HT73xx

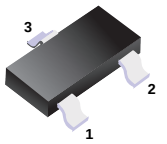
Low Dropout Regulators

Description

The HT73xx series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 20V. They are available with several fixed output voltages ranging from 2.1V to 9.0V. Because of the low power dissipation, HT73xx are widely used in a variety of equipment such as audio device, video device, communication device and so on.

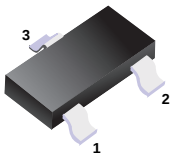
Features

Low power consumption
Low voltage drop
Low temperature coefficient
High input voltage (up to 20V)
Quiescent current : 1.5μA
Output voltage tolerance: ±2%
HAF(halogen and antimony free) is acquired



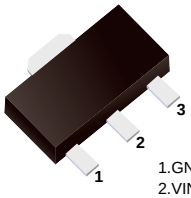
1.Gnd
2.Vout
3.Vin

■ **Simplified outline(SOT-23)**



1.Gnd
2.Vout
3.Vin

■ **Simplified outline(SOT23-3L)**



1.GND
2.VIN
3.VOUT

■ **Simplified outline(SOT-89)**

■ Absolute Maximum Ratings Ta = 25℃

Parameter	Limit	Unit
Supply voltage	-0.3 ~ +22	V
Storage temperature range	-50 ~ +125	℃
Operating temperature range	-40 ~ 85	℃

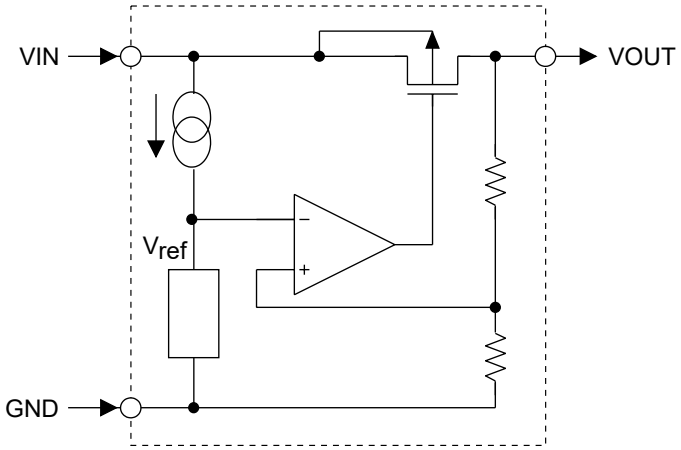
Note: 1.Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

HT73xx

Selection Tablet

Designator	Symbol	Description
HT73xx	21	2.1V(output)
	23	2.3V
	25	2.5V
	28	2.8V
	30	3.0V
	33	3.3V
	36	3.6V
	40	4.0V
	44	4.4V
	50	5.0V
	90	9.0V

Simplified outline(SOT-89)



Block Diagram

Parameter	Symbol	Value	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	200	˚C/W
Power Consumption	P_D	500	mW

HT73xx

■ Electrical Characteristics Ta = 25℃

HT7321

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	2.058	2.10	2.142	V
Output current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=10mA$, $\Delta V_{OUT}=2\%$	--	45	55	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

HT7323

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	2.254	2.30	2.346	V
Output current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=10mA$, $\Delta V_{OUT}=2\%$	--	40	55	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

HT73xx

■ Electrical Characteristics Ta = 25℃

HT7325

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	2.45	2.50	2.55	V
Output current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=10mA$, $\Delta V_{OUT}=2\%$	--	35	55	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

HT7328

Parameter	Symbol	Test conditions	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}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=10mA$, $\Delta V_{OUT}=2\%$	--	30	55	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

■ Electrical Characteristics Ta = 25℃

HT7330

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	2.94	3.0	3.06	V
Output current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=100mA$, $\Delta V_{OUT}=2\%$	--	210	300	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

HT7333

Parameter	Symbol	Test conditions	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}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=100mA$, $\Delta V_{OUT}=2\%$	--	195	300	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

■ Electrical Characteristics Ta = 25℃

HT7336

Parameter	Symbol	Test conditions	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}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=100mA$, $\Delta V_{OUT}=2\%$	--	180	300	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

HT7340

Parameter	Symbol	Test conditions	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}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=100mA$, $\Delta V_{OUT}=2\%$	--	170	300	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

■ Electrical Characteristics Ta = 25℃

HT7344

Parameter	Symbol	Test conditions	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}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=100mA$, $\Delta V_{OUT}=2\%$	--	160	300	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

HT7350

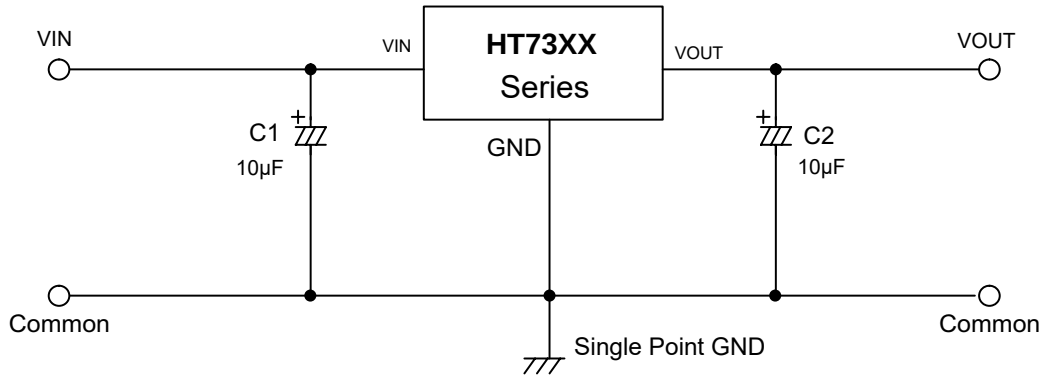
Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	4.90	5.0	5.10	V
Output current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=100mA$, $\Delta V_{OUT}=2\%$	--	150	300	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

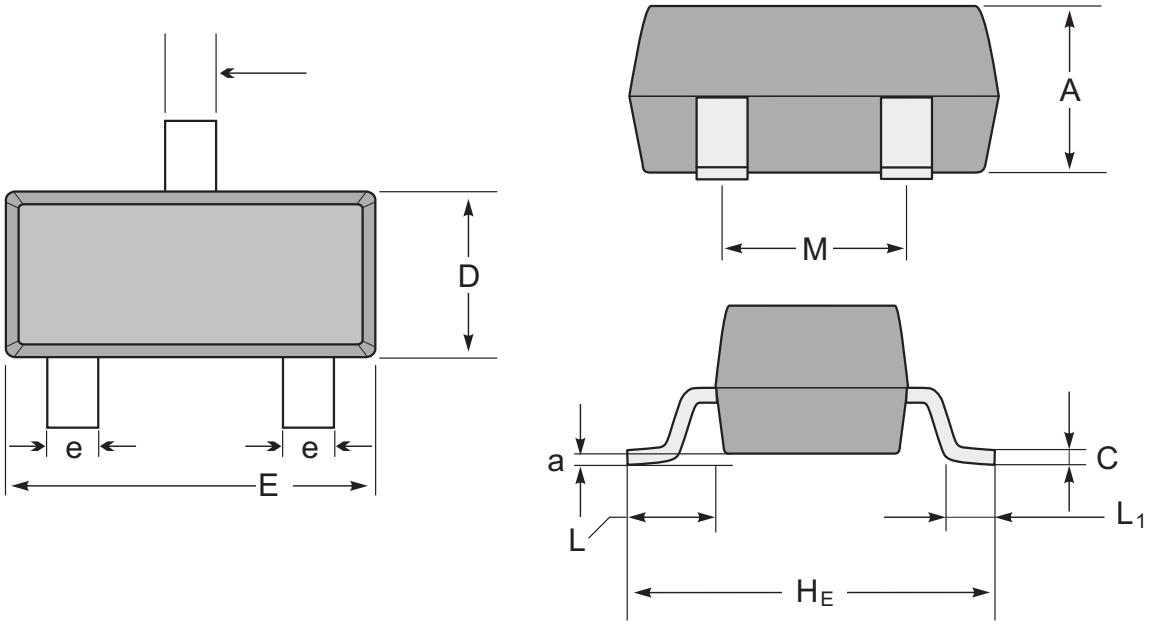
■ Electrical Characteristics Ta = 25℃

HT7390

Parameter	Symbol	Test conditions	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}	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \le I_{OUT} \le 300mA$	--	37	100	mV
Voltage drop Note1	V_{DIF}	$I_{OUT}=100mA$, $\Delta V_{OUT}=2\%$	--	130	300	mV
Quiescent Current	I_Q	No Load	--	1.5	3.0	μA
Line regulation	$\Delta V_{OUT} / V_{OUT} \times \Delta V_{IN}$	$V_{OUT}+1.0V \le V_{IN} \le 20V$, $I_{OUT}=1mA$	--	--	0.2	%/V
Input voltage	V_{IN}	--	--	--	20	V
Temperature coefficient	$\Delta V_{OUT} / V_{OUT} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃ \le T_A \le 85℃$	--	100	--	ppm/℃
Short Current	I_{Short}	$V_{OUT}=0V$	--	400	--	mA

Basic Circuits

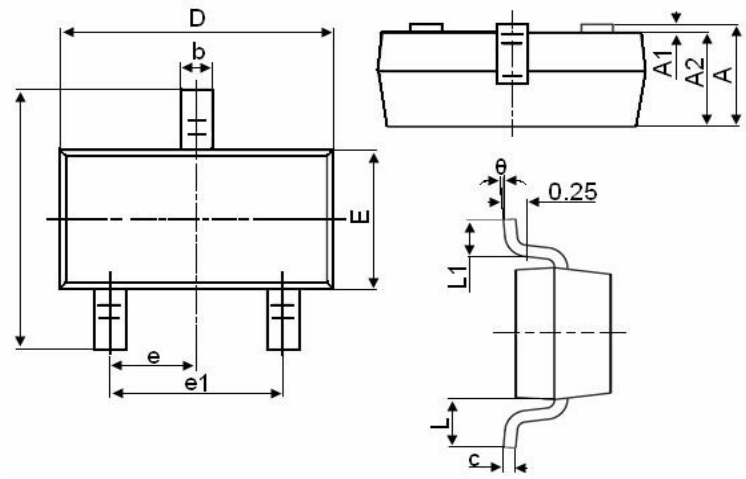




SOT-23 mechanical data

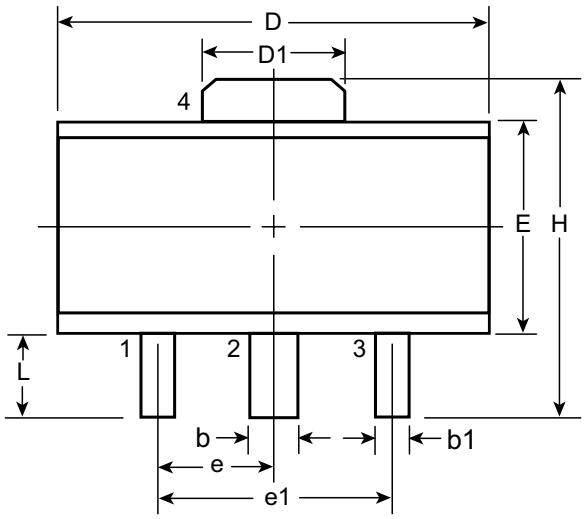
UNIT		A	C	D	E	H_E	e	M	L	L_1	a
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

SOT23-3L

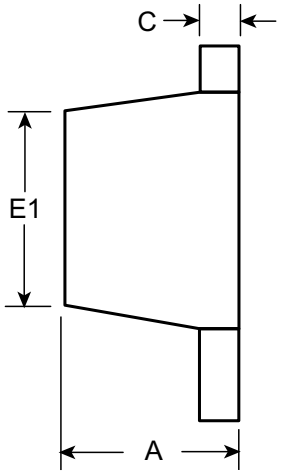


Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.300	0.500
c	0.100	0.200
D	2.800	3.000
E	1.500	1.700
E1	2.650	2.950
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.600
θ	0°	8°

SOT-89 PACKAGE OUTLINE



Top View



Side View

Symbol		A	b	b1	C	D	D1	E	E1	e	e1	H	L
Dimensions (mm)	MIN	1.40	0.44	0.36	0.3	4.40	1.50	2.29	2.00†	1.50 BSC	3.00 BSC	3.94	0.89
	NOM	-	-	-	-	-	-	-	-			-	-
	MAX	1.60	0.56	0.48	0.5	4.60	1.75	2.60	2.29			4.25	1.20

Dimensions in mm