HT71XX

30mA Low Power Consumption LDO

Features

- Low Quiescent Current：1uA
- High Input Voltage Rating：Up to 30V
- Low voltage drop
- Fixed Output Voltages：
2.1V,2.3V, 2.5V,2.7V,3.0V, 3.3V,3.6V,4.0V,4.4V and 5.0V
- High-accuracy Output Voltage: ±2%
- Fast Transient Response
- Over current protection

Application

- Battery-powered equipment
- Smoke detector and sensor
- Micro controller Applications
- Home Appliance

Description

The HT71XX series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 30V. They are available with several fixed output voltages ranging from 2.1V to 5.0V. CMOS technology ensures low voltage drop and low quiescent current.

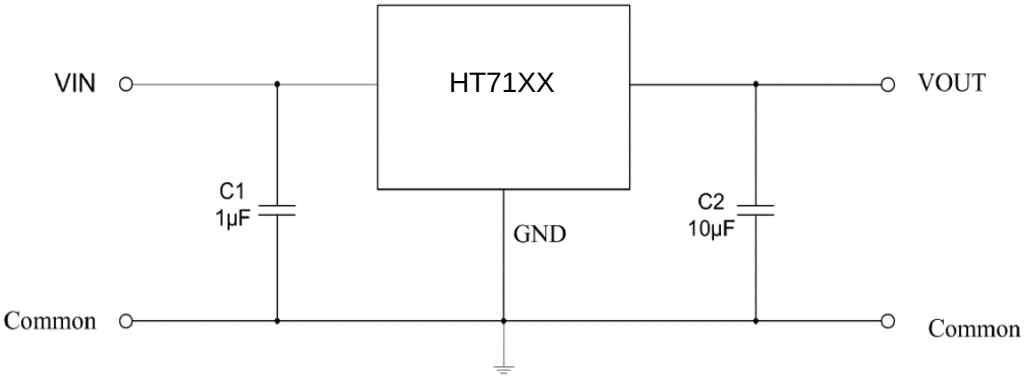
Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

Pb-Free RoHS Halogen-Free

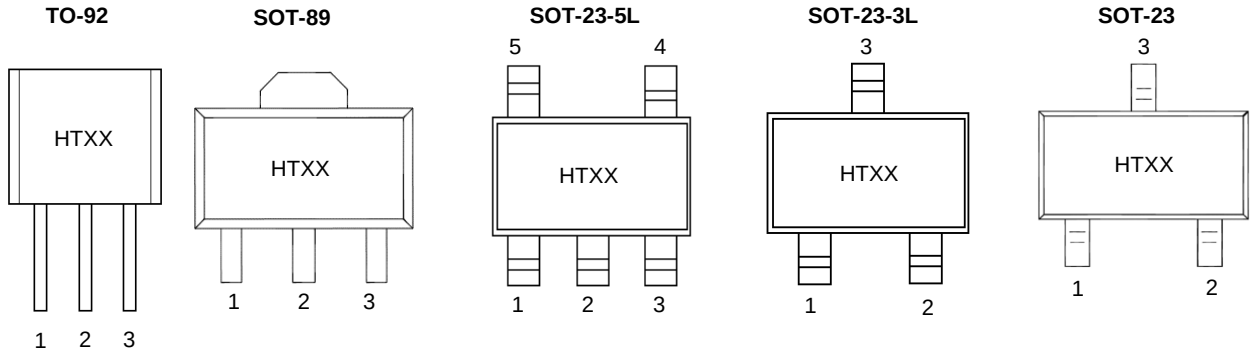
Type	Output voltage	Package	Marking
HT7121	2.1V	SOT-23 SOT-23-3L SOT-23-5L SOT-89 TO-92	HTXX
HT7123	2.3V		
HT7125	2.5V		
HT7127	2.7V		
HT7130	3.0V		
HT7133	3.3V		
HT7136	3.6V		
HT7140	4.0V		
HT7144	4.4V		
HT7150	5.0V		

Note: “XX” Represents the output voltage

Application Circuits

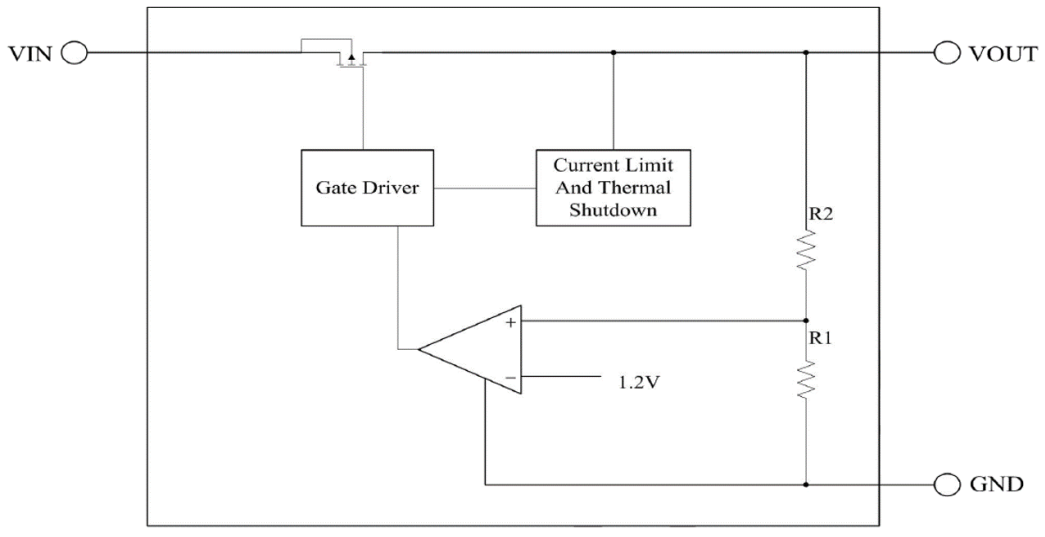


Packages And Pin Assignment



Pin No.					Pin Name	Pin Description
SOT-23	SOT-23-3L	SOT-23-5L	SOT-89	TO-92		
1	1	1	1	1	GND	Ground pin
3	3	2	2	2	VIN	Input pin
2	2	3	3	3	OUT	Output pin
-	-	4,5	-	-	NC	No connection

Functional Block Diagram



Absolute Maximum Ratings

Item	Description	Min	Max	Unit
Voltage	VIN to GND	-0.3	30	V
	VOUT to GND	-0.3	6	V
	VOUT to VIN	-30	0.3	V
Current	Peak Output Current	Internally Limited		
Temperature	Operating Junction Temperature	-40	125	℃
	Storage Temperature	-65	150	℃
Power Dissipation	TO-92	600		mW
	SOT-89	600		mW
	SOT-23-5L	400		mW
	SOT-23-3L	380		mW
	SOT-23	280		mW
Thermal Resistance (Junction to Ambient)	TO-92	165		℃/W
	SOT-89	165		℃/W
	SOT-23-5L	250		℃/W
	SOT-23-3L	260		℃/W
	SOT-23	360		℃/W
Electrostatic Discharge Rating	Human Body Model（HBM）	2		KV
	Charged Device Model（MM）	100		V

Electrical Characteristics

HT7121, +2.1V Output Type

Ta=25℃

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
		V_{IN}	Conditions				
V_{IN}	Input Voltage	-	-	3.0	-	30	V
V_{OUT}	Output Voltage	4.1V	I_{OUT}=10mA	2.058	2.100	2.142	V
I_{OUT}	Output Current	4.1V	-	-	30	-	mA
ΔV_{OUT}	Load Regulation	4.1V	1mA≤I_{OUT}≤20mA	-	15	45	mV/mA
V_{DIF}	Dropout Voltage(1)	-	I_{OUT}=1mA , ΔV_{OUT}=2%	-	35	100	mV
I_{SS}	Quiescent Current	4.1V	No load	-	1	1.5	uA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}*\Delta V_{IN}}$	Line Regulation	-	I_{OUT}=1mA , 3.1V≤V_{IN}≤30V	-	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a*\Delta V_{IN}}$	Line Regulation	4.1V	I_{OUT}=10mA , -40℃≤Ta≤85℃	-	±100	-	ppm/℃

Note：(1) 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 VIN = VOUT+2V with a fixed load.

HT7123, +2.3V Output Type

Ta=25℃

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
		V_{IN}	Conditions				
V_{IN}	Input Voltage	-	-	3.0	-	30	V
V_{OUT}	Output Voltage	4.3V	I_{OUT}=10mA	2.254	2.300	2.346	V
I_{OUT}	Output Current	4.3V	-	-	30	-	mA
ΔV_{OUT}	Load Regulation	4.3V	1mA≤I_{OUT}≤20mA	-	15	45	mV/mA
V_{DIF}	Dropout Voltage(1)	-	I_{OUT}=1mA , ΔV_{OUT}=2%	-	35	100	mV
I_{SS}	Quiescent Current	4.3V	No load	-	1.0	1.5	uA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}*\Delta V_{IN}}$	Line Regulation	-	I_{OUT}=1mA , 3.3V≤V_{IN}≤30V	-	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a*\Delta V_{IN}}$	Line Regulation	4.3V	I_{OUT}=10mA , -40℃≤Ta≤85℃	-	±100	-	ppm/℃

Note：(1) 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 VIN = VOUT+2V with a fixed load.

HT7125, +2.5V Output Type

Ta=25℃

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
		V_{IN}	Conditions				
V_{IN}	Input Voltage	-	-	3.0	-	30	V
V_{OUT}	Output Voltage	4.5V	I_{OUT}=10mA	2.450	2.500	2.550	V
I_{OUT}	Output Current	4.5V	-	-	30	-	mA
ΔV_{OUT}	Load Regulation	4.5V	1mA≤I_{OUT}≤20mA	-	15	45	mV/mA
V_{DIF}	Dropout Voltage(1)	-	I_{OUT}=1mA , ΔV_{OUT}=2%	-	35	100	mV
I_{SS}	Quiescent Current	4.5V	No load	-	1.0	1.5	uA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}*\Delta V_{IN}}$	Line Regulation	-	I_{OUT}=1mA , 3.5V≤V_{IN}≤30V	-	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a*\Delta V_{IN}}$	Line Regulation	4.5V	I_{OUT}=10mA , -40℃≤Ta≤85℃	-	±100	-	ppm/℃

Note：(1) 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 VIN = VOUT+2V with a fixed load.

HT7127, +2.7V Output Type

Ta=25℃

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
		V_{IN}	Conditions				
V_{IN}	Input Voltage	-	-	3.0	-	30	V
V_{OUT}	Output Voltage	4.7V	I_{OUT}=10mA	2.646	2.700	2.754	V
I_{OUT}	Output Current	4.7V	-	-	30	-	mA
ΔV_{OUT}	Load Regulation	4.7V	1mA≤I_{OUT}≤20mA	-	15	45	mV/mA
V_{DIF}	Dropout Voltage(1)	-	I_{OUT}=1mA , ΔV_{OUT}=2%	-	35	100	mV
I_{SS}	Quiescent Current	4.7V	No load	-	1.0	1.5	uA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}*\Delta V_{IN}}$	Line Regulation	-	I_{OUT}=1mA , 3.7V≤V_{IN}≤30V	-	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a*\Delta V_{IN}}$	Line Regulation	4.7V	I_{OUT}=10mA , -40℃≤Ta≤85℃	-	±100	-	ppm/℃

Note：(1) 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 VIN = VOUT+2V with a fixed load.

HT7130, +3.0V Output Type

Ta=25℃

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
		V_{IN}	Conditions				
V_{IN}	Input Voltage	-	-	3.0	-	30	V
V_{OUT}	Output Voltage	5V	I_{OUT}=10mA	2.940	3.000	3.060	V
I_{OUT}	Output Current	5V	-	-	30	-	mA
ΔV_{OUT}	Load Regulation	5V	1mA≤I_{OUT}≤20mA	-	15	45	mV/mA
V_{DIF}	Dropout Voltage(1)	-	I_{OUT}=1mA , ΔV_{OUT}=2%	-	35	100	mV
I_{SS}	Quiescent Current	5V	No load	-	1.0	1.5	uA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}*\Delta V_{IN}}$	Line Regulation	-	I_{OUT}=1mA , 4V≤V_{IN}≤30V	-	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a*\Delta V_{IN}}$	Line Regulation	5V	I_{OUT}=10mA , -40℃≤Ta≤85℃	-	±100	-	ppm/℃

Note：(1) 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 VIN = VOUT+2V with a fixed load.

HT7133, +3.3V Output Type

Ta=25℃

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
		V_{IN}	Conditions				
V_{IN}	Input Voltage	-	-	3.0	-	30	V
V_{OUT}	Output Voltage	5.3V	I_{OUT}=10mA	3.234	3.300	3.366	V
I_{OUT}	Output Current	5.3V	-	-	30	-	mA
ΔV_{OUT}	Load Regulation	5.3V	1mA≤I_{OUT}≤30mA	-	15	45	mV/mA
V_{DIF}	Dropout Voltage(1)	-	I_{OUT}=1mA , ΔV_{OUT}=2%	-	35	55	mV
I_{SS}	Quiescent Current	5.3V	No load	-	1.0	1.5	uA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}*\Delta V_{IN}}$	Line Regulation	-	I_{OUT}=1mA , 4.3V≤V_{IN}≤30V	-	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a*\Delta V_{IN}}$	Line Regulation	5.3V	I_{OUT}=10mA , -40℃≤Ta≤85℃	-	±100	-	ppm/℃

Note：(1) 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 VIN = VOUT+2V with a fixed load.

HT7136, +3.6V Output Type

Ta=25℃

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
		V_{IN}	Conditions				
V_{IN}	Input Voltage	-	-	3.0	-	30	V
V_{OUT}	Output Voltage	5.6V	I_{OUT}=10mA	3.528	3.600	3.672	V
I_{OUT}	Output Current	5.6V	-	-	30	-	mA
ΔV_{OUT}	Load Regulation	5.6V	1mA≤I_{OUT}≤30mA	-	15	45	mV/mA
V_{DIF}	Dropout Voltage(1)	-	I_{OUT}=1mA , ΔV_{OUT}=2%	-	35	55	mV
I_{SS}	Quiescent Current	5.6V	No load	-	1.0	1.5	uA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}*\Delta V_{IN}}$	Line Regulation	-	I_{OUT}=1mA , 4.6V≤V_{IN}≤30V	-	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a*\Delta V_{IN}}$	Line Regulation	5.6V	I_{OUT}=10mA , -40℃≤Ta≤85℃	-	±100	-	ppm/℃

Note：(1) 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 VIN = VOUT+2V with a fixed load.

HT7140, +4.0V Output Type

Ta=25℃

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
		V_{IN}	Conditions				
V_{IN}	Input Voltage	-	-	3.0	-	30	V
V_{OUT}	Output Voltage	6V	I_{OUT}=10mA	3.920	4.000	4.080	V
I_{OUT}	Output Current	6V	-	-	30	-	mA
ΔV_{OUT}	Load Regulation	6V	1mA≤I_{OUT}≤30mA	-	15	45	mV/mA
V_{DIF}	Dropout Voltage(1)	-	I_{OUT}=1mA , ΔV_{OUT}=2%	-	35	55	mV
I_{SS}	Quiescent Current	6V	No load	-	1.0	1.5	uA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}*\Delta V_{IN}}$	Line Regulation	-	I_{OUT}=1mA , 5V≤V_{IN}≤30V	-	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a*\Delta V_{IN}}$	Line Regulation	6V	I_{OUT}=10mA , -40℃≤Ta≤85℃	-	±100	-	ppm/℃

Note：(1) 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 VIN = VOUT+2V with a fixed load.

HT7144, +4.4V Output Type

Ta=25℃

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
		V_{IN}	Conditions				
V_{IN}	Input Voltage	-	-	3.0	-	30	V
V_{OUT}	Output Voltage	6.4V	I_{OUT}=10mA	4.312	4.400	4.488	V
I_{OUT}	Output Current	6.4V	-	-	30	-	mA
ΔV_{OUT}	Load Regulation	6.4V	1mA≤I_{OUT}≤30mA	-	15	45	mV/mA
V_{DIF}	Dropout Voltage(1)	-	I_{OUT}=1mA , ΔV_{OUT}=2%	-	35	55	mV
I_{SS}	Quiescent Current	6.4V	No load	-	1.0	1.5	uA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}*\Delta V_{IN}}$	Line Regulation	-	I_{OUT}=1mA , 5.4V≤V_{IN}≤30V	-	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a*\Delta V_{IN}}$	Line Regulation	6.4V	I_{OUT}=10mA , -40℃≤Ta≤85℃	-	±100	-	ppm/℃

Note：(1) 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 VIN = VOUT+2V with a fixed load.

HT7150, +5.0V Output Type

Ta=25℃

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
		V_{IN}	Conditions				
V_{IN}	Input Voltage	-	-	3.0	-	30	V
V_{OUT}	Output Voltage	7V	I_{OUT}=10mA	4.900	5.000	5.100	V
I_{OUT}	Output Current	7V	-	-	30	-	mA
ΔV_{OUT}	Load Regulation	7V	1mA≤I_{OUT}≤30mA	-	15	45	mV/mA
V_{DIF}	Dropout Voltage(1)	-	I_{OUT}=1mA , ΔV_{OUT}=2%	-	35	55	mV
I_{SS}	Quiescent Current	7V	No load	-	1.0	1.5	uA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}*\Delta V_{IN}}$	Line Regulation	-	I_{OUT}=1mA , 6V≤V_{IN}≤30V	-	0.1	0.2	%/V
$\frac{\Delta V_{OUT}}{\Delta T_a*\Delta V_{IN}}$	Line Regulation	7V	I_{OUT}=10mA , -40℃≤Ta≤85℃	-	±100	-	ppm/℃

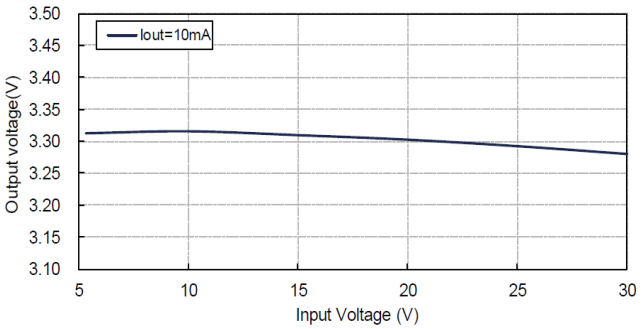
Note：(1) Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at VIN = VOUT+2V with a fixed load.

Typical Performance Characteristic

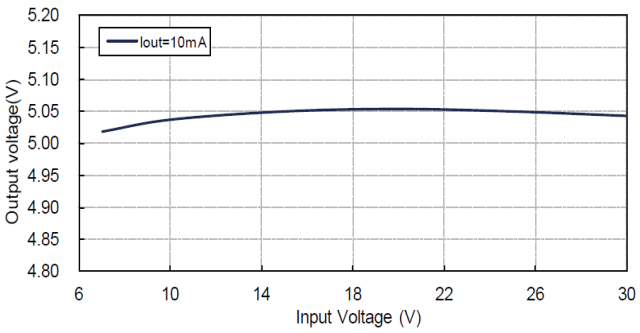
Test Condition: $V_{IN}=V_{OUT}+2V$, $I_{OUT}=10mA$, $T_J=25℃$, unless otherwise noted

Output Voltage vs Input Voltage

HT7133

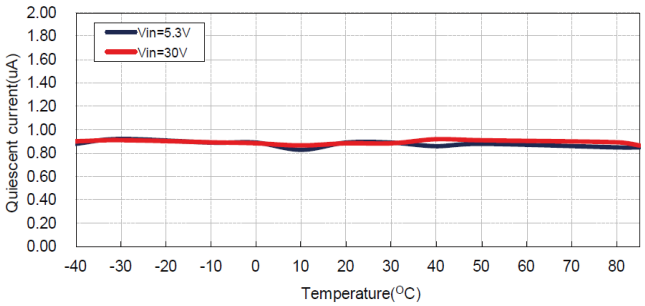


HT7150

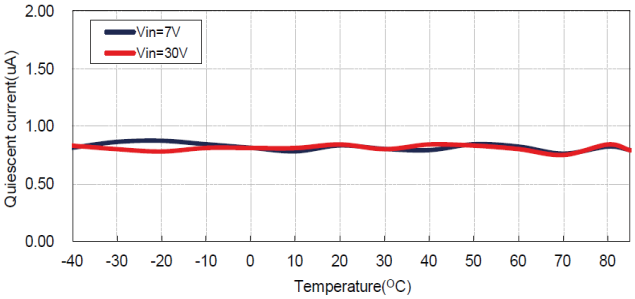


Quiescent Current (I_{OUT}=0mA) vs Temperature

HT7133

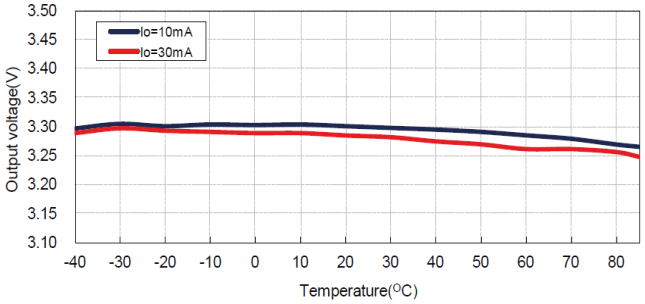


HT7150

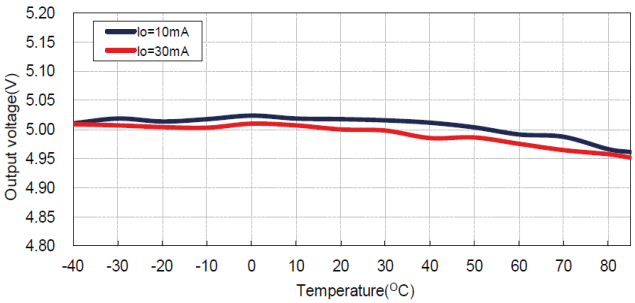


Output Voltage vs Temperature ($V_{IN}=V_{OUT}+2V$)

HT7133

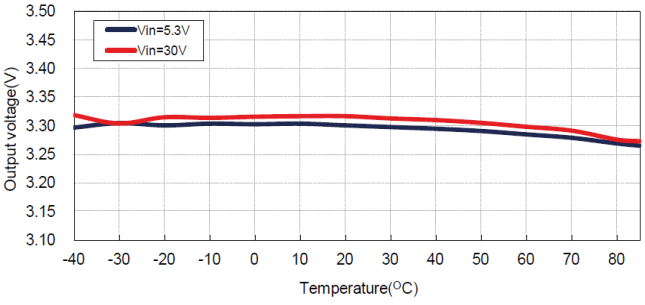


HT7150

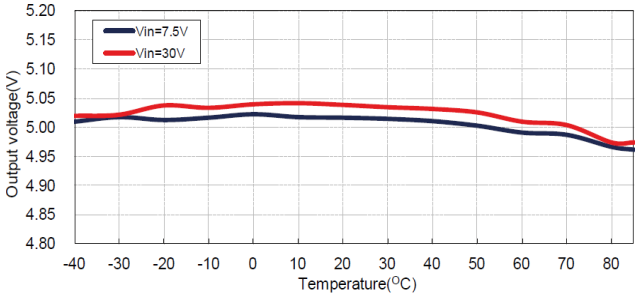


Output Voltage vs Temperature

HT7133

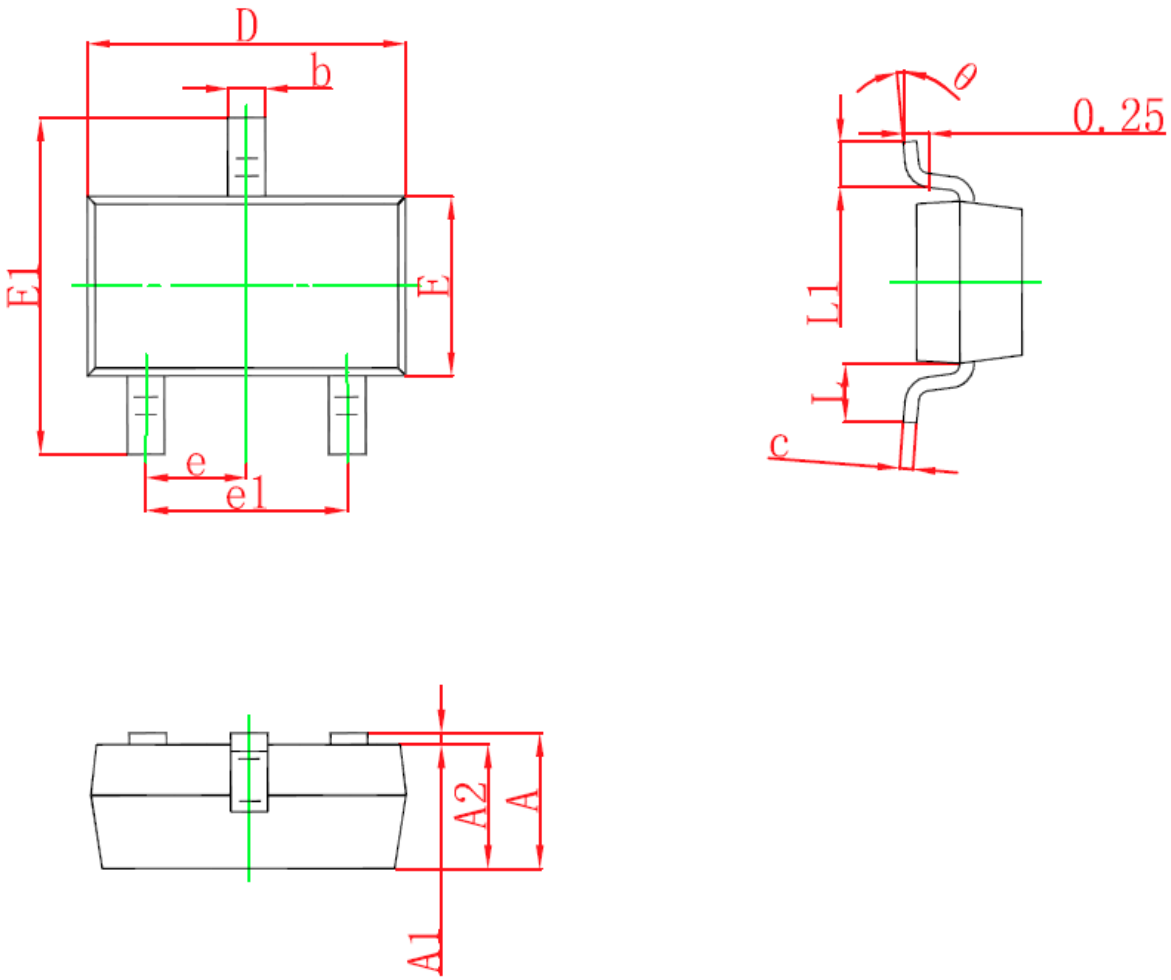


HT7150



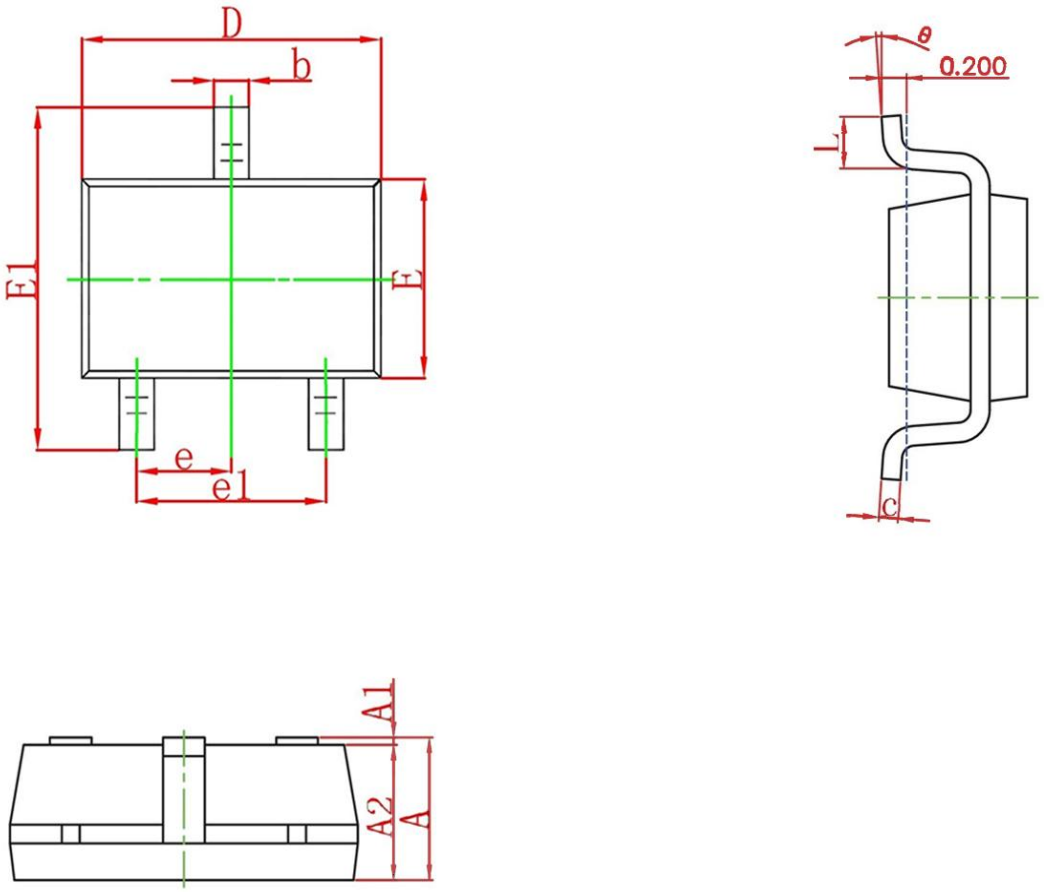
Package Outline Dimensions

SOT-23



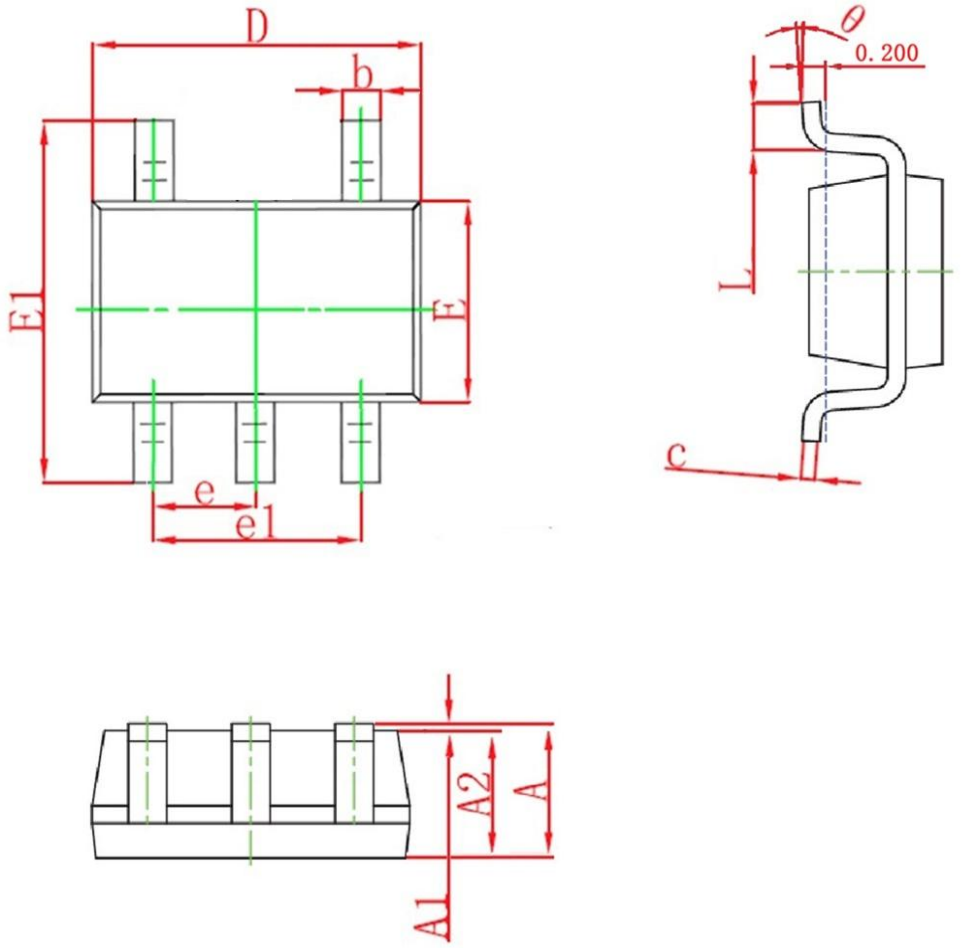
Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E1	2.250	2.550	0.088	0.100
E	1.200	1.400	0.047	0.055
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23-3L



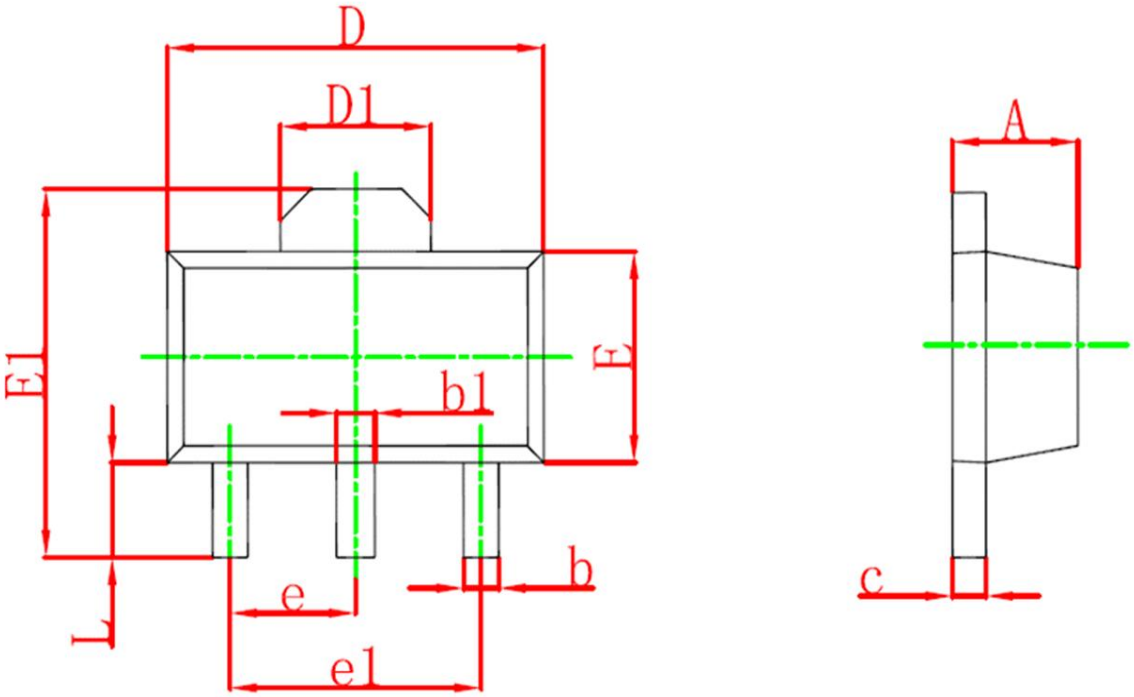
Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.042	0.050
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.042	0.046
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.112	0.120
E	1.500	1.700	0.060	0.068
E1	2.650	2.950	0.106	0.118
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

SOT-23-5L



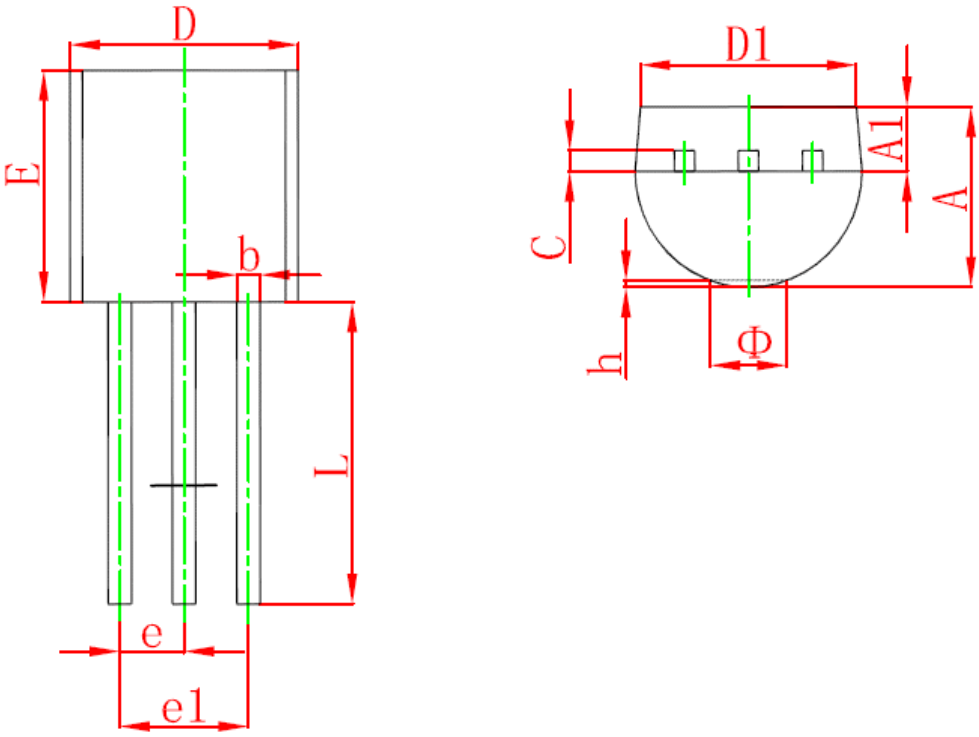
Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

SOT-89



Symbol	Dimensions in Millimeters(mm)		Dimensions in Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060 TYP	
e1	3.000 TYP		0.118 TYP	
L	0.900	1.200	0.035	0.047

TO-92



Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	3.480	3.560	0.137	0.140
A1	1.100	1.400	0.043	0.055
b	0.390	0.500	0.015	0.020
c	0.360	0.400	0.014	0.016
D	4.400	4.800	0.173	0.189
D1	3.430		0.135	
E	4.500	4.700	0.177	0.185
e	1.250TYP		0.049TYP	
e1	2.440	2.640	0.096	0.104
L	13.000	15.000	0.512	0.590
Φ		1.600		0.063
h	0.000	0.380	0.000	0.015