

IC for System Reset (battery backup)

Monolithic IC MM1134

Outline

This IC protects SRAM data by setting SRAM in backup mode (setting the CE pin of SRAM low and $\overline{CE}$ pin high with CS signal) when supply voltage falls below a predetermined voltage (detection voltage 3.5V, 4.2V typ.). Then, when supply voltage is getting lower, the main power supply is switched to a battery (switching voltage 3.3V typ.) to enter backup mode with the battery. Meanwhile, when the power supply rises, first it switches to the main power supply (switching voltage 3.3V typ.) from the battery backup mode, then switches SRAM from backup mode to normal mode (by setting the CE pin of SRAM high and $\overline{CE}$ pin low). Data damage can be reliably prevented by this signal processing.

Features

1. Power supply switching circuit (switching between the main power supply and a battery)
2. CS control for SRAM
 - Normal mode: Enables access to SRAM
 - Backup mode: Disables access to SRAM, low current consumption mode
3. With CS signal gate circuit

Characteristics

1. Battery back-up
 1. Low IC current consumption (loss current) 0.3μA typ.
 2. Drop voltage inside IC (input/output voltage difference) $I_o=100\mu A$ 0.3V typ.
 3. Reverse current (reverse leak current) 0.1μA 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

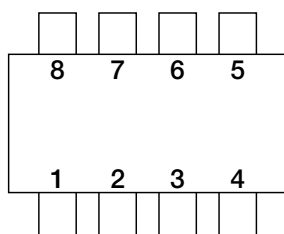
SOP-8C (MM1134 □ F)

* The box represents a rank of detection voltage.

Applications

1. Memory cards (SRAM cards)
2. PCs, word processors
3. Fax machines, photocopiers, other OA equipment
4. Sequence controllers, other FA equipment
5. SRAM-mounted devices such as video game devices

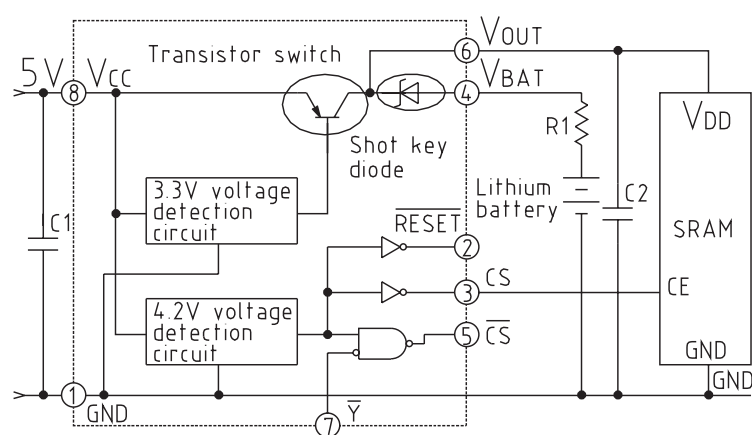
Pin Assignment



SOP-8C
(TOP VIEW)

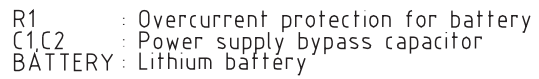
Pin no.	Pin name
1	GND
2	RESET
3	CS
4	V _{BATT}
5	$\overline{\text{CS}}$
6	V _{OUT}
7	$\overline{\text{Y}}$
8	V _{CC}

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 _{STG}	-40~+125	°C
Operating temperature	T _{OPR}	-20~+75	°C
Power supply voltage	V _{CC} max.	-0.3~7	V
Operating voltage	V _{CCOP}	-0.3~7	V
Allowable loss	P _d	300	mW
Output current	I _{O1}	80	mA
Output current	I _{O2}	200	μA

Note : lo1 expresses V_{CC} output current value, and lo2 expresses V_{BATT} output current value.

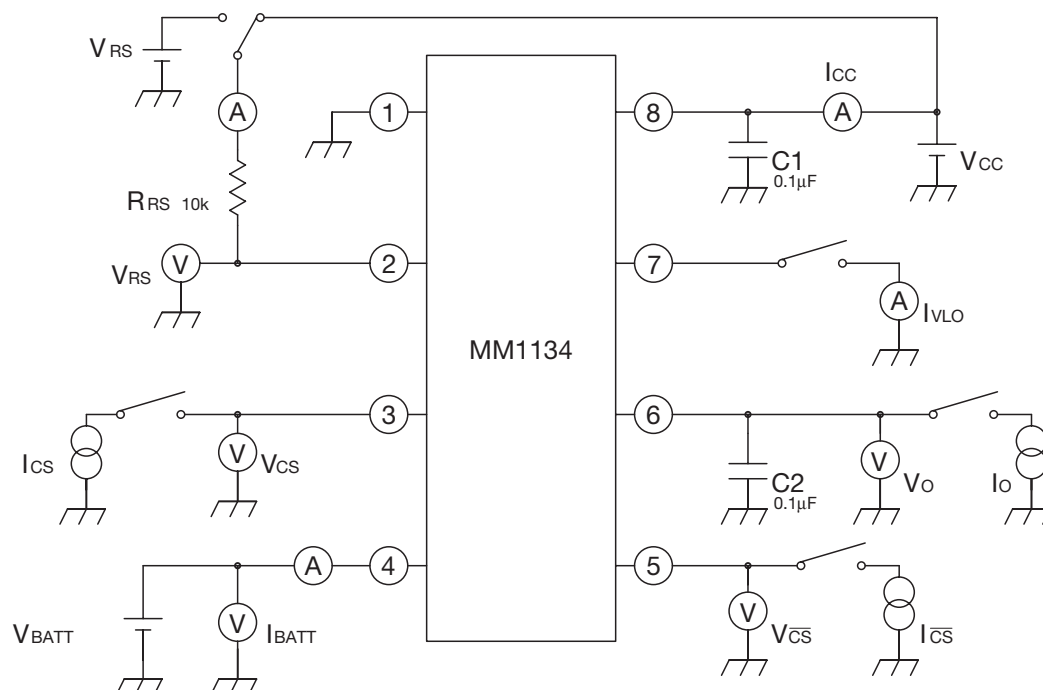
Electrical Characteristics

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

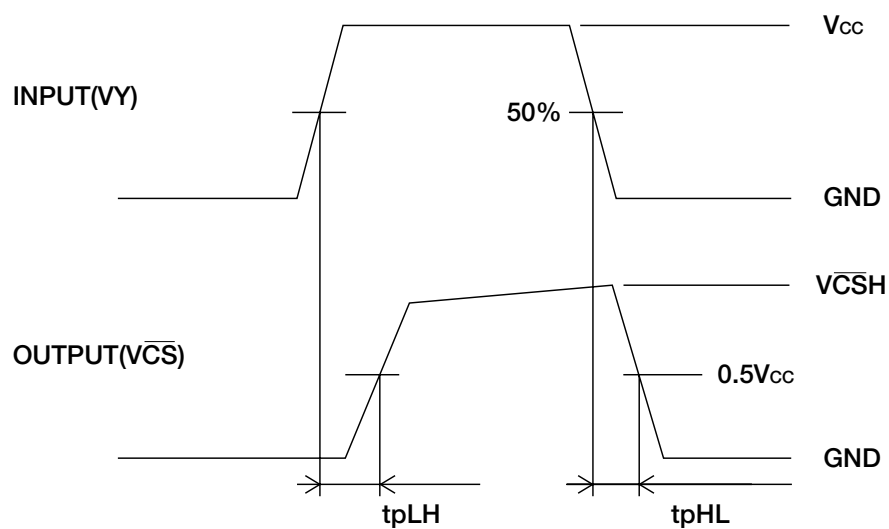
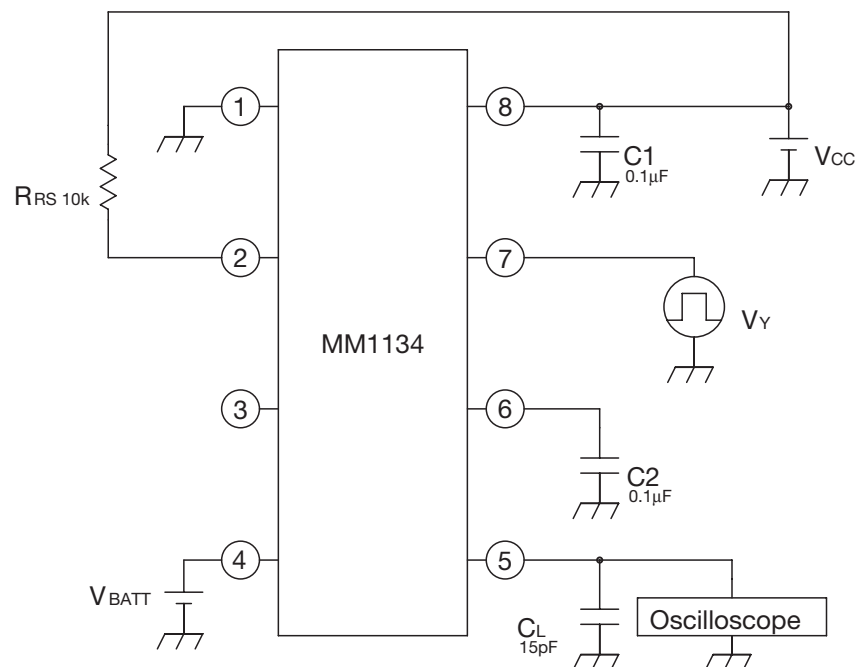
Item	Symbol	Measuring circuit	Measurement conditions	Min.	Typ.	Max.	Units
Consumption current	ICC	1	VCC=5V, VBATT=3V, Io1=0mA		1.4	2.2	mA
I/O voltage difference 1	VSAT1	1	VCC=5V, VBATT=3V, Io1=1mA		0.03	0.05	V
Output voltage 1	Vo1	1	VCC=5V, VBATT=3V, Io1=1mA	4.95	4.97		V
Output voltage 2	Vo2	1	VCC=5V, 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 _{RSL}	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 _{RSL} ≤0.4V, VCC=H→L		0.8	1.2	V
CS output voltage L	V _{CSL}	1	VCC=3.7V, VBATT=3V, ICS=1μA			0.1	V
CS output voltage H	V _{CSH}	1	VCC=5V, VBATT=3V, ICS=-1μA	4.90			V
$\overline{\text{CS}}$ output voltage L	V _{$\overline{\text{CS}}$L}	1	VCC=5V, VBATT=3V, I $\overline{\text{CS}}$ =1μA, V $\overline{\text{Y}}$ =0V			0.2	V
$\overline{\text{CS}}$ output voltage H	V _{$\overline{\text{CS}}$H}	1	VCC=3.7V, VBATT=3V, I $\overline{\text{CS}}$ =-1μA, V $\overline{\text{Y}}$ =0V VCC=5V, VBATT=3V, I $\overline{\text{CS}}$ =-1μA, V $\overline{\text{Y}}$ =5V	V ₀ -0.1			V
Detection voltage temperature characteristic	VS/ΔT	1				±0.05	%/°C
Power supply switching voltage	VB	1	VCC=H→L	3.15	3.30	3.45	V
Hysteresis voltage	ΔVB	1	VCC=L→H	50	100	200	mV
Switching voltage temperature characteristic	VB/ΔT	1				±0.05	%/°C
Loss current	IBL	1	VCC=0V, VBATT=3V, Io2=0μA		0.3	0.5	μA
I/O voltage difference 2	Vsat2	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	IOREV	1	VCC=5V, VBATT=0V			0.1	μA
$\overline{\text{Y}}$ pin Lo level current	I $\overline{\text{Y}}$ LO	1	VCC=5V, VBATT=3V, V $\overline{\text{Y}}$ =0V		150	400	μA
$\overline{\text{Y}}$ pin	t _{PLH}	2	V $\overline{\text{Y}}$ =L→H, CL=15pF	*	8	20	ns
Pin transmission delay time	t _{PHL}	2	V $\overline{\text{Y}}$ =H→L, CL=15pF	*	8	20	ns
Reference voltage (typical)	V _{REF}				1.25		V

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

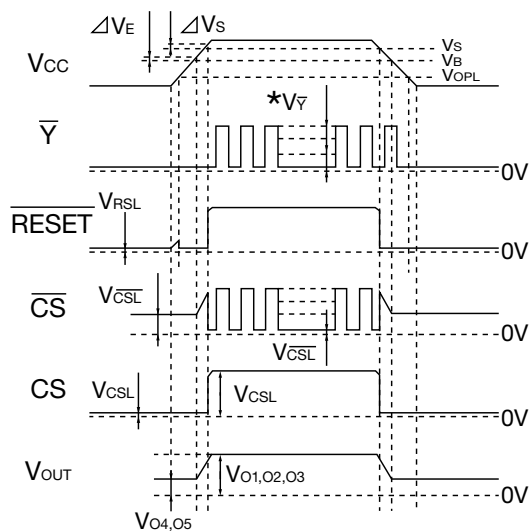
Measuring circuit 1



Measuring circuit 2



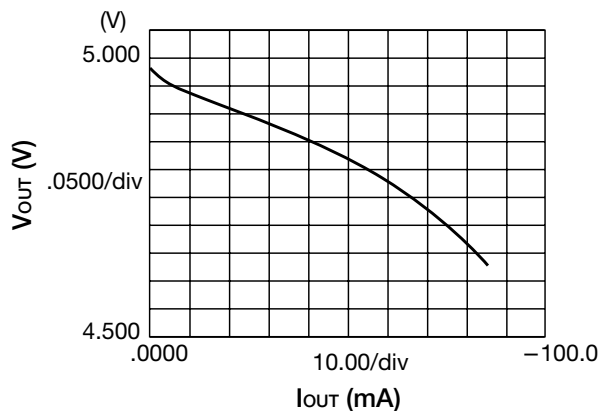
Timing Chart



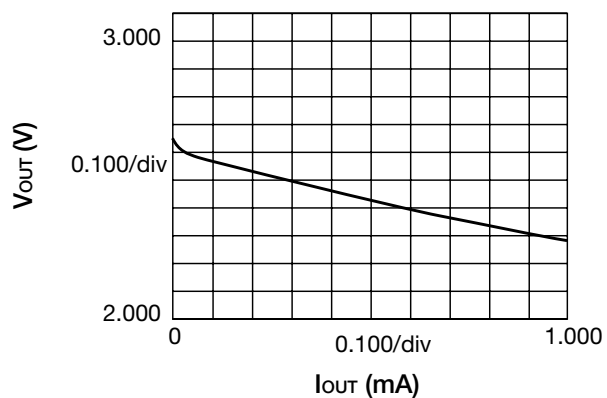
* Use $\bar{Y}$ pin input voltage at less than 5V when $V_{CC} \leq V_S$.

Characteristics

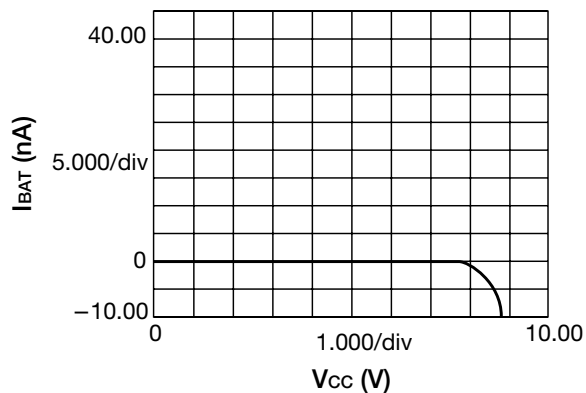
V_{OUT}-I_{OUT} (V_{CC}=5.0V)



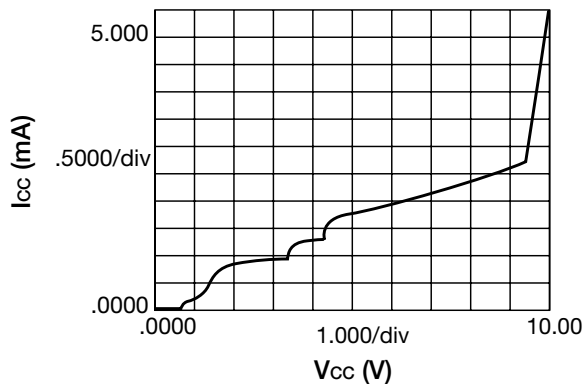
V_{OUT}-I_{OUT} (V_{BAT}=3.0V)



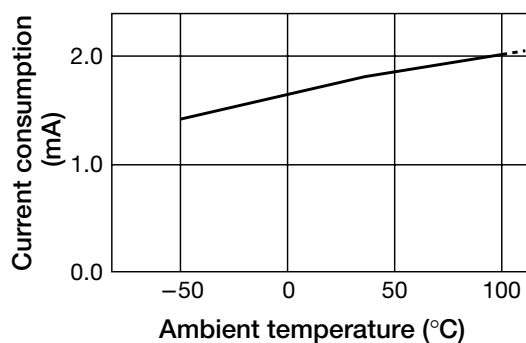
V_{CC}-I_{BAT}



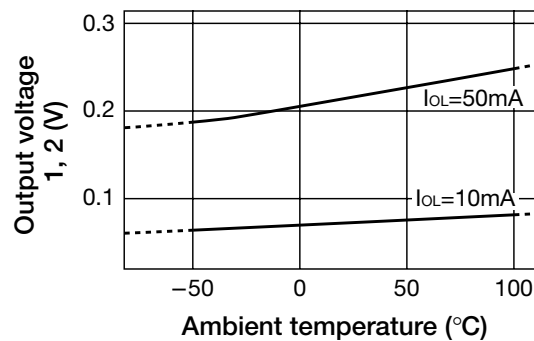
V_{CC}-I_{CC}



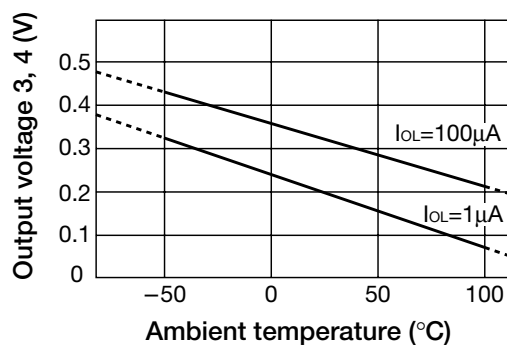
Current consumption-Temperature characteristics



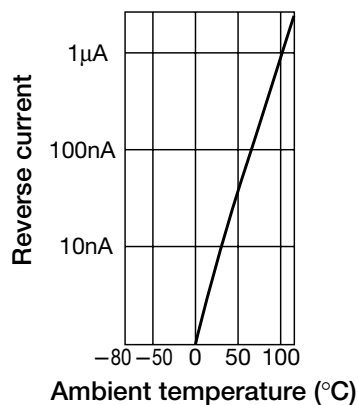
Output voltage 1, 2-Temperature characteristics



Output voltage 3, 4-Temperature



Reverse current-Temperature



Loss current-Temperature

