High Speed Low Dropout Middle Current Voltage Regulators

■ General Description

The LN1134 series are highly precise, low noise, positive voltage LDO regulators manufactured using CMOS processes. The series achieves high ripple rejection and low dropout and consists of a standard voltage source, an error correction, current limiter and a phase compensation circuit plus a driver transistor. Output voltage is selectable in 100mV increments within a range of 1.5V ~ 5.0V. The series is also compatible with low ESR ceramic capacitors which give added output stability. This stability can be maintained even during load fluctuations due to the excellent transient response of the series.

The current limiter's feedback circuit also operates as a short protect for the output current limiter and the output pin The CE function enables the output to be turned off, resulting in greatly reduced power consumption.

■ Features

- Output Voltage Range: 1.0V to 5.0V (selectable in 100mV steps)
- Highly Accurate: ± 2%
- Dropout Voltage: 300mV @ 100mA (3.0V type)
- High Ripple Rejection: 70dB (10 kHz)
- Low Power Consumption: 70μA (TYP.)
- Maximum Output Current : 300mA
- Standby Current : less than 2μA
- Internal protector: current limiter
- Internal discharge MOS

■ Applications

- Mobile phones
- Cordless phones
- Cameras, Video cameras
- Portable games
- Portable AV equipment
- Reference voltage
- Battery powered equipment

■ Package

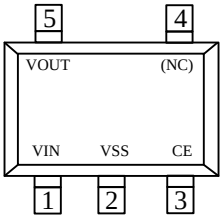
- SOT-23-5L
- DFNWB1X1-4L
- SOT-353/SC70-5
- SOT-343

■ Ordering Information

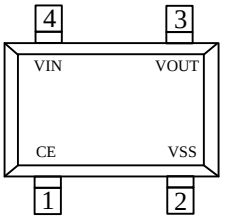
LN1134 ①②③④⑤⑥

Designator	Symbol	Description	Designator	Symbol	Description
①		CE Pin Logic :	⑤		Package Type :
	A	Active 'High' (pull-down resistor built in)		M	SOT-23-5L
	B	Active 'High' (no pull-down resistor built in)		K	SOT-353/SC70-5
	C	Active 'Low' (pull-up resistor built in)		C	SOT-343
	D	Active 'Low' (no pull-up resistor built in)		D	DFNWB1×1-4L
②③	10~60	Output Voltage: e.g. 20 = 2.0V 30 = 3.0V etc.	⑥		Device Orientation :
④	2	Output Voltage : 100mV increments e.g. ②=3, ③=8, ④=2 ⇒ 3.8V		R	Embossed Tape : Standard Feed
	A	Output Voltage : 50mV increments e.g. ②=3, ③=8, ④=A ⇒3.85V		L	Embossed Tape : Reverse Feed

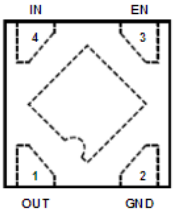
■ Pin Configuration



SOT-23-5,SOT-353/SC70-5



SOT-343



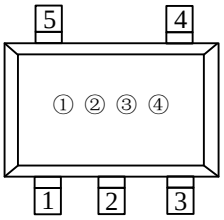
UTDFN-1×1-4L

■ Pin Assignment

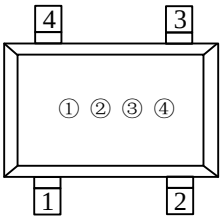
Pin Number				Pin Name	Function
SOT-23-5L	DFNWB1×1-4L	SOT-353/SC70-5	SOT-343		
1	4	1	4	VIN	Supply power
2	2	2	2	VSS	Ground
3	3	3	1	CE	Enable pin
4	-	4	-	NC	NC
5	1	5	3	VOUT	Voltage output

■ Marking Rule

- SOT-23-5,SOT-353,SOT-343(Top View)



SOT-23-5,SOT-353/SC70-5



SOT-343

① Represents the product name

Symbol	Product Name
4	LN1134◆◆◆◆◆◆

② Represents the type of regulator

Voltage(V)	1.0～3.0	3.1～6.0	1.05～3.05	3.15～6.05		
Symbol	V	A	E	L	Product Name	LN1134A◆◆◆◆◆
	X	B	F	M		LN1134B◆◆◆◆◆
	Y	C	H	N		LN1134C◆◆◆◆◆
	Z	D	K	P		LN1134D◆◆◆◆◆

③ **Represents the Output Voltage**

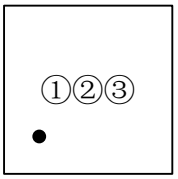
Symbol	Output Voltage（V）			
0		3.1		3.15
1		3.2		3.25
2		3.3		3.35
3		3.4		3.45
4		3.5		3.55
5		3.6		3.65
6		3.7		3.75
7		3.8		3.85
8		3.9		3.95
9	1.0	4.0	1.05	4.05
A	1.1	4.1	1.15	4.15
B	1.2	4.2	1.25	4.25
C	1.3	4.3	1.35	4.35
D	1.4	4.4	1.45	4.45
E	1.5	4.5	1.55	4.55

Symbol	Output Voltage（V）			
F	1.6	4.6	1.65	4.65
H	1.7	4.7	1.75	4.75
K	1.8	4.8	1.85	4.85
L	1.9	4.9	1.95	4.95
M	2.0	5.0	2.05	5.05
N	2.1		2.15	
P	2.2		2.25	
R	2.3		2.35	
S	2.4		2.45	
T	2.5		2.55	
U	2.6		2.65	
V	2.7		2.75	
X	2.8		2.85	
Y	2.9		2.95	
Z	3.0		3.05	

④ **Represents the assembly lot no.**

0~9, A~Z repeated (G, I, J, O, Q, W excepted)

- DFNWB1×1-4L (Top View)



① **Represents the output voltage**

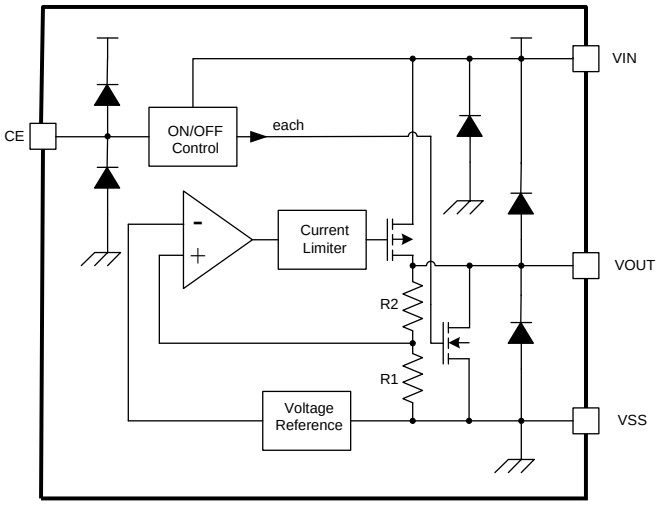
Symbol	Output	Symbol	Output	Symbol	Output	Symbol	Output
A	1.1	K	2.1	U	3.1	5	4.1
B	1.2	L	2.2	V	3.2	6	4.2
C	1.3	M	2.3	W	3.3	7	4.3
D	1.4	N	2.4	X	3.4	8	4.4
E	1.5	O	2.5	Y	3.5	9	4.5
F	1.6	P	2.6	Z	3.6	+	4.6
G	1.7	Q	2.7	1	3.7	-	4.7
H	1.8	R	2.8	2	3.8	*	4.8
I	1.9	S	2.9	3	3.9	?	4.9
J	2.0	T	3.0	4	4.0	=	5.0

②Represents the version of wafer.

③Represents the information of QA.

0~9, A~Z repeated (G, I, J, O, Q, W excepted)

■ Function Block Diagram

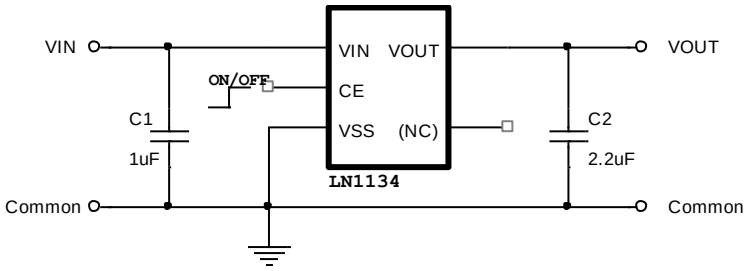


■ Absolute Maximum Ratings

Parameter	Symbol	Maximum Rating		Unit
Input Voltage	V_{IN}	V_{SS}-0.3～V_{SS}+8		V
	$V_{ON/OFF}$	V_{SS}-0.3～V_{IN}+0.3		
Output Current	V_{OUT}	V_{SS}-0.3～V_{IN}+0.3		
Power Dissipation	P_D	SOT-23-5	400	mW
		SOT-353/SC70-5,SOT-343	250	
		DFNWB1.8×2-6L	100	
Operating Ambient Temperature	Topr	-40～+85		°C
Storage Temperature	Tstg	-40～+125		

Caution: The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

■ Typical Application Circuit



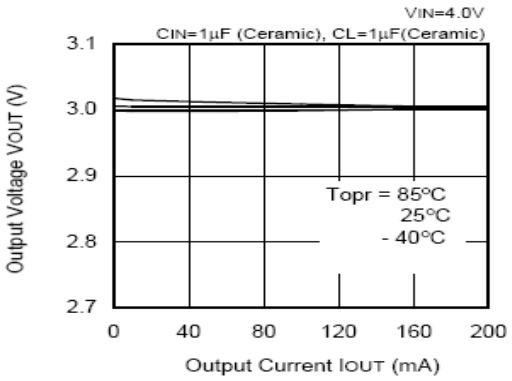
Caution: The above connection diagram and constant will not guarantee successful operation. Perform thorough evaluation using the actual application to set the constant.

■ Electrical Characteristics

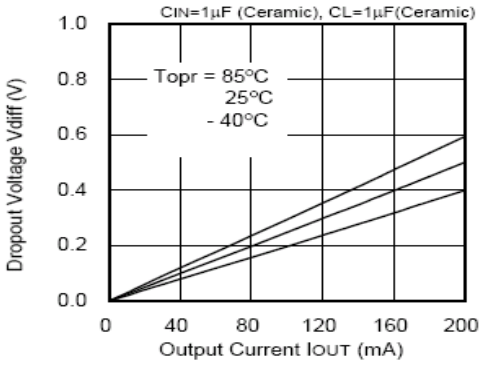
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Output Voltage	$V_{OUT(E)}$	V_{IN} =$V_{OUT(S)}$+1.0 V, I_{OUT}=30 mA	$V_{OUT(S)}$ ×0.98	$V_{OUT(S)}$	$V_{OUT(S)}$ ×1.02	V
Output Current	I_{OUT}	V_{IN}≥$V_{OUT(S)}$+1.0 V	300	—	—	mA
Dropout Voltage	V_{drop}	I_{OUT}=50 mA	—	0.12	0.20	V
		I_{OUT}=100 mA	—	0.30	0.45	
Line Regulations	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	$V_{OUT(S)}$+0.5 V ≤V_{IN}≤7 V I_{OUT}=30 mA	—	0.10	0.2	%/V
Load Regulation	ΔV_{OUT2}	V_{IN}=$V_{OUT(S)}$+1.0 V 1.0 mA ≤I_{OUT} ≤100 mA	—	50	100	mV
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta Ta \bullet V_{OUT}}$	V_{IN}=$V_{OUT(S)}$+1.0 V, I_{OUT}=10 mA -40°C ≤Ta ≤85°C	—	±100	—	ppm/℃
Supply Current	I_{SS1}	V_{IN}=$V_{OUT(S)}$+1.0 V	—	70		μA
Input Voltage	V_{IN}	——	2.0	—	7	V
Ripple-Rejection	|PSRR|	V_{IN}=$V_{OUT(S)}$+1.0 V，f=10 kHz Vrip=0.5 Vrms, I_{OUT}=50 mA	—	70	—	dB
Short-circuit Current	Ishort	V_{IN}=$V_{OUT(S)}$+1.0 V,V_{CE} on V_{OUT}=gnd	—	40	—	mA
CE “High” Voltage	V_{CEH}		1.6		VIN	V
CE “Low” Voltage	V_{CEL}				0.25	V
CE “High”Current （no resistor built in）	I_{CEH}	VIN=VCE=VOUT(T)+1.0V	-0.1		0.1	uA
CE “Low” Current （no resistor built in）	I_{CEH}	VIN= VOUT(T)+1.0V, VCE=VSS	-0.1		0.1	uA

■ Typical Performance Characteristics （3.0V output）

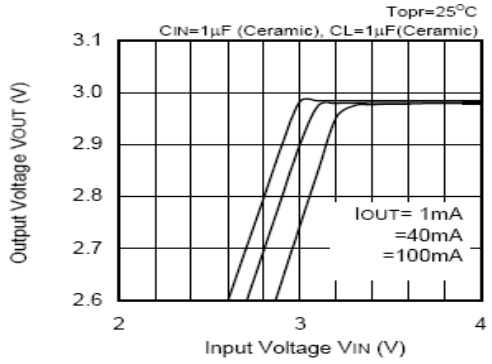
1、Output Voltage vs. Output Current



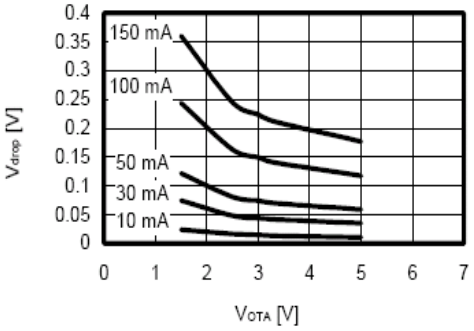
3、Dropout Voltage vs. Output Current



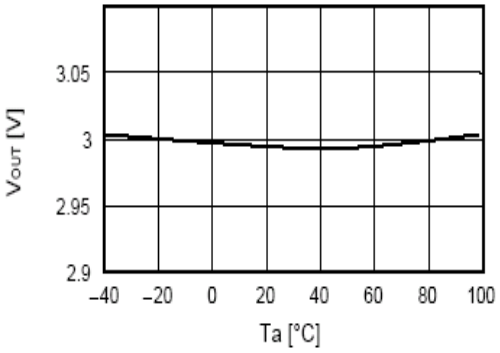
2、Output Voltage vs. Input Voltage (Contd.)



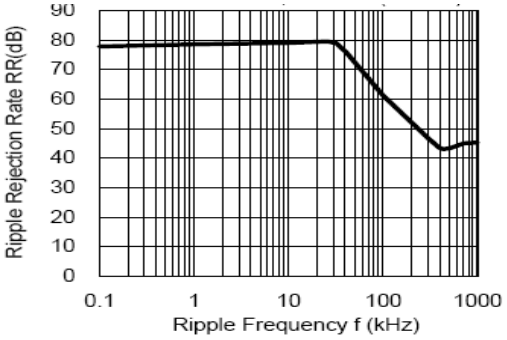
4、Dropout Voltage vs. Output Voltage



5、Output Voltage vs. Ambient Temperature

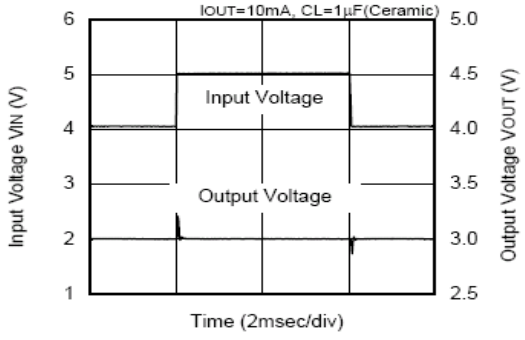


6、Ripple Rejection Rate

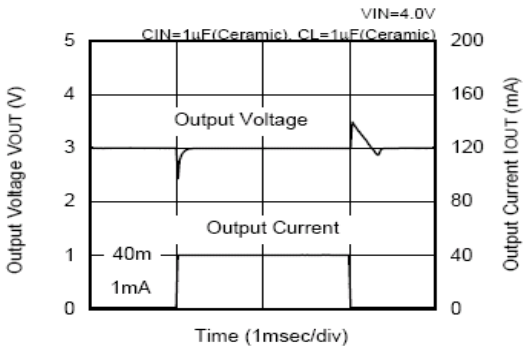


7、Transient Response

Input Transient Response

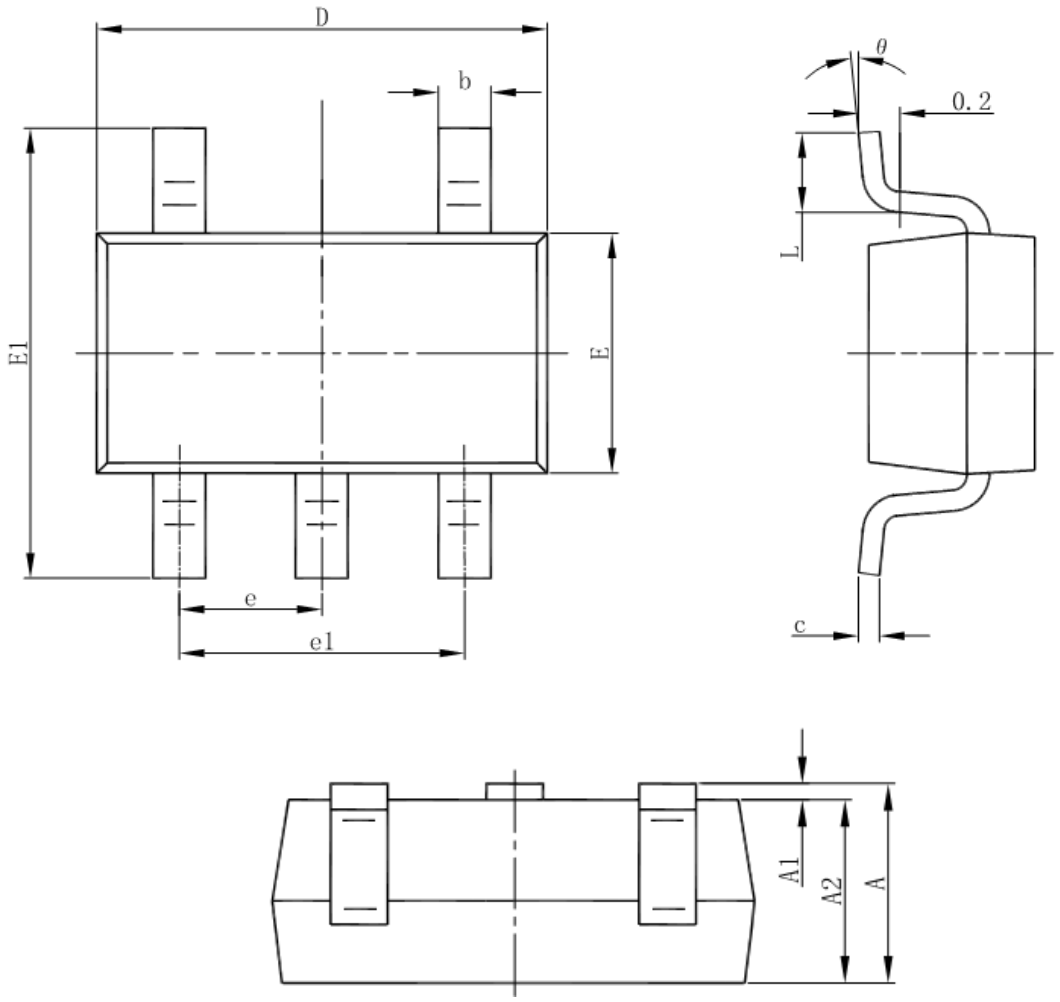


Load Transient Response



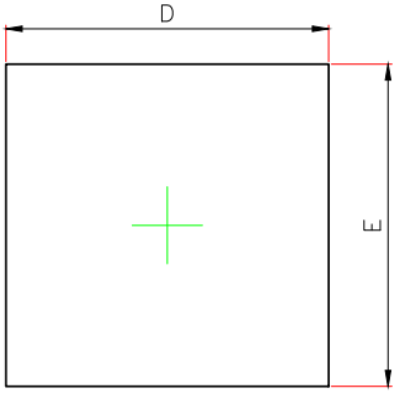
■ Package Information

- **SOT-23-5L**

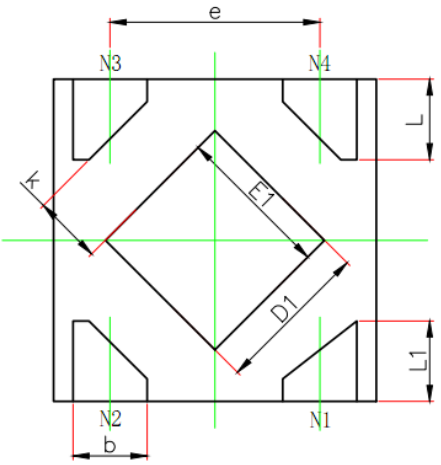


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

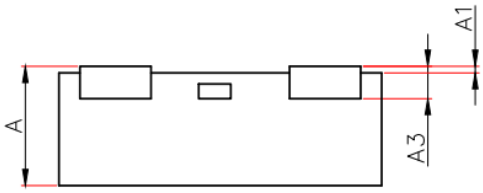
- **DFNWB1X1-4L**



TOP VIEW



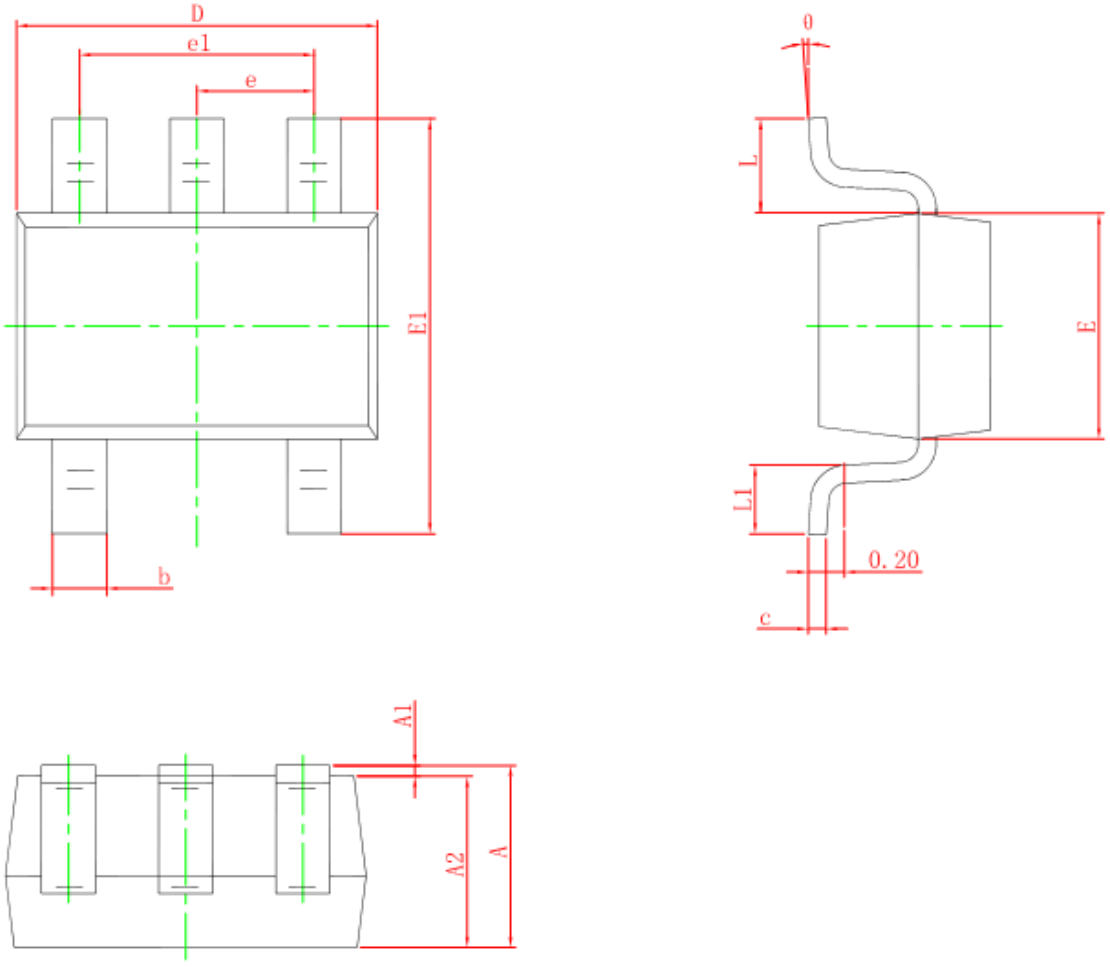
BOTTOM VIEW



SIDE VIEW

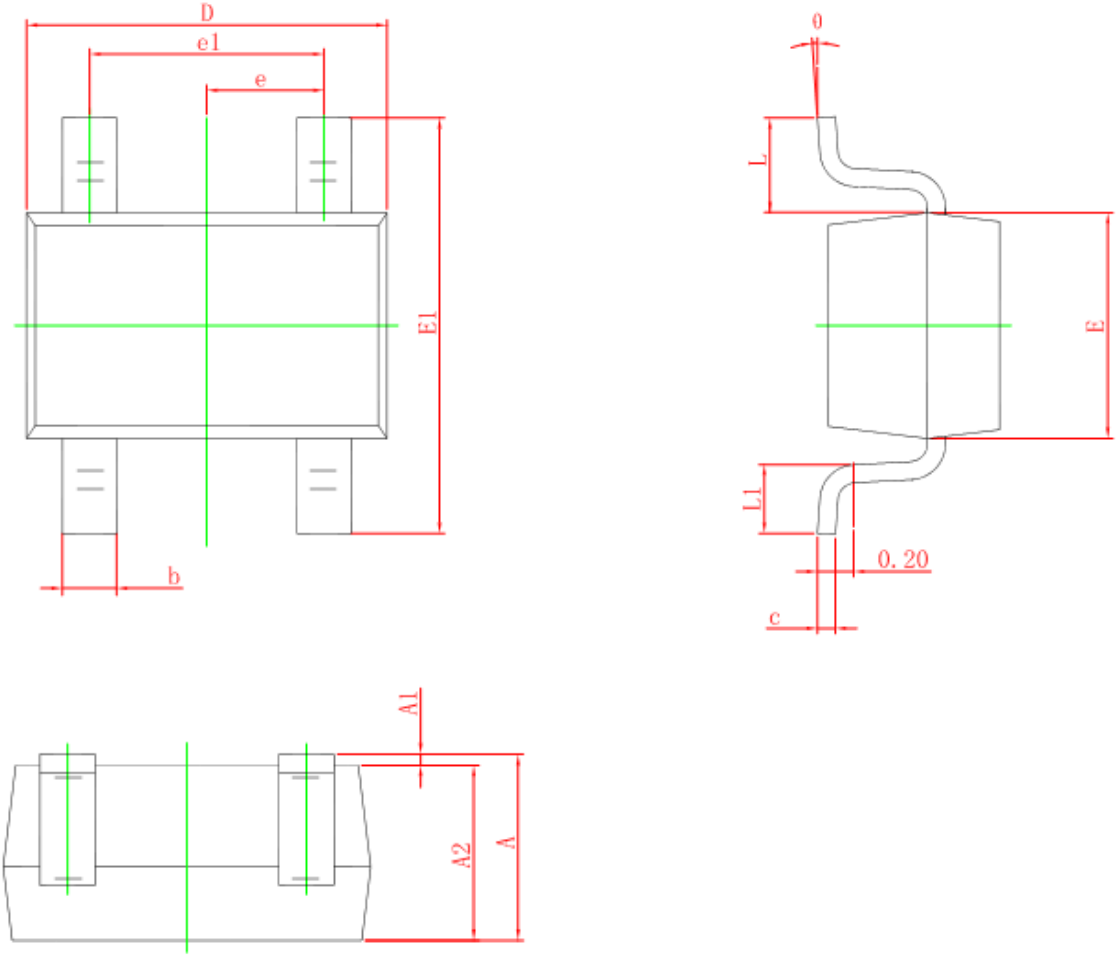
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.320	0.400	0.013	0.016
A1	0.000	0.050	0.000	0.002
A3	0.100REF.		0.004REF.	
D	0.950	1.050	0.037	0.041
E	0.950	1.050	0.037	0.041
D1	0.430	0.530	0.017	0.021
E1	0.430	0.530	0.017	0.021
k	0.150MIN.		0.006MIN.	
b	0.180	0.280	0.007	0.011
e	0.650TYP.		0.026TYP.	
L	0.200	0.300	0.008	0.012
L1	0.200	0.300	0.008	0.012

- **SOT-353**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

- **SOT-343**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°