



**THE DATASHEET OF  
MB3771PF-G-BND-JN-EF**



## Description

The Cypress MB3771 is designed to monitor the voltage level of one or two power supplies (+5 V and an arbitrary voltage) in a microprocessor circuit, memory board in large-size computer, for example.

If the circuit's power supply deviates more than a specified amount, then the MB3771 generates a reset signal to the microprocessor. Thus, the computer data is protected from accidental erasure.

Using the MB3771 requires few external components. To monitor only a +5 V supply, the MB3771 requires the connection of one external capacitor. The level of an arbitrary detection voltage is determined by two external resistors. The MB3771 is available in an 8-pin Dual In-Line, Single In-Line Package or space saving Flat Package.

## Features

- Precision voltage detection ( $V_{SA} = 4.2 \text{ V} \pm 2.5 \%$ )
- User selectable threshold level with hysteresis ( $V_{SB} = 1.23 \text{ V} \pm 1.5 \%$ )
- Monitors the voltage of one or two power supplies (5 V and an arbitrary voltage, >1.23 V)
- Usable as over voltage detector
- Low voltage output for reset signal ( $V_{CC} = 0.8 \text{ V Typ}$ )
- Minimal number of external components (one capacitor Min)
- Low power dissipation ( $I_{CC} = 0.35 \text{ mA Typ}$ ,  $V_{CC} = 5 \text{ V}$ )
- Detection threshold voltage has hysteresis function
- Reference voltage is connectable.
- One type of package (SOP-8pin : 1 type)

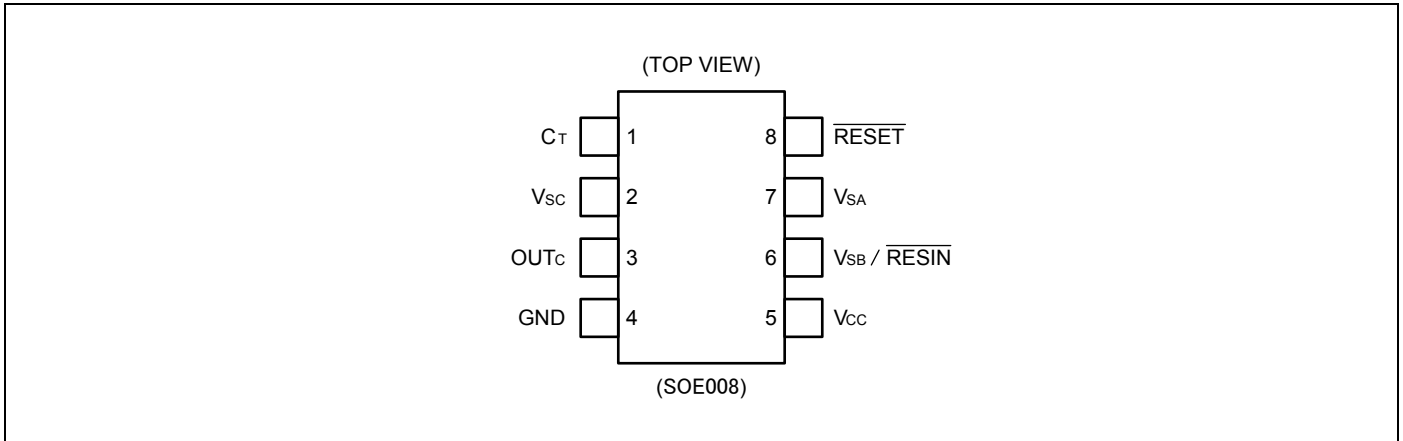
## Application

- Industrial Equipment
- Arcade Amusement etc.

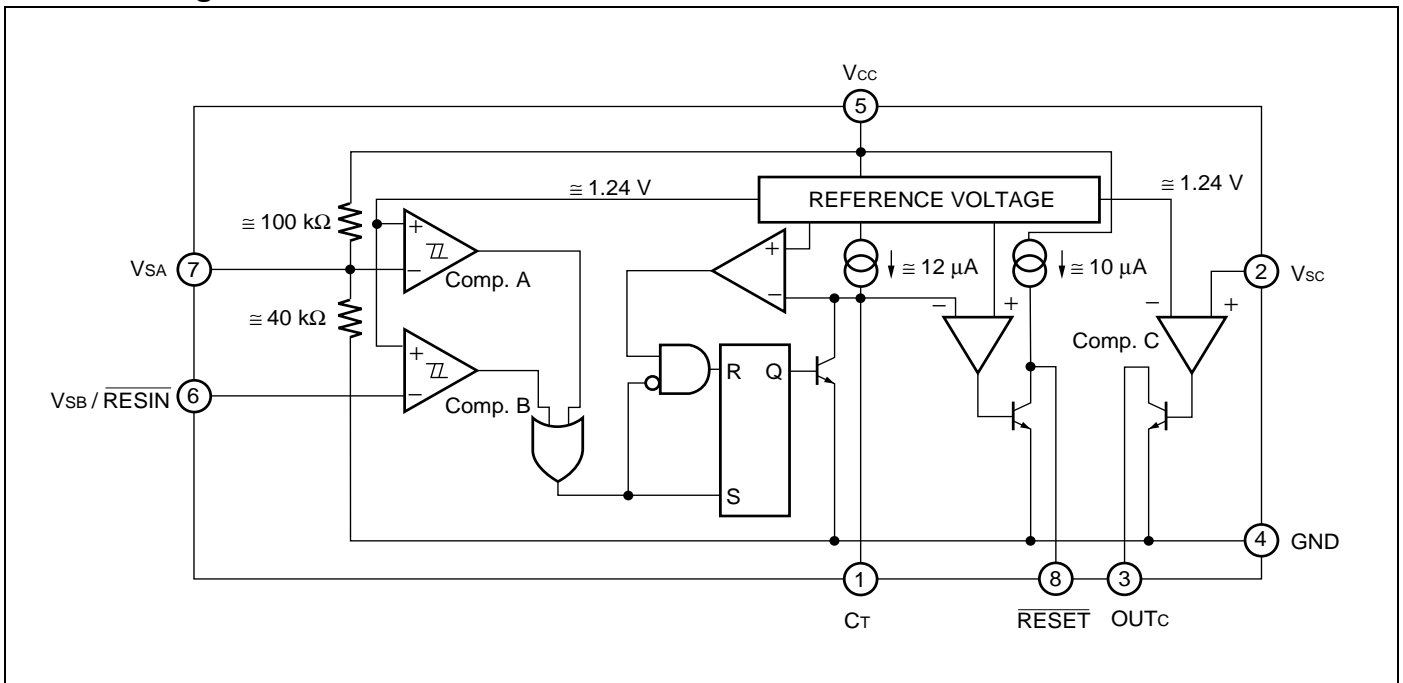
**Contents**

<b>Description</b> .....	<b>1</b>	(VCC = 5 V) .....	<b>11</b>
<b>Features</b> .....	<b>1</b>	8.7 5 V Power Supply Monitor with Non-inverted	
<b>Application</b> .....	<b>1</b>	RESET .....	<b>11</b>
<b>Contents</b> .....	<b>2</b>	8.8 Supply Voltage Monitoring with Delayed Trigger .....	<b>11</b>
<b>1. Pin Assignment</b> .....	<b>3</b>	8.9 Dual (Positive/Negative) Power Supply Voltage	
<b>2. Block Diagram</b> .....	<b>3</b>	Monitoring (VCC = 5 V, VEE = Negative Power Supply). 12	
<b>3. Functional Descriptions</b> .....	<b>4</b>	8.10 Reference Voltage Generation and Voltage Sagging	
<b>4. Function Explanation</b> .....	<b>4</b>	Detection .....	<b>12</b>
<b>5. Absolute Maximum Ratings</b> .....	<b>5</b>	8.11 Low Voltage and Over Voltage Detection	
<b>6. Recommended Operating Conditions</b> .....	<b>5</b>	(VCC = 5 V) .....	<b>14</b>
<b>7. Electrical Characteristics</b> .....	<b>6</b>	8.12 Detection of Abnormal State of Power Supply System	
7.1 DC Characteristics .....	<b>6</b>	(VCC = 5 V) .....	<b>14</b>
7.2 AC Characteristics .....	<b>7</b>	8.13 Back-up Power Supply System (VCC = 5 V) .....	<b>15</b>
<b>8. Application Circuit</b> .....	<b>8</b>	<b>9. Typical Characteristics</b> .....	<b>17</b>
8.1 5V Power Supply Monitor .....	<b>8</b>	<b>10. Notes on Use</b> .....	<b>19</b>
8.2 5V Power Supply Voltage Monitor		<b>11. Ordering Information</b> .....	<b>19</b>
(Externally Fine-Tuned Type) .....	<b>8</b>	<b>12. RoHS Compliance Information</b> .....	<b>19</b>
8.3 Arbitrary Voltage Supply Monitor .....	<b>9</b>	<b>13. Package Dimensions</b> .....	<b>20</b>
8.4 5 V and 12 V Power Supply Monitor (2 types of power		<b>Document History</b> .....	<b>21</b>
supply monitor VCC1 = 5 V, VCC2 = 12 V) .....	<b>10</b>	<b>Sales, Solutions, and Legal Information</b> .....	<b>22</b>
8.5 5 V and 12 V Power Supply Monitor (RESET signal is			
generated by 5 V, VCC1 = 5 V, VCC2 = 12 V) .....	<b>10</b>		
8.6 5 V Power Supply Monitor with forced RESET input			

### 1. Pin Assignment



### 2. Block Diagram



### 3. Functional Descriptions

Comparators Comp.A and Comp.B apply a hysteresis to the detected voltage, so that when the voltage at either the  $V_{SA}$  or  $V_{SB}$  pin falls below 1.23 V the RESET output signal goes to “low” level.

Comp. B may be used to detect any given voltage(8.Application Circuit 8.3 : Arbitrary Voltage Supply Monitor), and can also be used as a forced reset pin (with reset hold time) with TTL input (8.Application Circuit 8.6 : 5V Power Supply Monitor with forced RESET input ( $V_{CC} = 5 V$ )).

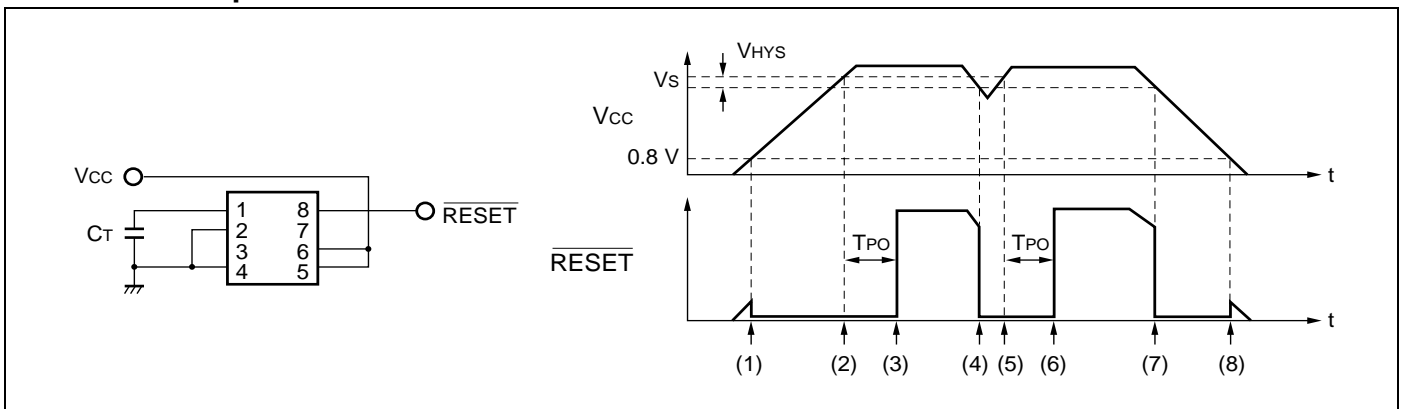
Note that if Comp.B is not used, the  $V_{SB}$  pin should be connected to the  $V_{CC}$  pin (8.Application Circuit 8.1 : 5V Power Supply Monitor). Instantaneous breaks or drops in the power supply can be detected as abnormal conditions by the MB3771 within a 2  $\mu s$  interval. However because momentary breaks or drops of this duration do not cause problems in actual systems in some cases, a delayed trigger function can be created by connecting capacitors to the  $V_{SA}$  or  $V_{SB}$  pin (8.Application Circuit 8.8 : Supply Voltage Monitoring with Delayed Trigger).

Because the  $\overline{RESET}$  output has built-in pull-up resistance, there is no need to connect to external pull-up resistance when connected to a high impedance load such as a CMOS logic IC.

Comparator Comp. C is an open-collector output comparator without hysteresis, in which the polarity of input/output characteristics is reversed. Thus Comp. C is useful for over-voltage detection (8.Application Circuit 8.11 : Low Voltage and Over Voltage Detection ( $V_{CC} = 5 V$ )) and positive logic RESET signal output (8.Application Circuit 8.7 : 5 V Power Supply Monitor with Non-inverted RESET), as well as for creating a reference voltage (8.Application Circuit 8.10 : Reference Voltage Generation and Voltage Sagging Detection).

Note that if Comp. C is not used, the  $V_{SC}$  pin should be connected to the GND pin (Application Circuit 1 : 5V Power Supply Monitor).

### 4. Function Explanation



1. When  $V_{CC}$  rises to about 0.8V,  $\overline{RESET}$  goes low.
2. When  $V_{CC}$  reaches  $V_S + V_{HYS}$ ,  $C_T$  then begins charging.  $\overline{RESET}$  remains low during this time
3.  $\overline{RESET}$  goes high when  $C_T$  begins charging.  
 $T_{PO} \approx C_T \times 10^5$  (Refer to “ $C_T$  pin capacitance vs. reset hold time” in “9. Typical Characteristics”.)
4. When  $V_{CC}$  level drops lower than  $V_S$ , then RESET goes low and  $C_T$  starts discharging.
5. When  $V_{CC}$  level reaches  $V_S + V_{HYS}$ , then  $C_T$  starts charging.  
 In the case of voltage sagging, if the period from the time  $V_{CC}$  goes lower than or equal to  $V_S$  to the time  $V_{CC}$  reaches  $V_S + V_{HYS}$  again, is longer than  $t_{PI}$ , (as specified in the 7.2.AC Characteristics),  $C_T$  is discharged and charged successively.
6. After  $T_{PO}$  passes, and  $V_{CC}$  level exceeds  $V_S + V_{HYS}$ , then  $\overline{RESET}$  goes high.
7. Same as Point 4.
8.  $\overline{RESET}$  remains low until  $V_{CC}$  drops below 0.8V.

## 5. Absolute Maximum Ratings

Parameter	Symbol	Rating		Unit
		Min	Max	
Power supply voltage	$V_{CC}$	-0.3	+20	V
Input voltage	$V_{SA}$	-0.3	$V_{CC} + 0.3 (< +20)$	V
	$V_{SB}$	-0.3	+20	V
	$V_{SC}$	-0.3	+20	V
Power dissipation	$P_D$	-	200 ( $T_a \leq 85^\circ\text{C}$ )	mW
Storage temperature	$T_{stg}$	-55	+125	$^\circ\text{C}$

**WARNING:** Semiconductor devices can be permanently damaged by application of stress (voltage, current, temperature, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

## 6. Recommended Operating Conditions

Parameter	Symbol	Value		Unit
		Min	Max	
Power supply voltage	$V_{CC}$	3.5	18	V
Output current	$I_{\overline{\text{RESET}}}$	0	20	mA
	$I_{\text{OUTC}}$	0	6	mA
Operating ambient temperature	$T_a$	-40	+85	$^\circ\text{C}$

**WARNING:** The recommended operating conditions are required in order to ensure the normal operation of the semiconductor device. All of the device's electrical characteristics are warranted when the device is operated within these ranges.




Always use semiconductor devices within their recommended operating condition ranges. Operation outside these ranges may adversely affect reliability and could result in device failure.

No warranty is made with respect to uses, operating conditions, or combinations not represented on the data sheet. Users considering application outside the listed conditions are advised to contact their Cypress representatives beforehand.

## 7. Electrical Characteristics

### 7.1 DC Characteristics

 (V<sub>CC</sub> = 5 V, Ta = + 25°C)

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Power supply current	I <sub>CC1</sub>	V <sub>SB</sub> = 5 V, V <sub>SC</sub> = 0 V	–	350	500	μA
	I <sub>CC2</sub>	V <sub>SB</sub> = 0 V, V <sub>SC</sub> = 0 V	–	400	600	μA
Detection voltage	V <sub>SAL</sub> (DOWN)	V <sub>CC</sub> 	4.10	4.20	4.30	V
		Ta = –40°C to +85°C	4.05	4.20	4.35	V
	V <sub>SAH</sub> (UP)	V <sub>CC</sub> 	4.20	4.30	4.40	V
		Ta = –40°C to +85°C	4.15	4.30	4.45	V
Hysteresis width	V <sub>HYSA</sub>	–	50	100	150	mV
Detection voltage	V <sub>SB</sub>	V <sub>SB</sub> 	1.212	1.230	1.248	V
		Ta = –40°C to +85°C	1.200	1.230	1.260	V
Deviation of detection voltage	ΔV <sub>SB</sub>	V <sub>CC</sub> = 3.5 V to 18 V	–	3	10	mV
Hysteresis width	V <sub>HYSB</sub>	–	14	28	42	mV
Input current	I <sub>IHB</sub>	V <sub>SB</sub> = 5 V	–	0	250	nA
	I <sub>ILB</sub>	V <sub>SB</sub> = 0 V	–	20	250	nA
Output voltage	V <sub>OHR</sub>	I <sub>RESET</sub> = –5 μA, V <sub>SB</sub> = 5 V	4.5	4.9	–	V
	V <sub>OLR</sub>	I <sub>RESET</sub> = 3mA, V <sub>SB</sub> = 0 V	–	0.28	0.4	V
		I <sub>RESET</sub> = 10mA, V <sub>SB</sub> = 0 V	–	0.38	0.5	V
Output sink current	I <sub>RESET</sub>	V <sub>OLR</sub> = 1.0 V, V <sub>SB</sub> = 0 V	20	40	–	mA
CT charge current	I <sub>CT</sub>	V <sub>SB</sub> = 5 V, V <sub>CT</sub> = 0.5 V	9	12	16	μA
Input current	I <sub>IHC</sub>	V <sub>SC</sub> = 5 V	–	0	500	nA
	I <sub>ILC</sub>	V <sub>SC</sub> = 0 V	–	50	500	nA
Detection voltage	V <sub>SC</sub>	–	1.225	1.245	1.265	V
		Ta = –40°C to +85°C	1.205	1.245	1.285	V
Deviation of detection voltage	ΔV <sub>SC</sub>	V <sub>CC</sub> = 3.5 V to 18 V	–	3	10	mV
Output leakage current	I <sub>OHC</sub>	V <sub>OHC</sub> = 18 V	–	0	1	μA
Output voltage	V <sub>OLC</sub>	I <sub>OUTC</sub> = 4 mA, V <sub>SC</sub> = 5 V	–	0.15	0.4	V
Output sink current	I <sub>OUTC</sub>	V <sub>OLC</sub> = 1.0 V, V <sub>SC</sub> = 5 V	6	15	–	mA
Reset operation minimum supply voltage	V <sub>CCL</sub>	V <sub>OLR</sub> = 0.4 V, I <sub>RESET</sub> = 200 μA	–	0.8	1.2	V

**7.2 AC Characteristics**
 $(V_{CC} = 5\text{ V}, T_a = +25^\circ\text{C}, C_T = 0.01\ \mu\text{F})$ 

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
$V_{SA}, V_{SB}$ input pulse width	$t_{PI}$	–	5.0	–	–	$\mu\text{s}$
Reset hold time	$t_{PO}$	–	0.5	1.0	1.5	ms
RESET rise time	$t_r$	$R_L = 2.2\ \text{k}\Omega,$ $C_L = 100\ \text{pF}$	–	1.0	1.5	$\mu\text{s}$
RESET fall time	$t_f$		–	0.1	0.5	$\mu\text{s}$
Propagation delay time	$t_{PD}^{*1}$	–	–	2	10	$\mu\text{s}$
	$t_{PHL}^{*2}$	$R_L = 2.2\ \text{k}\Omega,$ $C_L = 100\ \text{pF}$	–	0.5	–	$\mu\text{s}$
	$t_{PLH}^{*2}$		–	1.0	–	$\mu\text{s}$

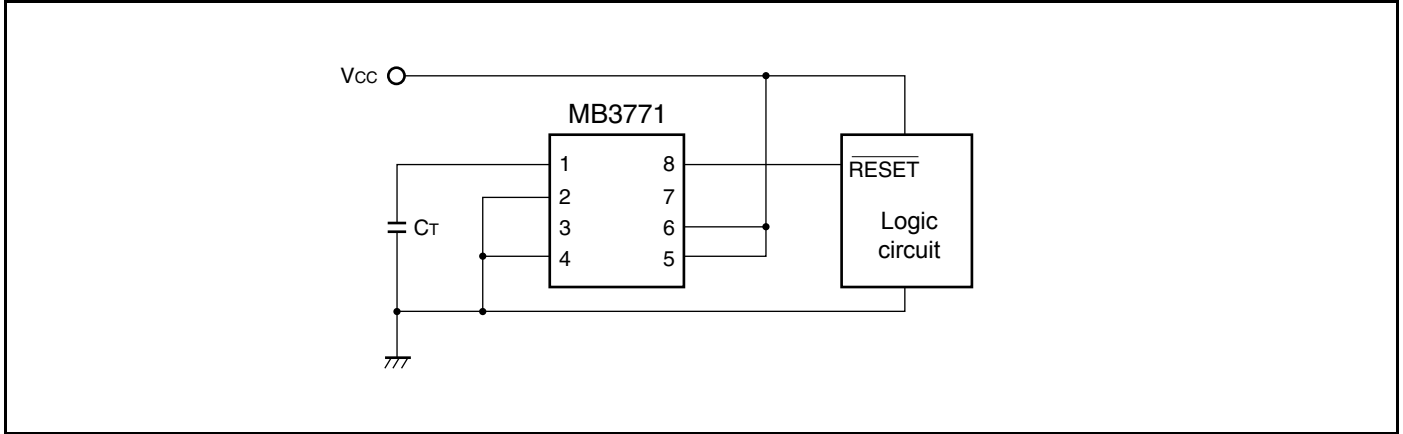
\*1: In case of  $V_{SB}$  termination.

\*2: In case of  $V_{SC}$  termination.

## 8. Application Circuit

### 8.1 5V Power Supply Monitor

Monitored by  $V_{SA}$ . Detection threshold voltage is  $V_{SAL}$  and  $V_{SAH}$



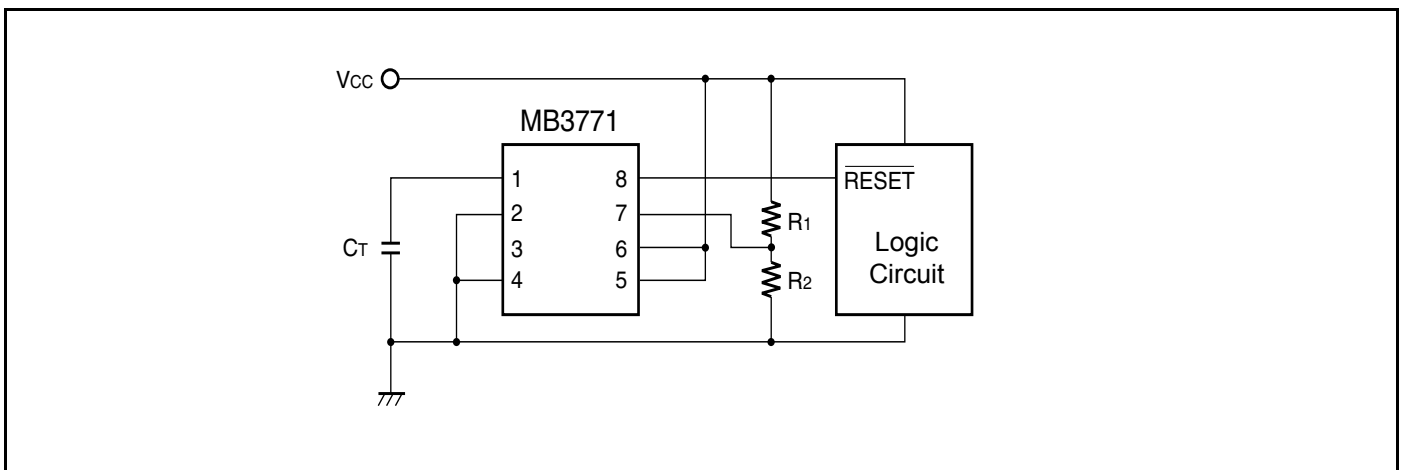
### 8.2 5V Power Supply Voltage Monitor (Externally Fine-Tuned Type)

The  $V_{SA}$  detection voltage can be adjusted externally.

Resistance  $R_1$  and  $R_2$  are set sufficiently lower than the IC internal partial voltage resistance, so that the detection voltage can be set using the ratio between resistance  $R_1$  and  $R_2$ . (Refer to the table below).

- $R_1, R_2$  calculation formula (when  $R_1 \ll 100\text{ k}\Omega, R_2 \ll 40\text{ k}\Omega$ )  
 $V_{SAL} \approx (R_1 + R_2) \times V_{SB} / R_2$  [V],  $V_{SAH} \approx (R_1 + R_2) \times (V_{SB} + V_{HYSB}) / R_2$  [V]

$R_1$ (k $\Omega$ )	$R_2$ (k $\Omega$ )	Detection voltage : $V_{SAL}$ (V)	Detection voltage : $V_{SAH}$ (V)
10	3.9	4.37	4.47
9.1	3.9	4.11	4.20

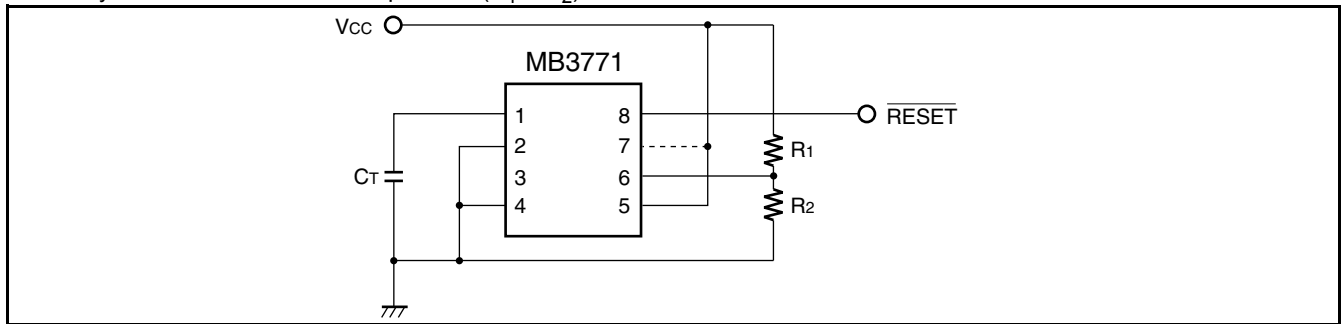


### 8.3 Arbitrary Voltage Supply Monitor

#### 8.3.1 Case: $V_{CC} \leq 18 V$

- Detection Voltage can be set by  $R_1$  and  $R_2$ .  
Detection Voltage =  $(R_1 + R_2) \cdot V_{SB}/R_2$
- Connect Pin 7 to  $V_{CC}$  when  $V_{CC}$  less than 4.45 V.
- Pin 7 can be opened when  $V_{CC}$  greater than 4.45 V  
Power Dissipation can be reduced.

**Note:** Hysteresis of 28 mV at  $V_{SB}$  at termination is available.  
Hysteresis width dose not depend on  $(R_1 + R_2)$ .....

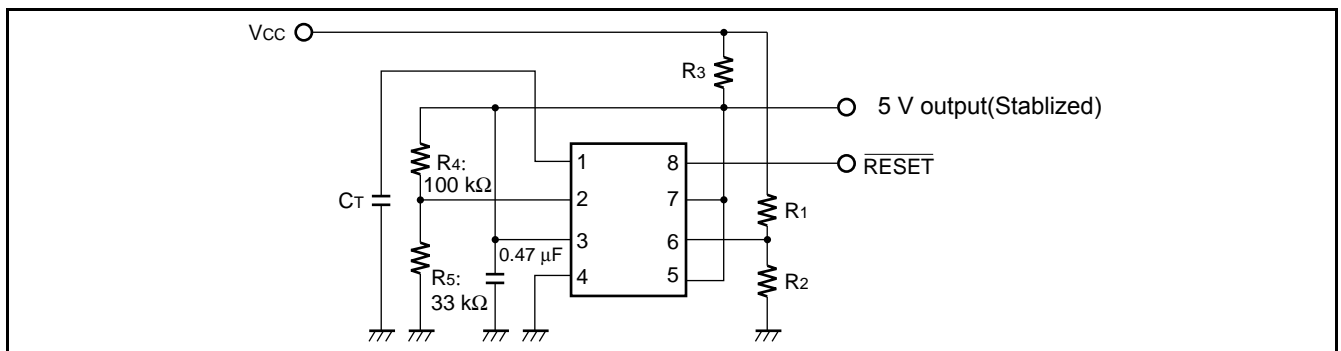


#### 8.3.2 Monitoring $V_{CC} > 18 V$

- Detection Voltage can be set by  $R_1$  and  $R_2$   
Detection Voltage =  $(R_1 + R_2) \times V_{SB}/R_2$
- The  $\overline{\text{RESET}}$  signal output is  $\approx 0V$  (low level) and  $\approx 5 V$  (high level).  $V_{CC}$  voltage cannot be output.  
Do not pull up  $\overline{\text{RESET}}$  to  $V_{CC}$ .
- Changing the resistance ratio between  $R_4$  and  $R_5$  changes the constant voltage output, thereby changing the voltage of the high level  $\overline{\text{RESET}}$  output. Note that the constant voltage output should not exceed 18 V.
- The 5 V output can be used as a power supply for control circuits with low current consumption.
- In setting the  $R_3$  resistance level, caution should be given to the power consumption in the resistor. The table below lists sample resistance values for reference (using  $1/4 \Omega$  resistance).

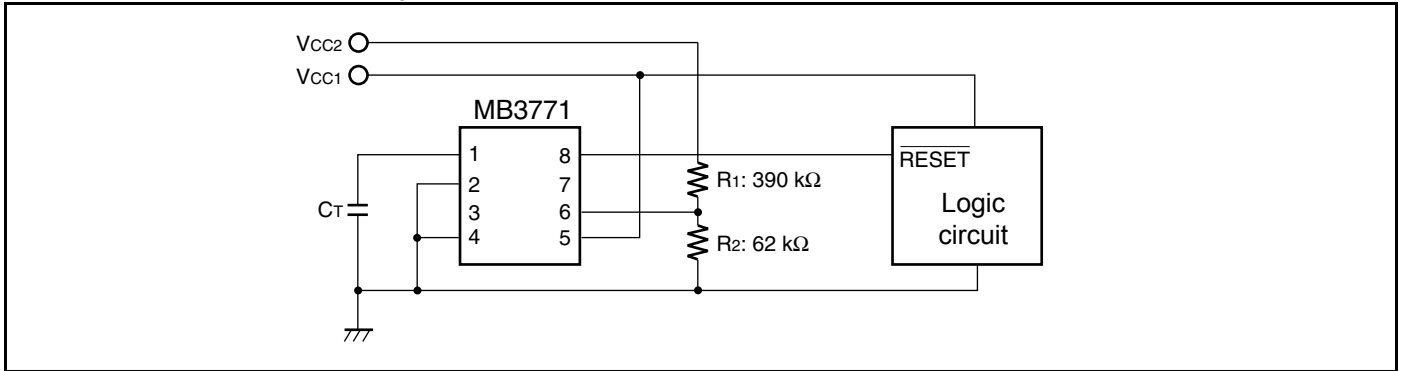
$V_{CC}$ (V)	Detection voltage (V)	RESET Output min. power supply voltage (V)	$R_1$ (M $\Omega$ )	$R_2$ (k $\Omega$ )	$R_3$ (k $\Omega$ )	Output Current (mA)
140	100	6.7	1.6	20	110	< 0.2
100	81	3.8	1.3	20	56	< 0.5
40	33	1.4	0.51	20	11	< 1.6

- Values are actual measured values (using  $I_{OUTC} = 100 \mu A$ ,  $V_{OLC} = 0.4 V$ ). Lowering the resistance value of  $R_3$  reduces the minimum supply voltage of the  $\overline{\text{RESET}}$  output, but requires resistance with higher allowable loss.



**8.4 5 V and 12 V Power Supply Monitor (2 types of power supply monitor  $V_{CC1} = 5\text{ V}$ ,  $V_{CC2} = 12\text{ V}$ )**

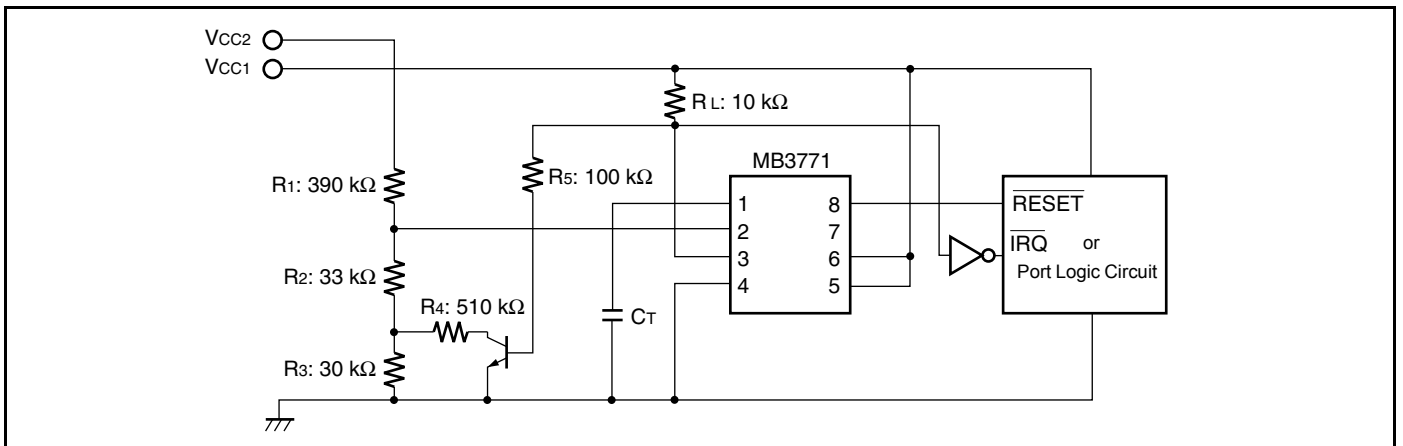
- 5 V is monitored by  $V_{SA}$ . Detection voltage is about 4.2 V
- 12 V is monitored by  $V_{SB}$ . When  $R_1 = 390\text{ k}\Omega$  and  $R_2 = 62\text{ k}\Omega$ , Detection voltage is about 9.0 V. Generally the detection voltage is determined by the following equation.  
 Detection Voltage =  $(R_1 + R_2) \times V_{SB}/R_2$


**8.5 5 V and 12 V Power Supply Monitor ( $\overline{\text{RESET}}$  signal is generated by 5 V,  $V_{CC1} = 5\text{ V}$ ,  $V_{CC2} = 12\text{ V}$ )**

- 5 V is monitored by  $V_{SA}$ , and generates  $\overline{\text{RESET}}$  signal when  $V_{SA}$  detects voltage sagging.
- 12 V is monitored by  $V_{SC}$ , and generates its detection signal at  $\text{OUT}_C$ .
- The detection voltage of 12 V monitoring and its hysteresis is determined by the following equations.

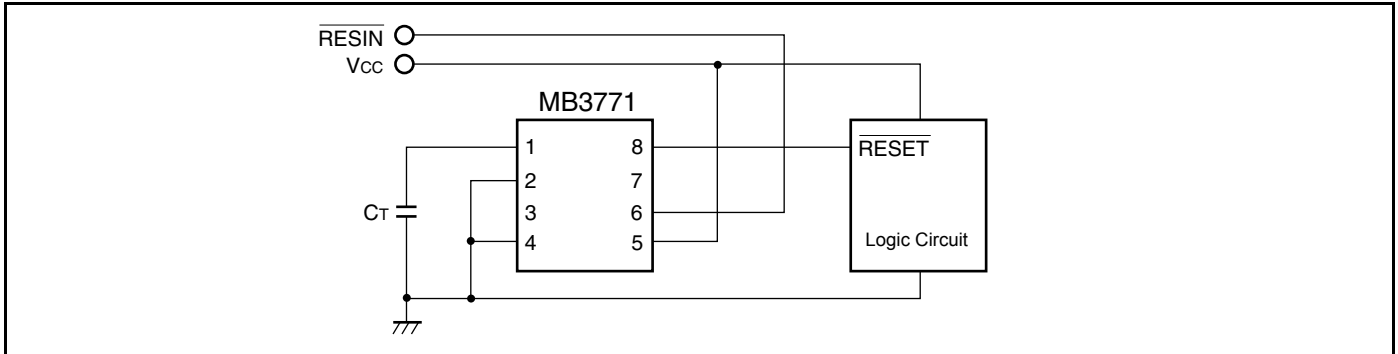
$$\text{Detection voltage} = \frac{R_1 + R_2 + R_3}{R_2 + R_3} \times V_{SC} \quad (8.95\text{ V in the circuit above})$$

$$\text{Hysteresis width} = \frac{R_1 (R_3 - R_3 // R_4)}{(R_2 + R_3) (R_2 + R_3 // R_4)} \times V_{SC} \quad (200\text{ mV in the circuit above})$$



### 8.6 5 V Power Supply Monitor with forced $\overline{\text{RESET}}$ input ( $V_{\text{CC}} = 5 \text{ V}$ )

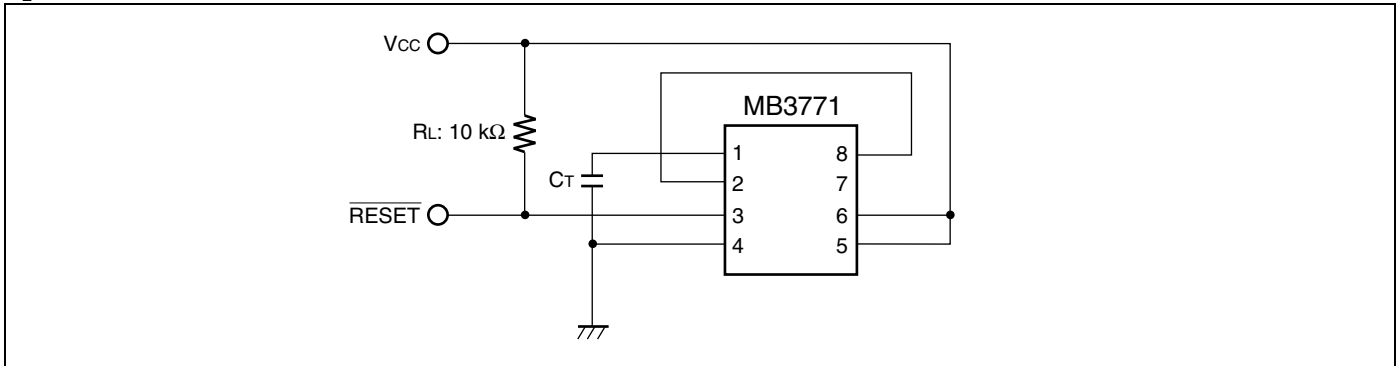
$\overline{\text{RESIN}}$  is an TTL compatible input.



### 8.7 5 V Power Supply Monitor with Non-inverted $\overline{\text{RESET}}$

In this case, Comparator C is used to invert  $\overline{\text{RESET}}$  signal. OUTC is an open-collector output.

$R_L$  is used as a pull-up resistor.

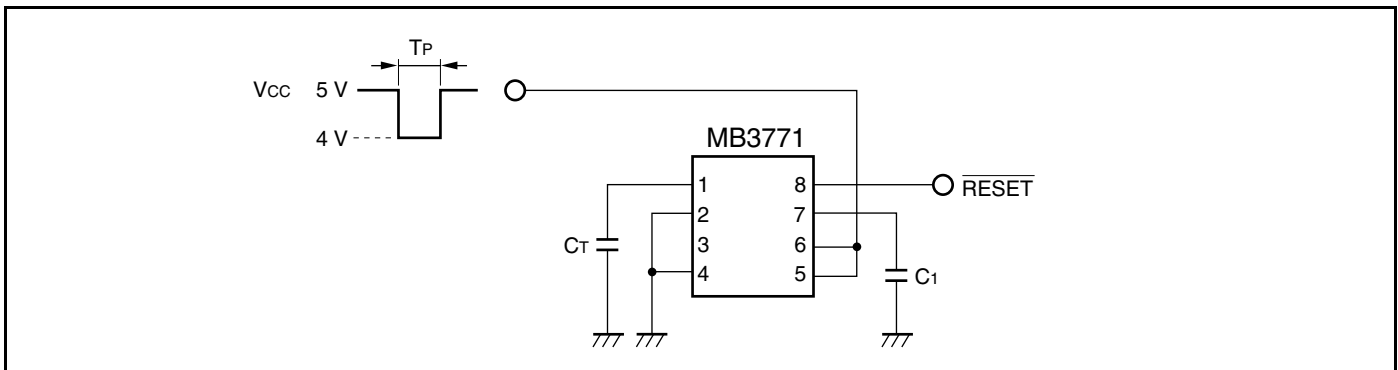


### 8.8 Supply Voltage Monitoring with Delayed Trigger

When the voltage shown in the diagram below is applied at  $V_{\text{CC}}$ , the minimum value of the input pulse width is increased to  $40 \mu\text{s}$  (when  $C_1 = 1000 \text{ pF}$ ).

The formula for calculating the minimum value of the input pulse width [ $T_{\text{PI}}$ ] is:

$$T_{\text{PI}} [\mu\text{s}] \approx 4 \times 10^{-2} \times C_1 [\text{pF}]$$



### 8.9 Dual (Positive/Negative) Power Supply Voltage Monitoring ( $V_{CC} = 5\text{ V}$ , $V_{EE} = \text{Negative Power Supply}$ )

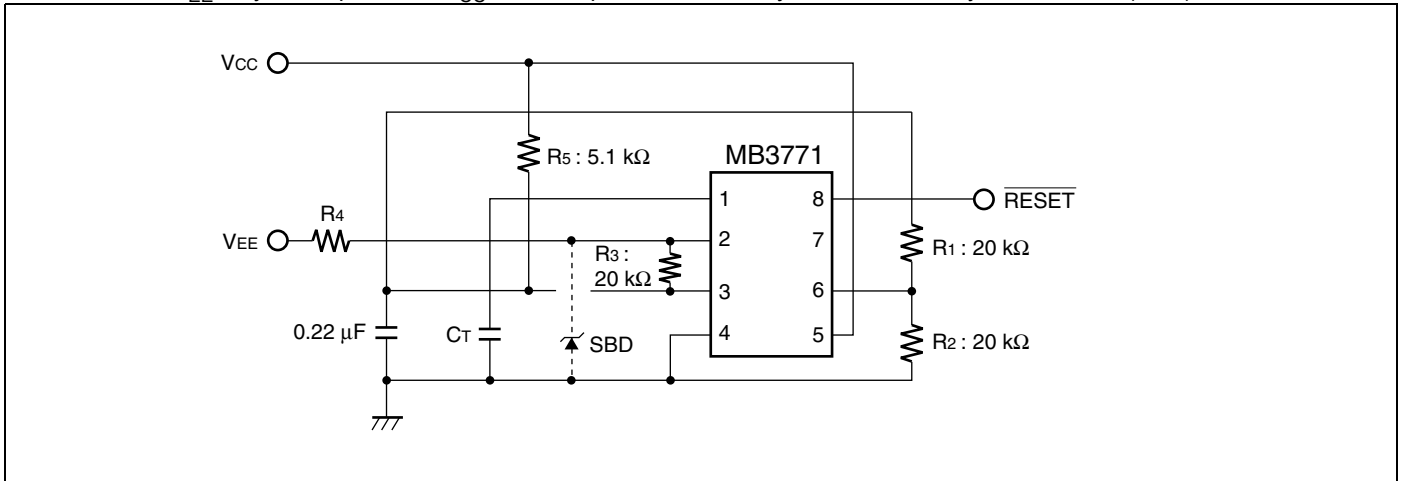
Monitors a 5 V and a negative (any given level) power supply.  $R_1$ ,  $R_2$ , and  $R_3$  should be the same value.

$$\text{Detection Voltage} = V_{SB} - V_{SB} \times R_4/R_3$$

Example if  $V_{EE} = -5\text{ V}$ ,  $R_4 = 91\text{ k}\Omega$

Then the detected voltage =  $-4.37\text{ V}$

In cases where  $V_{EE}$  may be output when  $V_{CC}$  is not output, it is necessary to use a Schottky barrier diode (SBD).



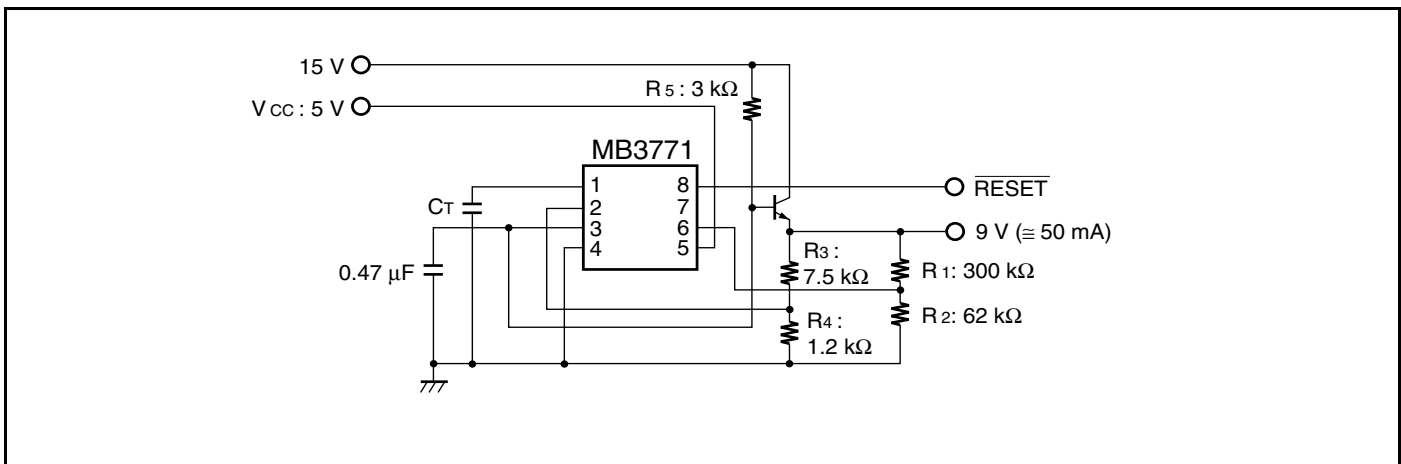
### 8.10 Reference Voltage Generation and Voltage Sagging Detection

#### 8.10.1 9V Reference Voltage Generation and 5V/9V Monitoring

Detection Voltage = 7.2 V

In the above examples, the output voltage and the detection voltage are determined by the following equations:

$$\text{Detection Voltage} = (R_1 + R_2) \times V_{SB}/R_2$$

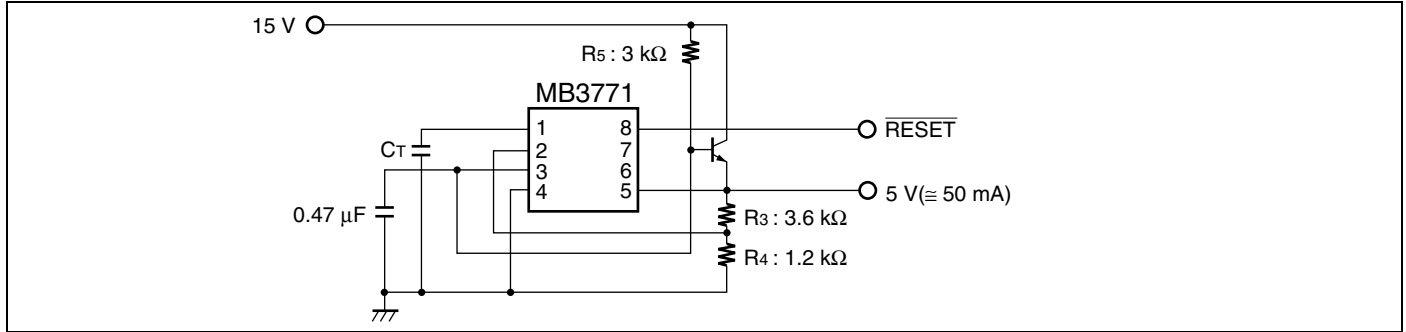


**8.10.2 5 V Reference Voltage Generation and 5V Monitoring (No.1)**

Detection Voltage = 4.2 V

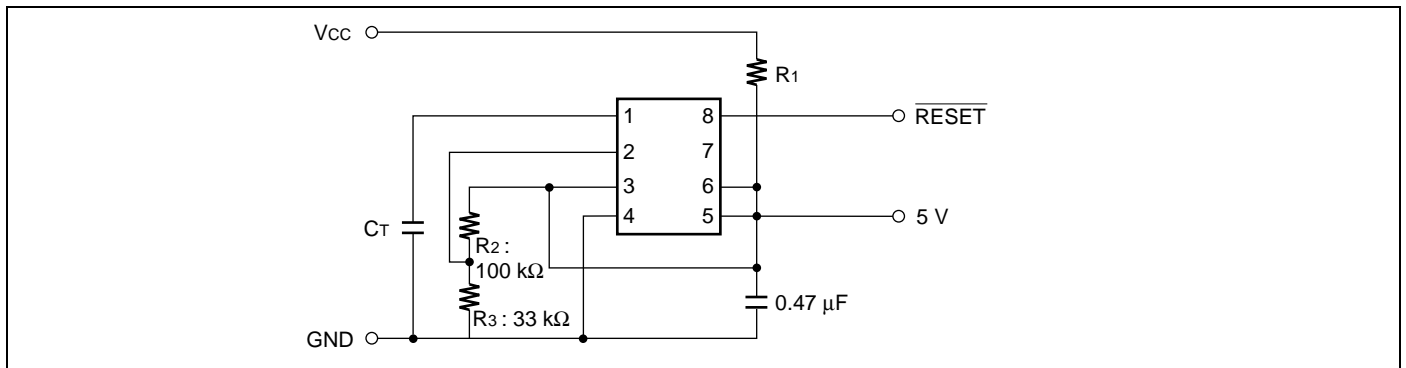
In the above examples, the output voltage and the detection voltage are determined by the following equations:

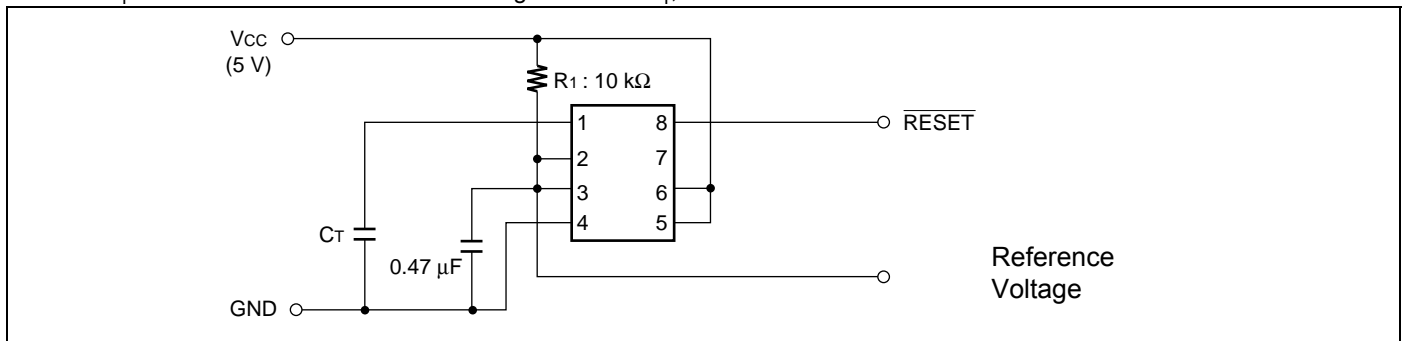
$$\text{Output Voltage} = (R_3 + R_4) \times V_{SC}/R_4$$


**8.10.3 5 V Reference Voltage Generation and 5 V Monitoring (No. 2)**

 The value of  $R_1$  should be calculated from the current consumption of the MB3771, the current flowing at  $R_2$  and  $R_3$ , and the 5 V output current. The table below provides sample resistance values for reference.

$V_{CC}$ (V)	$R_1$ (k $\Omega$ )	Output Current (mA)
40	11	< 1.6
24	6.2	< 1.4
15	4.7	< 0.6


**8.10.4 1.245 V Reference Voltage Generation and 5 V Monitoring**

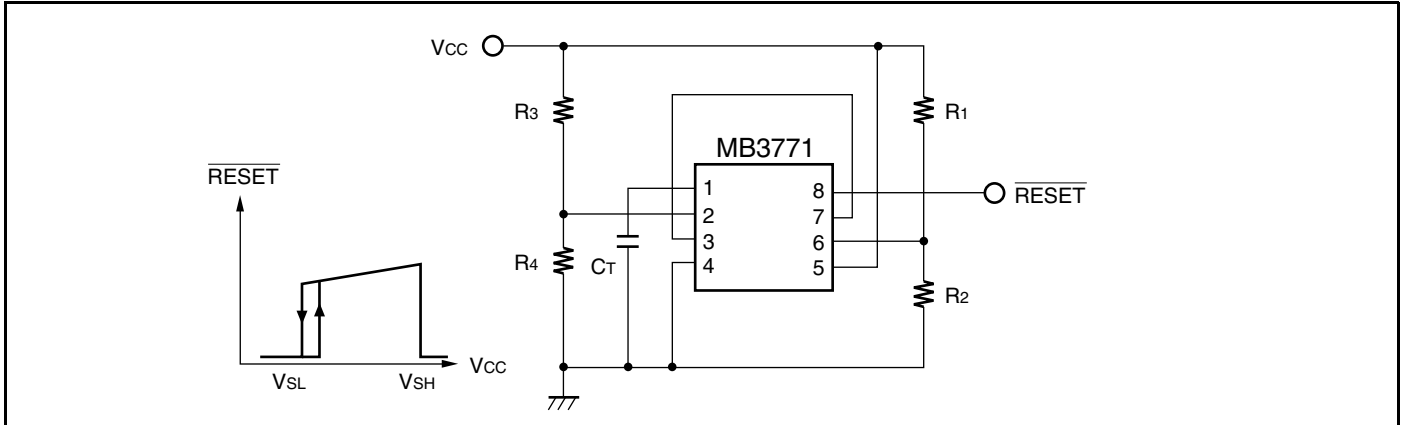
 Resistor  $R_1$  determines Reference current. Using 1.2 k $\Omega$  as  $R_1$ , reference current is about 2 mA.


### 8.11 Low Voltage and Over Voltage Detection ( $V_{CC} = 5\text{ V}$ )

$V_{SH}$  has no hysteresis. When over voltage is detected,  $\overline{\text{RESET}}$  is held in the constant time as well as when low voltage is detected.

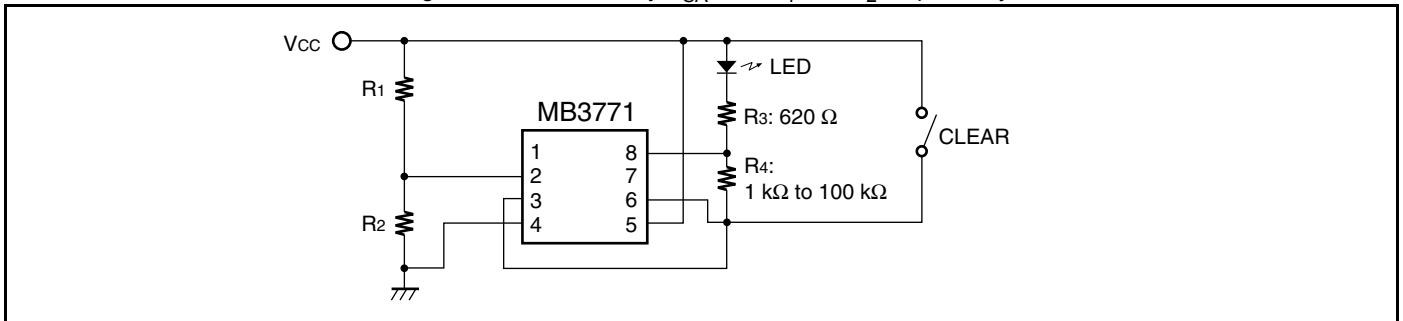
$$V_{SL} = (R_1 + R_2) \times V_{SB}/R_2$$

$$V_{SH} = (R_3 + R_4) \times V_{SC}/R_4$$



### 8.12 Detection of Abnormal State of Power Supply System ( $V_{CC} = 5\text{ V}$ )

- This Example circuit detects abnormal low/over voltage of power supply voltage and is indicated by LED indicator. LED is reset by the CLEAR key.
- The detection levels of low/over voltages are determined by  $V_{SA}$ , and  $R_1$  and  $R_2$  respectively.

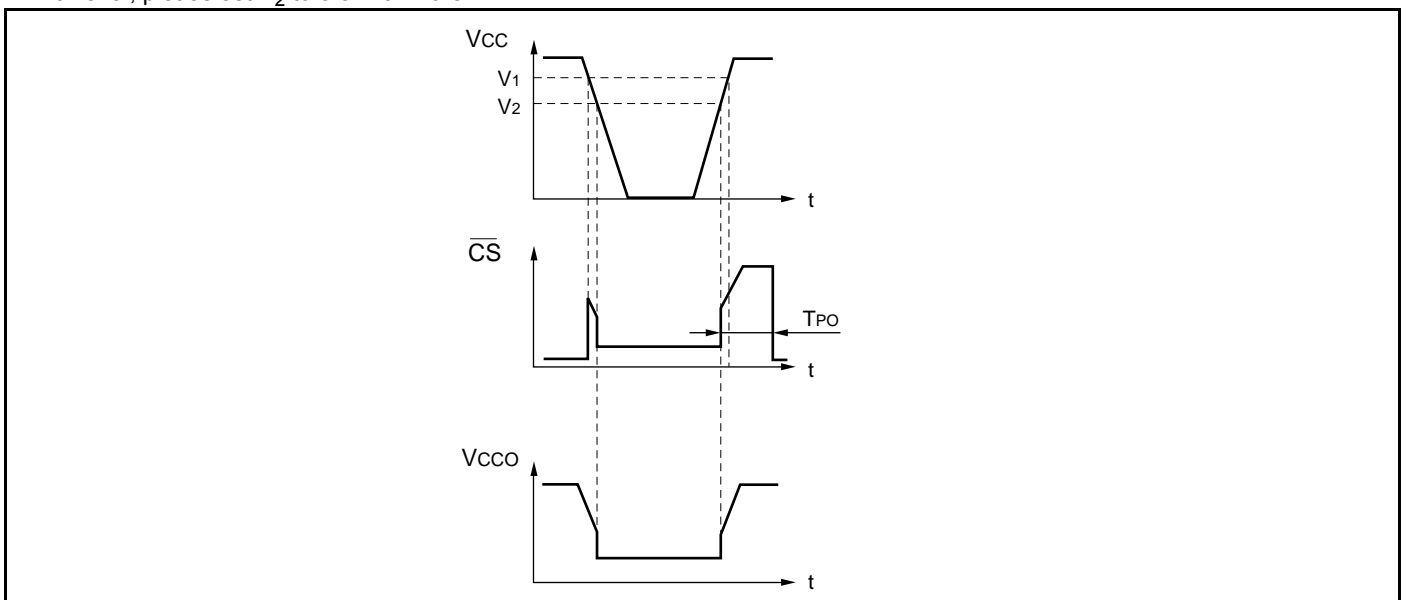


### 8.13 Back-up Power Supply System ( $V_{CC} = 5\text{ V}$ )

- Use CMOS Logic and connect  $V_{DD}$  of CMOS logic with  $V_{CCO}$ .
- The back-up battery works after CS goes high as  $V_2 < V_1$ .
- During  $t_{PO}$ , memory access is prohibited.
- CS's threshold voltage  $V_1$  is determined by the following equation:  

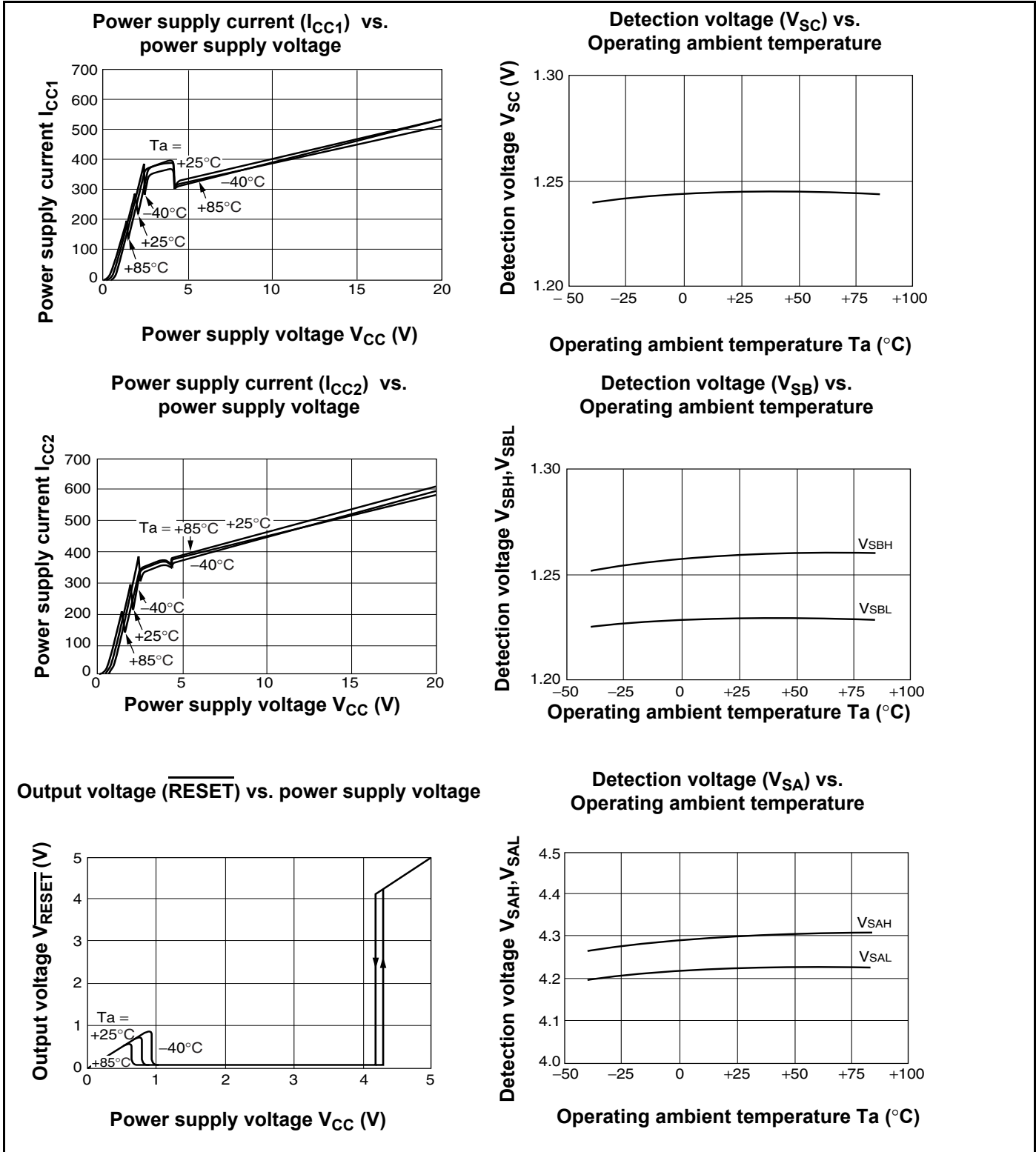
$$V_1 = V_F + (R_1 + R_2 + R_3) \times V_{SB}/R_3$$
 When  $V_1$  is 4.45 V or less, connect 7 pin with  $V_{CC}$ .  
 When  $V_1$  is 4.45 V or more, 7 pin can be used to open.
- The voltage to change  $V_2$  is provided as the following equation:  

$$V_2 = V_F + (R_1 + R_2 + R_3) \times V_{SC}/(R_2 + R_3)$$
 However, please set  $V_2$  to 3.5 V or more.





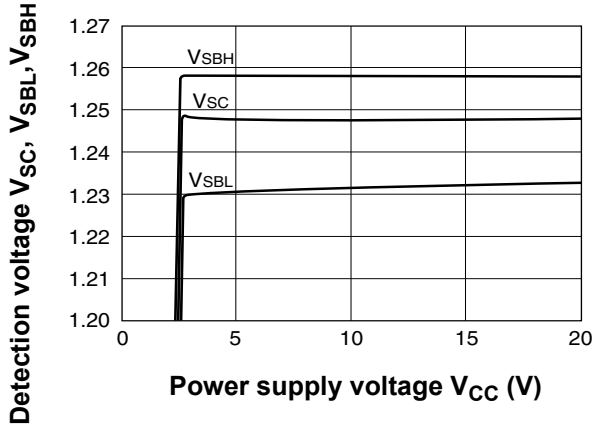
### 9. Typical Characteristics



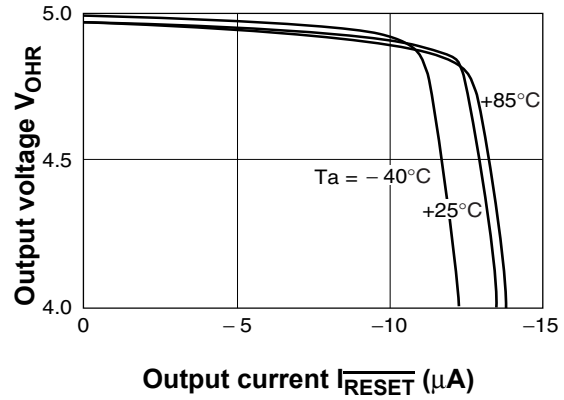
(Continued)

(Continued)

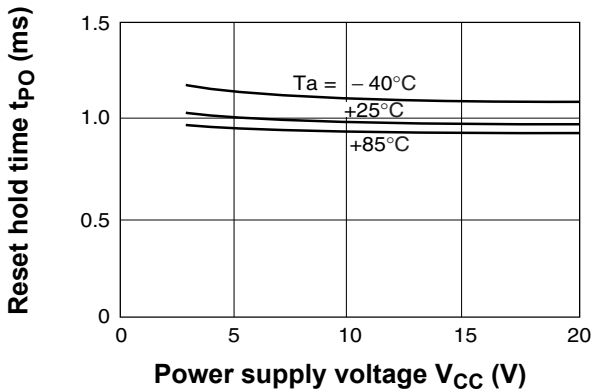
Detection voltage ( $V_{SB}$ ,  $V_{SC}$ ) vs. Power supply voltage



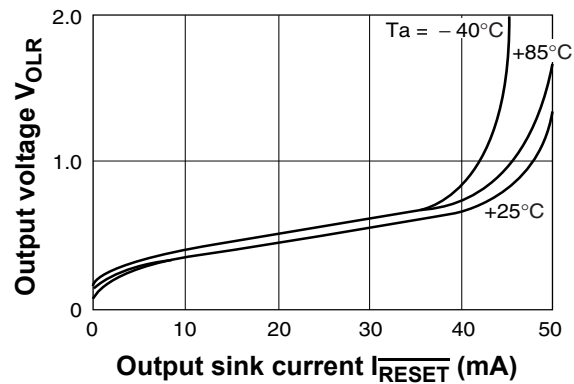
Output voltage ( $V_{OHR}$ ) vs. output current



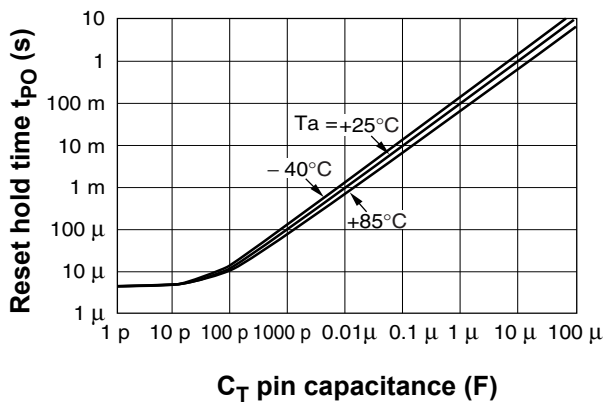
Reset hold time ( $t_{PO}$ ) vs. power supply voltage ( $C_T = 0.01 \mu F$ )



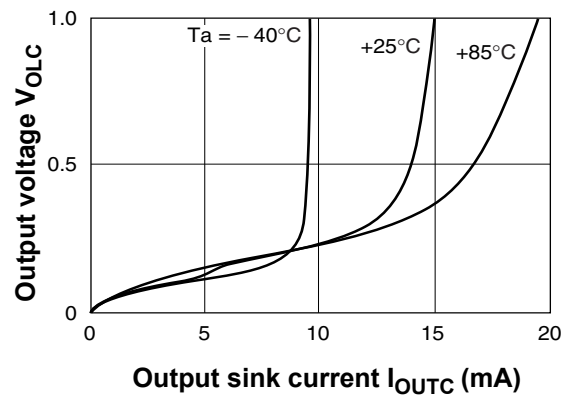
Output voltage ( $V_{OLR}$ ) vs. output sink current



Reset hold time ( $t_{PO}$ ) vs.  $C_T$  pin capacitance



Output voltage ( $V_{OLC}$ ) vs. output sink current



**10. Notes on Use**

- Take account of common impedance when designing the earth line on a printed wiring board.
- Take measures against static electricity.
  - For semiconductors, use antistatic or conductive containers.
  - When storing or carrying a printed circuit board after chip mounting, put it in a conductive bag or container.
  - The work table, tools and measuring instruments must be grounded.
  - The worker must put on a grounding device containing 250 kΩ to 1 MΩ resistors in series.
- Do not apply a negative voltage
  - Applying a negative voltage of -0.3 V or less to an LSI may generate a parasitic transistor, resulting in malfunction.

**11. Ordering Information**

Part Number	Package	Remarks
MB3771PF-□□□E1	8-pin Plastic SOP (SOE008)	-

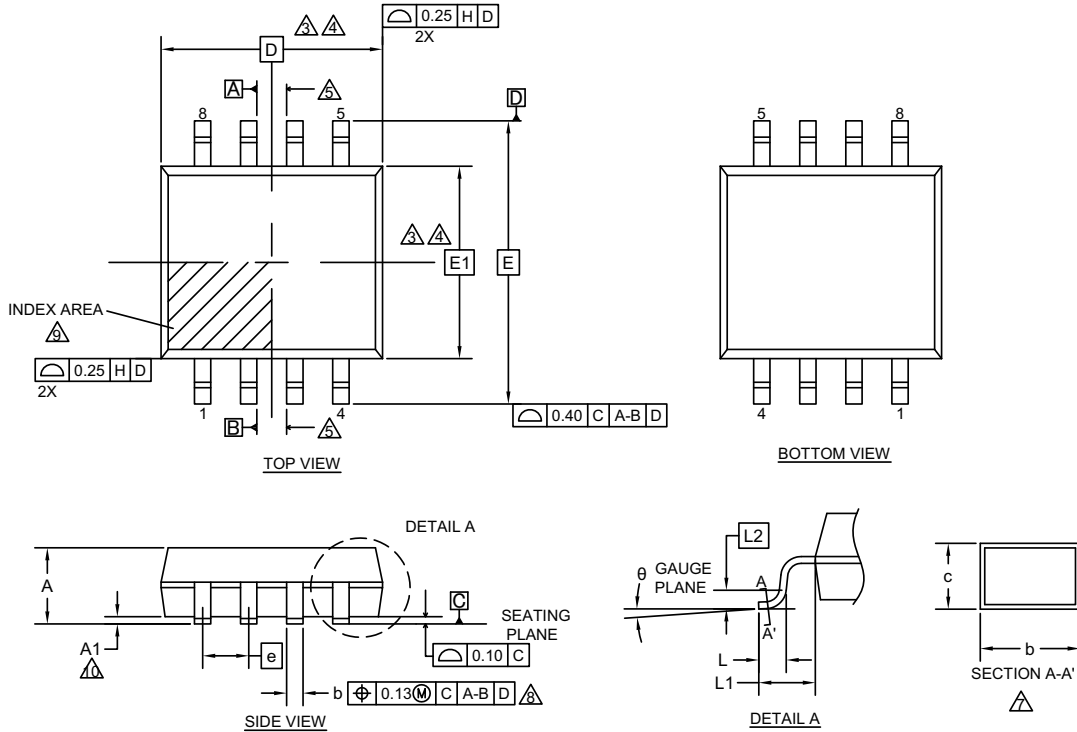
**12. RoHS Compliance Information**

The LSI products of Cypress with “E1” are compliant with RoHS Directive , and has observed the standard of lead, cadmium, mercury, Hexavalent chromium, polybrominated biphenyls (PBB) , and polybrominated diphenyl ethers (PBDE) .

The product that conforms to this standard is added “E1” at the end of the part number.

### 13. Package Dimensions

Package Code: SOE008



SYMBOL	DIMENSION		
	MIN.	NOM.	MAX.
A	—	—	2.25
A1	0.05	—	0.20
D	6.35 BSC		
E	7.80 BSC		
E1	5.30 BSC		
θ	0°	—	8°
c	0.13	—	0.20
b	0.39	0.47	0.55
L	0.45	0.60	0.75
L 1	1.25 REF		
L 2	0.25 BSC		
e	1.27 BSC		

#### NOTES

- ALL DIMENSIONS ARE IN MILLIMETER.
- DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
- DIMENSIONING D INCLUDE MOLD FLASH, DIMENSIONING E1 DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.025 mm PER SIDE. D and E1 DIMENSION ARE DETERMINED AT DATUM H.
- THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM. DIMENSIONING D and E1 ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, THE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
- DATUMS A & B TO BE DETERMINED AT DATUM H.
- "N" IS THE MAXIMUM NUMBER OF TERMINAL POSITIONS FOR THE SPECIFIED PACKAGE LENGTH.
- THE DIMENSION APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.10 mm TO 0.25mm FROM THE LEAD TIP.
- DIMENSION "b" DOES NOT INCLUDE THE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.10mm TOTAL IN EXCESS OF THE "b" DIMENSION AT MAXIMUM MATERIAL CONDITION. THE DAMBAR MAY NOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.
- THIS CHAMFER FEATURE IS OPTIONAL. IF IT IS NOT PRESENT, THEN A PIN 1 IDENTIFIER MUST BE LOCATED WITHIN THE INDEX AREA INDICATED
- "A1" IS DEFINED AS THE VERTICAL DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY EXCLUDING THE LID AND OR THERMAL ENHANCEMENT ON CAVITY DOWN PACKAGE CONFIGURATIONS.
- JEDEC SPECIFICATION NO. REF : N/A

002-15857 Rev. \*\*

## Document History

Spanion Publication Number: DS04-27400-11Ea

Document Title: MB3771 Power Supply Monitor Document Number: 002-08511				
Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	—	TAOA	05/12/2006	Migrated to Cypress and assigned document number 002-08511. No change to document contents or format.
*A	5177314	TAOA	03/16/2016	Updated to Cypress format.
*B	5550024	HIXT	12/12/2016	Updated <a href="#">Pin Assignment</a> : Change the package name from FPT-8P-M01 to SOE008 Updated <a href="#">Ordering Information</a> : Change the package name from FPT-8P-M01 to SOE008 Updated <a href="#">Package Dimensions</a> : Updated to Cypress format Deleted Marking Format (Lead Free version) Deleted Labeling Sample (Lead free version) Deleted MB3771PF-□□□E1 Recommended Conditions of Moisture Sensitivity Level
*C	5606248	HIXT	01/31/2017	Deleted the part number, "MB3771PF-□□□", from <a href="#">Ordering Information</a> Deleted the words in the Remarks, "Lead Free version", from <a href="#">Ordering Information</a>
*D	5788467	MASG	06/28/2017	Adapted Cypress new logo.

## Sales, Solutions, and Legal Information

### Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at [Cypress Locations](#).

#### Products

ARM <sup>®</sup> Cortex <sup>®</sup> Microcontrollers	<a href="http://cypress.com/arm">cypress.com/arm</a>
Automotive	<a href="http://cypress.com/automotive">cypress.com/automotive</a>
Clocks & Buffers	<a href="http://cypress.com/clocks">cypress.com/clocks</a>
Interface	<a href="http://cypress.com/interface">cypress.com/interface</a>
Internet of Things	<a href="http://cypress.com/iot">cypress.com/iot</a>
Memory	<a href="http://cypress.com/memory">cypress.com/memory</a>
Microcontrollers	<a href="http://cypress.com/mcu">cypress.com/mcu</a>
PSoC	<a href="http://cypress.com/psoc">cypress.com/psoc</a>
Power Management ICs	<a href="http://cypress.com/pmic">cypress.com/pmic</a>
Touch Sensing	<a href="http://cypress.com/touch">cypress.com/touch</a>
USB Controllers	<a href="http://cypress.com/usb">cypress.com/usb</a>
Wireless/RF	<a href="http://cypress.com/wireless">cypress.com/wireless</a>

#### PSoC<sup>®</sup> Solutions

[PSoC 1](#) | [PSoC 3](#) | [PSoC 4](#) | [PSoC 5LP](#) | [PSoC 6](#)

#### Cypress Developer Community

[Forums](#) | [WICED IOT Forums](#) | [Projects](#) | [Video](#) | [Blogs](#) | [Training](#) | [Components](#)

#### Technical Support

[cypress.com/support](http://cypress.com/support)

---

© Cypress Semiconductor Corporation, 2003-2017. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, WICED, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit [cypress.com](http://cypress.com). Other names and brands may be claimed as property of their respective owners.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- ⊖ [View MB3771PF-G-BND-JN-EF on WIN SOURCE](#)
- ⊖ [Fujitsu Electronics America, Inc. Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

- ✓ Global Sourcing Solution
- ✓ Obsolete Management
- ✓ Cost Control Management
- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management