



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: $\pm 2\%$
- Dropout Voltage: 300mV @ 100mA (3.0V type)

Ordering Information

- High Ripple Rejection: 70dB (10 kHz)
- Low Power Consumption: 70 μ A (TYP.)
- Maximum Output Current : 300mA
- Standby Current : less than 2 μ A
- Internal protector: current limiter and short protector

Applications

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

Package

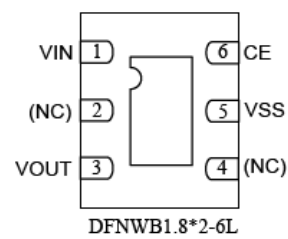
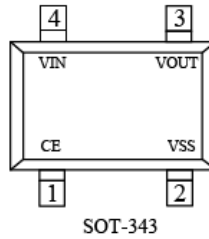
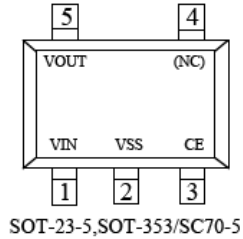
- SOT-23-5L
- DFNWB1.8 \times 2-6L
- SOT-353/SC70-5
- SOT-343

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 | DFNWB1.8 \times 2-6L |
| 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 \Rightarrow 3.8V | | R | Embossed Tape : Standard Feed |
| | A | Output Voltage : 50mV increments e.g. ②=3, ③=8, ④=A \Rightarrow 3.85V | | L | Embossed Tape : Reverse Feed |



Pin Configuration

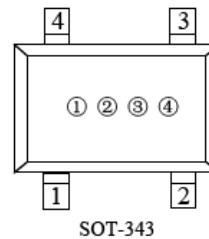
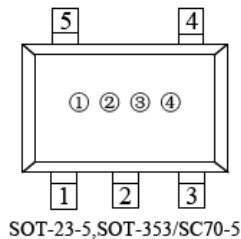


Pin Assignment

| Pin Number | | | | Pin Name | Function |
|------------|---------------|----------------|---------|----------|----------------|
| SOT-23-5L | DFNWB1.8×2-6L | SOT-353/SC70-5 | SOT-343 | | |
| 1 | 1 | 1 | 4 | VIN | Supply power |
| 2 | 5 | 2 | 2 | VSS | Ground |
| 3 | 6 | 3 | 1 | CE | Enable pin |
| 4 | 2, 4 | 4 | - | NC | NC |
| 5 | 3 | 5 | 3 | VOUT | Voltage output |

Marking Rule

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



- 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 | Product Name | |
|------------|---------|---------|-----------|-----------|--------------|-----------------|
| Symbol | V | A | E | L | | LN1134A◆◆◆◆◆◆◆◆ |
| | X | B | F | M | | LN1134B◆◆◆◆◆◆◆◆ |
| | Y | C | H | N | | LN1134C◆◆◆◆◆◆◆◆ |
| | Z | D | K | P | | LN1134D◆◆◆◆◆◆◆◆ |



④ Represents the integers of Output Voltage

Example: 3 represents 3.x, 5 represents 5.x

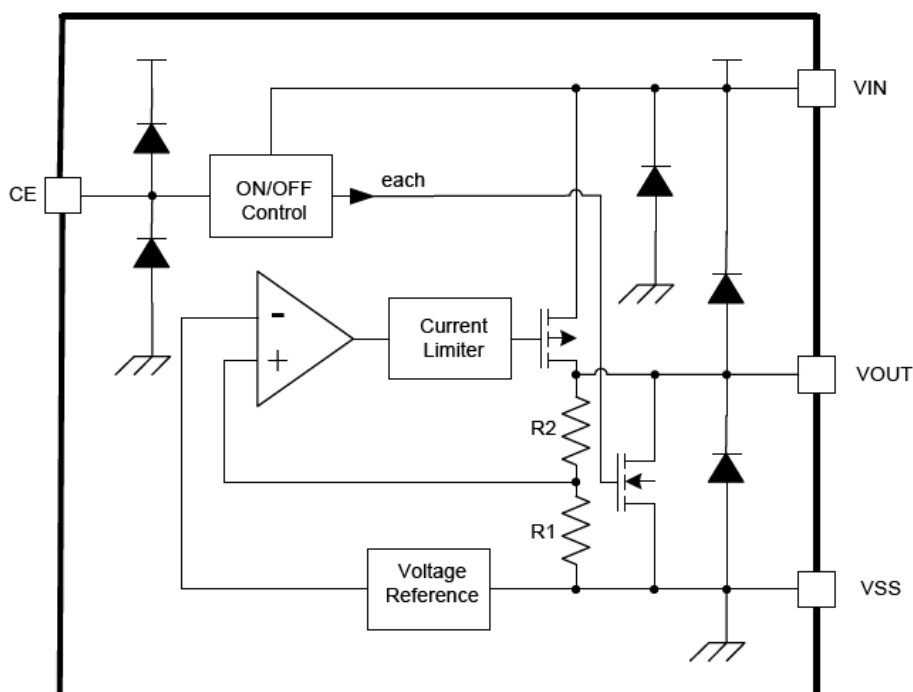
⑤ Represents the decimals of Output Voltage

| Symbol | Voltage (V) | Product Name | Symbol | Voltage (V) | Product Name |
|--------|-------------|--------------|--------|-------------|--------------|
| 0 | X.0 | LN1134XX0XDX | A | X.05 | LN1134XXAXDX |
| 1 | X.1 | LN1134XX1XDX | B | X.15 | LN1134XXBXDX |
| 2 | X.2 | LN1134XX2XDX | C | X.25 | LN1134XXCXDX |
| 3 | X.3 | LN1134XX3XDX | D | X.35 | LN1134XXDXDX |
| 4 | X.4 | LN1134XX4XDX | E | X.45 | LN1134XXEXDX |
| 5 | X.5 | LN1134XX5XDX | F | X.55 | LN1134XXFXDX |
| 6 | X.6 | LN1134XX6XDX | H | X.65 | LN1134XXHXDX |
| 7 | X.7 | LN1134XX7XDX | K | X.75 | LN1134XXKXDX |
| 8 | X.8 | LN1134XX8XDX | L | X.85 | LN1134XXLXDX |
| 9 | X.9 | LN1134XX9XDX | M | X.95 | LN1134XXMXDX |

⑥ Represents the assembly lot No.

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

■ Function Block Diagram



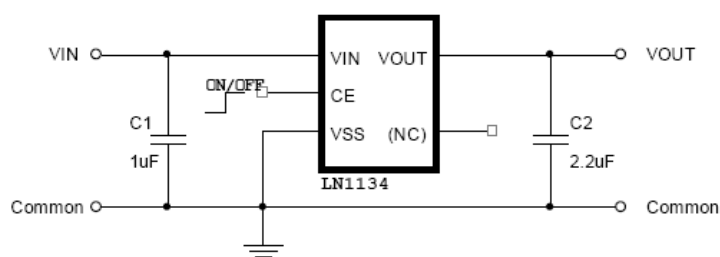


Absolute Maximum Ratings

| 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.

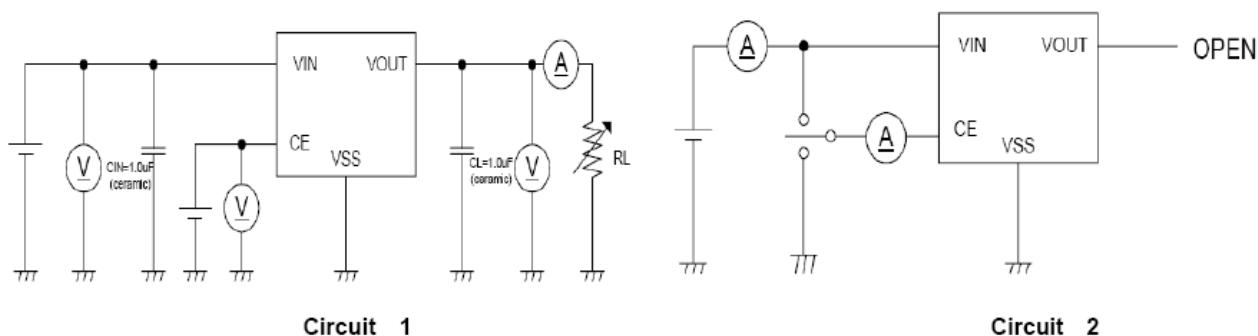
Application Conditions

Input capacitor (CIN): 1.0μF or more

Output capacitor (CL): 1.0μF or more (tantalum capacitor)

Caution A general series regulator may oscillate, depending on the external components selected. Check that no oscillation occurs with the application using the above capacitor.

Test Circuits





■ Electrical Characteristics

| Parameter | Symbol | Condition | Min | Typ | Max | Unit | Circuit |
|--|---|---|--------------------------|--------------|--------------------------|-----------------------|---------|
| Output Voltage | $V_{OUT(E)}$ | $V_{IN} = V_{OUT(S)} + 1.0 \text{ V}$, $I_{OUT} = 30 \text{ mA}$ | $V_{OUT(S)} \times 0.98$ | $V_{OUT(S)}$ | $V_{OUT(S)} \times 1.02$ | V | 1 |
| Output Current | I_{OUT} | $V_{IN} \geq V_{OUT(S)} + 1.0 \text{ V}$ | 300 | — | — | mA | 1 |
| Dropout Voltage | V_{drop} | $I_{OUT} = 50 \text{ mA}$ | — | 0.12 | 0.20 | V | 1 |
| | | $I_{OUT} = 100 \text{ mA}$ | — | 0.30 | 0.45 | | |
| Line Regulations | $\frac{\Delta V_{OUT1}}{\Delta V_{IN} \cdot V_{OUT}}$ | $V_{OUT(S)} + 0.5 \text{ V} \leq V_{IN} \leq 8 \text{ V}$ $I_{OUT} = 30 \text{ mA}$ | — | 0.10 | 0.2 | %/V | |
| Load Regulation | ΔV_{OUT2} | $V_{IN} = V_{OUT(S)} + 1.0 \text{ V}$ $1.0 \text{ mA} \leq I_{OUT} \leq 100 \text{ mA}$ | — | 50 | 100 | mV | |
| Output Voltage Temperature Characteristics | $\frac{\Delta V_{OUT}}{\Delta T_a \cdot V_{OUT}}$ | $V_{IN} = V_{OUT(S)} + 1.0 \text{ V}$, $I_{OUT} = 10 \text{ mA}$ $-40^\circ\text{C} \leq T_a \leq 85^\circ\text{C}$ | — | ± 100 | — | ppm/ $^\circ\text{C}$ | |
| Supply Current | I_{SS1} | $V_{IN} = V_{OUT(S)} + 1.0 \text{ V}$ | — | 70 | — | μA | 2 |
| Input Voltage | V_{IN} | — | 2.0 | — | 8 | V | — |
| Ripple-Rejection | PSRR | $V_{IN} = V_{OUT(S)} + 1.0 \text{ V}$, $f = 10 \text{ kHz}$ $V_{rip} = 0.5 \text{ V}_{rms}$, $I_{OUT} = 50 \text{ mA}$ | — | 70 | — | dB | 1 |
| Short-circuit Current | I_{short} | $V_{IN} = V_{OUT(S)} + 1.0 \text{ V}$, V_{CE} on $V_{OUT} = \text{gnd}$ | — | 40 | — | mA | 1 |
| CE "High" Voltage | V_{CEH} | | 1.6 | | V_{IN} | V | 1 |
| CE "Low" Voltage | V_{CEL} | | | | 0.25 | V | 1 |
| CE "High" Current | I_{CEH} | $V_{IN} = V_{CE} = V_{OUT(T)} + 1.0 \text{ V}$ | -0.1 | | 0.1 | μA | 2 |
| CE "Low" Current | I_{CEL} | $V_{IN} = V_{OUT(T)} + 1.0 \text{ V}$, $V_{CE} = V_{SS}$ | -0.1 | | 0.1 | μA | 2 |



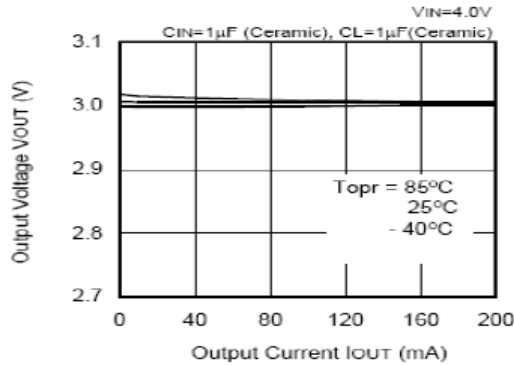
Taiwan Goodark Technology Co.,Ltd

LN1134

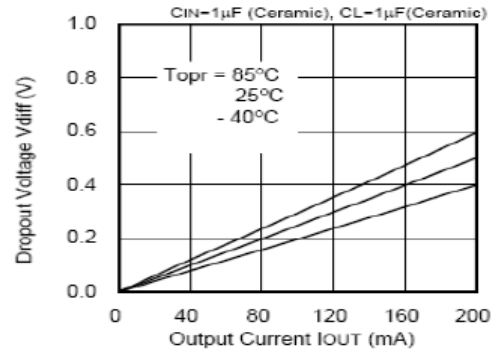


Typical Performance Characteristics (3.0V output)

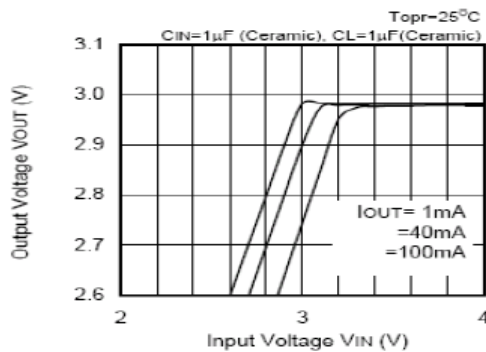
1、Output Voltage vs. Output Current



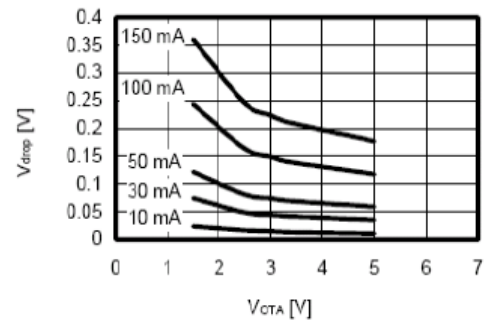
3、Dropout Voltage vs. Output Current



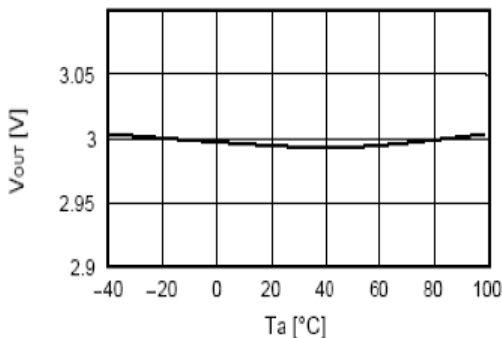
2、Output Voltage vs. Input Voltage (Contd.)



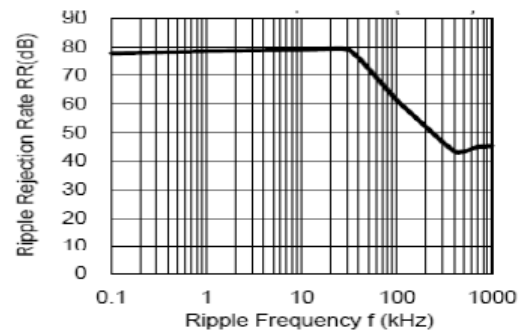
4、Dropout Voltage vs. Output Voltage



5、Output Voltage vs. Ambient Temperature

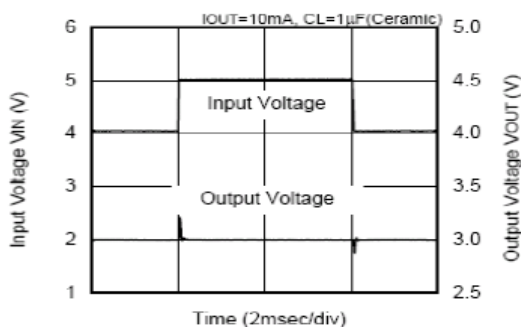


6、Ripple Rejection Rate

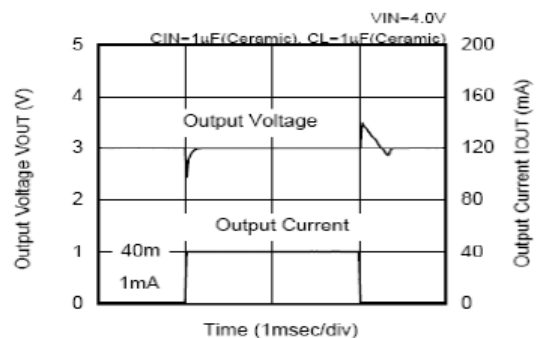


7、Transient Response

Input Transient Response



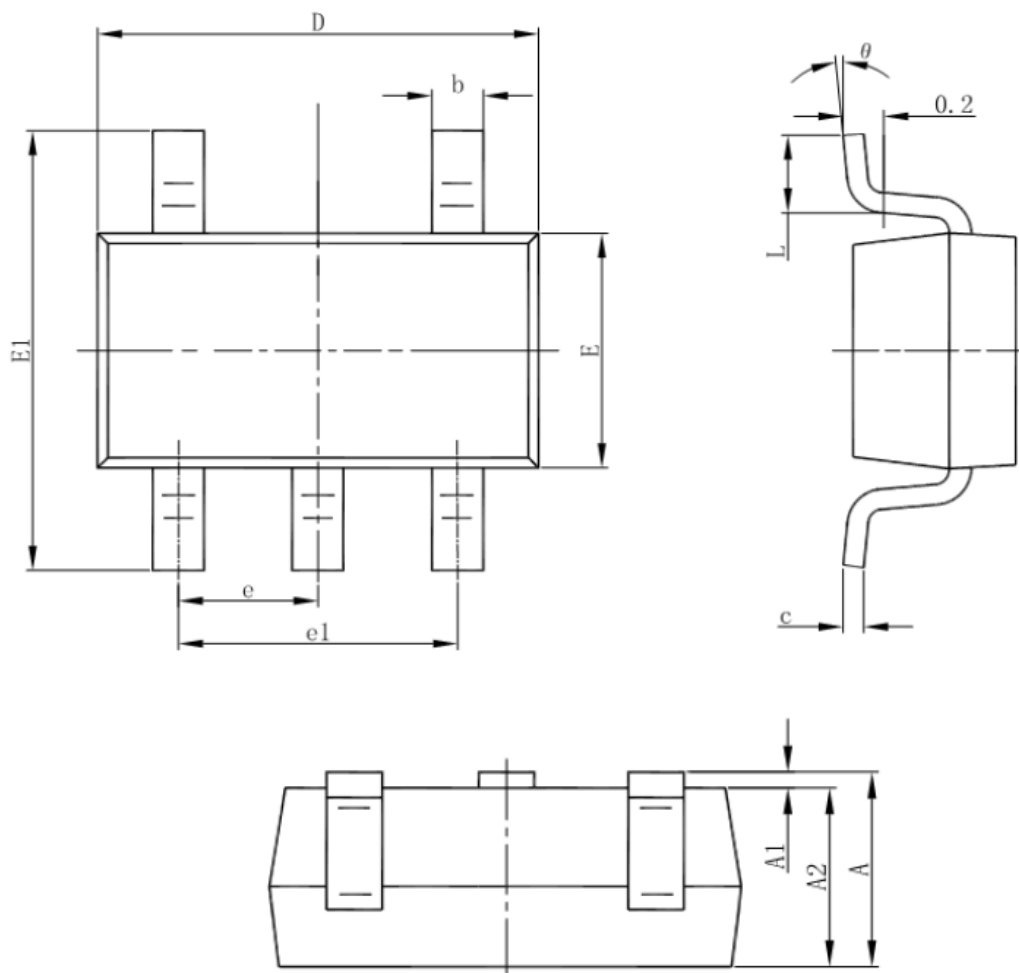
Load Transient Response





■ Package Information

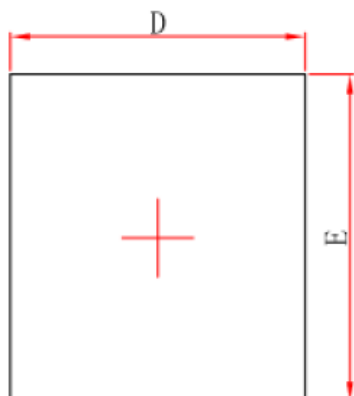
- SOT-23-5L



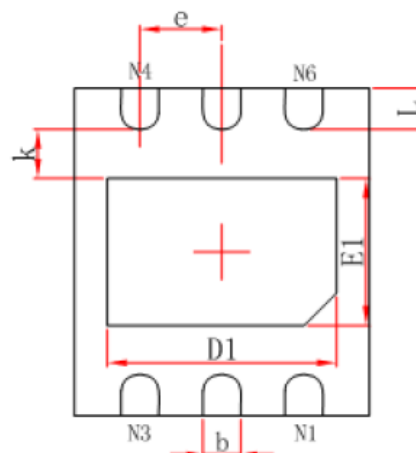
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 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° |



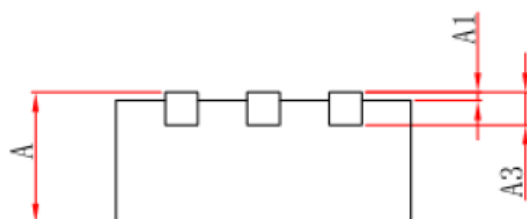
● DFNWB1.8×2-6L



Top View



Bottom View

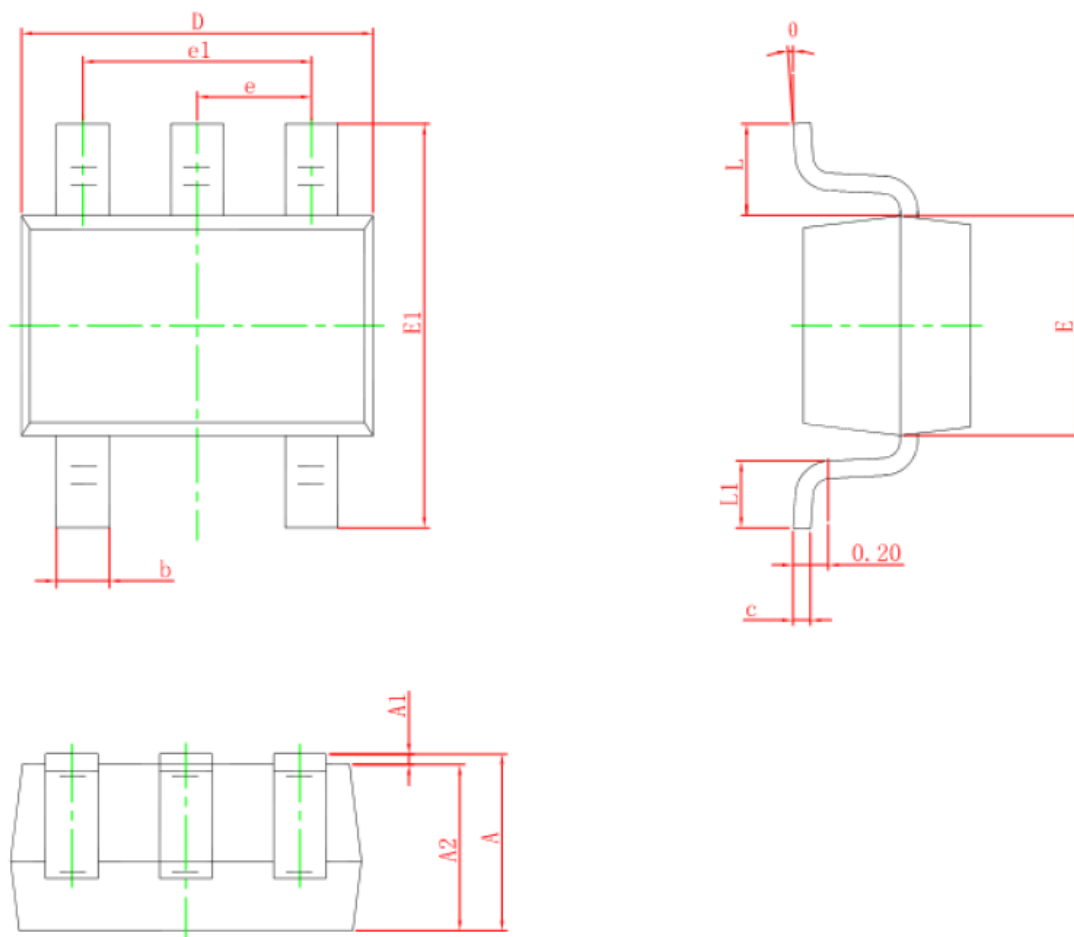


Side View

| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------------|----------------------|-------------|
| | Min. | Max. | Min. | Max. |
| A | 0.450/0.550 | 0.550/0.650 | 0.018/0.022 | 0.022/0.026 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| A3 | 0.150REF. | | 0.006REF. | |
| D | 1.724 | 1.876 | 0.068 | 0.074 |
| E | 1.924 | 2.076 | 0.076 | 0.082 |
| D1 | 1.300 | 1.500 | 0.051 | 0.059 |
| E1 | 0.800 | 1.000 | 0.031 | 0.039 |
| k | 0.200MIN. | | 0.008MIN. | |
| b | 0.180 | 0.280 | 0.007 | 0.011 |
| e | 0.500TYP. | | 0.020TYP. | |
| L | 0.174 | 0.326 | 0.007 | 0.013 |



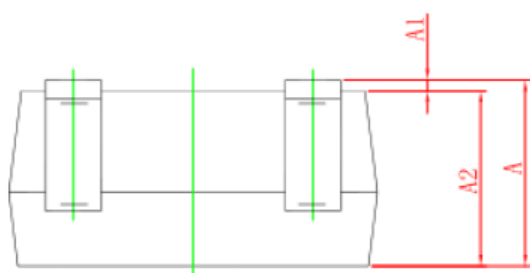
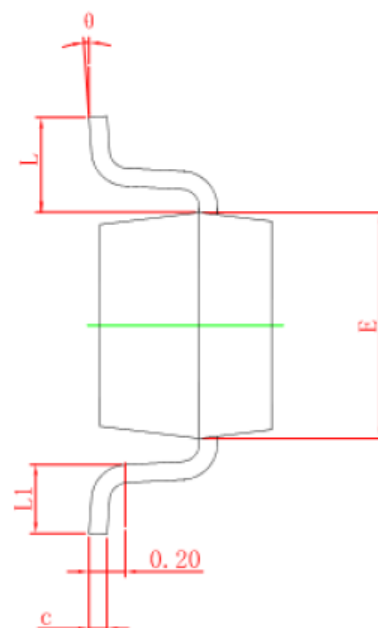
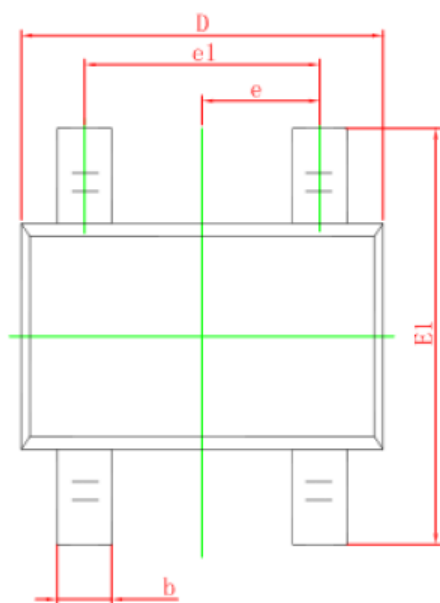
• SOT-353



| 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° |