

F-73-53

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Edition 2.1



DATA SHEET

MB3773

POWER SUPPLY MONITOR WITH WATCH-DOG TIMER

POWER SUPPLY MONITOR WITH WATCH-DOG TIMER

The Fujitsu MB3773 is designed to monitor the voltage level of a power supply (+5 V or an arbitrary voltage) in a microprocessor circuit, memory board in a large-size computer, for example. The MB3773 also contains a watch-dog timer function to detect uncontrol. Table status of processor and reset system/processor.

If the circuit's power supply deviates more than a specified amount, then the MB3773 generates a reset signal to the microprocessor. Thus, the computer data is protected from accidental erasure.

When the MB3773 does not receive the clock pulse from the processor in the specified period, the MB3773 generates a reset signal to the microprocessor.

Using the MB3773 requires few external components. To monitor only a +5 volt supply, the MB3773 requires the connection of one external capacitor.

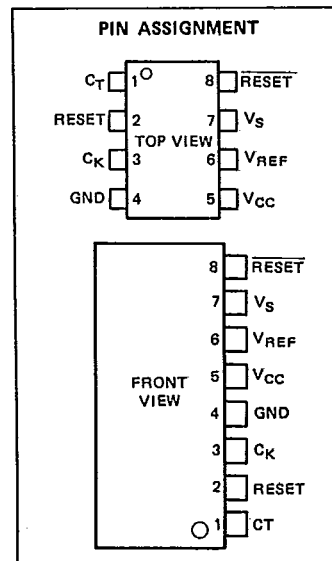
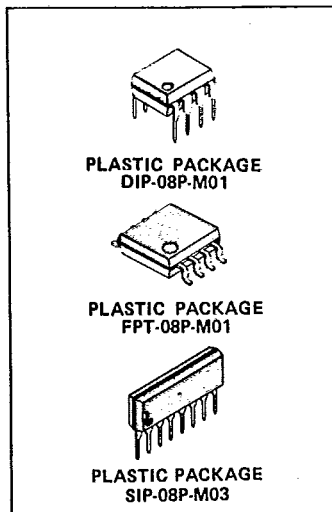
The MB3773 is available in an 8-pin Dual In-Line package space saving Flat Package, or a Single In-Line Package.

- Precision voltage detection ($V_S = 4.2\text{ V} \pm 2.5\%$)
- Threshold level with hysteresis
- Low voltage output for reset signal ($V_{CC} = 0.8\text{ V typ.}$)
- Precision reference voltage output ($V_{REF} = 1.245\text{ V} \pm 1.5\%$)
- External clock monitor and reset signal generator
- Negative-edge input watch-dog timer
- Minimal number of external components (one capacitor min.)
- Available in a variety of packages
 - 8-pin Dual In-Line Package
 - 8-pin Flat Package
 - 8-pin Single In-Line Package

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.3 to +18	V
Input Voltage	V_S	-0.3 to $V_{CC} + 0.3 (\leq +18)$	V
	V_{CK}	-0.3 to +18	V
RESET, RESET Supply Voltage	V_{OH}	-0.3 to $V_{CC} + 0.3 (\leq 18)$	V
Power Dissipation ($T_A \leq 85^\circ\text{C}$)	P_D	200	mW
Storage Temperature	T_{STG}	-55 to +125	$^\circ\text{C}$

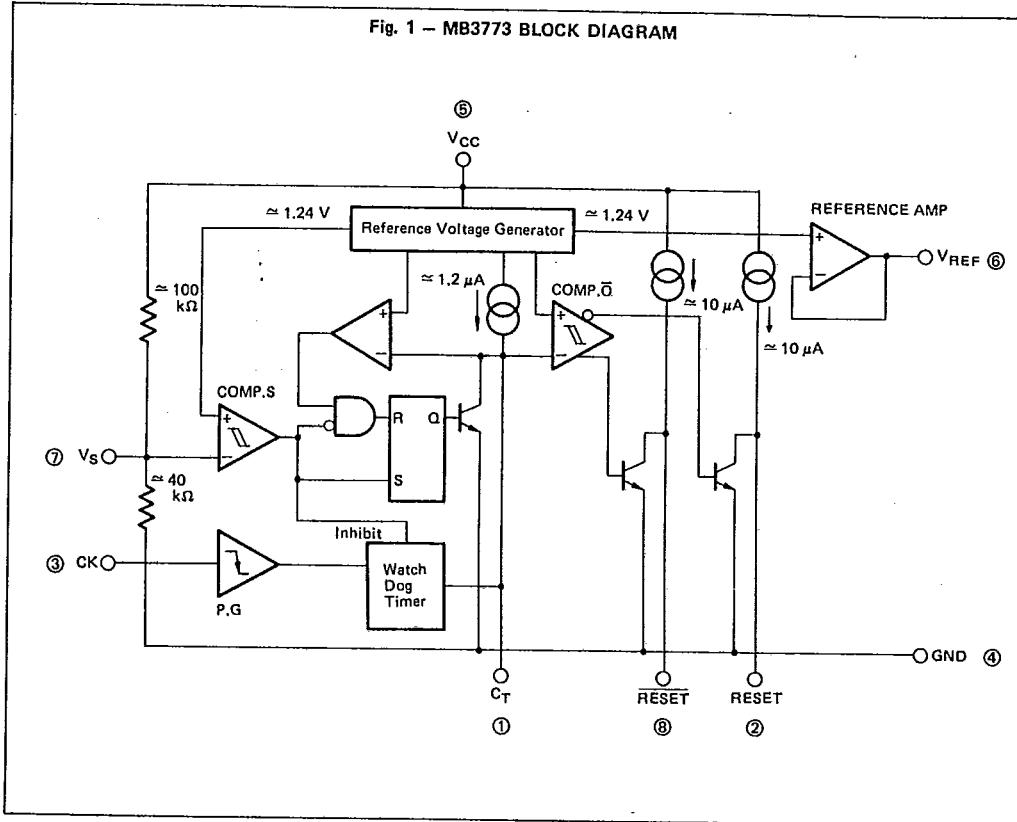
NOTE: Permanent device damage may occur if ABSOLUTE MAXIMUM RATINGS are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

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

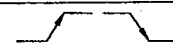


RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	+3.5 to +16	V
Reset, Reset Sink Current	I_{OL}	0 to 20	mA
V_{REF} Output Current	I_{OUT}	-200 to +5	mA
Watch Clock Setting Time	t_{WD}	0.1 to 1000	ms
Rising/Falling Time	t_{FC}, t_{FC}	<100	μs
Terminal Capacitance	C_T	0.001 to 10	μF
Operating Ambient Temperature	T_A	-40 to +85	$^{\circ}\text{C}$

ELECTORICAL CHARACTERISTICS

(1) DC CHARACTERISTICS

Parameter	Condition	Symbol	Value			Unit
			Min	Typ	Max	
Supply Current	Watch dog timer operating	I_{CC}		600	900	μA
Detection Voltage	V_{CC} 	V_{SL}	4.10	4.20	4.30	V
	$T_A = -40^\circ C$ to $+85^\circ C$		4.05	4.20	4.35	
	V_{CC} 	V_{SH}	4.20	4.30	4.40	
	$T_A = -40^\circ C$ to $+85^\circ C$		4.15	4.30	4.45	
Hysteresis Width	V_{CC} 	V_{HYS}	50	100	150	mV
Reference Voltage		V_{REF}	1.227	1.245	1.263	V
	$T_A = -40^\circ C$ to $+85^\circ C$		1.215	1.245	1.275	
Reference Voltage Change Rate	$V_{CC} = 3.5V$ to $16V$	ΔV_{REF1}		3	10	mV
Reference Voltage Output Loading Change Rate	$I_{OUT} = -200\mu A$ to $+5\mu A$	ΔV_{REF2}	-5		+5	mV
CK Threshold Voltage	$T_A = -40^\circ C$ to $+85^\circ C$	V_{TH}	0.8	1.25	2.0	V
CK Input Current	$V_{CK} = 5.0V$	I_{IH}		0	1.0	μA
	$V_{CK} = 0.0V$	I_{IL}	-1.0	-0.1		
C_T Open Current	Watch Dog Timer Operating $V_{CT} = 1.0V$	I_{CTD}	7	10	14	μA
High Level Output Voltage	V_S open, $I_{RESET} = -5\mu A$	V_{OH1}	4.5	4.9		V
	$V_S = 0V$, $I_{RESET} = -5\mu A$	V_{OH2}	4.5	4.9		
Output Saturation Voltage	$V_S = 0V$, $I_{RESET} = 3mA$	V_{OL1}		0.2	0.4	V
	$V_S = 0V$, $I_{RESET} = 10mA$	V_{OL2}		0.3	0.5	
	V_S open, $I_{RESET} = 3mA$	V_{OL3}		0.2	0.4	
	V_S open, $I_{RESET} = 10mA$	V_{OL4}		0.3	0.5	
Output Sink Current	$V_S = 0V$, $V_{RESET} = 1.0V$	I_{OL1}	20	60		mA
	V_S open, $V_{RESET} = 1.0V$	I_{OL2}	20	60		

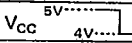
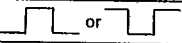


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(1) DC CHARACTERISTICS (Continued)

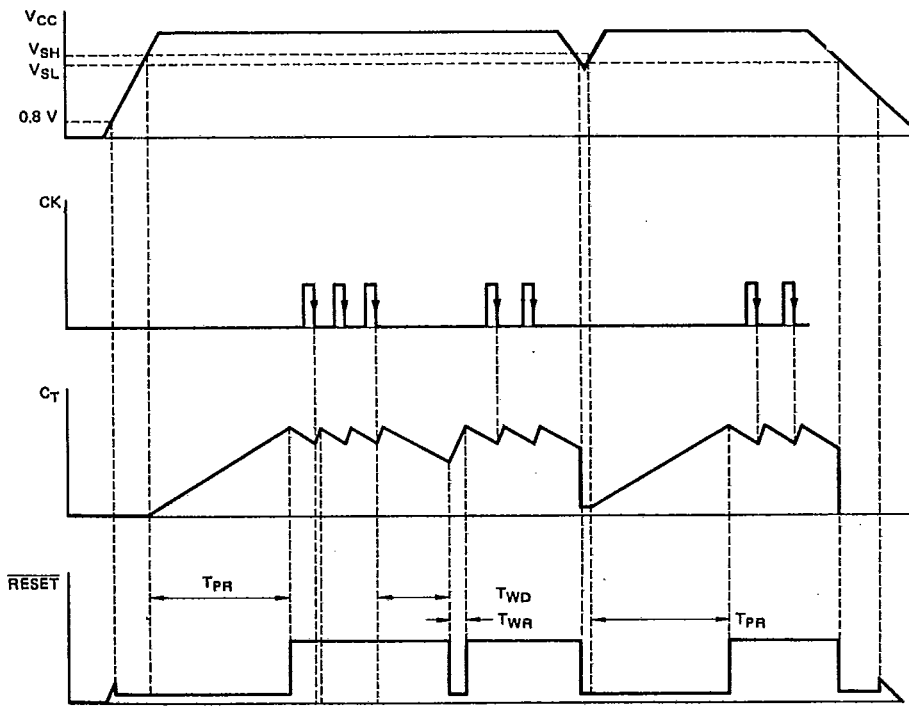
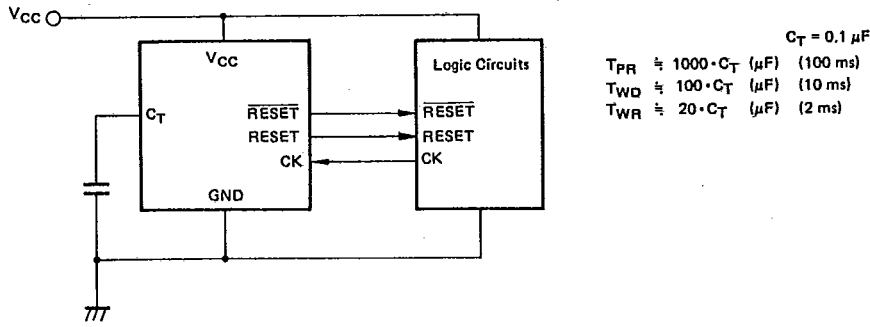
Parameter	Condition	Symbol	Value			Unit
			Min	Typ	Max	
C_T Charge Current	Power on reset operating $V_{CT} = 1.0V$	I_{CTU}	0.5	1.2	2.5	μA
Min. Supply Voltage for RESET	$V_{RESET} = 0.4V$ $I_{RESET} = 0.2mA$	V_{CCL1}		0.8	1.2	V
Min. Supply Voltage for RESET	$V_{RESET} = V_{CC} - 0.1V$ $R_L (2 \text{ pin} - GND) = 1M\Omega$	V_{CCL2}		0.8	1.2	V

(2) AC CHARACTERISTICS

Parameter	Condition	Symbol	Value			Unit
			Min	Typ	Max	
V_{CC} Input Pulse Width		T_{PI}	8.0			μs
CK Input Pulse Width	CK  or 	T_{CKW}	3.0			μs
CK Input Frequency		T_{CK}	20			μs
Watch Dog Timer Watching Time	$C_T = 0.1\mu F$	T_{WD}	5	10	15	ms
Watch Dog Timer Reset Time	$C_T = 0.1\mu F$	T_{WR}	1	2	3	ms
Rising Reset Hold Time	$C_T = 0.1\mu F, V_{CC}$ 	T_{PR}	50	100	150	ms
Output Propagation Delay Time from V_{CC}	$\overline{RESET}, R_L = 2.2k\Omega, C_L = 100pF$	T_{PD1}		2	10	μs
	$RESET, R_L = 2.2k\Omega, C_L = 100pF$	T_{PD2}		3	10	
Output Rising Time*	$R_L = 2.2k\Omega, C_L = 100pF$	t_R		1.0	1.5	μs
Output Falling Time*	$R_L = 2.2k\Omega, C_L = 100pF$	t_F		0.1	0.5	

* Output Rising/Falling time are measured at 10% to 90% of Voltage.

Fig. 2 - MB 3773 BASIC OPERATION



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TYPICAL CHARACTERISTICS CURVES

Fig. 3 - SUPPLY CURRENT vs. SUPPLY VOLTAGE

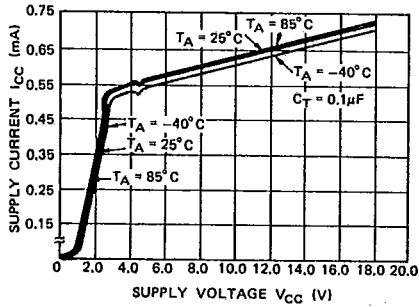


Fig. 4 - OUTPUT VOLTAGE vs. SUPPLY VOLTAGE

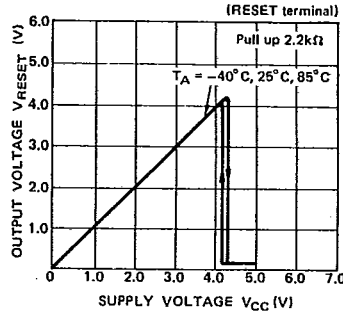


Fig. 5 - OUTPUT VOLTAGE vs. SUPPLY VOLTAGE

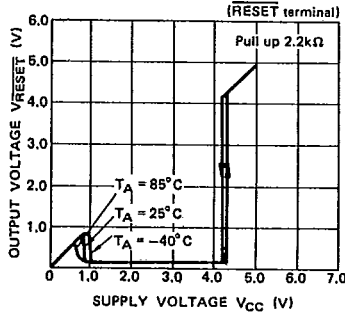


Fig. 6 - DETECTION VOLTAGE (V_{SH} , V_{SL}) vs. TEMPERATURE

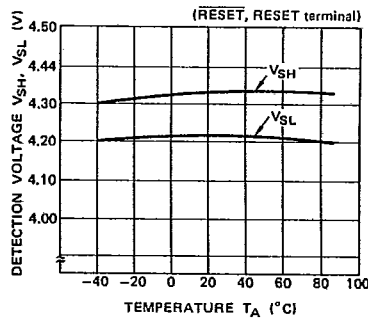


Fig. 7 - OUTPUT SATURATION VOLTAGE vs. OUTPUT SINK CURRENT

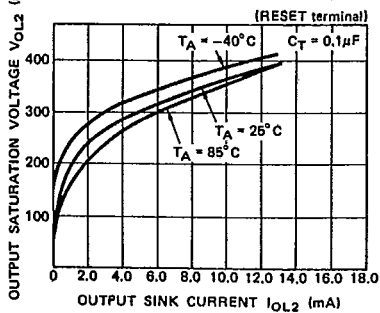
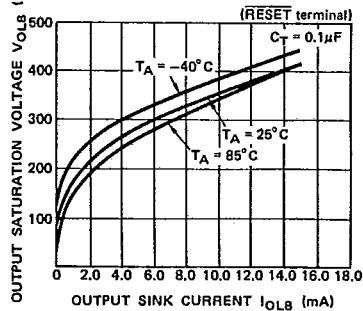
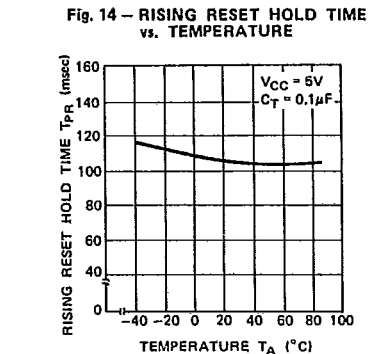
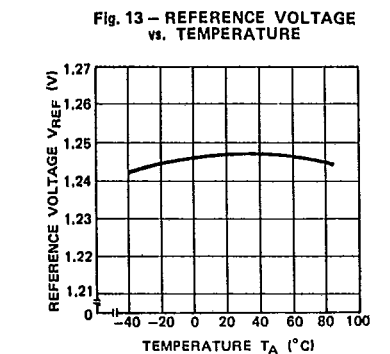
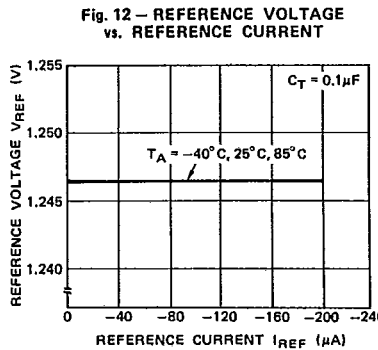
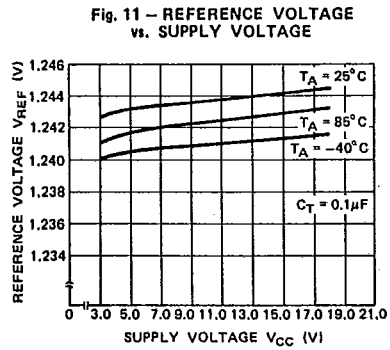
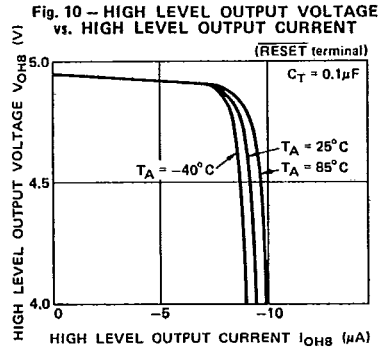
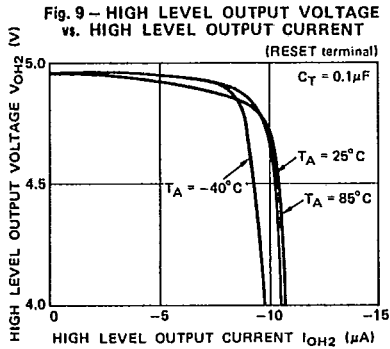


Fig. 8 - OUTPUT SATURATION VOLTAGE vs. OUTPUT SINK CURRENT



TYPICAL CHARACTERISTICS CURVES (continued)



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TYPICAL CHARACTERISTICS CURVES (continued)

Fig. 15 - RESET TIME vs. TEMPERATURE

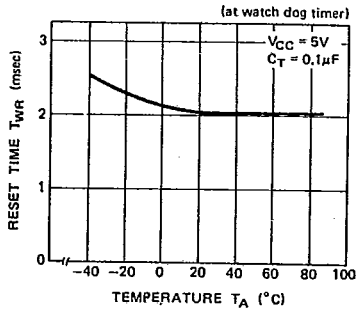


Fig. 16 - WATCH DOG TIMER WATCHING TIME vs. TEMPERATURE

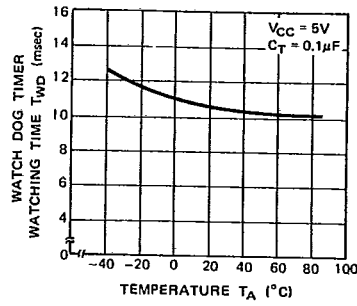


Fig. 17 - TERMINAL CAPACITANCE vs. RISING RESET HOLD TIME

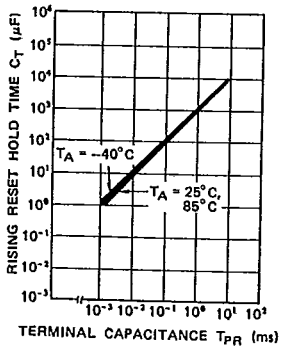


Fig. 18 - TERMINAL CAPACITANCE vs. RESET TIME

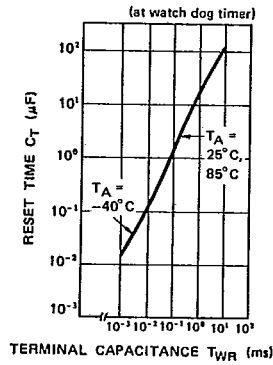
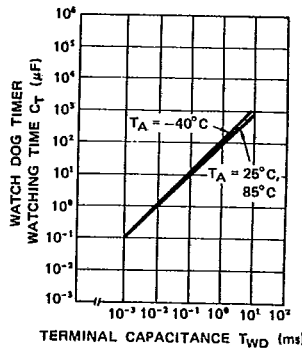


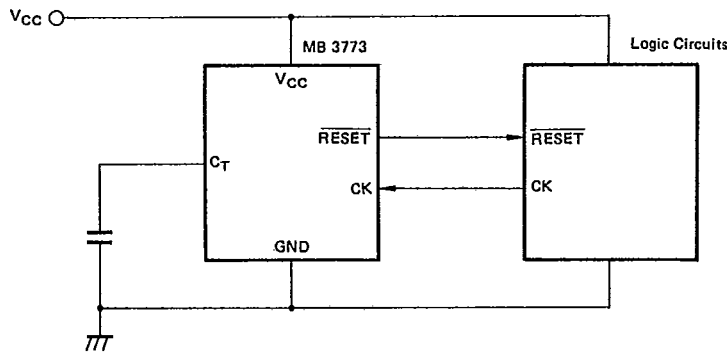
Fig. 19 - TERMINAL CAPACITANCE vs. WATCH DOG TIMER WATCHING TIME



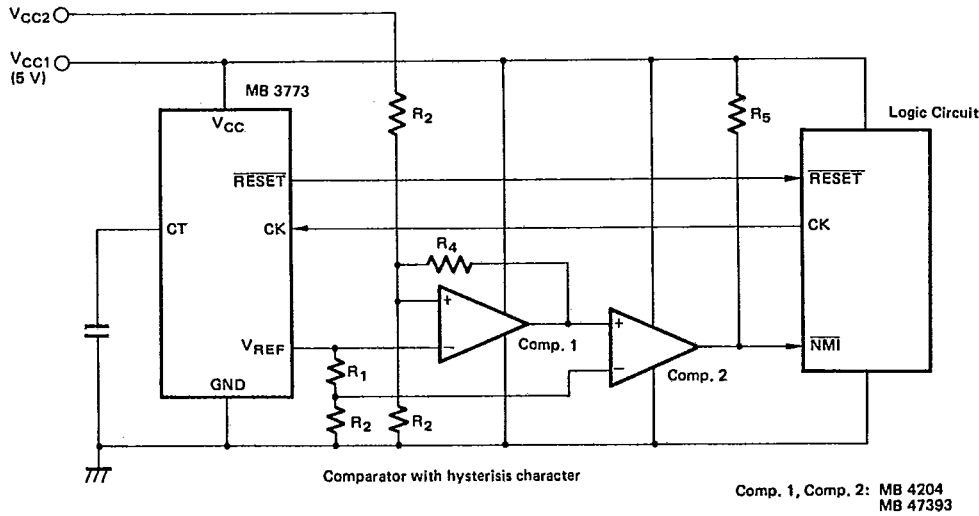
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Fig. 20 - MB3773 APPLICATION EXAMPLE

● Sagging Monitor and Watch-Dog Timer



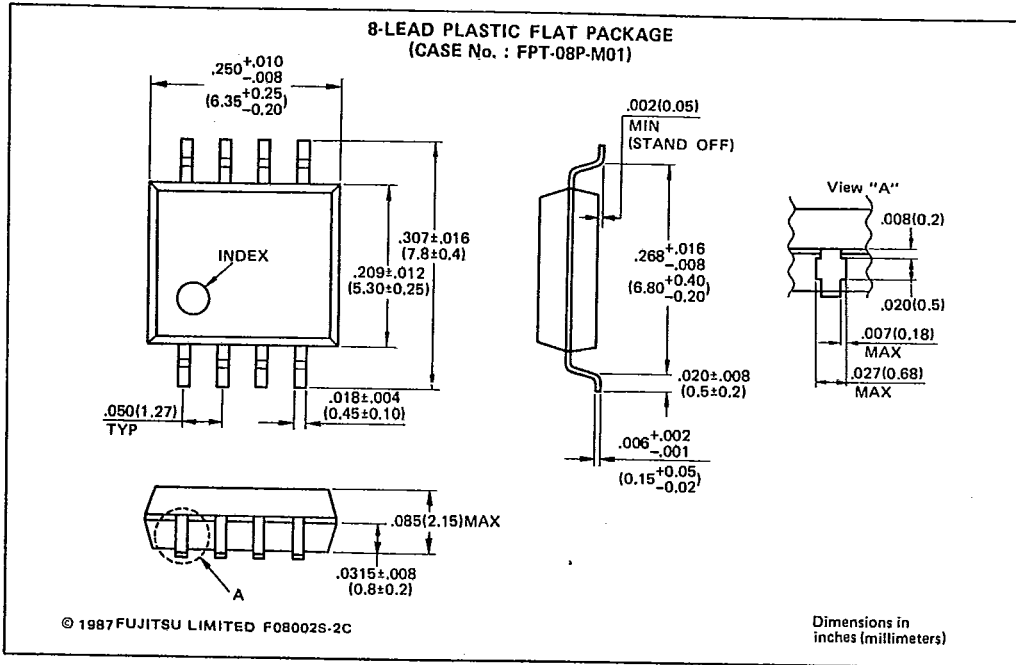
● Monitor for other power system



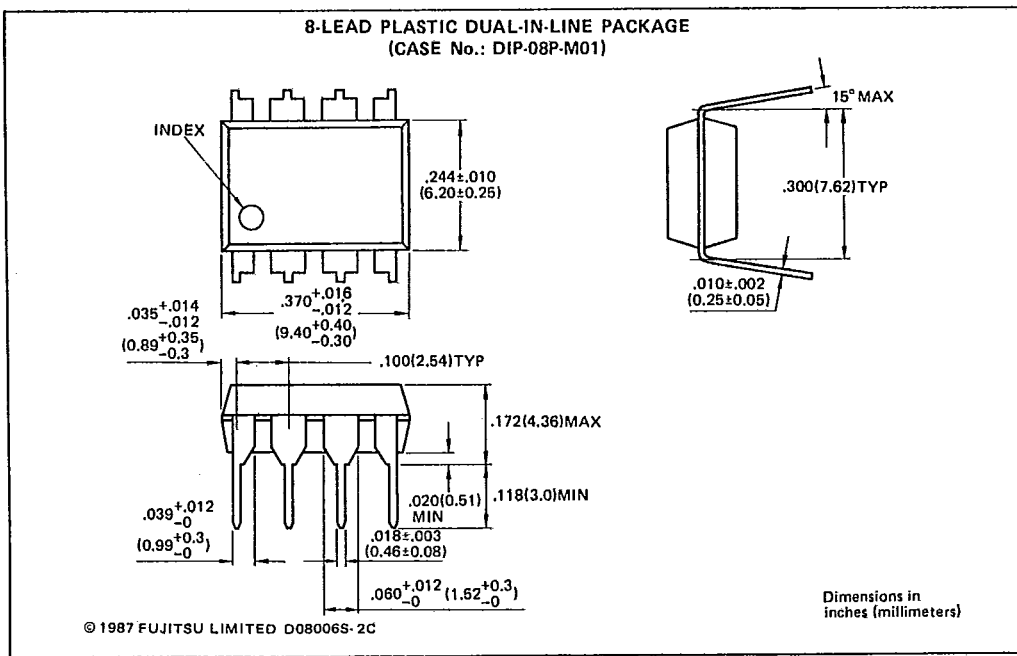
NOTE: When V_{CC2} is lower than the specified voltage, NMI low.
If over-voltage detection of V_{CC2} , Swap the inputs of comparator 2.

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PACKAGE DIMENSIONS

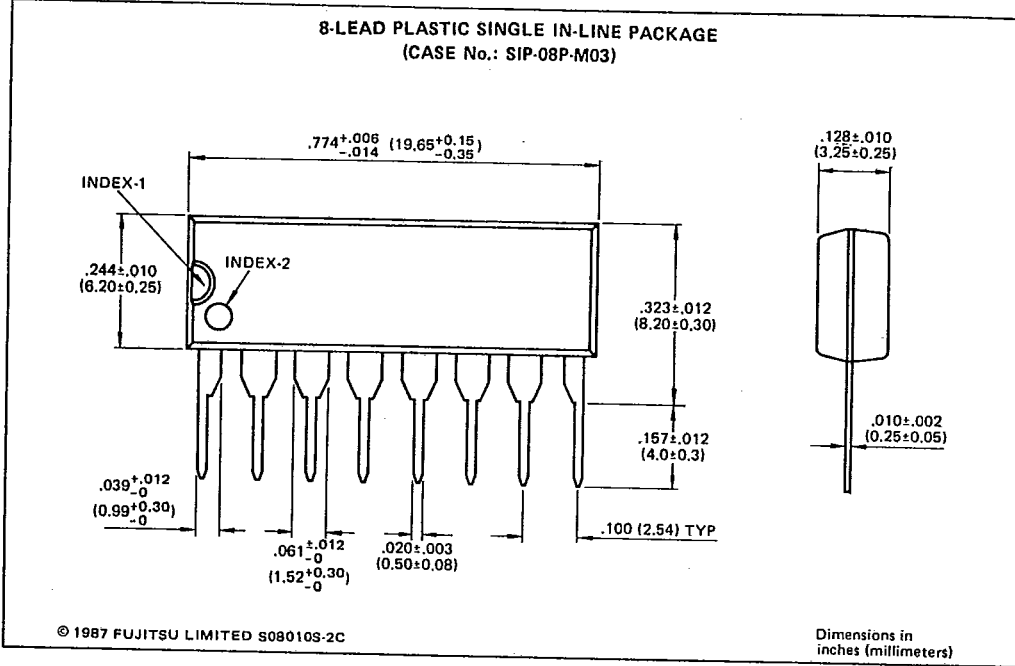


PACKAGE DIMENSIONS (continued)



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PACKAGE DIMENSIONS



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