



## Voltage Detectors, ME2808 Series

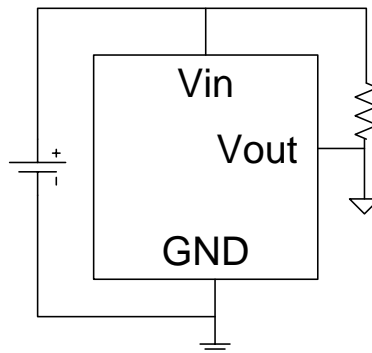
### General Description

ME2808 Series are a set of three-terminal low power voltage detectors implemented in NMOS technology. Each voltage detector in the series detects a particular fixed voltage ranging from 2.0V to 7.0V. The voltage detectors consist of a high precision and low power consumption standard voltage source, a comparator, hysteresis circuit, and an output driver. NMOS technology ensures low power consumption.

### Typical Application

- battery checkers
- Level selectors
- Power failure detectors
- Microcomputer reset
- Battery backup of Memories
- Store non-volatile RAM signal protectors

### Typical Application Circuit



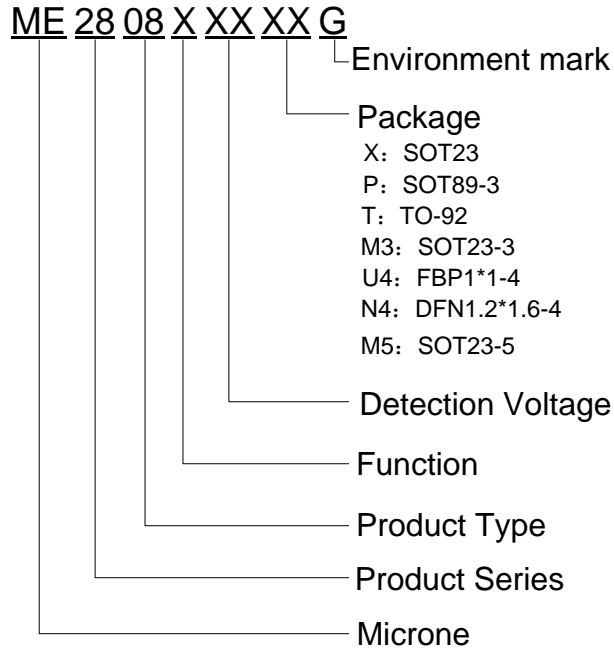
### Features

- Highly accuracy Detection voltage:  $\pm 1\%$
- Low power consumption: TYP 1.8uA ( $V_{in}=3V$ )
- Detection voltage range: 2.0V~7.0V in 0.1V increments
- Operating voltage range: 1.5V~18V
- Detect voltage temperature characteristics: TYP  $\pm 0.9mV/^{\circ}C$
- Output configuration: NMOS

### Package

- 3-pin SOT23、SOT23-3、SOT89-3、TO-92
- 4-pin FBP1\*1-4、DFN1.2\*1.6-4
- 5-pin SOT23-5

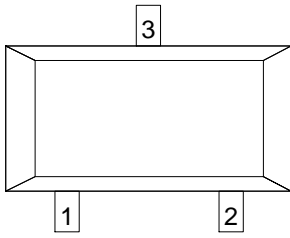
## Selection Guide



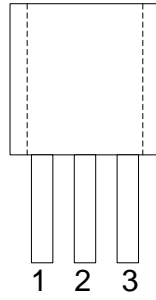
product series	product description
ME2808A25XG	VIN=H → L V <sub>DET</sub> =2.5V; VIN Falling edge detection; Package: SOT23
ME2808A36XG	VIN=H → L V <sub>DET</sub> =3.6V; VIN Falling edge detection; Package: SOT23
ME2808A22M3G	VIN=H → L V <sub>DET</sub> =2.2V; VIN Falling edge detection; Package: SOT23-3
ME2808A27M3G	VIN=H → L V <sub>DET</sub> =2.7V; VIN Falling edge detection; Package: SOT23-3
ME2808A33M3G	VIN=H → L V <sub>DET</sub> =3.3V; VIN Falling edge detection; Package: SOT23-3
ME2808A60M3G	VIN=H → L V <sub>DET</sub> =6.0V; VIN Falling edge detection; Package: SOT23-3
ME2808A30PG	VIN=H → L V <sub>DET</sub> =3.0V; VIN Falling edge detection; Package: SOT89-3
ME2808A27TG	VIN=H → L V <sub>DET</sub> =2.7V; VIN Falling edge detection; Package: TO-92
ME2808A42N4CG	VIN=H → L V <sub>DET</sub> =4.2V; VIN Falling edge detection; Package: DFN1.2*1.6-4
ME2808A42M5G	VIN=H → L V <sub>DET</sub> =4.2V; VIN Falling edge detection; Package: SOT23-5
ME2808A44PG	VIN=H → L V <sub>DET</sub> =4.4V; VIN Falling edge detection; Package: SOT89-3
ME2808A33U4AG	VIN=H → L V <sub>DET</sub> =3.3V; VIN Falling edge detection; Package: FBP1*1-4
ME2808B28M3G	VIN=L → H V <sub>DET</sub> =2.8V; VIN Rising edge detection; Package: SOT23-3

**NOTE:** At present ,there are nineteen kinds of detection voltage value: 2.2V、2.4V、2.5V、2.7V、2.8V、3.0V、3.2V、3.3V、3.5V、3.6V、3.8V、3.9V、4.0V、4.2V、4.3V、4.4V、4.5V、5.0V、6.0V。If you need other detection voltage and package, please contact our sales staff.

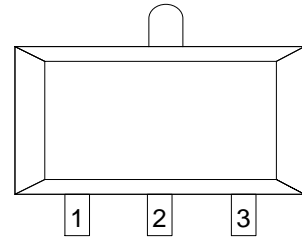
## Pin Configuration



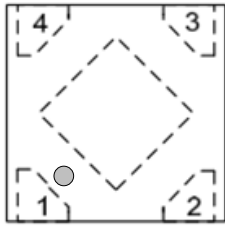
**SOT23/ SOT23-3**



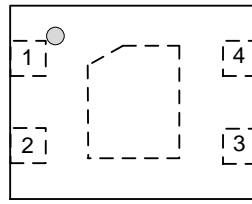
**TO-92**



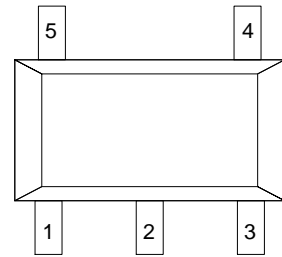
**SOT89-3**



**FBP1\*1-4**



**DFN1.2\*1.6-4**

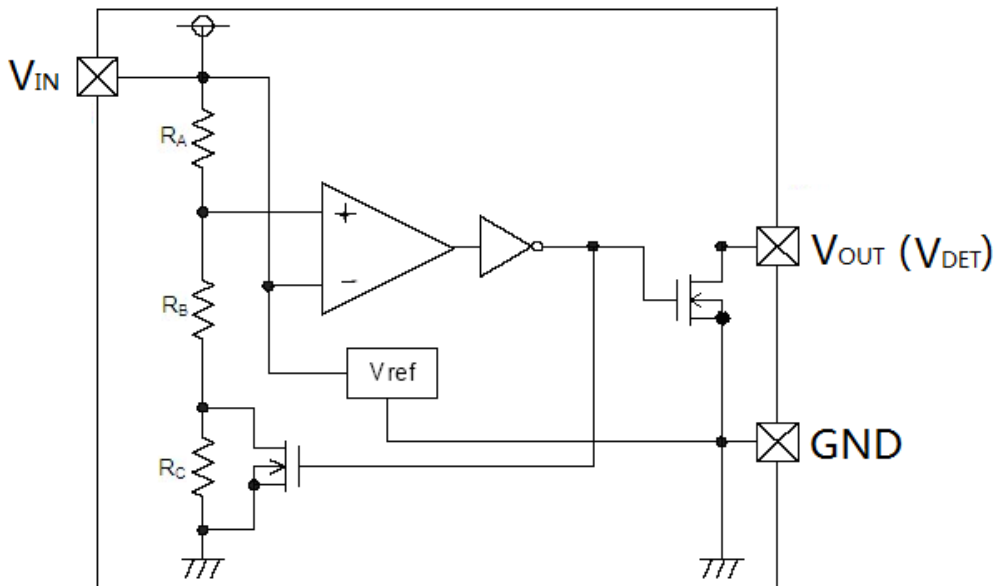


**SOT23-5**

## Pin Assignment

Pin Number							Pin Name	Functions
SOT23	SOT23-3	TO-92	SOT89-3	FBP1*1-4	DFN1.2*1.6-4	SOT23-5		
2	2	3	3	3	3	3	GND	Ground
1	1	1	1	4	4	1	V <sub>OUT</sub>	Output Voltage
3	3	2	2	1	1	2	V <sub>IN</sub>	Input Voltage
				2	2	4	NC	No Connection
						5	NC	No Connection

## Block Diagram



## Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
V <sub>IN</sub> Input Voltage		V <sub>INmax</sub>	18	V
Output Current		I <sub>OUTmax</sub>	20	mA
Output Voltage	NMOS	V <sub>OUT</sub>	GND-0.3~ V <sub>IN</sub> +0.3	V
Continuous Total Power Dissipation	SOT23	P <sub>D</sub>	0.38	W
	SOT23-3		0.54	
	DFN1.2*1.6-4		0.42	
	SOT23-5		0.6	
	SOT89-3		1.25	
	TO-92		0.83	
	FBP1*1-4		0.5	
Thermal resistance (Junction to air)	SOT23	θ <sub>JA</sub>	328	°C/W
	SOT23-3		230	
	DFN1.2*1.6-4		300	
	SOT23-5		210	
	SOT89-3		100	
	TO-92		150	
	FBP1*1-4		250	
Maximum junction temperature		T <sub>J</sub>	-40~+150	°C
Operating Ambient Temperature		T <sub>Opr</sub>	-40~+85	°C
Storage Temperature		T <sub>stg</sub>	-55~+150	°C
Soldering temperature and time		T <sub>solder</sub>	260°C, 10s	

## Electrical Characteristics (V<sub>DET</sub> = 2.0V to 7.0V, T<sub>A</sub> = 25°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Detect Voltage	V <sub>DET</sub>	ME2808A V <sub>IN</sub> =H → L	V <sub>DET</sub>	V <sub>DET</sub>	V <sub>DET</sub>	V
		ME2808B V <sub>IN</sub> =L → H	x0.99		x1.01	
Hysteresis Width	V <sub>HYS</sub>	V <sub>IN</sub> =L → H → L V <sub>HYS</sub> = V <sub>DET(+)</sub> - V <sub>DET(-)</sub>	V <sub>DET</sub> x0.02	V <sub>DET</sub> x0.05	V <sub>DET</sub> x0.1	V
Operating Current	I <sub>IN</sub>	V <sub>DET</sub> = 2.0V ~ 2.7V V <sub>IN</sub> = 3.0V	-	1.8	4	μA
		V <sub>DET</sub> = 2.8V ~ 3.5V V <sub>IN</sub> = 4.0V	-	1.8	4	
		V <sub>DET</sub> = 3.6V ~ 4.8V V <sub>IN</sub> = 5.0V	-	2.1	4	
		V <sub>DET</sub> = 4.9V ~ 7.0V V <sub>IN</sub> = 8.0V	-	3.5	4.5	
Operating Voltage	V <sub>IN</sub>	V <sub>DET</sub> = 2.0V ~ 7.0V	0.7	-	18	V
Output Sink Current	I <sub>OL</sub>	V <sub>DET</sub> = 2.0V ~ 2.7V V <sub>IN</sub> = 1.8V, V <sub>OUT</sub> = 0.2V	0.5	-	-	mA
		V <sub>DET</sub> = 2.8V ~ 3.5V V <sub>IN</sub> = 2.5V, V <sub>OUT</sub> = 0.3V	0.5	-	-	
		V <sub>DET</sub> = 3.6V ~ 4.8V V <sub>IN</sub> = 3.0V, V <sub>OUT</sub> = 0.3V	1.2	-	-	
		V <sub>DET</sub> = 4.9V ~ 7.0V V <sub>IN</sub> = 4.5V, V <sub>OUT</sub> = 0.3V	2.5	-	-	
Temperature characteristics	ΔV <sub>DET</sub> /ΔT <sub>A</sub>	0°C ≤ T <sub>opr</sub> ≤ 70°C	-	±0.9	-	mV/°C

## Functional Description

The ME2808 series is a set of voltage detectors equipped with a high stability voltage reference which is connected to the negative input of a comparator — denoted as  $V_{REF}$  in the following figure (Fig. 1). When the voltage drop to the positive input of the comparator (i.e.,  $V_B$ ) is higher than  $V_{REF}$ ,  $V_{OUT}$  goes high, M1 turns off, and  $V_B$  is expressed as  $V_{BH} = V_{IN} \times (R_B + R_C) / (R_A + R_B + R_C)$ . If  $V_{IN}$  is decreased so that  $V_B$  falls to a value that is less than  $V_{REF}$ , the comparator output inverts (from high to low),  $V_{OUT}$  goes low,  $V_C$  is high, M1 turns on,  $R_C$  is bypassed, and  $V_B$  becomes:  $V_{BL} = V_{IN} \times R_B / (R_A + R_B)$ , which is less than  $V_{BH}$ . By so doing the comparator out-put will stay low to prevent the circuit from oscillating when  $V_B \approx V_{REF}$ . If  $V_{IN}$  falls below the minimum operating voltage, the output becomes undefined. When  $V_{IN}$  goes from low to  $V_{IN} \times R_B / (R_A + R_B) > V_{REF}$ , the comparator output goes high and  $V_{OUT}$  goes high again.

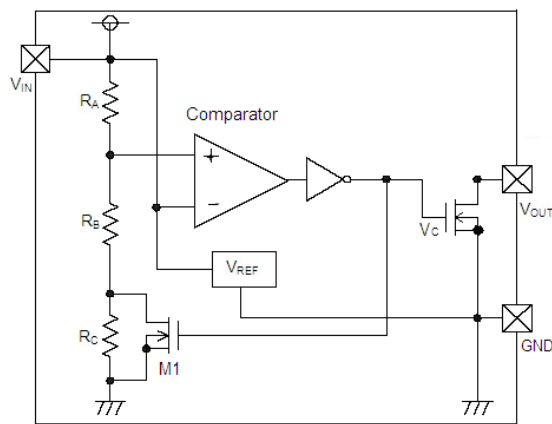


Fig.1 NMOS output voltage detector (ME2808)

### ME2808A: The detection voltage is as defined:

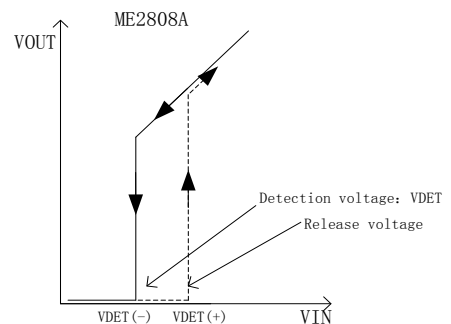
$$V_{DET} = V_{DET(-)} = (R_A + R_B + R_C) \times V_{REF} / (R_B + R_C)$$

The release voltage is as defined:

$$V_{DET(+)} = (R_A + R_B) \times V_{REF} / R_B$$

The hysteresis width is:

$$V_{HYS} = V_{DET(+)} - V_{DET(-)}$$



### ME2808B: The detection voltage is as defined:

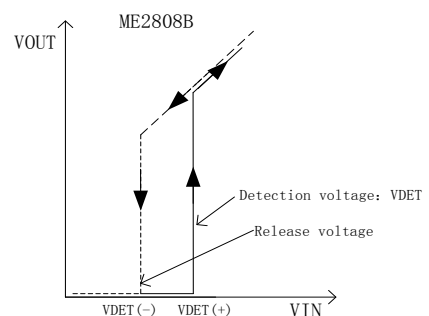
$$V_{DET} = V_{DET(+)} = (R_A + R_B) \times V_{REF} / R_B$$

The release voltage is as defined:

$$V_{DET(-)} = (R_A + R_B + R_C) \times V_{REF} / (R_B + R_C)$$

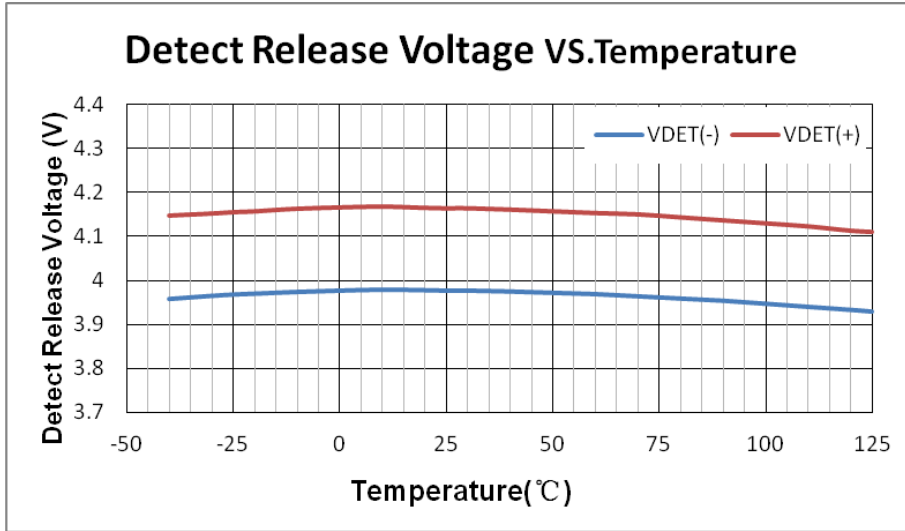
The hysteresis width is:

$$V_{HYS} = V_{DET(+)} - V_{DET(-)}$$

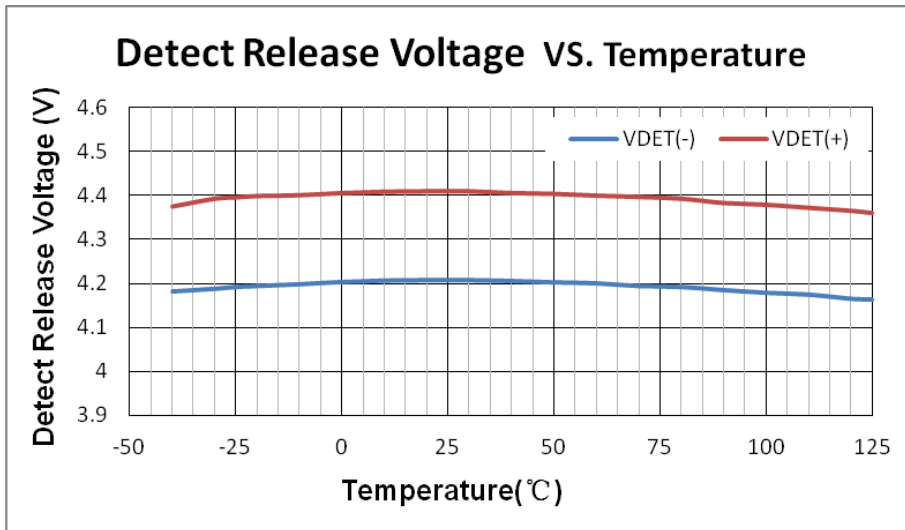


Typical Performance Characteristics

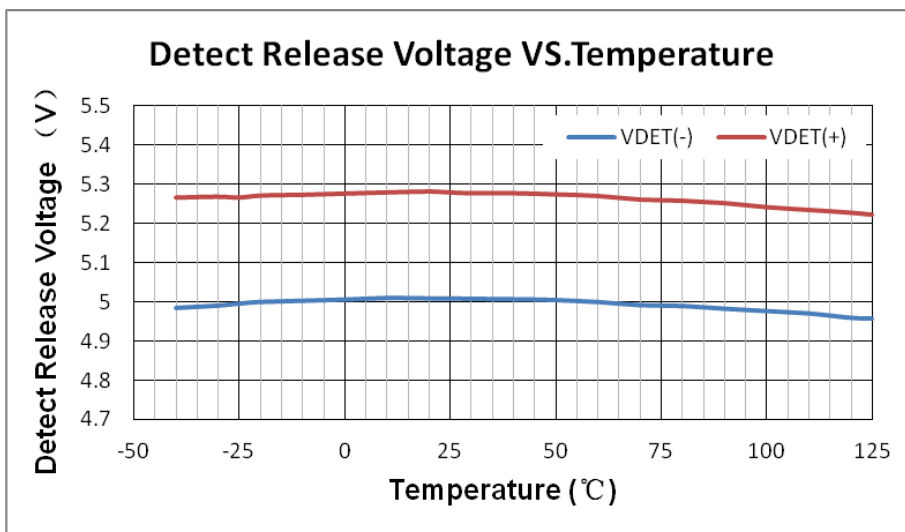
ME2808A40M3G



ME2808A42M3G

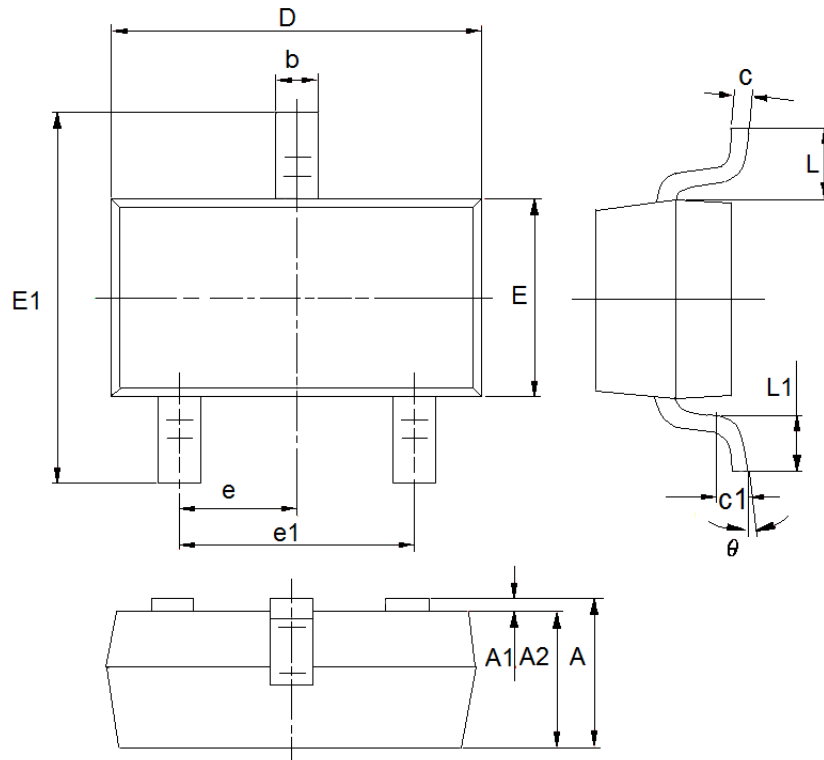


ME2808A50M3G



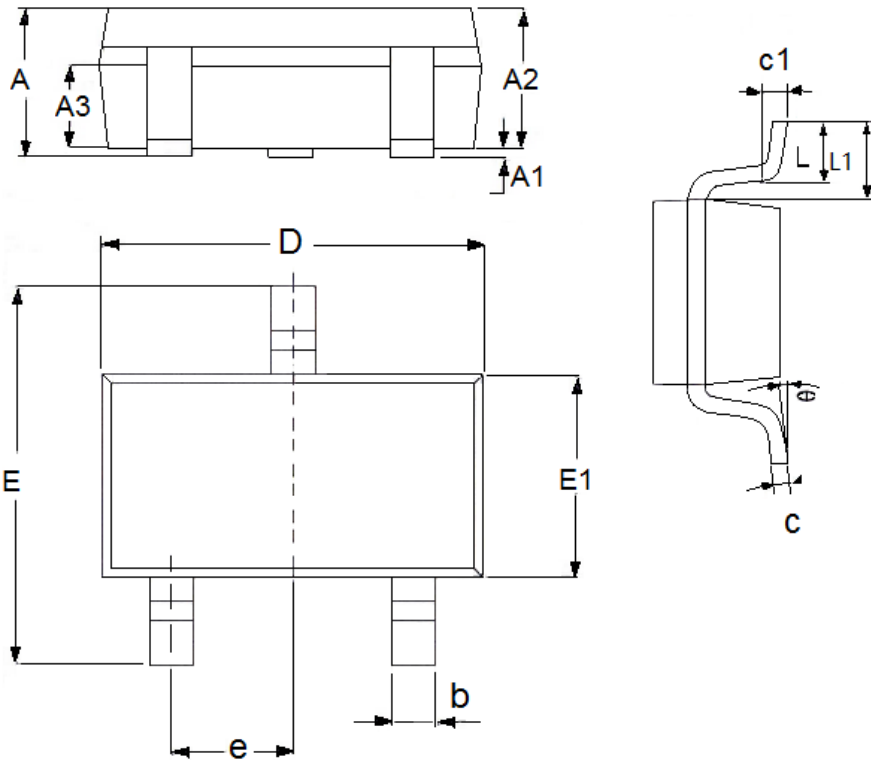
Packaging Information

● SOT23



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.9	1.15	0.0354	0.0453
A1	0	0.14	0.0000	0.0055
A2	0.9	1.05	0.0354	0.0413
b	0.28	0.52	0.0110	0.0205
c	0.07	0.23	0.0028	0.0091
D	2.8	3.0	0.1102	0.1181
e1	1.8	2.0	0.0709	0.0787
E	1.2	1.4	0.0472	0.0551
E1	2.2	2.6	0.0866	0.1024
e	0.95(TYP)		0.0374(TYP)	
L	0.55(TYP)		0.0217(TYP)	
L1	0.25	0.55	0.0098	0.0217
θ	0	8°	0.0000	8°
c1	0.25(TYP)		0.0098(TYP)	

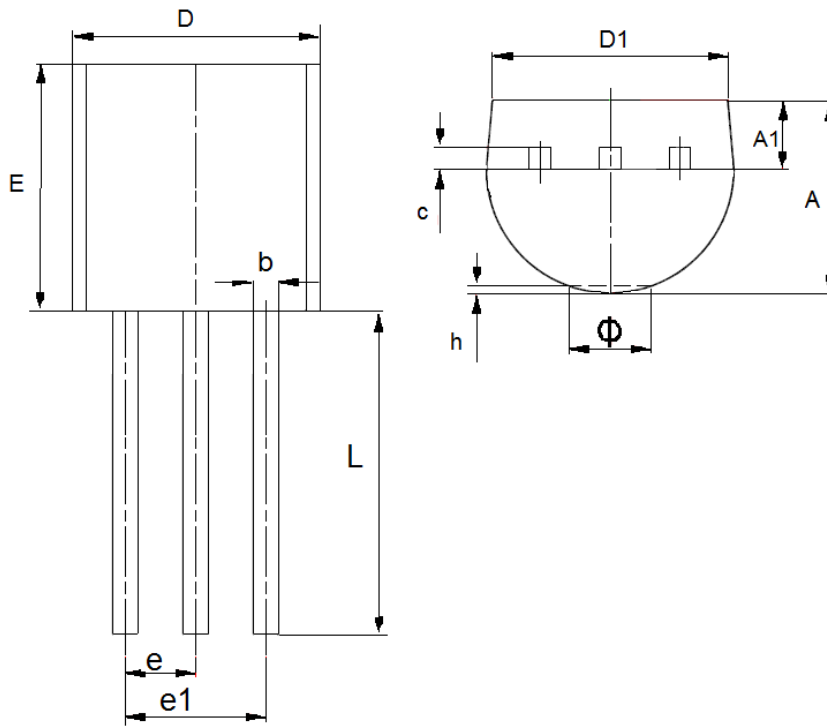
● SOT23-3



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.25	0.0039	0.0098
D	2.8	3.1	0.1102	0.1220
E	2.6	3.1	0.1023	0.1220
E1	1.5	1.8	0.0591	0.0709
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	

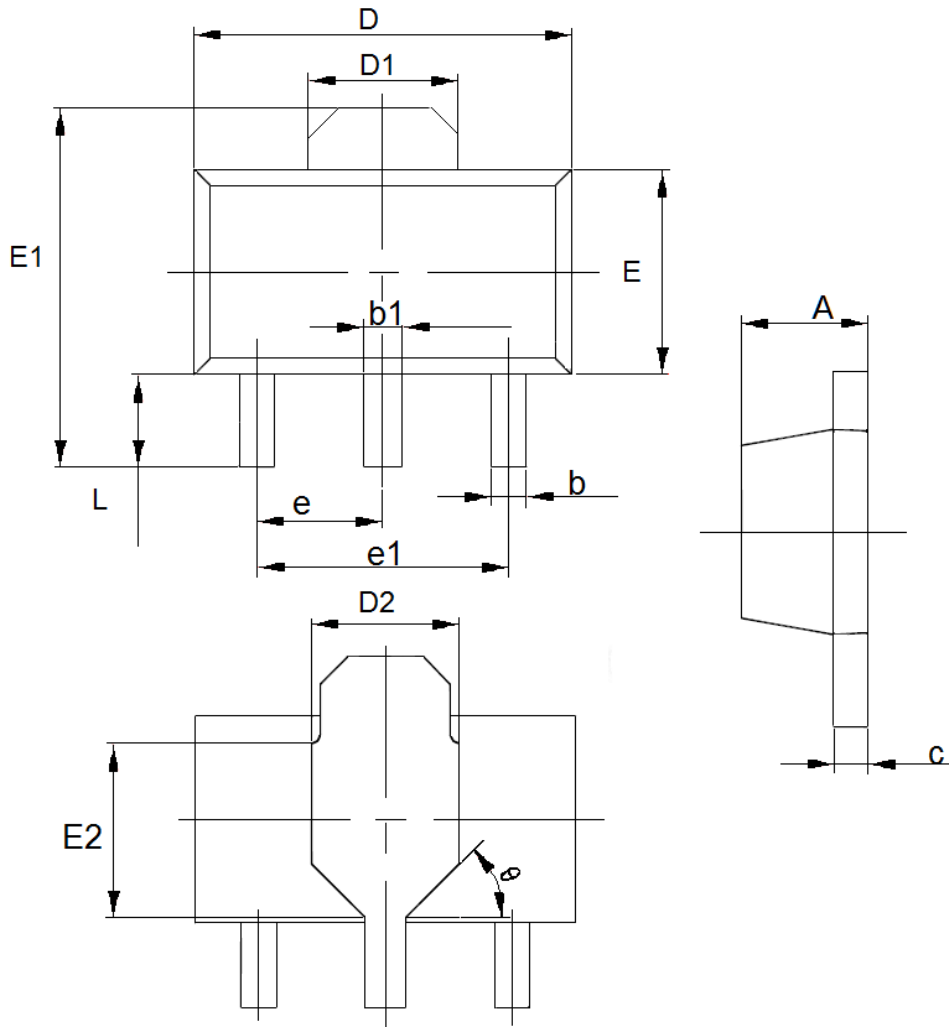


● TO-92



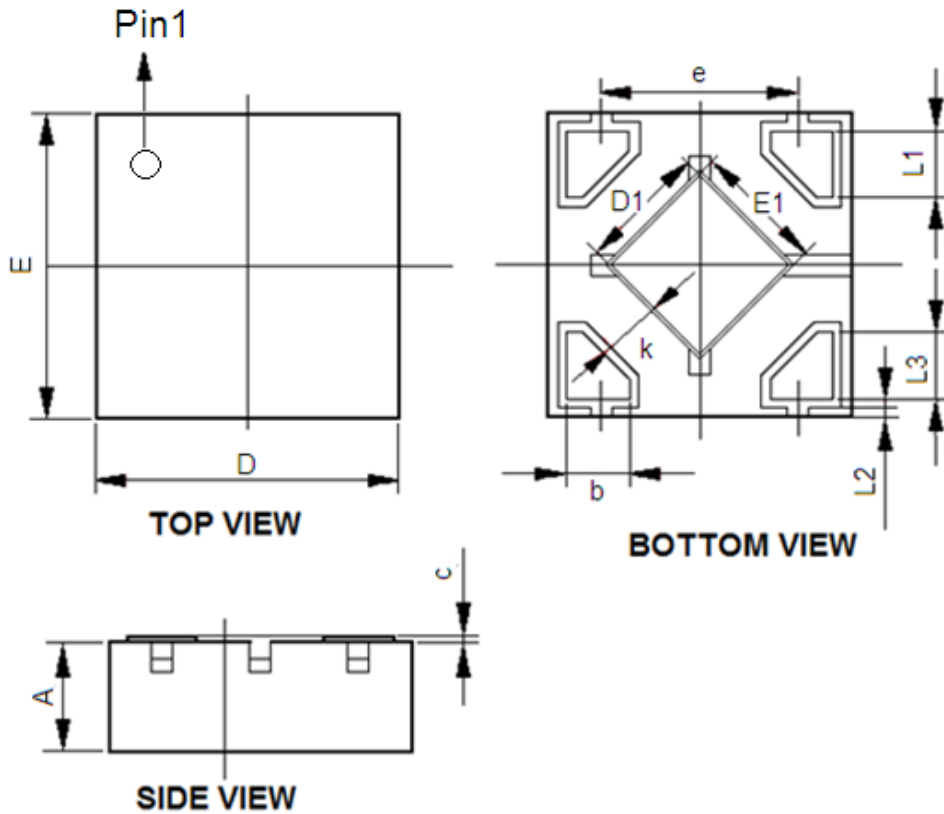
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	3.3	3.7	0.1299	0.1457
A1	1.1	1.4	0.0433	0.0551
b	0.38	0.55	0.015	0.0217
c	0.36	0.51	0.0142	0.0201
D	4.3	4.7	0.1693	0.185
D1	3.43	—	0.135	—
E	4.3	4.7	0.1693	0.185
e	1.27TYP		0.05TYP	
e1	2.44	2.64	0.0961	0.1039
L	14.1	14.5	0.5551	0.5709
h	0	0.38	0	0.015
Φ	—	1.6	—	0.063

● SOT89-3



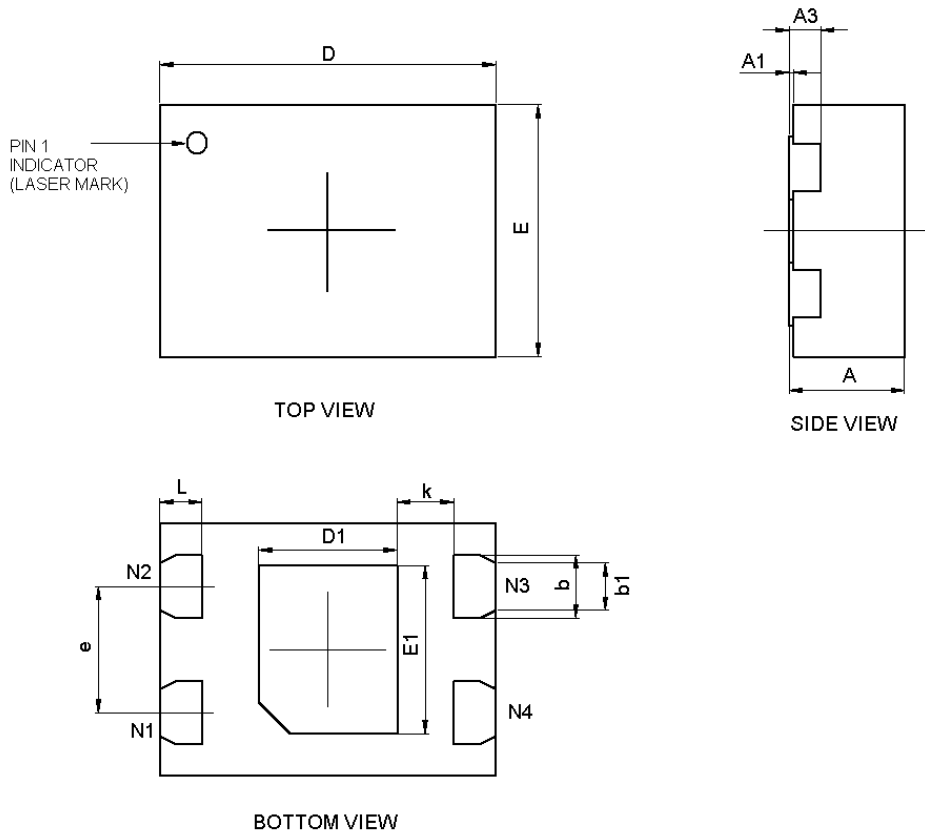
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.4	1.6	0.0551	0.0630
b	0.32	0.52	0.0126	0.0205
b1	0.4	0.58	0.0157	0.0228
c	0.35	0.45	0.0138	0.0177
D	4.4	4.6	0.1732	0.1811
D1	1.55(TYP)		0.061(TYP)	
D2	1.75(TYP)		0.0689(TYP)	
e1	3.0(TYP)		0.1181(TYP)	
E	2.3	2.6	0.0906	0.1023
E1	3.94	4.4	0.1551	0.1732
E2	1.9(TYP)		0.0748(TYP)	
e	1.5(TYP)		0.0591(TYP)	
L	0.8	1.2	0.0315	0.0472
θ	45°		45°	

● FBP1\*1-4



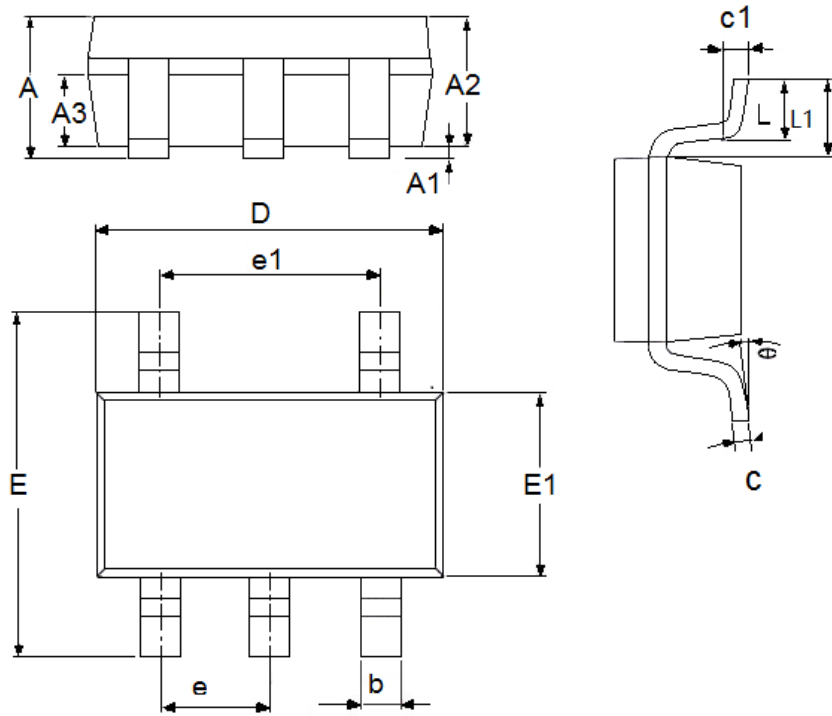
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.335	0.410	0.013	0.016
D	0.950	1.100	0.037	0.043
E	0.950	1.100	0.037	0.043
D1	0.370	0.470	0.015	0.019
E1	0.370	0.470	0.015	0.019
k	0.170MIN		0.007MIN	
b	0.160	0.260	0.060	0.010
C	0.010	0.090	0.000	0.004
e	0.600	0.700	0.024	0.028
L1	0.185	0.255	0.007	0.010
L2	0.03REF		0.001REF	
L3	0.185	0.255	0.007	0.010

● DFN1.2\*1.6-4



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.5	0.6	0.0197	0.0236
A1	0	0.05	0	0.0020
A3	0.152 (TYP)		0.006 (TYP)	
D	1.5	1.7	0.0591	0.0669
E	1.1	1.3	0.0433	0.0512
D1	0.56	0.76	0.0221	0.0299
E1	0.7	0.9	0.0276	0.0355
b	0.25	0.35	0.0098	0.0138
b1	0.175	0.275	0.0069	0.0108
e	0.6 (TYP)		0.0236 (TYP)	
L	0.15	0.25	0.0059	0.0098
k	0.2 (TYP)		0.0079 (TYP)	

● SOT23-5



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.23	0.0039	0.0091
D	2.82	3.05	0.1110	0.1201
e1	1.9(TYP)		0.0748(TYP)	
E	2.6	3.05	0.1024	0.1201
E1	1.5	1.75	0.0512	0.0689
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	

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