

ME70XXA Voltage Detector

General Description

The ME70XXA series is 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).

Features

- Low power consumption
- Low temperature coefficient
- Built-in high-stability reference source
- Built-in hysteresis characteristic
- TO-92 and SOT-23 package

Applications

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

Selection Table

Part No.	Detectable Voltage	Hysteresis Width	Tolerance	Package	Marking
ME7027A	2.7V	0.13V	3%	TO-92	70XX (for TO-92)
ME7044A	4.4V	0.22V	3%	SOT-23	0XX (for SOT-23)

Note: The output type selection codes are:

NMOS open drain normal open, active low

For example: The ME7044A is a 4.4V, NMOS open drain active low output

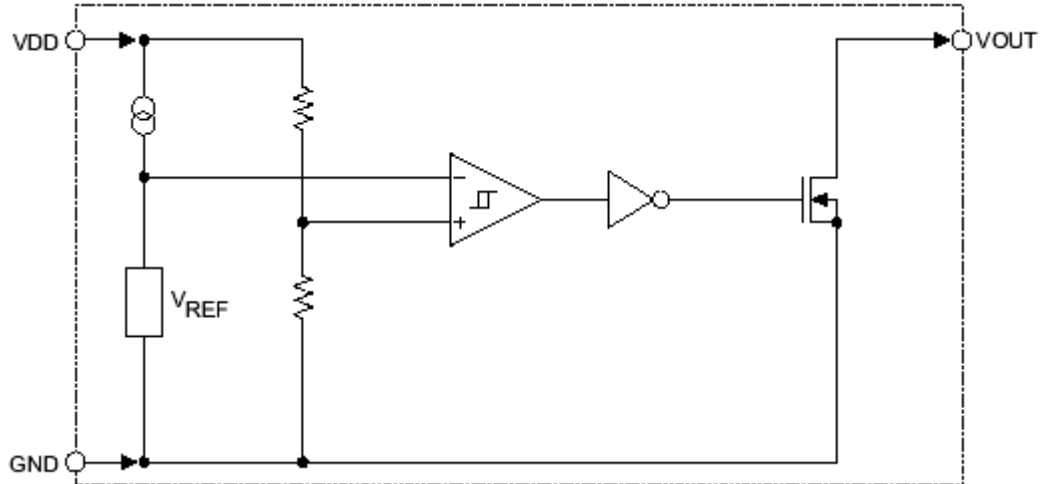
Output Type Selection Table

Type	V_{DD}	$V_{DD} > V_{DET}(+)$	$V_{DD} \leq V_{DET}(-)$
A	V_{OUT}	Hi-Z	VSS

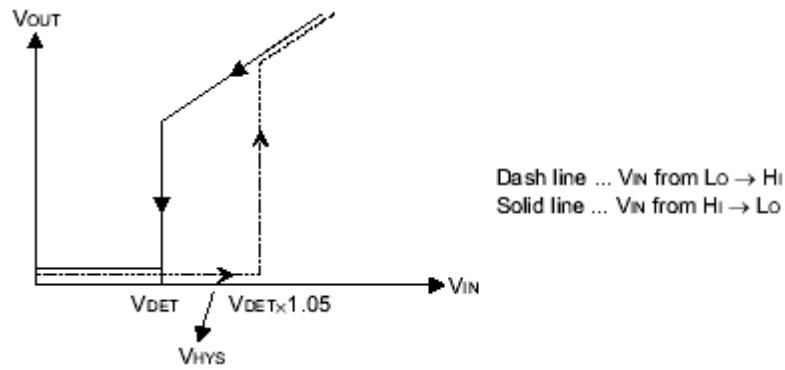
ME70XXA Voltage Detector

Block Diagram

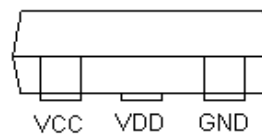
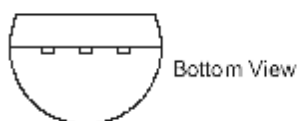
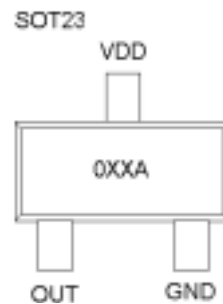
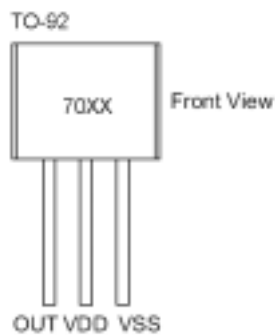
N Channel Open Drain Output (Normal Open; Active Low)



A Type



Pin Assignment



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Absolute Maximum Ratings

Supply Voltage	VSS-0.3V to VSS+10V	Operating Temperature.....	0 to 70
Output Voltage	VSS-0.3V to VDD+0.3V	Output Current.....	50mA
Storage Temperature	-50 to 125	Power Consumption	200mW

Note: 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

ME7027A

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{DD}	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	—	2	3	μA
V _{DD}	Operating Voltage	—	—	1.5	—	10	V
I _{OL}	Output Sink Current	2V	V _{OUT} =0.2V	0.5	1	—	mA
$\frac{\Delta V_{DET}}{\Delta T_a}$	Temperature Coefficient	—	0 <T _a <70	—	± 0.2	—	mV/

ME7044A

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{DD}	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	—	2	3	μA
V _{DD}	Operating Voltage	—	—	1.5	—	10	V
I _{OL}	Output Sink Current	3.6V	V _{OUT} =0.2V	3	6	—	mA
$\frac{\Delta V_{DET}}{\Delta T_a}$	Temperature Coefficient	—	0 <T _a <70	—	± 0.2	—	mV/

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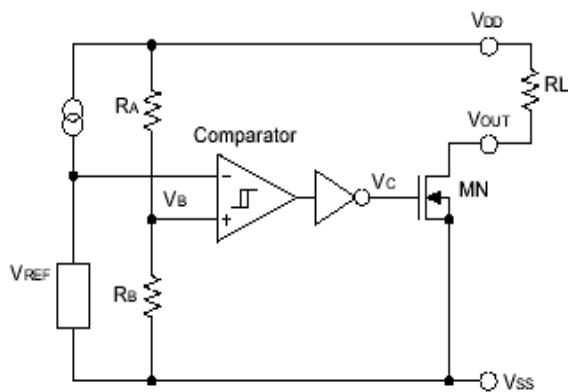
Functional Description

The ME70XXA 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 VREF 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 VREF, VOUT goes high, and V_B is expressed as $V_{BH} = V_{DD} \times R_B / (R_A + R_B)$. If VDD is decreased so that V_B falls to a value less than VREF, the comparator output inverts from high to low, VOUT goes low, VC is high. If VDD falls below the minimum operating voltage, the output becomes undefined.

The figure demonstrates the NMOS output type with positive output polarity (VOUT is normally open, active low).

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



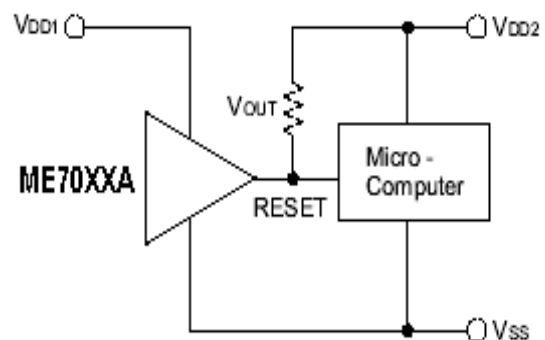
NMOS Output Voltage Detector (ME70XXA)

Application Circuits

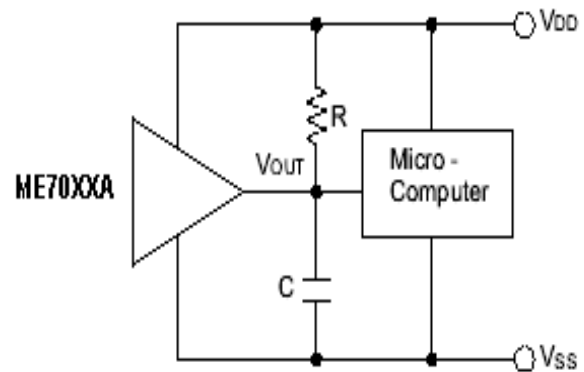
Microcomputer Reset Circuit

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

- NMOS open drain output application for separate power supply



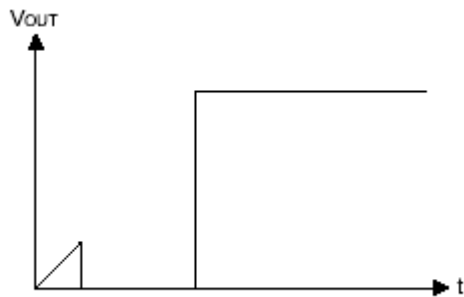
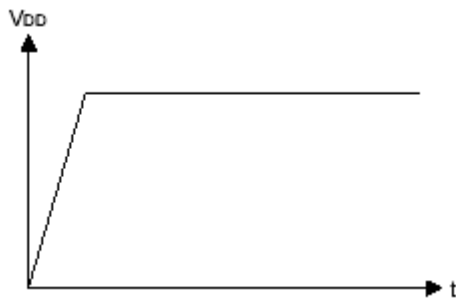
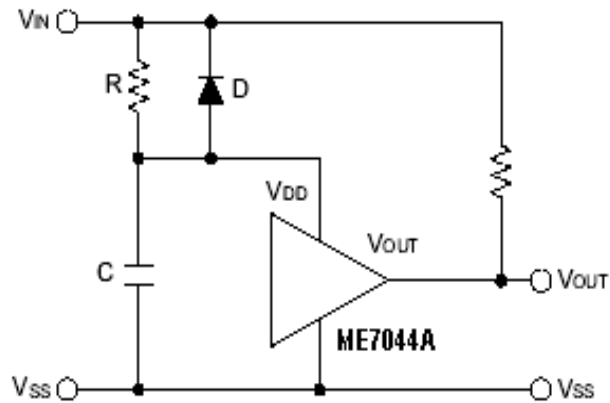
- NMOS open drain output application with R-C delay



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Power-on Reset Circuit

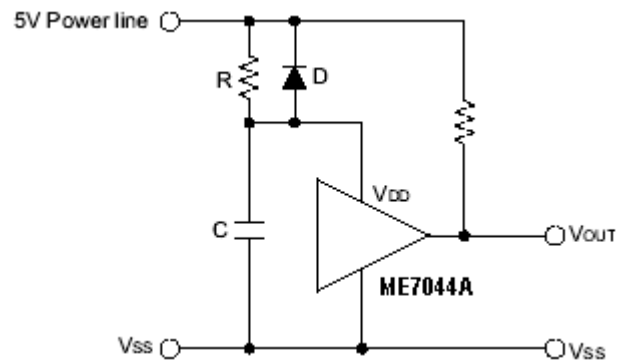
With several external components, the NMOS open drain type of the ME70XXA series can be used to perform a power-on reset function as shown.



5V Power Line Monitoring Circuit

Generally, a minimum operating voltage of 4.5V is guaranteed in a 5V power line system. The ME7044A is recommended for use as 5V power line monitoring circuit.

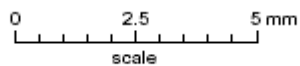
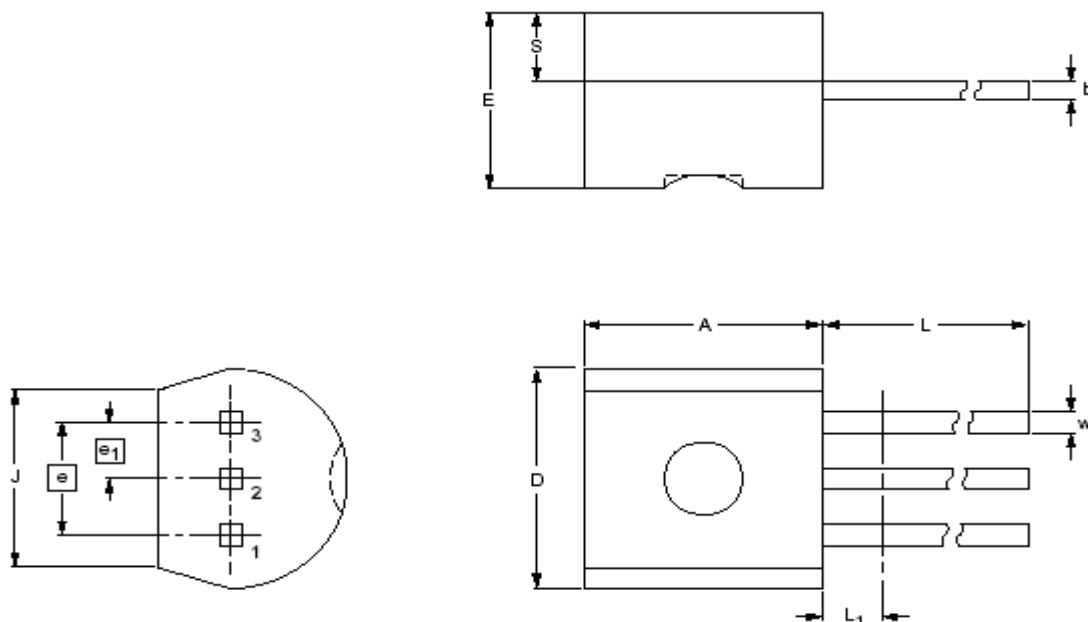
- 5V power line monitor with power-on reset



ME70XXA Voltage Detector

Package Information

3-Pin TO-92 Outline Dimensions



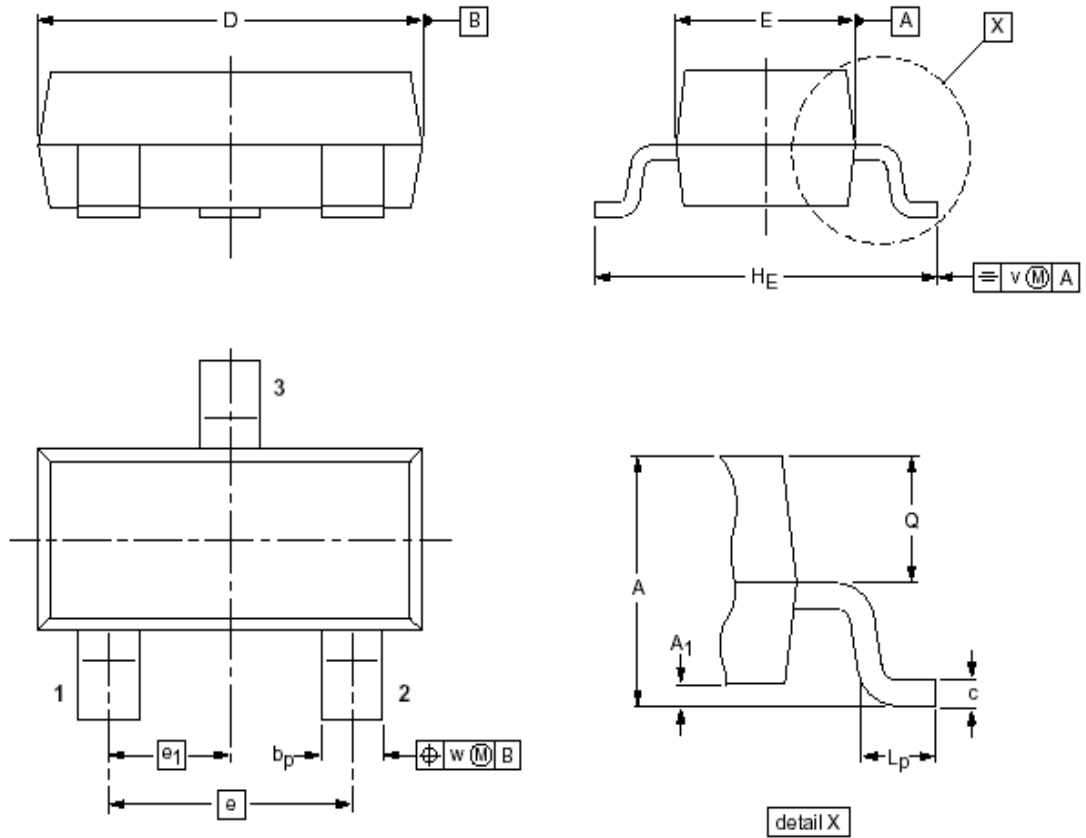
DIMENSIONS (mm are the original dimensions)

UNIT	A	b	D	E	e	e_1	J min.	L	$L_1^{(1)}$ max.	S	w
mm	4.95 4.32	0.51 0.36	4.95 4.45	3.94 3.30	2.54	1.27	3.4	15.4 12.7	1.27	1.52 1.14	0.56 0.41

Note

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3-Pin SOT-23 Outline Dimensions



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max.	b _p	c	D	E	e	e ₁	H _E	L _p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1