Voltage Detector IC

General Description

The ET9823A is a micro-power voltage detector IC used to monitor the multiple power supplies in microprocessor or logic system. It has high-accuracy, low current consumption and adjustable delay. It performs supervisory function by sending out a reset signal whenever the VDD voltage falls below a present threshold level, and sending out another power detect signal whenever the VCC1, VCC2, or VCC3 power off. Once supplies recovered the threshold level, the reset and power detect signal will be released after a certain delay time controlled by external capacitor.

Features

- Internal Fixed Threshold
- High Accuracy ±2%
- Low Supply Current 3μA
- N-Channel Open-Drain Output
- Low Function Supply Voltage 1.6V
- Delay Time controlled by External Capacitor
- Used to Multiple Supplies Application
- Fully Specified Over Temperature

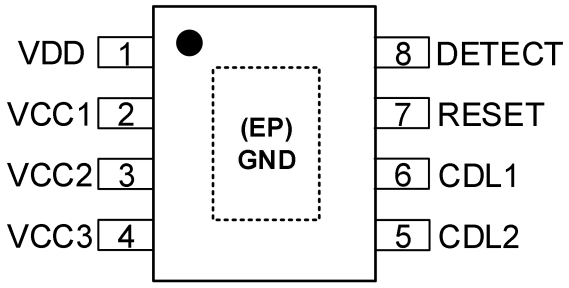
Applications

- Computers
- Intelligent Instruments
- Portable/Battery-Powered Equipment

Device information

Part No.	Package	Packing Option	MSL
ET9823A	ESOP8	Tape and Reel	3

Pin Configuration

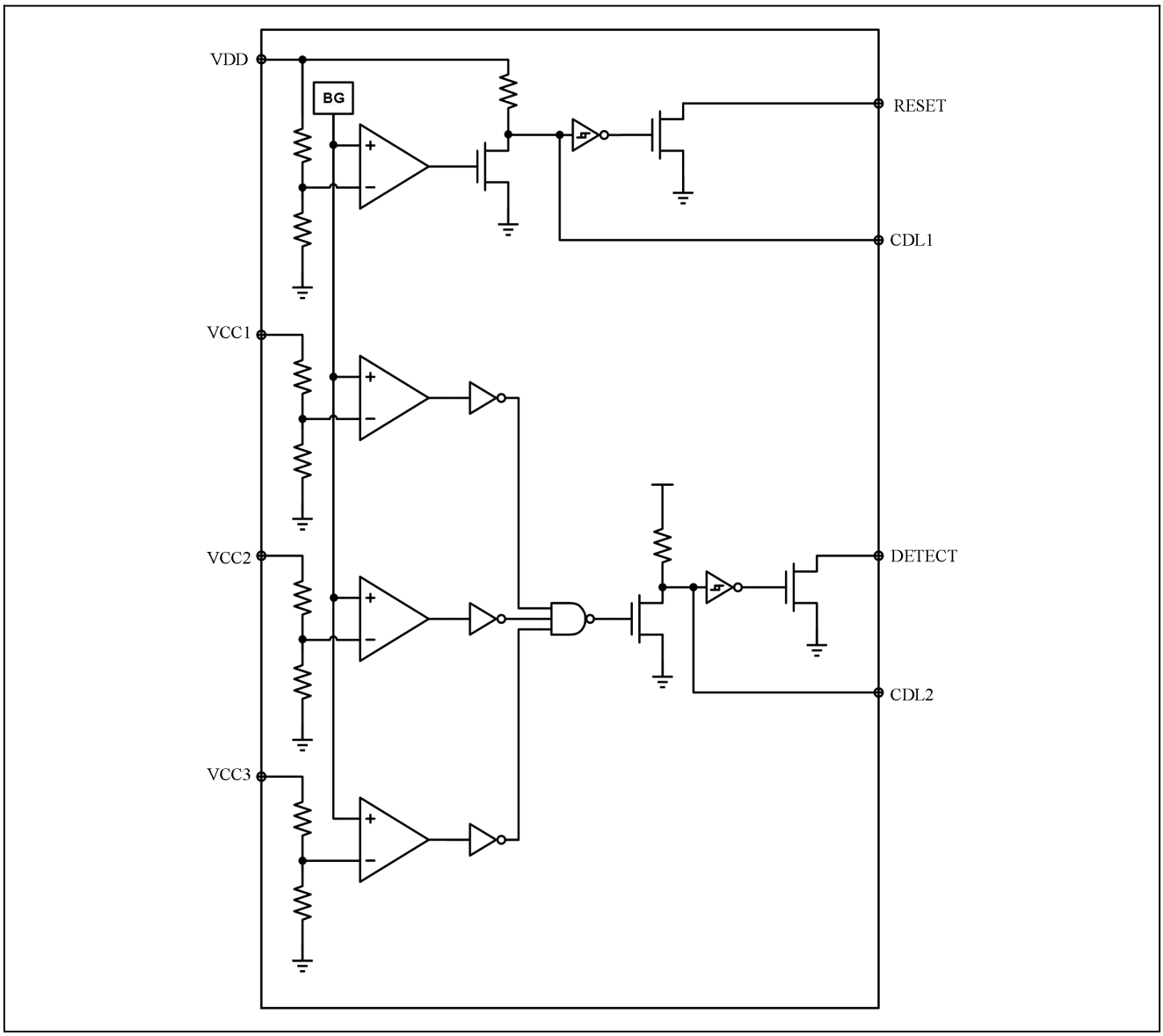


Top View

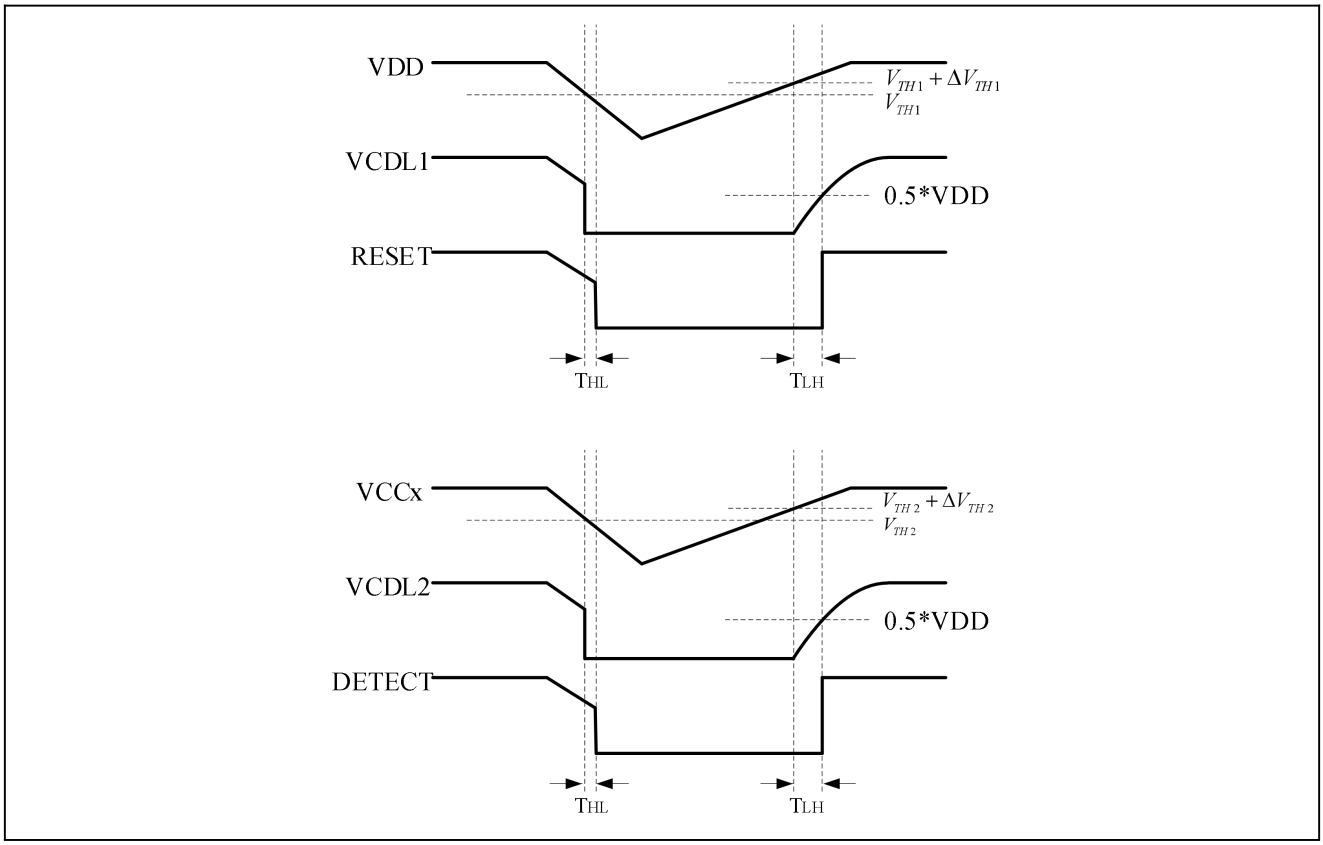
Pin Function

Pin Number	Symbol	Descriptions
1	VDD	Power Pin
2	VCC1	Power Detect Pin VCC1
3	VCC2	Power Detect Pin VCC2
4	VCC3	Power Detect Pin VCC3
5	CDL2	External capacitor connection to set delay time
6	CDL1	External capacitor connection to set delay time
7	RESET	VDD low voltage output
8	DETECT	VCCx voltage detect output
EP	GND	Ground

Block Diagram



Timing Diagram



Absolute Maximum Ratings

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are only stress ratings, and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions are not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

Symbol	Parameter	Value	Unit
V_{DD}	VDD Pin Voltage	-0.3 to 6	V
V_{CC}	VCCx Pin Voltage	-0.3 to 6	V
V_{RESET}	RESET Pin Voltage	-0.3 to 6	V
V_{DETECT}	DETECT Pin Voltage	-0.3 to 6	V
V_{CDL1}	CDL1 Pin Voltage	-0.3 to 6	V
V_{CDL2}	CDL2 Pin Voltage	-0.3 to 6	V
V_{ESD}	ESD susceptibility HBM (Human Body Mode)(1)	±2000	V
T_{STG}	Storage Temperature Range	-55 to +150	°C
T_A	Operating Temperature Range	-40 to +125	°C
T_R	Reflow Temperature	+260	°C

Note1:Device are ESD sensitive. Handing precaution recommended. The Human Body model is a 100pF capacitor discharged through a 1.5kΩ resistor into each pin.

Thermal Characteristics

Symbol	Package	Ratings	Value	Unit
$R_{\theta JA}$	ESOP8	Thermal Characteristics, Thermal Resistance, Junction-to-Air	75	°C/W

Electrical Characteristics

(Unless Otherwise Specified T_A= -40 to 125°C[(2)])

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{TH1}	VDD Reset Threshold	VDD=H->L, T_A=25°C, R_{PU}=470kΩ	2.842	2.9	2.958	V
V_{TH2}	VCCx Power Detect Threshold	VCCx=H->L, T_A=25°C, R_{PU}=470kΩ	3.92	4	4.08	V
V_{OPL}	Operating Voltage Range	Power supply VDD,VCCx	1.6	-	6	V
I_{DD1}	Supply Current when ON	VDD=V_{TH1}-0.2V=2.7V, VCCx=V_{TH2}-0.2V=3.8V	-	3.0	8.0	uA
I_{DD2}	Supply Current when OFF	VDD=V_{TH1}+2V=4.9V, VCCx=V_{TH2}+2V=6V	-	2.5	7.0	uA
ΔV_{TH1}	VDD Threshold Voltage Accuracy	V_{TH1}=2.9V	-2	-	2	%
ΔV_{TH2}	VCCx Threshold Voltage Accuracy	V_{TH2}=4V	-2	-	2	%
V_{RESETL}	RESET output Voltage Low	VDD=2.4V, I_{SINK}=3.6mA	-	-	0.2	V
$V_{DETECTL}$	DETECT Output Voltage Low	VCCx=3.7V, VDD=2.4V I_{SINK}=3.6mA	-	-	0.2	V
ΔV_{HYS1}	V_{TH1} Hysteresis Voltage Accuracy	T_A=-40 to 125°C, R_{PU}=470kΩ	0.03* V_{TH1}	0.045* V_{TH1}	0.06* V_{TH1}	V
ΔV_{HYS2}	V_{TH2} Hysteresis Voltage Accuracy	T_A=-40 to 125°C, R_{PU}=470kΩ	0.03* V_{TH2}	0.045* V_{TH2}	0.06* V_{TH2}	V
RDL1	RESET Output Delay Resistor	VDD=V_{TH1}×1.1, VCDL1=0.5V, T_A=25°C	9	10	12	MΩ
RDL2	DETECT Output Delay Resistor	VCCx=V_{TH2}×1.1, VCDL2=0.5V, T_A=25°C	10	12	15	MΩ
V_{CTH1}	CDL1 pin Threshold Voltage	VDD=V_{TH1}×1.1, T_A=25°C, R_{PU}=470kΩ	VDD×0.42	VDD×0.50	VDD×0.65	V
V_{CTH2}	CDL2 pin Threshold Voltage	VCCx=V_{TH2}×1.1, T_A=25°C, R_{PU}=470kΩ, VDD=V_{TH1}×1.1	VDD×0.42	VDD×0.50	VDD×0.65	V
I_{CDL1}	CDL1 pin Output Discharge Current	VCDL1=0.1V, VDD=1V	20	250	500	uA
I_{CDL2}	CDL2 pin Output Discharge Current	VCDL2=0.1V, VDD=1V	20	250	500	uA

Electrical Characteristics(Continued)

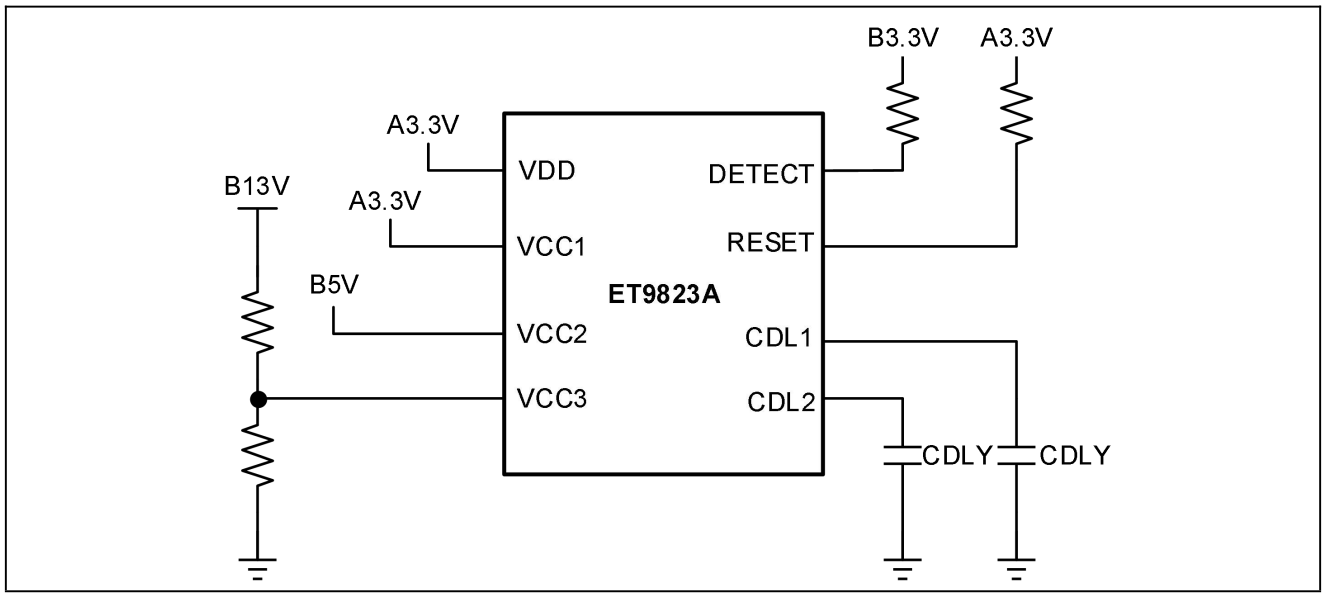
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{LH1}	RESET propagation delay time	CDL1 pin floating	50	70	200	us
T_{LH1b}	RESET delay time2	CDLY=1nF(3)	5	9	13	ms
T_{LH2}	DETECT propagation delay time	CDL2 pin floating	50	70	200	us
T_{LH2b}	DETECT delay time2	CDLY=1nF(3)	6	10.8	15.6	ms
I_{Leak1}	RESET Leak Current when OFF	V_{RESET}=6V, T_A=-40 to 85°C	-	-	0.1	uA
		V_{RESET}=6V, T_A=85 to 125°C	-	-	1	uA
I_{Leak2}	DETECT Leak Current when OFF	V_{DETECT}=6V, T_A=-40 to 85°C	-	-	0.1	uA
		V_{DETECT}=6V, T_A=85 to 125°C	-	-	1	uA

Note2:Production testing done at T_A=25°C, limits over temperature guaranteed by design.

Note3:CDLY is CDL pin external capacitor ,capacitor tolerance ±10%.

R_{PU}: Pull-up resistor

Application Circuit



When power pin VDD reaches threshold voltage (V_{TH1}) from high to low, RESET pin changes from high to low. When any power pin VCC1, VCC2 and VCC3 ramp down over the threshold voltage (V_{TH2}), DETECT pin changes from high to low. This circuit can set delay time controlled by the external capacitor at the rise of power pin.

$$T_{LH} = CDLY \times RCT \times \ln\left(\frac{VDD}{VDD - VCTH}\right)$$

T_{LH}: time until the voltage of CDL pin rises to 0.5*VDD after VDD rises up and beyond the release voltage..

RCT: CDL pin internal impedance.

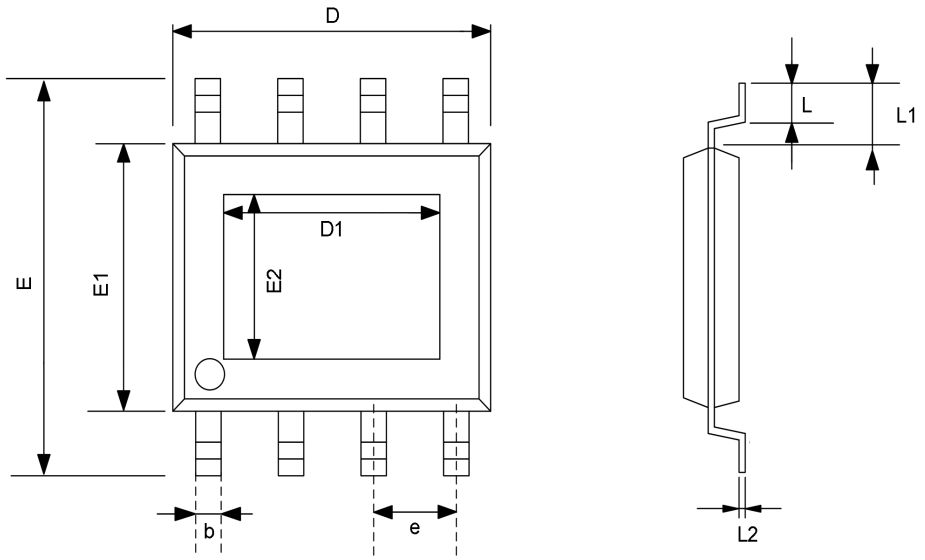
Note: There's some difference between real tested delay time and principle equation.

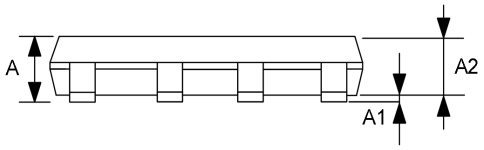
Open drain type need pull-up resistor connected to VDD or other power supply.

Because the resistor connected inside VCC3 pin is about 20MΩ, suggest that the low side resistor of external resistor divider is smaller than 20kΩ for accuracy.

Package Dimension

ESOP8



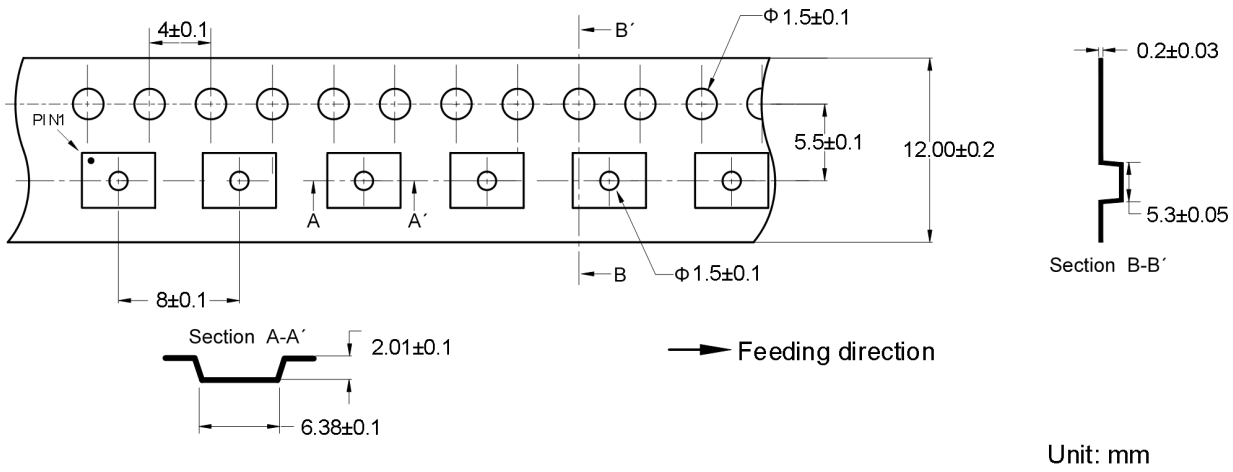


COMMON DIMENSIONS

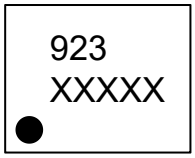
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	-	-	1.75
A1	0.00	-	0.15
A2	1.30	1.40	1.50
b	0.31	-	0.50
c	0.20	-	0.24
D	4.80	-	5.00
E	5.80	6.00	6.20
D1	3.30 REF		
E1	3.80	-	4.00
E2	2.41 REF		
e	1.27 BSC		
L	0.40	-	0.80
L1	1.05 REF		
L2	0.25 REF		

Tape Information



Marking Information



923 - Part Number

XXXXX - Tracking Number

Note：X (Tracking Number) is variable, according to the wafer lot number.

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
0.0	2025-5-19	Preliminary Version	Huyt	Tangyx	Liujy
1.0	2025-11-11	Original Version	Huyt	Chenh	Liujy
1.1	2025-12-8	Update I_{Leak} Test Conditions	Huyt	Chenh	Liujy