

## Voltage Detectors , ME2808 Series

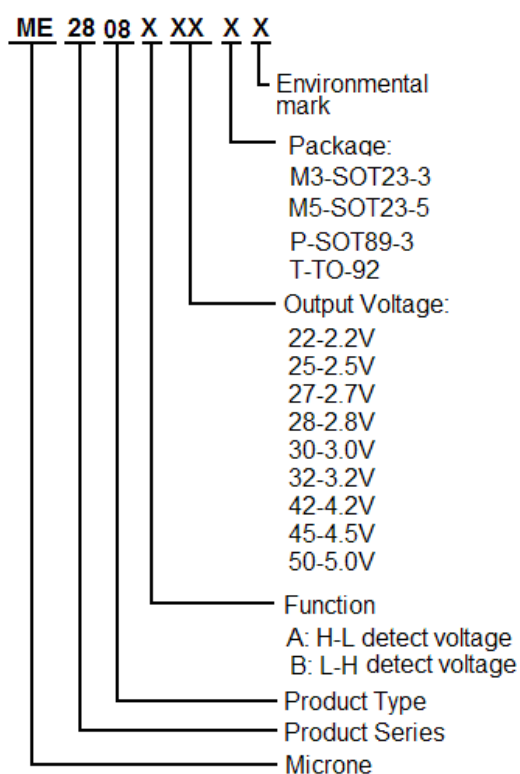
### General Description

**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.

### Features

- Highly accuracy:  $\pm 1\%$
- Low power consumption: TYP 1.8uA ( $V_{in}=3V$ )
- Detect 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: SOT-23-3, SOT-23-5, SOT-89-3, TO-92

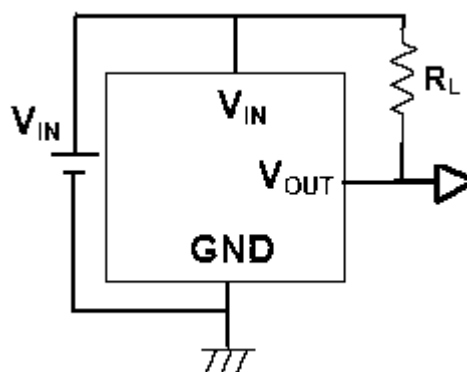
### Selection Guide



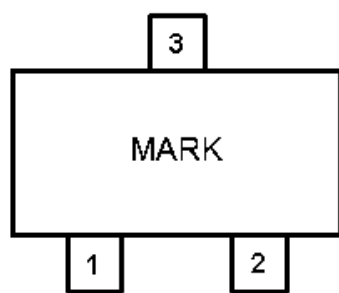
### Typical Application

- battery checkers
- Level selectors
- Power failure detectors
- Microcomputer reset
- Battery backup of Memories

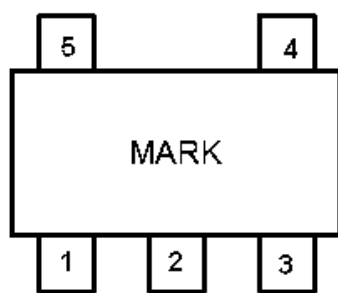
### Typical Application Circuit



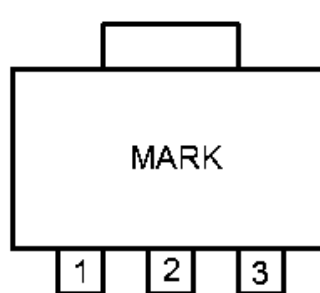
## Pin Configuration



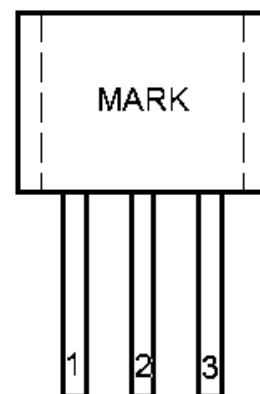
SOT23-3



SOT23-5



SOT89-3

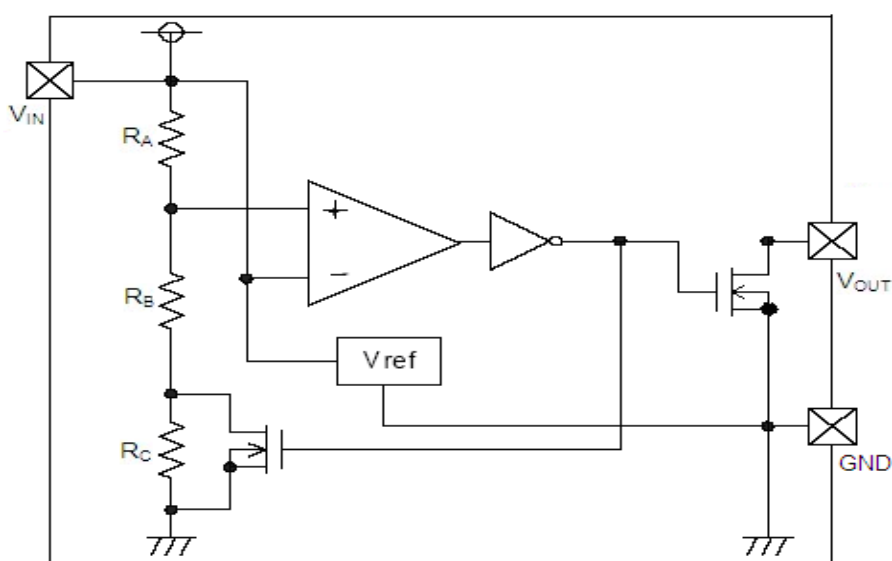


TO-92

## Pin Assignment

Pin Number				Pin Name	Functions
SOT-23-3	SOT-23-5	SOT-89-3	TO-92		
2	3	3	3	GND	Ground
1	1	1	1	V <sub>OUT</sub>	Output Voltage
3	2	2	2	V <sub>IN</sub>	Input Voltage
	4			NC	No Connection
	5			NC	No Connection

## Block Diagram



## Absolute Maximum Ratings

PARAMETER		SYMBAL	RATINGS	UNITS
$V_{IN}$ Input Voltage		$V_{IN}$	18	V
Output Current		$I_{OUT}$	50	mA
Output Voltage	NMOS	$V_{OUT}$	GND-0.3~ $V_{IN} +0.3$	V
Continuous Total Power Dissipation	SOT23-3/5	$P_D$	300	mW
	SOT89-3		500	
	TO-92		500	
Operating Ambient Temperature		$T_{Opr}$	-40~+85	°C
Storage Temperature		$T_{stg}$	-50~+125	°C
Soldering temperature and time		$T_{solder}$	260°C, 10s	

## Electrical Characteristics ( $V_{DET}=2.0V$ to $7.0V$ , $T_A=25^\circ C$ , unless otherwise noted)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
$V_{DET}$	Detect Voltage			$V_{DET} \times 0.99$	$V_{DET}$	$V_{DET} \times 1.01$	V
$V_{HYS}$	Hysteresis Width			$V_{DET} \times 0.02$	$V_{DET} \times 0.05$	$V_{DET} \times 0.1$	V
$I_{IN}$	Operating Current	$V_{DET}=2.0V \sim 2.8V$	$V_{IN}=3.0V$	-	1.8	3	$\mu A$
		$V_{DET}=2.8V \sim 3.6V$	$V_{IN}=4.0V$	-	1.8	4	
		$V_{DET}=3.6V \sim 4.7V$	$V_{IN}=5.0V$	-	2.1	4	
		$V_{DET}=4.7V \sim 7.0V$	$V_{IN}=8.0V$	-	2.5	4	
$V_{IN}$	Operating Voltage	$V_{DET}=2.0V$ to $7.0V$		0.7	-	18	V
$I_{OL}$	Output Sink Current	$V_{DET}=2.0V \sim 2.8V$	$V_{IN}=-V_{DET(S)}-0.2V$ , $V_{OUT}=0.2V$	0.5			mA
		$V_{DET}=2.8V \sim 3.6V$	$V_{IN}=-V_{DET(S)}-0.5V$ , $V_{OUT}=0.3V$	0.5			
		$V_{DET}=3.6V \sim 4.7V$	$V_{IN}=-V_{DET(S)}-0.5V$ , $V_{OUT}=0.3V$	1.2			
		$V_{DET}=4.7V \sim 7.0V$	$V_{IN}=-V_{DET(S)}-0.5V$ , $V_{OUT}=0.3V$	2.5			
$\Delta V_{DET}/\Delta T_A$	Temperature characteristics	$0^\circ C \leq T_{opr} \leq 70^\circ C$			$\pm 0.9$		mV/°C

**Note:** 1、VDF(S) : Specified Detection Voltage value  
 2、VDF : Actual Detection Voltage value  
 3、Release Voltage:  $VDR=VDF+VHYS$  (ME2808A series)  
 $VDR=VDF-VHYS$  (ME2808B series)

## 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. The detection voltage is as defined:

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

The release voltage is as defined:

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

The hysteresis width is:

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

Fig.1 demonstrates the NMOS output type with positive output polarity ( $V_{OUT}$  is normally high, active low).

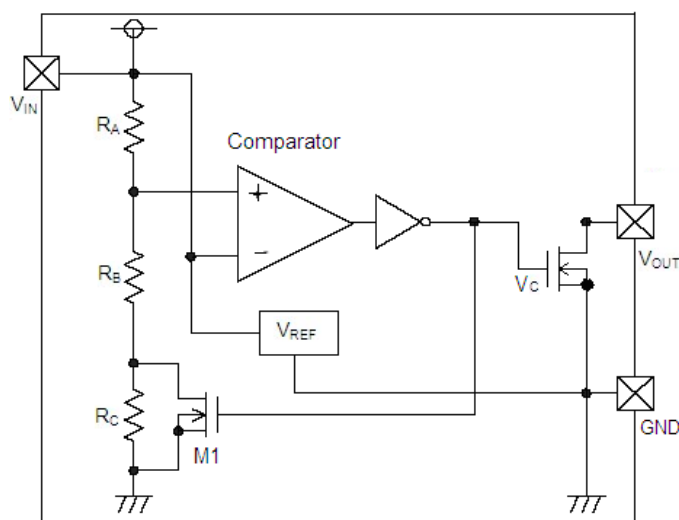
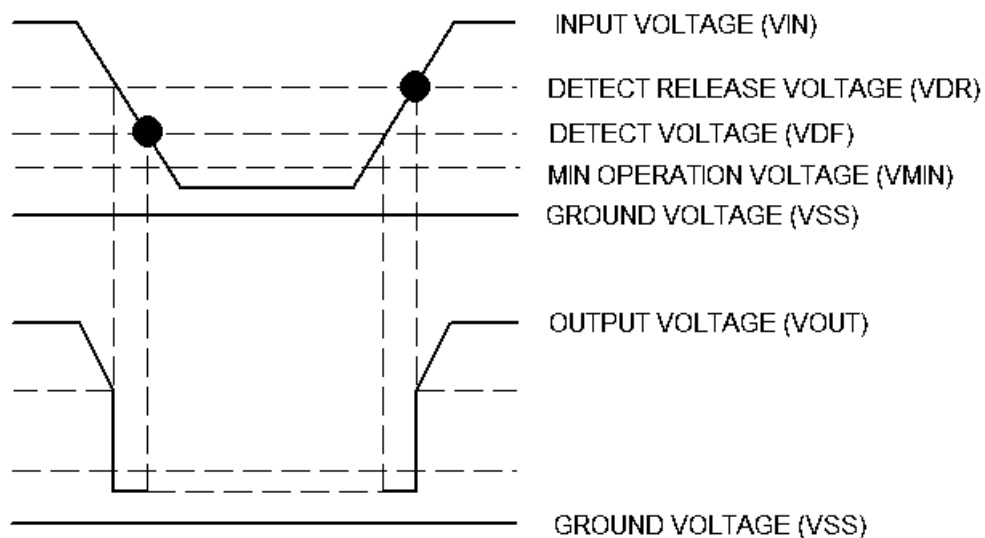


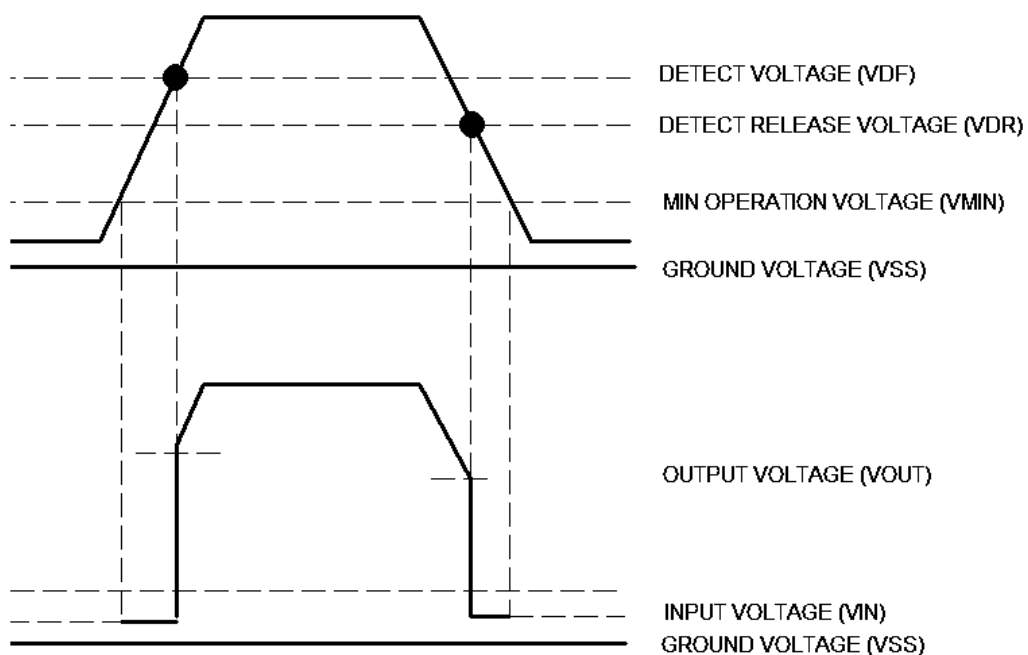
Fig.1 NMOS output voltage detector (ME2808)

## Timing Chart

ME2808AXX:

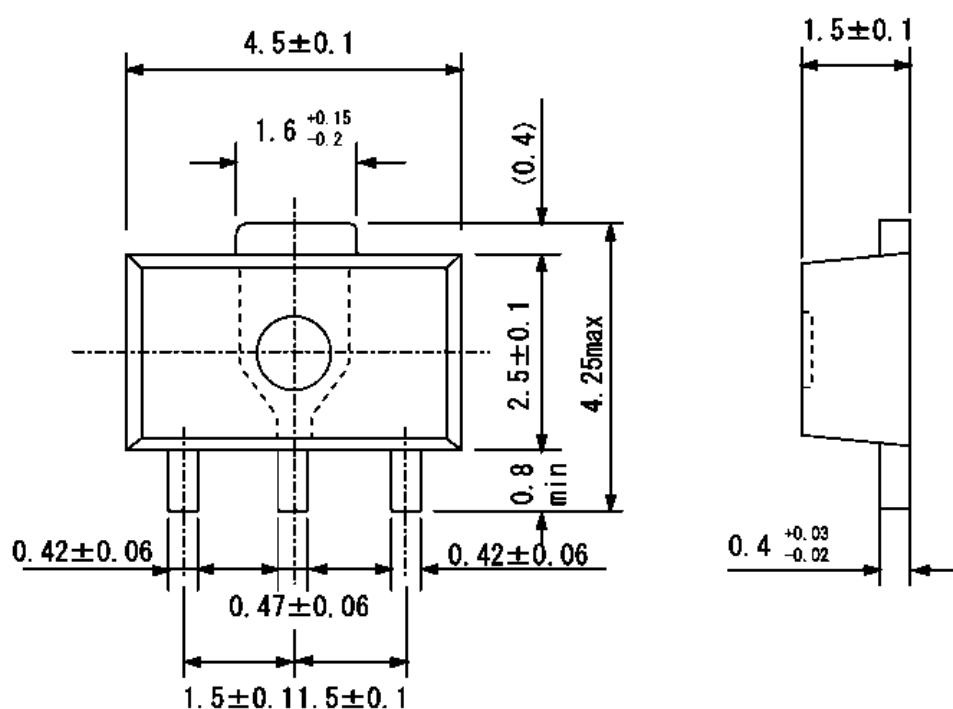


ME2808BXX:

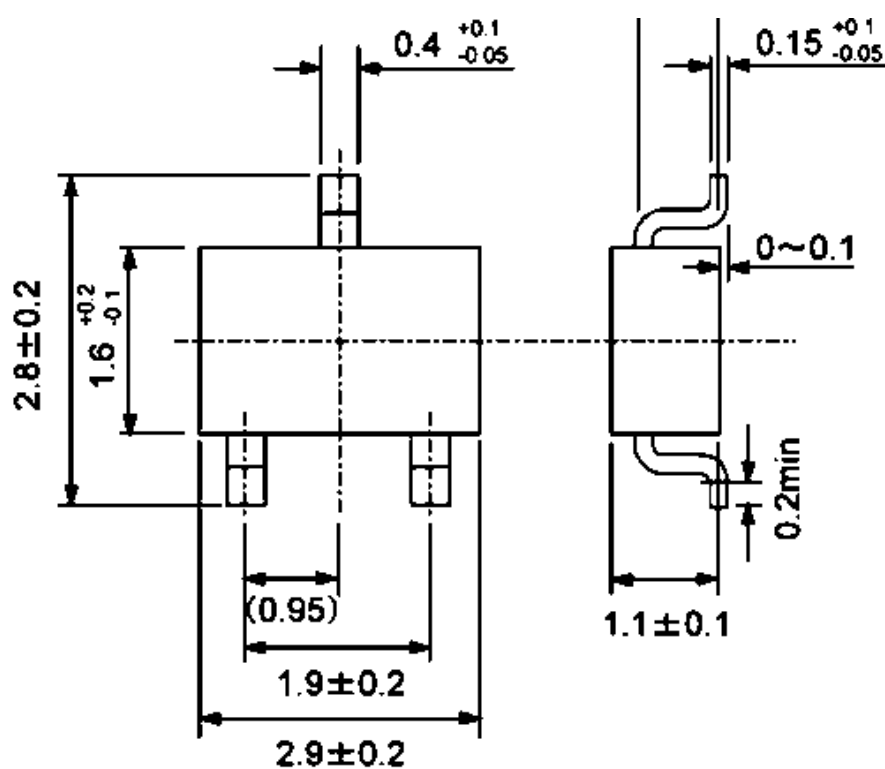


## Package Information

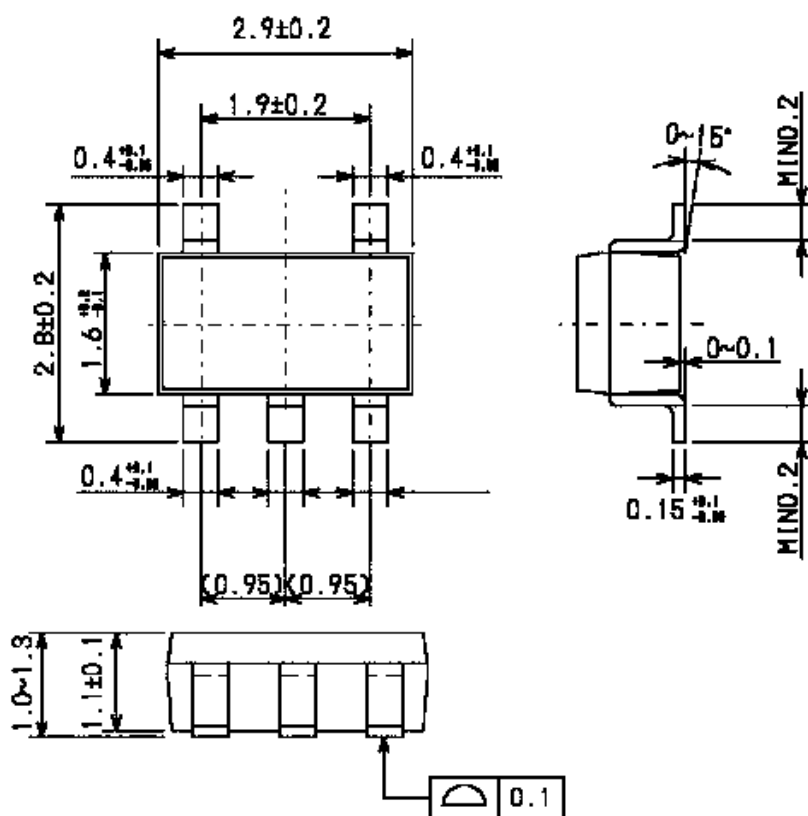
### ● SOT89-3



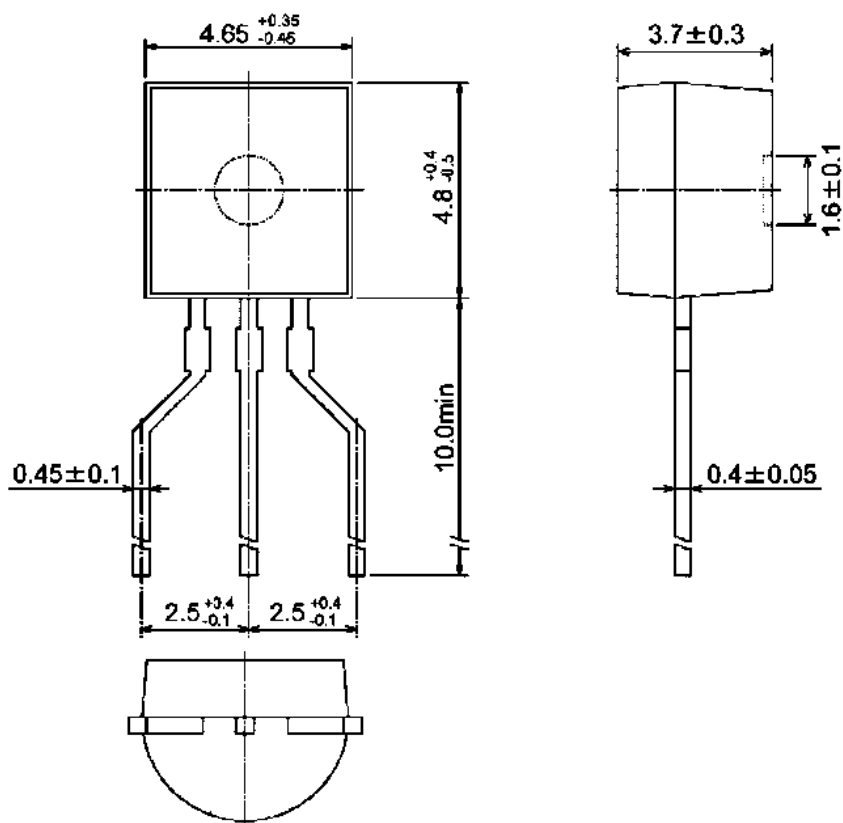
### ● SOT23-3



● SOT23-5



● TO-92



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