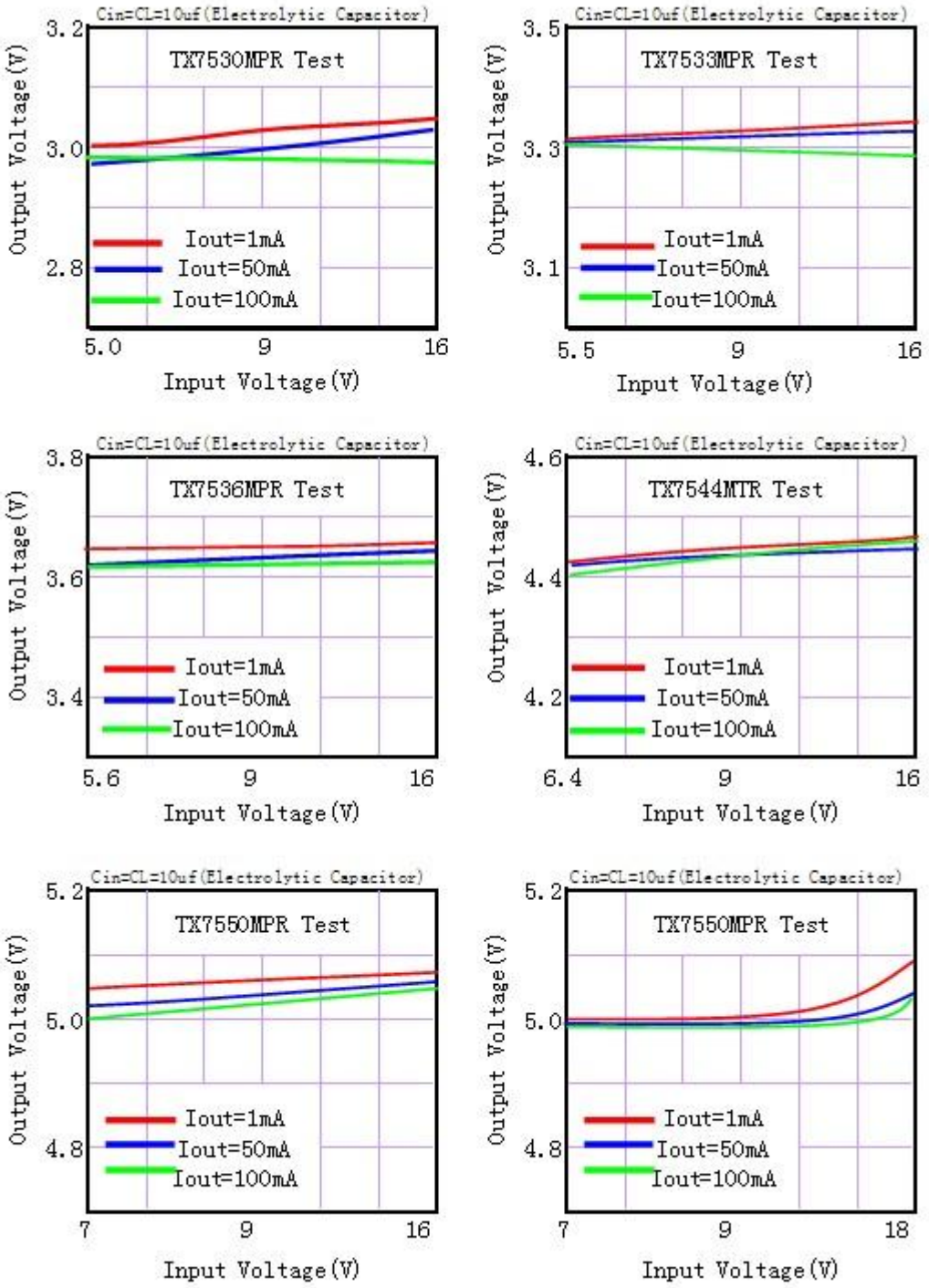
HT7550S ，+5.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	7V	I_{OUT}=10mA	4.9	5.00	5.1	V
I_{OUT}	Output Current	7V	-	120	150	-	mA
ΔV_{OUT}	Load Regulation	7V	1mA≤I_{OUT}≤50mA	-	60	150	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=1mA, ΔV_{OUT}=2%	-	50	-	mV
I_{SS}	Current Consumption	7V	No load	-	1.5	2.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	6V≤V_{IN}≤16V I_{OUT}=1mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	7V	I_{OUT}=10mA 0℃<Ta<70℃	-	±0.75	-	mV/℃

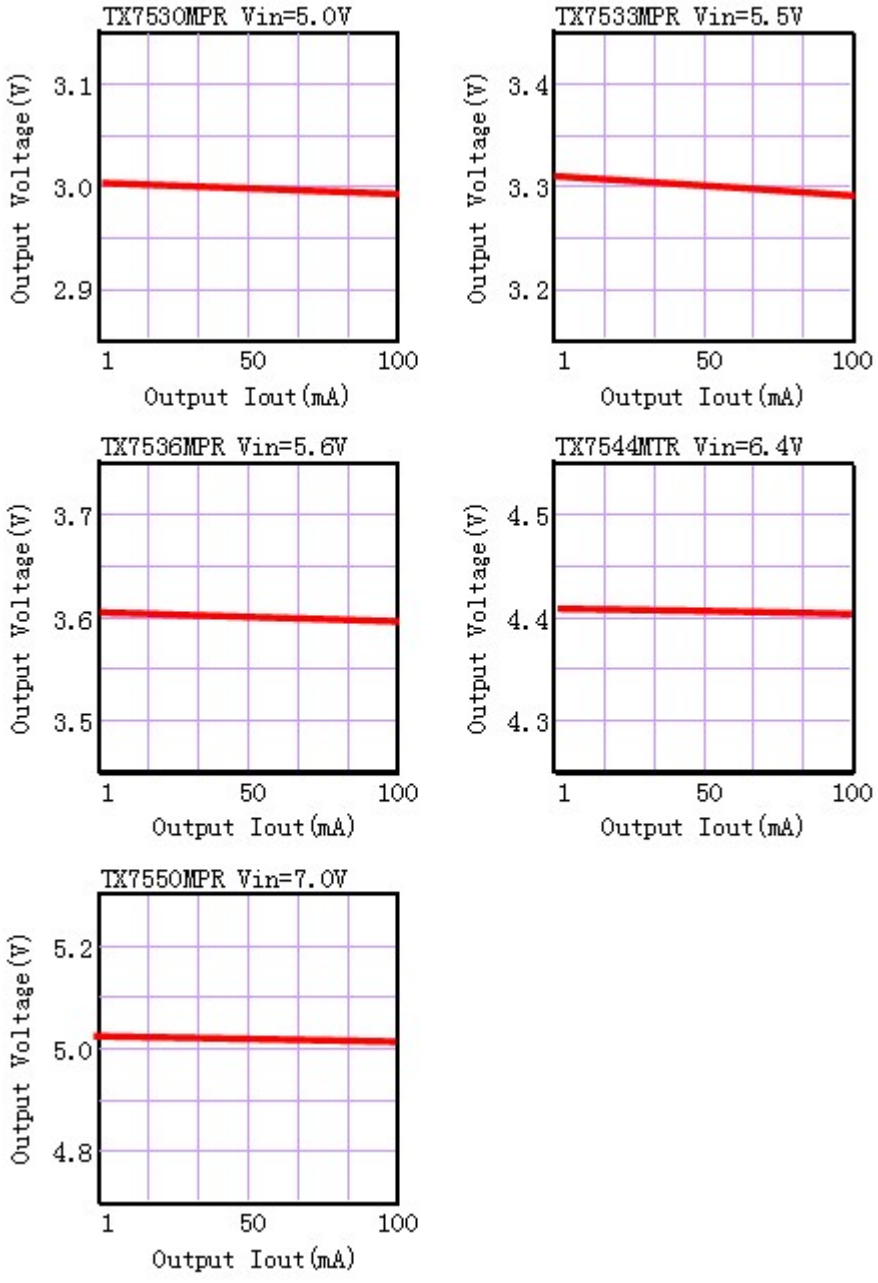
Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

Typical Performance Characteristics

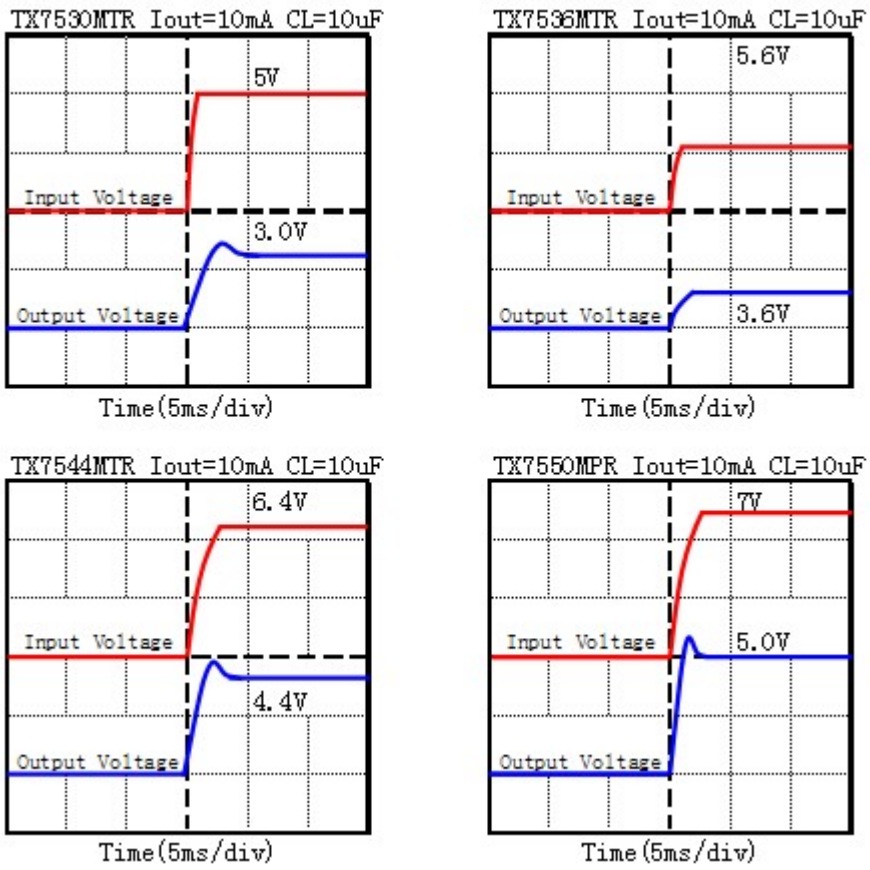
(1) Output Voltage vs Input voltage



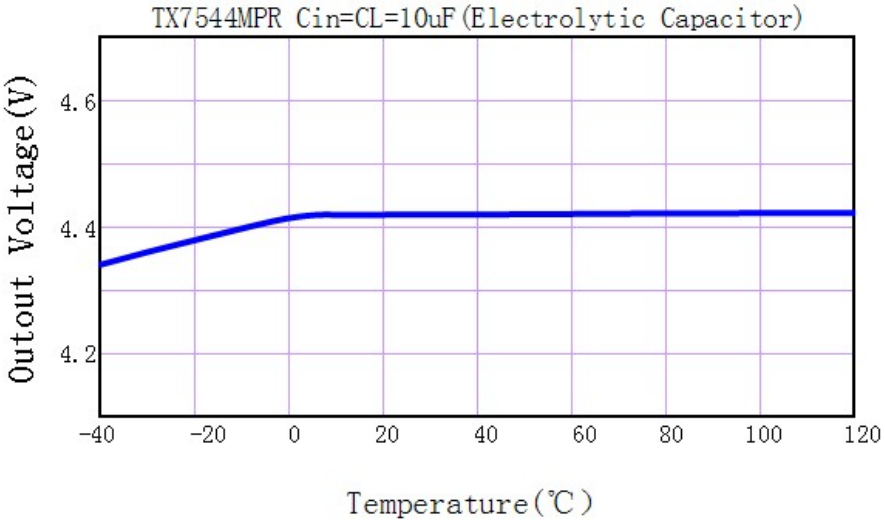
(2) Output Voltage vs.Output Current



(3) Input Transient Response



(4) Output Voltage vs.Ambient Temperature



(5) MAX Output Current Vs. Input Voltage

HT7530S

Input Voltage	Max Output Current
5V	150mA
9V	150mA
12V	100mA
16V	60mA

HT7533S

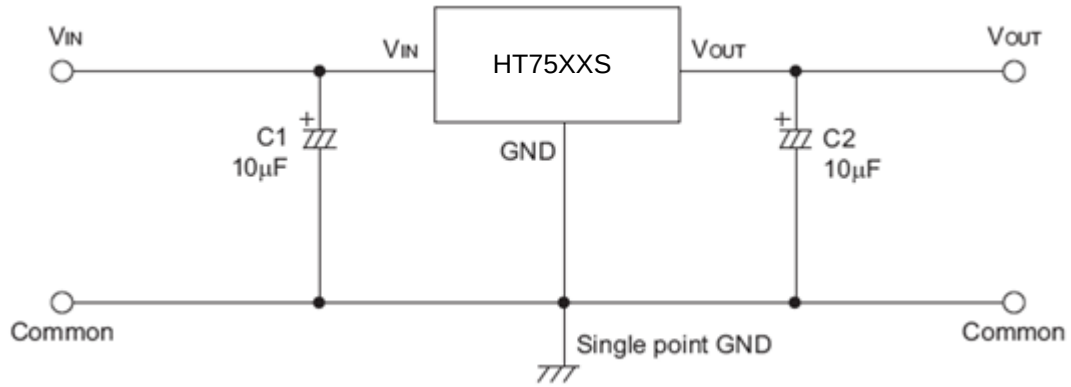
Input Voltage	Max Output Current
5.3V	150mA
9V	150mA
12V	150mA
16V	100mA

HT7550S

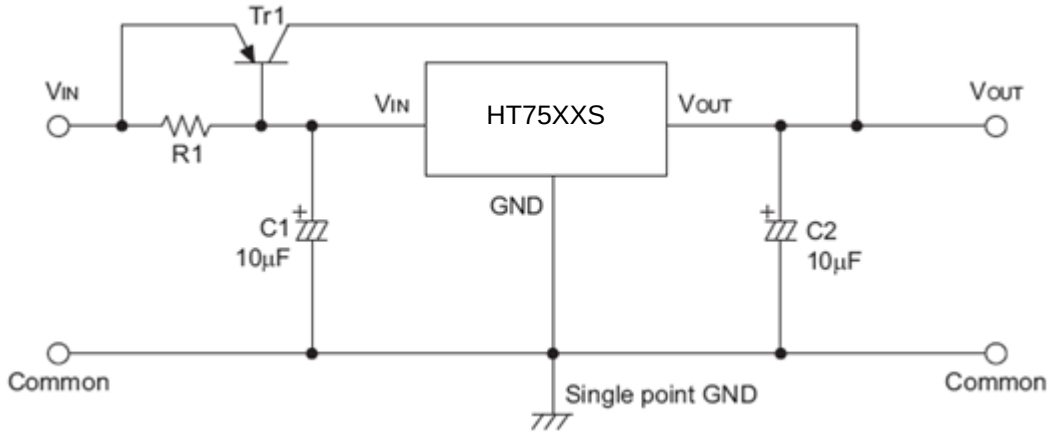
Input Voltage	Max Output Current
7V	150mA
9V	150mA
12V	150mA
16V	100mA

Application Circuits

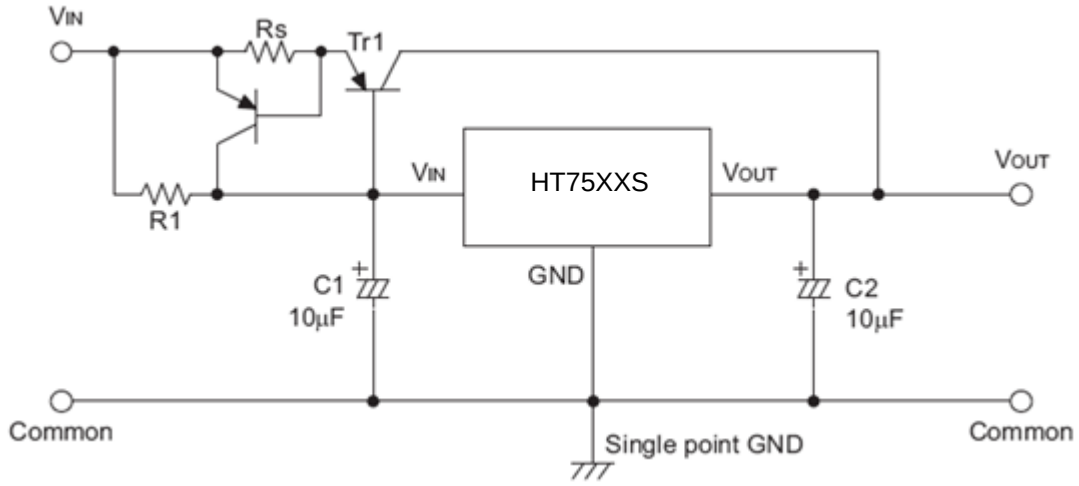
Basic Circuits



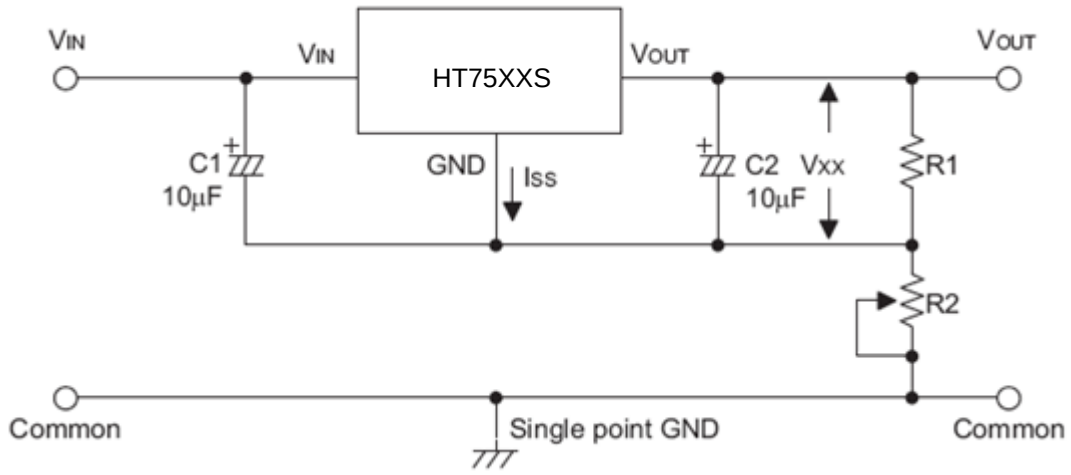
High Output Current Positive Voltage Regulator



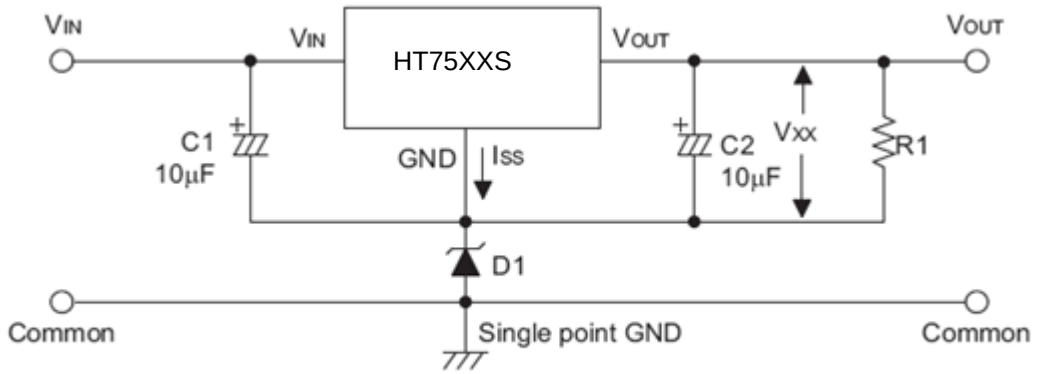
Short-Circuit Protection by Tr1



Circuit for Increasing Output Voltage

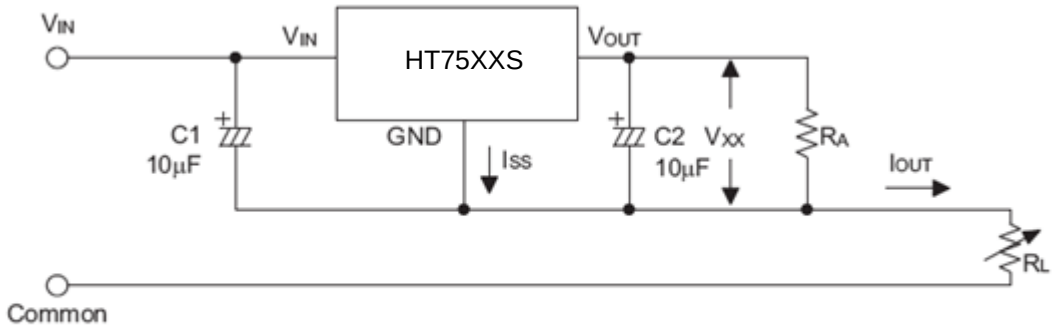


Circuit for Increasing Output Voltage



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

Constant Current Regulator



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

Dual Supply