



# SMA428A

## High Gain, Low Noise Amplifier

PRELIMINARY DATA

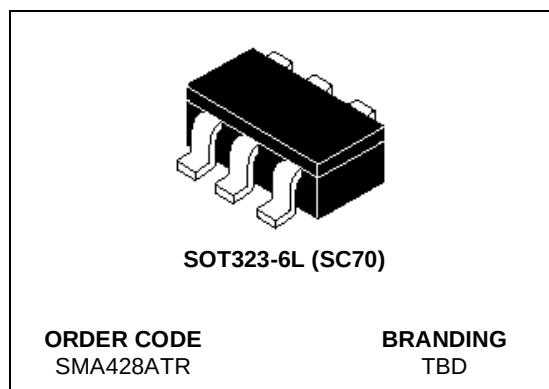
- HIGH GAIN  $G_p = 21$  dB at 1.85 GHz
- LOW NOISE FIGURE  $NF = 1.3$  dB at 1.85 GHz
- LOW CURRENT CONSUMPTION 5.9 mA
- OPEN COLLECTOR OUTPUT
- TYPICAL SUPPLY VOLTAGE: 2.4-3 V
- GAIN-STEP-MODE (36dB)
- ULTRA MINIATURE SOT323-6L PACKAGE (LEAD FREE)

### APPLICATIONS

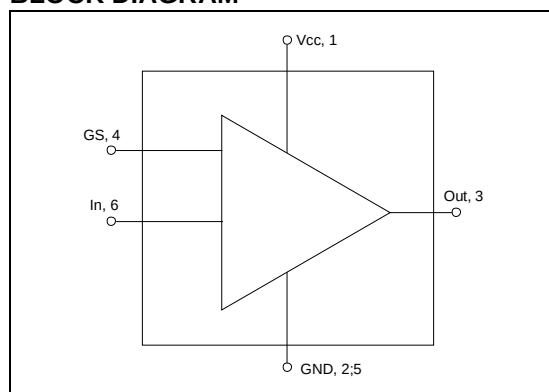
- LNA FOR CELLULAR MARKET (ideal for GSM900, DCS1800 and PCS1900).
- LNA FOR GPS APPLICATIONS

### DESCRIPTION

High gain and low noise figures make the SMA428A an ideal solution for Low Noise Amplifiers and receiver front end stages up to 2.5 GHz. SMA428A's typical supply voltage range is 2.4 to 3.3 volts. It shows excellent performances in terms of NF, Gain and current consumption, using just 3 external matching components. Applying supply voltage to the GS pin and grounding Vcc pin, it provides a reduced gain step of 35 dB. SMA428A is housed in ultra miniature SOT323-6L package(LEAD FREE), the relative dimensions are 1.15mmx1.8mm with 0.8mm thickness.



### BLOCK DIAGRAM



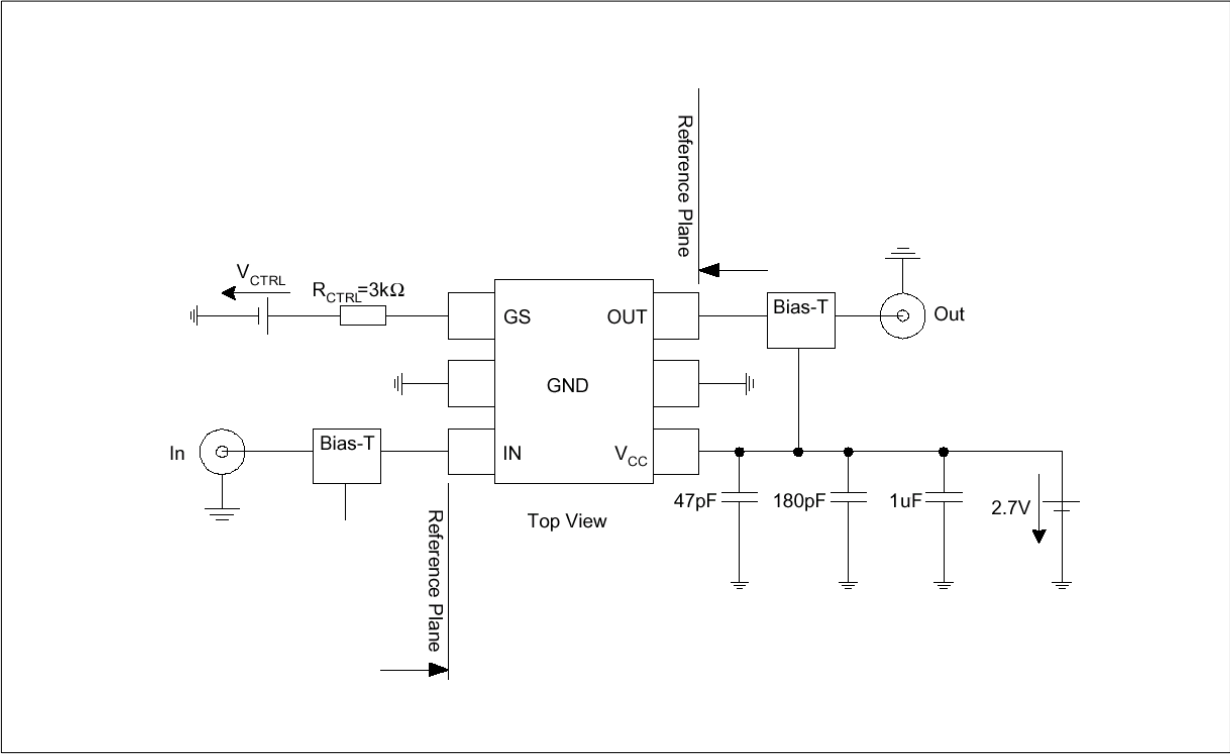
### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                           | Value       | Unit |
|-----------|-------------------------------------|-------------|------|
| $V_{cc}$  | Device voltage                      | 4           | V    |
| $V_{out}$ | Voltage at pin Out                  | 4           | V    |
| $V_{GS}$  | Voltage at pin GS                   | 3.5         | V    |
| $I_{tot}$ | Total Device Current                | 12          | mA   |
| $I_{in}$  | Current into pin In                 | 0.5         | mA   |
| $P_{tot}$ | Total dissipation, $T_s < 125$ °C   | 60          | mW   |
| $P_{IN}$  | Input Power                         | 8           | dBm  |
| $T_{op}$  | Operating temperature               | -40 to +85  | °C   |
| $T_{stg}$ | Storage temperature                 | -65 to +150 | °C   |
| $T_j$     | Max. operating junction temperature | 150         | °C   |

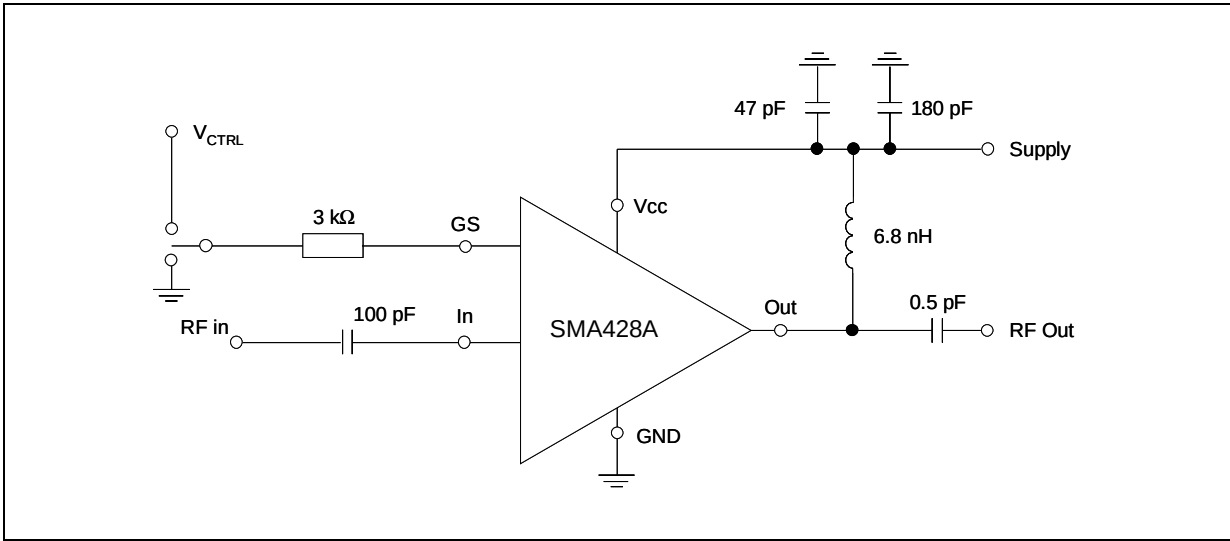
### THERMAL RESISTANCE

|            |                                             |     |      |
|------------|---------------------------------------------|-----|------|
| $R_{thjs}$ | Thermal Resistance Junction soldering point | 200 | °C/W |
|------------|---------------------------------------------|-----|------|

Test Circuit (Fig. 1)

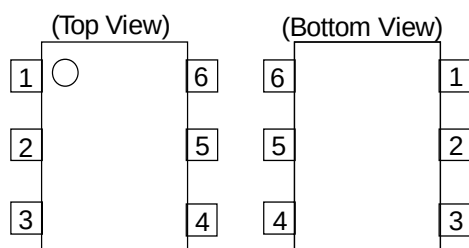


Typical application circuit (Fig. 2)



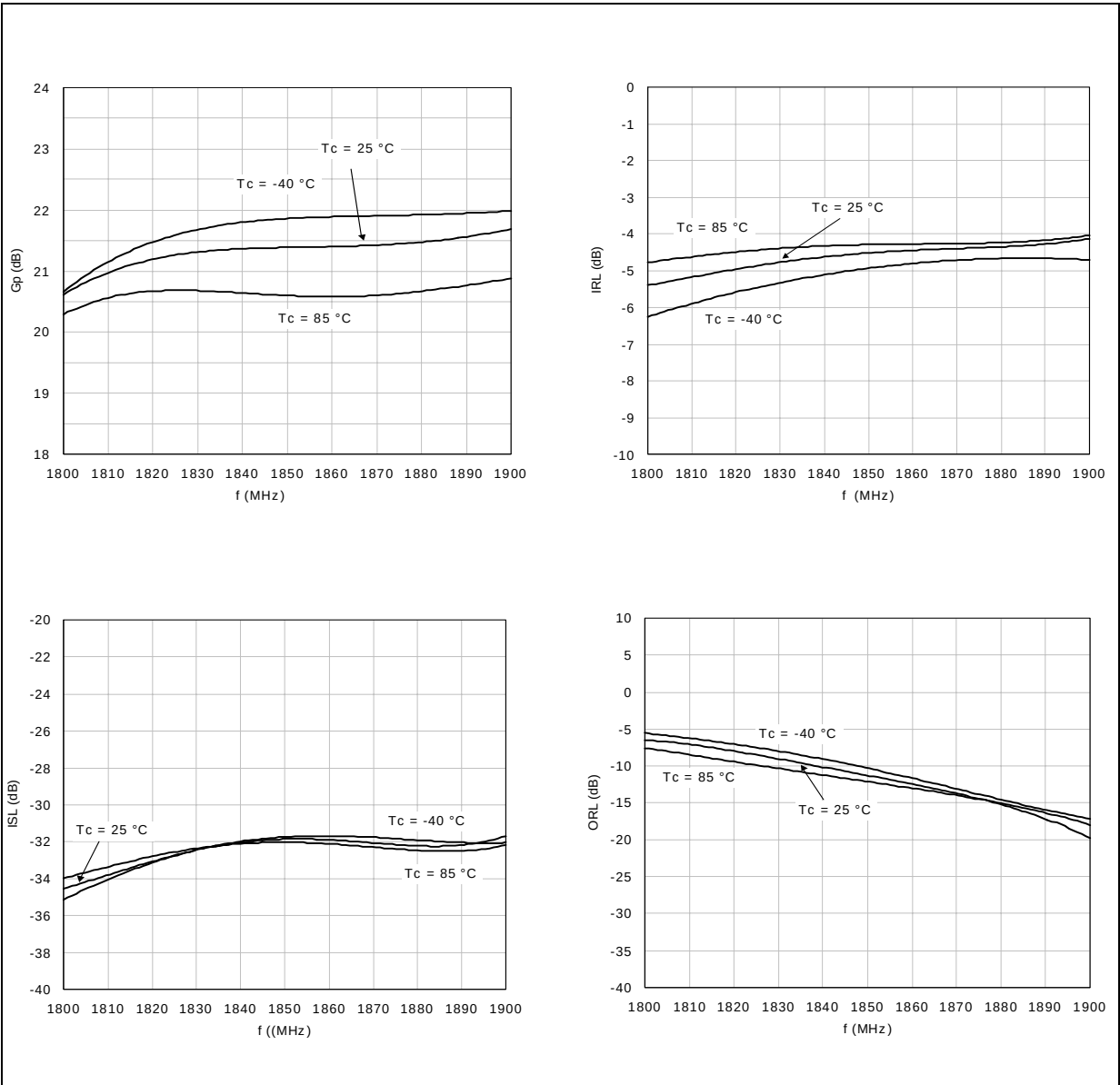
**ELECTRICAL CHARACTERISTICS**(Ta = +25°C, V<sub>CC</sub> = 2.7V, tested in circuit shown in fig.1, unless otherwise specified)

| Symbol            | Parameters                            | Test Conditions                                                                 | Min | Typ  | Max | Unit |
|-------------------|---------------------------------------|---------------------------------------------------------------------------------|-----|------|-----|------|
| f                 | Frequency Range                       |                                                                                 |     | 1850 |     | MHz  |
| I <sub>tot</sub>  | Total device current                  |                                                                                 |     | 5.9  | 7.5 | mA   |
| G <sub>p</sub>    | Power Gain                            |                                                                                 | 18  | 21   |     | dB   |
| NF                | Noise Figure (Z <sub>s</sub> = 50 Ω)  |                                                                                 |     | 1.3  | 1.7 | dB   |
| P <sub>-1dB</sub> | Input Power at 1 dB Gain Compression  |                                                                                 | -23 |      |     | dBm  |
| IIP3              | Input third order intercept point     |                                                                                 | -13 |      |     | dBm  |
| L <sub>GS</sub>   | Insertion Loss in Gain-Step-Mode      | V <sub>CC</sub> = 0.0 V, V <sub>CTRL</sub> = 2.7 V,<br>R <sub>CTRL</sub> = 3 kΩ | 11  |      | 18  | dB   |
| I <sub>CTR</sub>  | Current consumption in Gain-Step-Mode | V <sub>CC</sub> = 0.0 V, V <sub>CTRL</sub> = 2.7 V,<br>R <sub>CTRL</sub> = 3 kΩ |     | 0.33 |     | mA   |

**PIN CONNECTION**

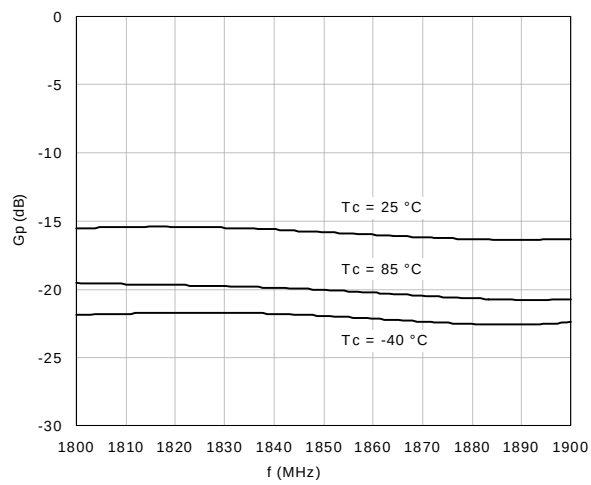
| Pin No. | Pin Name |
|---------|----------|
| 1       | VCC      |
| 2       | GND      |
| 3       | OUTPUT   |
| 4       | GS       |
| 5       | GND      |
| 6       | INPUT    |

S-Parameters (  $Z_L = Z_S = 50\ \Omega$ ,  $V_{CC} = 2.7V$ , measured in application circuit shown in fig.2)

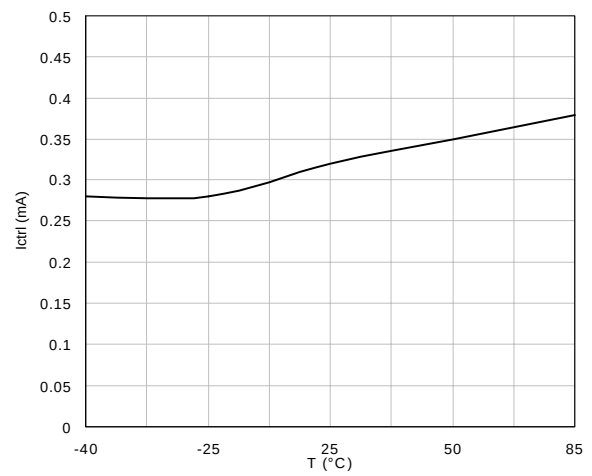
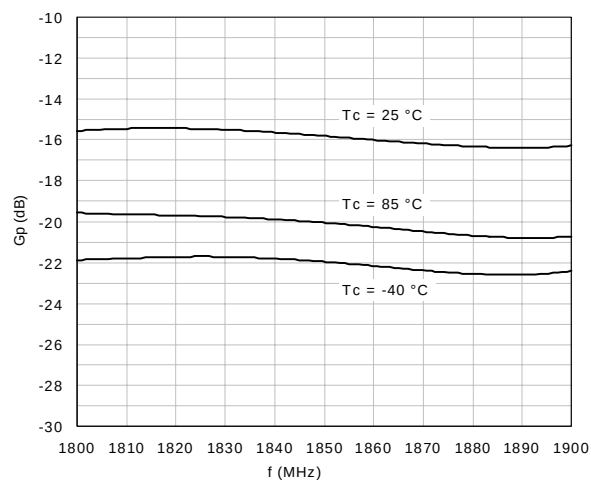


## TYPICAL PERFORMANCE

Supply Current Vs Temperature

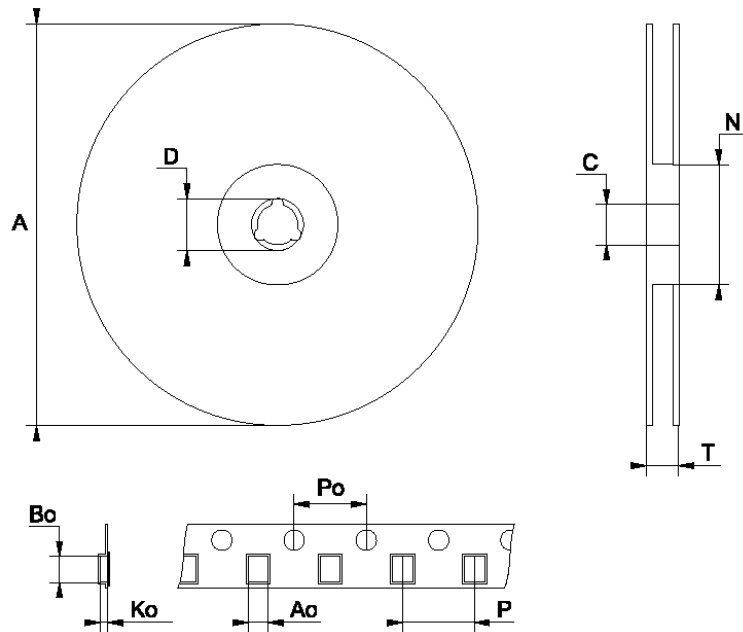


Control Current Vs Temperature

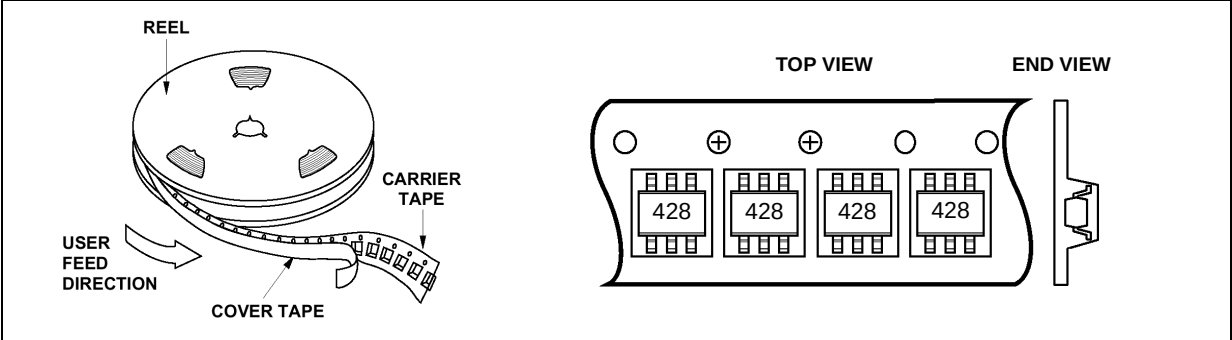
OFF-Gain ( $V_{cc} = 0V$ ,  $V_{ctrl} = 2.7V$ ,  $R_{ctrl} = 3Kohm$ )

TAPE & REEL DIMENSIONS

|    | mm                     |      |                        |
|----|------------------------|------|------------------------|
|    | MIN.                   | TYP. | MAX                    |
| A  | 178.5                  | 179  | 179.5                  |
| C  | 12.8                   | 13.0 | 13.5                   |
| D  | 20.2                   |      |                        |
| N  | 54.5                   | 55   | 55.5                   |
| T  |                        |      | 14.4                   |
| Ao |                        | 2.25 |                        |
| Bo |                        | 2.7  |                        |
| Ko |                        | 1.2  |                        |
| Po | 3.8 (cumulative 10 Po) | 4.0  | 4.2 (cumulative 10 Po) |
| P  |                        | 4.0  |                        |

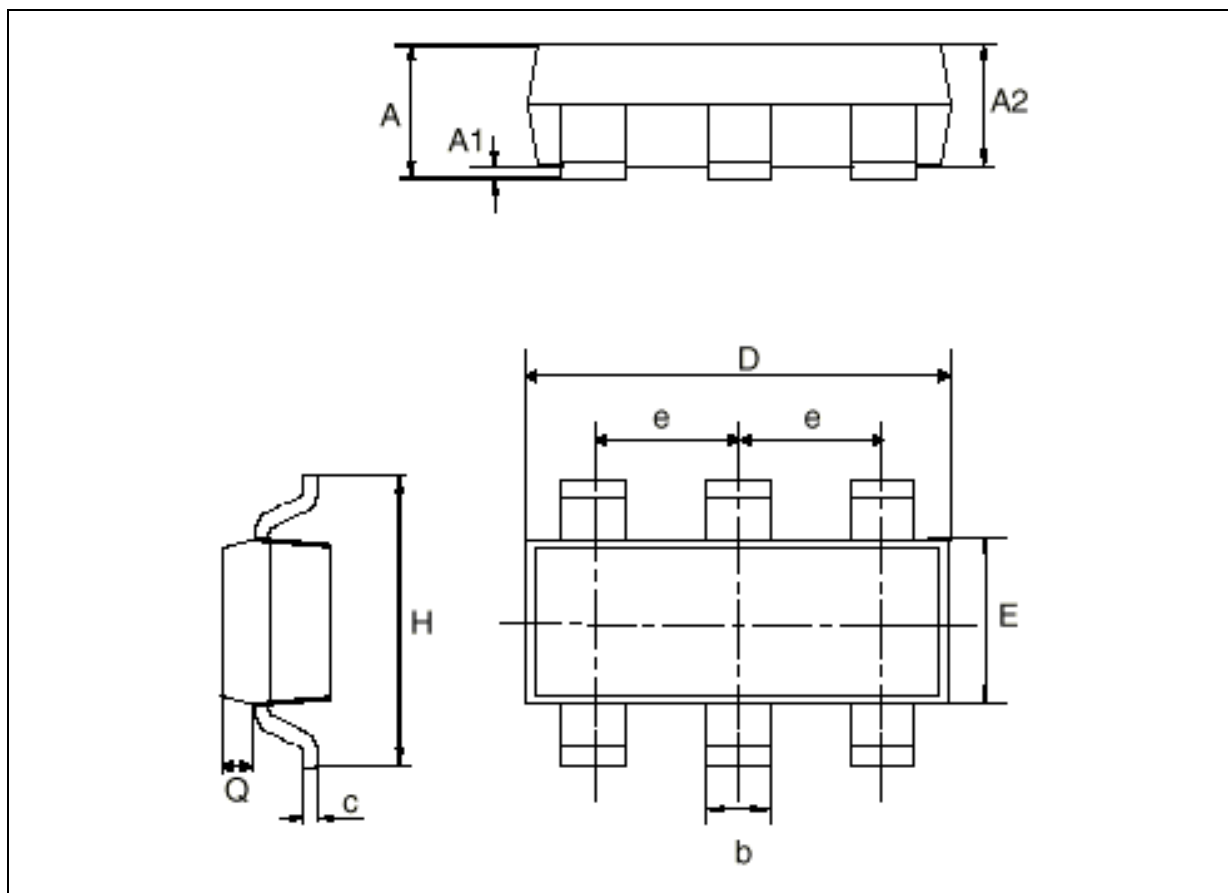


DEVICE ORIENTATION



## SOT323-6L MECHANICAL DATA

| DIM. | mm   |      |      | Inch   |       |       |
|------|------|------|------|--------|-------|-------|
|      | MIN. | TYP. | MAX  | MIN.   | TYP.  | MAX   |
| A    | 0.8  |      | 1.1  | 0.031  |       | 0.043 |
| A1   | 0    |      | 0.1  | 0      |       | 0.004 |
| A2   | 0.8  |      | 1    | 0.0031 |       | 0.039 |
| b    | 0.15 |      | 0.3  | 0.006  |       | 0.012 |
| c    | 0.1  |      | 0.18 | 0.004  |       | 0.007 |
| D    | 1.8  |      | 2.2  | 0.071  |       | 0.088 |
| E    | 1.15 |      | 1.35 | 0.045  |       | 0.59  |
| e    |      | 0.65 |      |        | 0.025 |       |
| H    | 1.8  |      | 2.4  | 0.071  |       | 0.094 |
| Q    | 0.1  |      | 0.4  | 0.004  |       | 0.016 |



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