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 Detection voltage： ± 1%
- Low power consumption：TYP 1.8uA (Vin=3V)
- Detection voltage range： 2.0V~7.0V in 0.1V increments
- Operating voltage range：1.5V~18V
- Detect voltage temperature characteristics：TYP ± 0.9mV/℃
- Output configuration： CMOS

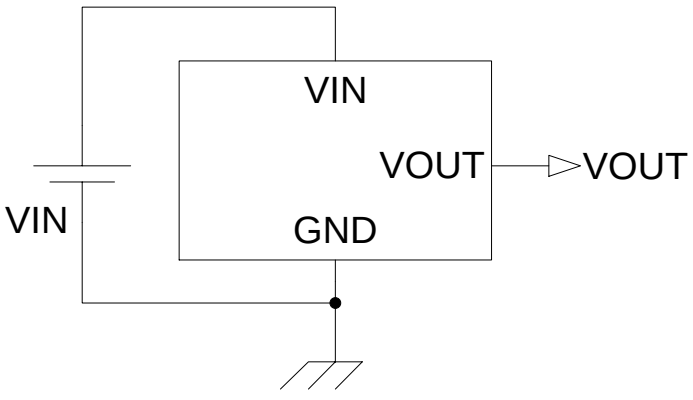
Typical Application

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

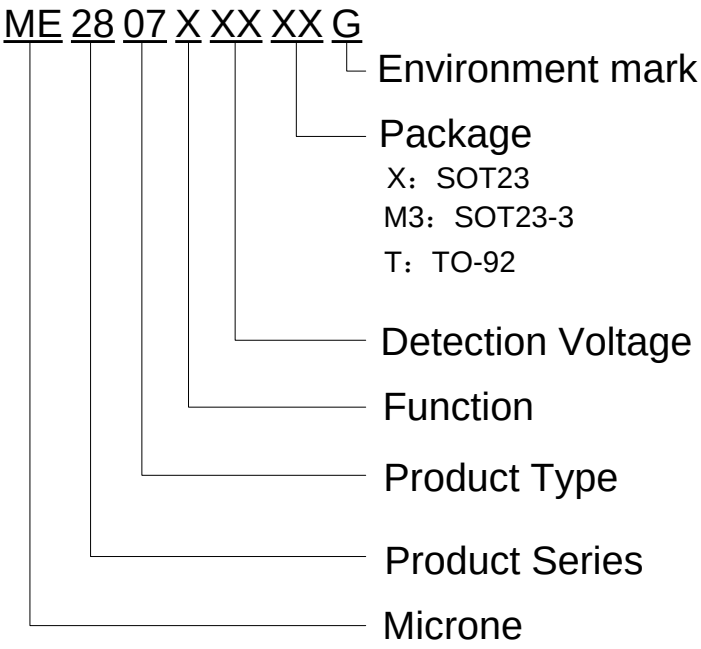
Package

- 3-pin SOT23、SOT23-3、TO-92

Typical Application Circuit



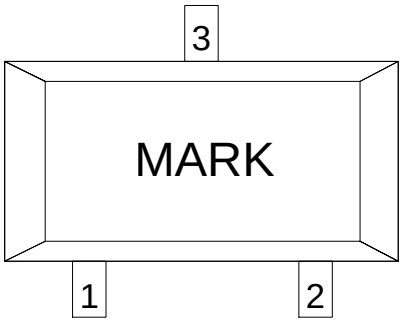
Selection Guide



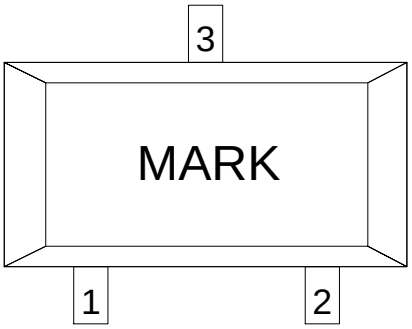
product series	product description
ME2807A27XG	VIN=H⟶L V_{DET} =2.7V； VIN Falling edge detection；Package：SOT23
ME2807A33XG	VIN=H⟶L V_{DET} =3.3V； VIN Falling edge detection；Package：SOT23
ME2807A22M3G	VIN=H⟶L V_{DET} =2.2V； VIN Falling edge detection；Package：SOT23-3
ME2807A33M3G	VIN=H⟶L V_{DET} =3.3V； VIN Falling edge detection；Package：SOT23-3
ME2807A22TG	VIN=H⟶L V_{DET} =2.2V； VIN Falling edge detection；Package：TO-92
ME2807B33M3G	VIN=L⟶H V_{DET} =3.3V； VIN Rising edge detection；Package：SOT23-3

NOTE: At present ,there are seventeen 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、4.5V、5.0V。If you need other detection voltage and package, please contact our sales staff.

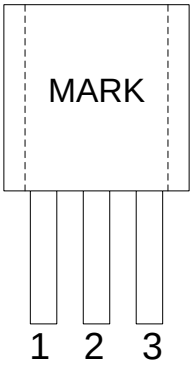
Pin Configuration



SOT23



SOT23-3

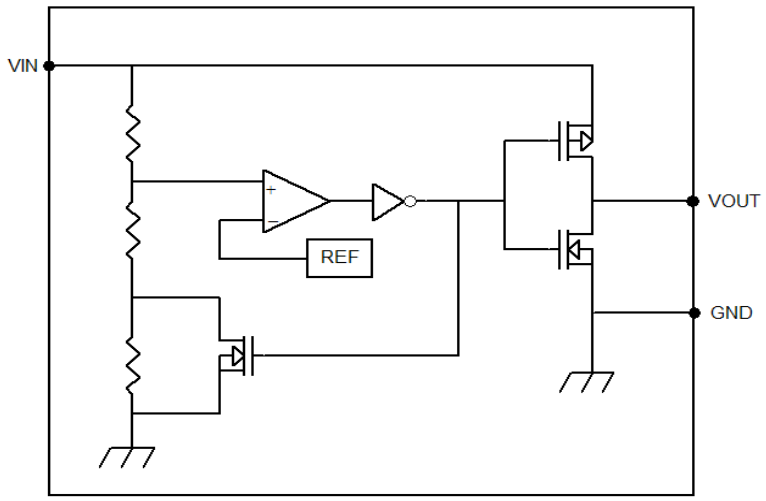


TO-92

Pin Assignment

Pin Number			Pin Name	Functions
SOT23	SOT23-3	TO-92		
2	2	3	GND	Ground
1	1	1	V_{OUT}	Output Voltage
3	3	2	V_{IN}	Input Voltage

Block Diagram



Absolute Maximum Ratings

PARAMETER		SYMBAL	RATINGS	UNITS
V_{IN} Input Voltage		V_{INmax}	18	V
Output Current		I_{OUTmax}	20	mA
Output Voltage	CMOS	V_{OUT}	GND-0.3~ V_{IN} +0.3	V
Continuous Total Power Dissipation	SOT23	P_D	0.38	W
	SOT23-3		0.54	
	TO-92		0.83	
Thermal resistance (Junction to air)	SOT23	θ_{JA}	330	ºC /W
	SOT23-3		230	
	TO-92		150	
Maximum junction temperature		T_J	-40~+150	℃
Operating Ambient Temperature		T_{Opr}	-40~+85	℃
Storage Temperature		T_{stg}	-55~+150	℃
Soldering temperature and time		T_{solder}	260℃, 10s	

Electrical Characteristics (V_{DET} =2.0V to 7.0V ,T_A=25℃ ,unless otherwise noted)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Units
Detect Voltage	V_{DET}	ME2807A V_{IN}=H→ L		V_{DET}×0.99	V_{DET}	V_{DET}×1.01	V
		ME2807B V_{IN}=L → H					
Hysteresis Width	V_{HYS}	V_{IN}=L→ H → L V_{HYS} =$V_{DET(+)}$ - $V_{DET(-)}$		V_{DET}×0.02	V_{DET}×0.05	V_{DET}×0.1	V
Operating Current	I_{IN}	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	
Operating Voltage	V_{IN}	V_{DET} =2.0V ~ 7.0V		0.7	-	18	V
Output Sink Current	I_{OL}	V_{DET}=2.2V	V_{IN} =2V V_{OUT}=0.2V	0.5	1		mA
		V_{DET}=2.4V					
		V_{DET}=2.7V					
Output Source Current	I_{OH}	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		
Temperature characteristics	ΔVDET/ΔTA	0℃≤Topr≤70℃			±0.9		mV/℃

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 ex-pressed 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 bellow 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.

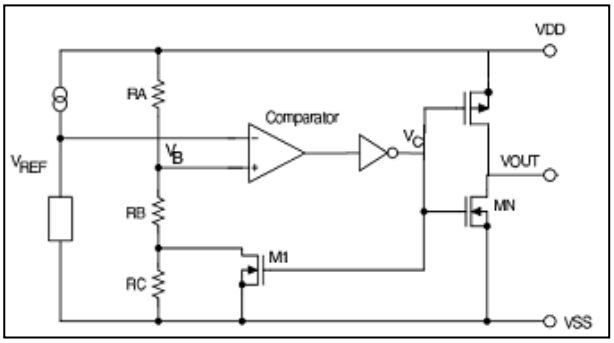


Fig.1 CMOS output voltage detector (ME2807)

ME2807A: The detection voltage is as defined:

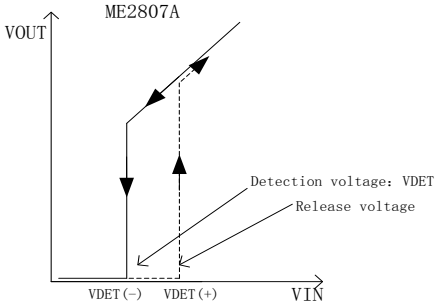
$V_{DET}=V_{DET(-)}=(R_A+R_B+R_C)\times V_{REF}/(R_B+R_C)$

The release voltage is as defined:

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

The hysteresis width is:

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



ME2807B: The detection voltage is as defined:

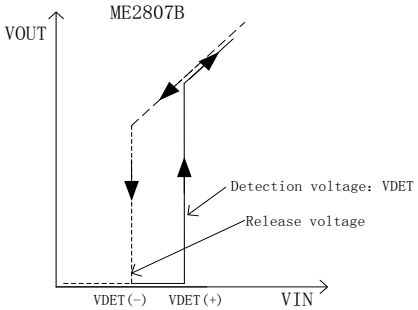
$V_{DET}=V_{DET(+)}=(R_A+R_B)\times V_{REF}/R_B$

The release voltage is as defined:

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

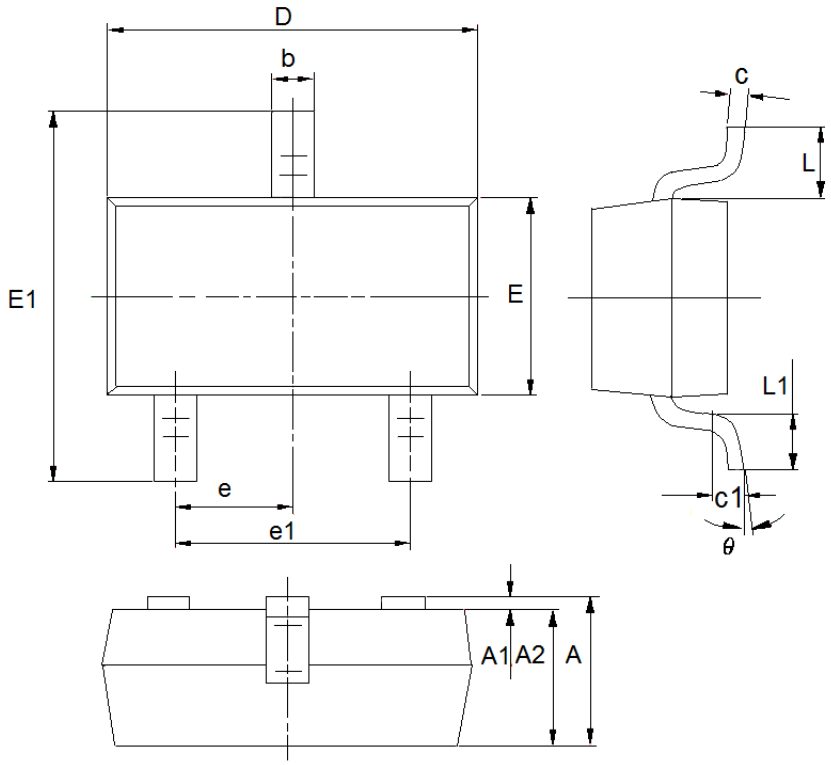
The hysteresis width is:

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



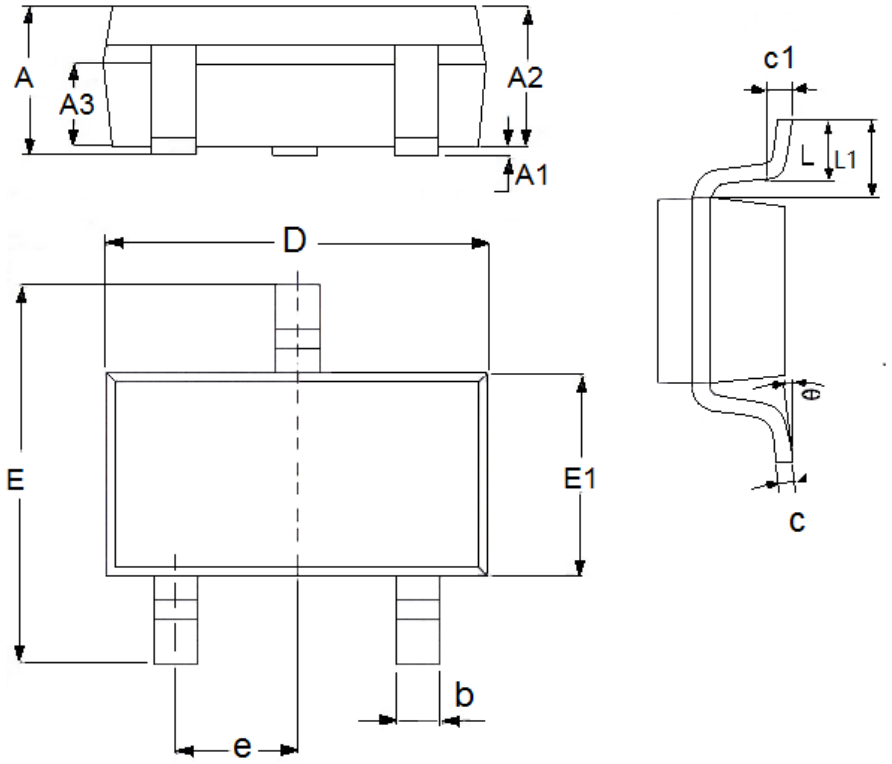
Packaging Information

- SOT23



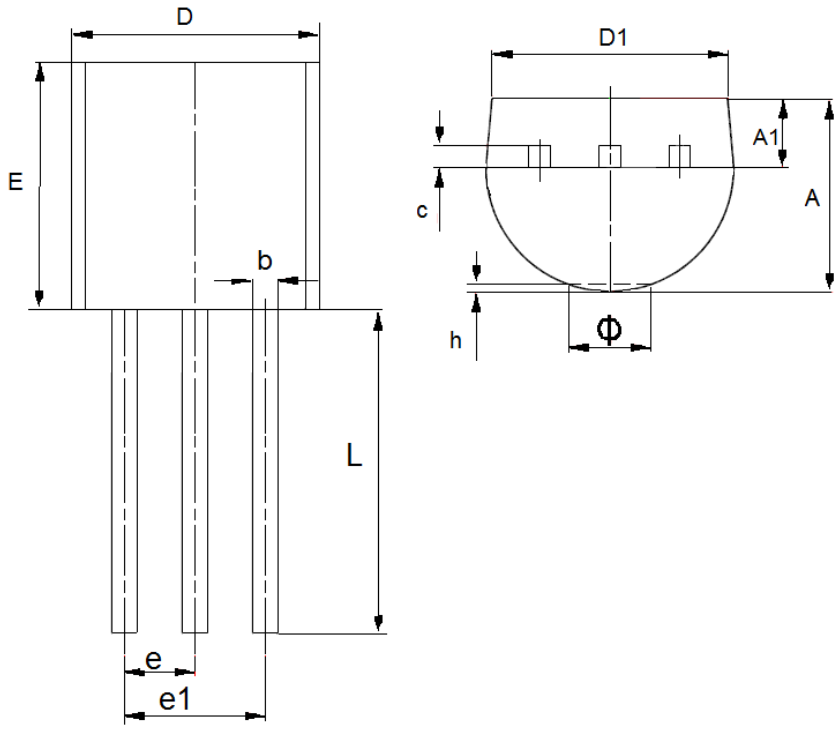
DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	0.9	1.15	0.0354	0.0453
A1	0	0.14	0.0000	0.0055
A2	0.9	1.05	0.0354	0.0413
b	0.28	0.52	0.0110	0.0205
c	0.07	0.23	0.0028	0.0091
D	2.8	3.0	0.1102	0.1181
e1	1.8	2.0	0.0709	0.0787
E	1.2	1.4	0.0472	0.0551
E1	2.2	2.6	0.0866	0.1024
e	0.95(TYP)		0.0374(TYP)	
L	0.55(TYP)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

- The information described herein is subject to change without notice.
- Nanjing Micro One Electronics Inc is not responsible for any problems caused by circuits or diagrams described herein whose related industrial properties, patents, or other rights belong to third parties. The application circuit examples explain typical applications of the products, and do not guarantee the success of any specific mass-production design.
- Use of the information described herein for other purposes and/or reproduction or copying without the express permission of Nanjing Micro One Electronics Inc is strictly prohibited.
- The products described herein cannot be used as part of any device or equipment affecting the human body, such as exercise equipment, medical equipment, security systems, gas equipment, or any apparatus installed in airplanes and other vehicles, without prior written permission of Nanjing Micro One Electronics Inc.
- Although Nanjing Micro One Electronics Inc exerts the greatest possible effort to ensure high quality and reliability, the failure or malfunction of semiconductor products may occur. The user of these products should therefore give thorough consideration to safety design, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue.