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 60µA 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)		0.3µA typ.
2. Drop voltage inside IC (input/output voltage difference)	I_O=100µA	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=50µA	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.	

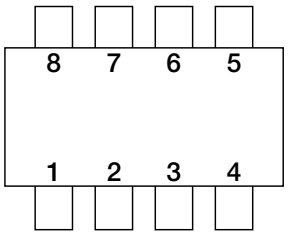
Package

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

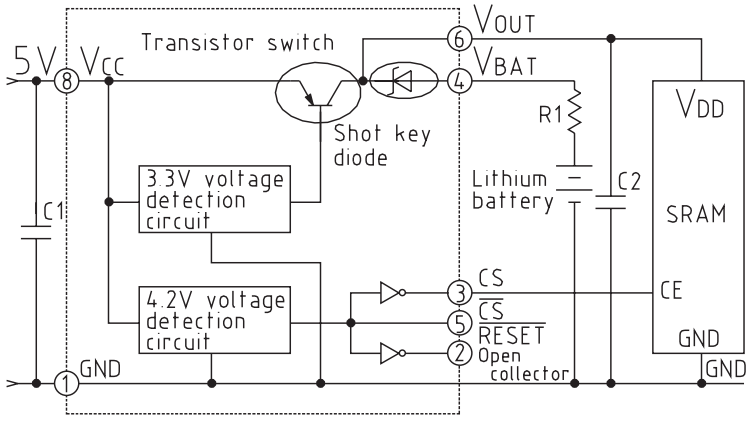


DIP-8P(C)/SOP-8P(C)/SOP-8P(C) Taping

Pin no.	Pin name			
	MM1026	MM1245	MM1080	MM1134
1	GND	GND	GND	GND
2	$\overline{\text{RESET}}$	Tc	NC	$\overline{\text{RESET}}$
3	CS	CS	CS	CS
4	V_{BATT}	V_{BATT}	V_{BATT}	V_{BATT}
5	$\overline{\text{CS}}$	$\overline{\text{CS}}$	NC	$\overline{\text{CS}}$
6	V_{OUT}	V_{OUT}	V_{OUT}	V_{OUT}
7	NC	Tr.B	NC	$\overline{\text{Y}}$
8	V_{CC}	V_{CC}	V_{CC}	V_{CC}

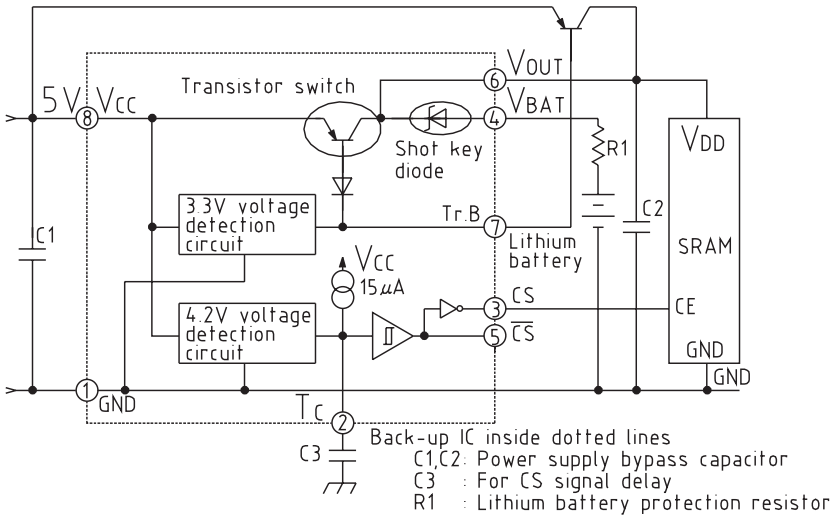
Block Diagram

MM1026



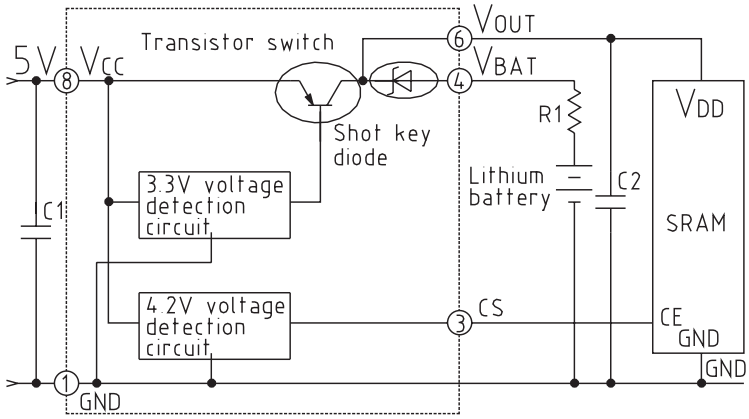
Back-up IC inside dotted lines
C1,C2: Power supply bypass capacitor
R1 : Lithium battery protection resistor

MM1245



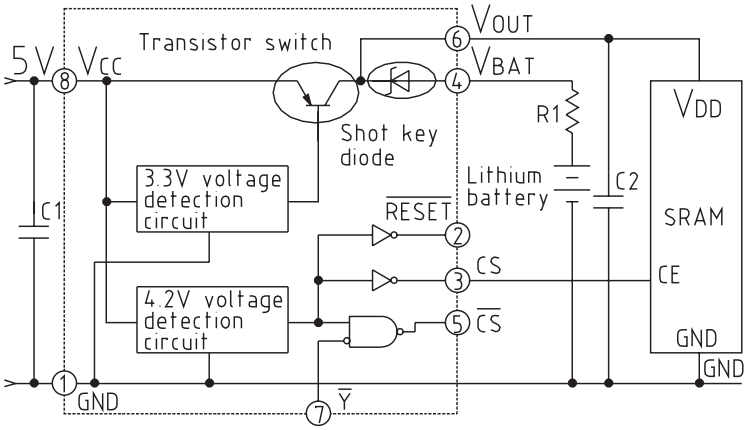
Back-up IC inside dotted lines
C1,C2: Power supply bypass capacitor
C3 : For CS signal delay
R1 : Lithium battery protection resistor

MM1080



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

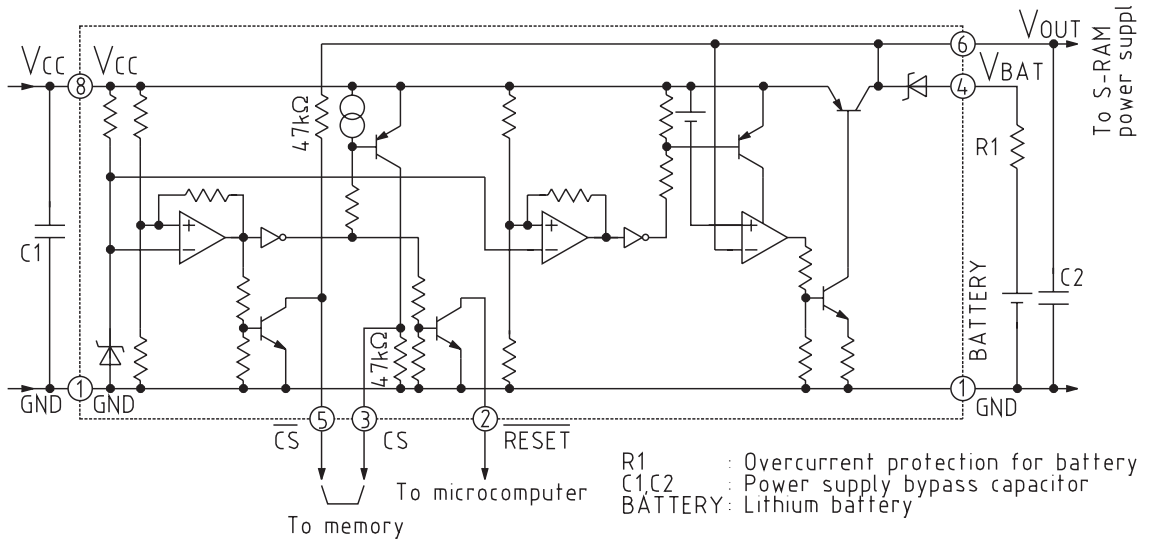
MM1134



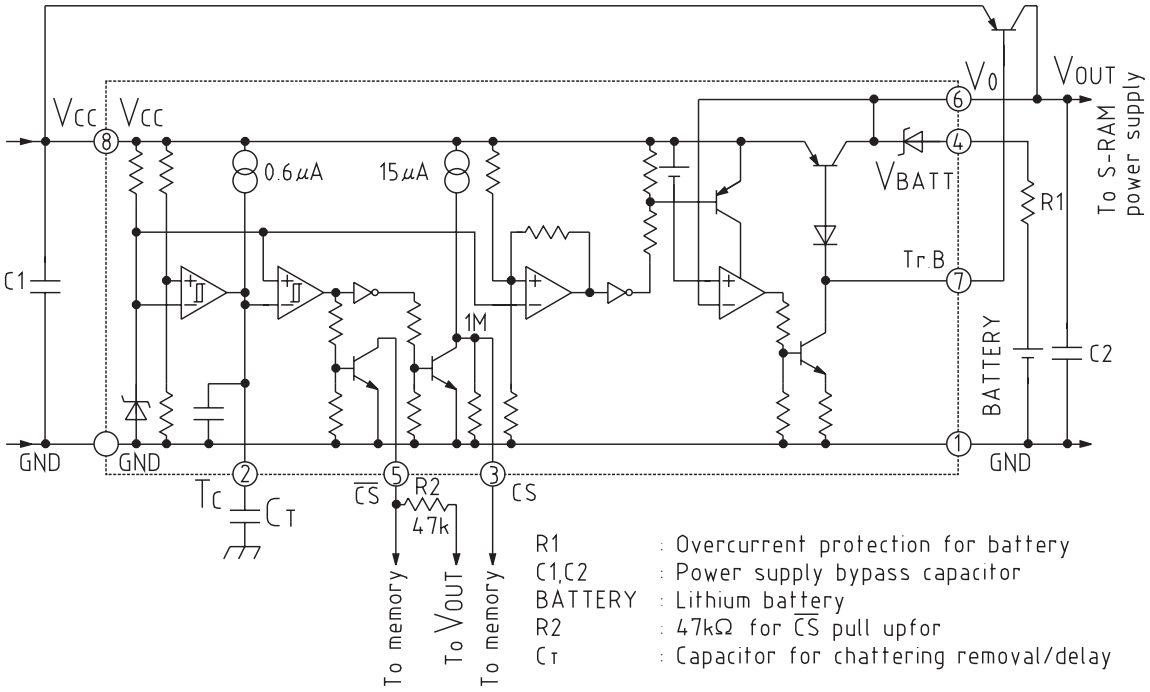
Back-up IC inside dotted lines
C1,C2: Power supply bypass capacitor
R1 : Lithium battery protection resistor

Equivalent Circuit Diagram

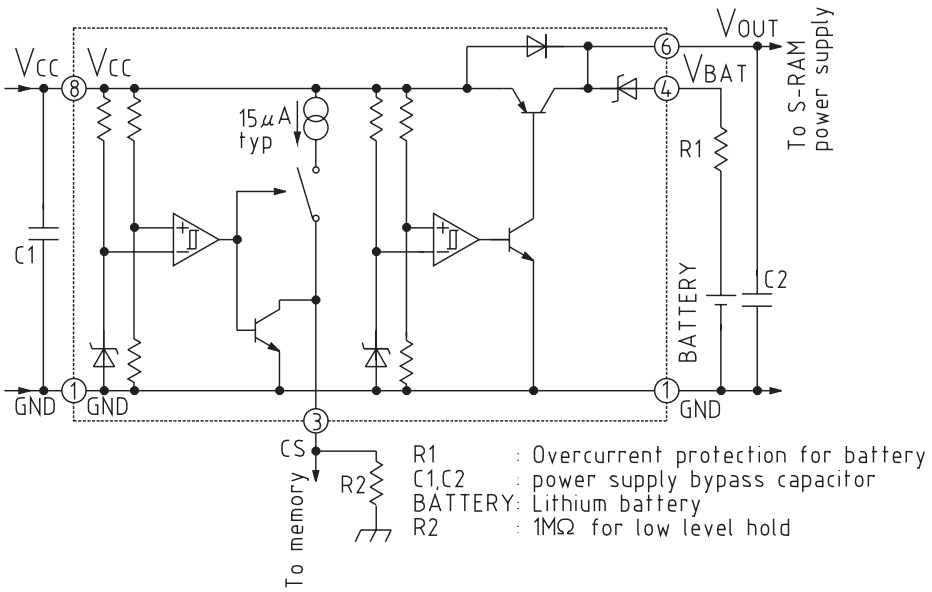
MM1026



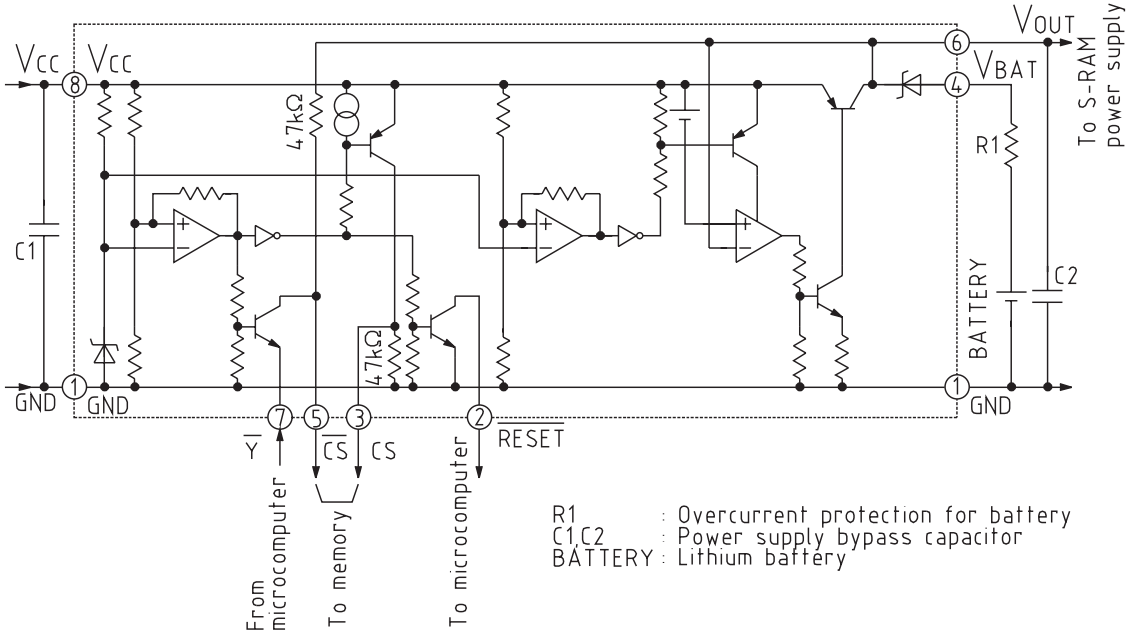
MM1245



MM1080



MM1134



Absolute Maximum Ratings (Ta=25℃)

Item		Symbol	Rating	Units
Storage temperature		T_{STG}	−40~+125	℃
Operating temperature		T_{OPR}	−20~+75	℃
Power supply voltage		V_{CC} max.	7	V
Operating voltage		V_{CCOP}	7	V
Allowable loss		Pd	300	mW
Output current	MM1245 MM1026 MM1134	I_{O1}	80	mA
	MM1080		50	mA
Output current		I_{O2}	200	μA

Note : I_{O1} expresses V_{CC} output current value, and I_{O2} expresses V_{BATT} output current value.

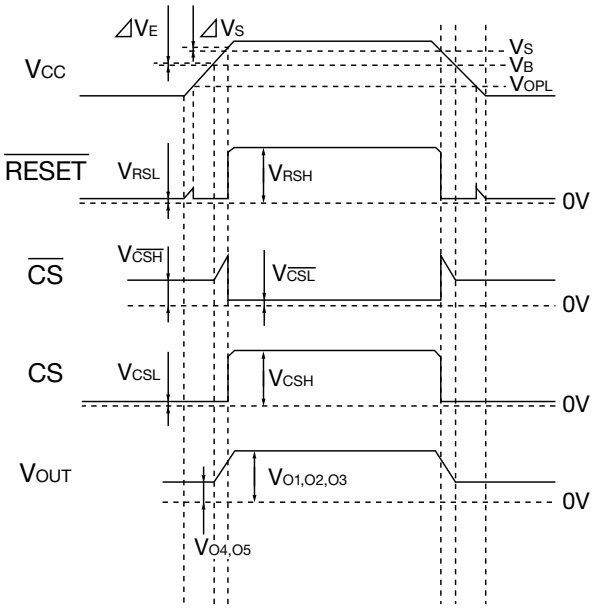
Electrical Characteristics (Except where noted otherwise, Ta=25°C, V_{CC}=V_{RS}=5V, R_{RS}=10kΩ)

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		$V_{SAT}1$	V_{CC}=5V, V_{BATT}=3V, I_{O1}=1mA		0.03	0.05	V
Output voltage 1		$V_{O}1$	V_{CC}=5V, V_{BATT}=3V, I_{O1}=1mA	4.95	4.97		V
I/O voltage difference 2	MM1245	$V_{SAT}2$	V_{CC}=5V, V_{BATT}=3V, I_{O1}=30mA		0.15	0.30	V
Output voltage 2	MM1026 MM1134	$V_{O}2$	V_{CC}=5V, V_{BATT}=3V, I_{O1}=15mA	4.75	4.90		V
	MM1080		V_{CC}=5V, V_{BATT}=3V, I_{O1}=30mA	4.5	4.7		V
I/O voltage difference 3	MM1245	$V_{SAT}3$	V_{CC}=5V, V_{BATT}=3V, I_{O1}=80mA		0.30	0.50	
Output voltage 3	Except MM1245	$V_{O}3$	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		⊿V_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 MM1134	V_{RSL}	V_{CC}=3V		0.2	0.4	V
Reset leakage current H		I_{RSH}	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
$\overline{CS}$ output voltage L		V_{CSL}	V_{CC}=5V, V_{BATT}=3V, I_{CS}=1µA			0.1	V
$\overline{CS}$ 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/⊿T				±0.05	%/°C
ON delay time	MM1245	T_{DON}	CTC=OPEN		50		µS
OFF delay time		T_{DOFF}	CTC=OPEN		5		µS
Tc 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_{CSSOU}	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		⊿V_B	V_{CC}=L→H		100		mV
Switching voltage temperature characteristic		V_B/⊿T				±0.05	%/°C
Loss current		I_{BL}	V_{CC}=0V, V_{BATT}=3V, I_{O2}=0µA			0.1	µA
I/O voltage difference 2		Vsat2	V_{CC}=0V, V_{BATT}=3V, I_{O2}=1µA		0.2	0.3	V
Output voltage 4		$V_{O}4$	V_{CC}=0V, V_{BATT}=3V, I_{O2}=1µA	2.7	2.8		V
Output voltage 5		$V_{O}5$	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
$\overline{Y}$ 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

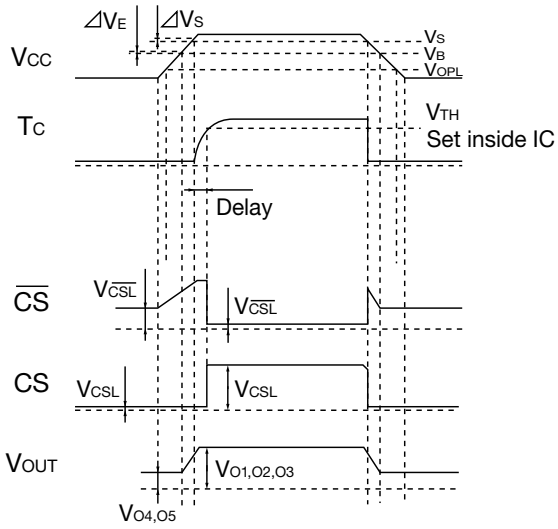
Note : Detection voltage ranks
A, B —— MM1026
B —— MM1134, MM1080
B, C —— MM1245

Timing Chart

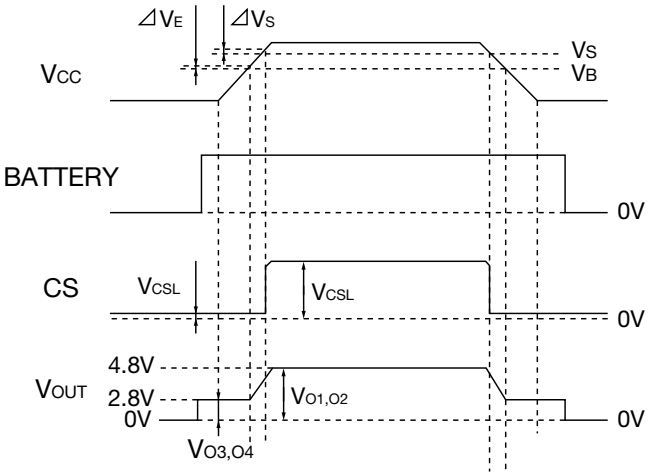
MM1026



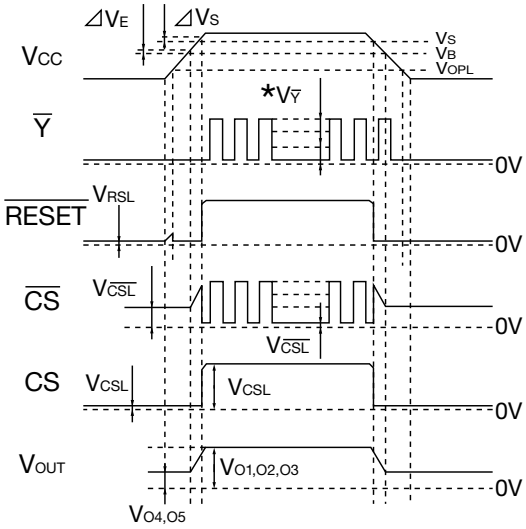
MM1245



MM1080



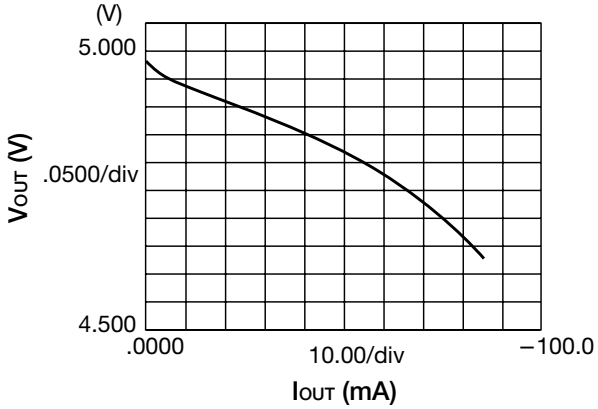
MM1134



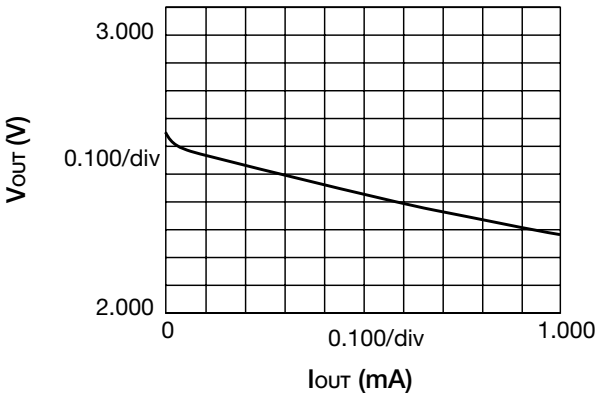
* Use $\overline{Y}$ pin input voltage at less than 5V when $V_{CC} \leqq V_S$.

Characteristics (MM1026, MM1134 series)

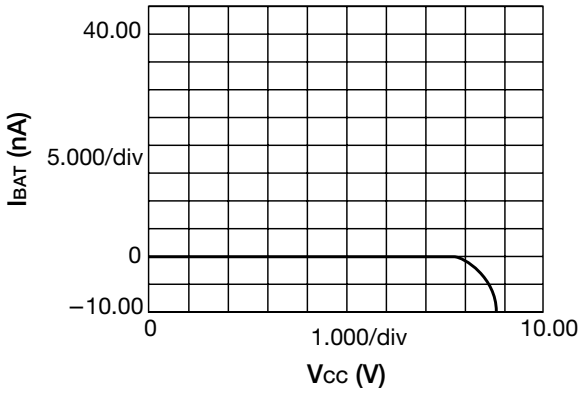
VOUT-IOUT (VCC=5.0V)



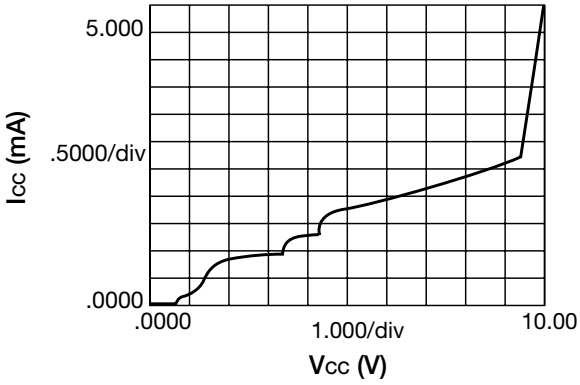
VOUT-IOUT (VBAT=3.0V)



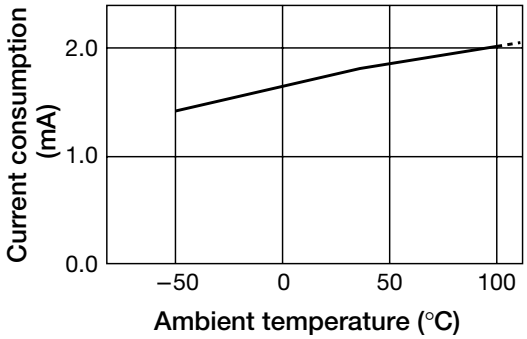
VCC-IBAT



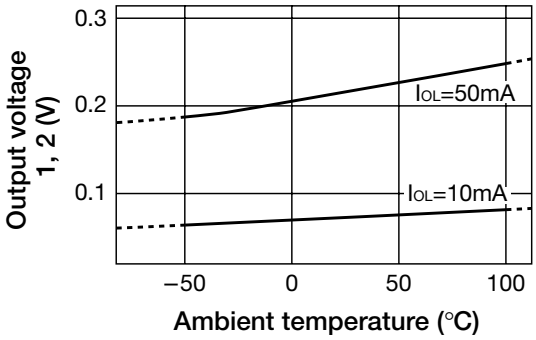
VCC-ICC



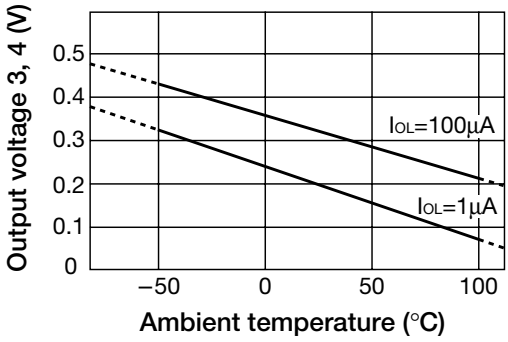
Current consumption-Temperature characteristics



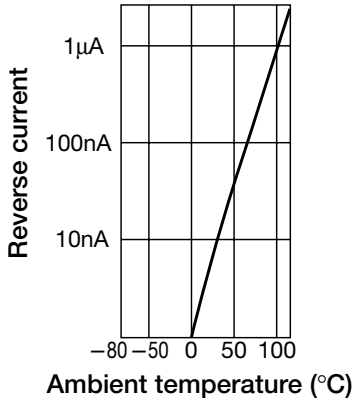
Output voltage 1, 2-Temperature characteristics



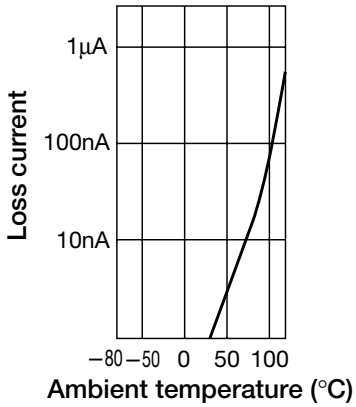
Output voltage 3, 4-Temperature



Reverse current-Temperature

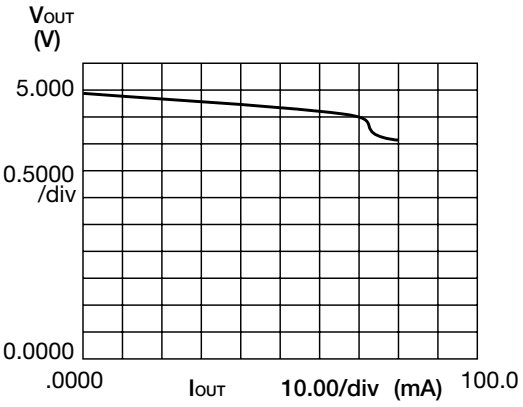


Loss current-Temperature

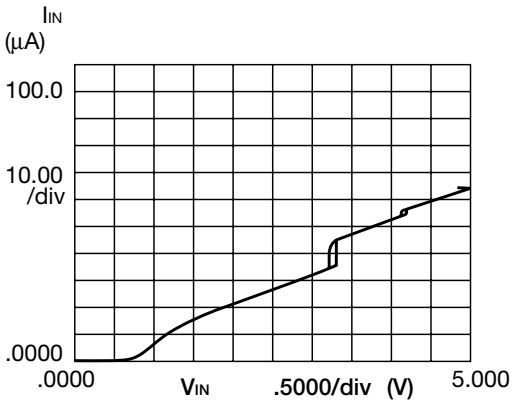


Characteristics (MM1080 series)

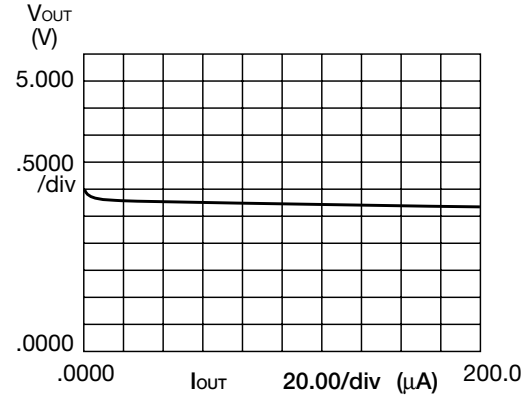
Current consumption-Temperature (Vcc=5V)



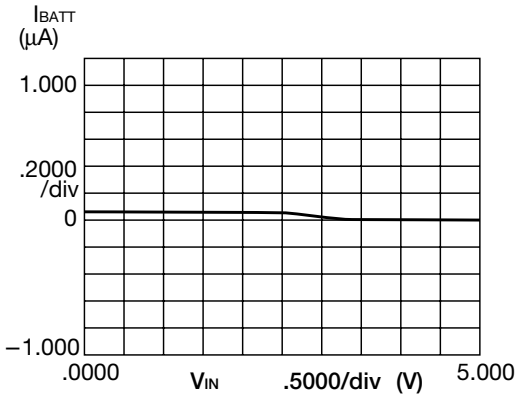
VIN-IIN



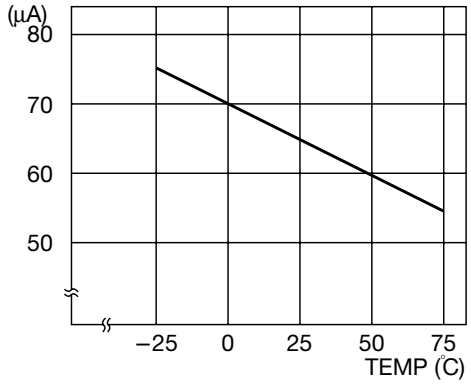
VOUT-IOUT (VBAT-3.0V)



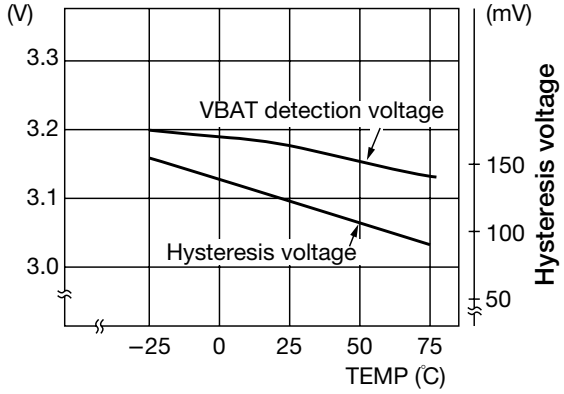
VIN-IBATT



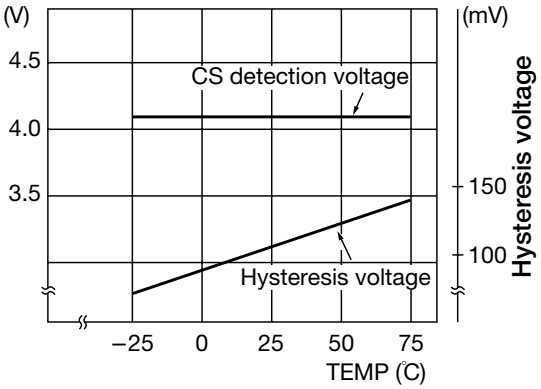
Current consumption-Temperature (Vcc=5V)



VBAT detection voltage-Temperature

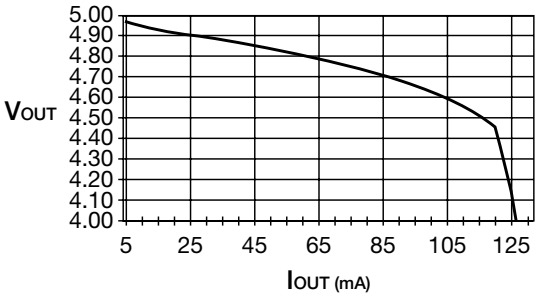


CS detection voltage-Temperature

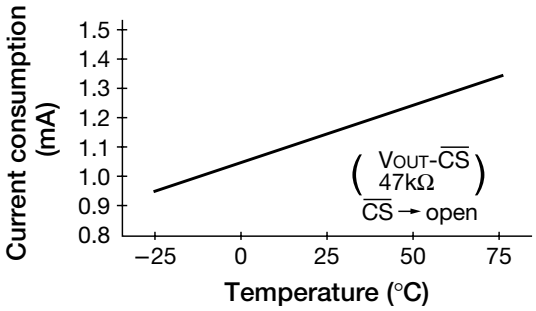


Characteristics (MM1245 series)

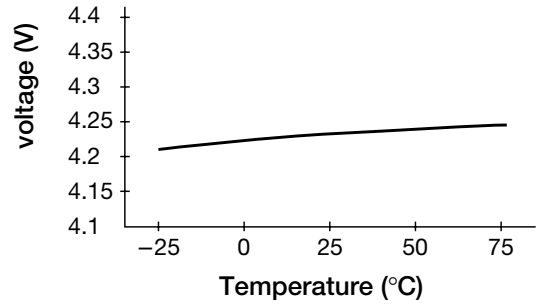
IOUT-VOUT



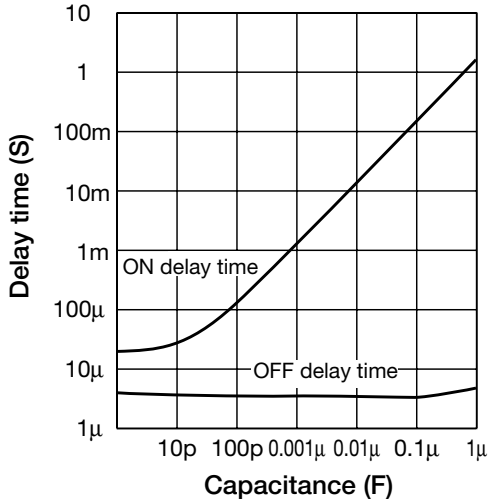
Current consumption-Temperature

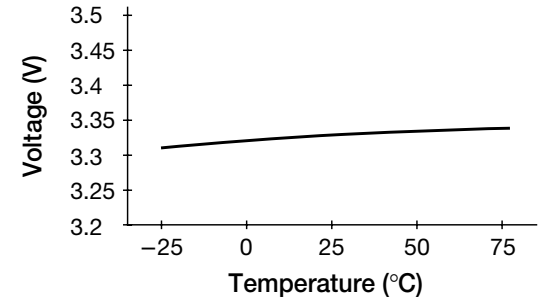


CS detection voltage-Temperature



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



Use 1S max. for CS-$\overline{CS}$ pin ON delay time.

VBAT detection voltage-Temperature