Voltage Detectors, BL8506B Series

General Description

BL8506B 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.

Selection Guide

BL8506B-XX X XX

- Package Type：
  - RM： SOT-23-3
  - RN： SOT-23-5
  - SM： SOT-89-3
  - （Default、Pb Free）
- Output Type：
  - N：Nch Open-drain
- Detector Voltage：
  - 20……2.0V
  - 30……3.0V
  - ……
  - 70……7.0V

Features

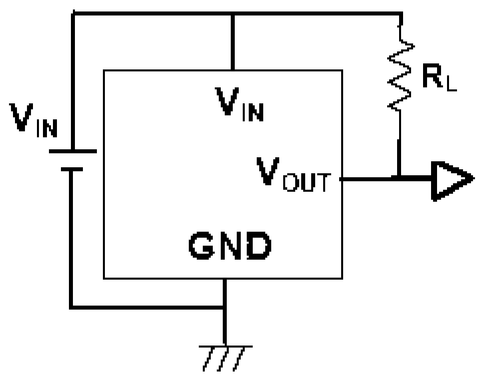
- Highly accuracy： ±2%
- Low power consumption：TYP 1.8uA (Vin=3V)
- Detect voltage range：2.0V~7.0V in 0.1V increments
- Operating voltage range：1.5V~18V
- Detect voltage temperature characteristics：

  TYP±0.9mV/℃
- Output configuration： NMOS
- Package： SOT-23-3，SOT-23-5，SOT-89-3

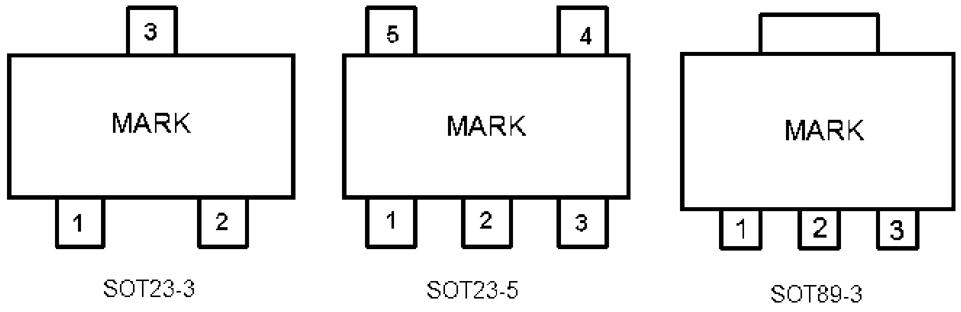
Typical Application

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

Typical Application Circuit



■ Pin Configuration



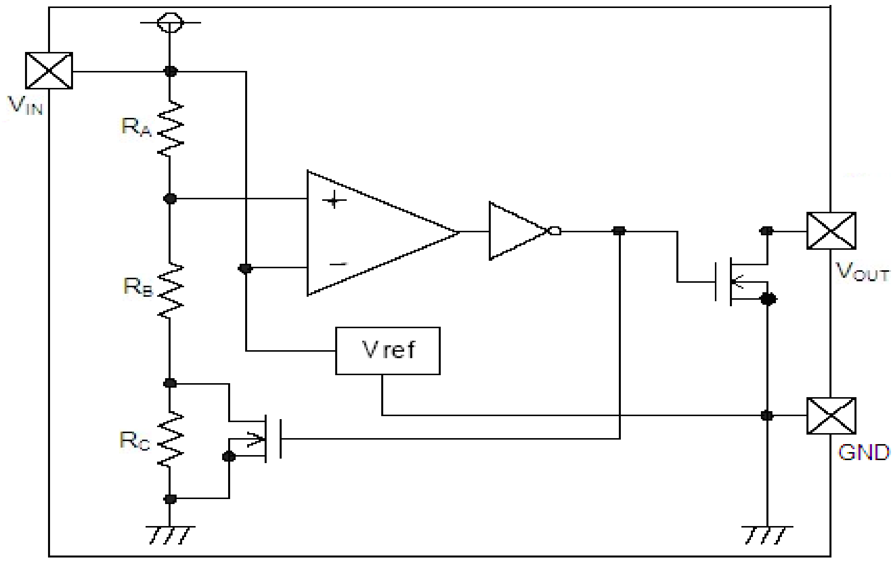
■ Pin Assignment

Pin Number			Pin Name	Functions
SOT-23-3	SOT-23-5	SOT-89-3		
2	3	3	GND	Ground
1	1	1	V_{OUT}	Output Voltage
3	2	2	V_{IN}	Input Voltage
	4		NC	No Connection
	5		NC	No Connection

■ Product Classification

Product Name	Detector Voltage	Output Type	Package
BL8506B-XXNRM	XX V	Nch Open-Drain	SOT-23-3
BL8506B-XXNRN	XX V	Nch Open-Drain	SOT-23-5
BL8506B-XXNSM	XX V	Nch Open-Drain	SOT-89-3

■ 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	
Operating Ambient Temperature		T_{Opr}	0~+70	℃
Storage Temperature		T_{stg}	-50~+125	℃
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
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	3	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	4	
		V_{DET} =4.7V~ 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~ 2.8V	V_{IN} =-$V_{DET(S)}$ -0.2 V , V_{OUT}=0.2V	0.5			mA
		V_{DET} =2.8V~ 3.6V	V_{IN} =-$V_{DET(S)}$ -0.5 V , V_{OUT}=0.3V	0.5			
		V_{DET} =3.6V ~ 4.7V	V_{IN} =-$V_{DET(S)}$ -0.5 V , V_{OUT}=0.3V	1.2			
		V_{DET} =4.7V~ 7.0V	V_{IN} =-$V_{DET(S)}$ -0.5 V , V_{OUT}=0.3V	2.5			
$\Delta V_{DET}/\Delta T_A$	Temperature characteristics	0℃≤T_{opr}≤70℃			±0.9		mV/℃

Note: 1、VDF(S) ： Specified Detection Voltage value

2、VDF ： Actual Detection Voltage value

3、Release Voltage：VDR=VDF+VHYS

Functional Description

The BL8506B 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. 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).

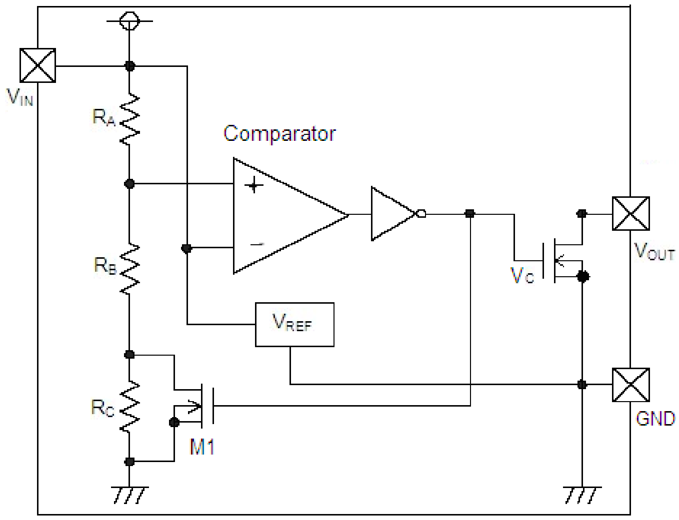
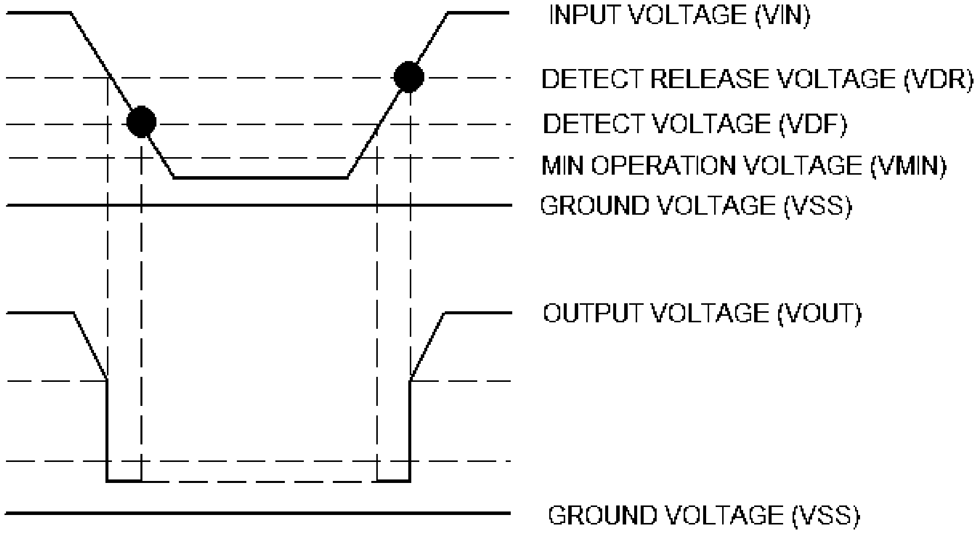


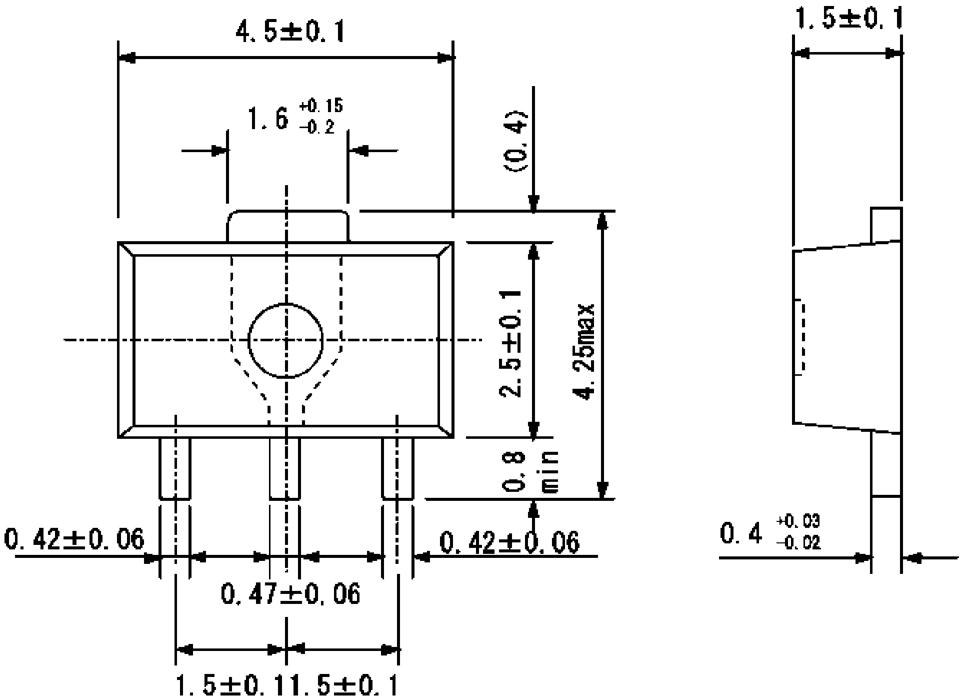
Fig.1 NMOS output voltage detector (BL8506B)

■ Timing Chart

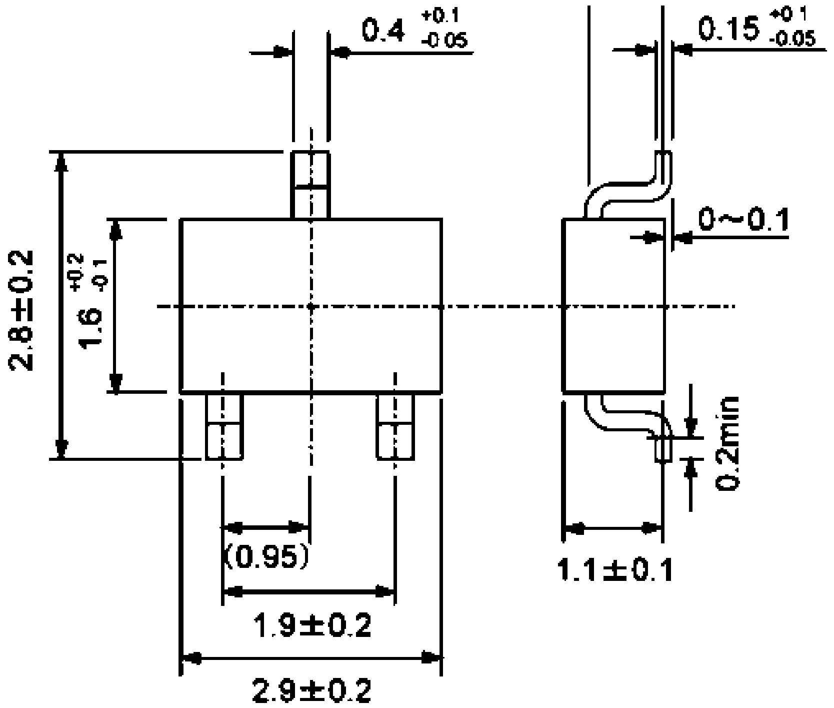


■ Package Information

- **SOT89-3**



- **SOT23-3**



- **SOT23-5**