



## 500mA, Low Quiescent, Low Dropout LDO Linear Regulators

### General Description

**ME6210** series are low quiescent, low-dropout linear voltage regulators. ME6210 series are based on the CMOS process and allow high voltage input. The allow operation voltage as high as 18V. ME6210 series have short circuit protection function.

### Features

- High output accuracy:  $\pm 2\%$
- Input voltage: 2V to 18 V
- Output voltage: 1.5V ~ 5.0V
- Ultra-low quiescent current (Typ. = 1.5  $\mu$  A)
- Output Current:  $I_{out} = 500\text{mA}$

(When  $V_{in} = 4\text{V}$  and  $V_{out} = 3\text{V}$ )

Low dropout voltage: 11mV@  $I_{out} = 10\text{mA}$  (Typ.  $V_{out} = 3.0\text{V}$ )

- Input good stability: Typ. 0.03% / V
- Short-circuit Current: Typ. 50mA
- Ceramic capacitor can be used

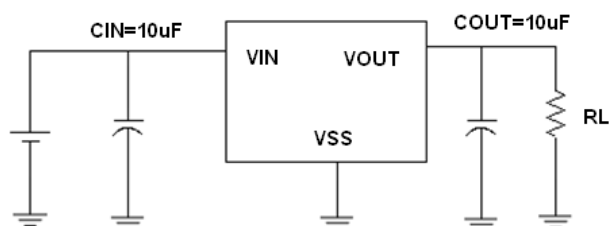
### Typical Application

- Power source for home electric/electronic appliances
- Power source for battery-powered devices
- Power source for personal communication devices

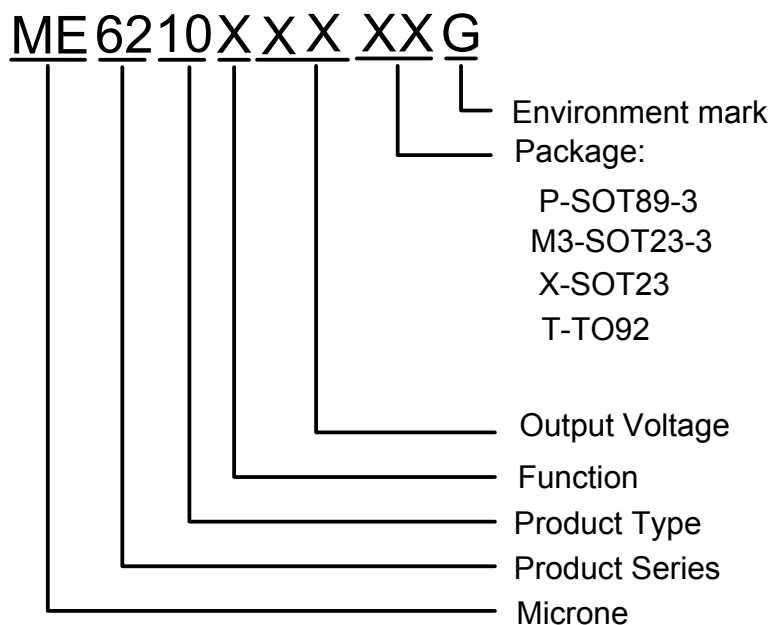
### Package

- 3-pin SOT89-3, SOT23-3, SOT23, TO92

### Typical Application Circuit



## Selection Guide

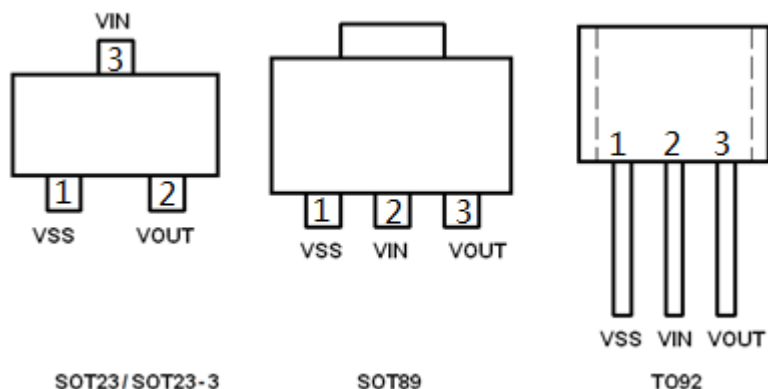


product series	product description
ME6210A30PG	V <sub>OUT</sub> =3.0V; Package: SOT89-3
ME6210A28M3G	V <sub>OUT</sub> =2.8V; Package: SOT23-3
ME6210A33M3G	V <sub>OUT</sub> =3.3V; Package: SOT23-3

### NOTE:

1. At present ,there are five kinds of voltage value: 2.5、 2.8V、 3.0V、 3.3V、 3.6V、 4.0V、 5.0V。
2. If you need other voltage and package, please contact our sales staff.

## Pin Configuration



## Pin Assignment

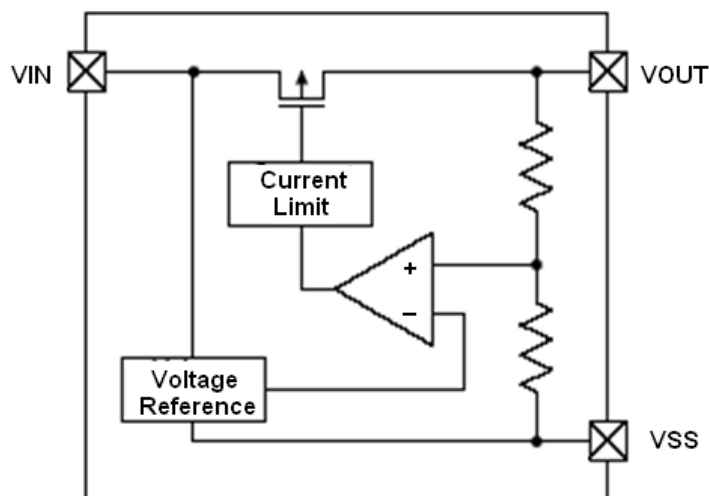
### ME6210Axx

Pin Number				Name	Function
M3	P	X	T		
SOT23-3	SOT89-3	SOT23	TO-92		
1	1	1	1	VSS	Ground
2	3	2	3	VOUT	Output
3	2	3	2	VIN	Input

## Absolute Maximum Ratings

Parameter	Symbol	Description	Units
Input Voltage	$V_{IN}$	18	V
Output Current	$I_{OUT}$	700	mA
Output Voltage	$V_{OUT}$	$V_{SS}-0.3 \sim V_{OUT}+0.3$	V
Power Dissipation	SOT23-3	$P_d$	300 mW
	SOT89-3	$P_d$	500 mW
	SOT23	$P_d$	250 mW
	TO-92	$P_d$	500 mW
Operating Ambient Temperature	$T_{Opr}$	-25 ~ +85	°C
Storage Temperature	$T_{stg}$	-40 ~ +125	°C
Lead Temperature		260°C, 10sec	

## Block Diagram



## Electrical Characteristics

### ME6210A30

( $V_{IN} = V_{OUT} + 1.0V$ ,  $C_{IN} = C_{OUT} = 10\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 40mA$ , $V_{IN} = V_{out} + 1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$				18	V
Maximum Output Current	$I_{OUT\_max}$	$V_{IN} = V_{out} + 1V$		500		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{out} + 1V$ , $1mA \leq I_{OUT} \leq 200mA$		12	30	mV
Dropout Voltage (Note 3)	$V_{DIF1}$	$I_{OUT} = 10mA$		11	14	mV
	$V_{DIF2}$	$I_{OUT} = 100mA$		110	140	mV
	$V_{DIF3}$	$I_{OUT} = 200mA$		220	280	mV
Supply Current	$I_{SS}$	$V_{IN} = V_{out} + 1V$		1.5	2.5	$\mu A$
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$I_{OUT} = 10mA$ $V_{out} + 1V \leq V_{IN} \leq 18V$		0.03	0.1	%/V
Temperature coefficient	$\frac{\Delta V_{OUT}}{\Delta T_a \times V_{OUT}}$	$V_{IN} = V_{out} + 1V$ , $I_{OUT} = 10mA$ $-40^\circ C \leq T_a \leq 125^\circ C$		$\pm 60$	$\pm 100$	Ppm/ $^\circ C$
Short-circuit Current	$I_{short}$	$V_{IN} = V_{out} + 1V$		50	70	mA

## ME6210A33

( $V_{IN} = V_{OUT} + 1.0V$ ,  $C_{IN} = C_{OUT} = 10\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 40mA$ , $V_{IN} = V_{OUT} + 1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$				18	V
Maximum Output Current	$I_{OUT\_max}$	$V_{IN} = V_{OUT} + 1V$		500		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 1V$ , $1mA \leq I_{OUT} \leq 200mA$		12	30	mV
Dropout Voltage (Note 3)	$V_{DIF1}$	$I_{OUT} = 10mA$		10	13	mV
	$V_{DIF2}$	$I_{OUT} = 100mA$		100	130	mV
	$V_{DIF3}$	$I_{OUT} = 200mA$		200	260	mV
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 1V$		1.6	2.5	$\mu A$
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$I_{OUT} = 10mA$ $V_{OUT} + 1V \leq V_{IN} \leq 18V$		0.03	0.1	%/V
Temperature coefficient	$\frac{\Delta V_{OUT}}{\Delta T_a \times V_{OUT}}$	$V_{IN} = V_{OUT} + 1V$ , $I_{OUT} = 10mA$ $-40^\circ C \leq T_a \leq 125^\circ C$		$\pm 60$	$\pm 100$	Ppm/ $^\circ C$
Short-circuit Current	$I_{short}$	$V_{IN} = V_{OUT} + 1V$		50	70	mA

## ME6210A50

( $V_{IN} = V_{OUT} + 1.0V$ ,  $C_{IN} = C_{OUT} = 10\mu F$ ,  $T_a = 25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	$V_{OUT(E)}$ (Note 2)	$I_{OUT} = 40mA$ , $V_{IN} = V_{OUT} + 1V$	X 0.98	$V_{OUT(T)}$ (Note 1)	X 1.02	V
Input Voltage	$V_{IN}$				18	V
Maximum Output Current	$I_{OUT\_max}$	$V_{IN} = V_{OUT} + 1V$		500		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 1V$ , $1mA \leq I_{OUT} \leq 200mA$		10	30	mV
Dropout Voltage (Note 3)	$V_{DIF1}$	$I_{OUT} = 10mA$		8	11	mV
	$V_{DIF2}$	$I_{OUT} = 100mA$		80	110	mV
	$V_{DIF3}$	$I_{OUT} = 200mA$		160	220	mV
Supply Current	$I_{SS}$	$V_{IN} = V_{OUT} + 1V$		1.7	2.5	$\mu A$
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$I_{OUT} = 10mA$ $V_{OUT} + 1V \leq V_{IN} \leq 18V$		0.03	0.1	%/V
Temperature coefficient	$\frac{\Delta V_{OUT}}{\Delta T_a \times V_{OUT}}$	$V_{IN} = V_{OUT} + 1V$ , $I_{OUT} = 10mA$ $-40^\circ C \leq T_a \leq 125^\circ C$		$\pm 60$	$\pm 100$	Ppm/ $^\circ C$
Short-circuit Current	$I_{short}$	$V_{IN} = V_{OUT} + 1V$		50	70	mA

Note :

1.  $V_{OUT}(T)$  : Specified Output Voltage
2.  $V_{OUT}(E)$  : Effective Output Voltage ( ie. The output voltage when " $V_{OUT}(T)+1.0V$ " is provided at the Vin pin while maintaining a certain lout value.)
3.  $V_{DIF}$ :  $V_{IN1} - V_{OUT}(E)'$   
 $V_{IN1}$  : The input voltage when  $V_{OUT}(E)'$  appears as input voltage is gradually decreased.  
 $V_{OUT}(E)'$  = A voltage equal to 98% of the output voltage whenever an amply stabilized lout and  $\{V_{OUT}(T) + 1.0V\}$  is input.

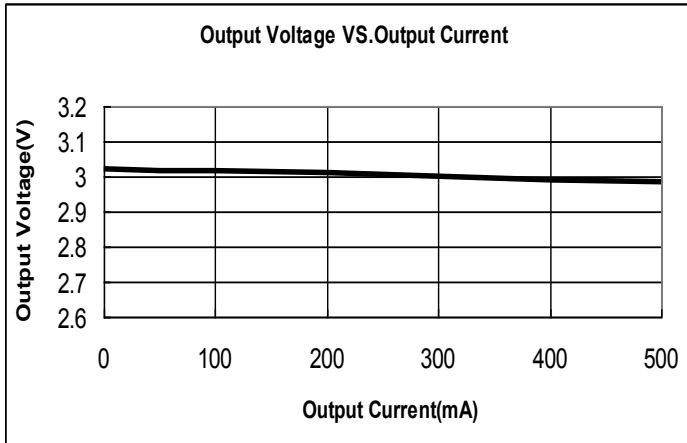
## Precautions

- During the test, if AC/DC power supply and the ceramic chip capacitors collocation is used, there may be serious voltage spike phenomenon instantaneously. When the power supply access to 15V, the voltage is rushed to about 30V instantaneously. Because of exceeding the limit voltage of chip, the chip is damaged. If you string a small resistance of 1 ohm in the input end during the test, the peak phenomenon can be avoided.
- In the test, there is serious burr phenomenon only when the AC/DC power is used with ceramic chip capacitors. But electrolytic capacitors and tantalum capacitance won't appear above phenomenon. Please be sure to pay attention to this point when you use AC/DC power.
- In normal use, when any type of capacitor is used with battery or the supply of fire power, the above phenomenon doesn't occur.

## Type Characteristics

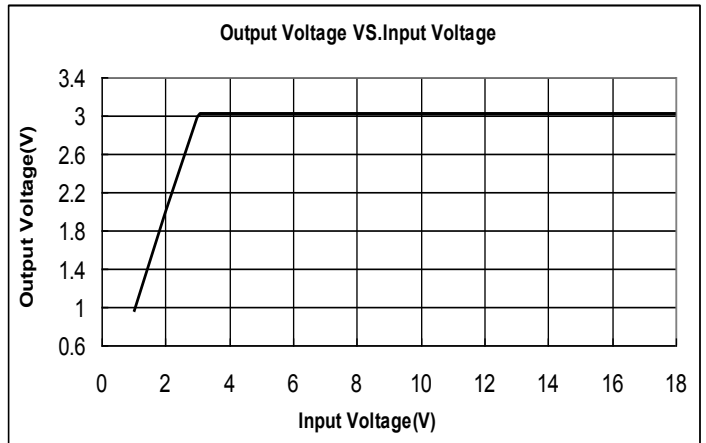
(1) Output Voltage VS. Output Current

( $T_a = 25\text{ }^\circ\text{C}$ ,  $V_{IN}=4\text{V}$ ) ME6210A30



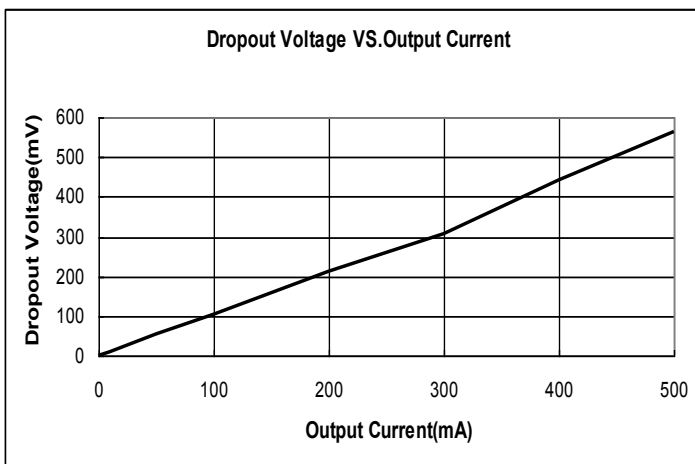
(2) Output Voltage VS. Input Voltage

( $T_a = 25\text{ }^\circ\text{C}$ ,  $I_{out}=10\text{mA}$ ) ME6210A30



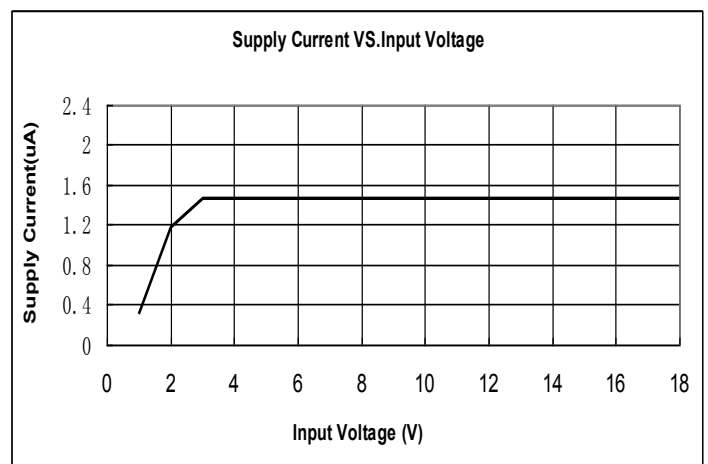
(3) Dropout Voltage VS. Output Current

( $T_a = 25\text{ }^\circ\text{C}$ ) ME6210A30

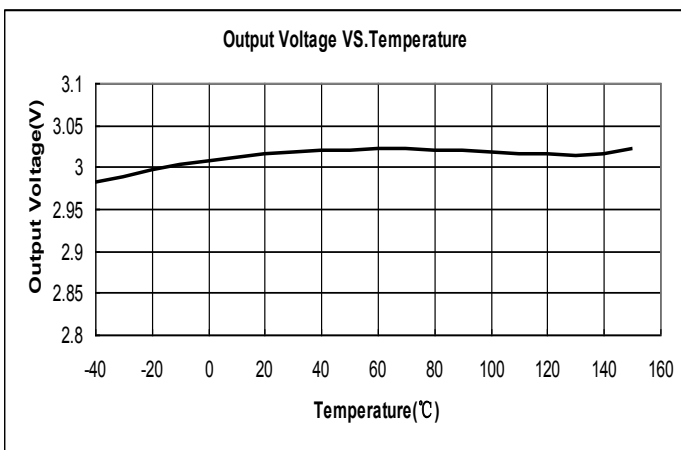


(4) Supply Current VS. Input Voltage

( $T_a = 25\text{ }^\circ\text{C}$ ) ME6210A30

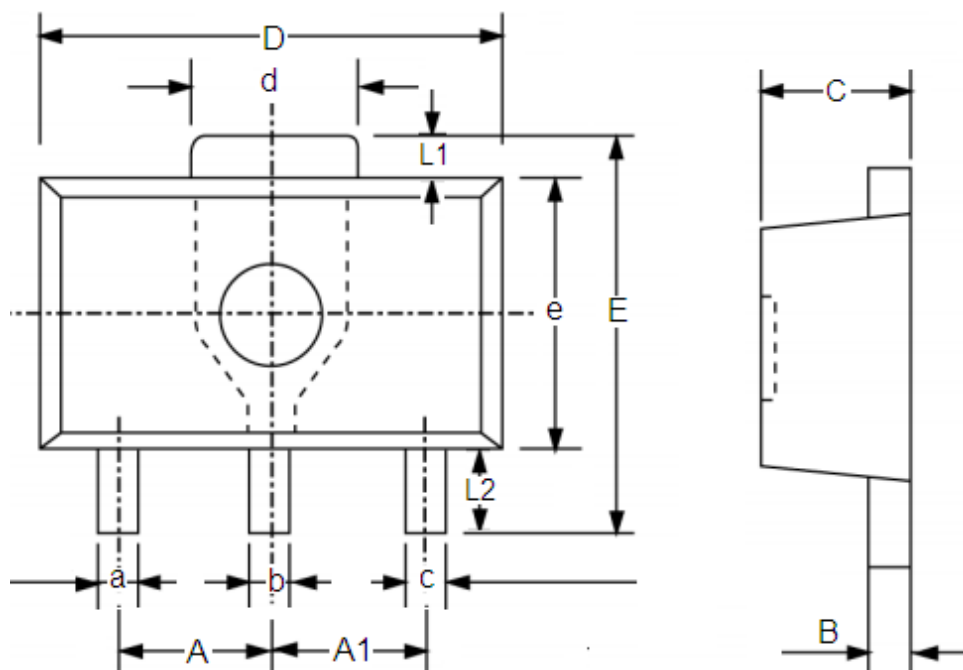


(5) Output Voltage VS. Temperature ( $V_{IN}=4\text{V}$ ,  $I_{out}=10\text{mA}$ ) ME6210A30



## Packaging Information

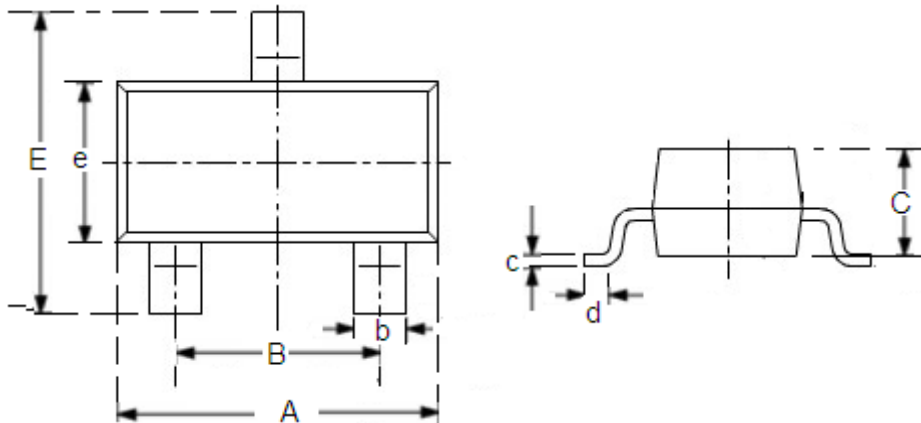
● SOT89-3



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.4	1.6	0.0551	0.0630
A1	1.4	1.6	0.0551	0.0630
a	0.36	0.48	0.0142	0.0189
b	0.41	0.53	0.0161	0.0209
c	0.36	0.48	0.0142	0.0189
d	1.4	1.75	0.0551	0.0689
B	0.38	0.43	0.015	0.0169
C	1.4	1.6	0.0551	0.0630
D	4.4	4.6	0.1732	0.181
E	-	4.25	-	0.1673
e	2.4	2.6	0.0945	0.1023
L1	0.4	-	0.0157	-
L2	0.8	-	0.0315	-

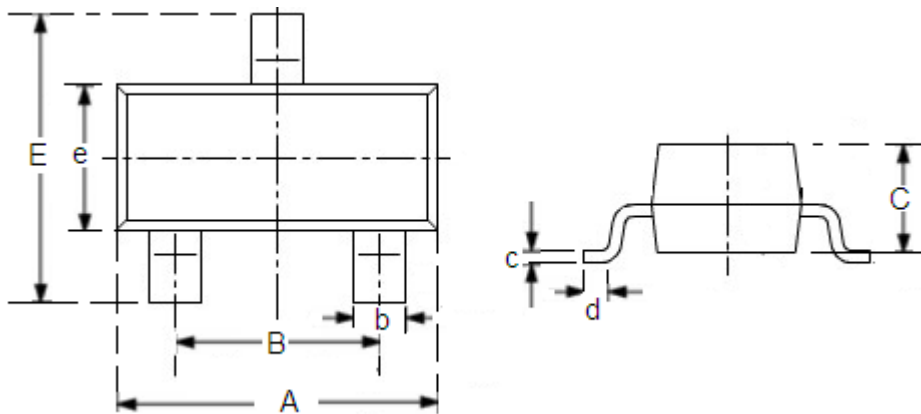


● SOT23-3



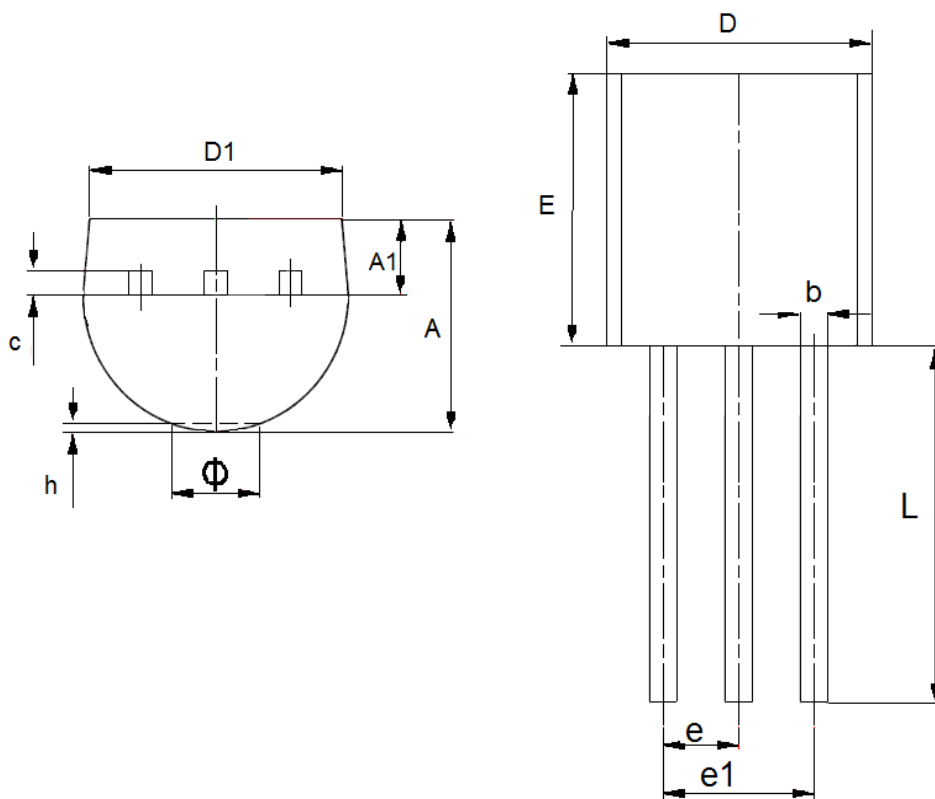
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.7	3.1	0.1063	0.122
B	1.7	2.1	0.0669	0.0827
b	0.35	0.5	0.0138	0.0197
C	1.0	1.2	0.0394	0.0472
c	0.1	0.25	0.0039	0.0098
d	0.2	-	0.0079	-
E	2.6	3.0	0.1023	0.1181
e	1.5	1.8	0.059	0.0708

● SOT23



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.7	3.1	0.1063	0.122
B	1.7	2.1	0.0669	0.0827
b	0.35	0.5	0.0138	0.0197
C	1.0	1.2	0.0394	0.0472
c	0.1	0.25	0.0039	0.0098
d	0.2	-	0.0079	-
E	2.1	2.64	0.0827	0.1039
e	1.2	1.4	0.0472	0.0551

● TO-92



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	3.3	3.7	0.1299	0.1457
A1	1.1	1.4	0.0433	0.0551
b	0.38	0.55	0.015	0.0217
c	0.36	0.51	0.0142	0.0201
D	4.3	4.7	0.1693	0.185
D1	3.43	—	0.135	—
E	4.3	4.7	0.1693	0.185
e	2.4	2.7	0.0945	0.1063
e1	2.44	2.64	0.0961	0.1039
L	14.1	14.5	0.5551	0.5709
h	0	0.38	0	0.015
$\Phi$	—	1.6	—	0.063

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