

# System Reset (with battery back-up) Monolithic IC MM1134

## Outline

These ICs protect S-RAM data in back-up mode (CS signal makes R-SAM CE pin low and  $\overline{CE}$  pin high) when power supply voltage goes below a certain set voltage (detection voltage 3.5V, 4.2V typ.). Further, it switches from main power supply to battery back-up when power supply voltage drops. Conversely, when power supply rises, it first switches the S-RAM from battery back-up to main power supply (switching voltage 3.3V typ.), then from back-up mode to normal mode (CS signal makes S-RAM CE pin high and CE pin low). These signal processes provide reliable protection against data damage.

## Features

- 1 Power supply switching circuit (switching between main power supply and battery)
- 2 CS control for S-RAM (normal mode : S-RAM can be accessed, back-up mode: S-RAM can not be accessed low current consumption mode)
- 3 With CS signal gate circuit

## Characteristics

1. Battery back-up		
1. Low IC current consumption (loss current)		0.3 $\mu$ A typ.
2. Drop voltage inside IC (input/output voltage difference)	$I_o=100\mu A$	0.3V typ.
3. Reverse current (reverse leak current)		0.1 $\mu$ A max.
2. Normal operation		
1. Drop voltage inside IC (input/output voltage difference)	$I_o=50\mu A$	0.2V typ.
2. Output voltage $V_{CC}=5V$	$I_o=50mA$	4.8V typ.
3. Battery- $V_{CC}$ switching voltage		3.3V typ.
4. Detection voltage (CS, $\overline{CS}$ , reset output)	A : 3.5V typ. B : 4.2V typ.	

## Package

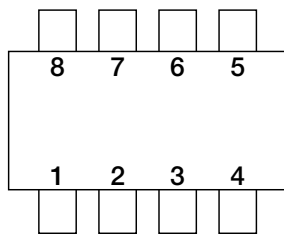
SOP-8C (MM1134 □ F)

\*□ contains detection voltage rank.

## Applications

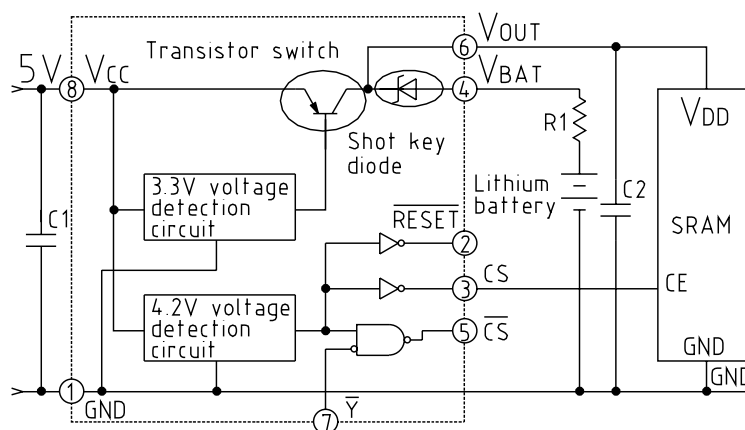
1. Memory cards (S-RAM cards)
2. PCs, word processors
3. Fax machines, photocopiers, other office equipment
4. Sequence controllers, other FA equipment
5. Video games and other equipment with S-RAMs

## Pin Assignment



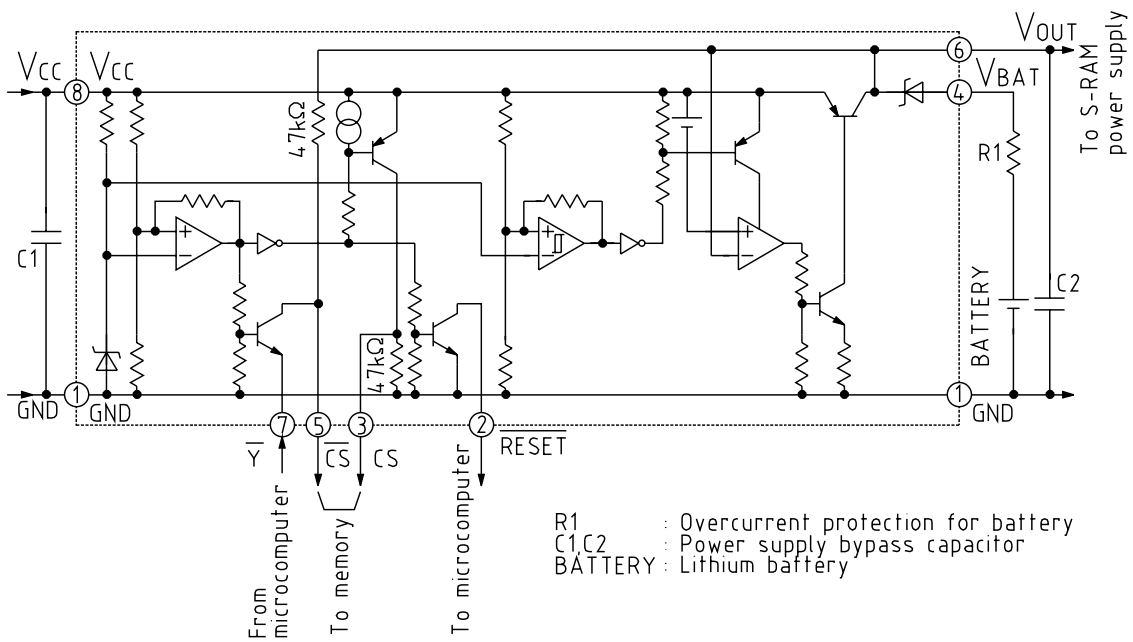
Pin no.	Pin name
1	GND
2	$\overline{\text{RESET}}$
3	CS
4	V <sub>BATT</sub>
5	$\overline{\text{CS}}$
6	V <sub>OUT</sub>
7	$\overline{\text{Y}}$
8	V <sub>CC</sub>

## Block Diagram



Back-up IC inside dotted lines  
 C1,C2: Power supply bypass capacitor  
 R1 : Lithium battery protection resistor

Equivalent Circuit Diagram



Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Units
Storage temperature	T <sub>STG</sub>	-40~+125	°C
Operating temperature	T <sub>OPR</sub>	-20~+75	°C
Power supply voltage	V <sub>CC max.</sub>	-0.3~7	V
Operating voltage	V <sub>CCOP</sub>	-0.3~7	V
Allowable loss	P <sub>d</sub>	300	mW
Output current	I <sub>o1</sub>	80	mA
Output current	I <sub>o2</sub>	200	μA

Note : I<sub>o1</sub> expresses V<sub>CC</sub> output current value, and I<sub>o2</sub> expresses V<sub>BATT</sub> output current value.

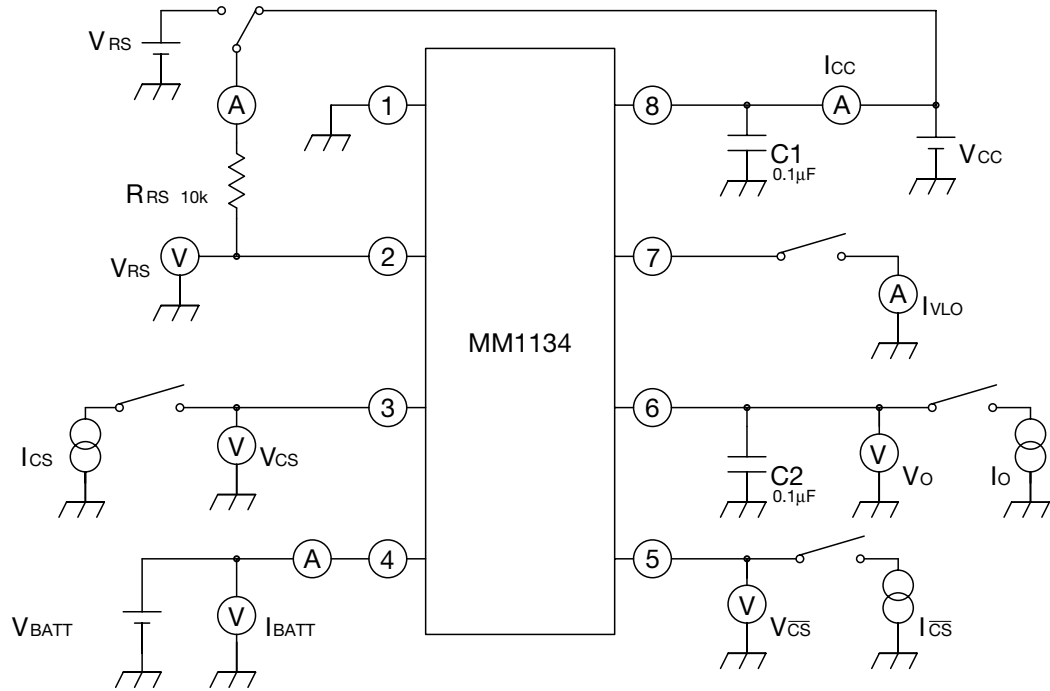
**Electrical Characteristics**

Typical model: MM1134B(Except where noted otherwise, Ta=25°C, VCC=VRS=5V, RRS=10kΩ)

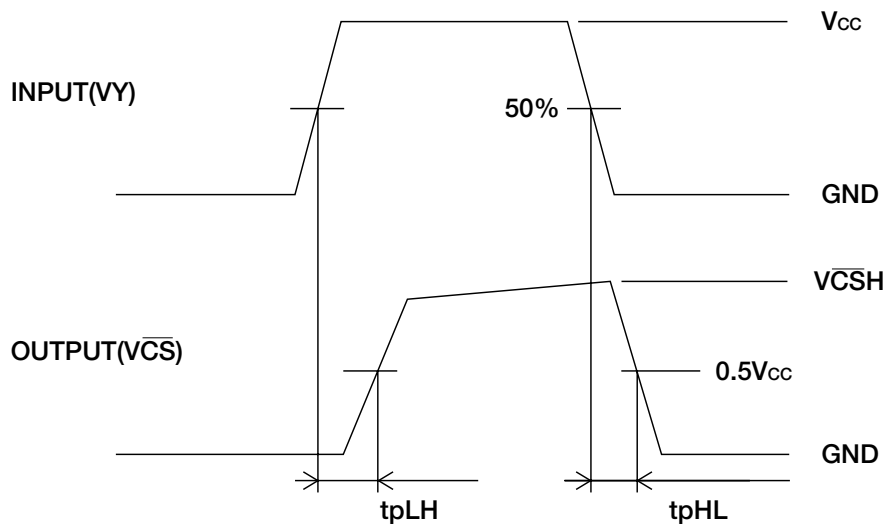
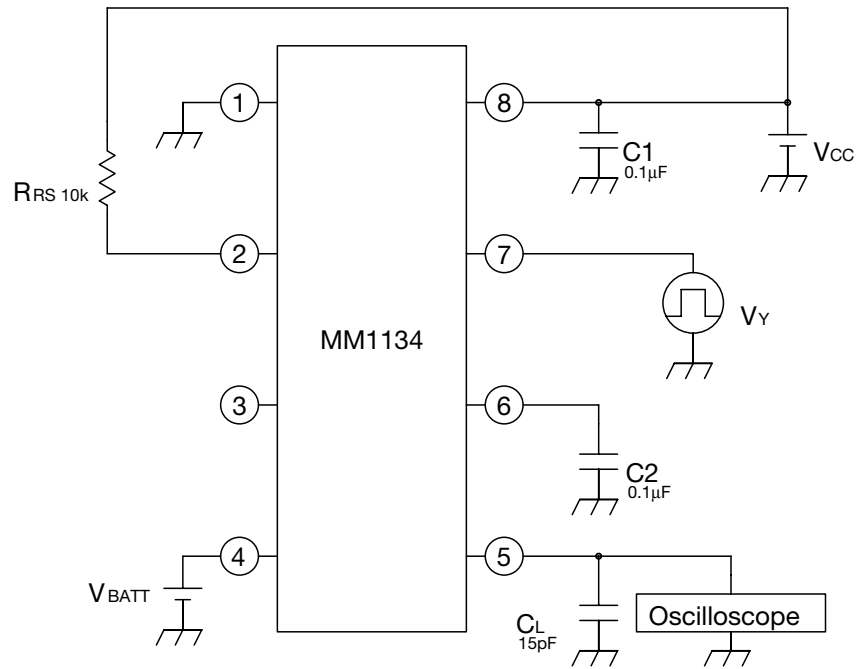
Item	Symbol	Measuring circuit	Measurement conditions	Min.	Typ.	Max.	Units
Consumption current	ICC	1	VCC=5V, VBATT=3V, Io1=0mA		1.4	2.2	mA
I/O voltage difference 1	VSAT1	1	VCC=5V, VBATT=3V, Io1=1mA		0.03	0.05	V
Output voltage 1	Vo1	1	VCC=5V, VBATT=3V, Io1=1mA	4.95	4.97		V
Output voltage 2	Vo2	1	VCC=5V, VBATT=3V, Io1=15mA	4.75	4.90		V
Output voltage 3	Vo3	1	VCC=5V, VBATT=3V, Io1=50mA	4.70	4.80		V
Detection voltage	VS	1	VCC=H→L	4.00	4.20	4.40	V
Hysteresis voltage	ΔVS	1	VCC=L→H	50	100	200	mV
Reset output voltage L	V <sub>RSL</sub>	1	VCC=3.7V		0.2	0.4	V
Reset leakage current H	IRSH	1	VCC=5V, VRS=7.0V		±0.01	±0.1	μA
Reset operation limit voltage	VOPL	1	V <sub>RSL</sub> ≤0.4V, VCC=H→L		0.8	1.2	V
CS output voltage L	V <sub>CSL</sub>	1	VCC=3.7V, VBATT=3V, ICS=1μA			0.1	V
CS output voltage H	V <sub>CSH</sub>	1	VCC=5V, VBATT=3V, ICS=-1μA	4.90			V
$\overline{\text{CS}}$ output voltage L	V <sub><math>\overline{\text{CS}}</math>L</sub>	1	VCC=5V, VBATT=3V, ICS=1μA, V $\overline{\text{Y}}$ =0V			0.2	V
$\overline{\text{CS}}$ output voltage H	V <sub><math>\overline{\text{CS}}</math>H</sub>	1	VCC=3.7V, VBATT=3V, ICS=-1μA, V $\overline{\text{Y}}$ =0V VCC=5V, VBATT=3V, ICS=-1μA, V $\overline{\text{Y}}$ =5V	V <sub>0</sub> -0.1			V
Detection voltage temperature characteristic	V <sub>S</sub> /ΔT	1				±0.05	%/°C
Power supply switching voltage	V <sub>B</sub>	1	VCC=H L	3.15	3.30	3.45	V
Hysteresis voltage	ΔV <sub>B</sub>	1	VCC=L →H	50	100	200	mV
Switching voltage temperature characteristic	V <sub>B</sub> /ΔT	1	→			±0.05	%/°C
Loss current	I <sub>BL</sub>	1	VCC=0V, VBATT=3V, Io2=0μA		0.3	0.5	μA
I/O voltage difference 2	V <sub>sat2</sub>	1	VCC=0V, VBATT=3V, Io2=1μA		0.2	0.3	V
Output voltage 4	Vo4	1	VCC=0V, VBATT=3V, Io2=1μA	2.7	2.8		V
Output voltage 5	Vo5	1	VCC=0V, VBATT=3V, Io2=100μA	2.6	2.7		V
Reverse current	I <sub>OREV</sub>	1	VCC=5V, VBATT=0V			0.1	μA
$\overline{\text{Y}}$ pin Lo level current	I <sub><math>\overline{\text{Y}}</math>LO</sub>	1	VCC=5V, VBATT=3V, V $\overline{\text{Y}}$ =0V		150	400	μA
$\overline{\text{Y}}$ pin	t <sub>PLH</sub>	2	V $\overline{\text{Y}}$ =L→H, CL=15pF *		8	20	ns
Pin transmission delay time	t <sub>PHL</sub>	2	V $\overline{\text{Y}}$ =H→L, CL=15pF *		8	20	ns
Reference voltage (typical)	V <sub>REF</sub>				1.25		V

Note : When input pulse rise and fall time is less than 6Nsec.

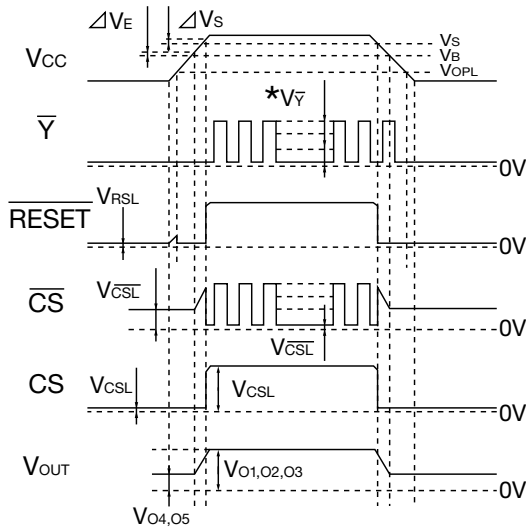
Measuring circuit 1



Measuring circuit 2



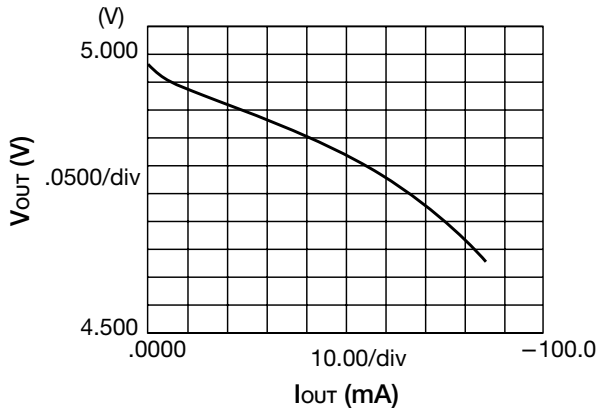
Timing Chart



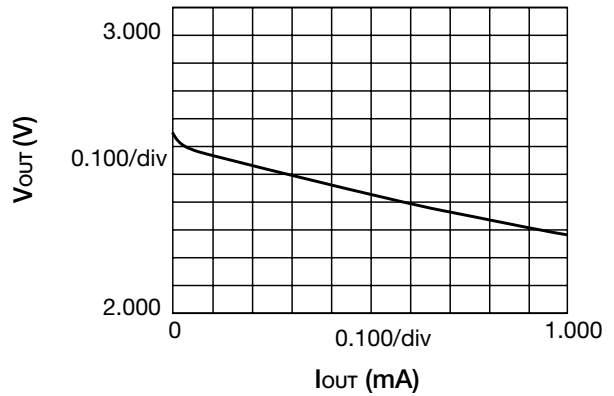
\* Use  $\bar{Y}$  pin input voltage at less than 5V when  $V_{CC} \leq V_S$ .

Characteristics

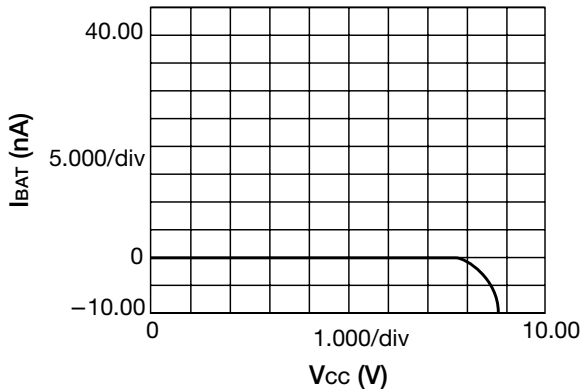
■  $V_{OUT}$ - $I_{OUT}$  ( $V_{CC}=5.0V$ )



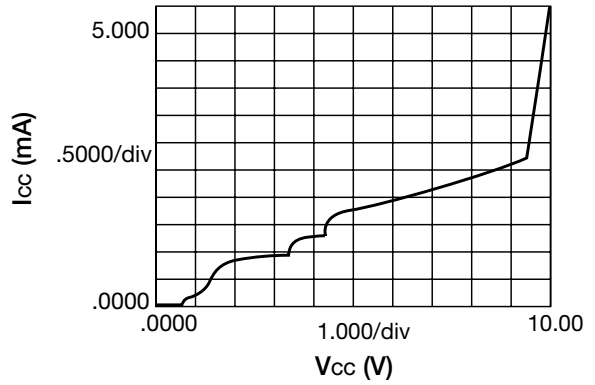
■  $V_{OUT}$ - $I_{OUT}$  ( $V_{BAT}=3.0V$ )



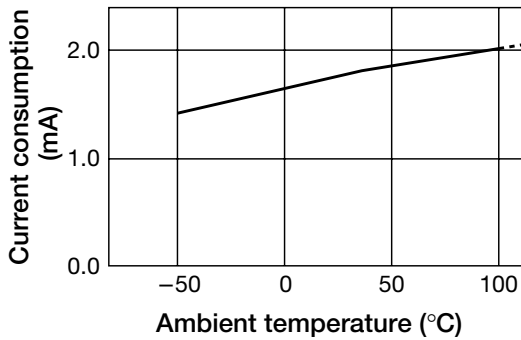
■  $V_{CC}$ - $I_{BAT}$



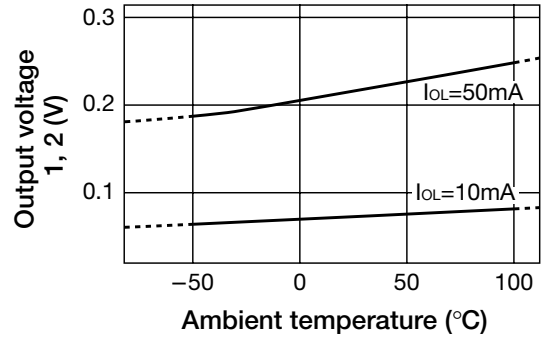
■  $V_{CC}$ - $I_{CC}$



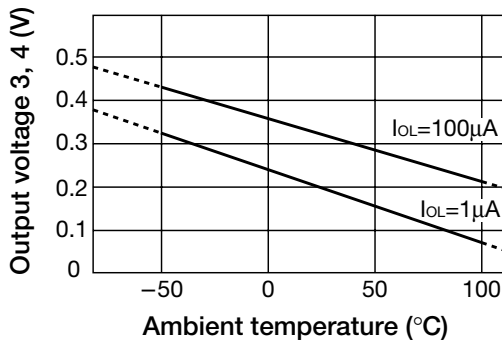
■ Current consumption-Temperature characteristics



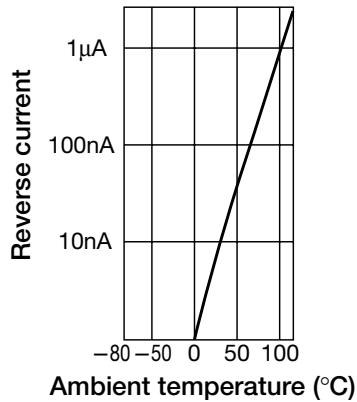
■ Output voltage 1, 2-Temperature characteristics



■ Output voltage 3, 4-Temperature



■ Reverse current-Temperature



■ Loss current-Temperature

