

Voltage Detector

UM70xxA SOT23-3

General Description

The UM70xxA series are a set of three-terminal low power voltage detectors implemented in CMOS technology. Each voltage detector in the series detects a particular fixed voltage ranging from 2.4V to 5V. The voltage detectors consist of a high-precision voltage divider circuit, band gap voltage source, a comparator and an output driver. CMOS technology ensures low power consumption.

Although designed primarily as fixed voltage detectors, these devices can be used with external components to detect user specified threshold voltages (NMOS open drain type only).

The UM70xxA series are available in SOT23-3 package.

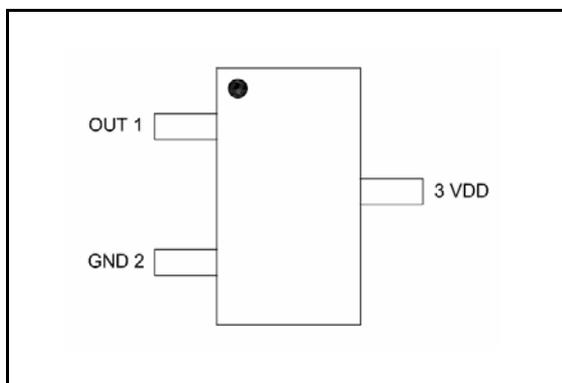
Applications

- Battery checkers
- Level selectors
- Power failure detectors
- Microcomputer reset
- Battery memory backup
- Non-volatile RAM signal storage protectors

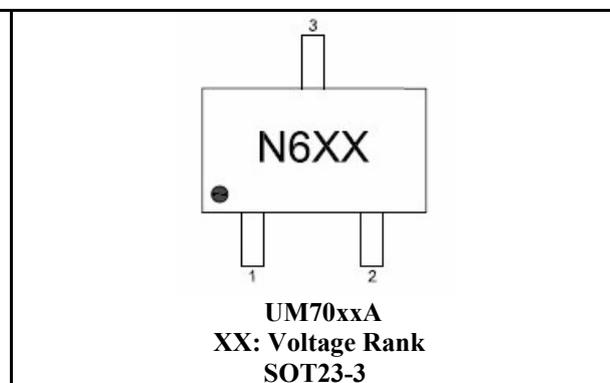
Features

- Low power consumption
- Low temperature coefficient
- Built-in high-stability reference source
- Built-in hysteresis characteristic
- SOT23-3 package

Pin Configurations



Top View



Selection Table

Part Number	Detector Voltage	Hysteresis Width	Tolerance	Marking Code	Packaging Type	Shipping Qty
UM7027A	2.7	0.13V	3%	N627	SOT23-3	3000pcs/7Inch Tape & Reel
UM7044A	4.4	0.22V	3%	N644		

Note: The output type selection codes are:

NMOS open drain normal open, active low

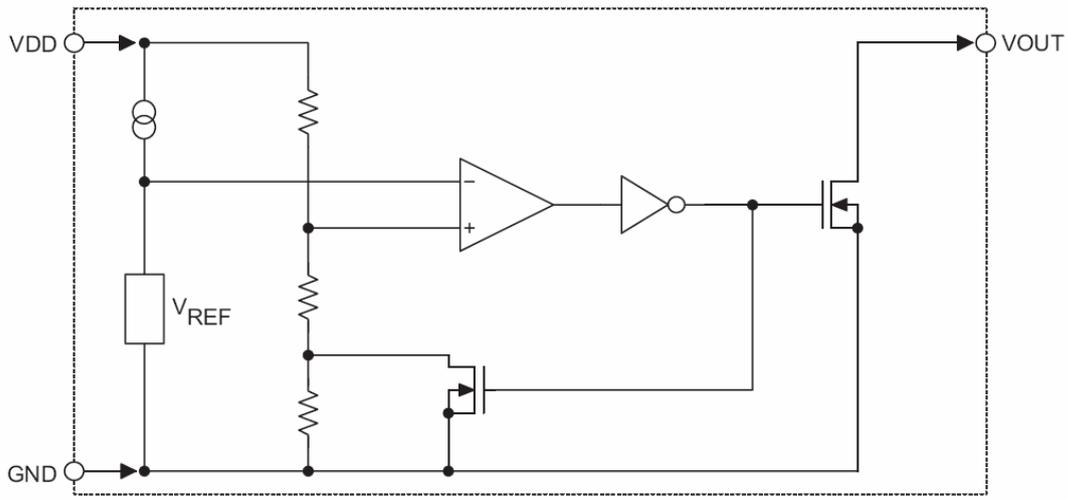
For example: The UM7044A is a 4.4V, NMOS open drain active low output.

Output Type Selection Table

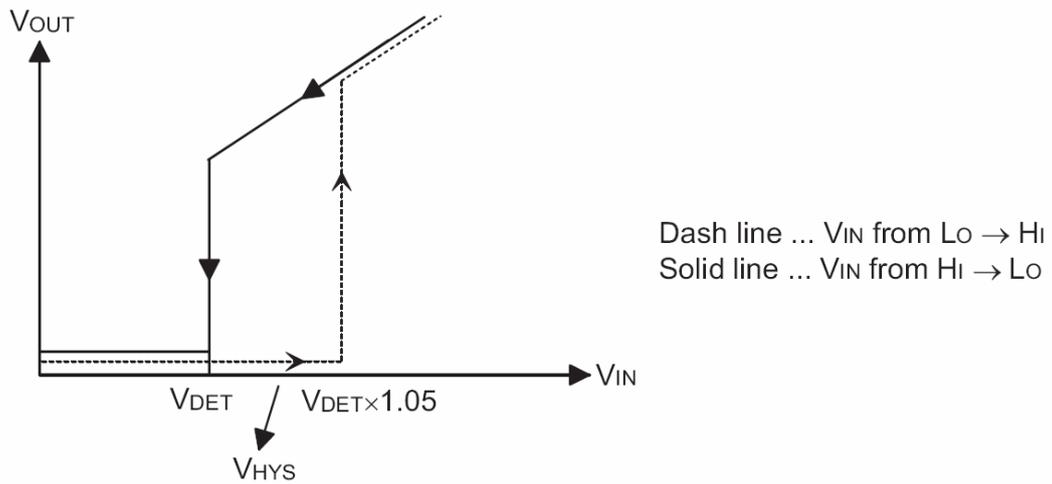
Type	V _{DD}	V _{DD} > V _{DET(+)}	V _{DD} ≤ V _{DET(-)}
A	V _{DD}	Hi-Z	VSS

Block Diagram

N Channel Open Drain Output (Normal Open; Active Low)



A Type



Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Value	Unit
V _{DD}	Supply Voltage	V _{SS} -0.3 to V _{SS} +10	V
V _{OUT}	Output Voltage	V _{SS} -0.3 to V _{DD} +0.3	V
I _O	Output Current	50	mA
T _J	Operating Junction Temperature	0 to +70	°C
T _{STG}	Storage Temperature Range	-50 to +125	°C
P _D	Power Consumption	200	mW

Note 1: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Electrical Characteristics
UM7027A

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		VDD	Conditions				
V _{DET}	Detection Voltage			2.619	2.700	2.781	V
V _{HYS}	Hysteresis Width			0.02 V _{DET}	0.05 V _{DET}	0.1 V _{DET}	V
I _{DD}	Operating Current	8V	No load		1	2	uA
V _{DD}	Operating Voltage			1.5		10	V
I _{OL}	Output Sink Current	2V	V _{OUT} =0.2V	0.5	1		mA
$\frac{\Delta V_{DET}}{\Delta Ta}$	Temperature Coefficient		0°C < Ta < 70°C		± 0.2		mV/°C

UM7044A

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		VDD	Conditions				
V _{DET}	Detection Voltage			4.268	4.400	4.532	V
V _{HYS}	Hysteresis Width			0.02 V _{DET}	0.05 V _{DET}	0.1 V _{DET}	V
I _{DD}	Operating Current	8V	No load		1	2	uA
V _{DD}	Operating Voltage			1.5		10	V
I _{OL}	Output Sink Current	2V	V _{OUT} =0.2V	3	6		mA
$\frac{\Delta V_{DET}}{\Delta Ta}$	Temperature Coefficient		0°C < Ta < 70°C		± 0.2		mV/°C

Function Description

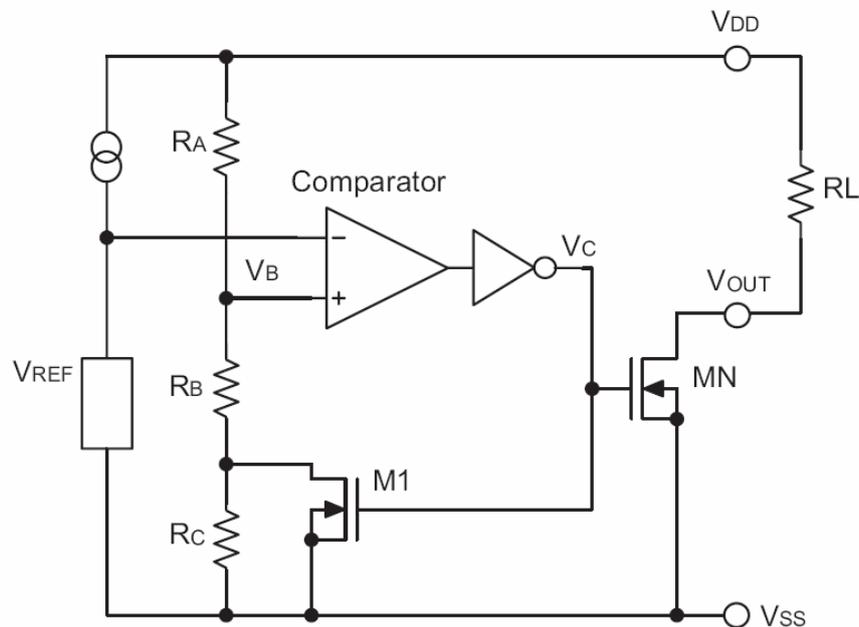
The UM70xxA series are a set of voltage detectors equipped with a high stability voltage reference which is connected to the negative input of a comparator—denoted as V_{REF} in the following figure for NMOS output voltage detector.

When the voltage drop to the positive input of the comparator (i.e., V_B) is higher than V_{REF} , V_{OUT} goes high, and V_B is expressed as $V_{BH} = V_{DD} R_B / (R_A + R_B)$. If V_{DD} is decreased so that V_B falls to a value less than V_{REF} , the comparator output inverts from high to low, V_{OUT} goes low, V_C is high.

If V_{DD} falls below the minimum operating voltage, the output becomes undefined.

The figure demonstrates the NMOS output type with positive output polarity (V_{OUT} is normally open, active low). The UM70xxA series also supplies options for other output types with active high outputs.

Application circuits shown are examples of positive output polarity (normally open, active low) unless otherwise specified



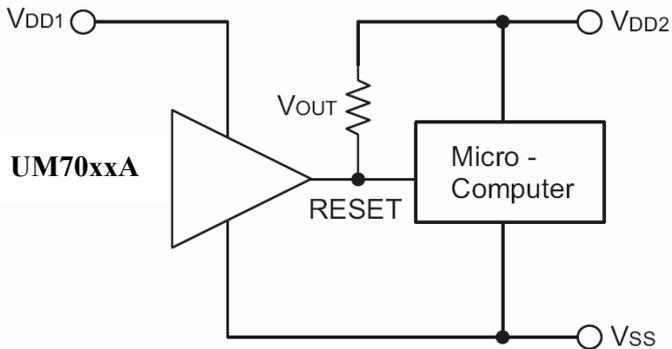
NMOS Output Voltage Detector (UM70xxA)

Applications Circuits

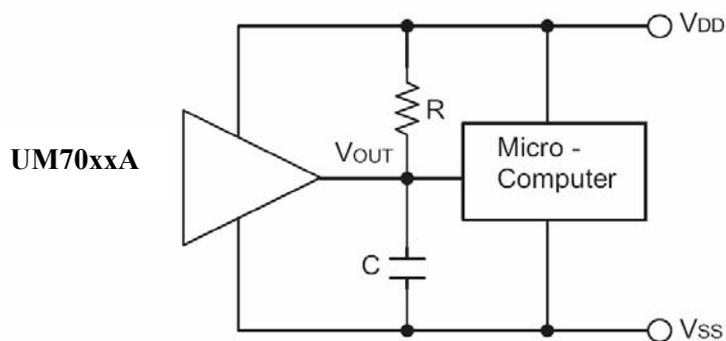
Microcomputer Reset Circuit

Normally a reset circuit is required to protect the microcomputer system from malfunctions due to power fail or power line interruptions. The following examples show how different output configurations perform a reset function in various systems.

NMOS open drain output application for separate power supply

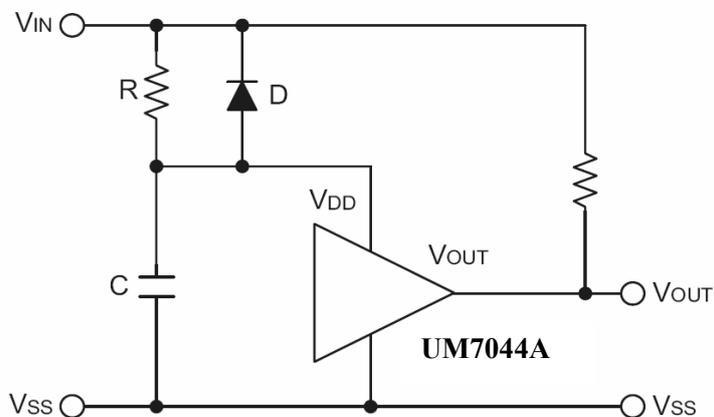


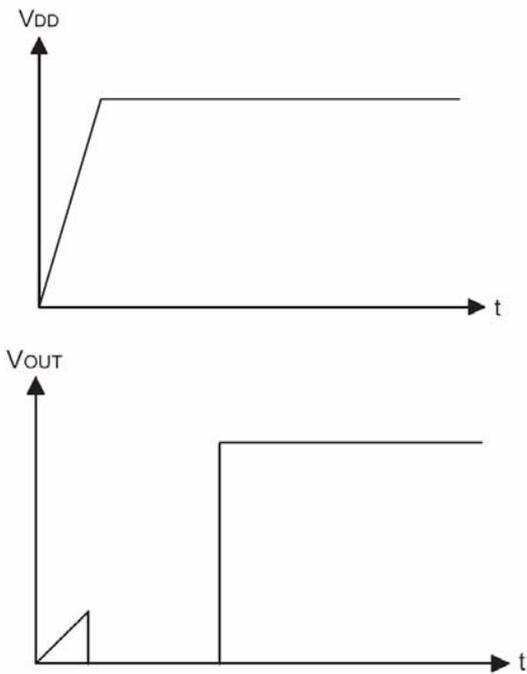
NMOS open drain output application with R-C Delay



Power-on Reset Circuit

With several external components, the NMOS open drain type of the UM70xxA series can be used to perform a power-on reset function as shown.

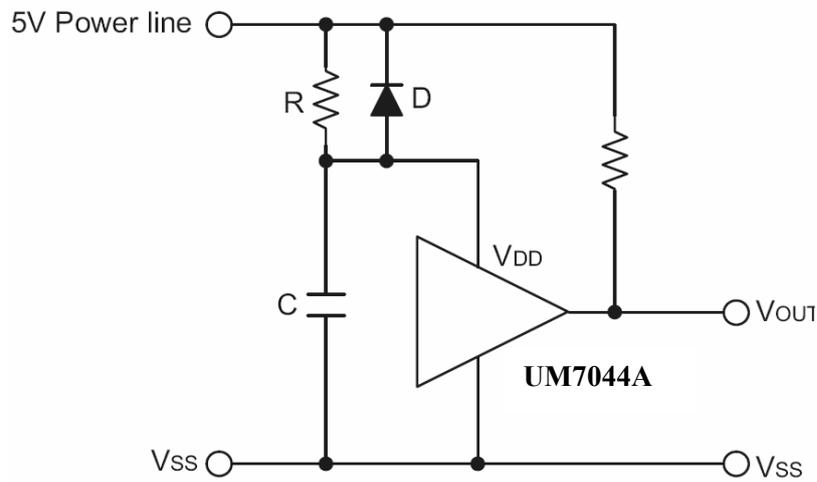




5V Power Line Monitoring Circuit

Generally, a minimum operating voltage of 4.5V is guaranteed in a 5V power line system. The UM7044A is recommended for use as 5V power line monitoring circuit.

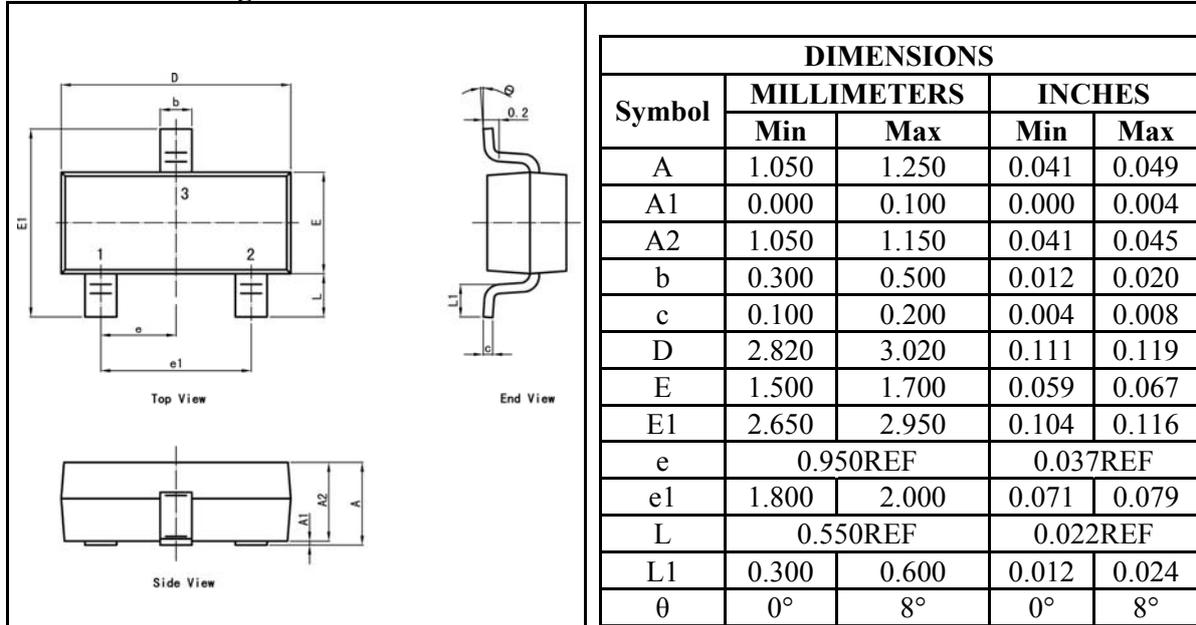
5V power line monitor with power-on reset



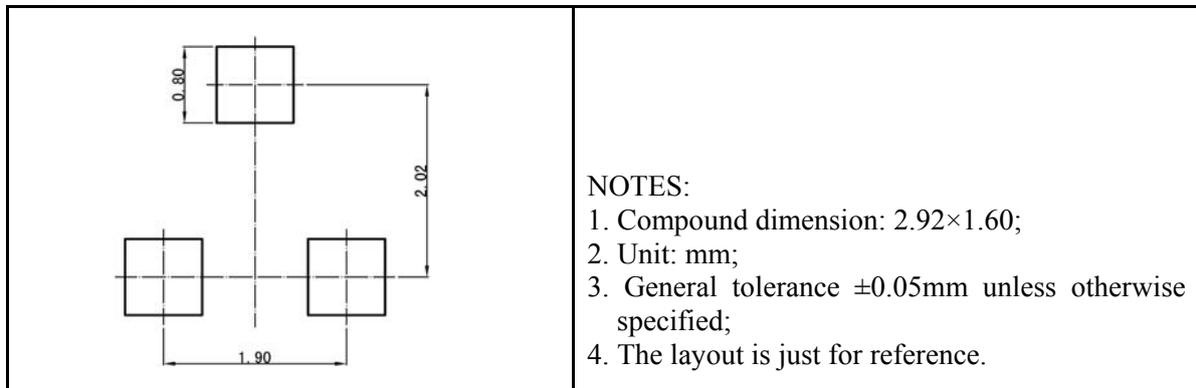
Package Information

UM70xxA: SOT23-3

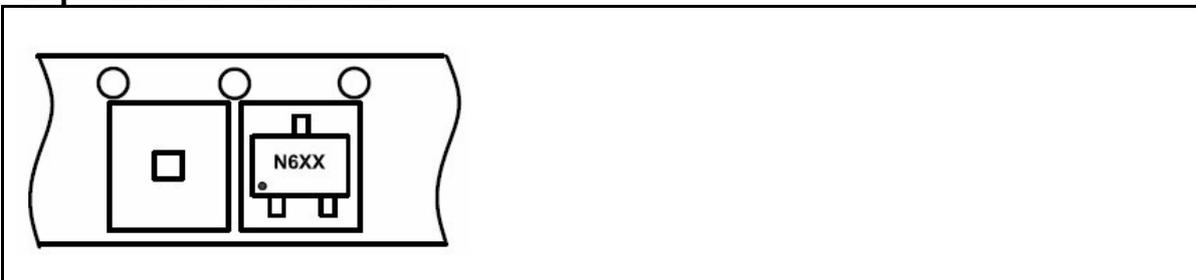
Outline Drawing



Land Pattern



Tape and Reel Orientation



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