

# 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 $I_L=40\text{mA}$ | 0.25V typ. |
| Output current                                    | 40mA max.  |

#### MM1174

|                                                   |            |
|---------------------------------------------------|------------|
| Current consumption                               | 300μA typ. |
| Input/output voltage difference $I_L=40\text{mA}$ | 0.13V typ. |
| Output current                                    | 40mA max.  |

### 2. Normal operation

#### MM1025

|                                                                         |            |
|-------------------------------------------------------------------------|------------|
| Input/output voltage difference $I_L=80\text{mA}$ (built-in transistor) | 0.29V typ. |
| Output current $V_{CC}=6\text{V}$                                       | 80mA typ.  |
| External transistor drive current $V_{CC}=6\text{V}$                    | 15mA typ.  |
| Current consumption                                                     | 900μA max. |

#### MM1174 (for external transistor)

|                                                                         |                                |
|-------------------------------------------------------------------------|--------------------------------|
| Input/output voltage difference $I_L=200\text{mA}$                      | 0.13V typ.                     |
| Output current                                                          | Depends on external transistor |
| External transistor drive current (no built-in TR) $V_{CC}=3.6\text{V}$ | 10mA typ.                      |
| Current consumption                                                     | 500μA max.                     |

### 3. Switching voltage from $V_{CC}$ to Battery $V_{CC}=\text{High} \rightarrow \text{Low}$

|        |            |
|--------|------------|
| MM1025 | 4.9V typ.  |
| MM1174 | 3.25V typ. |

### 4. $V_{CC}$ -Battery forced switching and detection voltage adjustment possible

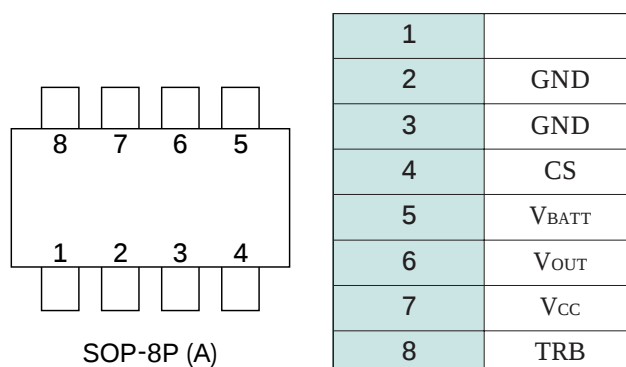
## Package

SOP-8A

## Applications

- Memory cards (D-RAM cards, other)
- PCs, word processors and other equipment with D-RAMs
- Fax machines, photocopiers and other office equipment with D-RAMs

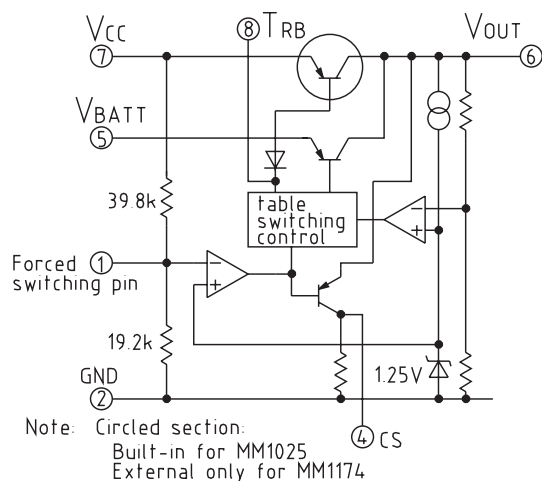
## Pin Assignment



## Pin Description

| Pin No. | Pin name          | Function                                          |
|---------|-------------------|---------------------------------------------------|
| 1       |                   | Forced switching and detection voltage adjustment |
| 2       | GND               |                                                   |
| 3       | GND               |                                                   |
| 4       | CS                |                                                   |
| 5       | V <sub>BATT</sub> |                                                   |
| 6       | V <sub>OUT</sub>  |                                                   |
| 7       | V <sub>CC</sub>   |                                                   |
| 8       | TRB               | External transistor drive                         |

## Block Diagram



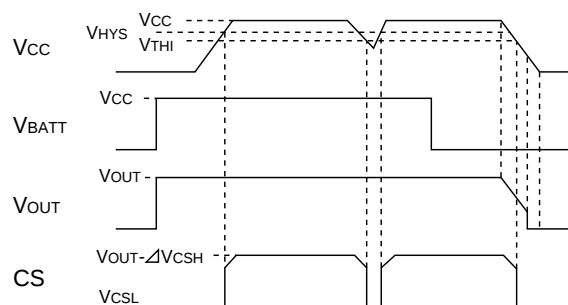
## Absolute Maximum Ratings (Ta=25°C)

| Item                     | Symbol              | Rating   | Units |
|--------------------------|---------------------|----------|-------|
| Operating temperature    | T <sub>OPR</sub>    | -20~+70  | °C    |
| Storage temperature      | T <sub>STG</sub>    | 40~+125  | °C    |
| Maximum output current 1 | I <sub>L</sub> max. | 80       | mA    |
| Maximum output current 2 | I <sub>L</sub> max. | 40       | mA    |
| Power supply voltage     | V <sub>CC</sub>     | -0.3~+18 | V     |
| Power consumption        | P <sub>d</sub>      | 300      | mW    |

## Electrical Characteristics (Ta=25°C)

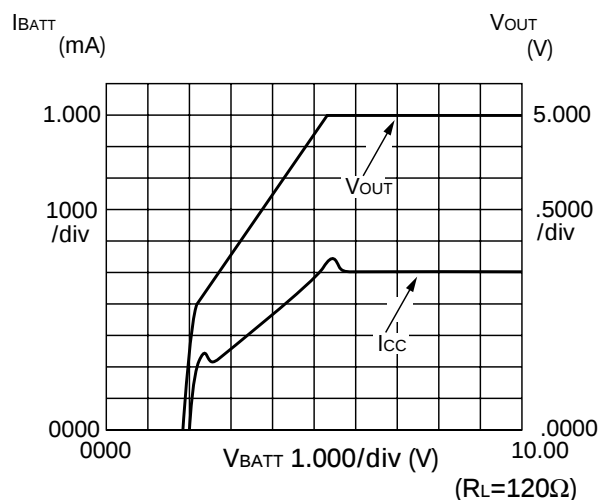
| Item                                   |        | Symbol              | Measurement conditions                                                               | Min. | Typ. | Max. | Units |
|----------------------------------------|--------|---------------------|--------------------------------------------------------------------------------------|------|------|------|-------|
| Consumption current 1                  | MM1025 | I <sub>CC</sub>     | V <sub>CC</sub> =6V, V <sub>BATT</sub> =0V, I <sub>L</sub> =0mA                      | 0.6  | 0.9  | 1.20 | mA    |
|                                        | MM1174 |                     | V <sub>CC</sub> =3.6V, V <sub>BATT</sub> =0V, I <sub>L</sub> =0mA                    | 0.25 | 0.50 | 1.00 |       |
| I/O voltage difference 1 *1            | MM1025 | V <sub>SAT1</sub>   | V <sub>CC</sub> =5V, V <sub>BATT</sub> =0V, I <sub>L</sub> =80mA                     | 0.15 | 0.29 | 0.40 | V     |
|                                        | MM1174 |                     | V <sub>CC</sub> =3.0V, V <sub>BATT</sub> =0V, I <sub>L</sub> =200mA                  |      | 0.13 | 0.20 |       |
| Consumption current 2                  | MM1025 | I <sub>BATT</sub>   | V <sub>CC</sub> =0V, V <sub>BATT</sub> =6V, I <sub>L</sub> =0mA                      | 400  | 600  | 780  | μA    |
|                                        | MM1174 |                     | V <sub>CC</sub> =0V, V <sub>BATT</sub> =3.6V, I <sub>L</sub> =0mA                    | 150  | 300  | 600  |       |
| I/O voltage difference 2               | MM1025 | V <sub>SAT2</sub>   | V <sub>CC</sub> =0V, V <sub>BATT</sub> =5V, I <sub>L</sub> =40mA                     | 0.15 | 0.25 | 0.40 | V     |
|                                        | MM1174 |                     | V <sub>CC</sub> =0V, V <sub>BATT</sub> =3.0V, I <sub>L</sub> =20mA                   |      | 0.13 | 0.20 |       |
| Output voltage                         | MM1025 | V <sub>OUT</sub>    | V <sub>CC</sub> =6V or V <sub>BATT</sub> =6V, I <sub>L</sub> =5mA                    | 4.8  | 5.0  | 5.2  | V     |
|                                        | MM1174 |                     | V <sub>CC</sub> =3.6V or V <sub>BATT</sub> =3.6V, I <sub>L</sub> =3mA                | 3.14 | 3.27 | 3.40 |       |
| Load fluctuation rate                  | MM1025 | REG-L               | V <sub>CC</sub> : I <sub>L</sub> =0~80mA, V <sub>BATT</sub> : I <sub>L</sub> =0~40mA |      |      | 0.05 | %/mA  |
|                                        | MM1174 |                     | V <sub>CC</sub> =0V, V <sub>BATT</sub> =3.6V, I <sub>L</sub> =0~20mA                 |      |      | 0.05 |       |
| Input fluctuation rate                 | MM1025 | REG-IN              | V <sub>CC</sub> or V <sub>BATT</sub> =5.5~10V, I <sub>L</sub> =5mA                   |      |      | 0.05 | %/V   |
|                                        | MM1174 |                     | V <sub>CC</sub> or V <sub>BATT</sub> =3.6V~10V, I <sub>L</sub> =3mA                  |      |      | 0.05 |       |
| Output voltage temperature coefficient | MM1025 | TC <sub>VO</sub>    | V <sub>CC</sub> or V <sub>BATT</sub> =6V, I <sub>L</sub> =5mA                        |      | 0.01 |      | %/°C  |
|                                        | MM1174 |                     | V <sub>CC</sub> or V <sub>BATT</sub> =3.6V, I <sub>L</sub> =3mA                      |      | 0.01 |      |       |
| Switching voltage (H→L)                | MM1025 | V <sub>TH1</sub>    | V <sub>CC</sub> =6V→4V, V <sub>BATT</sub> =6V, I <sub>L</sub> =40mA                  | 4.8  | 4.9  | 5.1  | V     |
|                                        | MM1174 |                     | V <sub>CC</sub> =4V→3V, V <sub>BATT</sub> =3.6V, I <sub>L</sub> =3mA                 | 3.1  | 3.25 | 3.4  |       |
| Hysteresis voltage                     | MM1025 | V <sub>HYS</sub>    | V <sub>CC</sub> =4V→6V, V <sub>BATT</sub> =6V, I <sub>L</sub> =40mA                  | 100  | 200  | 400  | mV    |
|                                        | MM1174 |                     | V <sub>CC</sub> =3V→4V, V <sub>BATT</sub> =3.6V, I <sub>L</sub> =3mA                 | 15   | 30   | 60   |       |
| Maximum base driving current           | MM1025 | I <sub>B</sub> max. | V <sub>CC</sub> =6V, V <sub>CC</sub> →Ampere meter→8PIN                              | 9.0  | 15.0 | 20.0 | mA    |
|                                        | MM1174 |                     | V <sub>CC</sub> =3.6V, V <sub>CC</sub> →Ampere meter→8PIN                            | 5.0  | 10.0 | 20.0 |       |
| CS output voltage H                    | MM1025 | ΔV <sub>CSH</sub>   | V <sub>CC</sub> =6V, V <sub>BATT</sub> =6V, V <sub>OUT</sub> -V <sub>CS</sub>        |      | 0.10 | 0.50 | V     |
|                                        | MM1174 |                     | V <sub>CC</sub> =3.6V, V <sub>BATT</sub> =3.6V, V <sub>OUT</sub> -V <sub>CS</sub>    |      | 0.10 | 0.50 |       |
| CS output voltage L                    | MM1025 | V <sub>CSL</sub>    | V <sub>CC</sub> =4V, V <sub>BATT</sub> =6V                                           |      |      | 0.50 | V     |
|                                        | MM1174 |                     | V <sub>CC</sub> =3.0V, V <sub>BATT</sub> =3.6V                                       |      |      | 0.50 |       |

## Timing Chart

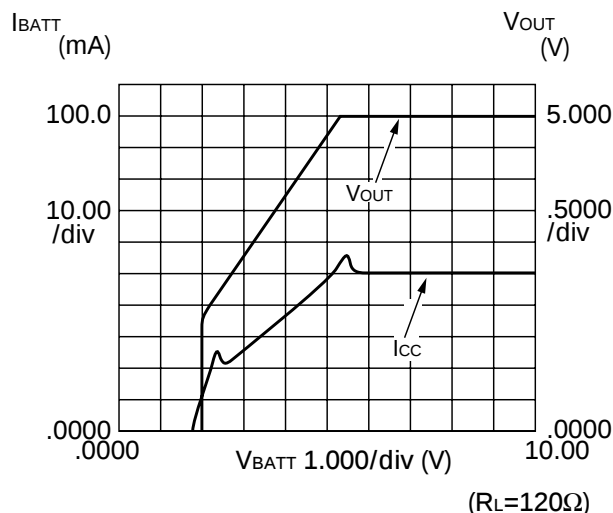


## Characteristics (MM1025 series)

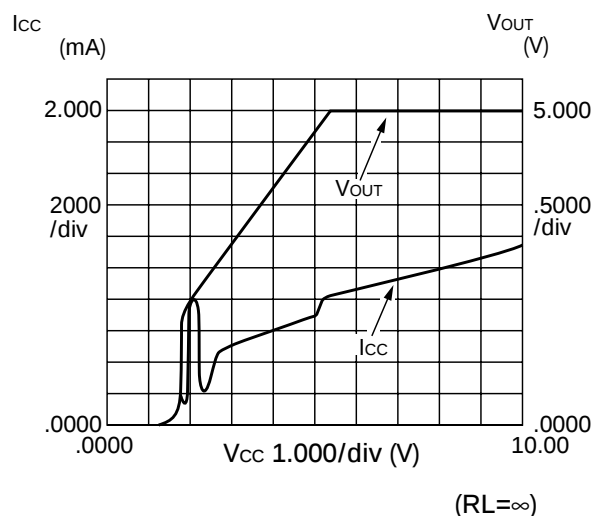
### Output voltage and current consumption for $V_{CC}$ voltage supply



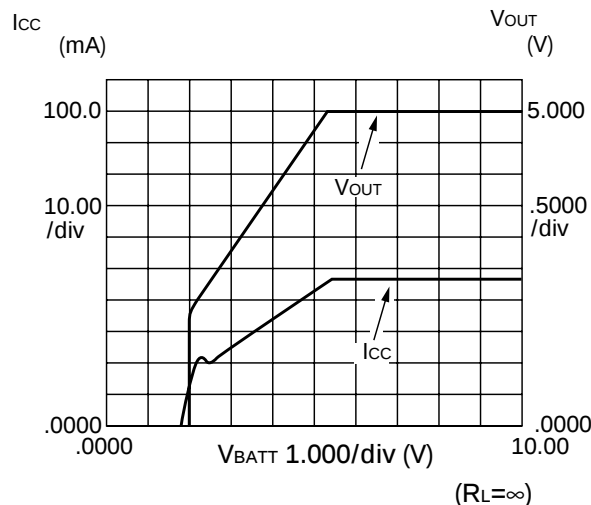
### Output voltage and current consumption for battery voltage supply



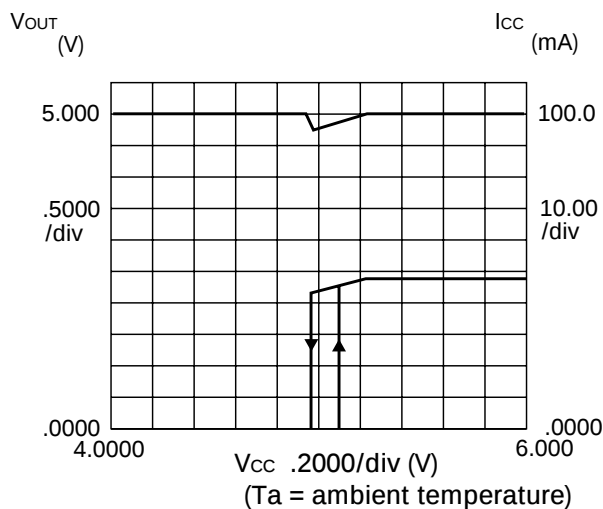
### Output voltage and current consumption for $V_{CC}$ voltage supply



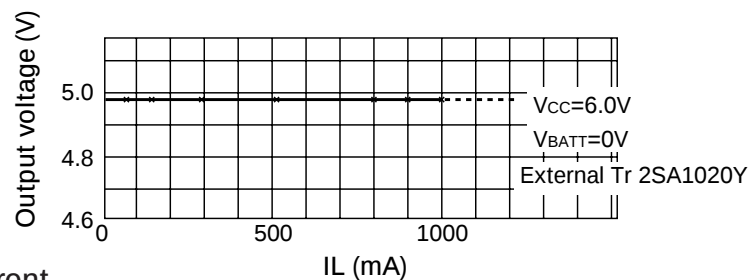
### Output voltage and current consumption for battery voltage supply



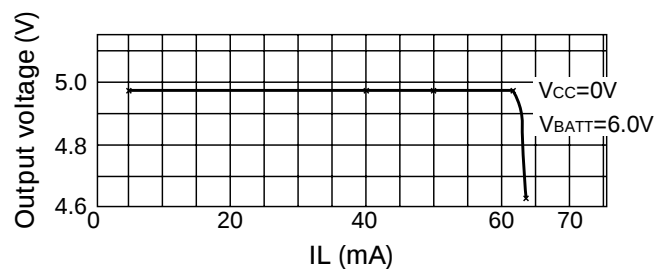
### Power supply switching voltage



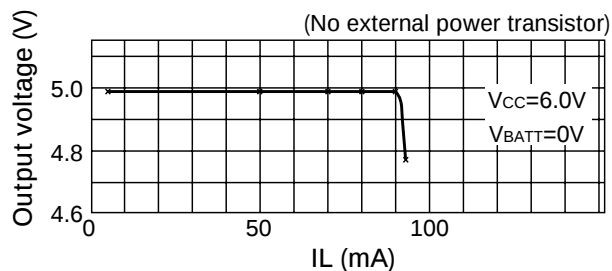
**$V_{CC}$  output current (external power transistor)**



**$V_{BATT}$  output current**

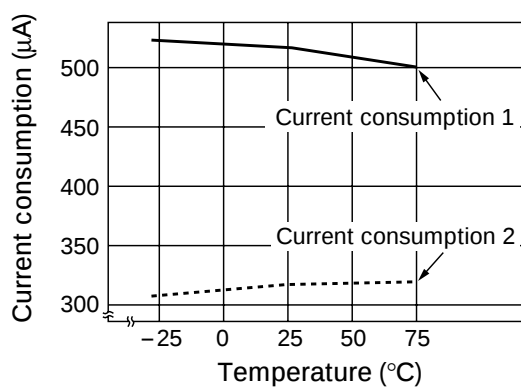


**$V_{CC}$  output current (no external power transistor)**

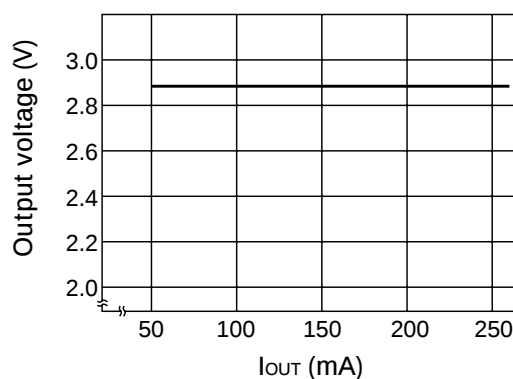


**Characteristics (MM1174 series)**

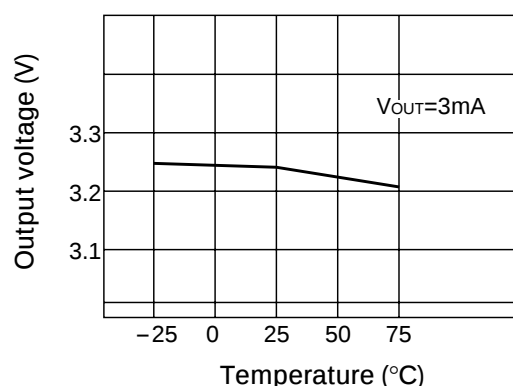
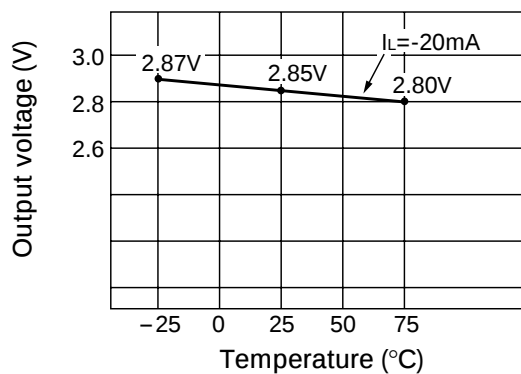
**Current consumption 1-2 temperatures**



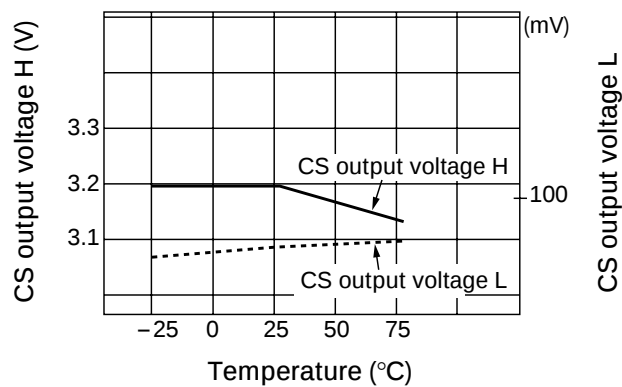
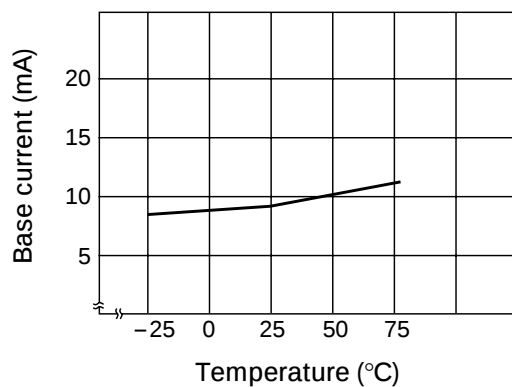
**Input/output voltage difference 1 temperature (external transistor 2SA1020)**



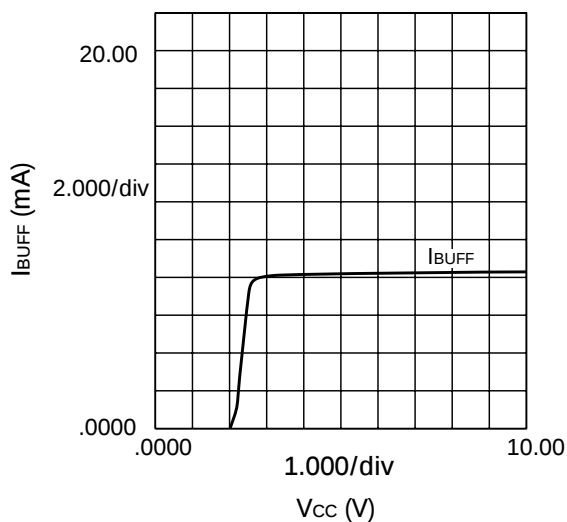
**Input/output voltage difference 2 temperature      Output voltage–Temperature**



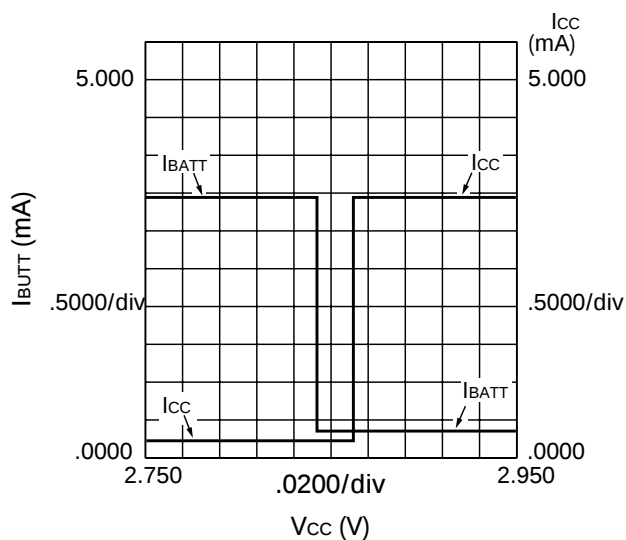
■ Maximum base drive current-Temperature
 ■ CS output voltage H-L temperature



■ Base drive current



■  $V_{CC} - I_{CC}, I_{BATT}$



■  $V_{CC} - V_{OUT}, V_{CS}$

