

Voltage Detectors , ME2807 Series

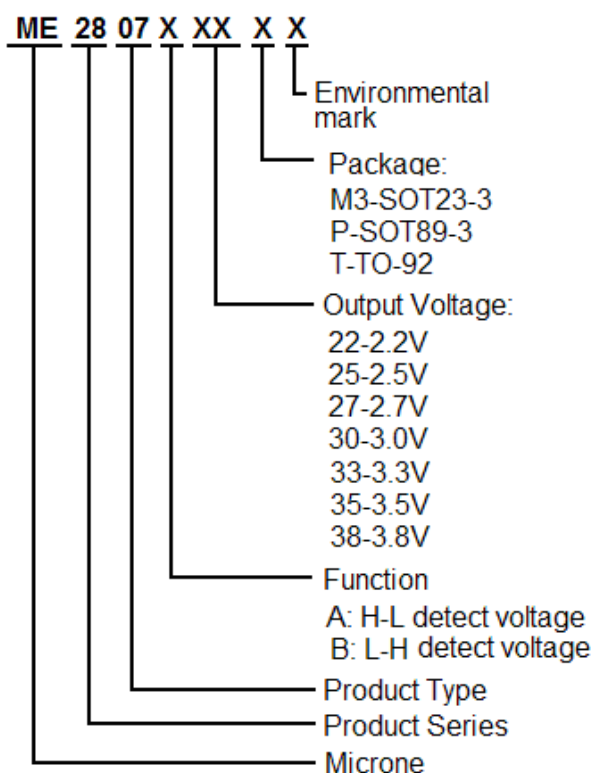
General Description

ME2807 Series are a set of three-terminal low power voltage detectors implemented in CMOS 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. CMOS 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: CMOS
- Package: SOT-23-3, SOT-89-3, TO-92

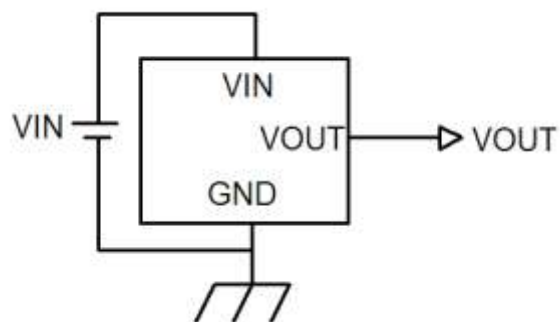
Selection Guide



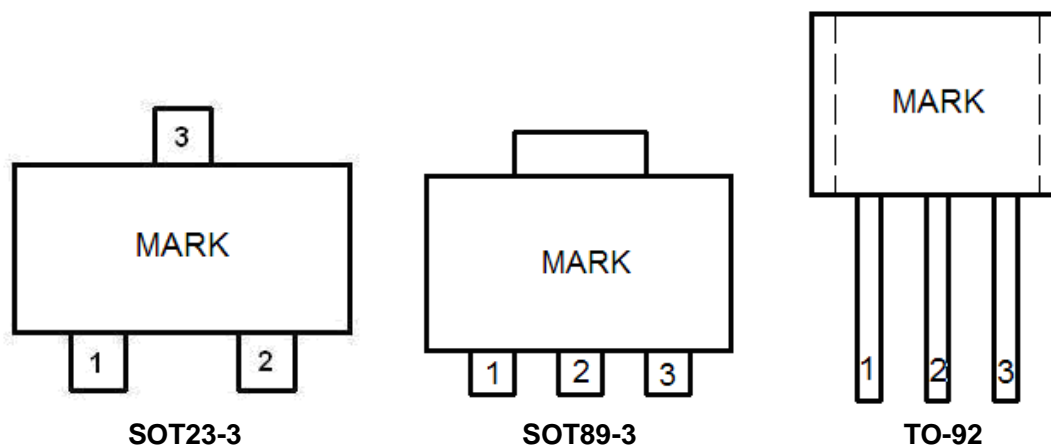
Typical Application

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

Typical Application Circuit



Pin Configuration

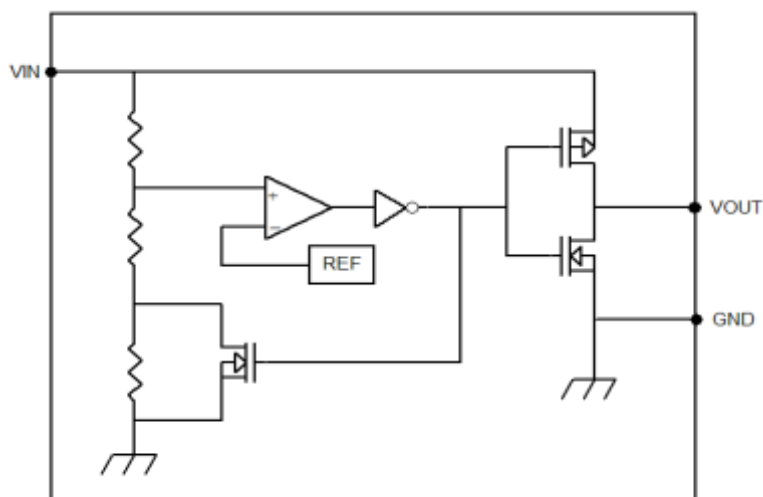


Pin Assignment

ME2807

Pin Number			Pin Name	Functions
SOT-23-3	SOT-89-3	TO-92		
2	3	3	GND	Ground
1	1	1	V_{OUT}	Output Voltage
3	2	2	V_{IN}	Input Voltage

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	CMOS	V _{OUT}	GND-0.3~V _{IN} +0.3	V
Continuous Total Power Dissipation	SOT23-3	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 7.5V ,T_a=25°C ,unless otherwise noted)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
V _{DET}	Detect Voltage			V _{DET} ×0.99	V _{DET}	V _{DET} ×1.01	V
V _{HYS}	Hysteresis Width			V _{DET} ×0.02	V _{DET} ×0.05	V _{DET} ×0.1	V
I _{IN}	Operating Current	V _{DET} =2.0V~ 2.8V	V _{IN} =3.0V	-	1.8	4	μA
		V _{DET} =2.8V~ 3.6V	V _{IN} =4.0V	-	1.8	4	
		V _{DET} =3.6V ~ 4.7V	V _{IN} =5.0V	-	2.1	7	
		V _{DET} =4.7V~7.0V	V _{IN} =6.0V	-	2.5	7	
V _{IN}	Operating Voltage	V _{DET} =2.0V to 7.0V		0.7	-	18	V
I _{OL}	Output Sink Current	V _{DET} =2.2V	V _{IN} =2V V _{OUT} =0.2V	0.5	1		mA
		V _{DET} =2.4V					
		V _{DET} =2.7V					
I _{OH}	Output Source Current	V _{DET} =2.2V	V _{IN} =2.5V V _{OUT} =2.2V	-0.3	-0.5		mA
		V _{DET} =2.4V	V _{IN} =3V V _{OUT} =2.7V	-0.3	-0.5		
		V _{DET} =2.7V	V _{IN} =3.2V V _{OUT} =2.9V	-0.3	-0.5		
ΔV _{DET} /ΔTA	Temperature characteristics	0°C≤T _{opr} ≤70°C			±0.9		mV/°C

Note: Use this IC within the stated maximum ratings. Operation beyond these limits may cause degrading or permanent damage to the device.

Functional Description

The ME2807 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:

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

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

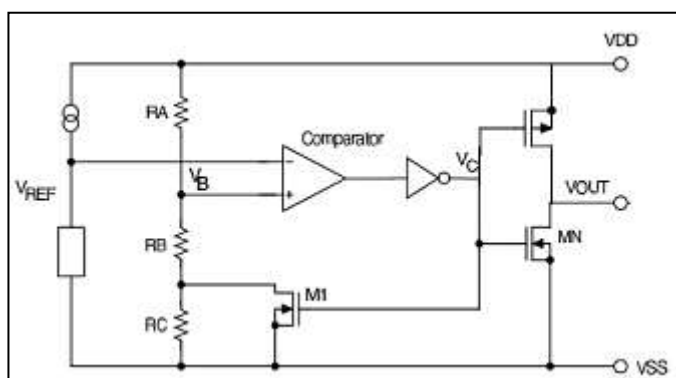
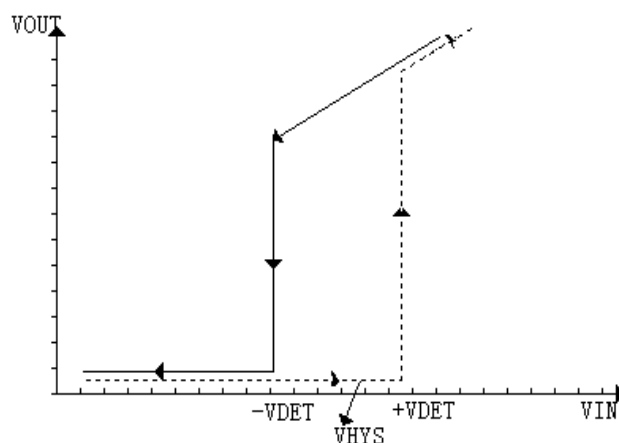


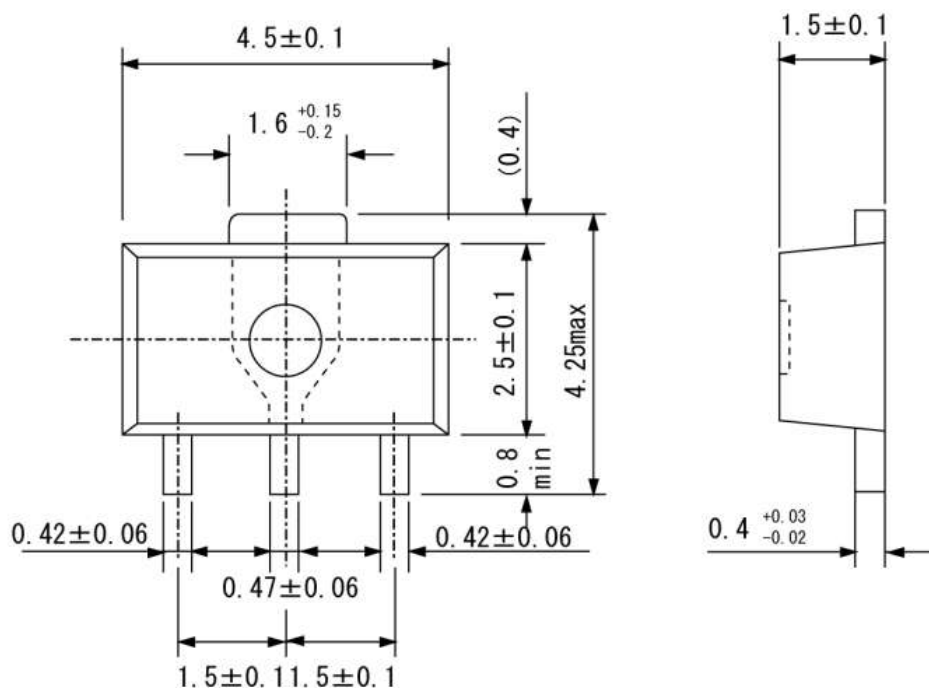
Fig.1 CMOS output voltage detector (ME2807)

Timing Chart

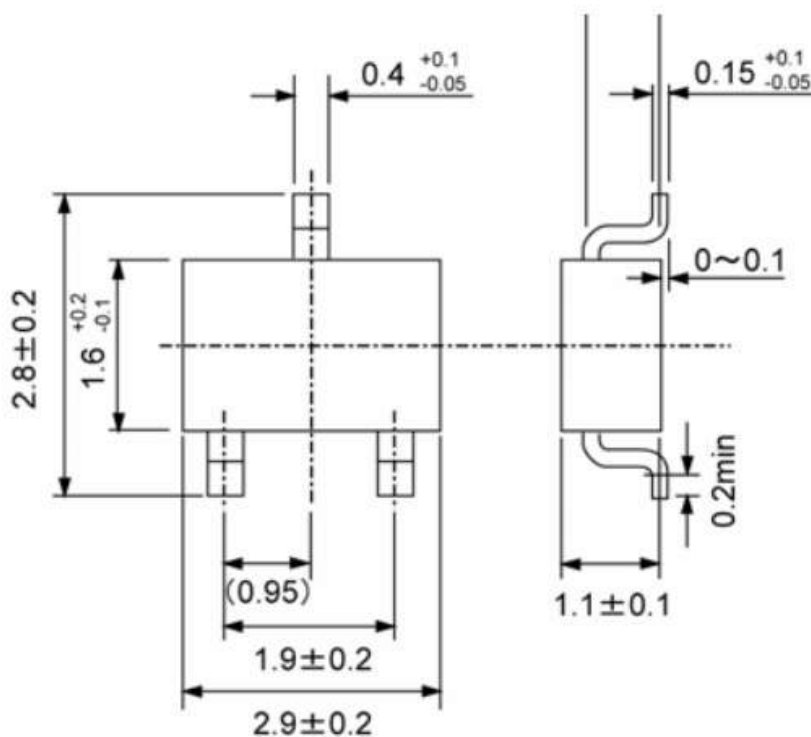


Package Information

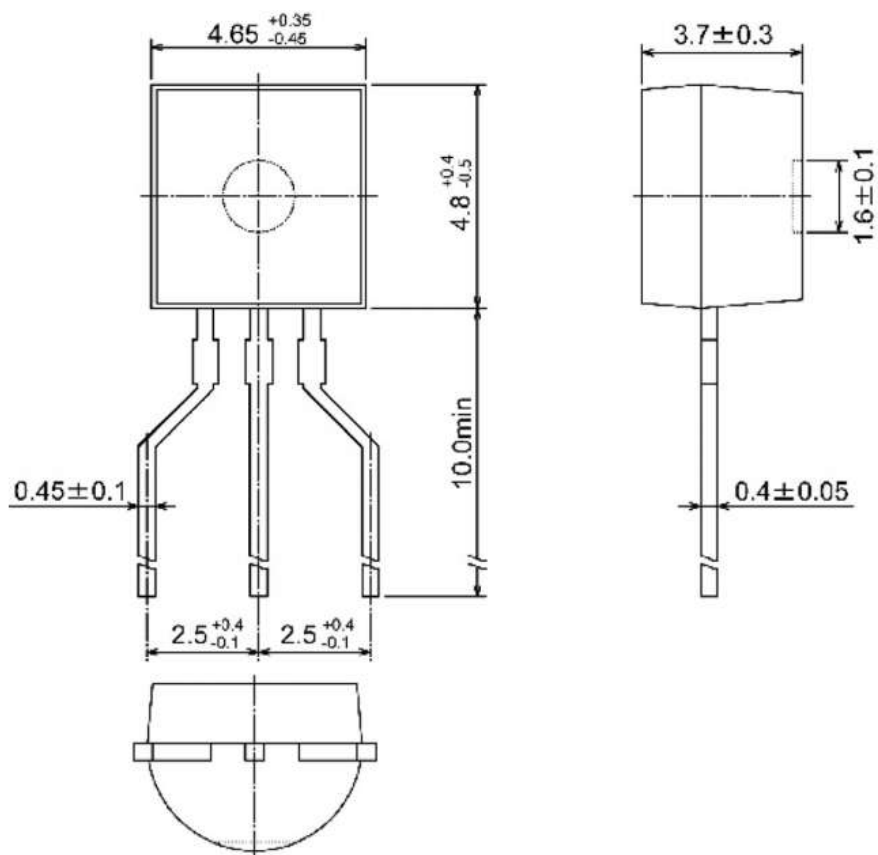
● SOT89-3



● SOT23-3



● TO-92



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