# SI-8000HFE Series Full-Mold, Separate Excitation Step-down Switching Mode

## ■Features

- Compact full-mold package (equivalent to TO220)
- Output current: 5.5 A
- High efficiency: 83% typ. (at Vo = 5 V)
- Requires only 4 discrete components
- Built-in reference oscillator (150 kHz)
- Built-in drooping-type-overcurrent and thermal protection circuits
- Built-in soft start circuit (Output ON/OFF available)

## ■Applications

- Onboard local power supplies
- OA equipment

## ■Lineup

| Part Number | SI-8008HFE | SI-8050HFE |
|---|---|---|
| $V_O$ (V) | Variable (0.8 to 15) | 5 |
| $I_O$ (A) | 5.5 | |

## ■Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit | Conditions |
|---|---|---|---|---|
| DC Input Voltage | $V_{IN}$ | 43 | V | |
| Power Dissipation | $P_{D1-1}$ | 25 (with infinite heatsink) | W | Limited by thermal protection, $T_{jmax}$=150°C |
| | $P_{D1-2}$ | 20 (with infinite heatsink) | | $T_{jmax}$=125°C |
| | $P_{D2-1}$ | 2.15 (without heat sink, standalone operation) | | Limited by thermal protection, $T_{jmax}$=150°C |
| | $P_{D2-2}$ | 1.72 (without heatsink, standalone operation) | | $T_{jmax}$=125°C |
| Junction Temperature* | $T_j$ | +150 | °C | |
| Storage Temperature | $T_{stg}$ | −40 to +150 | °C | |
| Thermal Resistance (Junction to Case) | $\theta_{j-c}$ | 5 | °C/W | |
| Thermal Resistance (Junction to Ambient Air) | $\theta_{j-a}$ | 58 | °C/W | |

*: This product has built-in thermal protection circuits that may operate when the junction temperature rises above 130°C. The recommended design for the junction temperature during operation is below 125°C.

## ■Recommended Operating Conditions

| Parameter | Symbol | Ratings SI-8008HFE | Ratings SI-8050HFE | Unit |
|---|---|---|---|---|
| Input Voltage Range | $V_{IN}$ | Vo+3*1 to 40 | 8 to 40 | V |
| Output Voltage Range | $V_O$ | 0.8 to 24 | 5.0 | V |
| Output Current Range | $I_O$ | 0 to 5.5 | | A |
| Operating Junction Temperature Range | $T_{jop}$ | −30 to +125 | | °C |
| Operating Temperature Range | $T_{op}$ | −30 to +85 | | °C |

*1: The minimum value of an input voltage range is the higher of 4.5 V or $V_O$ + 3 V.

## ■Electrical Characteristics

(Ta=25°C)

| Parameter | Symbol | | SI-8008HFE (at Vo = 5 V) min. | typ. | max. | SI-8050HFE min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|---|---|
| Output Voltage (Reference Voltage) | Vo ($V_{ADJ}$) | | | | | 4.90 | 5.00 | 5.10 | V |
| | | | 0.784 | 0.800 | 0.816 | | | | |
| | | Conditions | $V_{IN}$=15V, $I_O$=1A | | | $V_{IN}$=15V, $I_O$=1A | | | |
| Temperature Coefficient of Output Voltage (Temperature Coefficient of Reference Voltage) | $\Delta Vo/\Delta T$ ($\Delta V_{ADJ}/\Delta T$) | | | | | | ±0.5 | | mV/°C |
| | | | | ±0.1 | | | | | |
| | | Conditions | $V_{IN}$=15V, $I_O$=1A, $T_C$=0 to 100°C | | | $V_{IN}$=15V, $I_O$=1A, $T_C$=0 to 100°C | | | |
| Efficiency | η | | | 83 | | | 83 | | % |
| | | Conditions | $V_{IN}$=15V, $I_O$=3A | | | $V_{IN}$=15V, $I_O$=3A | | | |
| Oscillation Frequency | fo | | | 150 | | | 150 | | kHz |
| | | Conditions | $V_{IN}$=15V, $I_O$=3A | | | $V_{IN}$=15V, $I_O$=3A | | | |
| Line Regulation | $\Delta V_{OLINE}$ | | | 60 | 80 | | 60 | 80 | mV |
| | | Conditions | $V_{IN}$=10 to 30V, $I_O$=3A | | | $V_{IN}$=10 to 30V, $I_O$=3A | | | |
| Load Regulation | $\Delta V_{OLOAD}$ | | | 20 | 50 | | 20 | 50 | mV |
| | | Conditions | $V_{IN}$=15V, $I_O$=0.2 to 5.5A | | | $V_{IN}$=15V, $I_O$=0.2 to 5.5A | | | |
| Overcurrent Protection Starting Current | Is | | 5.6 | | | 5.6 | | | A |
| | | Conditions | $V_{IN}$=15V | | | $V_{IN}$=15V | | | |
| ON/OFF Pin* Low Level Voltage | $V_{SSL}$ | | | | 0.5 | | | 0.5 | V |
| ON/OFF Pin* Outflow Current at Low Voltage | $I_{SSL}$ | | | 10 | 30 | | 10 | 30 | μA |
| | | Conditions | $V_{SSL}$=0V | | | $V_{SSL}$=0V | | | |
| Quiescent Circuit Current | $I_q$ | | | 6 | | | 6 | | mA |
| | | Conditions | $V_{IN}$=15V, $I_O$=0A | | | $V_{IN}$=15V, $I_O$=0A | | | |
| | $I_{q(OFF)}$ | | | 200 | 400 | | 200 | 400 | μA |
| | | Conditions | $V_{IN}$=15V, $V_{SS}$=0V | | | $V_{IN}$=15V, $V_{SS}$=0V | | | |

*: Pin 5 is the SS pin. Soft start at power on can be performed with a capacitor connected to this pin. The output can also be turned ON/OFF with this pin. The output is stopped by setting the voltage of this pin to VSSL or lower. SS-pin voltage can be changed with an open-collector drive circuit of a transistor. When using both the soft-start and ON/OFF functions together, the discharge current from C3 flows into the ON/OFF control transistor. Therefore, limit the current securely to protect the transistor if C3 capacitance is large. The SS pin is pulled up to the power supply in the IC, so applying the external voltage is prohibited. If the pin is not used, leave it open.



$V_{OUT}$. ON/OFF

Soft start

Soft start +$V_{OUT}$. ON/OFF

http://store.iiic.cc/
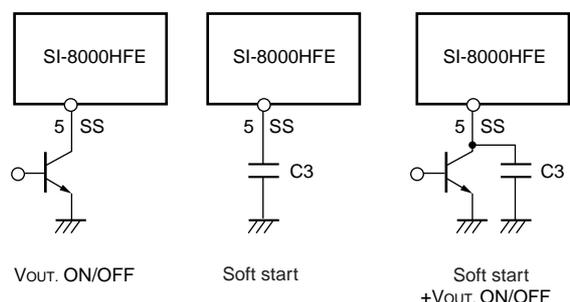
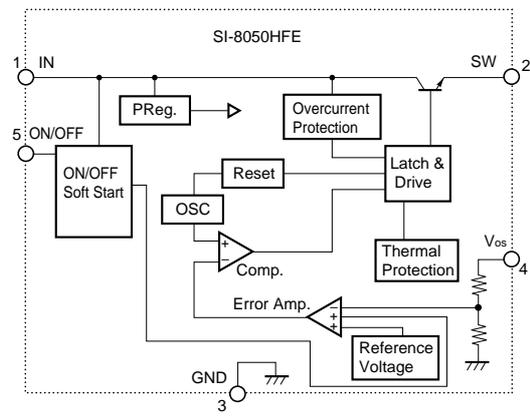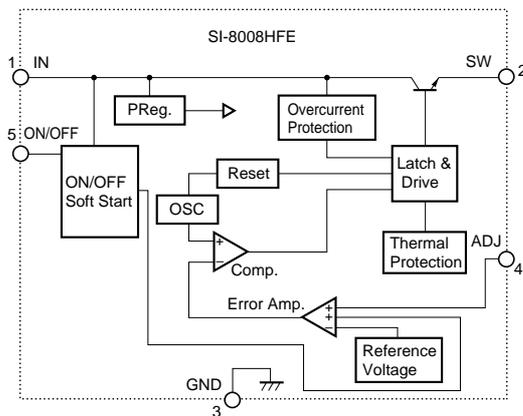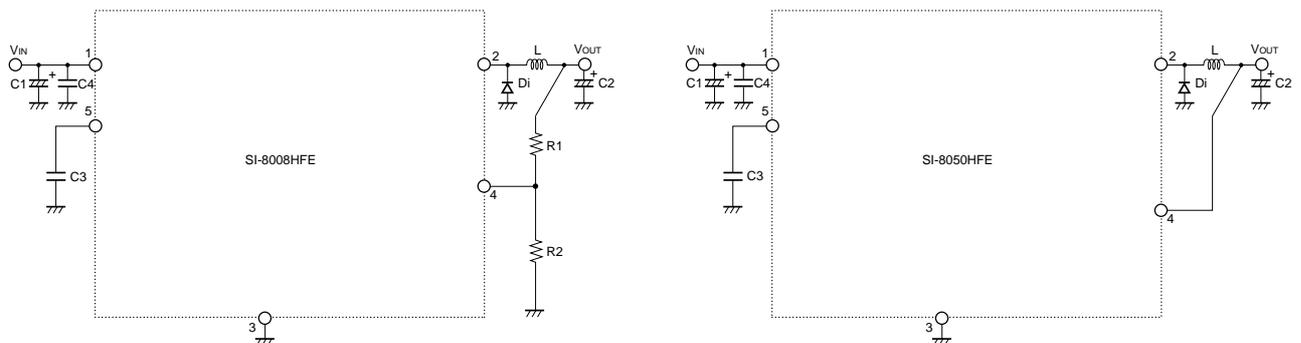## ■External Dimensions (TO220F-5)

(Unit : mm)
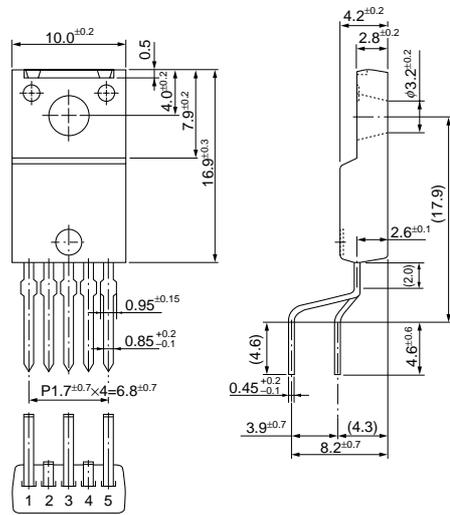


Pin Assignment
① V$_{IN}$
② SW
③ GND
④ ADJ (V$_{OS}$ for SI-8050HFE)
⑤ SS

Plastic Mold Package Type
Flammability: UL94V-0
Product Mass: Approx. 2.3g

## ■Block Diagram



## ■Typical Connection Diagram



C$_1$ : 1500$\mu$F
C$_2$ : 1000$\mu$F
C$_3$ :1$\mu$F (Only when using soft-start function)
C$_4$ :4.7$\mu$F (RPER11H475K5 (Murata Manufacturing) recommended)
L$_1$ :100$\mu$H
Di : FMB-G16L (Sanken)