

Micro-Power Voltage Detectors

General Description

The ET9818C29 is a micro-power voltage detector supervising the power supply voltage level for microprocessors (μ P) or digital systems. It provides internally fixed threshold levels of 2.9V. It features low supply current of 3 μ A.

The ET9818C29 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 2.9V
- High Accuracy $\pm 1.5\%$
- Low Supply Current 3 μ A
- No External Components Required
- Quick Reset within 20 μ s
- Built-in Recovery Delay 220ms
- Low Functional Supply Voltage 0.9V
- N-Channel Open-Drain Output
- Package information:

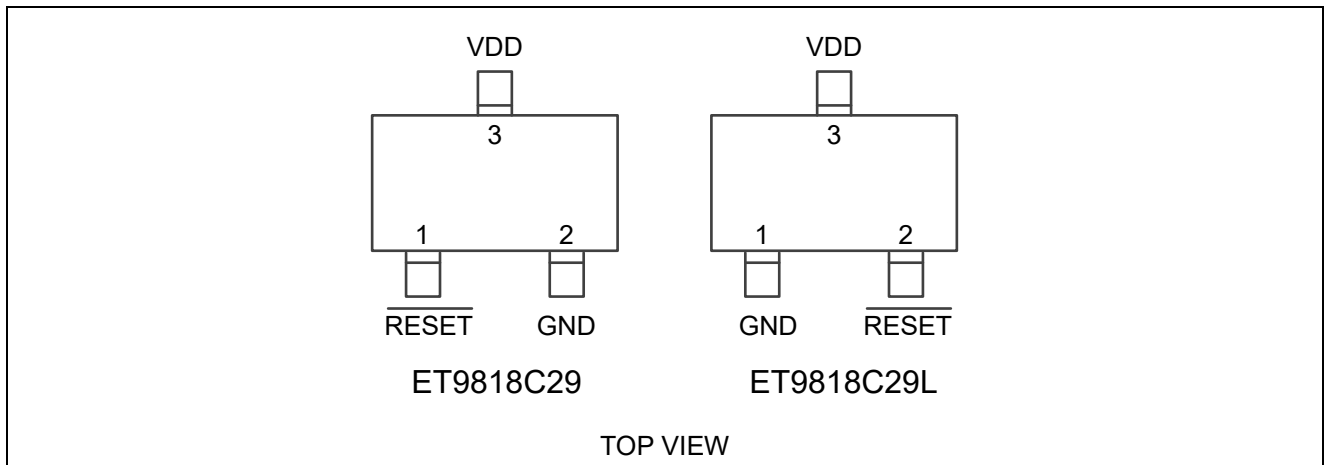
Part No.	Package	MSL
ET9818C29	SOT23-3	Level 1
ET9818C29L	SOT23-3 (RESET, GND Pin Swapped)	Level 1

Application

- Computers
- Controllers
- Intelligent Instruments
- Critical μ P and μ C Power Monitoring
- Portable/Battery-Powered Equipment

ET9818C29

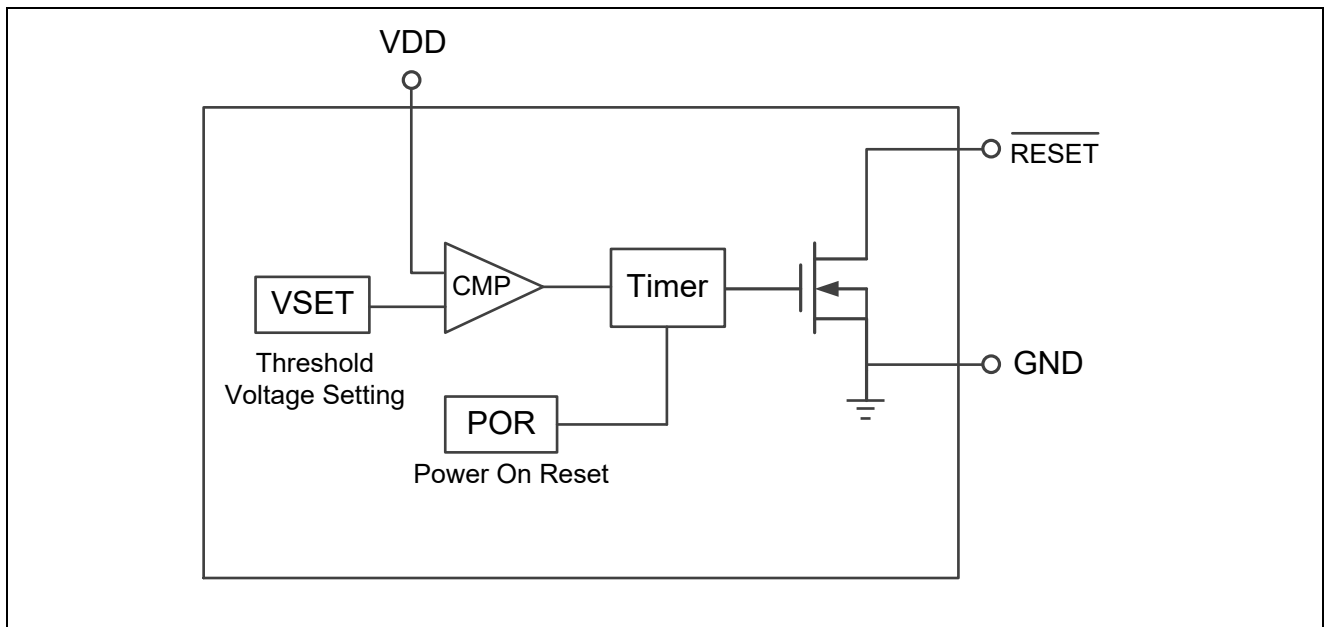
Pin Configuration



Pin Function

Pin Name	Description
$\overline{\text{RESET}}$	Active Low Open-Drain Reset Output
GND	Ground
VDD	Power Pin

Block Diagram



ET9818C29

Absolute Maximum Ratings⁽¹⁾

Characteristic	Symbol	Min	Max	Unit
Supply Voltage	V _{DD}	-0.3	6	V
Input Voltage	V _{IN}	-0.3	V _{DD} +0.3V	V
Input Current	I _{VDD}		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	ESD ⁽²⁾	2000		V
Charged Device Model, JESD22-C101		200		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
Junction Temperature	T _J	-40	125	°C
Operating Ambient Temperature	T _A	-40	85	°C
Power Dissipation	P _D		400	mW

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

ET9818C29

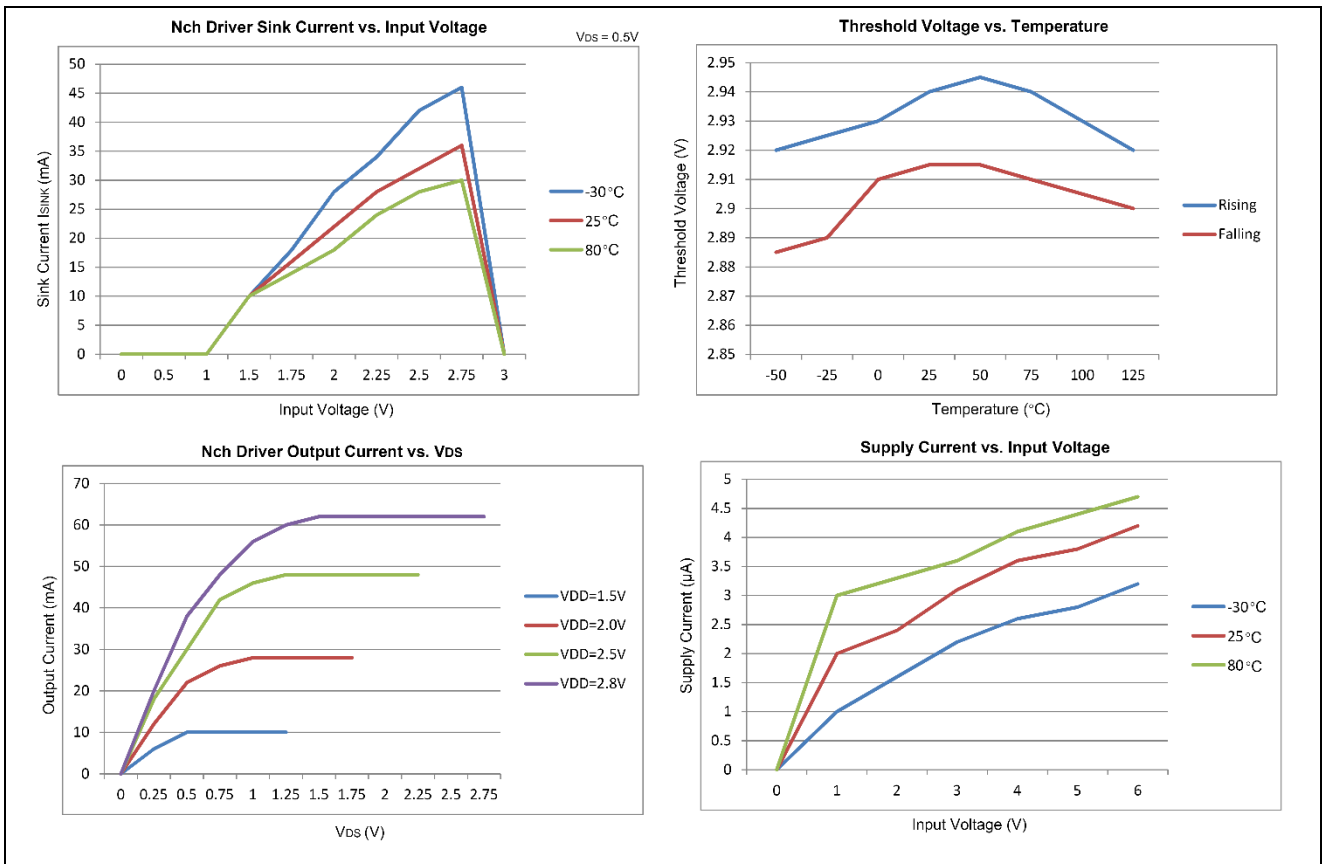
Electrical Characteristics

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operating VDD (VOUT) Range	V _{DD}		0.9		6	V
Supply Current	I _{DD}	V _{TH} = 3V, V _{DD} = 4.5V T _A = 27°C		3	8	μA
Reset Threshold	V _{TH}	T _A = 27°C		2.9		V
Threshold Voltage Accuracy	ΔV _{TH}	T _A = 27°C	-1.5		+1.5	%
V _{DD} Drop to Reset Delay	t _{RD}	Drop = V _{TH} -125mV		20		μs
Reset Active Time Out Period	t _{RP}	V _{DD} ≥ 1.02×V _{TH}	143	220	297	ms
RESET Output Voltage Low ⁽⁵⁾	V _{OL1}	V _{DD} < 0.6V, I _{SINK} < 0.1uA			0.6	V
	V _{OL2}	0.6V < V _{DD} < 1.3V, I _{SINK} =1uA			0.4	
	V _{OL3}	1.3V < V _{DD} < V _{TH} , I _{SINK} =3.5mA			0.4	
Hysteresis Width	V _{HYS}			0.01 V _{TH}		V

Note5. The voltage VOL can be calculated by $VOL = VDD - I_r \cdot R$. Where R is the pull-up resistor and I_r is the current flowing through the pull-up resistor. For typical application (R=100kΩ), VOL is less than 0.2V.

Typical Operating Characteristics



ET9818C29

Application Information

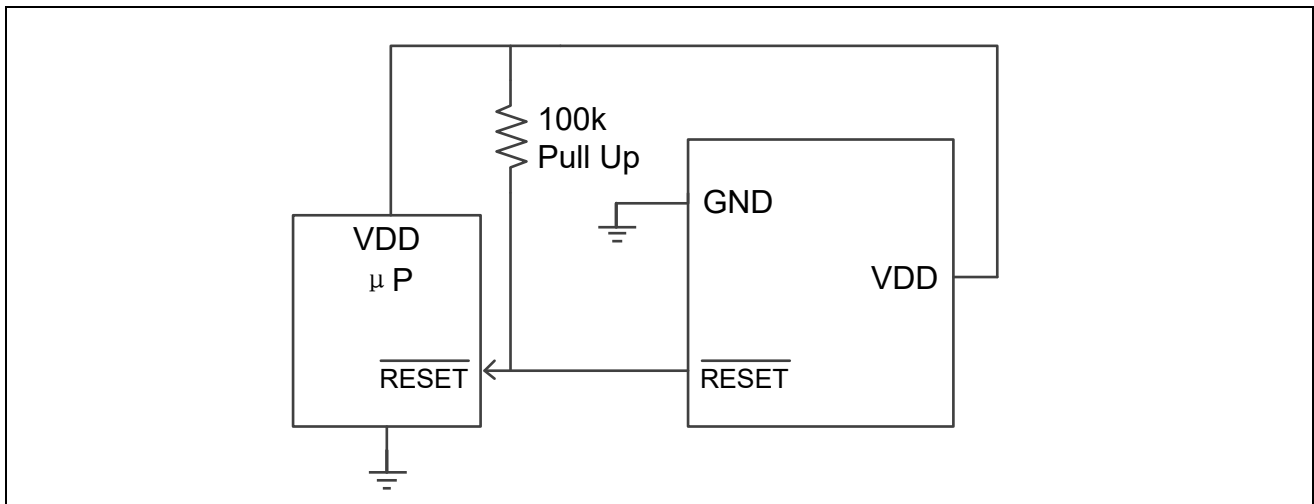
Multiple Supplies

Mainly, the pull-up connected to the ET9818C29 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

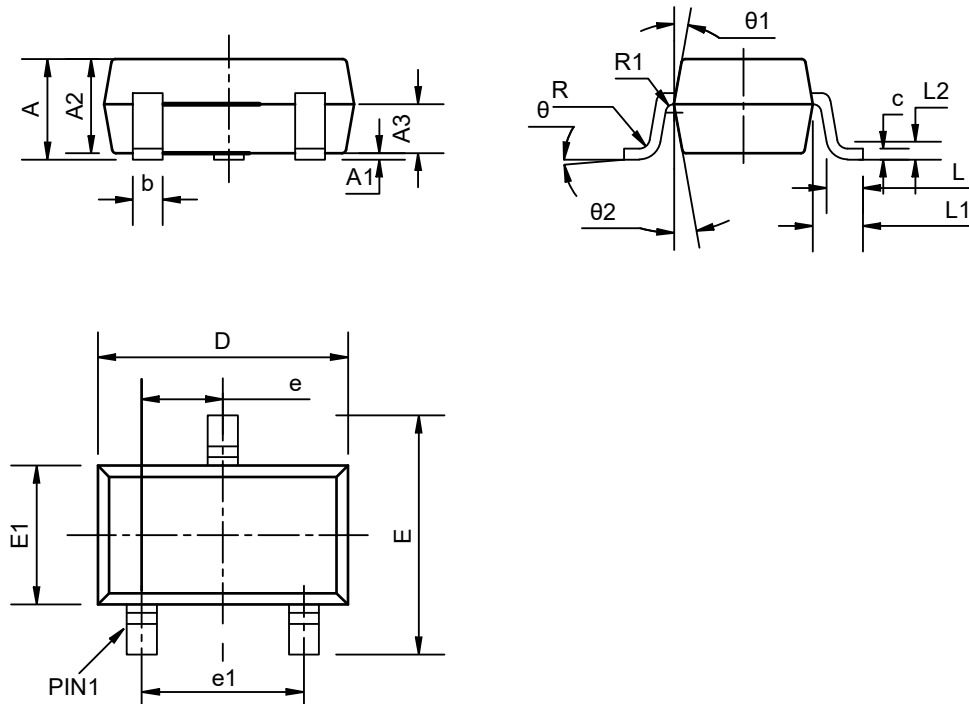
Most μ P supervisor ICs have reset threshold voltages between 1% and 1.5% below the value of nominal supply voltages. This ensures a reset will not occur within 1% of the nominal supply, but will occur when the supply is 1.5% below nominal.

Test Circuit



ET9818C29

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
theta	0°	--	8°
theta1	3°	5°	7°
theta2	6°	8°	10°

ET9818C29

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2018-04-16	Original version	Wanggp	Wanggp	Zhuji
1.1	2017-7-13	Update V _{OL}	Wanggp	Wanggp	Zhuji
1.2	2021-7-28	Add ET9818C29L	Wanggp	Wanggp	Zhuji
1.3	2023-10-10	Update Typeset	Huyt	Zhuji	Zhuji