

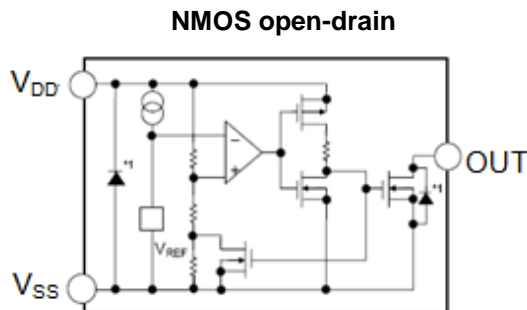
■ INTRODUCTION

The SMV801 Series is a series of high-precision low voltage detectors developed using CMOS process. The detection voltage is fixed internally, with an accuracy of 2.0%. Two output forms, NMOS open-drain and CMOS output, are available.

■ APPLICATIONS

- Memory battery back-up circuits
- Power-on reset circuits
- Power failure detection
- Power monitor for portable equipment such as notebook computers, digital cameras, PDA, and cellular phones
- Constant voltage power monitors for cameras, video equipment and communication devices
- Power monitor for microcomputers and reset for CPUs

■ BLOCK DIAGRAMS



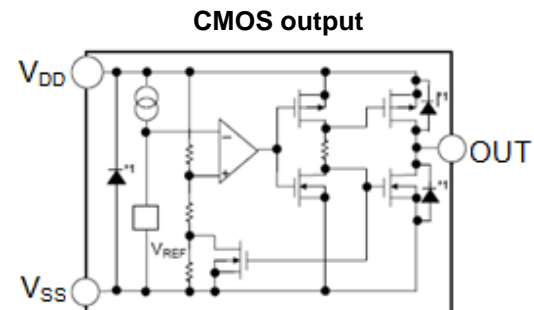
■ FEATURES

- Ultra-low current consumption: 0.9mA @ 3.5V (Typ.)
- High-precision detection voltage: $\pm 2.0\%$
- Operating voltage range: 0.7V ~ 6.0V
- Hysteresis characteristics: $-V_{DET} \times 5\%$ (Typ.)
- Detection voltage: 0.9V ~ 2.0V (10mV step)
- Output forms:
 - NMOS open-drain output (Active Low)
 - CMOS output (Active Low)

■ ORDER INFORMATION

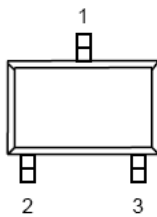
SMV801①②③④⑤

| DESIGNATOR | SYMBOL | DESCRIPTION |
|------------|------------|---|
| ① | C | CMOS |
| | N | NMOS open drain |
| ② ③ ④ | Integer | Detection Voltage (0.90V~2.00V), “④”elide when it is “0” e.g. 3.0V=② :3, ③ :0 2.93V=② :2, ③ :9, ④ :3 |
| ⑤ | M/MA/MB/MR | Package: SOT-23,SOT-23-3/5 |
| | N | Package: SOT-343(SC-82) |
| | P | Package: SOT-89-3 |
| | T/TA | Package: TO-92 |



■ PIN CONFIGURATION

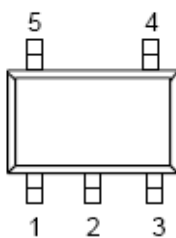
SOT-23-3
Top view



SMV801 Series (SOT-23-3/SOT-23)

| PIN NO. | M | MA | MB | FUNCTION |
|---------|------------------|------------------|------------------|------------------------------|
| 1 | V _{DD} | V _{DD} | V _{DD} | Voltage input pin |
| 2 | V _{OUT} | - | V _{OUT} | Voltage detection output pin |
| | - | V _{SS} | - | Ground |
| 3 | V _{SS} | - | V _{SS} | Ground |
| | - | V _{OUT} | - | Voltage detection output pin |

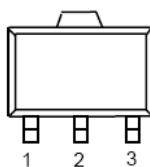
SOT-23-5
Top view



SMV801 Series (SOT-23-5)

| PIN NO. | MR | FUNCTION |
|---------|------------------|------------------------------|
| 1 | V _{OUT} | Voltage detection output pin |
| 2 | V _{DD} | Voltage input pin |
| 3 | V _{SS} | Ground |
| 4 | NC | No connection |
| 5 | NC | No connection |

SOT-89-3
Top view



SMV801 Series (SOT-89-3)

| PIN NO. | P | FUNCTION |
|---------|------------------|------------------------------|
| 1 | V _{OUT} | Voltage detection output pin |
| 2 | V _{DD} | Voltage input pin |
| 3 | V _{SS} | Ground |

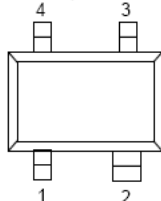
TO-92
Bottom view



SMV801 Series (TO-92)

| PIN NO. | T | TA | FUNCTION |
|---------|------------------|------------------|------------------------------|
| 1 | V _{OUT} | - | Voltage detection output pin |
| | - | V _{DD} | Voltage input pin |
| 2 | V _{DD} | - | Voltage input pin |
| | - | V _{SS} | Ground |
| 3 | V _{SS} | - | Ground |
| | - | V _{OUT} | Voltage detection output pin |

SOT343(SC-82)
Top view



SMV801 Series (SOT-343)

| PIN NO. | N | FUNCTION |
|---------|------------------|------------------------------|
| 1 | V _{OUT} | Voltage detection output pin |
| 2 | V _{DD} | Voltage input pin |
| 3 | NC | No Connection |
| 4 | V _{SS} | Ground |

■ ABSOLUTE MAXIMUM RATINGS

(TA=25°C, unless otherwise specified)

| PARAMETER | | SYMBOL | RATINGS | UNITS |
|-------------------------------|------------------------|---------------------|--|-------|
| Power supply voltage | | V _{DD} | V _{SS} -0.3 ~ V _{SS} + 8 | V |
| Output voltage | | V _{OUT} | V _{SS} -0.3 ~ V _{SS} + 8 | V |
| Power dissipation | SOT-343 | PD | 250 | mW |
| | SOT-23 | | 250 | mW |
| | SOT-23-3/5 | | 400 | mW |
| | TO-92 | | 500 | mW |
| | SOT-89-3 | | 600 | mW |
| Operating ambient temperature | | T _{opr} | -40 ~ +85 | °C |
| Storage temperature | | T _{stg} | -40 ~ +125 | °C |
| Soldering Temperature & Time | | T _{solder} | 260°C, 10s | |
| ESD rating | Human Body Model-(HBM) | | 2 | KV |
| | Machine Model-(MM) | | 200 | V |

■ ELECTRICAL CHARACTERISTICS

(TA=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|-------------------------|-------------------|--|--------------------------------|--------------------------------|--------------------------------|--------|
| Detection voltage*1 | -V _{DET} | — | -V _{DET(S)} × 0.98 | -V _{DET(S)} | -V _{DET(S)} × 1.02 | V |
| Hysteresis width | V _{HYS} | — | 0.02 × -V _{DET(S)} | 0.05 × -V _{DET(S)} | 0.08 × -V _{DET(S)} | V |
| Current consumption | I _{SS} | V _{DD} = -V _{DET} + 0.5V | — | 1.0 | 2.0 | uA |
| Operating voltage | V _{DD} | — | 0.7 | — | 6 | V |
| Leakage current | I _{LEAK} | Only for NMOS open-drain output products, V _{DD} = 8.0V, V _{OUT} = 8.0V | — | — | 1.0 | uA |
| temperature coefficient | | T _a = -40°C~ +85°C | — | ±120 | ±360 | ppm/°C |
| Delay time | T _{PLH} | | | | 200 | uS |

*1. -V_{DET}: Actual detection voltage value, -V_{DET(S)}: Specified detection voltage value.

■ FUNCTIONAL DESCRIPTION

1. When a voltage higher than the release voltage ($+V_{DET}$) is applied to the voltage input pin (V_{DD}), the voltage will be equal to the input at V_{DD} .

Note that high impedance exists at V_{OUT} with the N-channel open drain configuration. If the pin is pulled up, V_{OUT} will be equal to the pull up voltage.

2. When V_{DD} falls below $-V_{DET}$, V_{OUT} will be equal to the ground voltage (V_{SS}) level (detect state).

Note that this also applies to N-channel open drain configurations.

3. When V_{DD} falls to a level below that of the minimum operating voltage (V_{MIN}) output will become unstable.

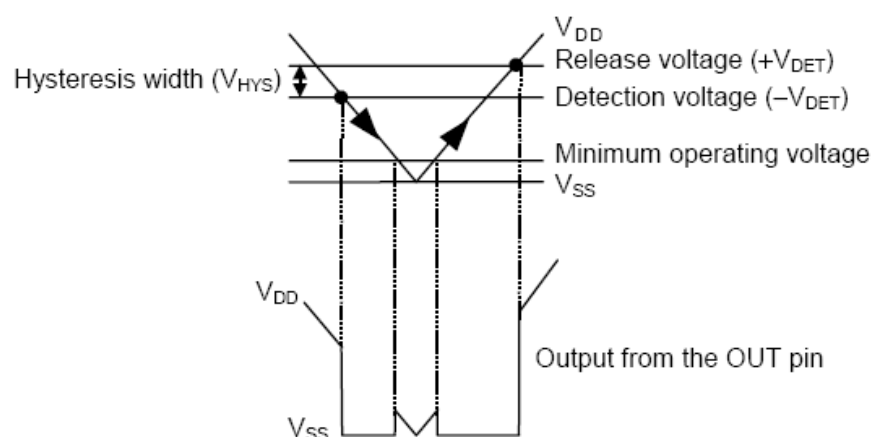
Because the output pin is generally pulled up with N-channel open drain configurations, output will be equal to pull up voltage.

4. When V_{DD} rises above the V_{SS} level (excepting levels lower than minimum operating voltage), V_{OUT} will be equal to V_{SS} until V_{DD} reaches the $+V_{DET}$ level.

5. Although V_{DD} will rise to a level higher than $+V_{DET}$, V_{OUT} maintains ground voltage level via the delay circuit.

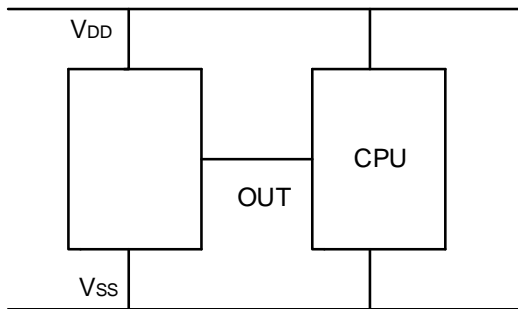
6. Following transient delay time, V_{DD} will be output at V_{OUT} .

Note that high impedance exists with the N-channel open drain configuration and that voltage will be dependent on pull up.

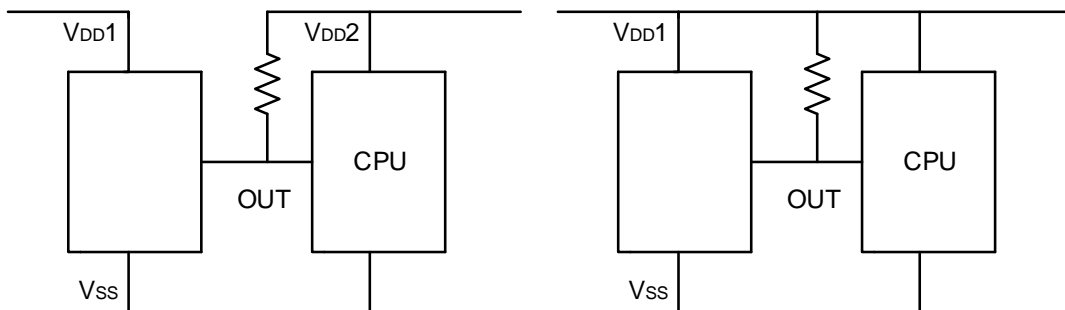


■ TYPICAL APPLICATION CIRCUITS

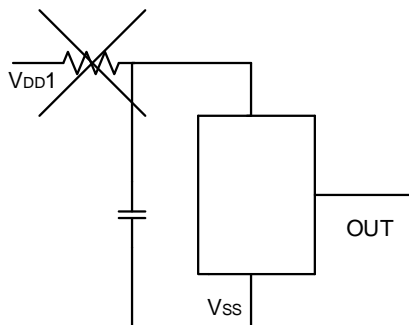
1、CMOS output:



2、NMOS open-drain

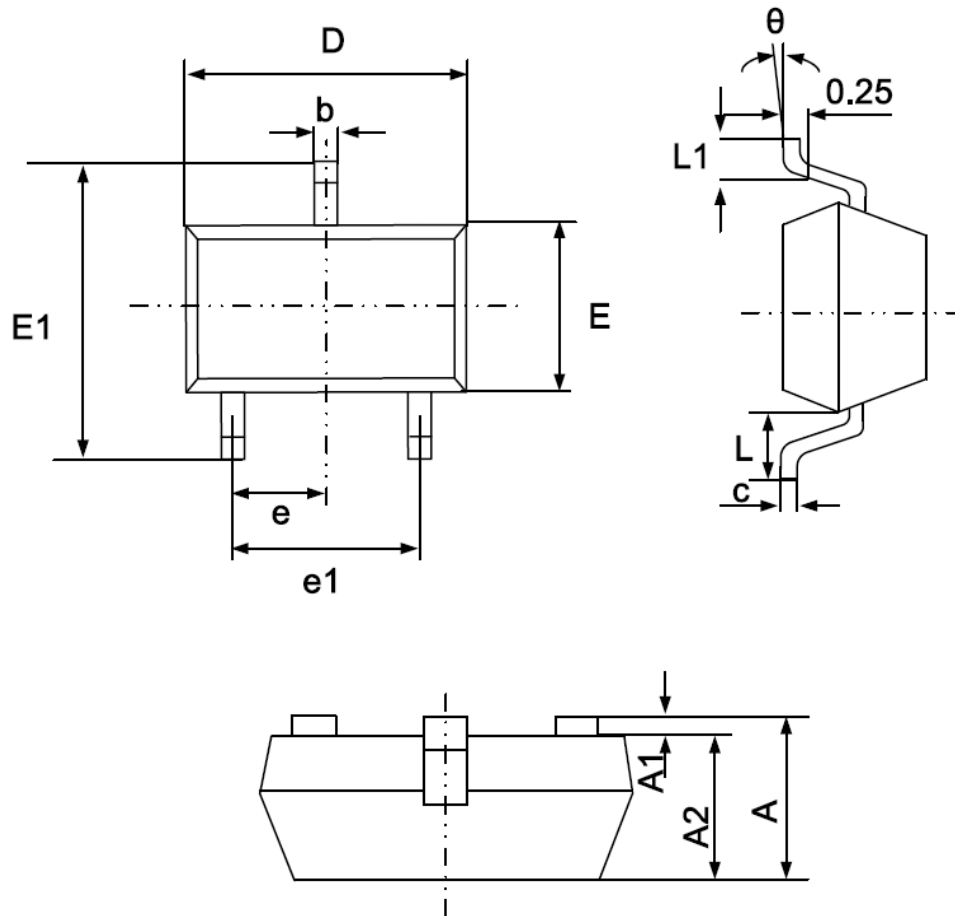


3. Forbidden Circuits



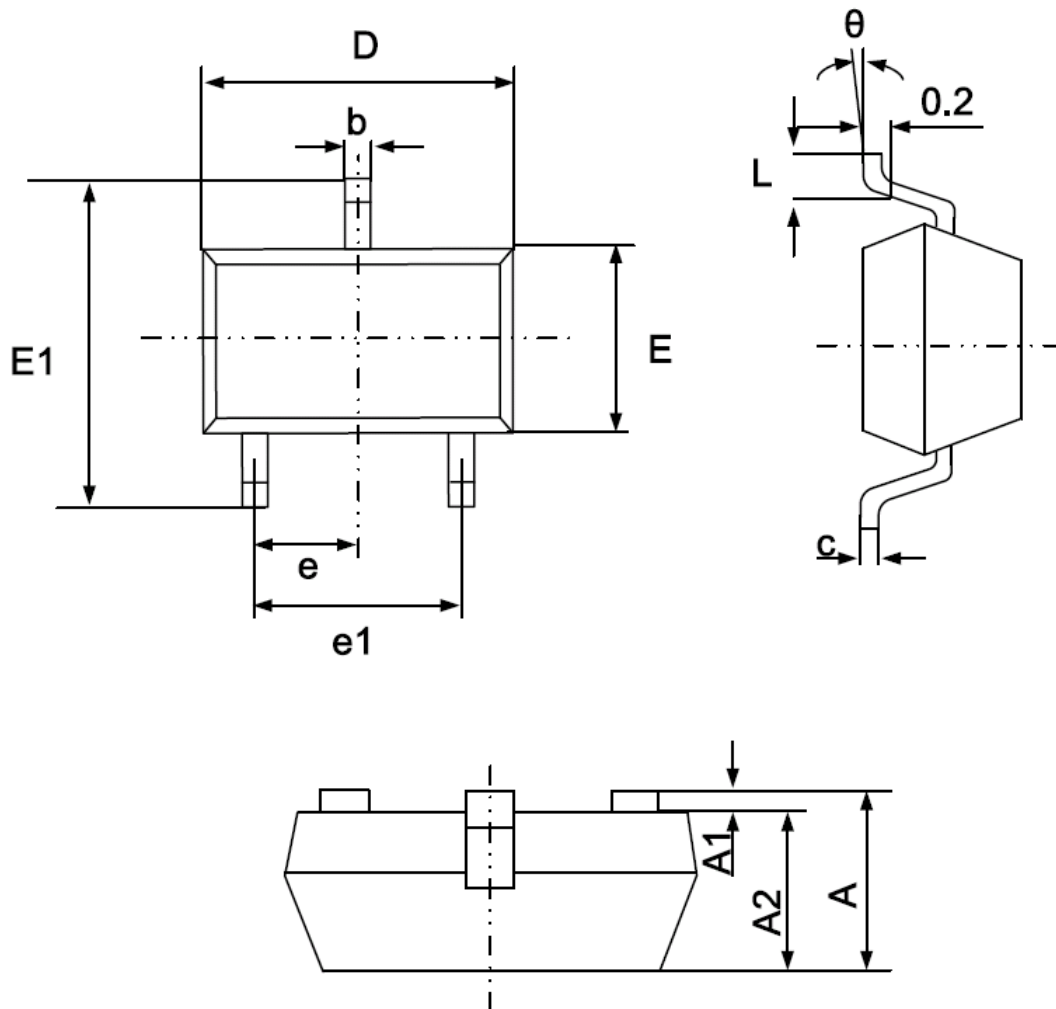
■ PACKAGING INFORMATION

● SOT-23



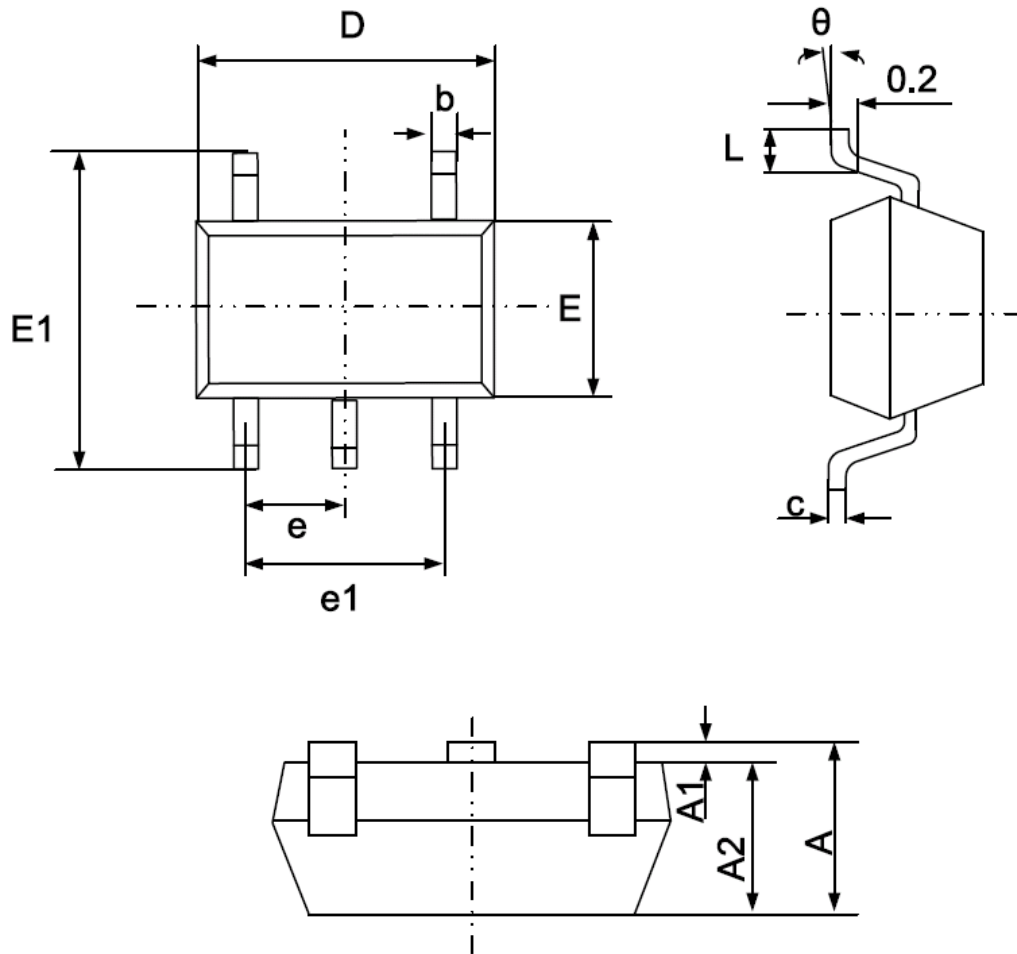
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550REF | | 0.022REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

• SOT-23-3



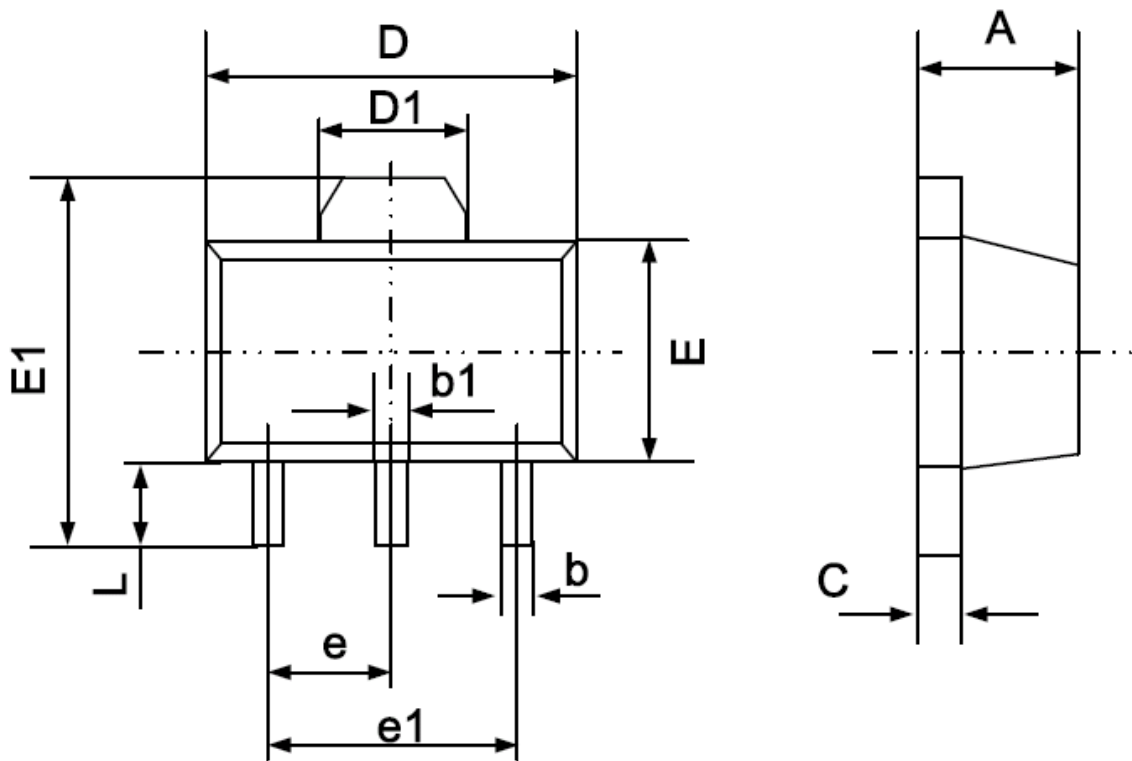
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300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

• SOT-23-5



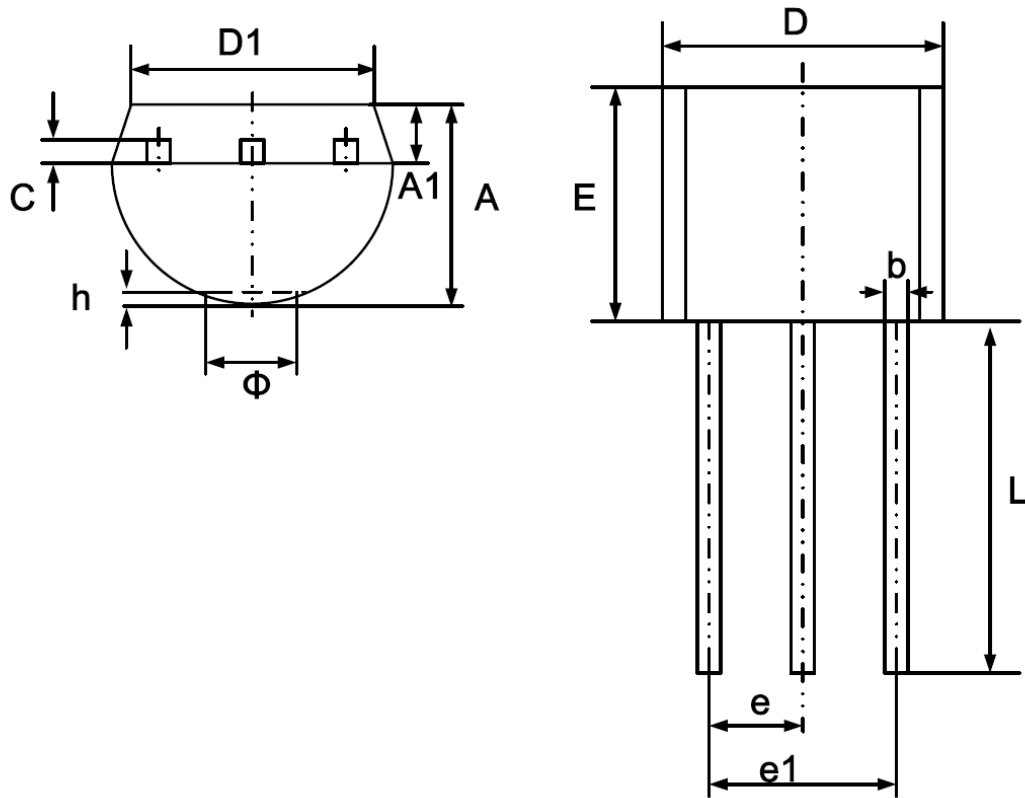
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300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

• SOT-89-3



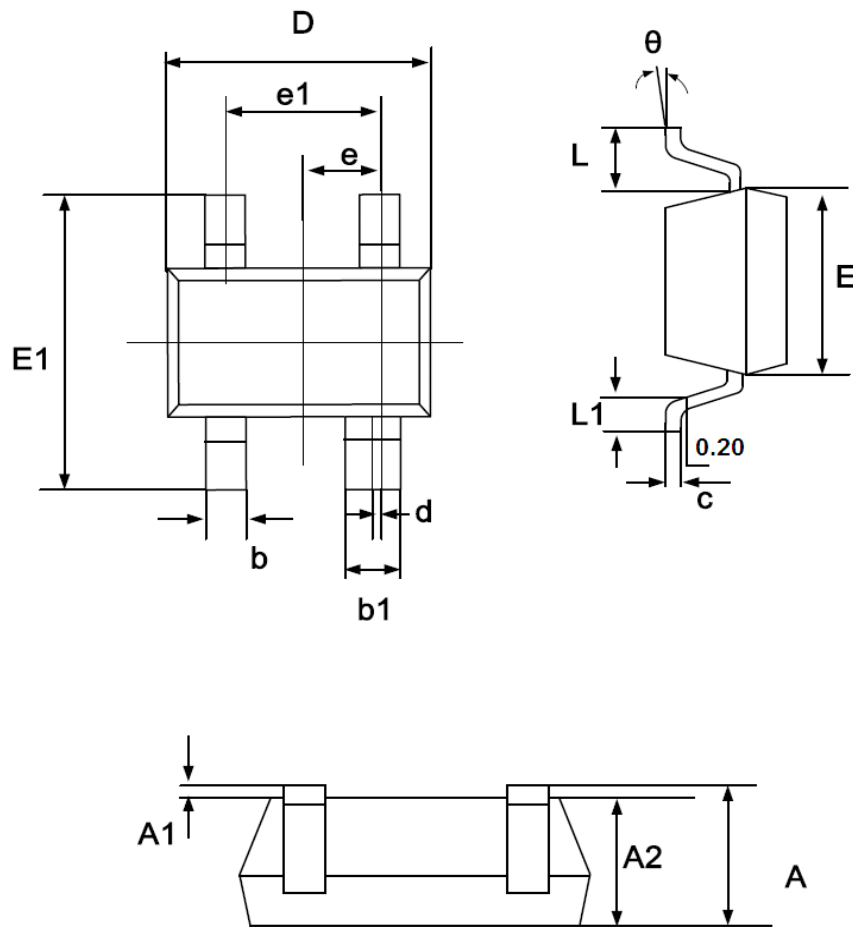
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.400 | 1.600 | 0.055 | 0.063 |
| b | 0.320 | 0.520 | 0.013 | 0.020 |
| b1 | 0.400 | 0.580 | 0.016 | 0.023 |
| c | 0.350 | 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 | | 0.060 TYP | |
| e1 | 3.000 TYP | | 0.118 TYP | |
| L | 0.900 | 1.200 | 0.035 | 0.047 |

• TO-92



| Symbol | Dimensions In Millimeters | |
|--------|---------------------------|-------|
| | Min. | Max. |
| A | 3.300 | 3.800 |
| A1 | 1.100 | 1.400 |
| b | 0.380 | 0.600 |
| c | 0.300 | 0.500 |
| D | 4.400 | 4.800 |
| D1 | 3.430 | |
| E | 4.300 | 4.700 |
| e | 1.270 TYP | |
| e1 | 2.440 | 2.640 |
| L | 13.00 | 15.00 |
| Φ | | 1.600 |
| h | 0.000 | 0.380 |

• SOT-343



| Symbol | Dimensions In Millimeters | |
|----------|---------------------------|-------|
| | Min. | Max. |
| A | 0.900 | 1.100 |
| A1 | 0.000 | 0.100 |
| A2 | 0.900 | 1.000 |
| b | 0.250 | 0.400 |
| b1 | 0.350 | 0.500 |
| c | 0.080 | 0.150 |
| d | 0.050 TYP. | |
| D | 2.000 | 2.200 |
| E | 1.150 | 1.350 |
| E1 | 2.150 | 2.450 |
| e | 0.650 TYP | |
| e1 | 1.200 | 1.400 |
| L | 0.525 REF | |
| L1 | 0.260 | 0.460 |
| θ | 0° | 8° |

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