

System Reset (with battery back-up)

Monolithic IC MM1026, 1245, 1080 ,1134

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 or 4.5V 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

MM1026

- Power supply switching circuit (switching between main power supply and battery)
- 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)
- Reset output

MM1245

- Power supply switching circuit
- CS control for S-RAM
- CS control signal delay, power supply line chattering removal approx. 1S max.
- Supply current from main power supply can be increased by external power transistor

MM1080

- Power supply switching circuit
- CS control for S-RAM
- Low current consumption 60 μ A typ.

MM1134

- Power supply switching circuit
- CS control for S-RAM
- Gate circuit with CS signal

Characteristics

1. Battery back-up

- | | | |
|---|----------------|------------------|
| 1. Low IC current consumption (loss current) | | 0.3 μ 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 μ 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. |
| C : 4.5V typ. |

Package

DIP-8B (MM××××□D)

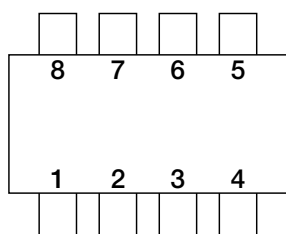
SOP-8C (MM××××□F)

*□ 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

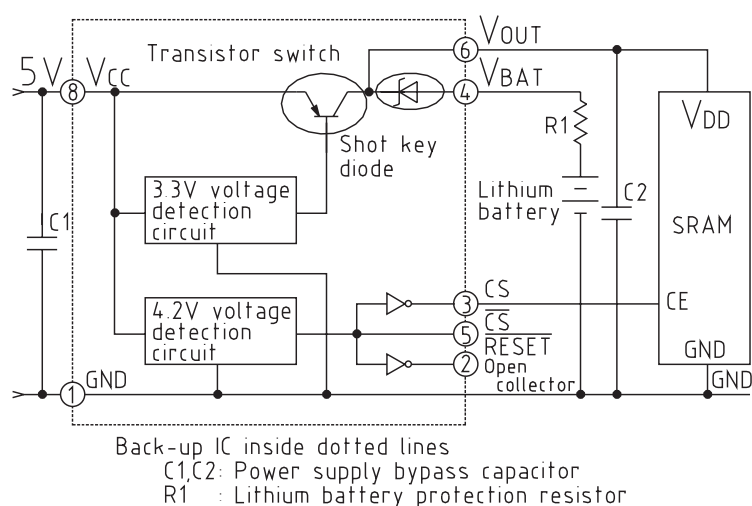


DIP-8P(C)/SOP-8P(C)/SOP-8P(C) Taping

Pin no.	Pin name			
	MM1026	MM1245	MM1080	MM1134
1	GND	GND	GND	GND
2	RESET	T _c	NC	RESET
3	CS	CS	CS	CS
4	V _{BATT}	V _{BATT}	V _{BATT}	V _{BATT}
5	CS	CS	NC	CS
6	V _{OUT}	V _{OUT}	V _{OUT}	V _{OUT}
7	NC	Tr.B	NC	Y
8	V _{CC}	V _{CC}	V _{CC}	V _{CC}

Block Diagram

MM1026



[illegible]

Back-up IC inside dotted lines

C1,C2: Power supply bypass capacitor

R1 : Lithium battery protection resistor

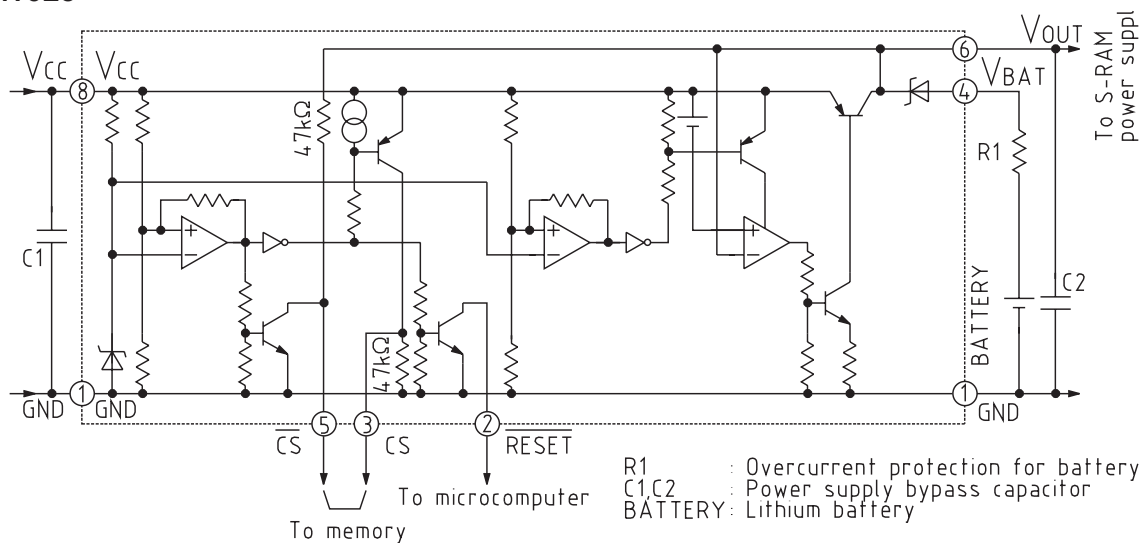
Back-up IC inside dotted lines

C1,C2: Power supply bypass capacitor

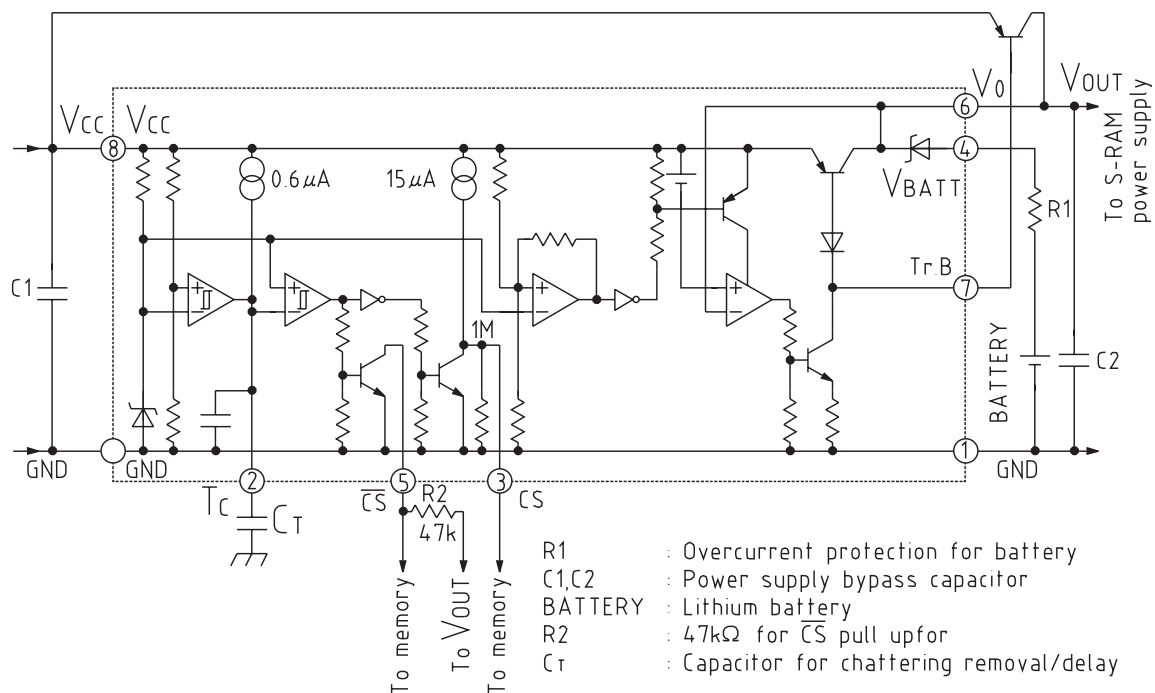
R1 : Lithium battery protection resistor

Equivalent Circuit Diagram

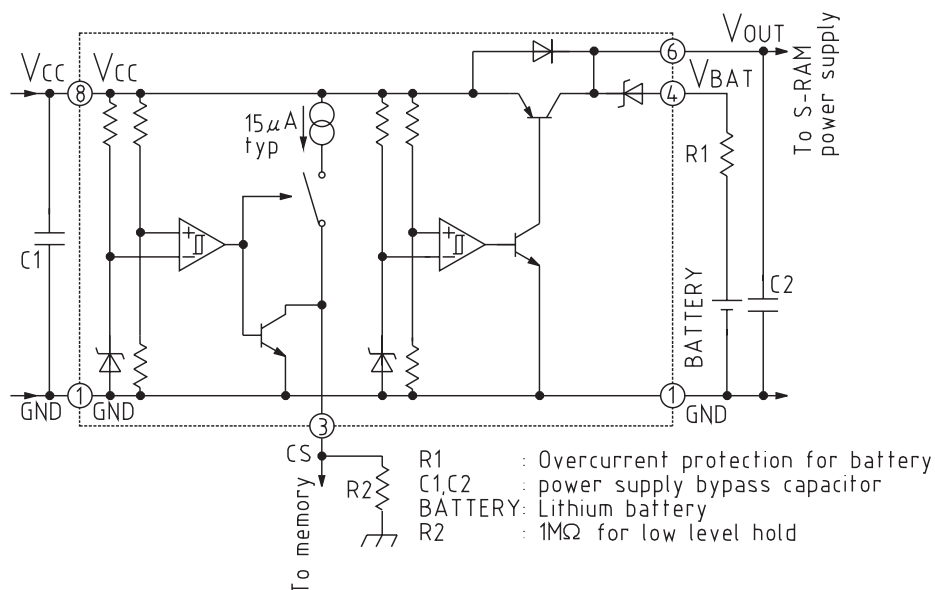
MM1026



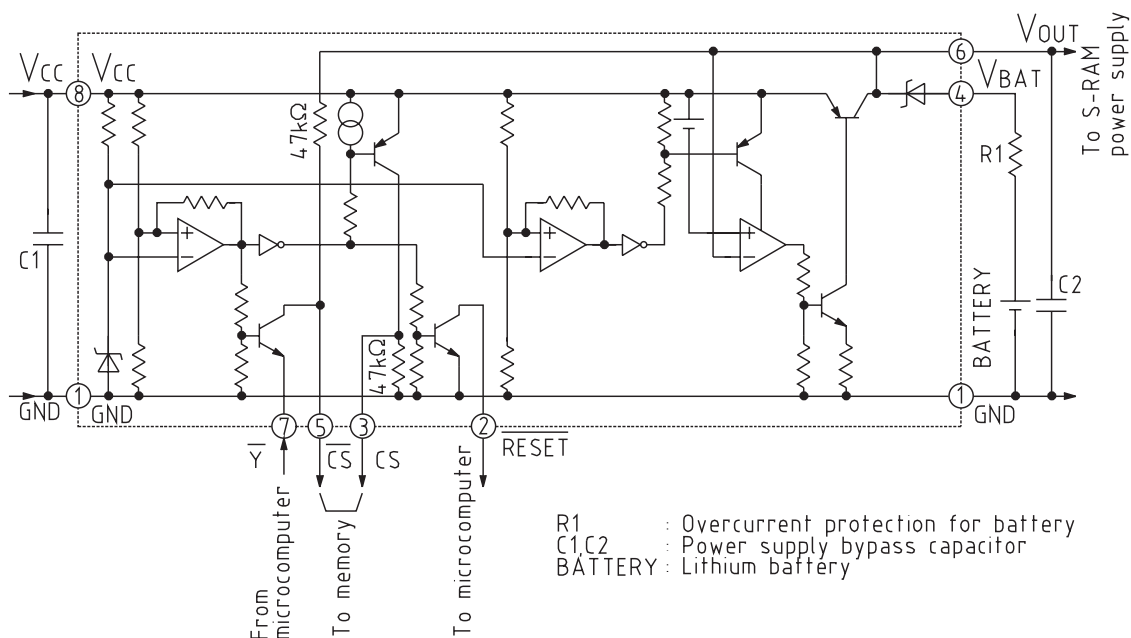
MM1245



■ MM1080



■ MM1134



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.	7	V
Operating voltage	V _{CCOP}	7	V
Allowable loss	P _d	300	mW
Output current	I _{o1}	80	mA
		50	mA
		200	µA
Output current	I _{o2}	200	µA

Note : I_{o1} expresses V_{CC} output current value, and I_{o2} expresses V_{BATT} output current value.

Electrical Characteristics

(Except where noted otherwise, $T_a=25^\circ\text{C}$, $V_{CC}=V_{RS}=5\text{V}$, $R_{RS}=10\text{k}\Omega$)

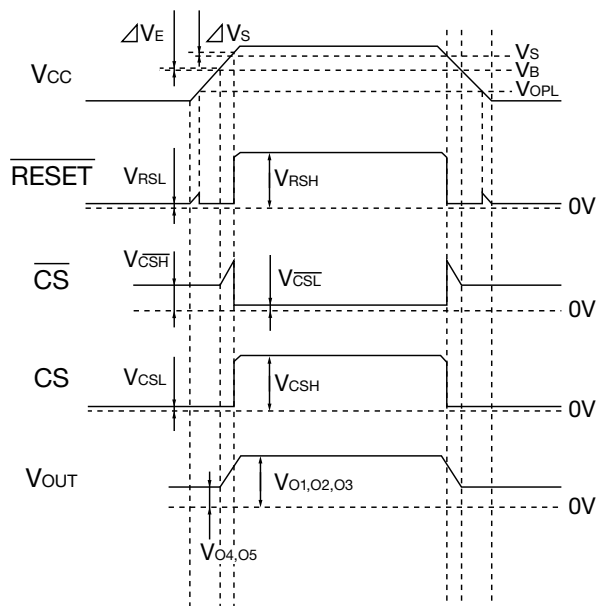
Item		Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Consumption current	MM1026	I _{CC}	V _{CC} =5V, V _{BATT} =3V, I _{o1} =0mA			2.0	mA
	MM1245			0.6	1.0	1.4	mA
	MM1080				60	120	μA
	MM1134				1.4	2.2	mA
I/O voltage difference 1		V _{SAT1}	V _{CC} =5V, V _{BATT} =3V, I _{o1} =1mA		0.03	0.05	V
Output voltage 1		V _{O1}	V _{CC} =5V, V _{BATT} =3V, I _{o1} =1mA	4.95	4.97		V
I/O voltage difference 2	MM1245	V _{SAT2}	V _{CC} =5V, V _{BATT} =3V, I _{o1} =30mA		0.15	0.30	V
Output voltage 2	MM1026	V _{O2}	V _{CC} =5V, V _{BATT} =3V, I _{o1} =15mA	4.75	4.90		V
	MM1134						
	MM1080		V _{CC} =5V, V _{BATT} =3V, I _{o1} =30mA	4.5	4.7		V
I/O voltage difference 3	MM1245	V _{SAT3}	V _{CC} =5V, V _{BATT} =3V, I _{o1} =80mA		0.30	0.50	
Output voltage 3	Except MM1245	V _{O3}	V _{CC} =5V, V _{BATT} =3V, I _{o1} =50mA	4.7	4.8		V
Detection voltage	A type	V _S	V _{CC} =H→L	3.35	3.50	3.65	V
	B type			4.05	4.20	4.35	V
	C type			4.30	4.50	4.70	V
Hysteresis voltage		ΔV _S	V _{CC} =L→H		100		mV
Maximum base driving current	MM1245	I _{BUF}	V _{CC} =5V, V _{BUF} =4.5V	14	20	26	mA
Reset output voltage L	MM1026	V _{RSL}	V _{CC} =3V		0.2	0.4	V
Reset leakage current H	MM1134	I _{RS} H	V _{CC} =5V, V _{RS} =7.0V		±0.01	±0.1	μA
Reset operation limit voltage		V _{OPL}	V _{RSL} ≤ 0.4V, V _{CC} =H→L		0.8	1.2	V
CS output voltage L	MM1080 (CS only) MM1026 MM1245 MM1134	V _{CSL}	V _{CC} =3.7V, V _{BATT} =3V, I _{CS} =1μA			0.1	V
CS output voltage H		V _{CSH}	V _{CC} =5V, V _{BATT} =3V, I _{CS} =-1μA	4.90			V
CS output voltage L		V _{CSL}	V _{CC} =5V, V _{BATT} =3V, I _{CS} =1μA			0.1	V
CS output voltage H		V _{CSH}	V _{CC} =3.7V, V _{BATT} =3V, I _{CS} =-1μA	V _O -0.1			V
Detection voltage temperature characteristic		V _S /ΔT				±0.05	%/°C
ON delay time	MM1245	T _{dON}	CTC=OPEN		50		μS
OFF delay time		T _{dOFF}	CTC=OPEN		5		μS
T _C pin charge current	MM1245	I _{TC}	V _{CC} =5V, V _{BATT} =3V, V _{TC} =0V	0.60	0.80	1.10	μA
CS source current		I _{CS} SOU	V _{CC} =5V, V _{BATT} =3V, V _{CS} =4.5V	25	50	80	μA
Power supply switching voltage		V _B	V _{CC} =H→L	3.15	3.30	3.45	V
Hysteresis voltage		ΔV _B	V _{CC} =L→H		100		mV
Switching voltage temperature characteristic		V _B /ΔT				±0.05	%/°C
Loss current		I _{BL}	V _{CC} =0V, V _{BATT} =3V, I _{o2} =0μA			0.1	μA
I/O voltage difference 2		V _{sat2}	V _{CC} =0V, V _{BATT} =3V, I _{o2} =1μA		0.2	0.3	V
Output voltage 4		V _{o4}	V _{CC} =0V, V _{BATT} =3V, I _{o2} =1μA	2.7	2.8		V
Output voltage 5		V _{o5}	V _{CC} =0V, V _{BATT} =3V, I _{o2} =100μA	2.6	2.7		V
Reverse current		I _{OREV}	V _{CC} =5V, V _{BATT} =0V			0.1	μA
Y pin Lo H level current	MM1134	I _{YLO}	V _{CC} =5V, V _{BATT} =3V, V _Y =0V		150	400	μA
Reference voltage (typical)		V _{REF}			1.25		V

Note : Detection voltage ranks

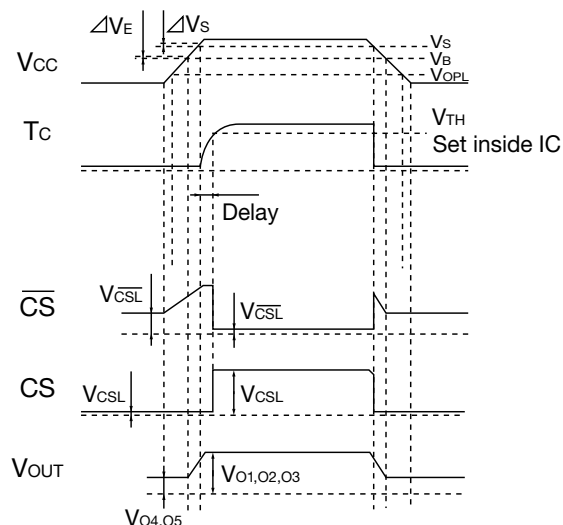
A, B	— MM1026
B	— MM1134, MM1080
B, C	— MM1245

Timing Chart

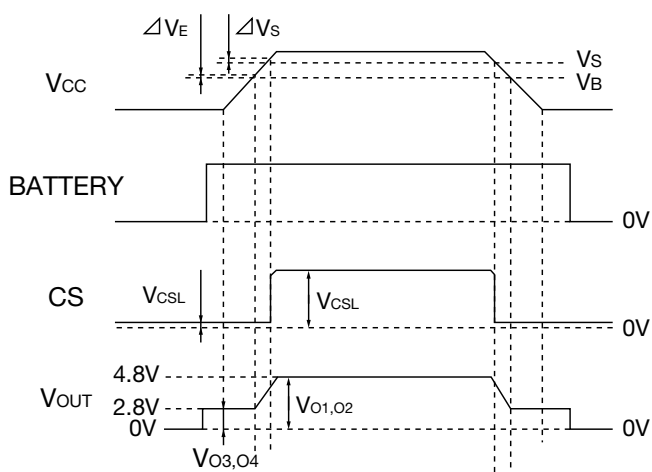
MM1026



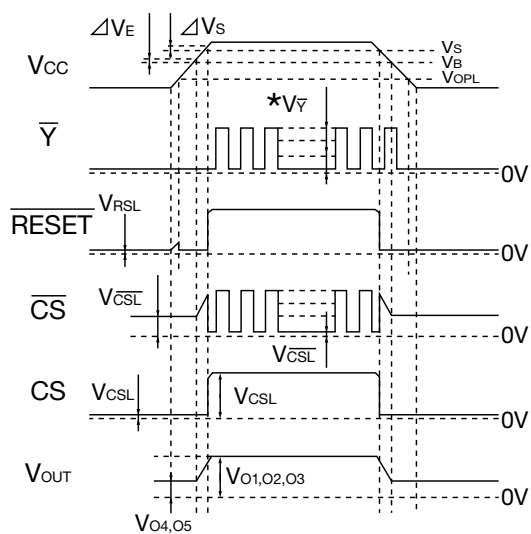
MM1245



MM1080



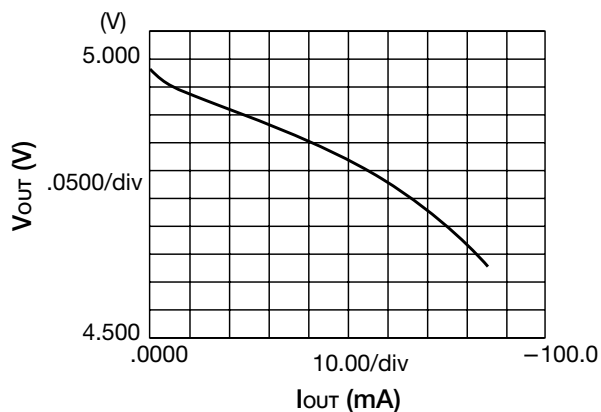
MM1134



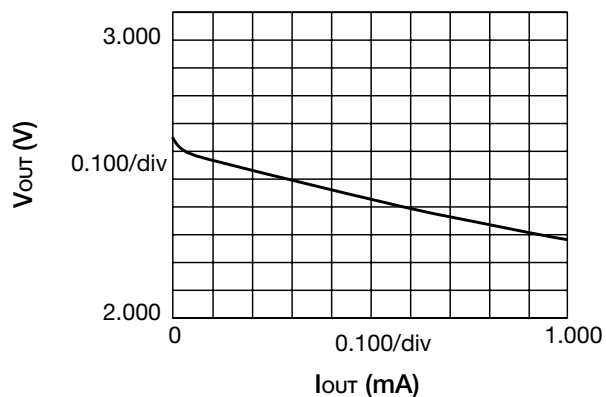
* Use $\overline{\text{Y}}$ pin input voltage at less than 5V when $V_{\text{CC}} \leq V_{\text{S}}$.

Characteristics (MM1026, MM1134 series)

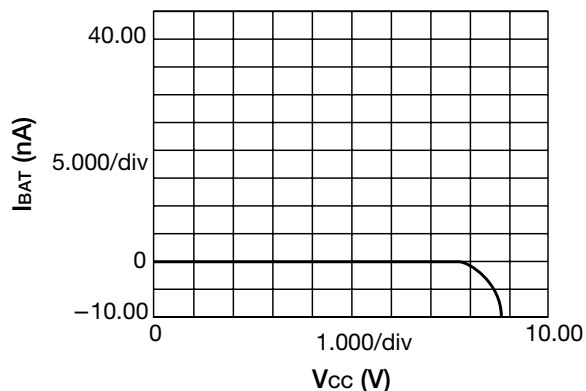
V_{OUT}-I_{OUT} (V_{CC}=5.0V)



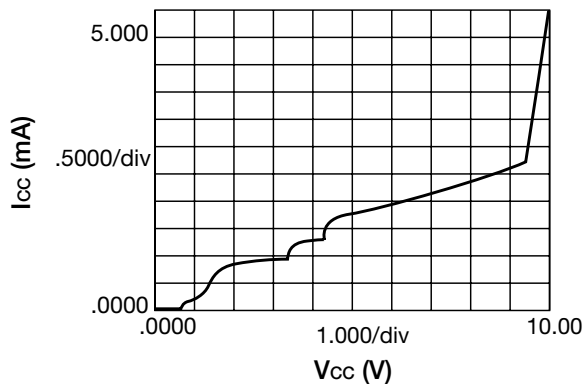
V_{OUT}-I_{OUT} (V_{BAT}=3.0V)



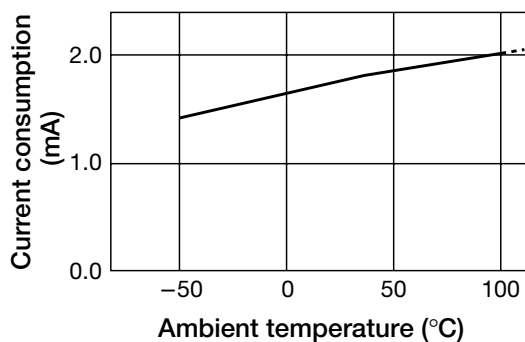
■ V_{CC}-I_{BAT}



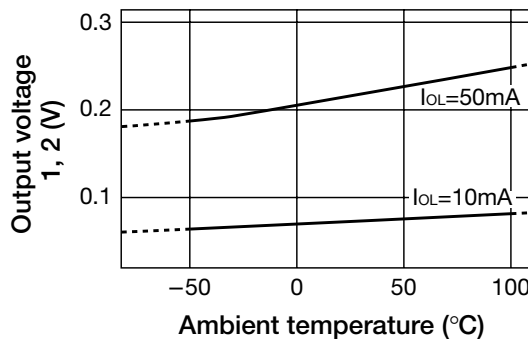
■ V_{CC}-I_{CC}



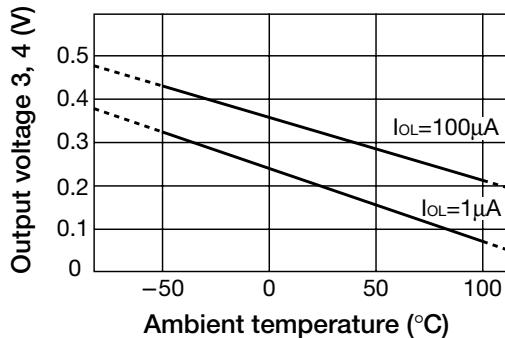
■ Current consumption-Temperature characteristics



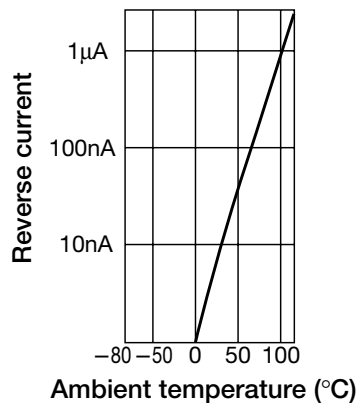
■ Output voltage 1, 2-Temperature characteristics



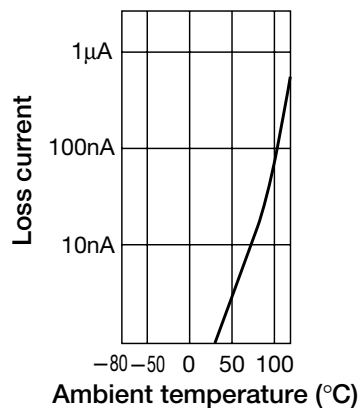
■ Output voltage 3, 4-Temperature



■ Reverse current-Temperature

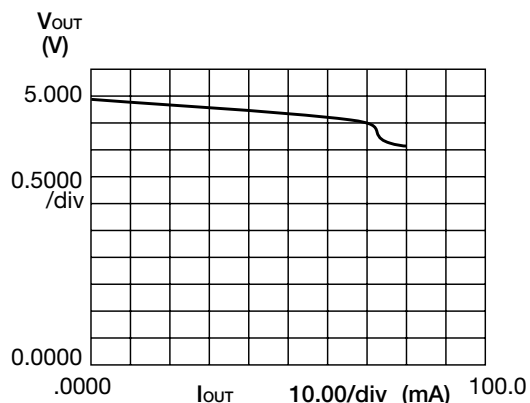


■ Loss current-Temperature

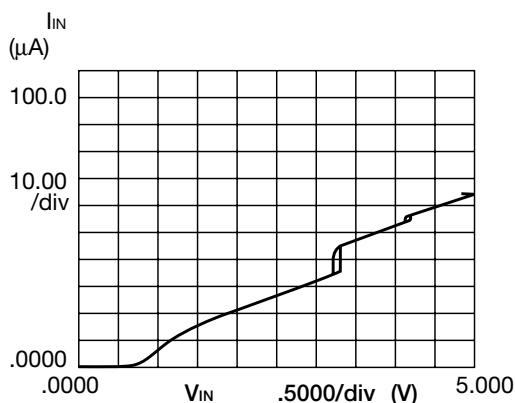


Characteristics (MM1080 series)

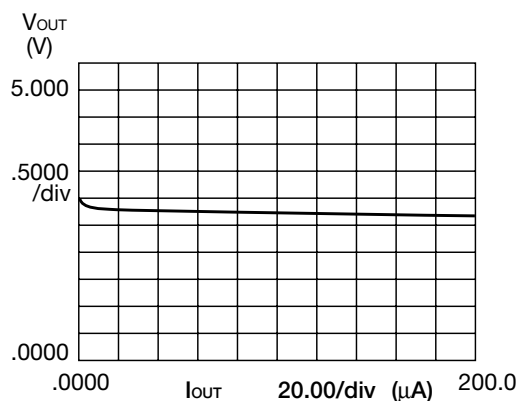
Current consumption-Temperature ($V_{CC}=5V$)



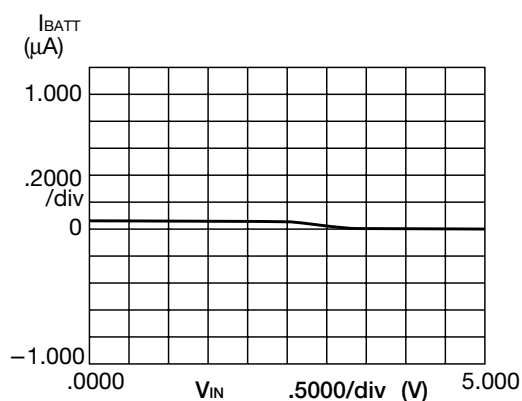
$V_{IN}-I_{IN}$



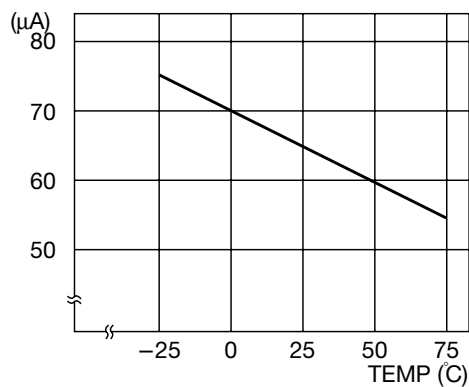
$V_{OUT}-I_{OUT}$ ($V_{BAT}=3.0V$)



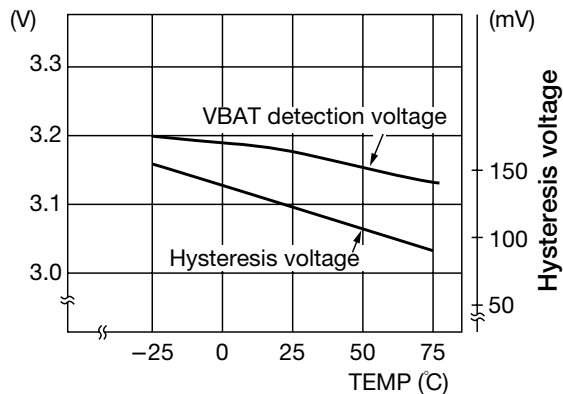
$V_{IN}-I_{BATT}$



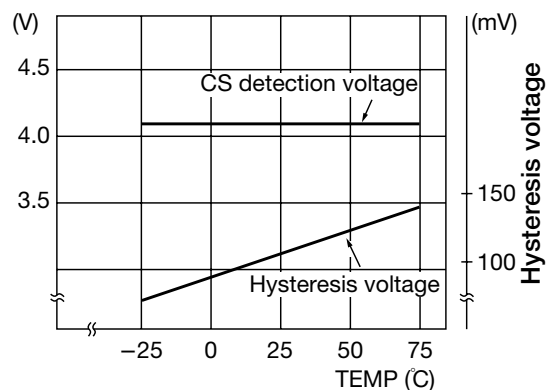
Current consumption-Temperature ($V_{CC}=5V$)



V_{BAT} detection voltage-Temperature

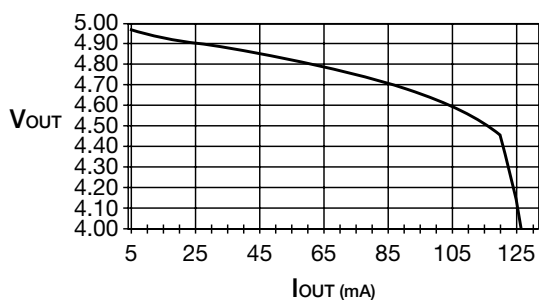


CS detection voltage-Temperature

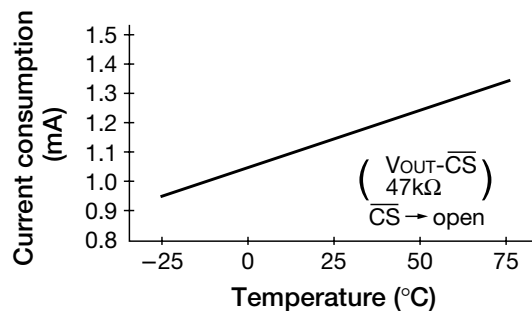


Characteristics (MM1245 series)

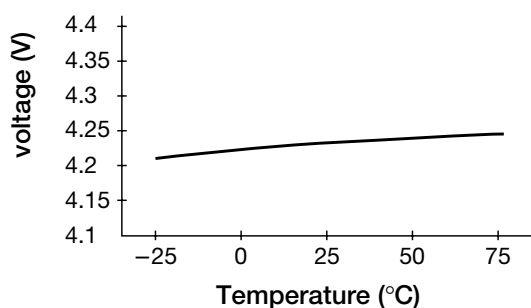
I_{OUT}-V_{OUT}



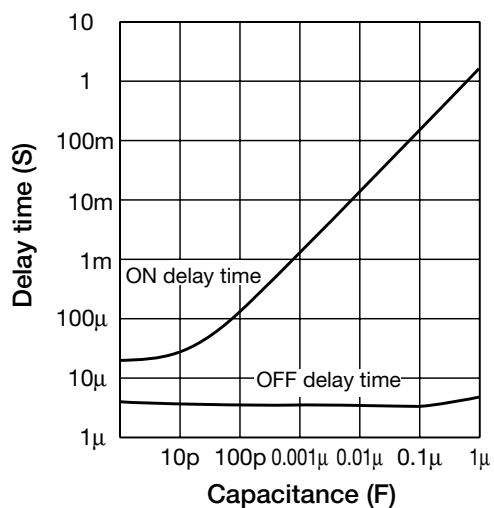
Current consumption-Temperature



CS detection voltage-Temperature



CS-CS pin ON/OFF delay time vs. capacitance TC



Use 1S max. for CS-CS pin ON delay time.

V_{BAT} detection voltage-Temperature

