Micro-Power Voltage Detectors

General Description

The ET9818C13 is a micro-power voltage detector supervising the power supply voltage level for microprocessors (μP) or digital systems. It provides internally fixed threshold levels of 1.3V. It features low supply current of 3μA.

The ET9818C13 performs supervisory function by sending out a reset signal whenever the V_{DD} voltage falls below a preset threshold level. This reset signal will last the whole period before V_{DD} recovering. Once V_{DD} recovered up crossing the threshold level, the reset signal will be released after a certain delay time.

Features

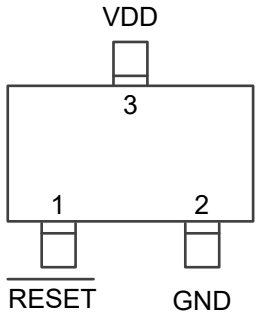
- Internally Fixed Threshold 1.3V
- High Accuracy ±1.5%
- Low Supply Current 3μA
- No External Components Required
- Quick Reset within 20μs
- Built-in Recovery Delay 220ms
- Low Functional Supply Voltage 0.9V
- N-Channel Open-Drain Output
- Package information:

Part No.	Package	MSL
ET9818C13	SOT23-3	3

Application

- Computers
- Controllers
- Intelligent Instruments
- Critical μP and μC Power Monitoring
- Portable/Battery-Powered Equipment

Pin Configuration

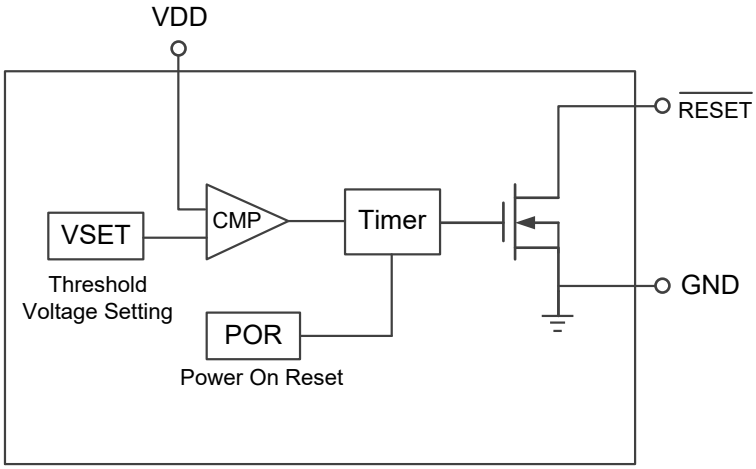


TOP VIEW

Pin Function

Pin NO.	Pin Name	Description
1	$\overline{\text{RESET}}$	Active Low Open-Drain Reset Output
2	GND	Ground
3	VDD	Power Pin

Block Diagram



Absolute Maximum Ratings[1]

Characteristic	Symbol	Min	Max	Unit
Supply Voltage	V_{DD}	-0.3	6.5	V
Input Current	I_{DD}		20	mA
Junction Temperature	T_J		+150	°C
Package Thermal Resistance [3]	θ_{JA}		250	°C/W
Storage Temperature Range	T_{STG}	-65	+150	°C
Lead Temperature (Soldering, 10sec.)	T_{LEAD}		260	°C
Power Dissipation	P_D		400	mW
Human Body Model, JESD22-A114	V_{ESD}[2]	±4000		V
Charged Device Model,JESD22-C101		±500		V

Note1. Stresses listed as the above "Absolute Maximum Ratings" may cause permanent damage to the device.These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability.

Note2. Devices are ESD sensitive. Handling precaution recommended.

Note3. θ_{JA} is measured in the natural convection at T_A = 25°C on a low effective thermal conductivity test board of JEDEC 51-3 thermal measurement standard.

Recommended Operating Conditions [4]

Characteristic	Symbol	Min	Max	Unit
Supply Voltage	V_{DD}	0.9	6.0	V
Operating Ambient Temperature	T_A	-40	85	°C

Note4.The device is not guaranteed to function outside its operating conditions.

Electrical Characteristics

(V_{DD} = 3V, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operating VDD (VOUT) Range	V_{DD}		0.9		6.0	V
Supply Current	I_{DD}	V_{DD} = 3.0V T_A = 27°C		3	8	μA
Reset Threshold	V_{TH}	T_A = 27°C		1.3		V
Threshold Voltage Accuracy	ΔV_{TH}	T_A = 27°C	-1.5		+1.5	%
V_{DD} Drop to Reset Delay[5]	t_{RD}	Drop = V_{TH} -125mV		20		μs
Reset Active Time Out Period	t_{RP}	$V_{DD} \geq 1.02 \times V_{TH}$	143	220	297	ms
RESET Output Voltage Low[6]	V_{OL1}	0<V_{DD}<V_{TH}, R-pull up=100KΩ			0.2	V
	V_{OL2}	V_{DD}=1.2V , I_{SINK} =3.5mA			0.2	
Hysteresis Width	V_{HYS}			0.01 V_{TH}		V

Note5. Guaranteed by design and characterization, not a FT item.

Note6. The voltage V_{OL} can be calculated by $V_{OL} = V_{DD} - Ir * R$. Where R is the pull-up resistor and Ir is the current flowing through the pull-up resistor. For typical application (R=100kΩ), V_{OL} is less than 0.2V.

Application Information

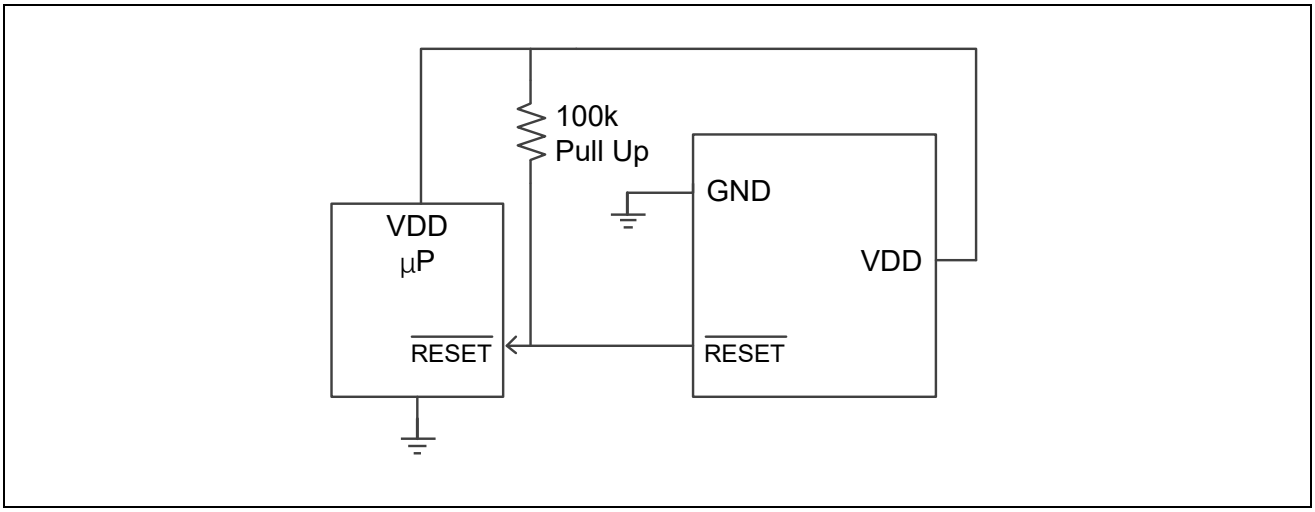
Multiple Supplies

Mainly, the pull-up connected to the ET9818C13 will connect to the supply voltage that is being monitored at the IC' s VDD pin. However, some systems may use the open-drain output to level-shift from the monitored supply to reset circuitry powered by some other supply.

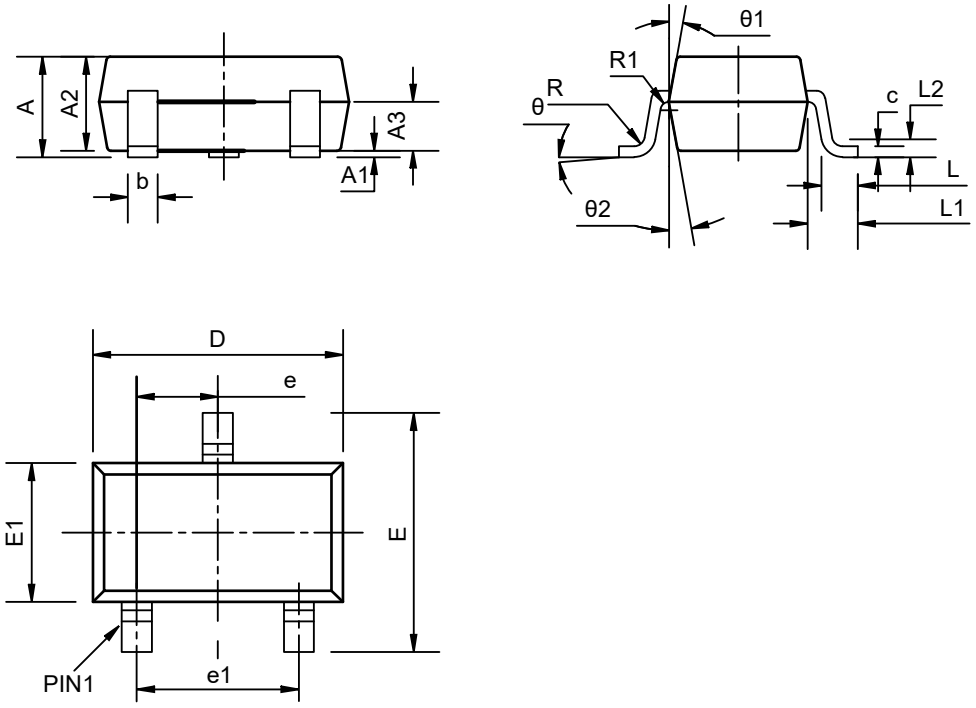
Benefits of Highly Accurate Reset Threshold

Most μP supervisor ICs have reset threshold voltages between 1% and 1.5% below the value of nominal supply voltages. This ensures a reset will not occur within 1% of the nominal supply, but will occur when the supply is 1.5% below nominal.

Test Circuit



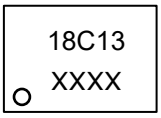
Package Dimension



Unit: mm

SYMBOL	MIN	NOM	MAX
A	--	--	1.25
A1	0	--	0.15
A2	1.00	1.10	1.20
A3	0.60	0.65	0.70
b	0.36	--	0.50
c	0.14	--	0.20
D	2.826	2.926	3.026
E	2.60	2.80	3.00
E1	1.526	1.626	1.726
e	0.95BSC		
e1	1.90BSC		
L	0.35	0.45	0.60
L1	0.59REF		
L2	0.25BSC		
R	0.05	--	--
R1	0.05	--	0.20
θ	0°	--	8°
θ1	3°	5°	7°
θ2	6°	8°	10°

Marking



18C13 = Part Number

XXXX = Tracking Number

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2016-06-21	Original version	Wanggp	Wanggp	Zhujl
1.1	2017-7-13	Update V_{OL}	Wanggp	Wanggp	Zhujl
1.2	2018-02-27	Update RESET Output Voltage Low	Wanggp	Wanggp	Zhujl
1.3	2019-05-22	Update AMR table	Wanggp	Zhujl	Zhujl
1.4	2023-10-14	Update Typeset	Huyt	Zhujl	Zhujl
1.5	2023-03-10	Add Marking	Tugz	Wanggp	Liujy