



## General Description

HTLV704 series are a set of Low Dropout Linear Regulator ICs implemented in CMOS technology. They can withstand voltage 30V. And they are available with low voltage drop and low quiescent current, widely used in audio, video and communication appliances.

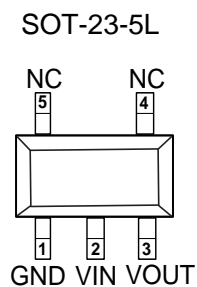
## Features

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 30V
- Quiescent Current 1.8uA
- Output Voltage Accuracy: tolerance  $\pm 2\%$
- High output current: 150mA

## Application

- Battery-powered Equipments
- Communication Equipments
- Audio/Video Equipments
- Smart Battery Packs
- Smoke Detectors
- CO2 DETECTORS

## Pin Configuration And Descriptions



PIN No.	Name	Functions Description
SOT-23-5L		
1	GND	Ground
2	V <sub>IN</sub>	Input
3	V <sub>OUT</sub>	Output
4	NC	No Connect
5	NC	No Connect

## Order Information

Orderable Device	Package	Output Voltage	Packing Option
HTLV70430DBVR	SOT-23-5L	3.0V	3000/Reel
HTLV70433DBVR	SOT-23-5L	3.3V	3000/Reel
HTLV70450DBVR	SOT-23-5L	5.0V	3000/Reel



## Absolute Maximum Ratings

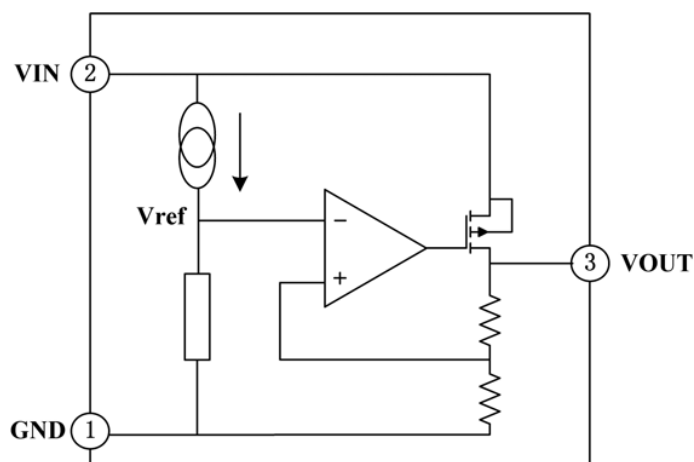
Description	Symbol	Value Range	Unit
Limit Power Voltage	$V_{IN}$	-0.3~+33	V
Storage Temperature Range	$T_{STG}$	-50~+125	°C
Operating Free-air Temperature Range	$T_A$	-40~+85	°C

Note: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

## Heat Dissipation

Description	Symbol	Package	Value Range	Unit
Thermal resistance	$J_A$	SOT-23-5L	500	°C/W
Power dissipation	$P_W$	SOT-23-5L	200	mW

## Block Diagram





## DC Characteristics (unless otherwise noted $T_A = 25^\circ\text{C}$ )

( $V_{IN} = V_{OUT} + 2.0\text{V}$ ,  $C_{IN} = C_L = 10\mu\text{F}$ ,  $T_A = 25^\circ\text{C}$ , unless otherwise noted)

### Series +3.0V OUTPUT

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN} = V_{OUT} + 2.0\text{V}$ , $I_{OUT} = 10\text{mA}$	2.94	3.00	3.06	V
Output Current	$I_{OUT}$	$V_{IN} = V_{OUT} + 2.0\text{V}$		150		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 2.0\text{V}$ $1\text{mA} \leq I_{OUT} \leq 50\text{mA}$		25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT} = 1\text{mA}$ , $\Delta V_{OUT} = 2\%$		30	100	mV
Quiescent Current	$I_{SS}$	No Load		1.8	3.0	$\mu\text{A}$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \frac{\Delta V_{IN}}{\Delta V_{IN}}$	$V_{OUT} + 1.0\text{V} \leq V_{IN} \leq 30\text{V}$ , $I_{OUT} = 1\text{mA}$			0.2	%/V
Input Voltage	$V_{IN}$				30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$	$V_{IN} = V_{OUT} + 2.0\text{V}$ , $I_{OUT} = 10\text{mA}$ , $-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$		100		ppm/ $^\circ\text{C}$

Note: When  $V_{IN} = V_{OUT} + 2.0\text{V}$ , as the output voltage declined 2%, the  $V_{DIF} = V_{IN} - V_{OUT}$ .

### Series +3.3V OUTPUT

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN} = V_{OUT} + 2.0\text{V}$ , $I_{OUT} = 10\text{mA}$	3.234	3.30	3.366	V
Output Current	$I_{OUT}$	$V_{IN} = V_{OUT} + 2.0\text{V}$		150		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 2.0\text{V}$ $1\text{mA} \leq I_{OUT} \leq 50\text{mA}$		25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT} = 1\text{mA}$ , $\Delta V_{OUT} = 2\%$		25	55	mV
Quiescent Current	$I_{SS}$	No Load		1.8	3.0	$\mu\text{A}$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \frac{\Delta V_{IN}}{\Delta V_{IN}}$	$V_{OUT} + 1.0\text{V} \leq V_{IN} \leq 30\text{V}$ , $I_{OUT} = 1\text{mA}$			0.2	%/V
Input Voltage	$V_{IN}$				30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$	$V_{IN} = V_{OUT} + 2.0\text{V}$ , $I_{OUT} = 10\text{mA}$ , $-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$		100		ppm/ $^\circ\text{C}$

Note: When  $V_{IN} = V_{OUT} + 2.0\text{V}$ , as the output voltage declined 2%, the  $V_{DIF} = V_{IN} - V_{OUT}$ .



#### Series +5.0V OUTPUT

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$	4.9	5.0	5.1	V
Output Current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0V$		200		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 50mA$		25	60	mV
Voltage Drop	$V_{DIF}$	$I_{OUT}=1mA$ , $\Delta V_{OUT}=2\%$		25	55	mV
Quiescent Current	$I_{SS}$	No Load		1.8	3.0	uA
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \frac{\Delta V_{IN}}{\Delta V_{IN}}$	$V_{OUT}+1.0V \leq V_{IN} \leq 30V$ , $I_{OUT}=1mA$			0.2	%/V
Input Voltage	$V_{IN}$				30	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10mA$ , $-40^{\circ}C \leq T_A \leq 85^{\circ}C$		100		ppm/ $^{\circ}C$

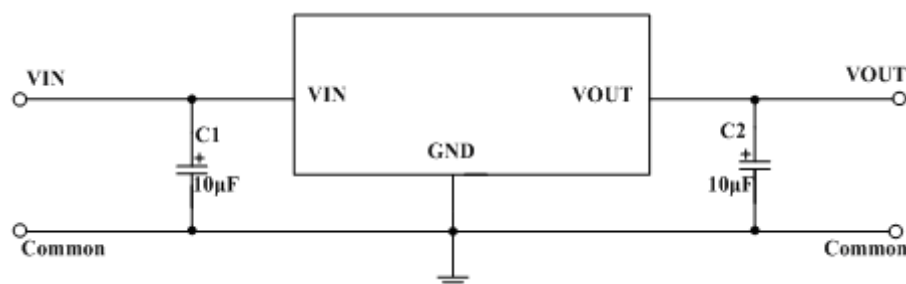
Note: When  $V_{IN}=V_{OUT}+2.0V$ , as the output voltage declined 2%, the  $V_{DIF}=V_{IN}-V_{OUT}$ .

## Function Description

HTLV704 series are linear voltage regulator ICs withstanding 30V voltage. The series IC consists of a voltage reference, an error amplifier, a current limiter and a phase compensation circuit plus a driver transistor. The output stabilization capacitor is also compatible with low ESR ceramic capacitors. The over current protection circuit and the over voltage protection circuit are built-in. The protection circuit will operate when the output current or input voltage reaches limit level.

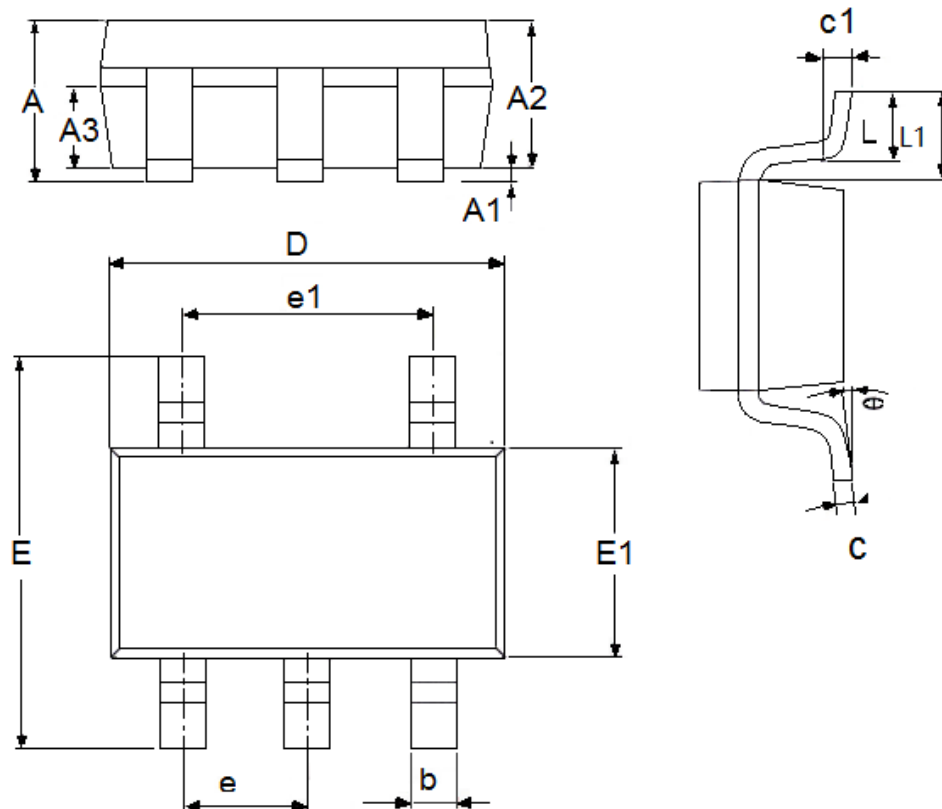
## Application Circuit

### Basic Circuits





Package Outline Dimensions  
SOT-23-5L



Symbol	Dimensions in Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.23	0.0039	0.0091
D	2.82	3.05	0.1110	0.1201
e1	1.9(TYP)		0.0748(TYP)	
E	2.6	3.05	0.1024	0.1201
E1	1.5	1.75	0.0512	0.0689
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	



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