SUPPLY VOLTAGE MONITOR

ZSM561

DEVICE DESCRIPTION

The ZSM561 is a three terminal under voltage monitor circuit for use in microprocessor systems. The threshold voltage of the device has been set to 4.6 volts 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 ZSM561 features on open collector output capable of sinking at least I0mA 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.

Also included is a 6 volt zener diode connected between Vcc and Gnd. With just the addition of a low cost external NPN transistor and resistor, this zener allows the ZSM561 to provide both regulator and supply monitor functions

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
- 4.6 volt threshold for 5 volt logic
- 20mV hysteresis prevents erratic operation

APPLICATIONS

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

SCHEMATIC DIAGRAM
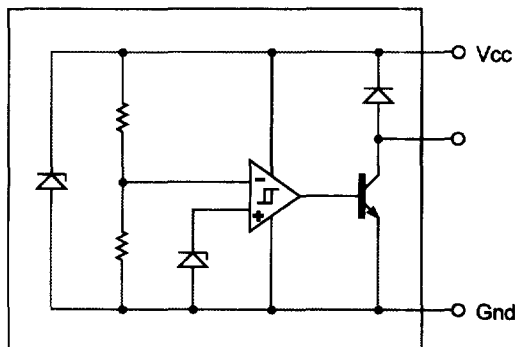
CONNECTION TABLE

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			

ZSM561

ABSOLUTE MAXIMUM RATING

Input Supply Voltage	-1 to 7V	**Power Dissipation**	
Supply zener current	25mA continuous	TO92	780mW
Offstate Output Voltage	7V	SOT223	2W(Note 2)
Onstate Output Sink Current(Note 1)	Internally limited	SO8	780mW(Note 2)
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°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 (Vcc increasing)	V_{IH}	4.5	4.61	4.7	V
Threshold Voltage Low state output (Vcc decreasing)	V_{IL}	4.5	4.59	4.7	V
Hysteresis	V_H	0.01	0.02	0.05	V

OUPUT

Output sink saturation:	V_{OL}				
(V_{cc}=4.0V, I_{sink}=8.0mA)			0.46	1.0	V
(V_{cc}=4.0V, I_{sink}=2.0mA)			0.15	0.4	V
(V_{cc}=1.0V, I_{sink}=0.1mA)				0.25	V
Onstate output sink current (V_{cc}, Output=4V)	I_{sink}	10	20	60	mA
Offstate output leakage current (V_{cc}, Output=5V)	I_{oh}		0.02	0.5	µA
Clamp diode forward voltage (I_f=10mA)	V_f	0.6	1.2	1.5	V
Propagation delay (V_{in} 5V to 4V, R_l=10k, T_{amb}=25°C)	T_d		1.5		µs

SUPPLY ZENER

Avalanche Voltage:(Icc=1mA)	V_z	5.8	6	6.2	V
Slope Resistance: (Icc=15mA)	R_z		45	60	Ω
(Icc=15mA to 50mA)			21	30	Ω

TOTAL DEVICE

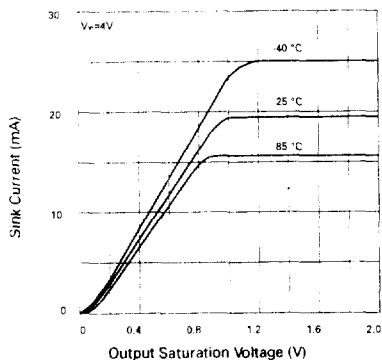|					
Operating input voltage range(Note 5)	V_{cc}	1.0 to 7			V

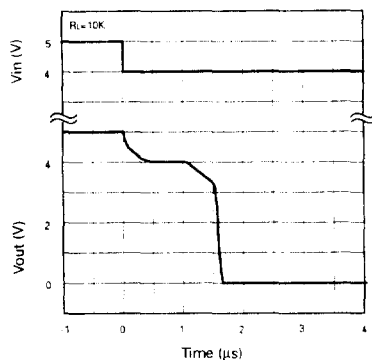# TYPICAL CHARACTERISTICS
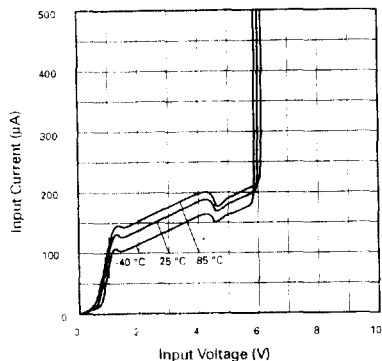
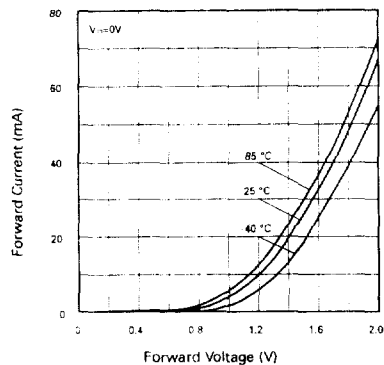**Input Current vs. Input Voltage**
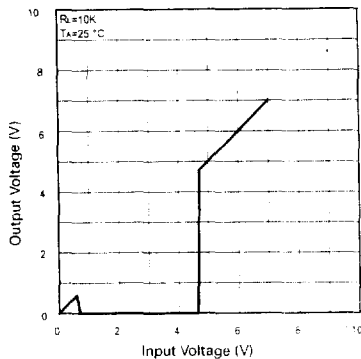
Output Voltage vs. Input Voltage
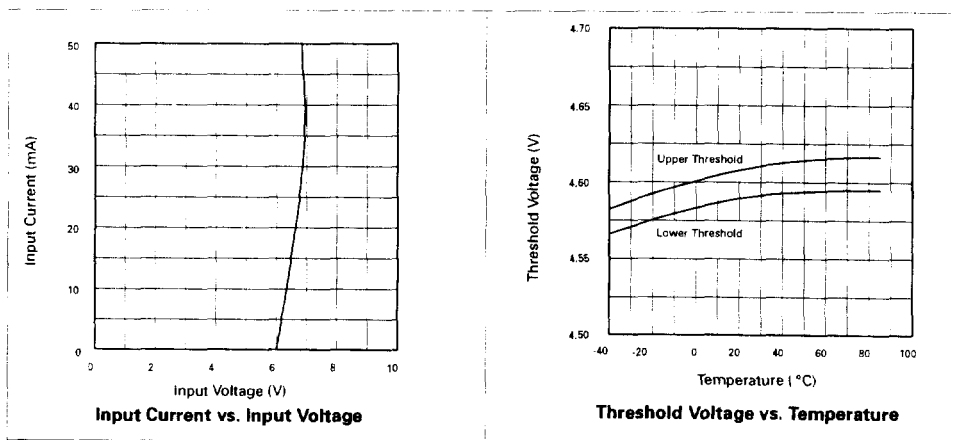

Output Saturation Voltage vs. Sink Current

Reset Delay Time
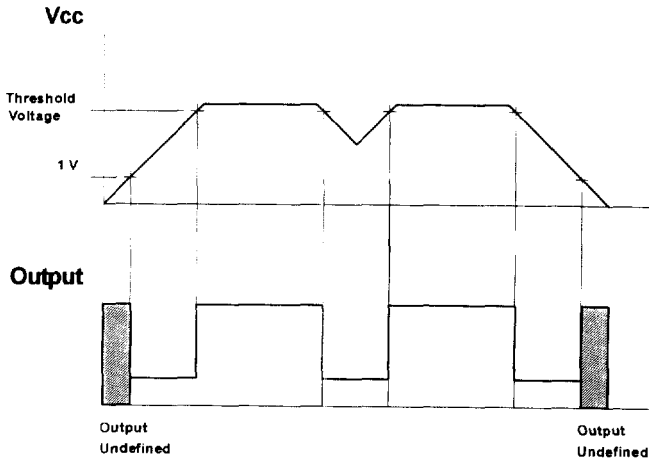

Clamp Diode Forward Current vs. Voltage

TYPICAL CHARACTERISTICS

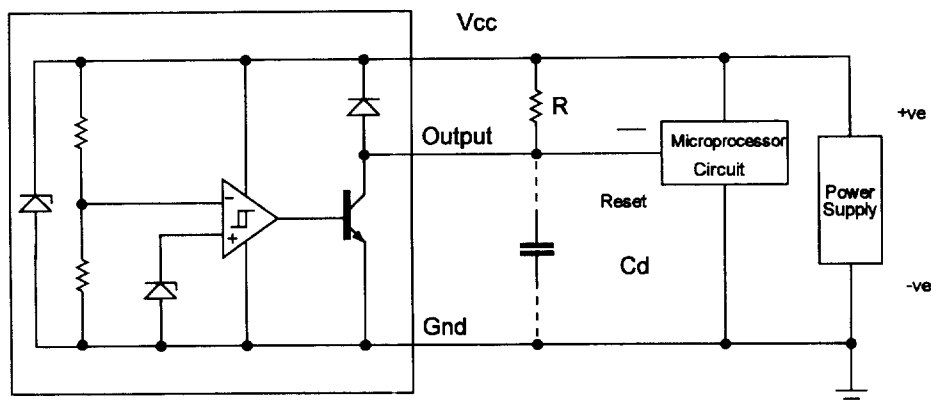Input Current vs. Input Voltage

Threshold Voltage vs. Temperature

TIMING DIAGRAM

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

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

5 Operation above V_z may be restricted by the supply current rating I_z

APPLICATION CIRCUITS
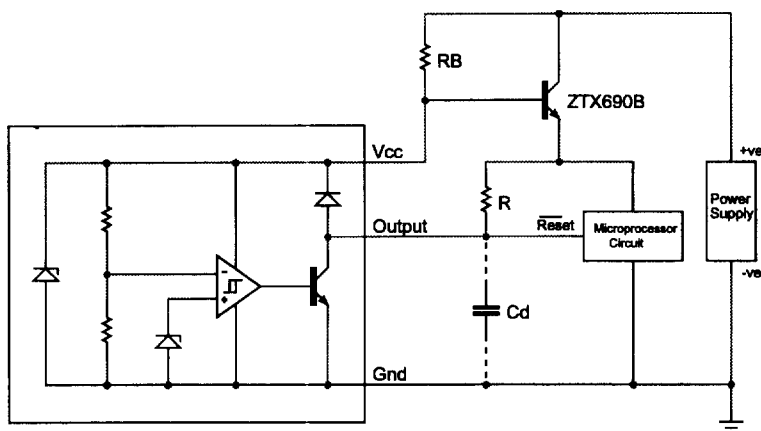

$$T_{DY} = RCd \ln\left(\cfrac{1}{1 - \cfrac{V_{TH(mpu)}}{V_{in}}}\right)$$

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

$$R_B = \cfrac{(V_{INMIN} - 6)}{(I_Q + \cfrac{I_L}{h_{FE}})}$$

V_{INMIN} = The minimum input voltage provided by the unregulated supply.

I_Q = The ZSM561 quiescent current (ie 200 μA)
I_L = Load current taken by the microprocessor system
h_{FE} = The minimum h_{FE} that can be expected from the pass transistor under worst case conditions. (ie Lowest temperature and minimum input voltage).For the ZTX690B a value of 250 could be used.