

**■ INTRODUCTION**

The CE8377 is a CMOS PFM-control step-up switching DC/DC controller. The PFM controller allows the duty ratio to be automatically switched according to the load, enabling products with a low ripple over a wide range, high efficiency, and high output current. With the CE8377, a step-up switching DC/DC controller can be configured by using an external coil, capacitor, and diode. This feature, along with the mini package and low current consumption, makes the CE8377 ideal for applications such as the power supply unit of portable equipment.

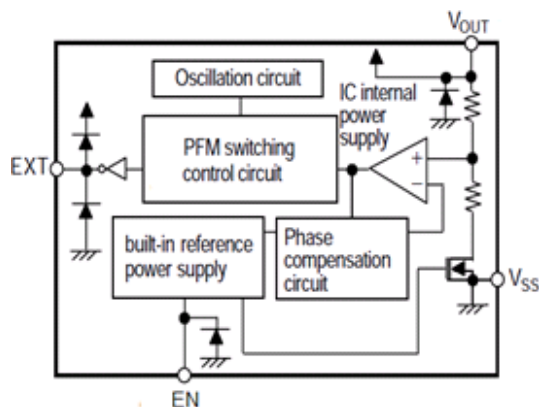
**■ FEATURES**

- Low voltage operation:  
Startup at 0.9 V @ $I_{OUT} = 1\text{ mA}$
- Working frequency: 300KHz
- External parts: Coil, capacitor, diode
- Accuracy of  $\pm 2\%$
- High efficiency: up to 90%
- Shutdown function
- Low ripple, Low noise

**■ APPLICATIONS**

- Digital cameras
- Electronic notebooks and PDAs
- Portable CD/MD players
- Cameras, video equipment,
- Communications equipment
- Power supply for microcomputers

**■ BLOCK DIAGRAM**



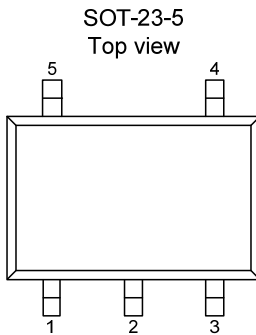
**■ ORDER INFORMATION**

**CE8377D①②③M**

| DESIGNATOR | SYMBOL  | DESCRIPTION   |
|------------|---------|---|
| ①②③        | Integer | Output Voltage<br>(1.8~6.0)<br>e.g.: 5.15V=①:5;<br>②:1; ③:5 |

## ■ PIN CONFIGURATION

Table 1 CE8377D Series (SOT-23-5 PKG)



| PIN NO. | PIN NAME  | PIN DESCRIPTION   |
|---------|-----------|---|
| 1       | $V_{OUT}$ | Output voltage pin and IC power supply pin                  |
| 2       | NC        | Not Connect   |
| 3       | EN        | Enable pin<br>“H”: Normal operation<br>“L”: Step-up stopped |
| 4       | $V_{SS}$  | GND pin   |
| 5       | EXT       | External transistor connection pin                          |

## ■ ABSOLUTE MAXIMUM RATINGS

(Unless otherwise specified,  $T_a=25^{\circ}\text{C}$ )

| PARAMETER                     |          | SYMBOL       | RATINGS                       | UNITS |
|-------------------------------|----------|--------------|-------------------------------|-------|
| V <sub>OUT</sub> pin voltage  |          | $V_{OUT}$    | $V_{SS}-0.3 \sim V_{SS}+8$    | V     |
| EN pin voltage                |          | $V_{EN}$     | $V_{SS}-0.3 \sim V_{SS}+8$    | V     |
| EXT pin voltage               |          | $V_{EXT}$    | $V_{SS}-0.3 \sim V_{OUT}+0.3$ | V     |
| EXT pin current               |          | $I_{EXT}$    | ±80                           | mA    |
| Power dissipation             | SOT-23-5 | $P_D$        | 250                           | mW    |
| Operating ambient temperature |          | $T_{opr}$    | -40 ~+85                      | °C    |
| Storage temperature           |          | $T_{stg}$    | -40 ~+125                     | °C    |
| Soldering Temperature & Time  |          | $T_{solder}$ | 260°C, 10s                    |       |

## ■ ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, Ta=25°C)

| PARAMETER                           | SYMBOL            | CONDITIONS  | MIN                      | TYP       | MAX                      | UNITS   |
|-------------------------------------|-------------------|---|--------------------------|-----------|--------------------------|---------|
| Output voltage                      | $V_{OUT}$         | —   | $V_{OUT(S)} \times 0.98$ | $V_{OUT}$ | $V_{OUT(S)} \times 1.02$ | V       |
| Input voltage                       | $V_{IN}$          | —   | —                        | —         | 6                        | V       |
| Current consumption                 | $I_{SS2}$         | $V_{OUT} = V_{OUT(S)} + 0.5 V$                                      | —                        | 7         | —                        | $\mu A$ |
| Current consumption during shutdown | $I_{SSS}$         | $V_{EN} = 0 V$ , No load  | —                        | —         | 1.0                      | $\mu A$ |
| EXT pin output current              | $I_{EXTH}$        | $V_{EXT} = V_{OUT} - 0.4 V$   |                          | -32       |                          | mA      |
|                                     | $I_{EXTL}$        | $V_{EXT} = 0.4 V$   |                          | 55        |                          | mA      |
| Line regulation                     | $\Delta V_{OUT1}$ | $V_{IN} = V_{OUT(S)} \times 0.4$ to $\times 0.6$                    |                          | 30        |                          | mV      |
| Load regulation                     | $\Delta V_{OUT2}$ | $I_{OUT} = 10 \mu A$ to $V_{OUT(S)} / 50 \times 1.25$               |                          | 30        |                          | mV      |
| Maximum Oscillation frequency       | $F_{max}$         | $V_{OUT} = 0.95 \times V_{OUT(S)}$ ,<br>measure waveform at EXT pin | —                        | 300       | —                        | KHz     |
| Duty ratio                          | Duty              | $V_{OUT} = 0.95 \times V_{OUT(S)}$ ,<br>measure waveform at EXT pin | —                        | 75        | —                        | %       |
| EN pin input voltage                | $V_{SH}$          | Measured oscillation at EXT pin                                     | 1.5                      | —         | —                        | V       |
|                                     | $V_{SL}$          | Judged oscillation stop at EXT pin                                  | —                        | —         | 0.3                      | V       |
| EN pin input current                | $I_{SH}$          | $V_{EN} = 0.95 \times V_{OUT(S)}$                                   | -0.1                     | —         | 0.1                      | $\mu A$ |
|                                     | $I_{SL}$          | $V_{EN} = 0V$   | -0.1                     | —         | 0.1                      | $\mu A$ |
| Efficiency                          | EFF1              |   | —                        | 87        |                          | %       |

Remark:  $V_{IN} = V_{OUT(S)} \times 0.6$  applied,  $I_{OUT} = V_{OUT(S)} / 250 \Omega$

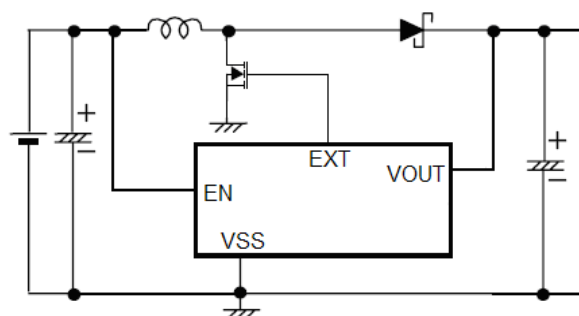
$V_{OUT(S)}$  specified above is the set output voltage value, and  $V_{OUT}$  is the typical value of the actual output voltage.

## ■ STANDARD CIRCUITS

Component: Inductor: 22uH(Sumida) Capacitor: 47uF/10V(Tantalum)

Diode: SS34、SS54

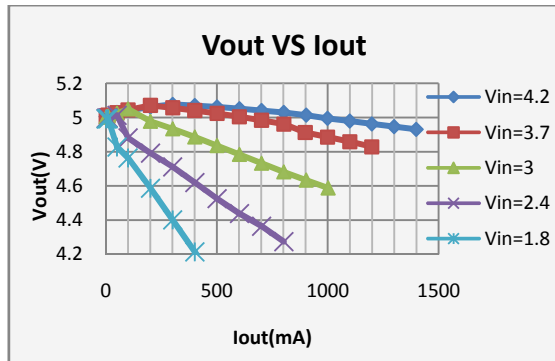
NMOS: CE2312



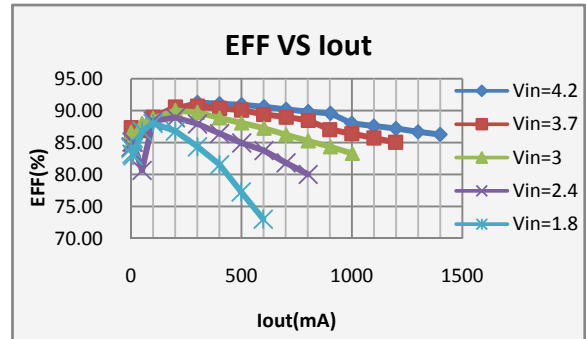
■ TYPICAL PERFORMANCE CHARACTERISTICS

CE8377D50M:

a、 $V_{OUT}$  vs.  $I_{OUT}$  :

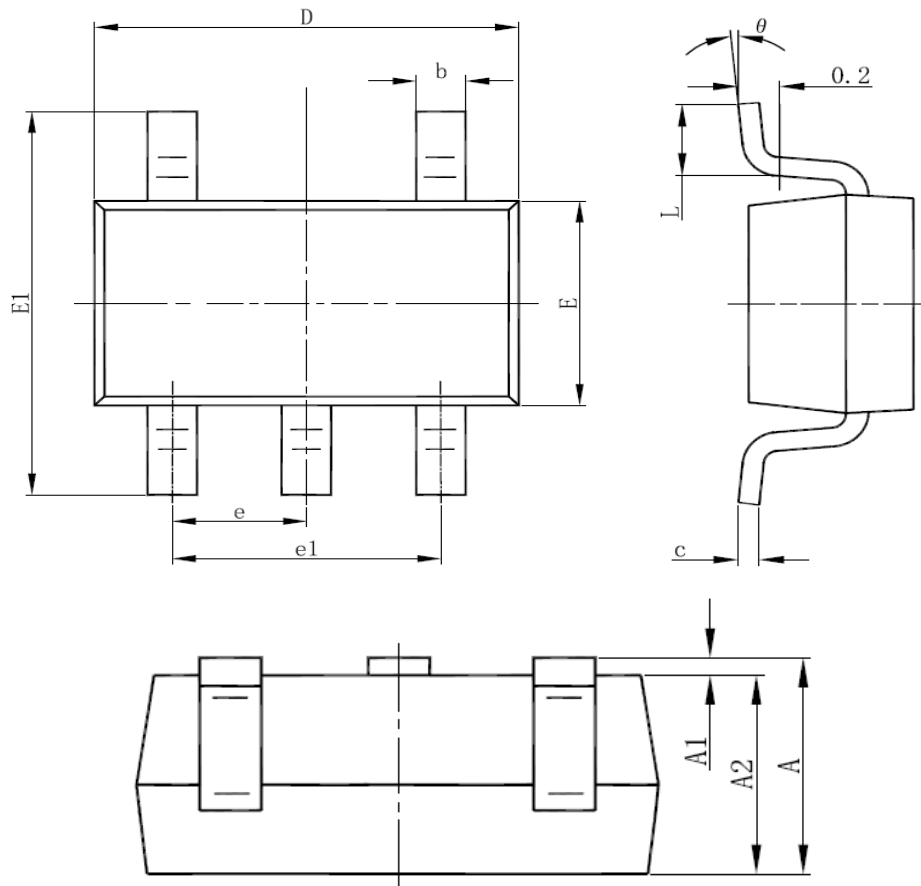


b、Efficiency vs.  $I_{OUT}$  :



## ■ PACKAGING INFORMATION

### ● SOT-23-5 Package Outline Dimensions



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 1.050                     | 1.150 | 0.041                | 0.045 |
| b        | 0.300                     | 0.500 | 0.012                | 0.020 |
| c        | 0.100                     | 0.200 | 0.004                | 0.008 |
| D        | 2.820                     | 3.020 | 0.111                | 0.119 |
| E        | 1.500                     | 1.700 | 0.059                | 0.067 |
| E1       | 2.650                     | 2.950 | 0.104                | 0.116 |
| e        | 0.950(BSC)                |       | 0.037(BSC)           |       |
| e1       | 1.800                     | 2.000 | 0.071                | 0.079 |
| L        | 0.300                     | 0.600 | 0.012                | 0.024 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |

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