

SUPPLY VOLTAGE MONITOR

ZM33164-3**ISSUE 2 – NOVEMBER 1995**

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.

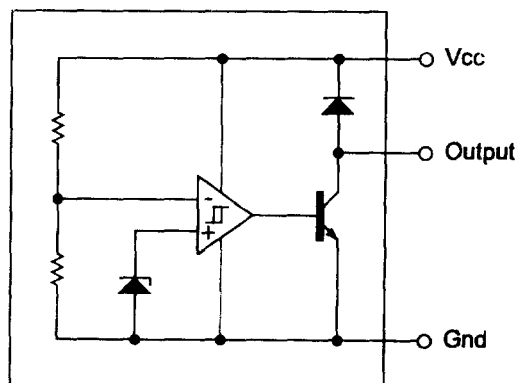
FEATURES

- 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

**CONNECTION TABLE**

Pin	SO8	SOT223	TO92
1	Out	V _{CC}	G _{nd}
2	V _{CC}	G _{nd}	V _{CC}
3	N/C	Out	Out
4	G _{nd}	-	-
5	N/C	-	-
6	N/C	-	-
7	N/C	-	-
8	N/C	-	-
Pack	N8	G	C

see Diagrams Page 3 - 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 (Notes 3))

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

PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNITS
Output sink saturation:	V_{OL}				
($V_{cc}=2.4\text{V}$, $I_{sink}=8.0\text{mA}$)			0.46	1.0	V
($V_{cc}=2.4\text{V}$, $I_{sink}=2.0\text{mA}$)			0.15	0.4	V
($V_{cc}=1.0\text{V}$, $I_{sink}=0.1\text{mA}$)				0.25	V
Onstate output sink current	I_{sink}	10	20	60	mA
(V_{cc} , Output=2.4V)					
Offstate output leakage current	I_{oh}		0.02	0.5	μA
(V_{cc} , Output=3V)					
Clamp diode forward voltage ($I_f=10\text{mA}$)	V_f	0.6	1.2	1.5	V
Propagation delay	T_d		2.5		μs
(V_{in} 3V to 2.4V, $R_i=10\text{k}$, $T_{amb}=25^{\circ}\text{C}$)					

TOTAL DEVICE

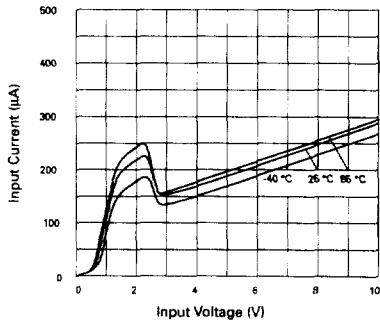
PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNITS
Operating input voltage range	V_{cc}	1.0 to 10			V
Quiescent input current ($V_{cc}=3\text{V}$)	I_q		125	190	μA

Note:

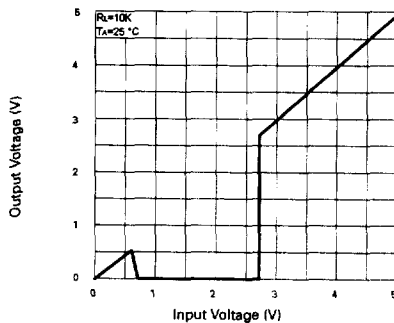
- Maximum package power dissipation must be observed
- Maximum power dissipation, for the SOT223 and SO8 packages, is calculated assuming that the device is mounted on a PCB measuring 2 inches square.
- Low duty cycle pulse techniques are used during test to maintain junction temperatures as close to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

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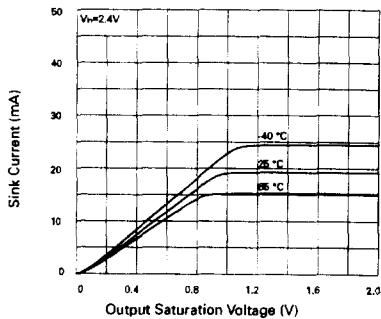
TYPICAL CHARACTERISTICS



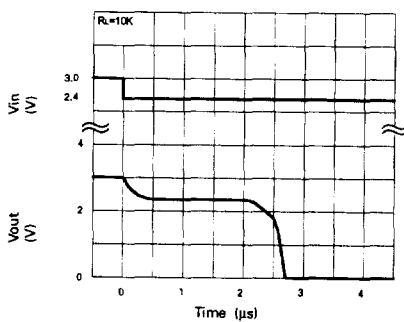
Input Current vs. Input Voltage



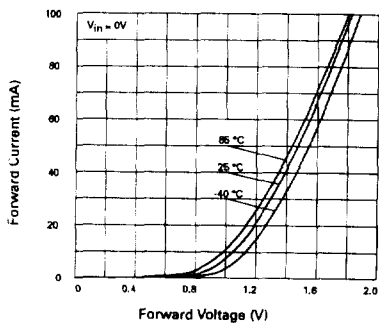
Output Voltage vs. Input Voltage



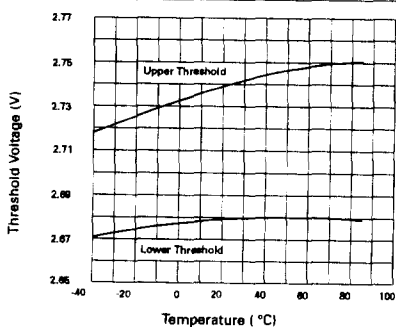
Output Saturation Voltage vs. Sink Current



Reset Delay Time

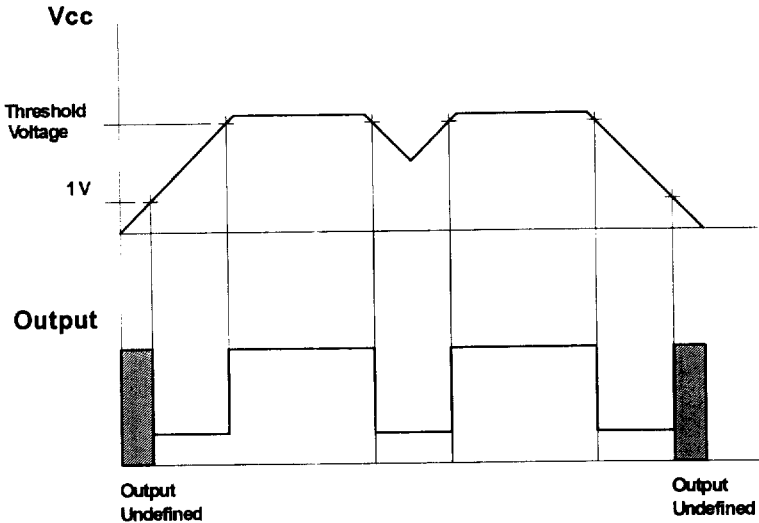


Clamp Diode Forward Current vs. Voltage

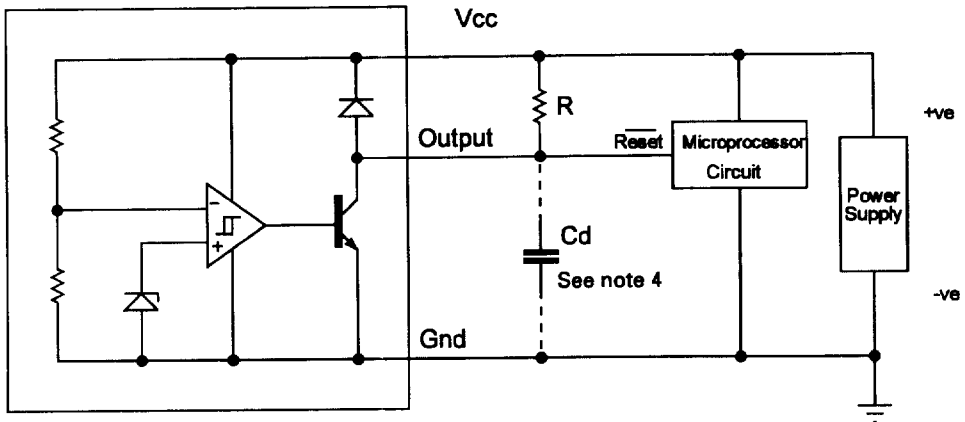


Threshold Voltage vs. Temperature

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 Resistance Threshold(Ohms)

V_{in} =Power Supply Voltage