HT73XXS

250mA Low Power LDO

Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- Ultra low quiescent current: 2μA(typ.)
- High input voltage (up to 15V)
- Maximum output current: 250mA
- Output voltage accuracy: tolerance ±2%
- SOT89 ,SOT23-3 and SOT23 package

Applications

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

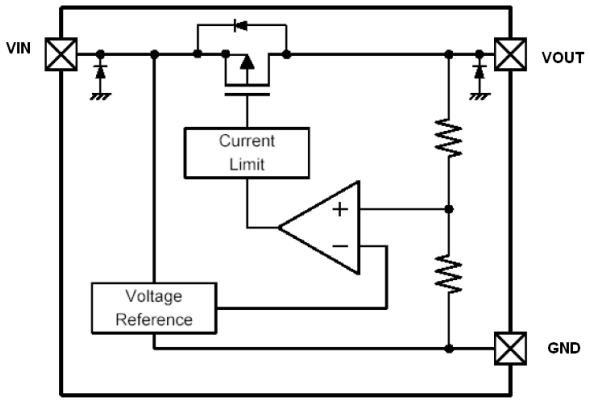
General Description

The HT73XXS series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 15V. The series features extremely low quiescent current which is typically 2μA. They are available with several fixed output voltages ranging from 1.5V 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.

Selection Table

Part No.	Output Voltage	Package
HT7315S	1.5V	SOT89 SOT23-3 SOT23
HT7318S	1.8V	
HT7325S	2.5V	
HT7328S	2.8V	
HT7330S	3.0V	
HT7333S	3.3V	
HT7336S	3.6V	
HT7340S	4.0V	
HT7344S	4.4V	
HT7350S	5.0V	

Block Diagram



*Diodes inside the circuit are an ESD protection diode and a parasitic diode.

Pin Assignment

SOT23 and SOT23-3 (Top View)

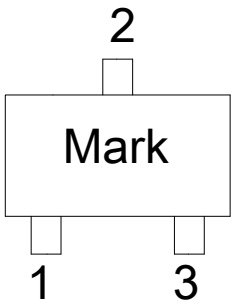


Table1: HT73XXS series (SOT23/SOT23-3)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VIN	Input voltage pin
3	VOUT	Output voltage pin

SOT89 (Top View)

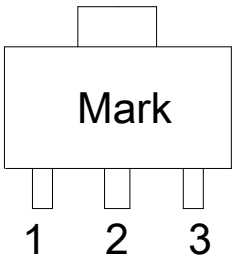


Table2: HT73XXS series (SOT89)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VIN	Input voltage pin
3	VOUT	Output voltage pin

Absolute Maximum Ratings

Supply Voltage .....-0.3V to 18V Storage Temperature .....-50℃ to 125℃

Operating Temperature .....-30℃ 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)	SOT23	500	℃/W
		SOT89	200	℃/W
P_D	Power Dissipation	SOT23	0.20	W
		SOT89	0.50	W

Note: P_D is measured at Ta= 25℃

Electrical Characteristics

HT7315S ，+1.5V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	3.5V	I_{OUT}=40mA	1.47	1.50	1.53	V
I_{OUT}	Output Current	5.5V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	3.5V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	650	750	mV
I_{SS}	Current Consumption	3.5V	No load	-	2.0	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	2.5V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	3.5V	I_{OUT}=40mA -40℃<Ta<85℃	-	±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}+1V with a fixed load.

HT7318S ，+1.8V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	3.8V	I_{OUT}=10mA	1.764	1.800	1.836	V
I_{OUT}	Output Current	5.8V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	3.8V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	620	720	mV
I_{SS}	Current Consumption	3.8V	No load	-	2.0	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	2.8V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	3.8V	I_{OUT}=10mA -40℃<Ta<85℃	-	±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}+1V with a fixed load.

HT7325S ，+2.5V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.5V	I_{OUT}=40mA	2.45	2.500	2.55	V
I_{OUT}	Output Current	6.0V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	4.5V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	550	650	mV
I_{SS}	Current Consumption	4.5V	No load	-	2.0	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.5V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	4.5V	I_{OUT}=40mA -40℃<Ta<85℃	-	±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}+1V with a fixed load.

HT7328S ，+2.8V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.8V	I_{OUT}=10mA	2.744	2.800	2.856	V
I_{OUT}	Output Current	6.1V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	4.8V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	520	620	mV
I_{SS}	Current Consumption	4.8V	No load	-	2.0	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.8V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	4.8V	I_{OUT}=10mA -40℃<Ta<85℃	-	±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}+1V with a fixed load.

HT7330S , +3.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5V	I_{OUT}=40mA	2.94	3.00	3.06	V
I_{OUT}	Output Current	6.2V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	5V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	480	580	mV
I_{SS}	Current Consumption	5V	No load	-	2.0	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	5V	I_{OUT}=40mA -40℃<Ta<85℃	-	±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}+1V with a fixed load.

HT7333S，+3.3V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5.3V	I_{OUT}=40mA	3.234	3.300	3.366	V
I_{OUT}	Output Current	6.8V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	5.3V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	440	540	mV
I_{SS}	Current Consumption	5.3V	No load	-	2.0	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4.3V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	5.3V	I_{OUT}=40mA -40℃<Ta<85℃	-	±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}+1V with a fixed load.

HT7336S，+3.6V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	5.6V	I_{OUT}=40mA	3.528	3.600	3.672	V
I_{OUT}	Output Current	7.0V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	5.6V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	400	500	mV
I_{SS}	Current Consumption	5.6V	No load	-	2.0	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4.6V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	5.6V	I_{OUT}=40mA -40℃<Ta<85℃	-	±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}+1V with a fixed load.

HT7344S , +4.4V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	6.4V	I_{OUT}=40mA	4.312	4.400	4.488	V
I_{OUT}	Output Current	7.4V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	6.4V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	280	380	mV
I_{SS}	Current Consumption	6.4V	No load	-	2.0	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	5.4V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	6.4V	I_{OUT}=40mA -40℃<Ta<85℃	-	±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}+1V with a fixed load.

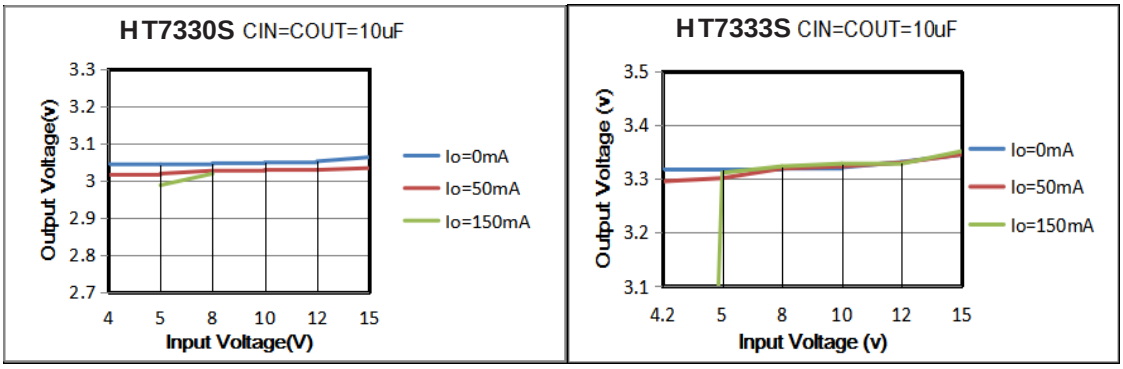
HT7350S , +5.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	7V	I_{OUT}=40mA	4.9	5.00	5.1	V
I_{OUT}	Output Current	8V	-	-	250	-	mA
ΔV_{OUT}	Load Regulation	7V	1mA≤I_{OUT}≤60mA	-	45	90	mV
V_{DIF}	Voltage Drop(Note)	-	I_{OUT}=40mA, ΔV_{OUT}=2%	-	200	300	mV
I_{SS}	Current Consumption	7V	No load	-	2.0	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	6V≤V_{IN}≤12V I_{OUT}=40mA	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta Ta}$	Temperature Coefficient	7V	I_{OUT}=40mA -40℃<Ta<85℃	-	±0.5	-	mV/℃

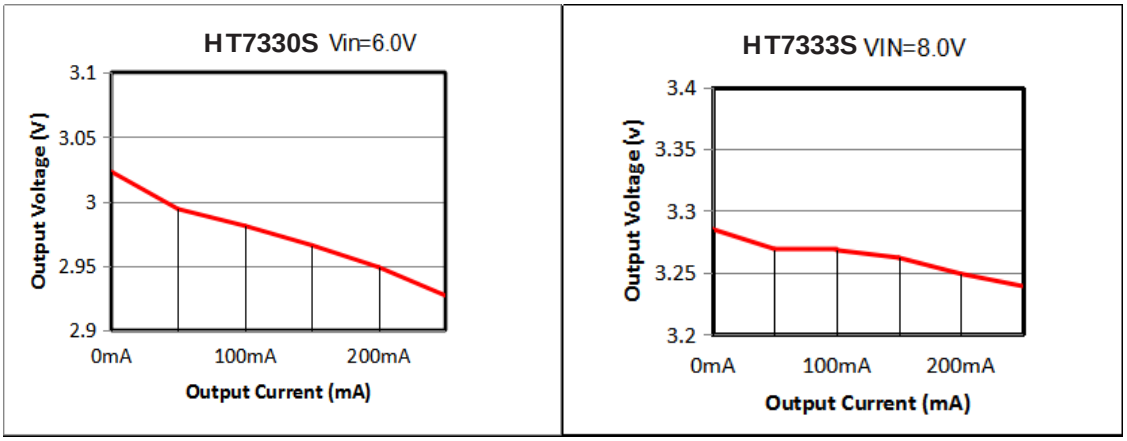
Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+1V with a fixed load.

Typical Performance Characteristics

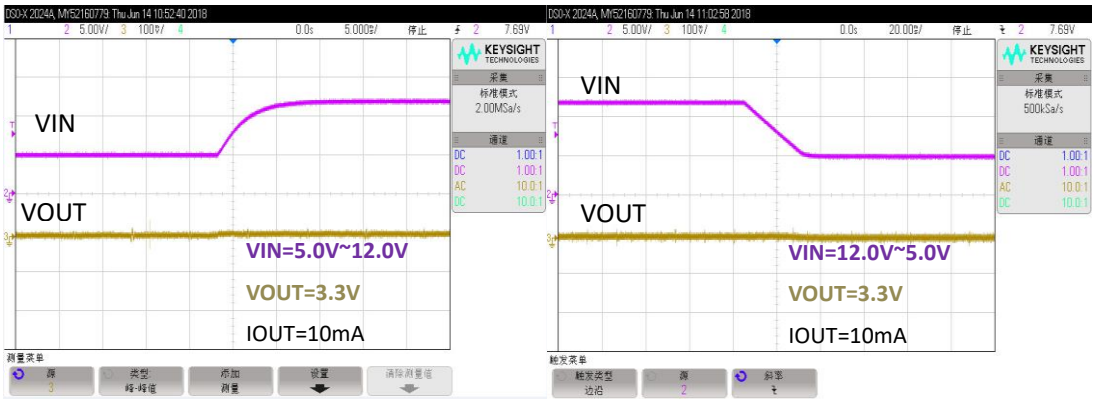
(1) Output Voltage vs Input voltage



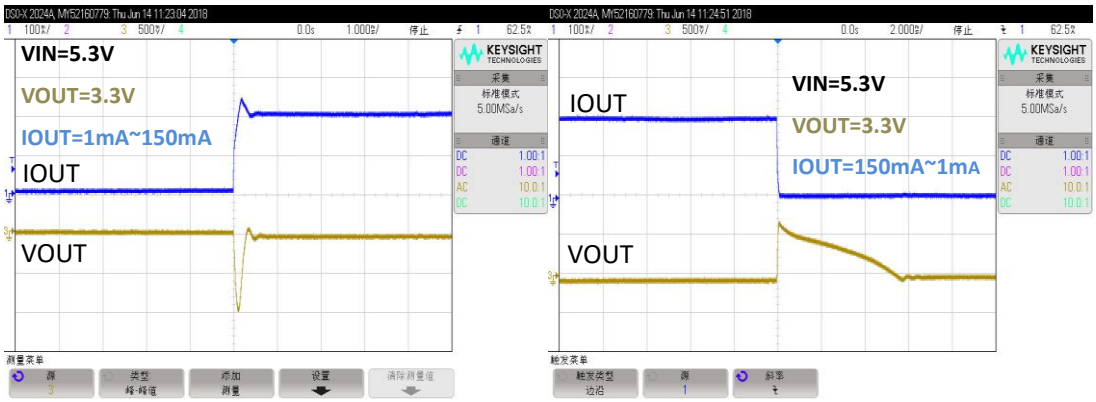
(2) Output Voltage vs.Output Current



(3) Input Transient Response



(4) Load Transient Response



(5) MAX Output Current Vs. Input Voltage

HT7330S

Input Voltage	Max Output Current
6V	250mA
9V	200mA
12V	150mA
15V	100mA

HT7333S

Input Voltage	Max Output Current
6.3V	250mA
9V	200mA
12V	150mA
15V	100mA

HT7350S

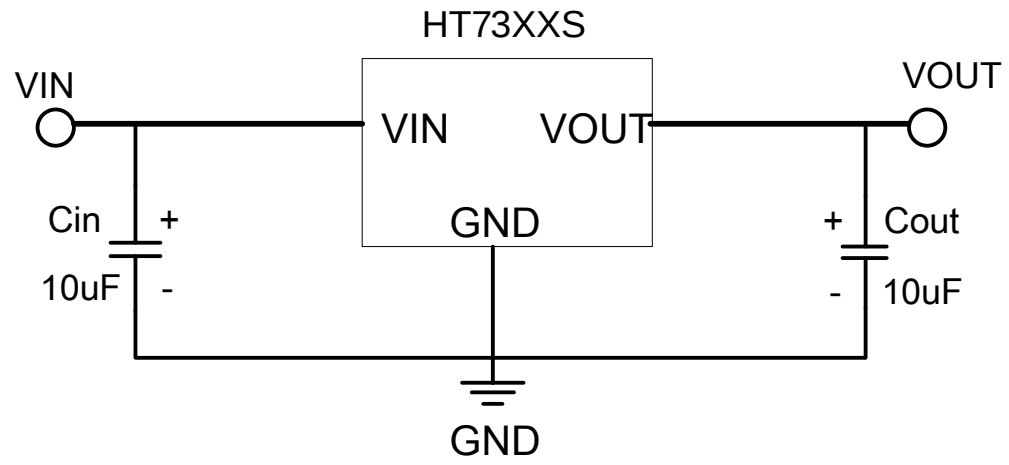
Input Voltage	Max Output Current
8V	250mA
9V	200mA
12V	150mA
15V	100mA

Note: 1. The Max Output Current is the typical value;

2. In order to ensure that the best parameters can be achieved, the PCB is preferably provided with a large copper foil area to increase heat dissipation.

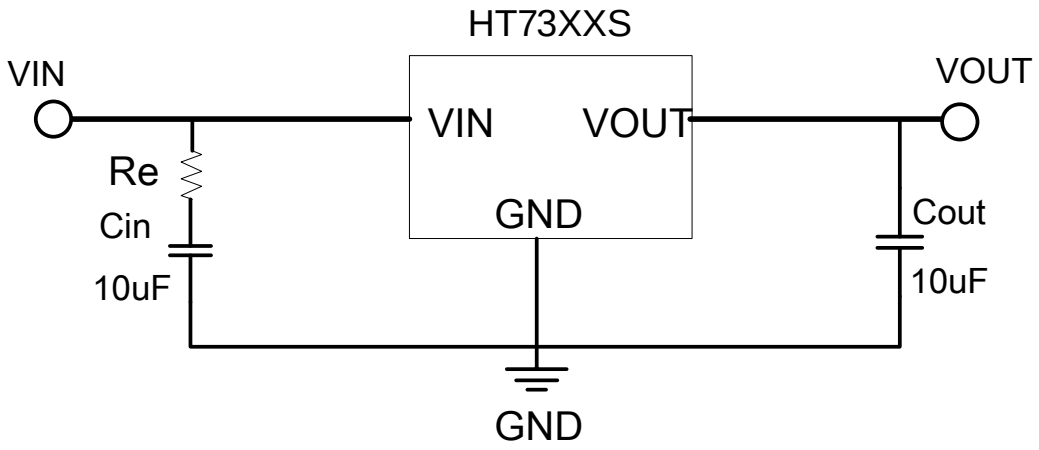
Application Circuits

Basic Circuits



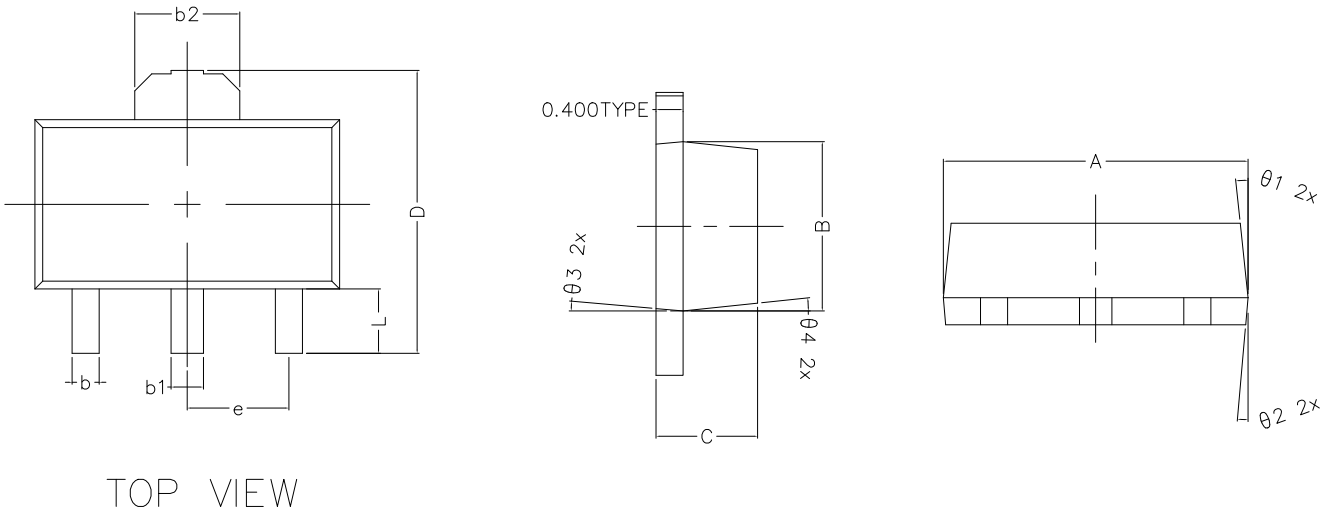
Note1: Cin=Cout=10uF. (10uF Electrolytic capacitor is recommended).

Note2: If the input and output capacitors are ceramic, add a resistor at the input, as follows.



Note: Re= (1.2~1.8) Ω .

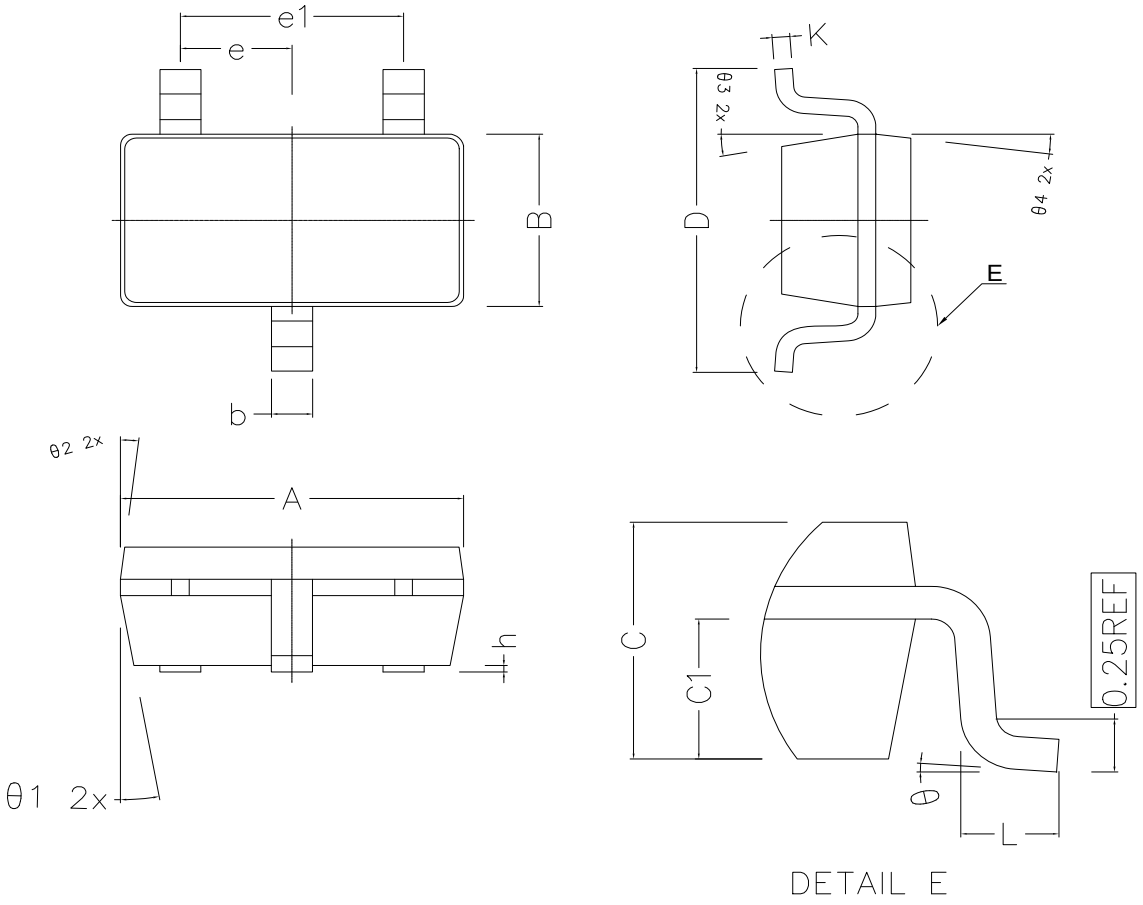
SOT-89 Package Outline Dimensions (Units: mm)



TOP VIEW

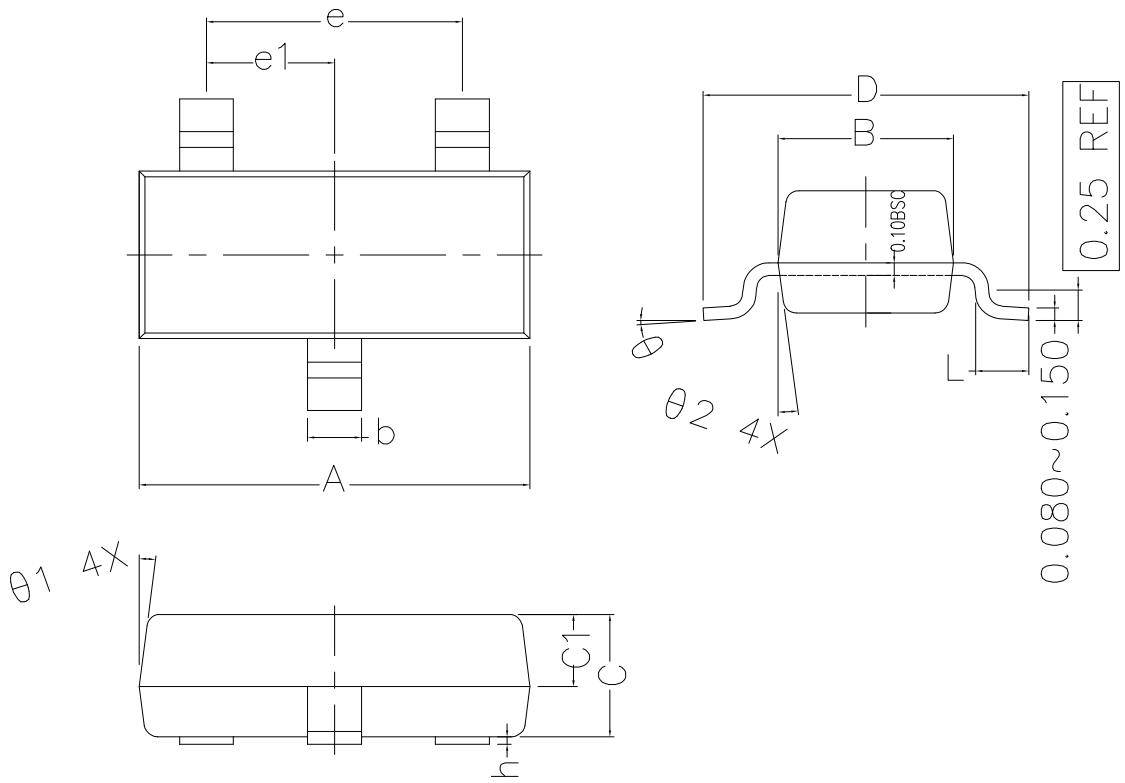
COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	4.450	4.550	4.650
B	2.450	2.550	2.650
C	1.400	1.500	1.600
D	4.100	4.200	4.300
L	0.850	0.950	1.050
b	0.350	0.400	0.450
b1	0.430	0.480	0.530
b2	1.500	1.550	1.600
e	1.500TYPE		
θ_1	6° TYPE		
θ_2	5° TYPE		
θ_3	5° TYPE		
θ_4	6° TYPE		

SOT-23-3L **Package Outline Dimensions (Units: mm)**



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	2.820	2.920	3.020
B	1.500	1.600	1.700
C	1.050	1.100	1.150
C1	0.600	0.650	0.700
D	2.650	2.800	2.950
L	0.300	0.450	0.600
b	0.280	0.350	0.420
h	0.020	0.050	0.100
K	0.120	—	0.230
e	0.950TYPE		
e1	1.900TYPE		
θ_1	10° TYPE		
θ_2	7° TYPE		
θ_3	10° TYPE		
θ_4	7° TYPE		
θ	0° ~ 8°		

SOT-23 Package Outline Dimensions (Units: mm)



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A	2.800	2.900	3.000
B	1.200	1.300	1.400
C	0.900	1.000	1.100
C1	0.500	0.550	0.600
D	2.250	2.400	2.550
L	0.300	0.400	0.500
h	0.010	0.050	0.100
b	0.300	0.400	0.500
e	1.90 TYPE		
e1	0.95 TYPE		
θ_1	7° TYPE		
θ_2	7° TYPE		
θ	0° ~ 7°		