



March 2001

# LMS33460

## 3V Under Voltage Detector

### General Description

The LMS33460 is an under voltage detector with a 3.0V threshold and extremely low power consumption. The LMS33460 is specifically designed to accurately monitor power supplies. It is especially suited to battery powered systems where low quiescent current and small size are required. This IC generates an active output whenever the input voltage drops below 3.0 Volts.

This part uses a precision on-chip voltage reference and a comparator to measure the input voltage. Built in hysteresis helps to prevent erratic operation in the presence of noise. The UVD is available in the ultra-miniature SC70-5 package.

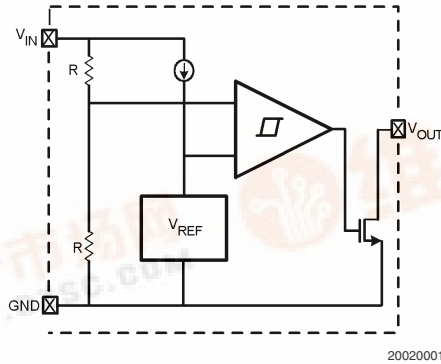
### Features

- Ultra low Power
- 3.0V detection
- $V_{IN}$  Range: 0.8V to 7.0V
- Open drain output
- Ultra-small SC70-5 package
- Extended Temperature range ( $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ )
- Ultra Low Quiescent current ( $1\mu\text{A}$  typ)

### Applications

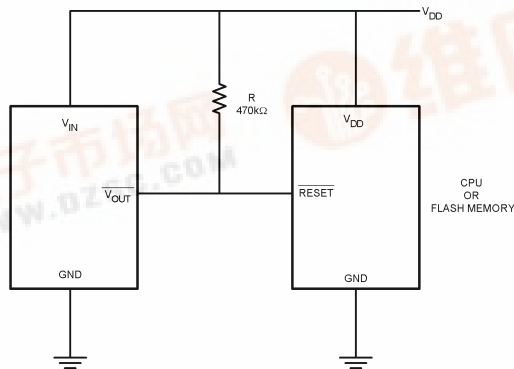
- Low battery voltage detector
- Power Fail Indicator
- Processor Reset Generator
- Battery Backup Control
- Battery Operated Equipment
- Hand-held Instruments

### Circuit Block Diagram



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### Typical Application

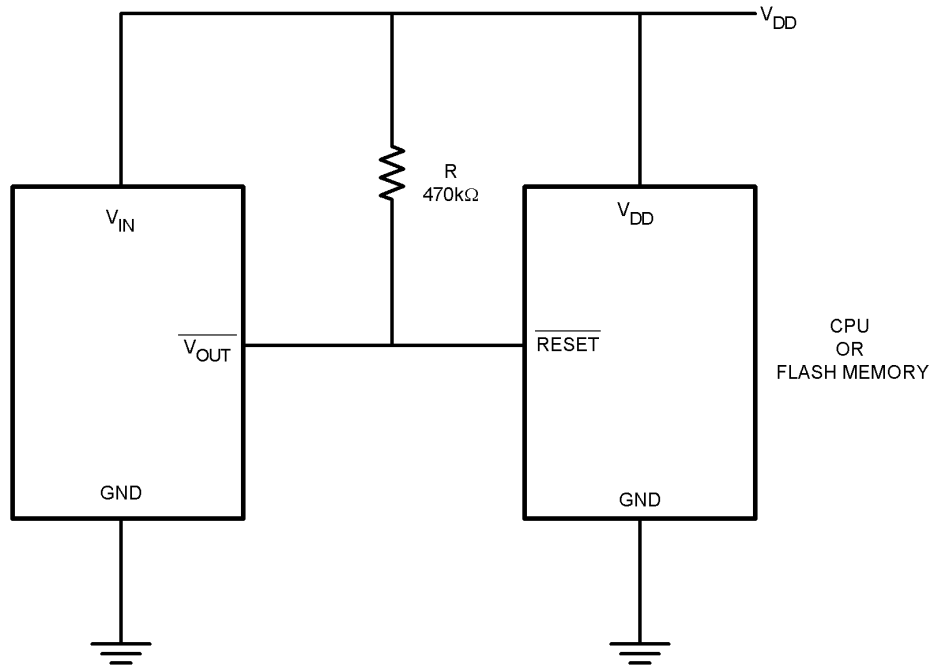


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LMS33460 3V Under Voltage Detector

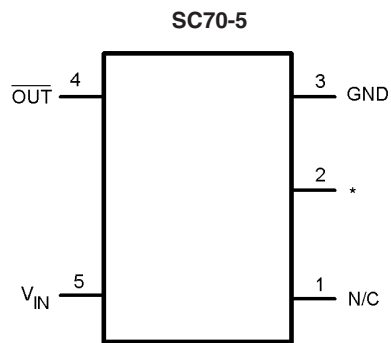


## Typical Application (Continued)



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## Connection Diagram



\* Internally connected to ground. This pin should be either left floating or connected to ground.

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Top View

## Ordering Information

Package	Part Number	Package Marking	Transport Media	NSC Drawing
5-Pin SC70-5	LMS33460MG	C33	1k Units Tape and Reel	MAA05A
	LMS33460MGX		3k Units Tape and Reel	

**Absolute Maximum Ratings** (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Input Voltage to GND	8.0V
Output Voltage to GND	8.0V
Output Continuous Output Current	30mA
Vapor Phase IR Convection Reflow	240°C
ESD Rating (Note 4)	

Human Body Model	2500V
Machine Model	200V
$T_{JMAX}$ (Note 3)	150°C
$\theta_{JA}$ (Note 3)	478°C/W

**Temperature Range**

Operating Junction	-40°C to +85°C
Storage Temperature Range	-65°C to +150°C

**Electrical Characteristics**

Unless otherwise specified, all limits guaranteed for  $T_J = 25^\circ\text{C}$ . **Boldface** limits apply at the temperature extremes.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$V_{DET}$	Detector Threshold	$V_{IN}$ Falling	2.85	3.0	3.15	V
$V_{HYS}$	Detector Voltage Hysteresis	$V_{IN}$ Rising	0.095	0.155	0.215	V
$I_{IN}$	Input Supply Current	$V_{IN} = 2.87\text{V}$	–	1.0	2.2	$\mu\text{A}$
		$V_{IN} = 4.7\text{V}$	–	1.2	3.6	$\mu\text{A}$
		$V_{IN} = 7.0\text{V}$ (Note 3)	–	25	200	$\mu\text{A}$
$V_{IN(MAX)}$	Maximum Operating Voltage		–	–	7.0	V
$V_{IN(MIN)}$	Maximum Operating Voltage (Note 2)			0.7	1.1	V
				<b>1.0</b>	<b>1.3</b>	
$I_{OUT(LOW)}$	Output Current Low	$V_{OUT} = 0.05\text{V}$ , $V_{IN} = 1.1\text{V}$	0.01	0.6		mA
		$V_{OUT} = 0.50\text{V}$ , $V_{IN} = 1.5\text{V}$	2	11		
$T_{pdHL}$	Output Delay Time Output Transition High to Low $C_L = 10\text{pF}$ , $R_L = 470\text{k}\Omega$		–	70	130	$\mu\text{sec}$
$\Delta V_{DET}/\Delta T$	Detect Voltage Temperature Coefficient		–	<b><math>\pm 120</math></b>	–	PPM/°C

**Note 1:** Absolute maximum ratings indicate limits beyond which damage to the device may occur. Electrical specifications do not apply when operating the device beyond its rated operating conditions.

**Note 2:** Temperature range specifications is guaranteed by design.

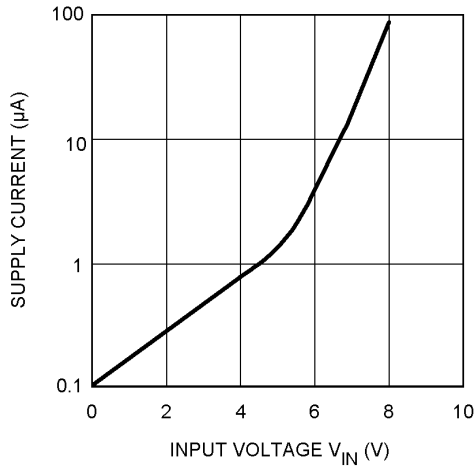
**Note 3:** Quiescent current will increase substantially above 5.5 volts, but is very low in the normal range below 5.5 volts.

**Note 4:** Human body model, 1.5k $\Omega$  in series with 100pF. Machine model, 0 $\Omega$  in series with 200pF.

## Typical Characteristics

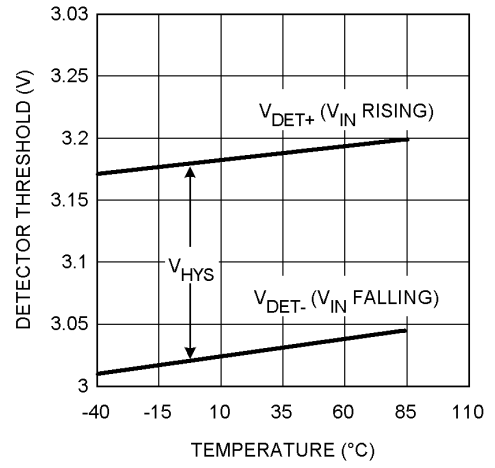
( $T_A = 25^\circ\text{C}$ ,  $R_L = 470\text{k}\Omega$  and  $C_L = 10\text{pF}$  unless otherwise noted).

Supply Current vs. Input Voltage



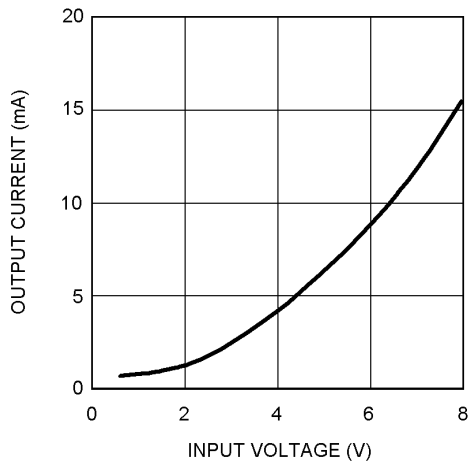
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Detector Threshold vs. Temperature



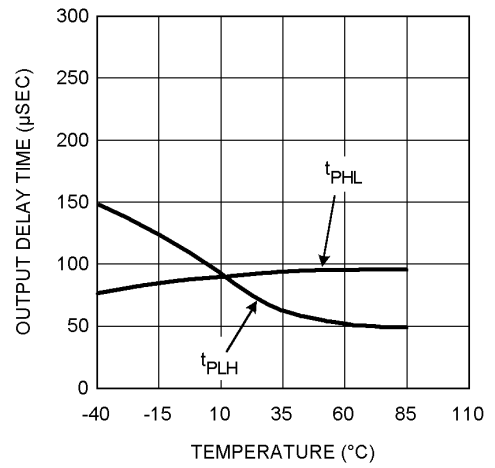
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Output Current vs. Input Voltage



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Output Delay Time vs. Temperature

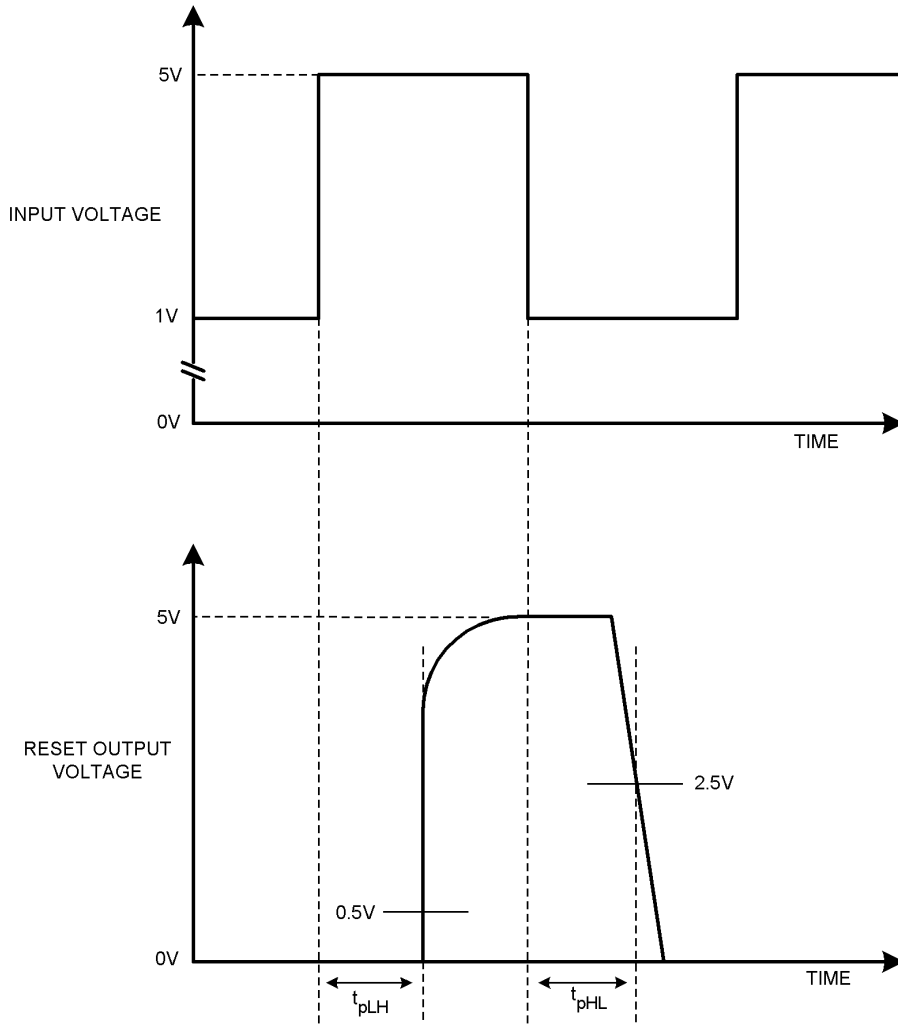


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### Application Circuit Information

The LMS33460 is a micro power under voltage sensing circuit with an open drain output configuration, which requires a pull resistor.

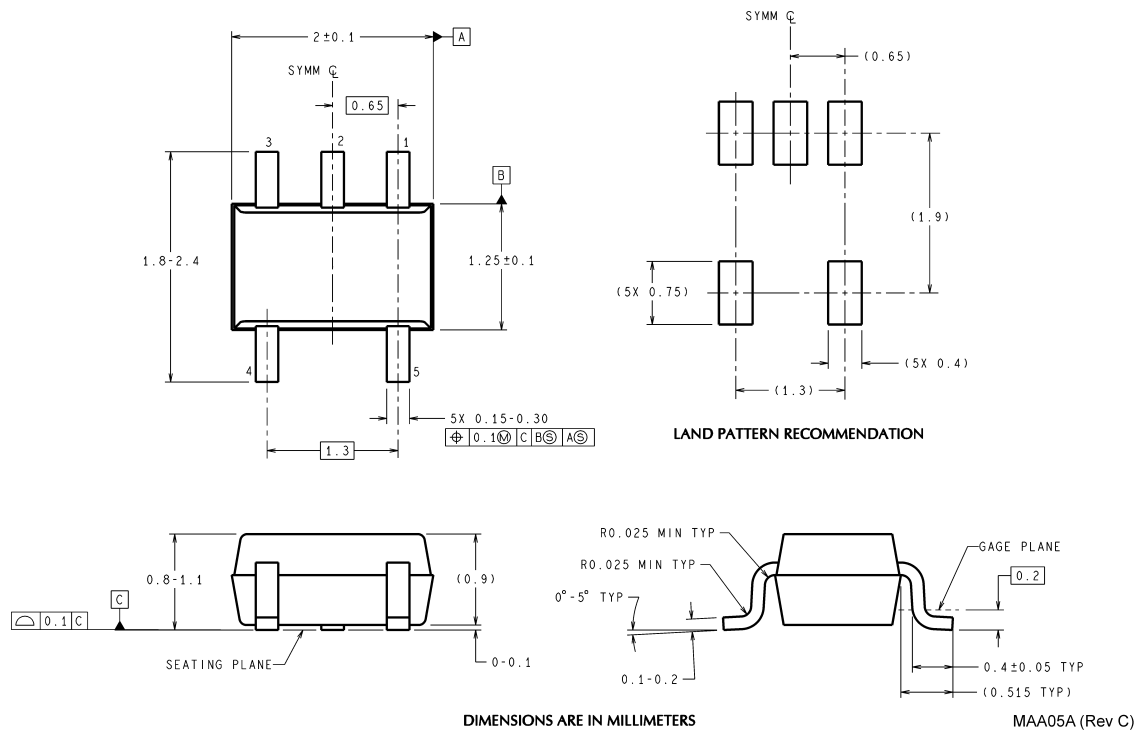
The LMS33460 features a voltage reference, a comparator with precise thresholds and built in hysteresis to prevent erratic reset operation.



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FIGURE 1. Propagation Delay

**Physical Dimensions** inches (millimeters) unless otherwise noted



**5-Pin SC70-5  
NSC Package Number MAA05A**

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