

Voltage Detectors , ME2804 Series

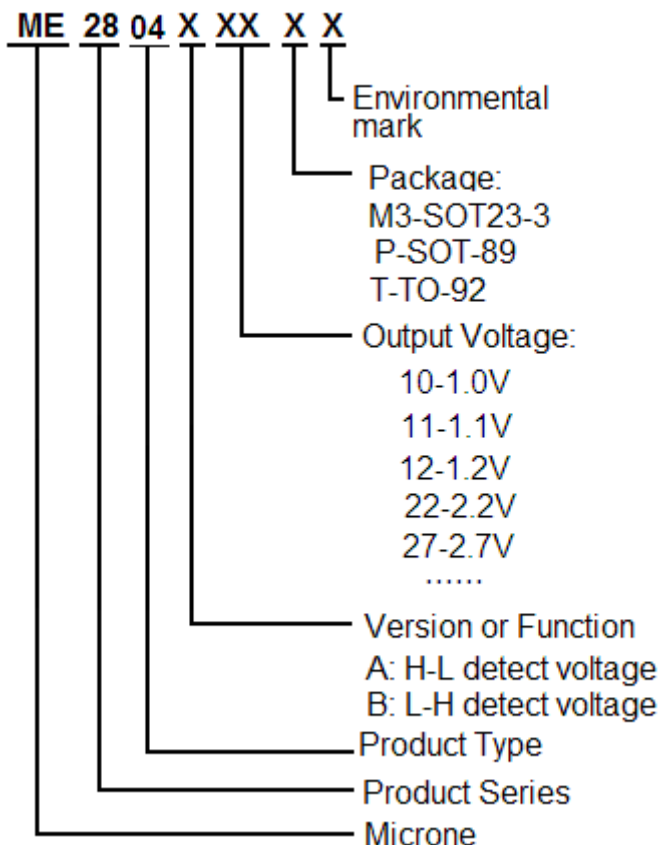
General Description

ME2804 Series are highly precise, low power consumption voltage detectors, manufactured using NMOS technologies. Detect voltage is extremely accurate with minimal temperature drift. NMOS output configurations are available.

Features

- Highly accuracy: $\pm 1\%$ ($-V_{DET}=1.5V$ 以上)
- Low power consumption:
TYP 0.7 μ A ($V_{IN}=3.5V, -V_{DET}=2.2V$)
- Detect voltage range: 1.0V~6.5V in 0.1V increments
- Operating voltage range: 0.7V~7V
- Detect voltage temperature characteristics:
TYP ± 100 ppm/ $^{\circ}$ C
- Output configuration: NMOS

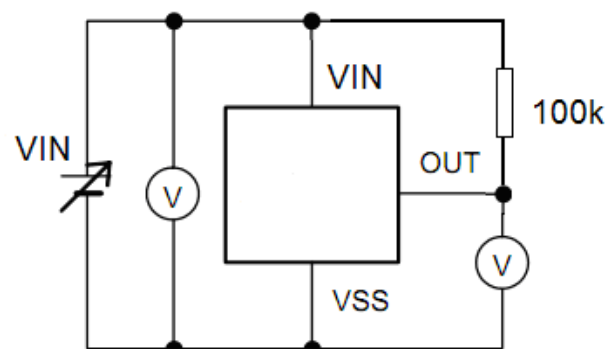
Selection Guide



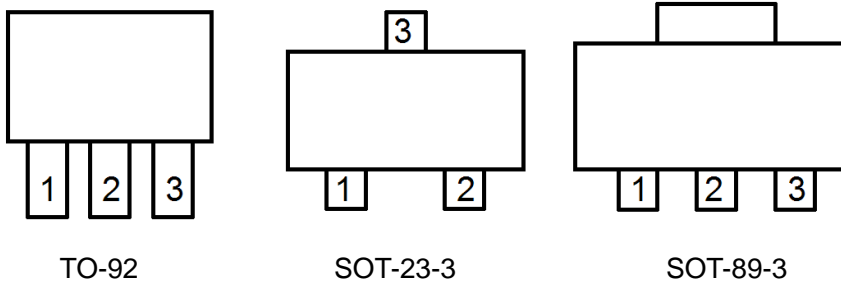
Typical Application

- Microprocessor reset circuitry
- Memory battery back-up circuits
- Power-on reset circuits
- Power failure detection

Typical Application Circuit



Pin Configuration

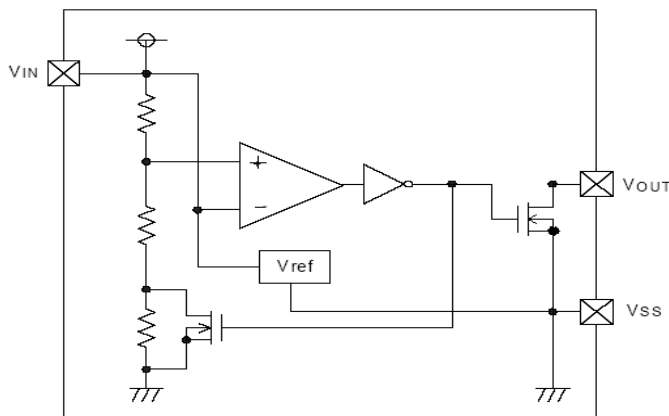


Pin Assignment

ME2804XX

| Pin Number | | | Pin Name | Functions |
|------------|----------|-------|----------|----------------|
| SOT-23-3 | SOT-89-3 | TO-92 | | |
| 2 | 3 | 3 | VSS | Ground |
| 1 | 1 | 1 | VOUT | Output Voltage |
| 3 | 2 | 2 | VIN | Input Voltage |

Block Diagram



Absolute Maximum Ratings

| PARAMETER | SYMBOL | RATINGS | UNITS |
|------------------------------------|--------------|------------------------------|-------|
| V_{IN} Input Voltage | V_{IN} | 8 | V |
| Output Current | I_{OUT} | 50 | mA |
| Output Voltage | CMOS | $V_{SS}-0.3 \sim V_{IN}+0.3$ | V |
| Continuous Total Power Dissipation | SOT-23-3 | 300 | mW |
| | SOT-89-3 | 500 | |
| | TO-92 | 500 | |
| Operating Ambient Temperature | T_{Opr} | -40~+85 | °C |
| Storage Temperature | T_{stg} | -40~+125 | °C |
| Soldering temperature and time | T_{solder} | 260°C, 10s | |
| ESD | MM | 400 | V |
| | HBM | 4000 | V |

Electrical Characteristics

($-V_{DET}(S)=1.0V$ to $6.5V$, $T_a=25^{\circ}C$, unless otherwise noted)

| Parameter | Symbol | Conditions | Min. | Typ | Max. | Units |
|-----------------------------|---|--|---------------------------|---------------------------|---------------------------|------------------|
| Detect Voltage | -VDET | $-V_{DET}(S) \leq 1.5V$ | $-V_{DET}(S) \times 0.98$ | -VDET(S) | $-V_{DET}(S) \times 1.02$ | V |
| | | $-V_{DET}(S) > 1.5V$ | $-V_{DET}(S) \times 0.99$ | -VDET(S) | $-V_{DET}(S) \times 1.01$ | |
| Hysteresis Range | VHYS | - | $-V_{DET}(S) \times 0.03$ | $-V_{DET}(S) \times 0.05$ | $-V_{DET}(S) \times 0.08$ | V |
| Supply Current | ISS | $V_{IN}=2V$ (1.0V-1.5V) | | 0.7 | 1 | uA |
| | | $V_{IN}=3.5V$ (1.6V-2.4V) | | 0.7 | 1 | |
| | | $V_{IN}=4.5V$ (2.5V-3.9V) | | 1.2 | 2 | |
| | | $V_{IN}=6V$ (4.0V-5.6V) | | 1.1 | 2 | |
| | | $V_{IN}=7V$ (5.7V-6.5V) | | 1 | 2 | |
| Output Current | Iout N-ch | $V_{DS}=0.5V$ $V_{IN}=0.7V$ | 0.01 | 0.14 | -- | mA |
| Operating voltage | V_{IN} | - | 0.7 | - | 7 | V |
| Responding time | tpLH | | | | 60 | us |
| Temperature characteristics | $\frac{\Delta -V_{DET}}{\Delta T_a \bullet -V_{DET}}$ | $\Delta T_a = -40^{\circ}C \sim 85^{\circ}C$ | - | ± 100 | ± 350 | ppm/ $^{\circ}C$ |

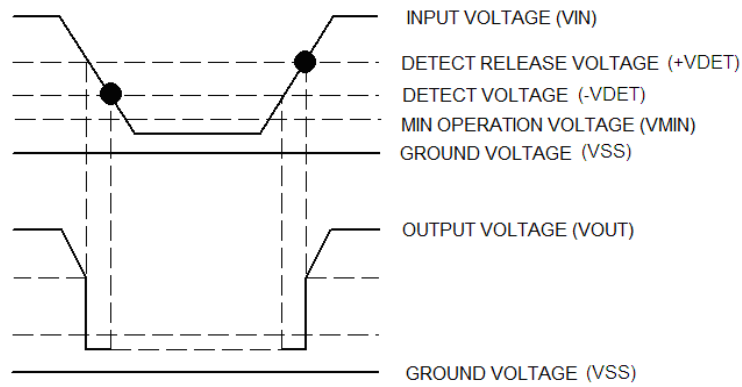
- Note:
- 1、-VDET(S) : Specified Detection Voltage value
 - 2、-VDET : Actual Detection Voltage value
 - 3、Release Voltage: $+V_{DET}=-V_{DET}+V_{HYS}$

Functional Description:

- 1、 When input voltage (V_{IN}) rises above detect voltage ($-V_{DET}$), output voltage (V_{OUT}) will be equal to V_{IN} .
- 2、 When input voltage (V_{IN}) falls below detect voltage ($-V_{DET}$), output voltage (V_{OUT}) will be equal to the ground voltage (V_{SS}) level.
- 3、 When input voltage (V_{IN}) falls to a level below that of the minimum operating voltage (V_{MIN}), output will become unstable. In this condition, V_{IN} will equal the pulled-up output (should output be pulled-up.)
- 4、 When input voltage (V_{IN}) rises above the ground voltage (V_{SS}) level, output will be unstable at levels below the minimum operating voltage (V_{MIN}). Between the V_{MIN} and detect release voltage ($+V_{DET}$) levels, the ground voltage (V_{SS}) level will be maintained.
- 5、 When input voltage (V_{IN}) rises above detect release voltage ($+V_{DET}$), output voltage (V_{OUT}) will be equal to V_{IN} .
- 6、 The difference between $+V_{DET}$ and $-V_{DET}$ represents the hysteresis range.

Timing Chart:

ME2804AXX:



Directions for use:

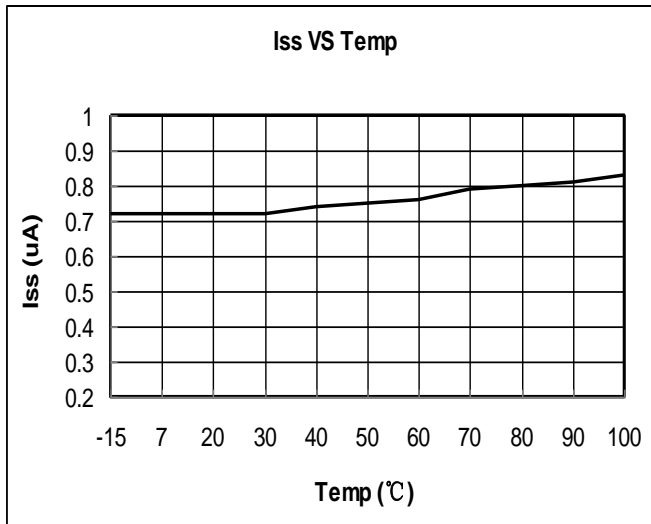
Notes on Use

- 1、 Please use this IC within the stated maximum ratings. Operation beyond these limits may cause degrading or permanent damage to the device.
- 2、 In order to stabilize the IC's operations, please ensure that VIN pin's input frequency's rise and fall times are more than several μ Sec/V.

Type Characteristics

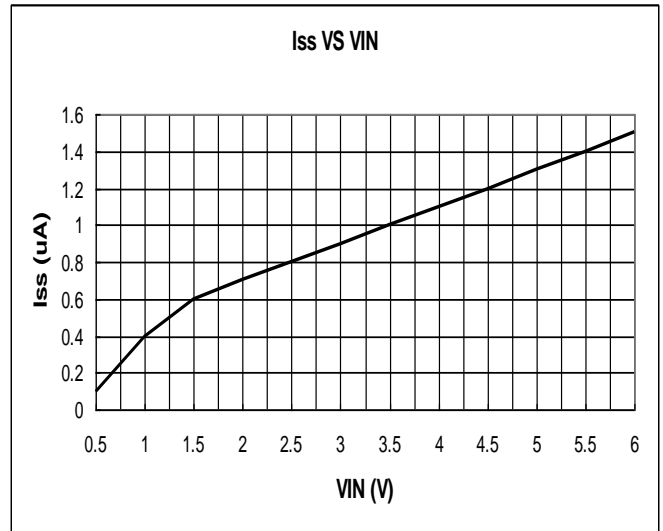
1、 SUPPLY CURRENT VS. AMBIENT TEMPERATURE

VIN=2V,-VDET=1.1V



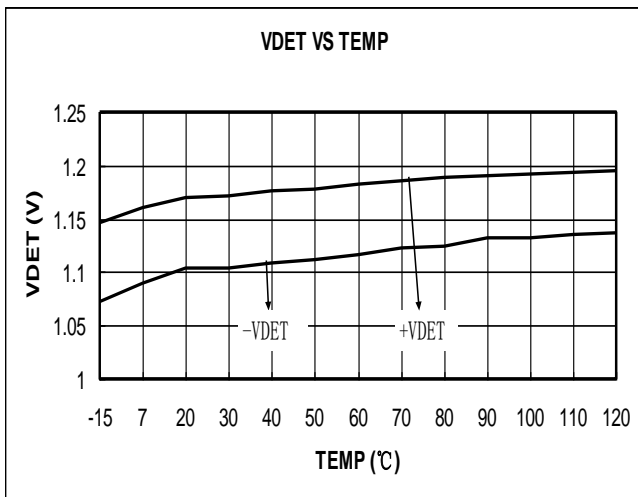
2、 SUPPLY CURRENT VS. INPUT VOLTAGE

-VDET=1.1V (T=25°C)



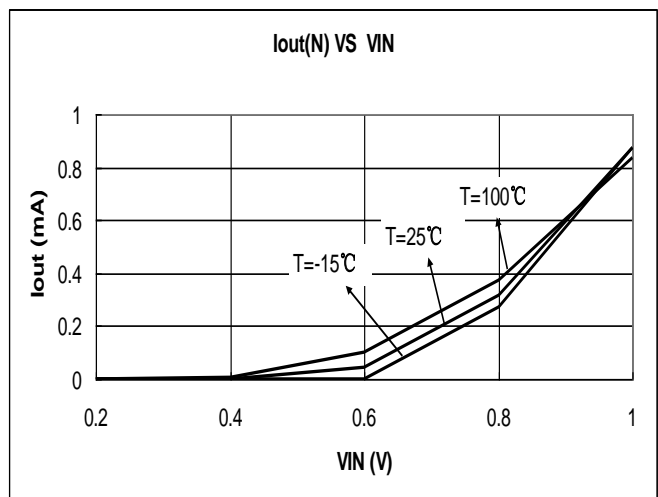
3、 DETECT, RELEASE VOLTAGE VS. AMBIENT TEMPERATURE

-VDET=1.1V



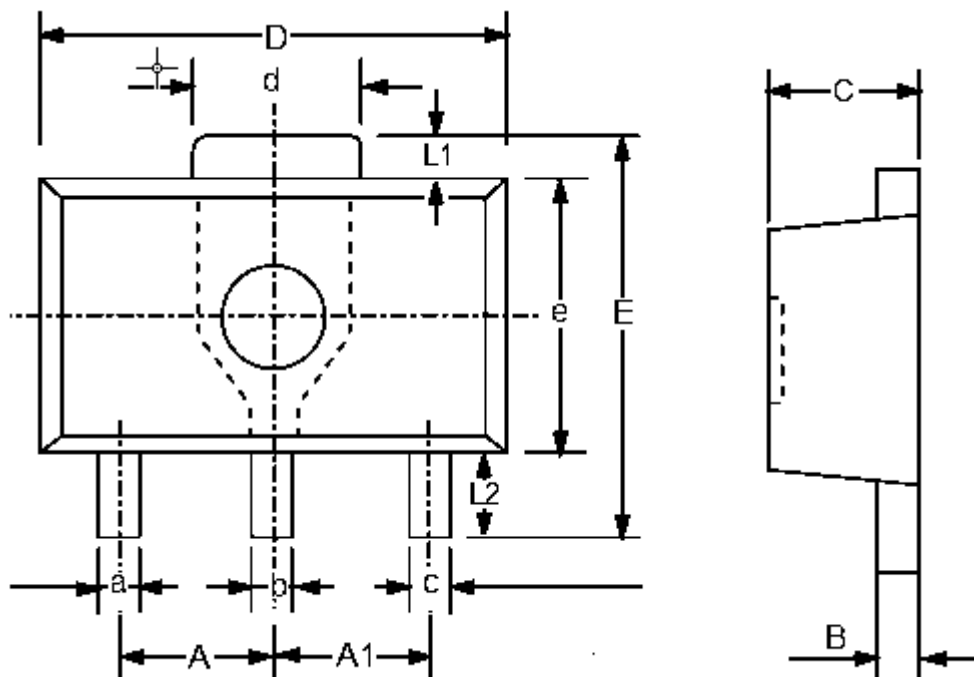
4、 N-ch OUTPUT CURRENT VS. INPUT VOLTAGE

VDS=0.5V -VDET=1.1V



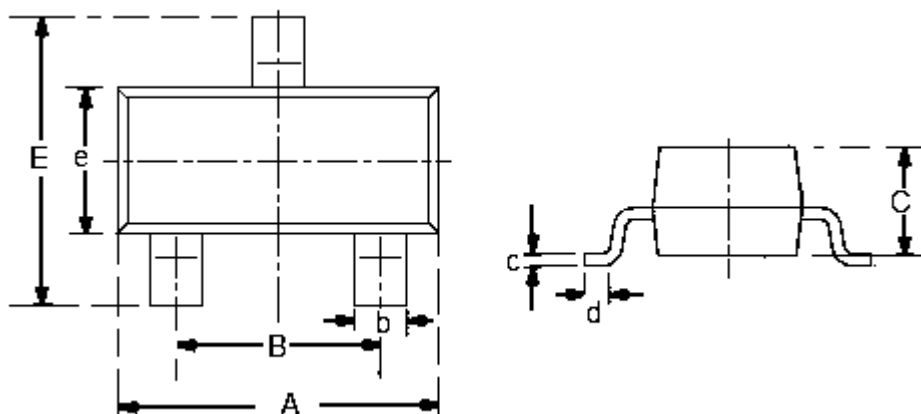
Package Information

• SOT-89-3



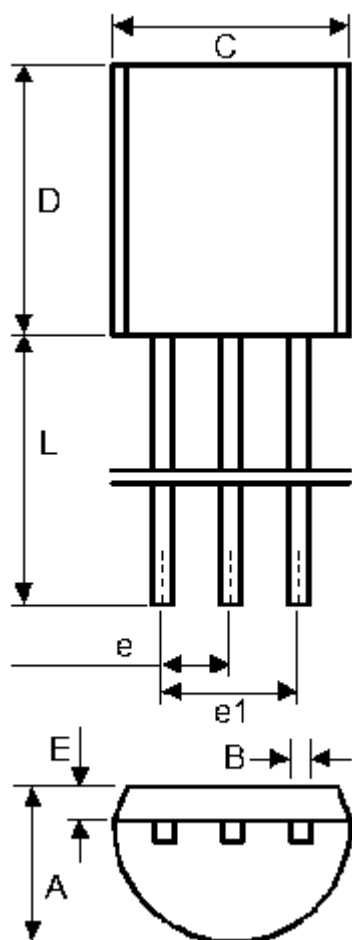
| DIM | Millimeters | | Inches | |
|-----|-------------|------|--------|--------|
| | Min | Max | Min | Max |
| A | 1.4 | 1.6 | 0.0551 | 0.0630 |
| A1 | 1.4 | 1.6 | 0.0551 | 0.0630 |
| a | 0.36 | 0.48 | 0.0142 | 0.0189 |
| b | 0.41 | 0.53 | 0.0161 | 0.0209 |
| c | 0.36 | 0.48 | 0.0142 | 0.0189 |
| d | 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 | - |

• SOT-23-3



| 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 |

• TO-92



| | Min | Max | Min | Max |
|----|------|------|---------|--------|
| A | 3.4 | 3.8 | 0.13386 | 0.1496 |
| B | 0.3 | 0.5 | 0.0118 | 0.0197 |
| C | 4.4 | 4.8 | 0.1732 | 0.189 |
| D | 4.4 | 4.8 | 0.1732 | 0.189 |
| E | 0.9 | 1.5 | 0.0354 | 0.059 |
| e | 1.17 | 1.37 | 0.046 | 0.0539 |
| e1 | 2.39 | 2.69 | 0.094 | 0.1059 |
| L | 12 | 16 | 0.4724 | 0.6299 |

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