

### Features

- Low Start-Up from below 1.0V
- Low Input Quiescent Current(Switching Off Current for 3.3V output) : 60 $\mu$ A (typ.)
- High Output Voltage Accuracy  $\pm 2.0\%$
- Small Number of External Components needed
- Output Voltage from 1.2V to 5.5V
- Space Saving MSOP-8 or TSSOP8 package

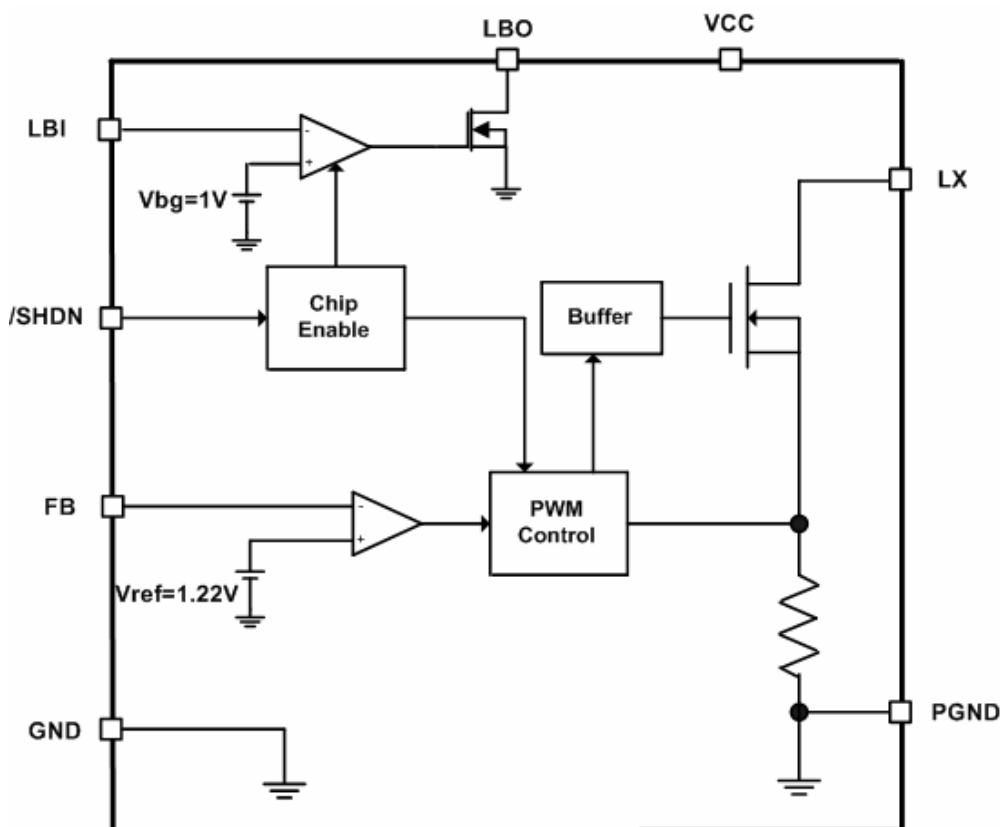
### Applications

- Personal Digital Assistant (PDA)
- Digital Camera
- Portable Audio (MP3)
- Electronic Game

### General Description

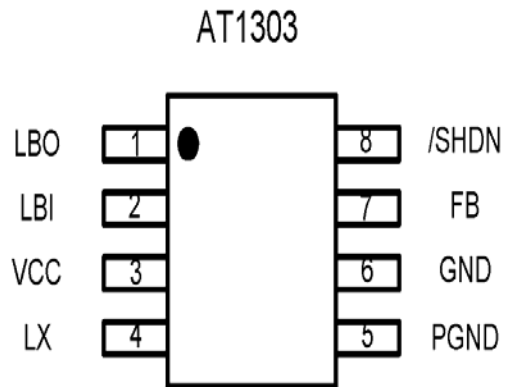
The AT1303 is a high efficiency current mode PWM step-up DC/DC converter with light load control for applications using battery-powered system. The device will automatically skip switching cycles under light load condition to maintain high efficiency at light load. The small MSOP-8 or TSSOP-8 packages make the AT1303 an ideal choice of DC/DC Converter for space conscious applications.

### Block Diagram



**Aimtron reserves the right without notice to change this circuitry and specifications.**

## Pin Configuration



## Pin Description

| Pin No. | Symbol | I/O | Description                               |
|---------|--------|-----|-------------------------------------------|
| 1       | LBO    | O   | Low Battery Detected output (active Hi-Z) |
| 2       | LBI    | I   | Low Battery Detected input                |
| 3       | VCC    | P   | Power Supply                              |
| 4       | LX     | O   | Switching Pin                             |
| 5       | PGND   | P   | Power Ground                              |
| 6       | GND    | P   | Ground                                    |
| 7       | FB     | I   | Error Amplifier Input                     |
| 8       | /SHDN  | I   | Chip Enable Input                         |

## Ordering Information

| Part number | Package         | Marking                                 |
|-------------|-----------------|-----------------------------------------|
| AT1303P     | TSSOP8          | AT1303P                                 |
| AT1303P_PBF | TSSOP8, Pb-Free | AT1303P, Date Code with one bottom line |
| AT1303P_GRE | TSSOP8, Green   | AT1303P, Date Code with two bottom line |
| AT1303M     | MSOP8           | AT1303                                  |
| AT1303M_PBF | MSOP8, Pb-Free  | AT1303, Date Code with one bottom line  |
| AT1303M_GRE | MSOP8, Green    | AT1303, Date Code with two bottom line  |

## Absolute Maximum Ratings

(T<sub>a</sub>=+25°C)

| Parameter             | Symbol           | Condition | Rated Value |      | Unit |
|-----------------------|------------------|-----------|-------------|------|------|
|                       |                  |           | Min.        | Max. |      |
| Power supply voltage  | V <sub>CC</sub>  | —         | —           | 6.0  | V    |
| LX pin voltage        | V <sub>LX</sub>  | —         | —           | 6.0  | V    |
| LX pin output current | I <sub>LX</sub>  | —         | —           | 1.7  | A    |
| Allowable dissipation | P <sub>D</sub>   | TSSOP8    | —           | 430  | mW   |
|                       |                  | MSOP8     | —           | 330  | mW   |
| Operating temperature | T <sub>OP</sub>  | —         | -30         | +85  | °C   |
| Storage temperature   | T <sub>stg</sub> | —         | -55         | +125 | °C   |

**WARNING:** Semiconductor devices can be permanently damaged by application of stress (voltage, current, temperature, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

## Electrical Characteristics

(T<sub>a</sub>=+25°C)

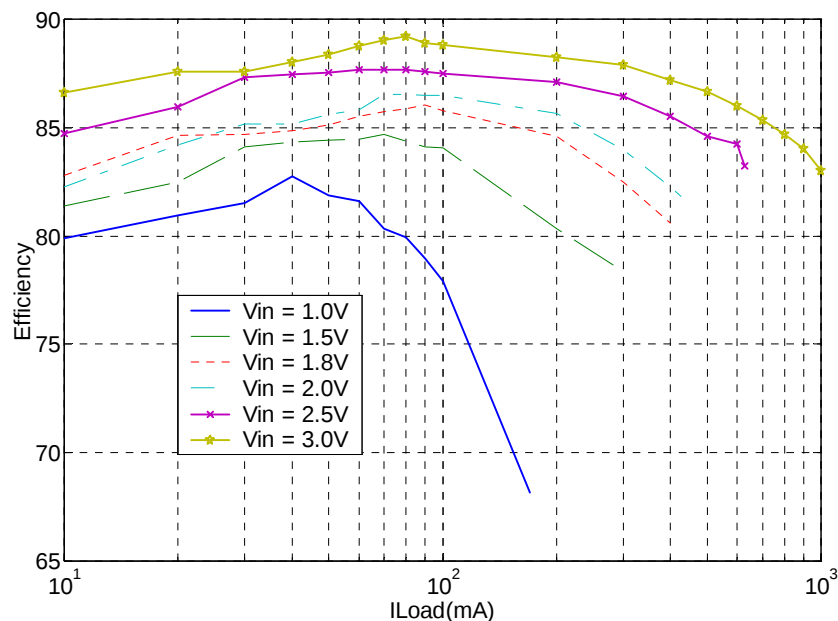
| Parameter                         | Symbol             | Condition                                                         | Values |       |       | Unit |
|-----------------------------------|--------------------|-------------------------------------------------------------------|--------|-------|-------|------|
|                                   |                    |                                                                   | Min.   | Typ.  | Max.  |      |
| Power Supply Voltage              | V <sub>CC</sub>    |                                                                   | 2.5    | -     | 5.5   | V    |
| Input Voltage                     | V <sub>IN</sub>    |                                                                   | 1.5    | -     | 5.5   | V    |
| Start-Up Voltage                  | V <sub>Start</sub> | I <sub>OUT</sub> =1mA V <sub>IN</sub> =0→2V                       | -      | 1.0   | 1.1   | V    |
| Switch off Current                | I <sub>2</sub>     | V <sub>IN</sub> = V <sub>OUT</sub> +0.5V(V <sub>OUT</sub> = 3.3V) | 50     | 60    | 70    | μ A  |
|                                   | I <sub>2</sub>     | V <sub>IN</sub> = V <sub>OUT</sub> +0.5V(V <sub>OUT</sub> = 5.0V) | 90     | 100   | 110   | μ A  |
| Shutdown Current                  | I <sub>3</sub>     | /SHDN=0V, V <sub>IN</sub> =5.5V                                   | -      | 1     | 5     | μ A  |
| Feedback Reference                | V <sub>REF</sub>   | Close loop, V <sub>OUT</sub> =3.3V                                | 1.200  | 1.220 | 1.244 | V    |
| Switching Frequency               | F <sub>S</sub>     | V <sub>OUT</sub> =3.3V                                            | -      | 380   | -     | KHz  |
| Maximum Duty                      | D <sub>max</sub>   | V <sub>OUT</sub> =3.3V                                            | 85     | 90    | 95    | %    |
| LX ON Resistance                  |                    | V <sub>OUT</sub> =3.3V                                            | 0.2    | 0.23  | 0.26  | Ω    |
| Current Limit                     | I <sub>Limit</sub> | V <sub>IN</sub> = 2.0V , V <sub>OUT</sub> =3.3V, Duty=55%         | 1.0    | 1.4   | 1.7   | A    |
| /SHDN Trip Level                  |                    | V <sub>OUT</sub> =3.3V                                            | 0.4    | 0.8   | 1.2   | V    |
| LBI Trip Level                    |                    | V <sub>CC</sub> Falling                                           | 0.98   | 1.0   | 1.02  | V    |
| Hysteresis Width (LBI Trip Level) |                    | V <sub>CC</sub> Rising                                            | 50     | 70    | 90    | mV   |
| LBO/LD Sink current               | I <sub>LBO</sub>   | LBO/LD=0.4V                                                       | -      | 7.5   | -     | mA   |
| Thermal shutdown                  |                    |                                                                   | -      | 170   | -     | °C   |

|                                |  |  |   |    |   |    |
|--------------------------------|--|--|---|----|---|----|
| Thermal shutdown<br>Hysteresis |  |  | - | 20 | - | °C |
|--------------------------------|--|--|---|----|---|----|

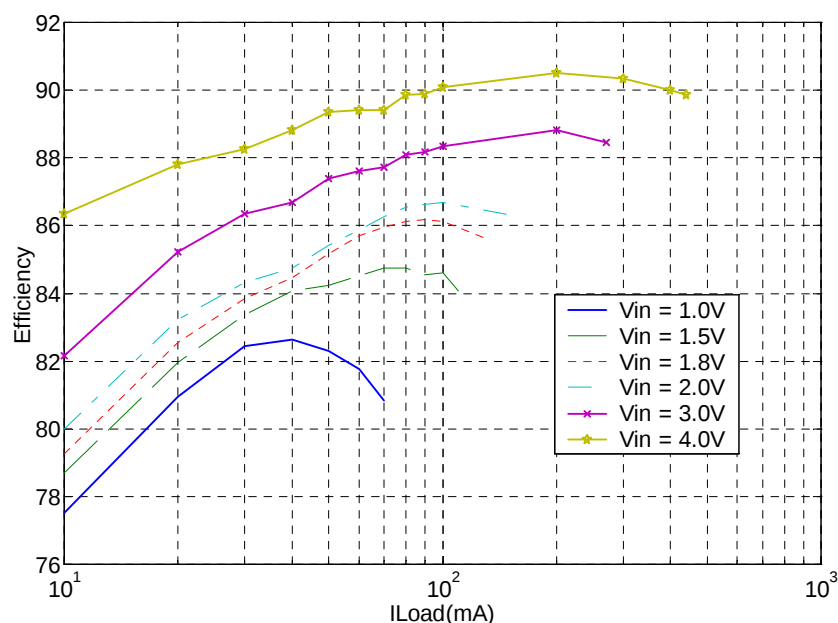
\*Unless otherwise provided,  $V_{IN} = 1.5V$  (when  $V_{OUT} = 3.3V$ ), and use External Circuit of Typical Application (Fig 1).

Typical Curve (as Fig.1, Fig. 2)  $L=10\mu H$ /LYS6S28(LEE YU)

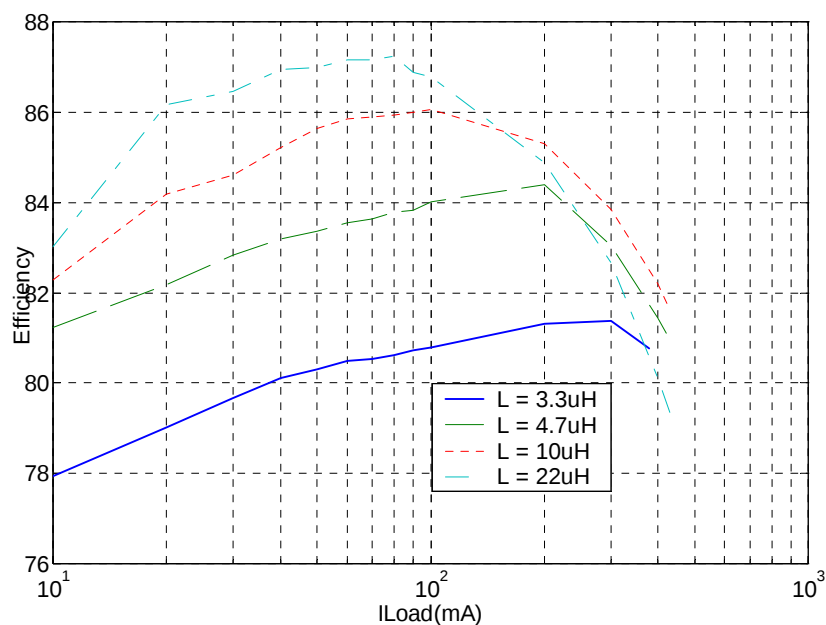
### Efficiency for 3.3V Output



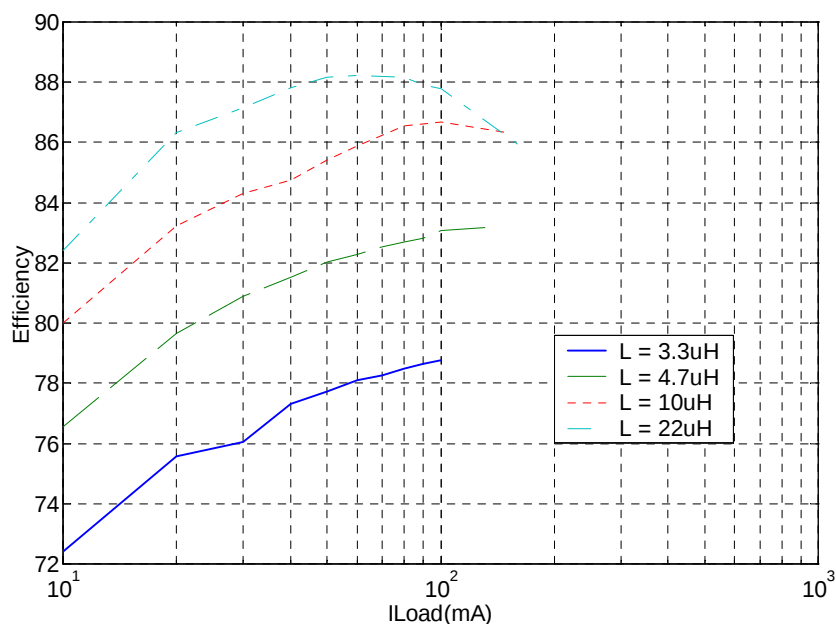
### Efficiency for 5.0V Output

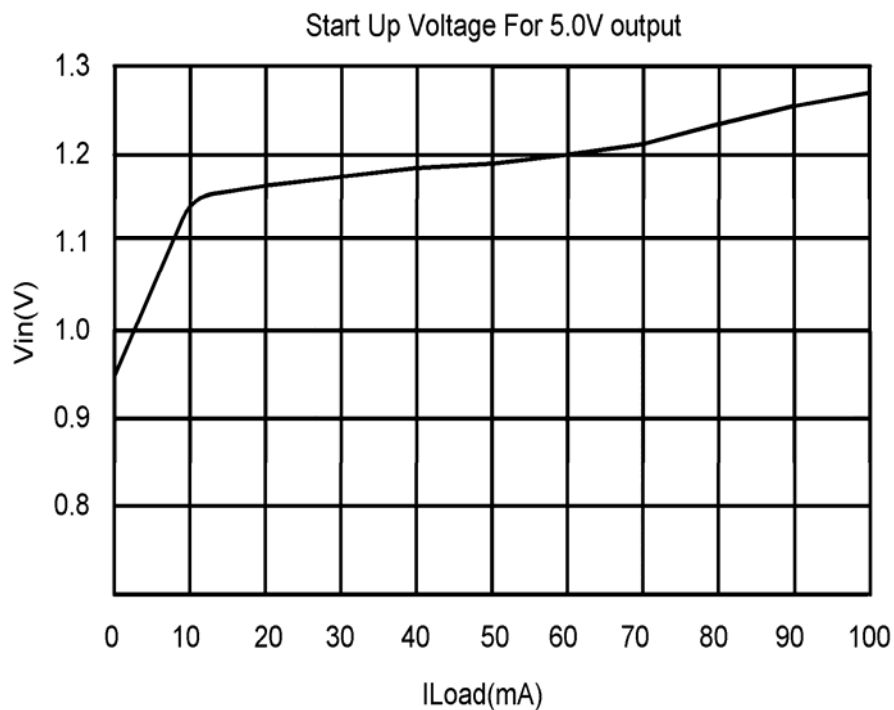
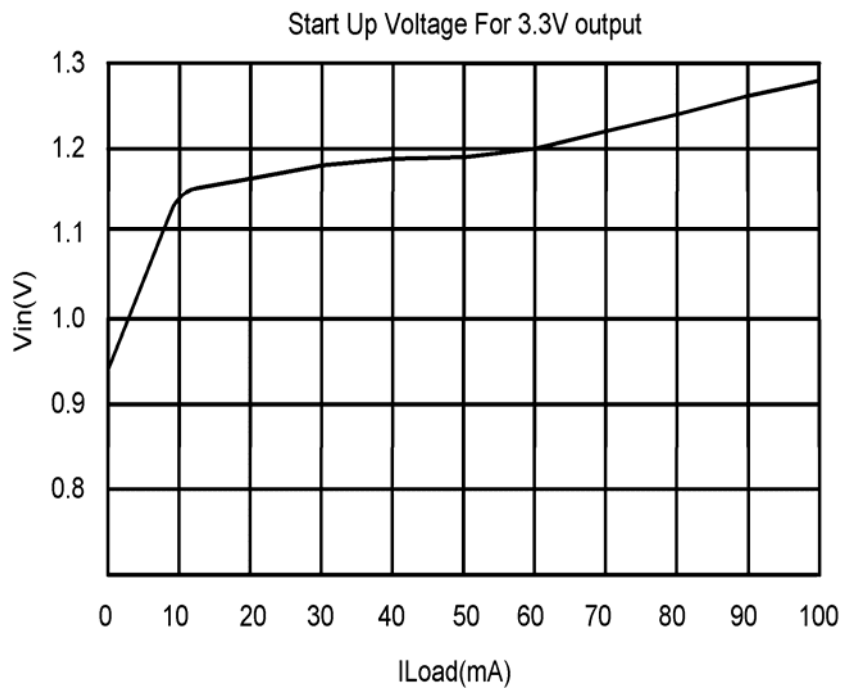


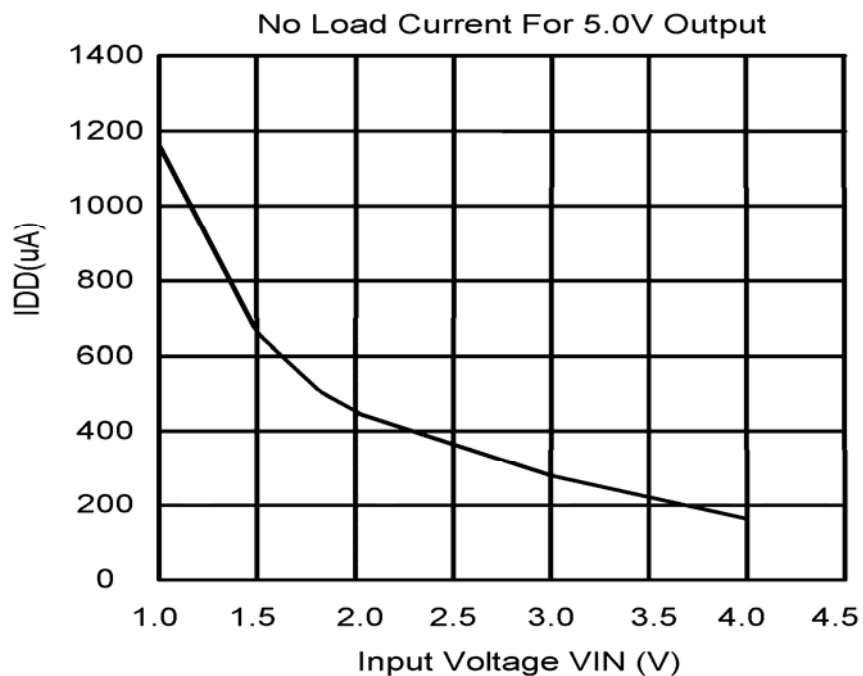
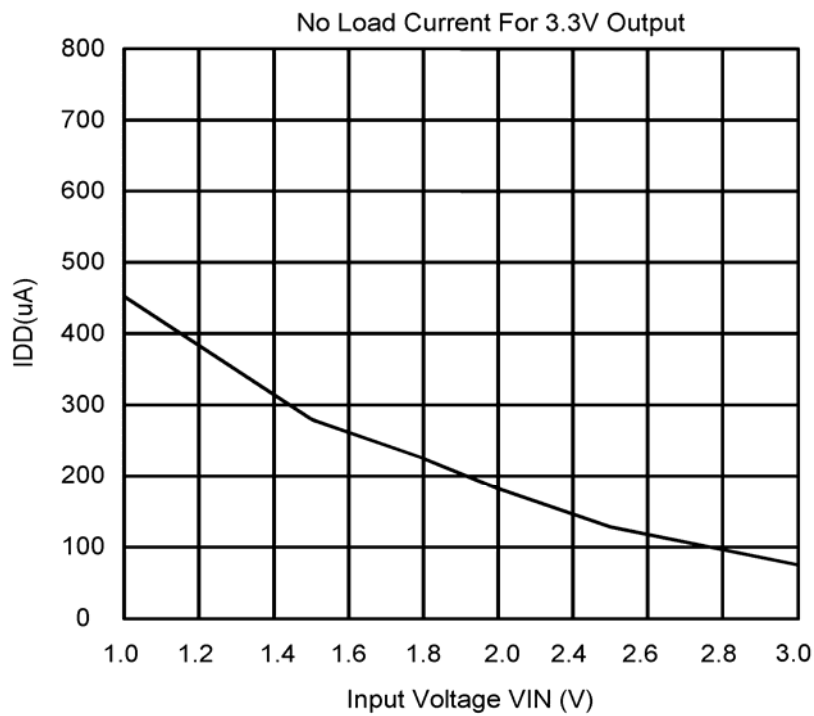
**Efficiency for 3.3V Output ( $V_{in}=2.0V$ )**



**Efficiency for 5.0V Output ( $V_{in}=2.0V$ )**







**Typical Application Circuit**

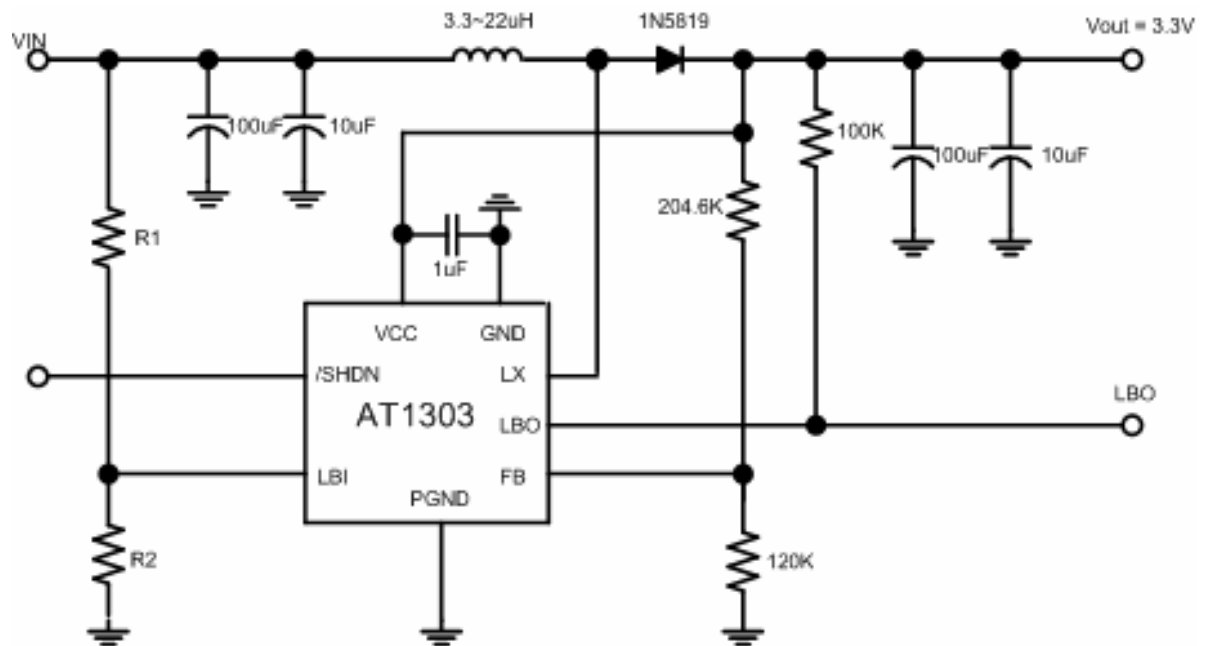


Fig. 1

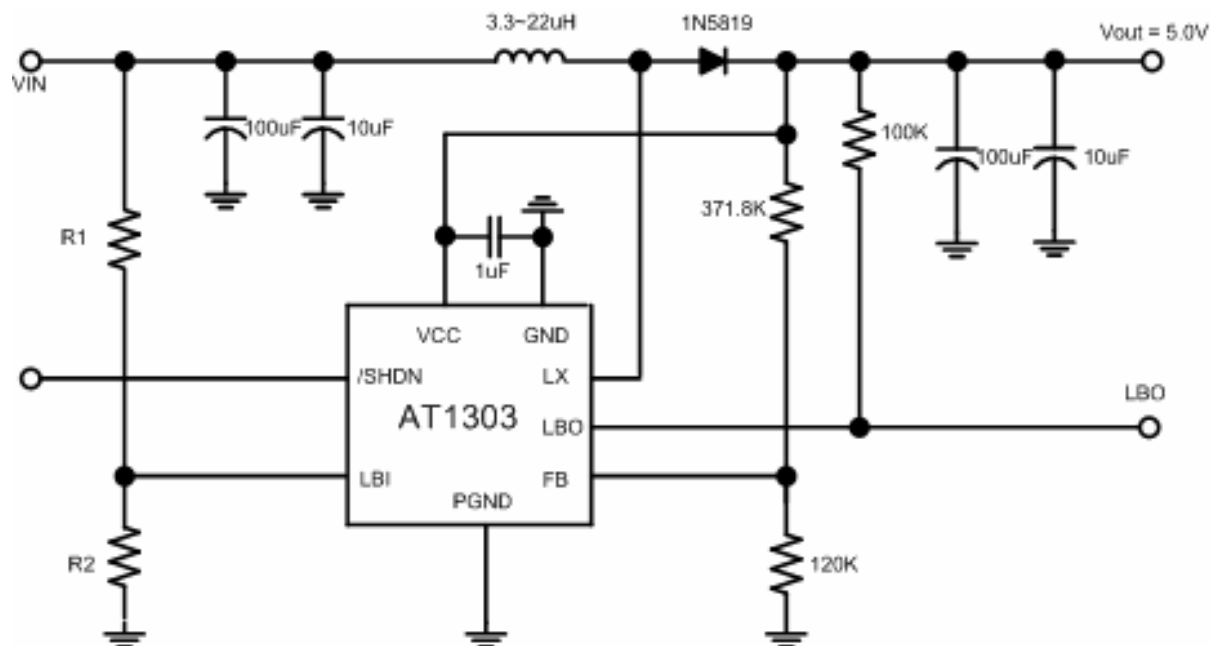
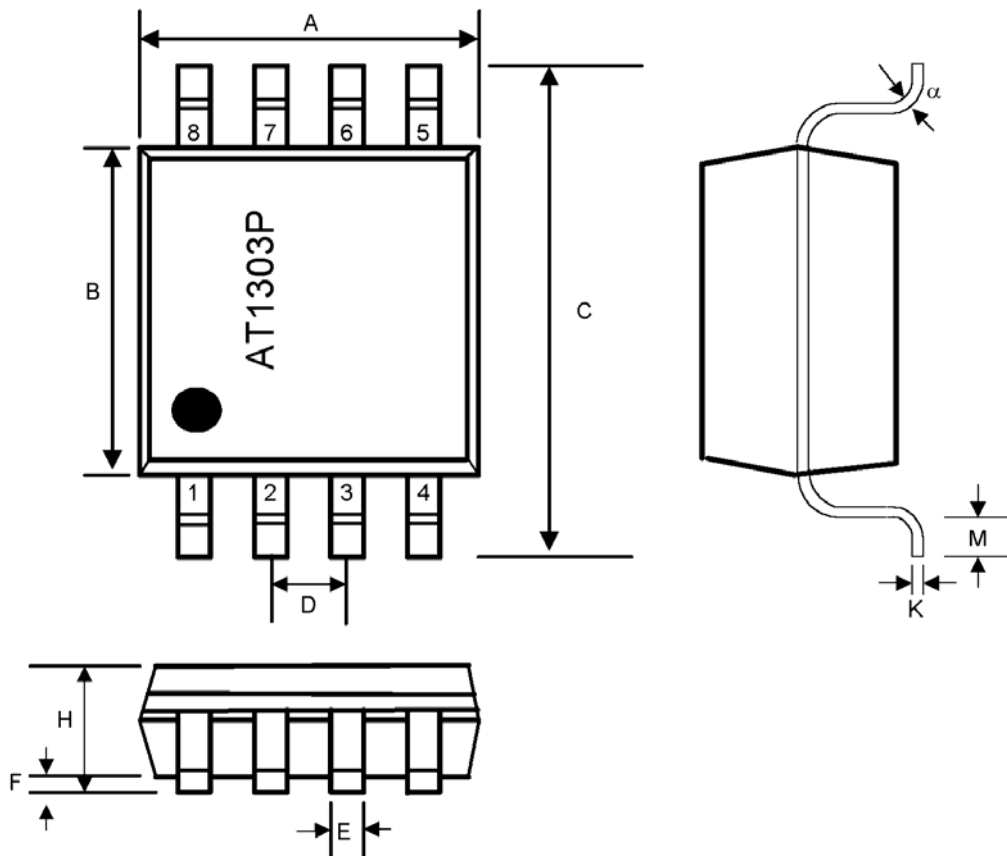


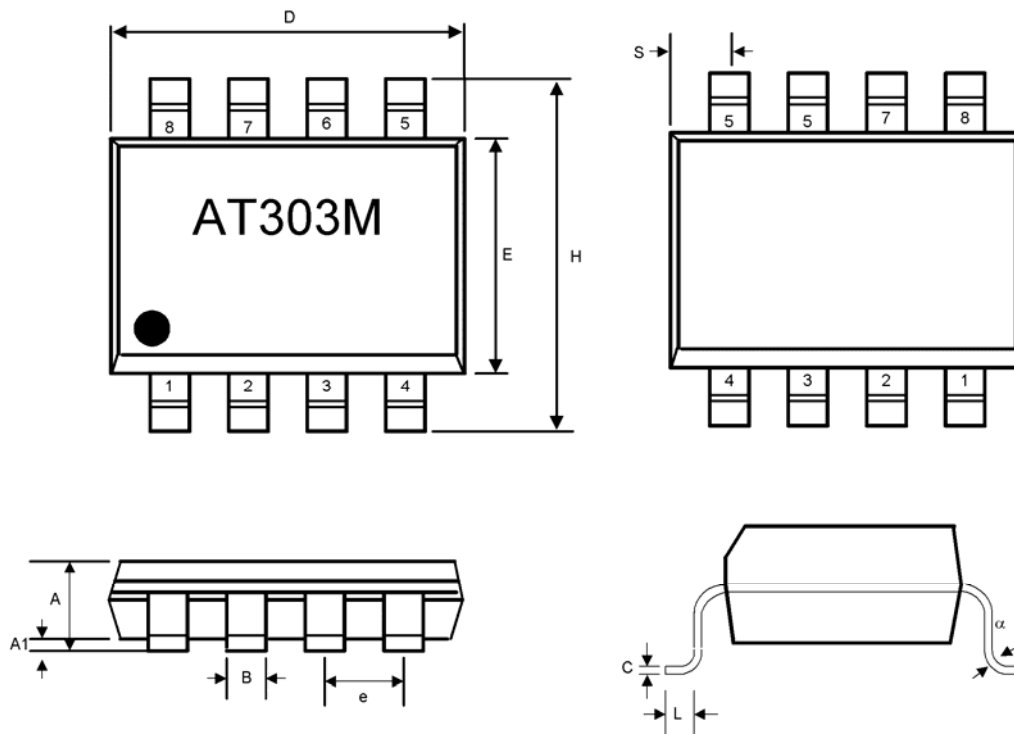
Fig. 2

**Small Outline 8-pin TSSOP**



| SYMBOL   | INCHES |       | MILLIMETERS |      | NOTES |
|----------|--------|-------|-------------|------|-------|
|          | MIN    | MAX   | MIN         | MAX  |       |
| A        | 0.114  | 0.122 | 2.90        | 3.10 | -     |
| B        | 0.169  | 0.177 | 4.30        | 4.50 | -     |
| C        | 0.244  | 0.260 | 6.20        | 6.60 | -     |
| D        | 0.026  | BSC   | 0.65        | BSC  | -     |
| E        | 0.010  | 0.012 | 0.25        | 0.30 | -     |
| F        | 0.002  | 0.006 | 0.05        | 0.15 | -     |
| H        | 0.041  | 0.047 | 1.05        | 1.20 | -     |
| K        | 0.005  | BSC   | 0.127       | BSC  | -     |
| M        | 0.020  | 0.028 | 0.50        | 0.70 | -     |
| $\alpha$ | 0°     | 8°    | 0°          | 8°   | -     |

**Small Outline 8-pin Plastic MSOP**



| SYMBOL | INCHES     |       | MILLIMETERS |      | NOTES |
|--------|------------|-------|-------------|------|-------|
|        | MIN        | MAX   | MIN         | MAX  |       |
| A      | 0.037      | 0.043 | 0.94        | 1.10 | -     |
| A1     | 0.002      | 0.006 | 0.05        | 0.15 | -     |
| B      | 0.010      | 0.014 | 0.25        | 0.36 | -     |
| C      | 0.005      | 0.007 | 0.13        | 0.18 | -     |
| D      | 0.116      | 0.120 | 2.95        | 3.05 | -     |
| e      | 0.0256 BSC |       | 0.65 BSC    |      | -     |
| E      | 0.116      | 0.120 | 2.95        | 3.05 | -     |
| H      | 0.188      | 0.198 | 4.78        | 5.03 | -     |
| L      | 0.016      | 0.026 | 0.41        | 0.66 | -     |
| α      | 0°         | 6°    | 0°          | 6°   | -     |
| S      | 0.207 BSC  |       | 0.525 BSC   |      | -     |