

SUPPLY VOLTAGE MONITOR

ISSUE 2 – NOVEMBER 1995

ZM33164-3

DEVICE DESCRIPTION

The ZM33164-3 is a three terminal under voltage monitor circuit for use in microprocessor systems. The threshold voltage of the device has been set to 2.68 volts making it ideal for 3 volt circuits.

Included in the device is a precise voltage reference and a comparator with built in hysteresis to prevent erratic operation. The ZM33164-3 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 SO8 and SOT223 for surface mount requirements.

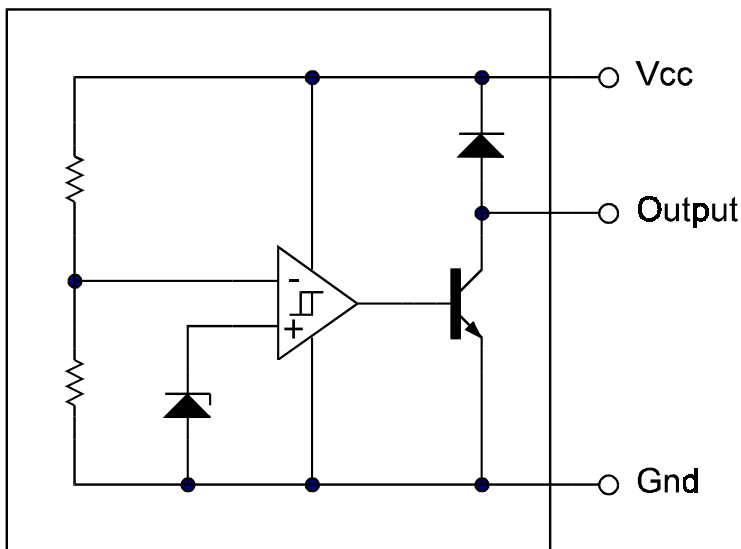
FEATURES

- SO8, 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
- 2.68 volt threshold for 3 volt logic
- 60mV hysteresis prevents erratic operation

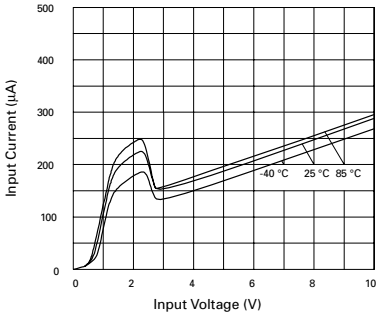
APPLICATIONS

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

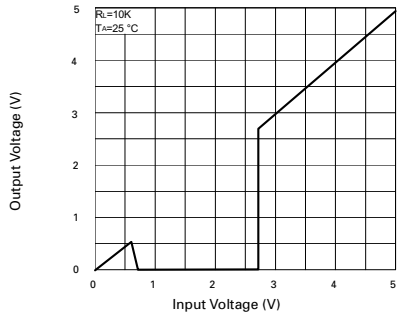
SCHEMATIC DIAGRAM



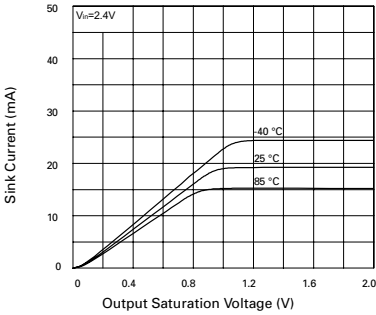
TYPICAL CHARACTERISTICS



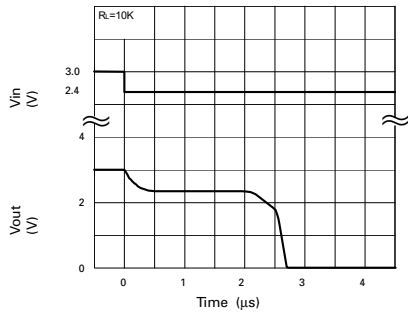
Input Current vs. Input Voltage



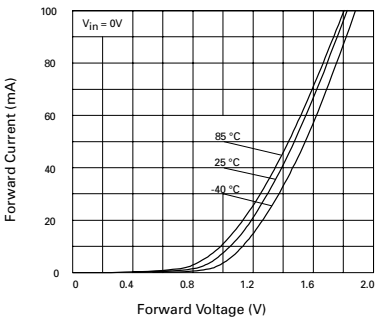
Output Voltage vs. Input Voltage



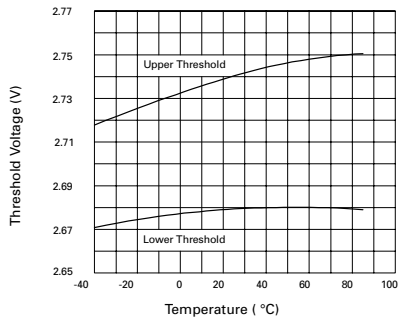
Output Saturation Voltage vs. Sink Current



Reset Delay Time



Clamp Diode Forward Current vs. Voltage



Threshold Voltage vs. Temperature

ZM33164-3

ABSOLUTE MAXIMUM RATING

| | | | |
|--------------------------------|--------------------|--------------------------|----------------|
| Input Supply Voltage | -1 to 12V | Power Dissipation | |
| Offstate Output Voltage | 12V | TO92 | 780mW |
| Onstate Output | | SOT223 | 2W(Notes 2) |
| Sink Current(Notes 1) | Internally limited | SO8 | 780mW(Notes 2) |
| Clamp diode | | | |
| Forward Current(Notes 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 (Notes3))

COMPARATOR

| PARAMETER | SYMBOL | MIN | TYP. | MAX. | UNITS |
|---|----------|------|------|------|-------|
| Threshold Voltage High state output (V_{cc} increasing) | V_{IH} | 2.55 | 2.71 | 2.8 | V |
| Threshold Voltage Low state output (V_{cc} decreasing) | V_{IL} | 2.55 | 2.65 | 2.8 | V |
| Hysteresis | V_H | 0.03 | 0.06 | 0.15 | V |

OUTPUT

| | | | | | |
|---|------------|-----|--------------|--------------------|---------------|
| Output sink saturation: ($V_{cc}=2.4\text{V}$, $I_{sink}=8.0\text{mA}$) ($V_{cc}=2.4\text{V}$, $I_{sink}=2.0\text{mA}$) ($V_{cc}=1.0\text{V}$, $I_{sink}=0.1\text{mA}$) | V_{OL} | | 0.46 0.15 | 1.0 0.4 0.25 | V V V |
| Onstate output sink current (V_{cc} , Output=2.4V) | I_{sink} | 10 | 20 | 60 | mA |
| Offstate output leakage current (V_{cc} , Output=3V) | 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} 3V to 2.4V, $R_l=10\text{k}$, $T_{amb}=25^{\circ}\text{C}$) | T_d | | 2.5 | | μs |

TOTAL DEVICE

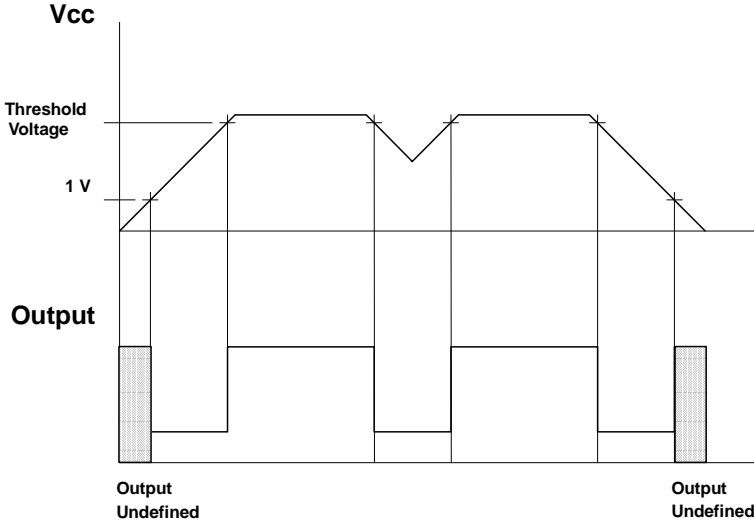
| | | | | | |
|--|----------|-----------|-----|-----|---------------|
| Operating input voltage range | V_{cc} | 1.0 to 10 | | | V |
| Quiescent input current ($V_{cc}=3\text{V}$) | I_q | | 125 | 190 | μA |

Note:

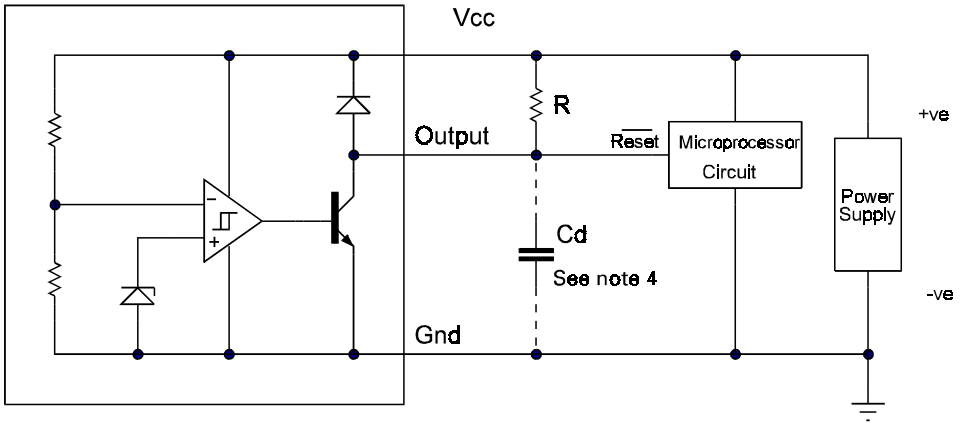
1. Maximum package power dissipation must be observed
2. Maximum power dissipation, for the SOT223 and SO8 packages, is calculated assuming that the device is mounted on a PCB measuring 2 inches square.
3. Low duty cycle pulse techniques are used during test to maintain junction temperatures as close to ambient as possible

ZM33164-3

TIMING DIAGRAM



APPLICATION CIRCUIT



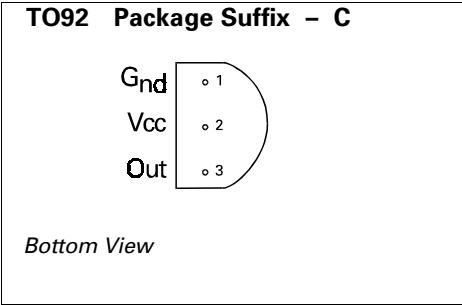
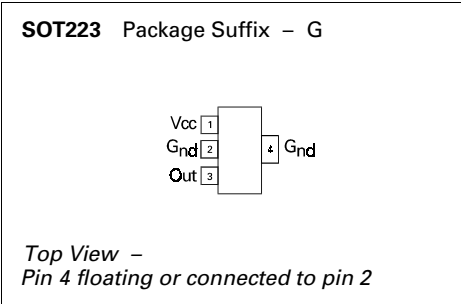
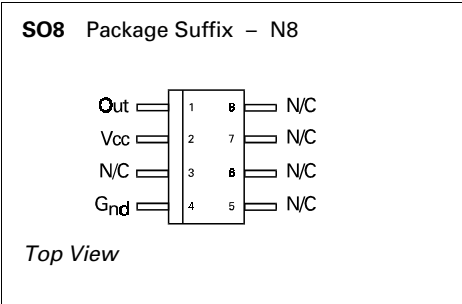
Note 4: A time delayed reset can be accomplished with the additional Cd.

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

T_{DY} =Time (Seconds)
 V_{TH} =Microprocessor Reset Threshold
 V_{in} =Power Supply Voltage

ZM33164-3

CONNECTION DIAGRAMS



ORDERING INFORMATION

| Part Number | Package | Part Mark |
|-------------|---------|-----------|
| ZM331643N8 | SO8 | ZM331643 |
| ZM331643G | SOT223 | ZM331643 |
| ZM331643C | TO92 | ZM331643 |