

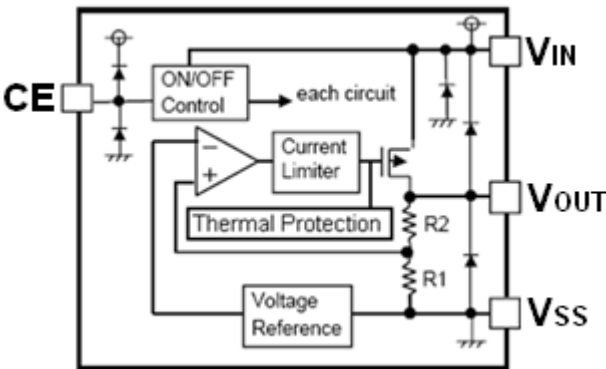
INTRODUCTION

The CE6208 Series are a group of positive voltage regulators manufactured by CMOS technology with high ripple rejection, ultra-fast transient response and low dropout voltage, which provide large output currents even when the difference of the input-output voltage is small. Each of the CE6208 series consists of a high-precision voltage reference, an error correction circuit, and a current limited output driver. Thus the series are very suitable for the battery-powered equipments, wireless communication applications, industry equipments and so on.

APPLICATIONS

- Battery powered systems
- Portable instrumentations
- PC peripherals

BLOCK DIAGRAM



FEATURES

- Guaranteed Output Current: 1.0A(Typ.)
- Low Quiescent Current: 70μA (Typ.)
- Output Voltage Range: 1.5V~5.0V
- Input Voltage Range: 2.5V~6.0V
- High Accuracy: ±2% (Typ.)
- Dropout Voltage:  
500mV@1.0A (3.0V Typ.)
- Excellent Line Regulation: 0.02%/V
- High PSRR : 70dB@1KHz
- Built-in Current Limiter & Thermal Protection
- Short Circuit Current Fold-back
- Output Capacitor: Ceramic Compatible

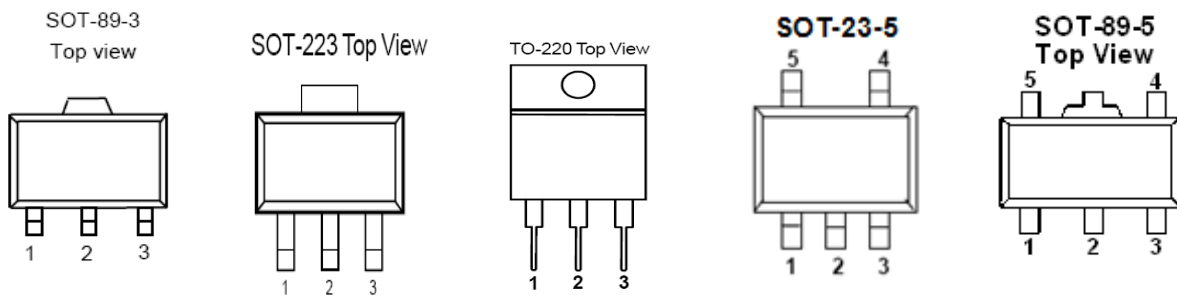
- CD/DVD-ROM, CD/RW
- Wireless devices
- Battery charger

ORDER INFORMATION

CE6208①②③④

| DESIGNATOR | SYMBOL  | DESCRIPTION                                   |
|------------|---------|-----------------------------------------------|
| ①          | A       | Standard                                      |
|            | B       | With Shutdown Function                        |
| ②③         | Integer | Output Voltage(1.5~5.0V)<br>e.g:3.0V=②:3, ③:0 |
| ④          | G       | Package:SOT-223                               |
|            | P       | Package:SOT-89                                |
|            | B       | Package:TO-220                                |
|            | M       | Package:SOT-23-5                              |

### ■ PIN CONFIGURATION (Pin output sequence can be ordered by customer)



### CE6208AXX (SOT-223, SOT-89-3, TO-220)

| PIN NUMBER |    |    |          |    |    |        |    |    | PIN NAME         | FUNCTION    |
|------------|----|----|----------|----|----|--------|----|----|------------------|-------------|
| SOT-223    |    |    | SOT-89-3 |    |    | TO-220 |    |    |                  |             |
| G          | GW | GL | P        | PW | PL | B      | BW | BL |                  |             |
| 1          | 1  | 2  | 1        | 1  | 2  | 1      | 1  | 2  | V <sub>SS</sub>  | Ground      |
| 2          | 3  | 1  | 2        | 3  | 1  | 2      | 3  | 1  | V <sub>IN</sub>  | Power input |
| 3          | 2  | 3  | 3        | 2  | 3  | 3      | 2  | 3  | V <sub>OUT</sub> | Output      |

### ■ CE6208BXXP (SOT-89-5) /CE6208BXXM (SOT-23-5)

| PIN NUMBER |          | PIN NAME         | FUNCTION      |
|------------|----------|------------------|---------------|
| SOT-23-5   | SOT-89-5 |                  |               |
| 3          | 1        | CE               | Chip Enable   |
| 2          | 2        | V <sub>SS</sub>  | Ground        |
| 4          | 3        | NC               | No Connection |
| 1          | 4        | V <sub>IN</sub>  | Power input   |
| 5          | 5        | V <sub>OUT</sub> | Output Pin    |

### ■ ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified, Ta=25°C)

| PARAMETER                    |          | SYMBOL              | RATINGS                                   | UNITS |
|------------------------------|----------|---------------------|-------------------------------------------|-------|
| Input Voltage                |          | V <sub>IN</sub>     | V <sub>SS</sub> -0.3~V <sub>SS</sub> +7   | V     |
| Output Current               |          | I <sub>OUT</sub>    | 2000                                      | mA    |
| Output Voltage               |          | V <sub>OUT</sub>    | V <sub>SS</sub> -0.3~V <sub>IN</sub> +0.3 | V     |
| Power Dissipation            | SOT-89   | Pd                  | 600                                       | mW    |
|                              | SOT-223  | Pd                  | 800                                       | mW    |
|                              | TO-220   | Pd                  | 3000                                      | mW    |
|                              | SOT-23-5 | Pd                  | 250                                       | mW    |
| Operating Temperature        |          | T <sub>opr</sub>    | -40~+85                                   | °C    |
| Storage Temperature          |          | T <sub>stg</sub>    | -40~+125                                  | °C    |
| Soldering Temperature & Time |          | T <sub>solder</sub> | 260°C, 10s                                |       |

## ■ ELECTRICAL CHARACTERISTICS

CE6208 Series ( $V_{IN}=V_{OUT}+1V$ ,  $C_{IN}=C_{OUT}=4.7\mu F$ ,  $T_a=25^\circ C$ , unless otherwise specified)

| PARAMETER                                        | SYMBOL                                           | CONDITIONS                                               | MIN                | TYP                   | MAX                | UNITS              |
|--------------------------------------------------|--------------------------------------------------|----------------------------------------------------------|--------------------|-----------------------|--------------------|--------------------|
| Output Voltage                                   | $V_{OUT}(E)$<br>(Note 2)                         | $I_{OUT}=100mA$                                          | $V_{OUT}$<br>*0.98 | $V_{OUT}$<br>(Note 1) | $V_{OUT}$<br>*1.02 | V                  |
| Supply Current                                   | $I_{SS}$                                         |                                                          |                    | 70                    |                    | $\mu A$            |
| Shutdown Current                                 | $I_{SHDN}$                                       | $V_{CE}=V_{SS}$                                          |                    | 0.1                   | 1.0                | $\mu A$            |
| Output Current                                   | $I_{OUT}$                                        | —                                                        | 1000               |                       |                    | mA                 |
| Dropout Voltage<br>(Note 3)                      | $V_{dif1}$                                       | $I_{OUT}=300mA$                                          |                    | 150                   |                    | mV                 |
|                                                  | $V_{dif2}$                                       | $I_{OUT}=1000mA$                                         |                    | 500                   |                    | mV                 |
| Load Regulation                                  | $\Delta V_{OUT}$                                 | $V_{IN}=V_{OUT}+1V$ ,<br>$1mA \leq I_{OUT} \leq 1.0A$    |                    | 30                    |                    | mV                 |
| Line Regulation                                  | $\frac{\Delta V_{OUT}}{\Delta V_{IN} * V_{OUT}}$ | $I_{OUT}=100mA$<br>$V_{OUT}+1V \leq V_{IN} \leq 6V$      |                    | 0.02                  | 0.2                | %/V                |
| Output Voltage<br>Temperature<br>Characteristics | $\frac{\Delta V_{OUT}}{\Delta T * V_{OUT}}$      | $I_{OUT}=100mA$<br>$-40^\circ C \leq T \leq +85^\circ C$ |                    | 50                    |                    | ppm/<br>$^\circ C$ |
| Short Current                                    | $I_{Short}$                                      | $V_{OUT}=V_{SS}$                                         |                    | 200                   |                    | mA                 |
| Input Voltage                                    | $V_{IN}$                                         | —                                                        | 2.5                |                       | 6.0                | V                  |
| Power Supply<br>Rejection Rate                   | 1KHz                                             | PSRR                                                     | $I_{OUT}=100mA$    | 70                    |                    | dB                 |
|                                                  | 10KHz                                            |                                                          |                    | 50                    |                    |                    |
| CE "High" Voltage                                | $V_{CE} "H"$                                     |                                                          | 1.5                |                       | $V_{IN}$           | V                  |
| CE "Low" Voltage                                 | $V_{CE} "L"$                                     |                                                          |                    |                       | 0.3                | V                  |
| Thermal Shutdown<br>Temperature                  | $T_{SD}$                                         |                                                          |                    | 150                   |                    | $^\circ C$         |
| Thermal Shutdown<br>Temperature Hysteresis       | $\Delta T_{SD}$                                  |                                                          |                    | 30                    |                    | $^\circ C$         |

### NOTE:

1.  $V_{OUT}$ : Specified Output Voltage.
2.  $V_{OUT}(E)$ : Effective Output Voltage (I.e. The Output Voltage When  $V_{IN} = (V_{OUT} + 1.0V)$  And Maintain A Certain  $I_{OUT}$  Value).
3.  $V_{diff}$ : The Difference Of Output Voltage And Input Voltage When Input Voltage Is Decreased Gradually Till Output Voltage Equals To 98% Of  $V_{OUT}(E)$ ; When  $V_{OUT} < 2.5V$ ,  $V_{IN} \geq 2.5V$  Should be Guaranteed.

## TYPICAL APPLICATION CIRCUITS

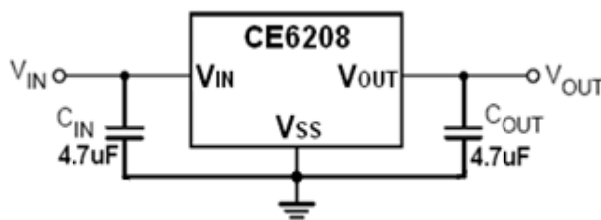


Figure1 CE6208A Typical Application Circuit

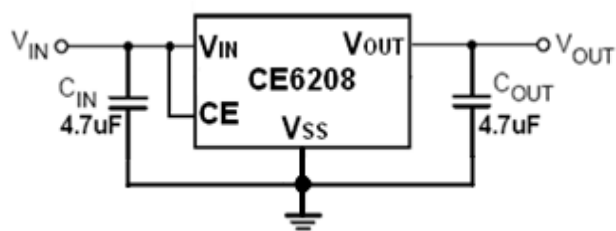


Figure2 CE6208B Typical Application Circuit

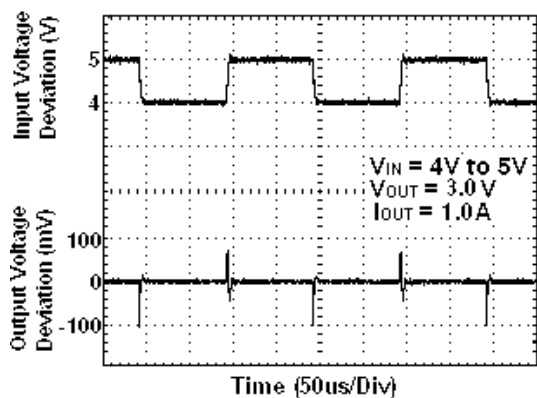
Input capacitor ( $C_{IN}$ ): 4.7 $\mu$ F or more;

Output capacitor ( $C_{OUT}$ ): 4.7 $\mu$ F or more;

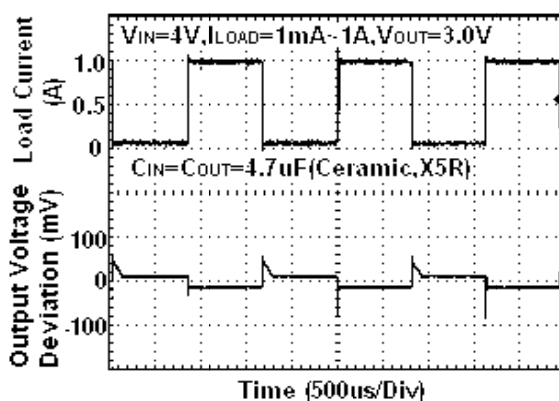
**Caution:** A general series regulator may oscillate, depending on the external components selected. Check that no oscillation occurs with the application using the above capacitor.

## TYPICAL PERFORMANCE CHARACTERISTICS

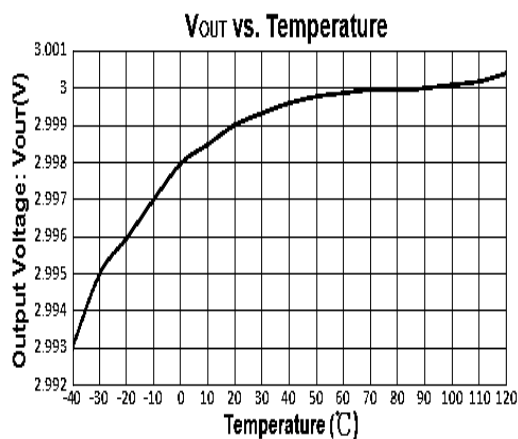
### (1) Input Transient Response



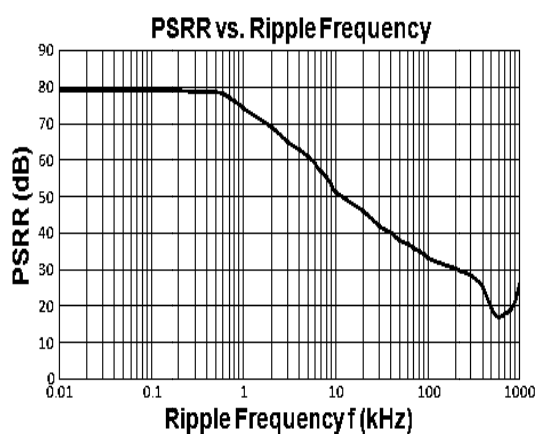
### (2) Load Transient Response



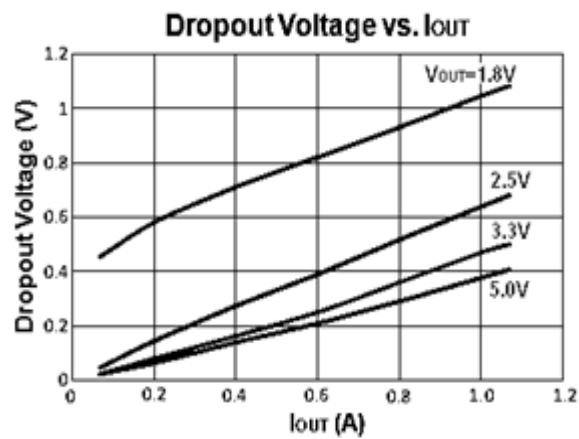
### (3) Output Voltage vs. Temperature



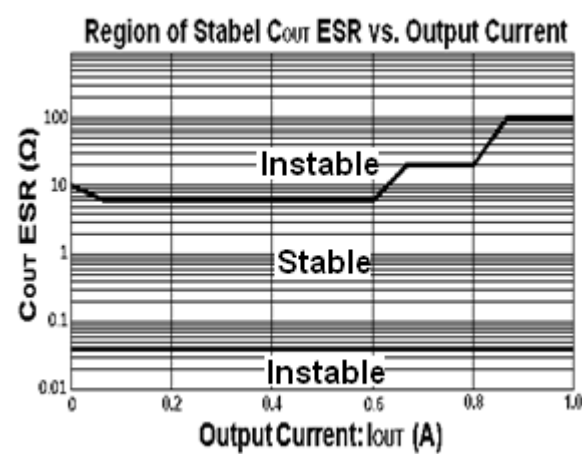
### (4) Power Supply Rejection Ratio



(3) Dropout Voltage vs. Output Current

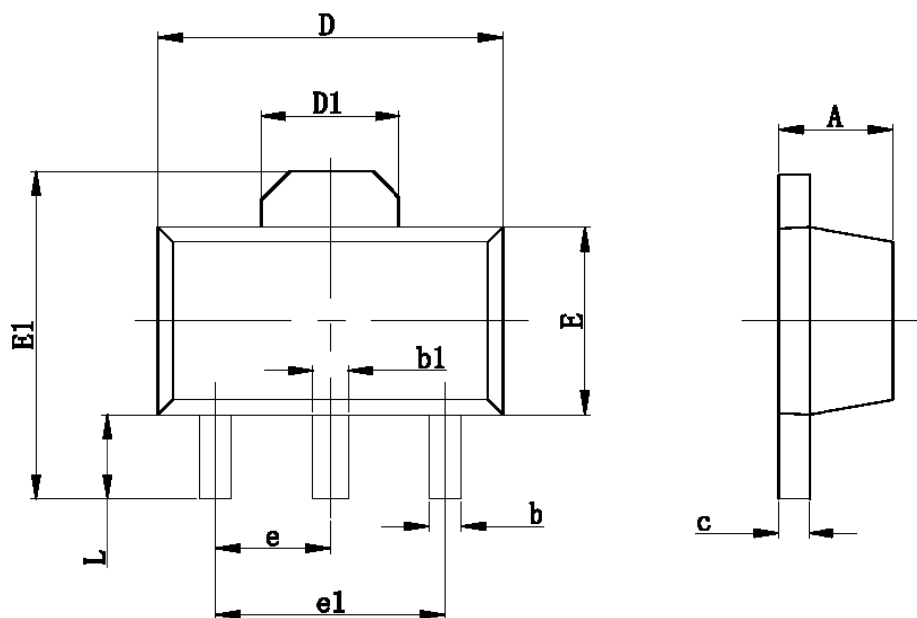


(4) Region of Stable  $C_{OUT}$  ESR vs. Load



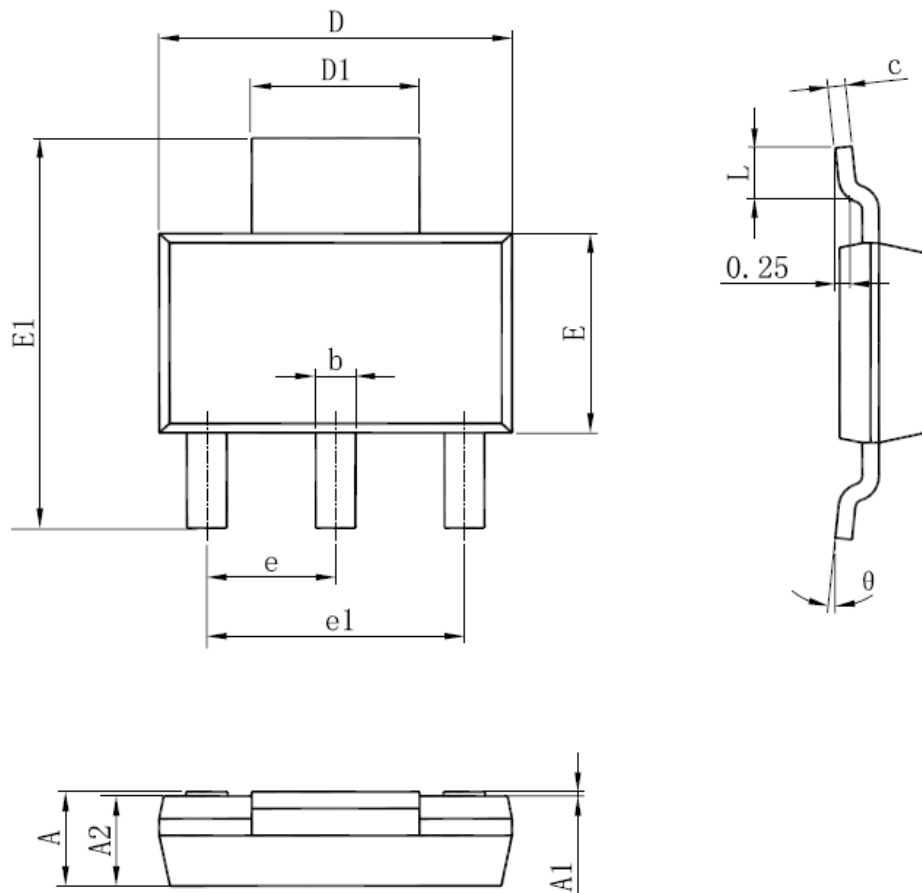
## ■ PACKAGING INFORMATION

### ● SOT-89-3 PACKAGE OUTLINE DIMENSIONS



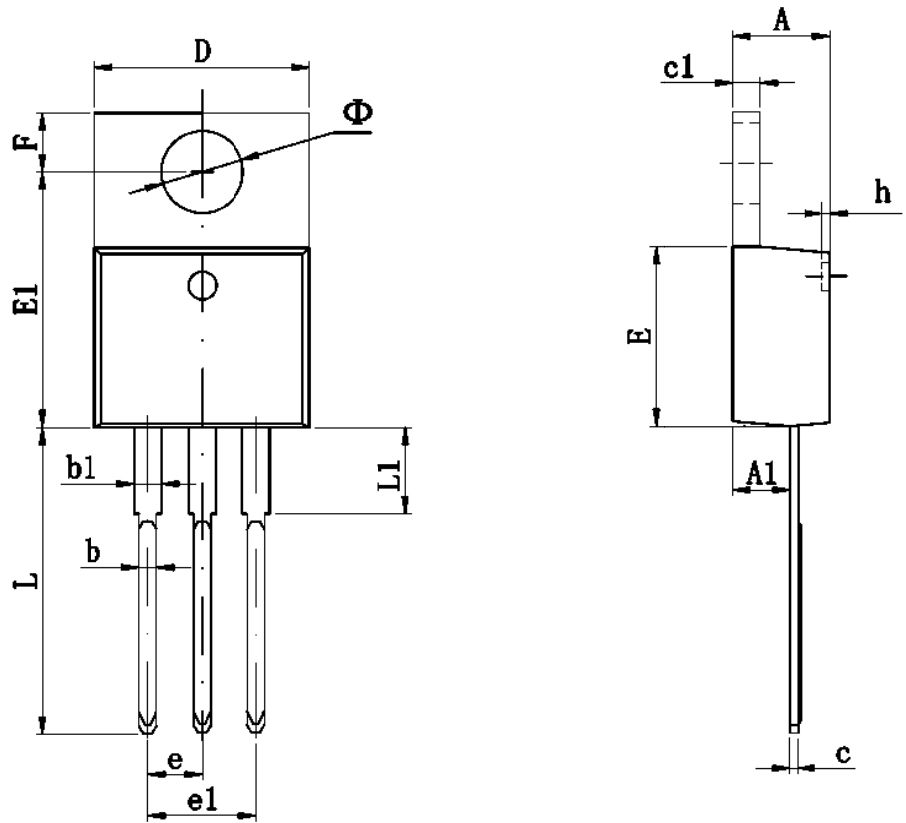
| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.400                     | 1.600 | 0.055                | 0.063 |
| b      | 0.320                     | 0.520 | 0.013                | 0.197 |
| b1     | 0.400                     | 0.580 | 0.016                | 0.023 |
| c      | 0.350                     | 0.440 | 0.014                | 0.017 |
| D      | 4.400                     | 4.600 | 0.173                | 0.181 |
| D1     | 1.550 REF                 |       | 0.061 REF            |       |
| E      | 2.300                     | 2.600 | 0.091                | 0.102 |
| E1     | 3.940                     | 4.250 | 0.155                | 0.167 |
| e      | 1.500 TYP                 |       | 0.060TYP             |       |
| e1     | 3.000 TYP                 |       | 0.118TYP             |       |
| L      | 0.900                     | 1.200 | 0.035                | 0.047 |

• SOT-223 PACKAGE OUTLINE DIMENSIONS



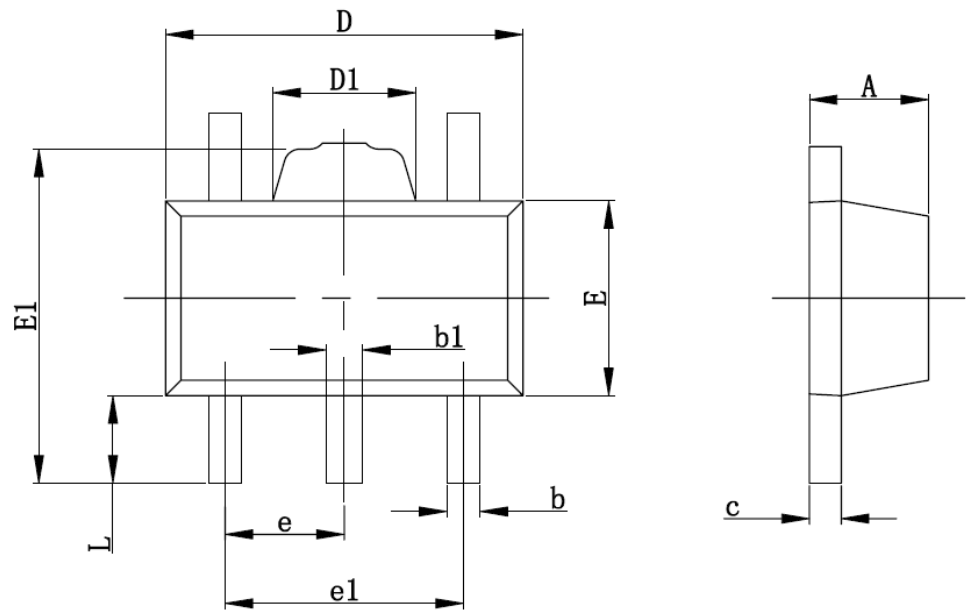
| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.520                     | 1.800 | 0.060                | 0.071 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.500                     | 1.700 | 0.059                | 0.067 |
| b      | 0.660                     | 0.820 | 0.026                | 0.032 |
| c      | 0.250                     | 0.350 | 0.010                | 0.014 |
| D      | 6.200                     | 6.400 | 0.244                | 0.252 |
| D1     | 2.900                     | 3.100 | 0.114                | 0.122 |
| E      | 3.300                     | 3.700 | 0.130                | 0.146 |
| E1     | 6.830                     | 7.070 | 0.269                | 0.278 |
| e      | 2.300(BSC)                |       | 0.091(BSC)           |       |
| e1     | 4.500                     | 4.700 | 0.177                | 0.185 |
| L      | 0.900                     | 1.150 | 0.035                | 0.045 |
| θ      | 0°                        | 10°   | 0°                   | 10°   |

• TO-220 PACKAGE OUTLINE DIMENSIONS



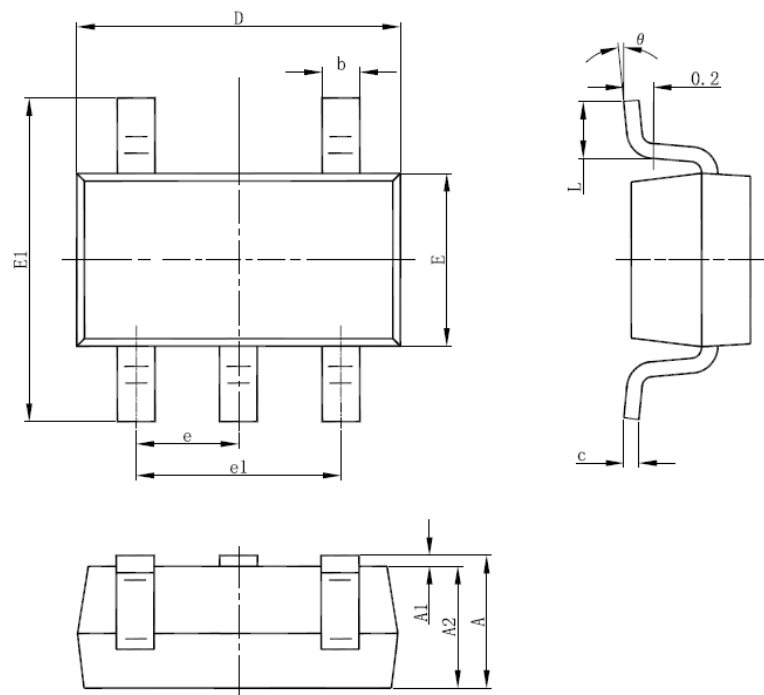
| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min                       | Max    | Min                  | Max   |
| A      | 4.470                     | 4.670  | 0.176                | 0.184 |
| A1     | 2.520                     | 2.820  | 0.099                | 0.111 |
| b      | 0.710                     | 0.910  | 0.028                | 0.036 |
| b1     | 1.170                     | 1.370  | 0.046                | 0.054 |
| c      | 0.310                     | 0.530  | 0.012                | 0.021 |
| c1     | 1.170                     | 1.370  | 0.046                | 0.054 |
| D      | 10.010                    | 10.310 | 0.394                | 0.406 |
| E      | 8.500                     | 8.900  | 0.335                | 0.350 |
| E1     | 12.060                    | 12.460 | 0.475                | 0.491 |
| e      | 2.540 TYP                 |        | 0.100 TYP            |       |
| e1     | 4.980                     | 5.180  | 0.196                | 0.204 |
| F      | 2.590                     | 2.890  | 0.102                | 0.114 |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| L      | 13.400                    | 13.800 | 0.528                | 0.543 |
| L1     | 3.560                     | 3.960  | 0.140                | 0.156 |
| Φ      | 3.735                     | 3.935  | 0.147                | 0.155 |

• SOT-89-5 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.400                     | 1.600 | 0.055                | 0.063 |
| b      | 0.320                     | 0.520 | 0.013                | 0.020 |
| b1     | 0.360                     | 0.560 | 0.014                | 0.022 |
| c      | 0.350                     | 0.440 | 0.014                | 0.017 |
| D      | 4.400                     | 4.600 | 0.173                | 0.181 |
| D1     | 1.400                     | 1.800 | 0.055                | 0.071 |
| E      | 2.300                     | 2.600 | 0.091                | 0.102 |
| E1     | 3.940                     | 4.250 | 0.155                | 0.167 |
| e      | 1.500TYP                  |       | 0.060TYP             |       |
| e1     | 2.900                     | 3.100 | 0.114                | 0.122 |
| L      | 0.900                     | 1.100 | 0.035                | 0.043 |

● SOT-23-5 PACKAGE OUTLINE DIMENSIONS



| 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°    |

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