HT71XX-1 LOW DROPOUT LINEAR REGULATOR

GENERAL DESCRIPTION

HT71XX-1 series are a set of Low Dropout LinearRegulator ICs implemented inCMOS technology.They can withstand voltage 30V. And they areavailable with lowvoltage drop and low quiescentcurrent, widely used in audio, videoandcommunication appliances.

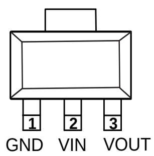
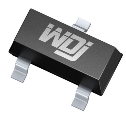
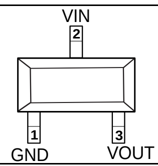
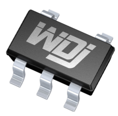
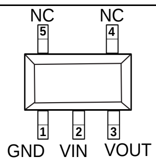
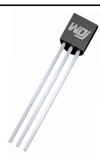
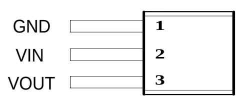
FEATURES

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 30V
- Quiescent Current 1.5μA
- Output Voltage Accuracy: tolerance ±2%
- High output current: 50mA

TYPICAL APPLICATIONS

- Battery-powered Equipments
- Communication Equipments
- Audio/Video Equipments

PIN CONFIGURATION

SOT89		SOT23-3	
			
SOT23-5		**TO-92**	
			

OUTPUT

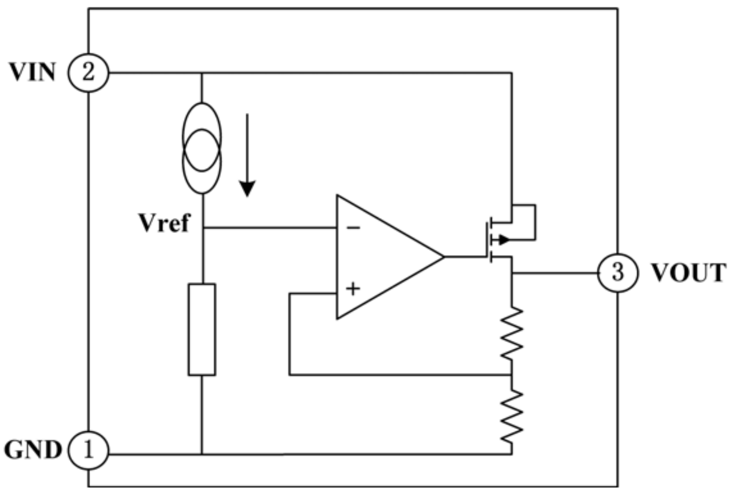
Series	Output	Package
HT7128-1	2.8V	SOT89 TO92 SOT23-5 SOT23-3
HT7130-1	3.0V	
HT7133-1	3.3V	
HT7136-1	3.6V	
HT7140-1	4.0V	
HT7144-1	4.4V	
HT7150-1	5.0V	
HT7190-1	9.0V	

NOTE： “XX” is output voltage.

PIN DESCRIPTION

No.	Name	Functions Description
1	GND	ground
2	V_{IN}	input
3	V_{OUT}	output

FUNCTIONAL BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

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

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	θ_{JA}	SOT89	200	℃/W
		TO92	200	℃/W
		SOT23-5 SOT23-3	500	℃/W
Power dissipation	P_W	SOT89	500	mW
		TO92	500	mW
		SOT23-5 SOT23-3	200	mW

DC CHARACTERISTICS (unless otherwise noted T_A =＋25°C)

Series HT7128-1

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	2.744	2.80	2.856	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	50	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 50mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$, $\triangle V_{OUT}=2\%$	—	30	100	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	μA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 30V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40°C \le T_A \le 85°C$	—	100	—	ppm/°C

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

Series HT7130-1

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	2.94	3.00	3.06	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	50	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA\leqslant I_{OUT}\leqslant 50mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$, $\triangle V_{OUT}=2\%$	—	30	100	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	µA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V\leqslant V_{IN}\leqslant 30V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃\leqslant T_A\leqslant 85℃$	—	100	—	ppm/℃

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

Series HT7133-1

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	3.234	3.30	3.366	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	50	—	mA
Load Regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA\leqslant I_{OUT}\leqslant 50mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$, $\triangle V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	µA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V\leqslant V_{IN}\leqslant 30V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃\leqslant T_A\leqslant 85℃$	—	100	—	ppm/℃

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

Series HT7136-1

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	3.528	3.60	3.672	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	50	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA\leqslant I_{OUT}\leqslant 50mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$， $\triangle V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	µA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V\leqslant V_{IN}\leqslant 30V$， $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$， $I_{OUT}=10mA$， $-40℃\leqslant T_A\leqslant 85℃$	—	100	—	ppm/℃

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

Series HT7140-1

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$， $I_{OUT}=10mA$	3.92	4.0	4.08	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	50	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA\leqslant I_{OUT}\leqslant 50mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$， $\triangle V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	µA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V\leqslant V_{IN}\leqslant 30V$， $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$， $I_{OUT}=10mA$， $-40℃\leqslant T_A\leqslant 85℃$	—	100	—	ppm/℃

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

Series HT7144-1

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	4.312	4.4	4.488	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	50	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA\leqslant I_{OUT}\leqslant 50mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$， $\triangle V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	μA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V\leqslant V_{IN}\leqslant 30V$， $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/ \triangle T_A*V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$， $I_{OUT}=10mA$， $-40℃\leqslant T_A\leqslant 85℃$	—	100	—	ppm/℃

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

Series HT7150-1

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}	$V_{IN}=V_{OUT}+2.0V$	—	50	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA\leqslant I_{OUT}\leqslant 70mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$， $\triangle V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	μA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0 V\leqslant V_{IN}\leqslant 30V$， $I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/ \triangle T_A*V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$， $I_{OUT}=10mA$， $-40℃\leqslant T_A\leqslant 85℃$	—	100	—	ppm/℃

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

Series HT7190-1

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$ ，$I_{OUT}=10mA$	8.82	9.0	9.18	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	50	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA\leqslant I_{OUT}\leqslant 70mA$	—	25	60	mV
Voltage Drop	V_{DIF}	$I_{OUT}=1mA$，$\triangle V_{OUT}=2\%$	—	25	55	mV
Quiescent Current	I_{SS}	No Load	—	1.5	3.0	μA
Line Regulation	$\triangle V_{OUT}/ V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0\ V\leqslant V_{IN}\leqslant 30V$，$I_{OUT}=1mA$	—	—	0.2	%/V
Input Voltage	V_{IN}	—	—	—	30	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$，$I_{OUT}=10mA$，$-40℃\leqslant T_A\leqslant 85℃$	—	100	—	ppm/℃

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

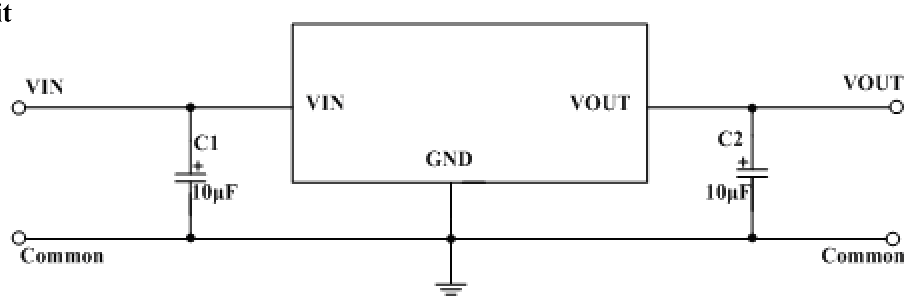
FUNCTIONAL DESCRIPTION

HT71XX-1 series are linear voltage regulator ICs withstanding 30V voltage. The series ICconsists of a voltage reference, an error amplifier, a current limiter and a phase compensationcircuit 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.

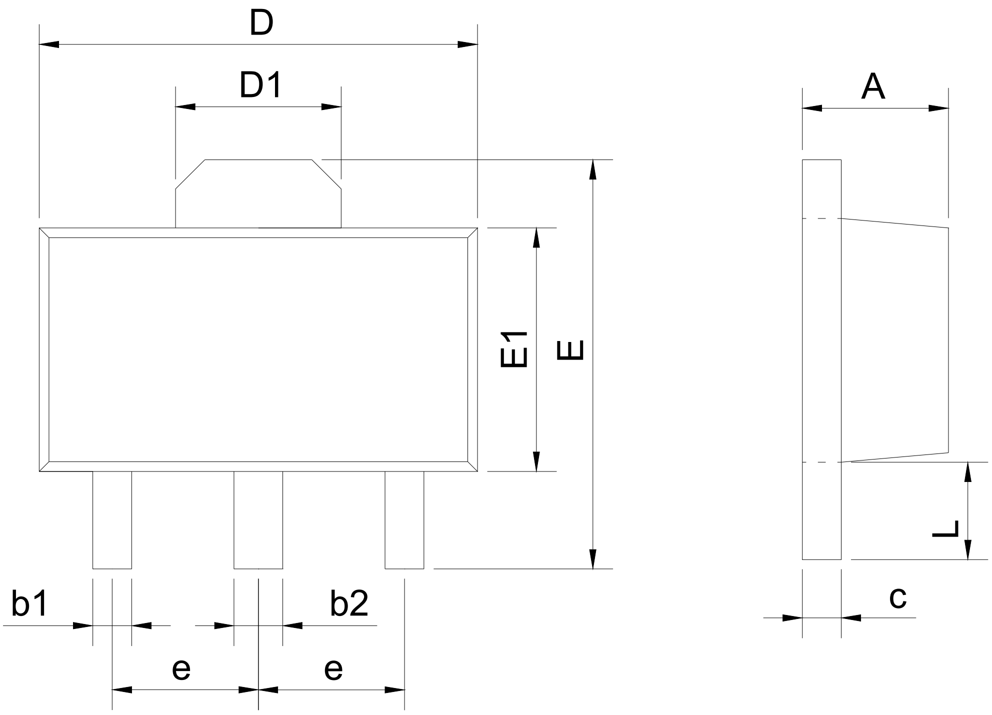
TYPICAL APPLICATION CIRCUIT

Basic Circuit



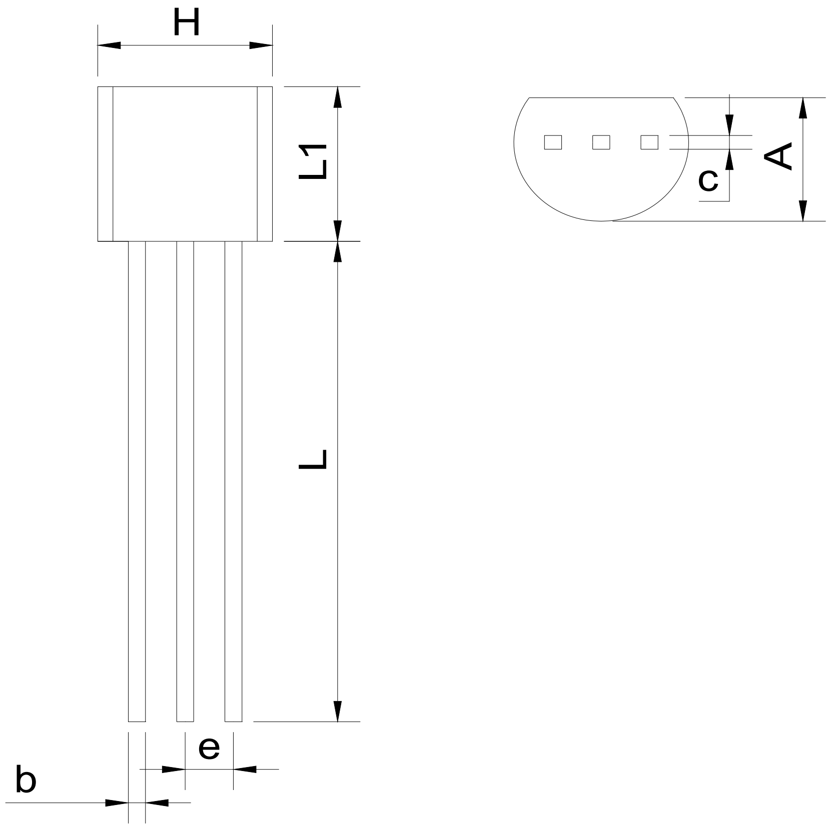
PACKAGE INFORMATION

SOT89



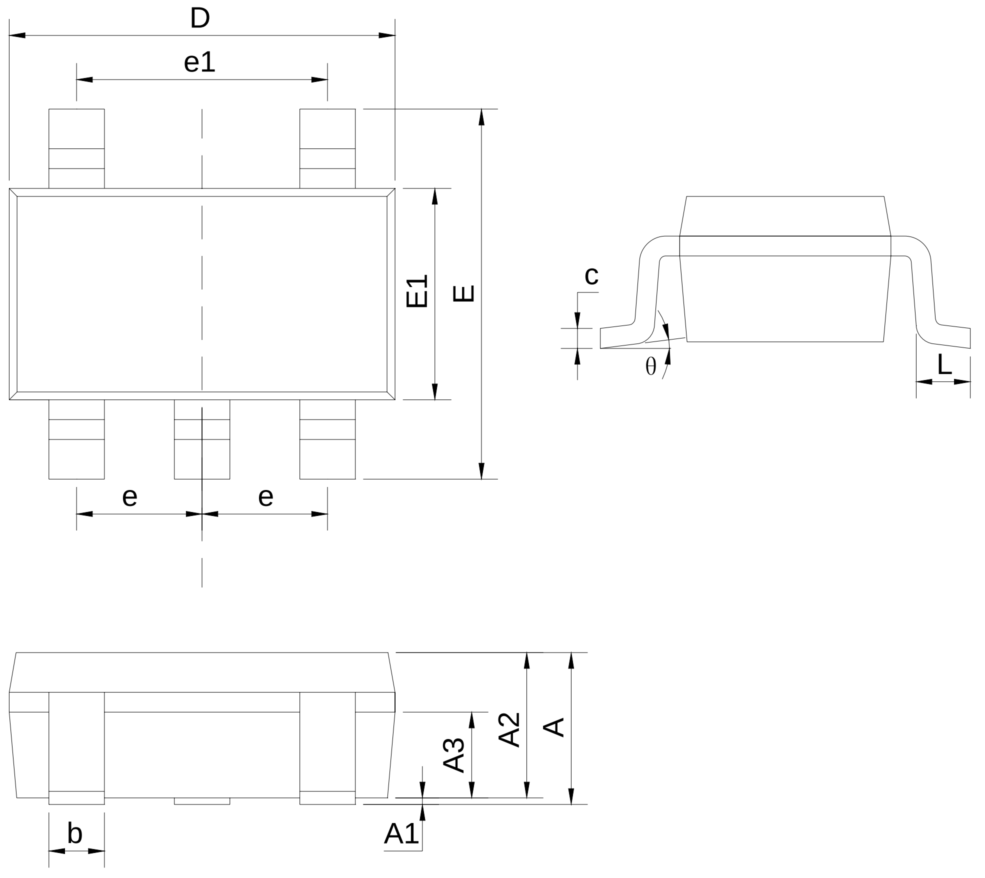
SYMBOL	mm	
	min	max
A	1.40	1.60
b1	0.35	0.50
b2	0.45	0.60
c	0.36	0.46
D	4.30	4.70
D1	1.40	1.80
E	4.00	4.40
E1	2.30	2.70
e	1.50BSC	
L	0.80	1.20

TO92



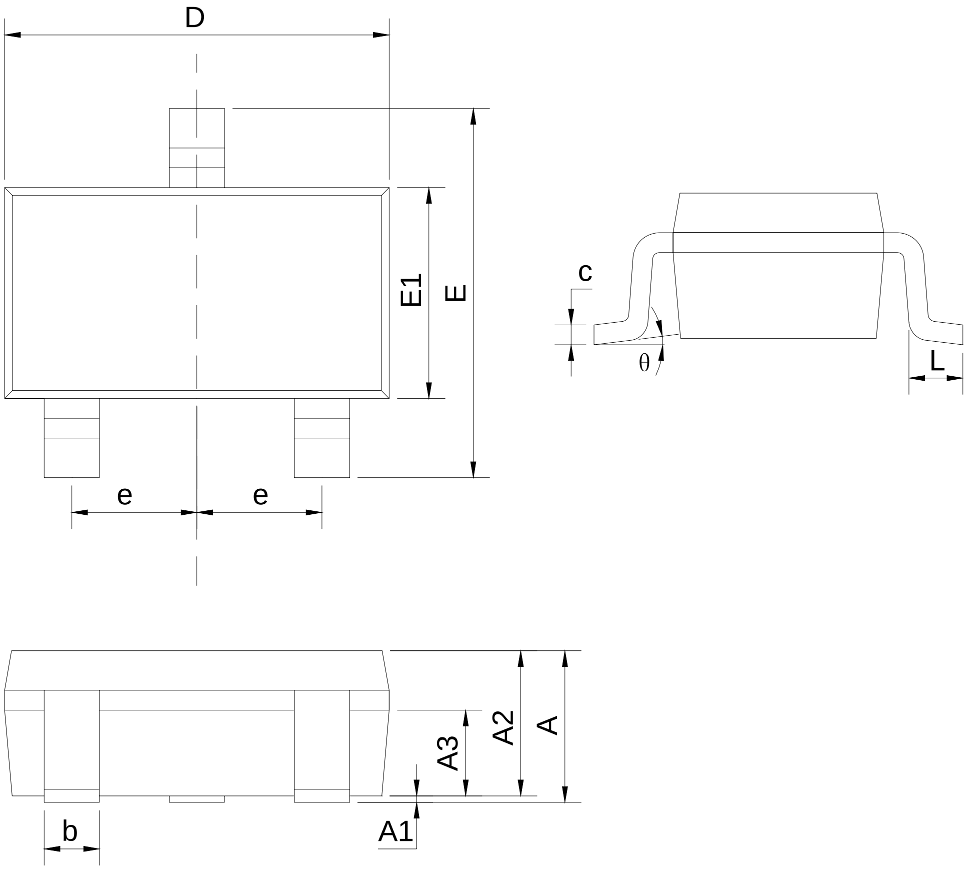
SYMBOL	mm	
	min	max
A	3.40	3.80
b	0.40	0.50
c	0.35	0.45
e	1.27BSC	
H	4.40	4.80
L	13.00	15.00
L1	4.30	4.70

SOT23-5



SYMBOL	mm	
	min	max
A		1.35
A1	0.04	0.15
A2	1.00	1.20
A3	0.55	0.75
b	0.38	0.48
c	0.10	0.25
D	2.72	3.12
E	2.60	3.00
E1	1.40	1.80
e	0.95BSC	
e1	1.90BSC	
L	0.30	0.60
θ	0	8°

SOT23-3



SYMBOL	mm	
	min	max
A		1.35
A1	0.04	0.15
A2	1.00	1.20
A3	0.55	0.75
b	0.38	0.48
c	0.10	0.25
D	2.72	3.12
E	2.60	3.00
E1	1.20	1.80
e	0.95BSC	
L	0.30	0.60
θ	0	8°