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SUPPLY VOLTAGE MONITOR

ISSUE 4 – JULY 2006

ZM33164

DEVICE DESCRIPTION

The ZM33164 is a three terminal under voltage monitor circuit for use in microprocessor systems. The threshold voltage of the device has been set to 4.3volts making it ideal for 5 volt circuits.

Included in the device is a precise voltage reference and a comparator with built in hysteresis to prevent erratic operation. The ZM33164 features an open collector output capable of sinking at least 10mA which only requires a single external resistor to interface to following circuits.

Operation of the device is guaranteed from one volt upwards, from this level to the device threshold voltage the output is held low providing a power on reset function. Should the supply voltage, once established, at any time drop below the threshold level then the output again will pull low.

The device is available in a TO92 package for through hole applications as well as SOT223 for surface mount requirements.

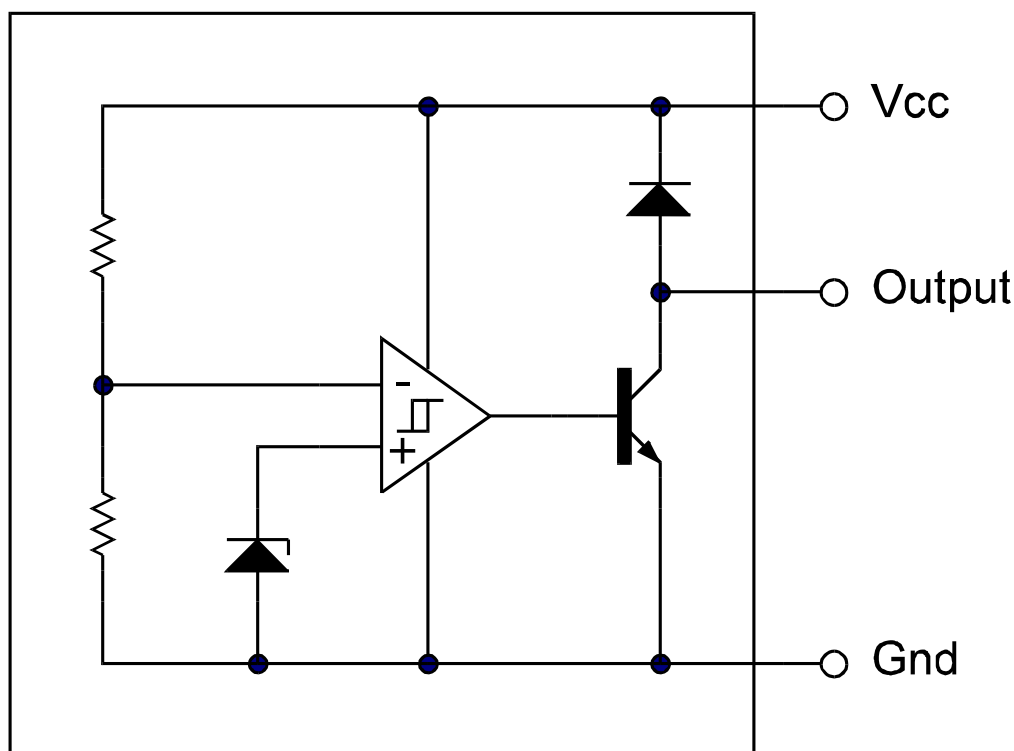
FEATURES

- SOT223 and TO92 packages
- Power on reset generator
- Automatic reset generation
- Low standby current
- Guaranteed operation from 1 volt
- Wide supply voltage range
- Internal clamp diode to discharge delay capacitor
- 4.3 volt threshold for 5 volt logic
- 60mV hysteresis prevents erratic operation

APPLICATIONS

- Microprocessor systems
- Computers
- Computer peripherals
- Instrumentation
- Automotive
- Battery powered equipment

SCHEMATIC DIAGRAM



ZM33164

ABSOLUTE MAXIMUM RATING

Input Supply Voltage	-1 to 12V	Power Dissipation	
Offstate Output Voltage	12V	TO92	780mW
Onstate Output		SOT223	2W(Note 2)
Sink Current(Note 1)	Internally limited		
Clamp diode			
Forward Current(Note 1)	100mA		
Operating junction temperature	150°C		
Operating Temperature	-40 to 85°C		
Storage Temperature	-65 to 150°C		

TEST CONDITIONS

($T_{amb}=25^{\circ}\text{C}$ for typical values, $T_{amb}=-40$ to 85°C for min/max values (Note3))

COMPARATOR

PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNITS
Threshold Voltage High state output (V_{cc} increasing)	V_{IH}	4.15	4.33	4.45	V
Threshold Voltage Low state output (V_{cc} decreasing)	V_{IL}	4.15	4.27	4.45	V
Hysteresis	V_H	0.02	0.06		V

OUTPUT

Output sink saturation: ($V_{cc}=4.0\text{V}$, $I_{sink}=8.0\text{mA}$) ($V_{cc}=4.0\text{V}$, $I_{sink}=2.0\text{mA}$) ($V_{cc}=1.0\text{V}$, $I_{sink}=0.1\text{mA}$)	V_{OL}		0.46 0.15	1.0 0.4 0.25	V V V
Onstate output sink current (V_{cc} , Output=4V)	I_{sink}	10	20	50	mA
Offstate output leakage current (V_{cc} , Output=5V)	I_{oh}		0.02	0.5	μA
Clamp diode forward voltage ($I_f=10\text{mA}$)	V_f	0.6	1.2	1.5	V
Propagation delay (V_{in} 5V to 4V, $R_I=10\text{k}$, $T_{amb}=25^{\circ}\text{C}$)	T_d		2.0		μs

TOTAL DEVICE

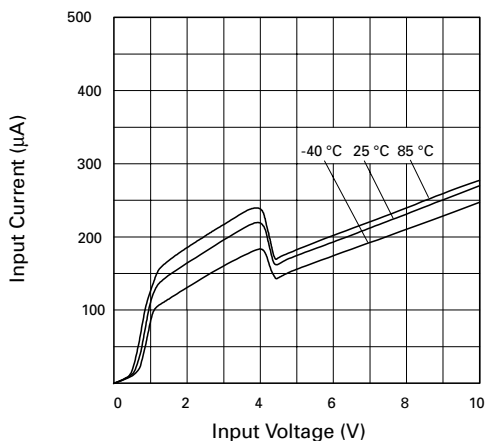
Operating input voltage range	V_{cc}	1.0 to 10			V
Quiescent input current ($V_{cc}=5\text{V}$)	I_q		175	260	μA

Note:

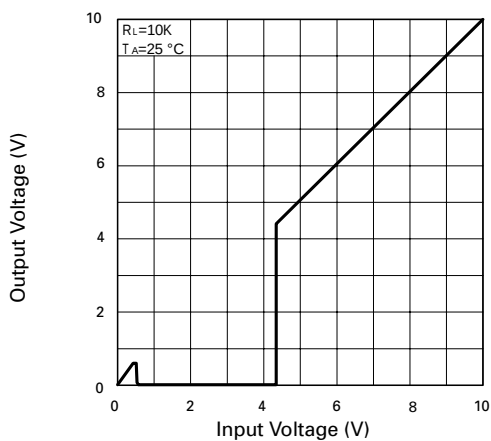
- Maximum package power dissipation must be observed
- Maximum power dissipation for the SOT223 package is calculated assuming that the device is mounted on a PCB measuring 2 inches square.
- Low duty cycle pulse techniques are used during test to maintain junction temperatures as close to ambient as possible

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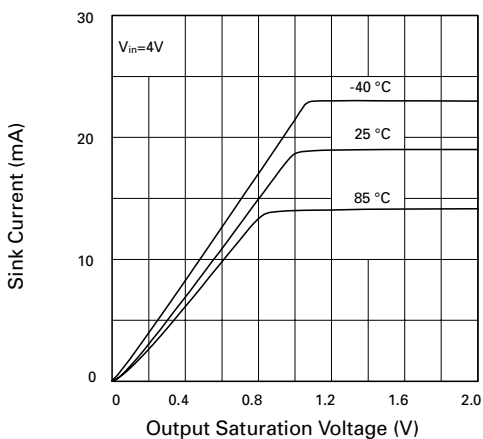
TYPICAL CHARACTERISTICS



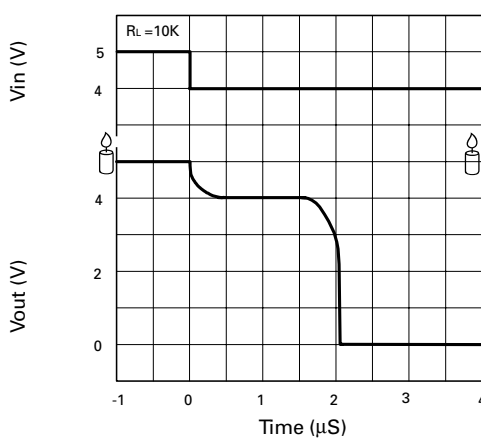
Input Current vs. Input Voltage



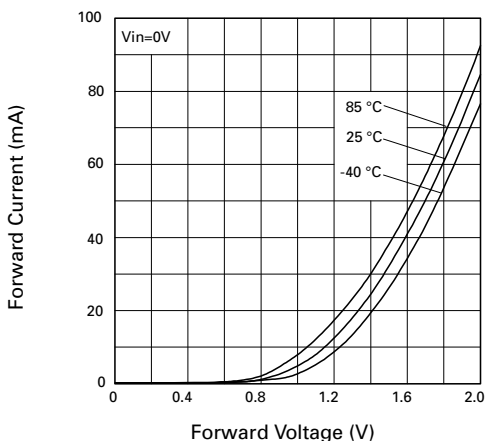
Output Voltage vs. Input Voltage



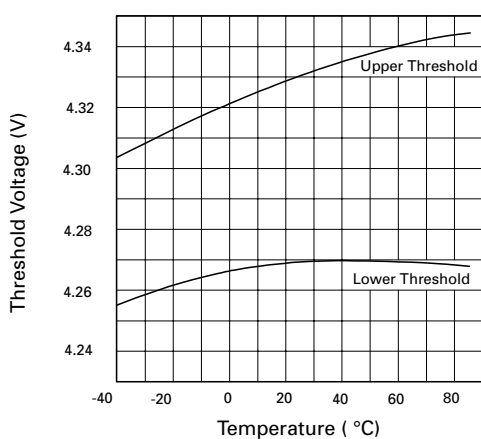
Output Saturation Voltage vs. Sink Current



Reset Delay Time



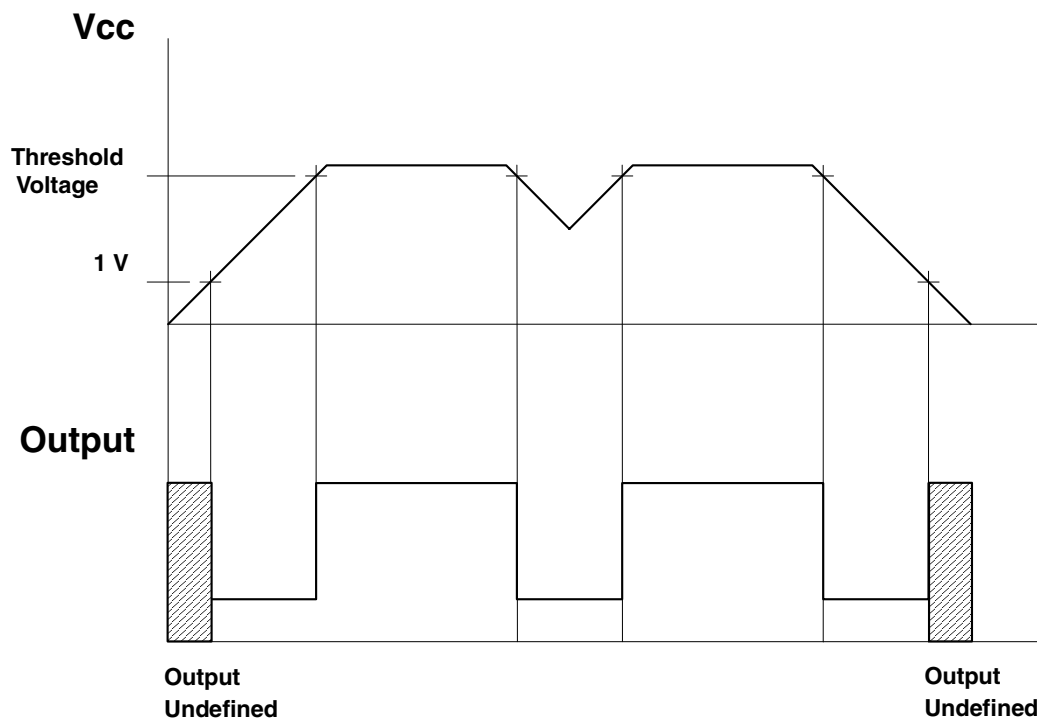
Clamp Diode Forward Current vs. Voltage



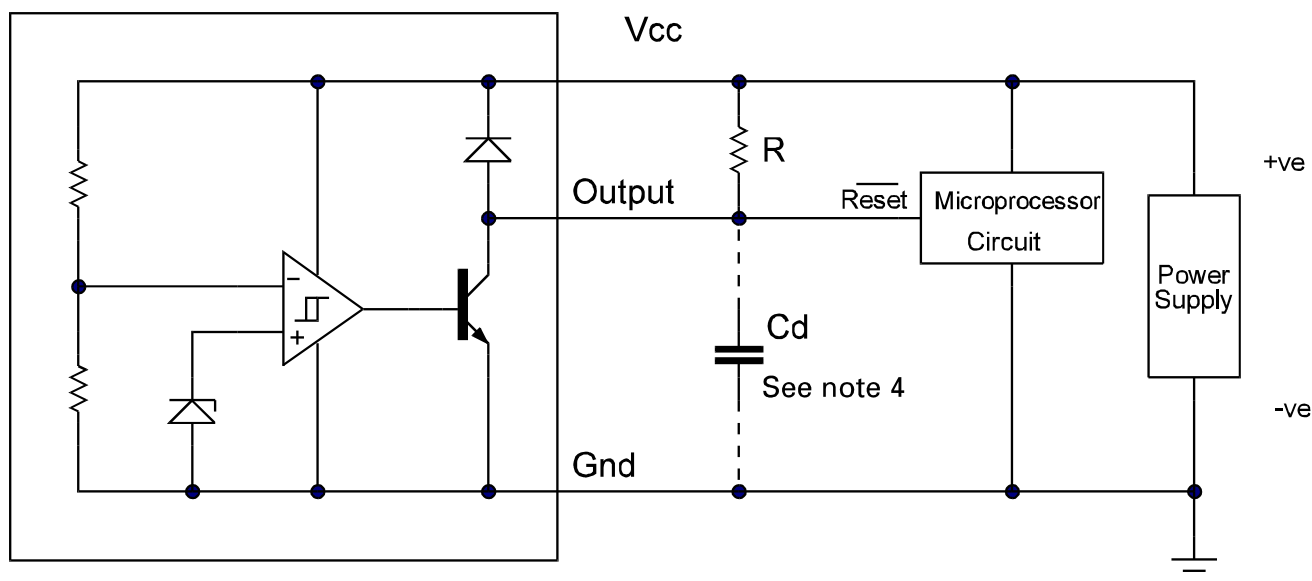
Threshold Voltage vs. Temperature

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TIMING DIAGRAM



APPLICATION CIRCUIT



Note 4: A time delayed reset can be accomplished with the additional C_d .

$$T_{DY} = RCd \ln \left(\frac{1}{1 - \frac{V_{TH(mpu)}}{V_{in}}} \right)$$

T_{DY} =Time (Seconds)

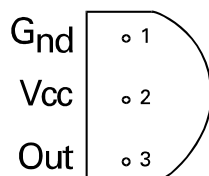
V_{TH} =Microprocessor Reset Threshold

V_{in} =Power Supply Voltage

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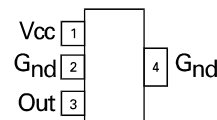
CONNECTION DIAGRAMS

TO92 Package Suffix – C



Bottom View

SOT223 Package Suffix – G



*Top View –
Pin 4 floating or connected to pin 2*

ORDERING INFORMATION

Part Number	Package	Part Mark
ZM33164G	SOT223	ZM33164
ZM33164C	TO92	ZM33164

Europe

Zetex GmbH
Streitfeldstraße 19
D-81673 München
Germany

Telefon: (49) 89 45 49 49 0
Fax: (49) 89 45 49 49 49
europe.sales@zetex.com

Americas

Zetex Inc
700 Veterans Memorial Highway
Hauppauge, NY 11788
USA

Telephone: (1) 631 360 2222
Fax: (1) 631 360 8222
usa.sales@zetex.com

Asia Pacific

Zetex (Asia Ltd)
3701-04 Metroplaza Tower 1
Hing Fong Road, Kwai Fong
Hong Kong

Telephone: (852) 26100 611
Fax: (852) 24250 494
asia.sales@zetex.com

Corporate Headquarters

Zetex Semiconductors plc
Zetex Technology Park, Chadderton
Oldham, OL9 9LL
United Kingdom

Telephone: (44) 161 622 4444
Fax: (44) 161 622 4446
hq@zetex.com

For international sales offices visit www.zetex.com/offices

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