System Reset (with battery back-up)
Monolithic IC MM1025, 1174

Outline

These ICs were developed for D-RAM and dummy S-RAM battery back-up. D-RAM and dummy S-RAM power supplies differ from that of S-RAMs because 5V or 3.3V of power supply is required even during battery back-up. Therefore, these ICs provide voltage from a stable power supply during both normal operation and back-up. Also, the internal stable power supply switches automatically to battery back-up if the main power supply voltage goes down for any reason.

Features

1. Battery back-up
    MM1025
        Current consumption   600µA typ.
        Input/output voltage difference I_L=40mA   0.25V typ.
        Output current   40mA max.
    MM1174
        Current consumption   300µA typ.
        Input/output voltage difference I_L=40mA   0.13V typ.
        Output current   40mA max.
2. Normal operation
    MM1025
        Input/output voltage difference I_L=80mA (built-in transistor)   0.29V typ.
        Output current V_{CC}=6V   80mA typ.
        External transistor drive current V_{CC}= 6V   15mA typ.
        Current consumption   900µA max.
    MM1174 (for external transistor)
        Input/output voltage difference I_L=200mA   0.13V typ.
        Output current   Depends on external transistor
        External transistor drive current (no built-in TR) V_{CC}=3.6V   10mA typ.
        Current consumption   500µA max.

3. Switching voltage from V_{CC} to Battery V_{CC}=High→Low
    MM1025   4.9V typ.
    MM1174   3.25V typ.
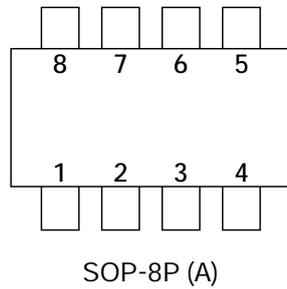4. V_{CC}-Battery forced switching and detection voltage adjustment possible

Package

SOP-8A

Applications

1. Memory cards (D-RAM cards, other)
2. PCs, word processors and other equipment with D-RAMs
3. Fax machines, photocopiers and other office equipment with D-RAMs
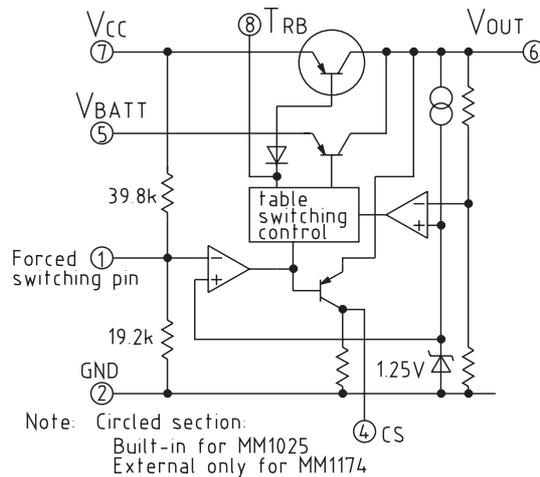
Pin Assignment

SOP-8P (A)

1	
2	GND
3	GND
4	CS
5	V$_{BATT}$
6	V$_{OUT}$
7	V$_{CC}$
8	TRB

Pin Description

Pin No.	Pin name	Function
1		Forced switching and detection voltage adjustment
2	GND	
3	GND	
4	CS	
5	V$_{BATT}$	
6	V$_{OUT}$	
7	V$_{CC}$	
8	T$_{RB}$	External transistor drive

Block Diagram

Note: Circled section:
Built-in for MM1025
External only for MM1174

Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Units
Operating temperature	T$_{OPR}$	−20~+70	°C
Storage temperature	T$_{STG}$	40~+125	°C
Maximum output current 1	I$_L$ max.	80	mA
Maximum output current 2	I$_L$ max.	40	mA
Power supply voltage	V$_{CC}$	−0.3~+18	V
Power consumption	Pd	300	mW

Electrical Characteristics (Ta=25℃)

Item		Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Consumption current 1	MM1025	I_{CC}	V_{CC}=6V, V_{BATT}=0V, I_L=0mA	0.6	0.9	1.20	mA
	MM1174		V_{CC}=3.6V, V_{BATT}=0V, I_L=0mA	0.25	0.50	1.00	
I/O voltage difference 1 *1	MM1025	$V_{SAT}1$	V_{CC}=5V, V_{BATT}=0V, I_L=80mA	0.15	0.29	0.40	V
	MM1174		V_{CC}=3.0V, V_{BATT}=0V, I_L=200mA		0.13	020	
Consumption current 2	MM1025	I_{BATT}	V_{CC}=0V, V_{BATT}=6V, I_L=0mA	400	600	780	μA
	MM1174		V_{CC}=0V, V_{BATT}=3.6V, I_L=0mA	150	300	600	
I/O voltage difference 2	MM1025	$V_{SAT}2$	V_{CC}=0V, V_{BATT}=5V, I_L=40mA	0.15	0.25	0.40	V
	MM1174		V_{CC}=0V, V_{BATT}=3.0V, I_L=20mA		0.13	0.20	
Output voltage	MM1025	V_{OUT}	V_{CC}=6V or V_{BATT}=6V, I_L=5mA	4.8	5.0	5.2	V
	MM1174		V_{CC}=3.6V or V_{BATT}=3.6V, I_L=3mA	3.14	3.27	3.40	
Load fluctuation rate	MM1025	REG-L	V_{CC} : I_L=0-80mA, V_{BATT} : I_L=0-40mA			0.05	%/mA
	MM1174		V_{CC}=0V, V_{BATT}=3.6V, I_L=0~20mA			0.05	
Input fluctuation rate	MM1025	REG-IN	V_{CC} or V_{BATT}=5.5~10V, I_L=5mA			0.05	%/V
	MM1174		V_{CC} or V_{BATT}=3.6V~10V, I_L=3mA			0.05	
Output voltage emperature coefficient	MM1025	TC_{VO}	V_{CC} or V_{BATT}=6V, I_L=5mA		0.01		%/℃
	MM1174		V_{CC} or V_{BATT}=3.6V, I_L=3mA		0.01		
Switching voltage (H→L)	MM1025	$V_{TH}1$	V_{CC}=6V→4V, V_{BATT}=6V, I_L=40mA	4.8	4.9	5.1	V
	MM1174		V_{CC}=4V→3V, V_{BATT}=3.6V, I_L=3mA	3.1	3.25	3.4	
Hysteresis voltage	MM1025	V_{HYS}	V_{CC}=4V→6V, V_{BATT}=6V, I_L=40mA	100	200	400	mV
	MM1174		V_{CC}=3V→4V, V_{BATT}=3.6V, I_L=3mA	15	30	60	
Maximum base driving current	MM1025	I_B max.	V_{CC}=6V, V_{CC}→Ampere meter→8PIN	9.0	15.0	20.0	mA
	MM1174		V_{CC}=3.6V, V_{CC}→Ampere meter→8PIN	5.0	10.0	20.0	
CS output voltage H	MM1025	△V_{CSH}	V_{CC}=6V, V_{BATT}=6V, V_{OUT}-V_{CS}		0.10	0.50	V
	MM1174		V_{CC}=3.6V, V_{BATT}=3.6V, V_{OUT}-V_{CS}		0.10	0.50	
CS output voltage L	MM1025	V_{CSL}	V_{CC}=4V, V_{BATT}=6V			0.50	V
	MM1174		V_{CC}=3.0V, V_{BATT}=3.6V			0.50	

Timing Chart
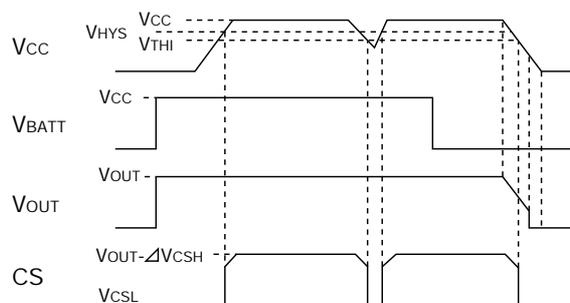
Characteristics (MM1025 series)

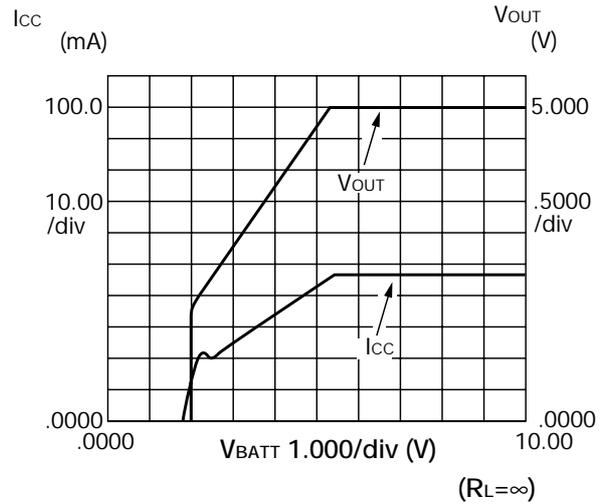### ■ Output voltage and current consumption for V_{CC} voltage supply
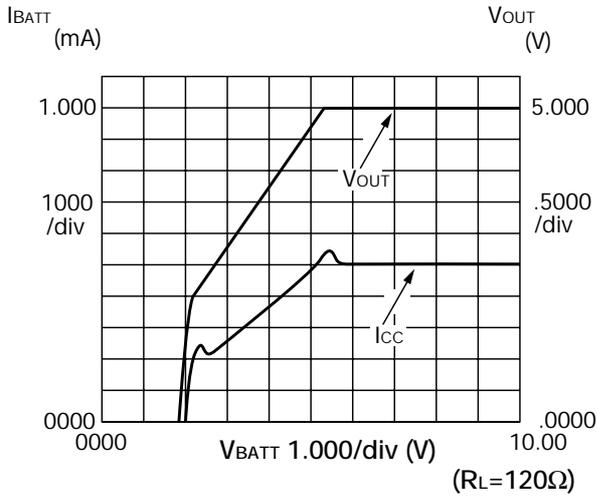
I_{BATT} (mA) V_{OUT} (V)

1.000 ────────────── 5.000

1000 /div

V_{OUT}

.5000 /div

I_{CC}

0000 ────────────── .0000
0000   10.00

V_{BATT} 1.000/div (V)

(R_L=120Ω)

■ Output voltage and current consumption for battery voltage supply

I_{BATT} (mA) V_{OUT} (V)

100.0 ────────────── 5.000

10.00 /div

V_{OUT}

.5000 /div

I_{CC}

.0000 ────────────── .0000
.0000   10.00

V_{BATT} 1.000/div (V)

(R_L=120Ω)

■ Output voltage and current consumption for V_{CC} voltage supply

I_{CC} (mA) V_{OUT} (V)

2.000 ────────────── 5.000

2000 /div

V_{OUT}

.5000 /div

I_{CC}

.0000 ────────────── .0000
.0000   10.00

V_{CC} 1.000/div (V)

(R_L=∞)

■ Output voltage and current consumption for battery voltage supply

I_{CC} (mA) V_{OUT} (V)

100.0 ────────────── 5.000

10.00 /div

V_{OUT}

.5000 /div

I_{CC}

.0000 ────────────── .0000
.0000   10.00

V_{BATT} 1.000/div (V)

(R_L=∞)
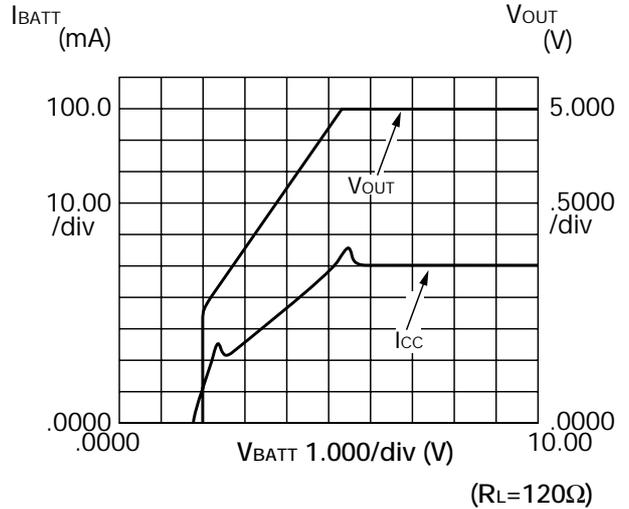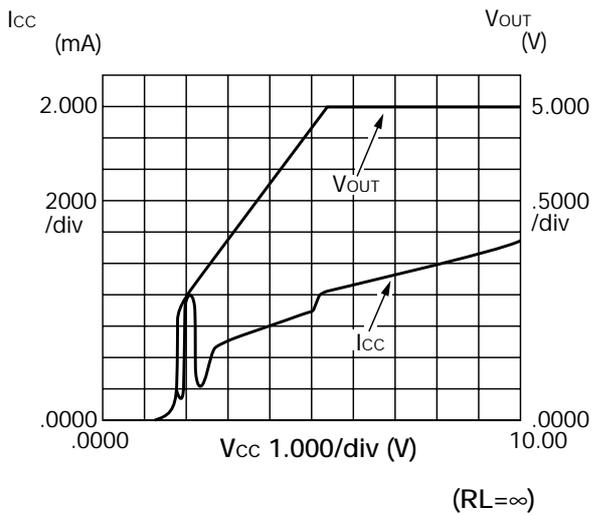
■ Power supply switching voltage

V_{OUT} (V) I_{CC} (mA)

5.000 ────────────── 100.0

.5000 /div

10.00 /div

.0000 ────────────── .0000
4.0000   6.000

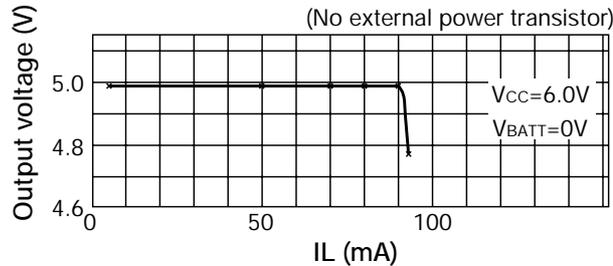V_{CC} .2000/div (V)

(Ta = ambient temperature)
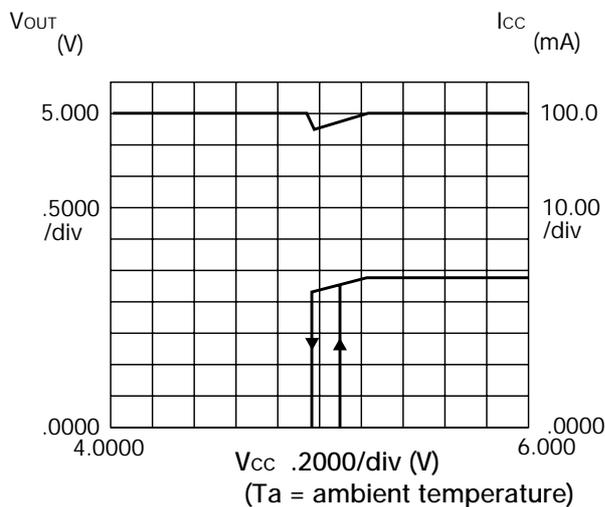
■ V_{CC} output current (external power transistor)
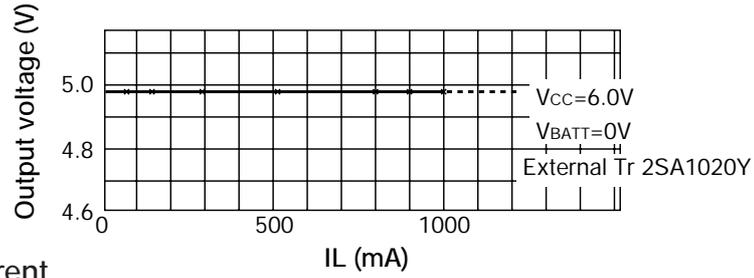
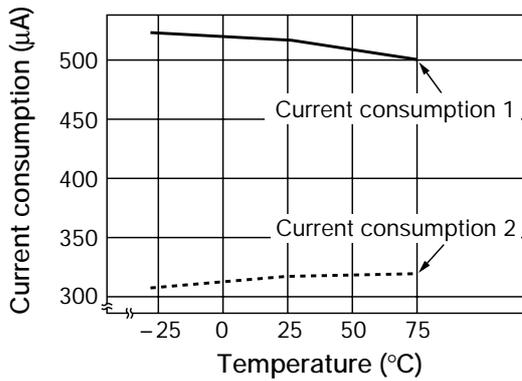

■ V_{BATT} output current
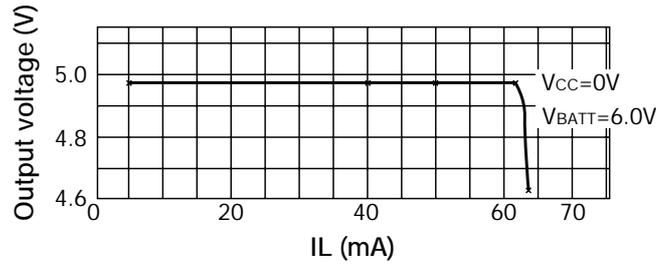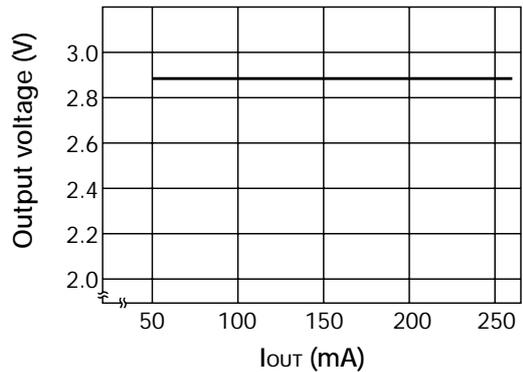

■ V_{CC} output current (no external power transistor)
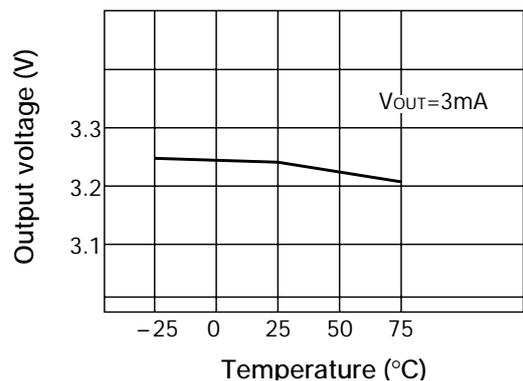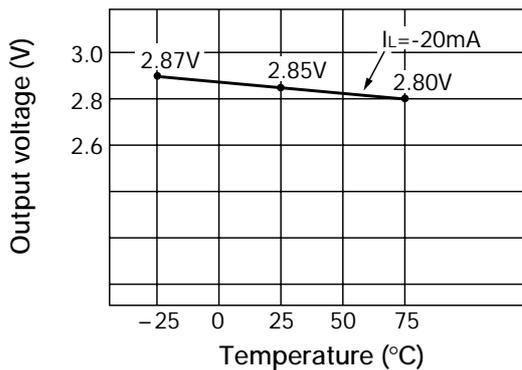

Characteristics (MM1174 series)
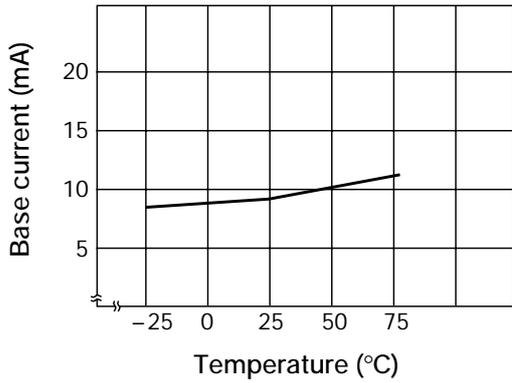
■ Current consumption 1-2 temperatures

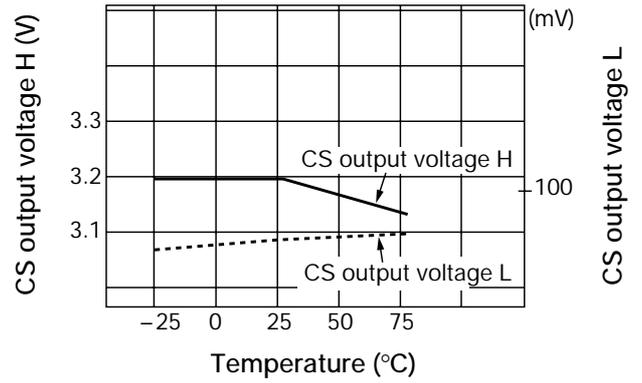■ Input/output voltage difference 1 temperature (external transistor 2SA1020)

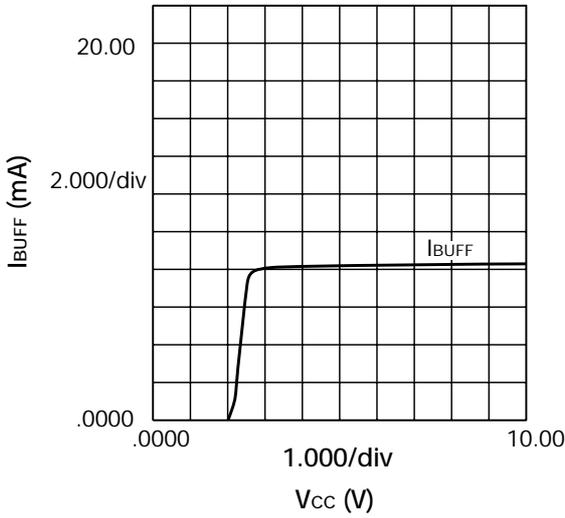■ Input/output voltage difference 2 temperature

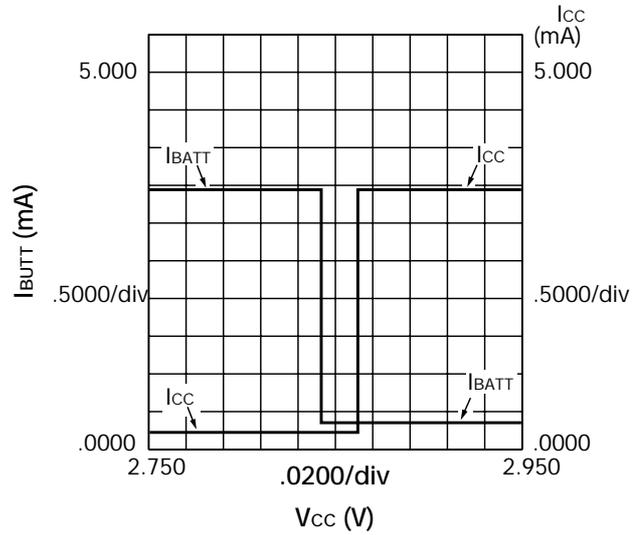■ Output voltage－Temperature

■ Maximum base drive current-Temperature   ■ CS output voltage H-L temperature

Base current (mA) vs Temperature (°C)

CS output voltage H (V) / CS output voltage L (mV) vs Temperature (°C)

■ Base drive current   ■ $V_{CC} - I_{CC}, I_{BATT}$

I_{BUFF} (mA) vs V_{CC} (V)

I_{BUTT} (mA) / I_{CC} (mA) vs V_{CC} (V)

■ $V_{CC} - V_{OUT}, V_{CS}$

V_{OUT} (V) / V_{CS} (V) vs V_{CC} (V)