

# SI-8205NHD Surface-Mount, Current Mode Control, Synchronous Rectifier Step-down Switching Mode

## ■ Features

- Compact surface-mount (HSOP8) package
- Wide input voltage range ( $V_{IN}$ ):  $V_o + 3$  to 43 V
- Synchronous rectifier mode
- Output current: 3 A
- Reference voltage and accuracy of 0.5 V  $\pm 1\%$
- Oscillation frequency: 200 kHz to 1 MHz
- A ceramic capacitor can be used for output
- Output can be disabled
- Undervoltage Lock Out
- Soft start function

## ■ Applications

- Power supply for LCD module
- Power supply for notebook PC
- Onboard local power supplies
- Power supply for LBP/PPC

## ■ Absolute Maximum Ratings

| Parameter                                     | Symbol         | Ratings     | Unit | Conditions   |
|---|----------------|-------------|------|--|
| Input Voltage ( $V_{IN}$ Pin)                 | $V_{IN}$       | 46          | V    |  |
| Power Dissipation                             | $P_D$          | 1.35        | W    | When mounted on a 30 × 30 mm glass-epoxy board (with a 25 × 25 mm copper area) |
| Junction Temperature                          | $T_J$          | -40 to +150 | °C   |  |
| Storage Temperature                           | $T_{stg}$      | -40 to +150 | °C   |  |
| Thermal Resistance (Junction to Lead <1 pin>) | $\theta_{j-c}$ | 40          | °C/W |  |
| Thermal Resistance (Junction to Ambient Air)  | $\theta_{j-a}$ | 74          | °C/W | When mounted on a 30 × 30 mm glass-epoxy board (with a 25 × 25 mm copper area) |

## ■ Recommended Operating Conditions

| Parameter                            | Symbol    | Ratings              | Unit |
|--------------------------------------|-----------|----------------------|------|
| Input Voltage Range                  | $V_{IN}$  | 8 or $V_o + 3$ to 43 | V    |
| Output Current Range                 | $I_o$     | 0 to 3.0             | A    |
| Output Voltage Range                 | $V_o$     | 0.5 to 24            | V    |
| Operating Junction Temperature Range | $T_{jop}$ | -40 to +125          | °C   |
| Operating Temperature Range          | $T_{op}$  | -40 to +85           | °C   |

\*: The minimum value of the input voltage range is 8 V or  $V_o + 3V$ , whichever is higher.

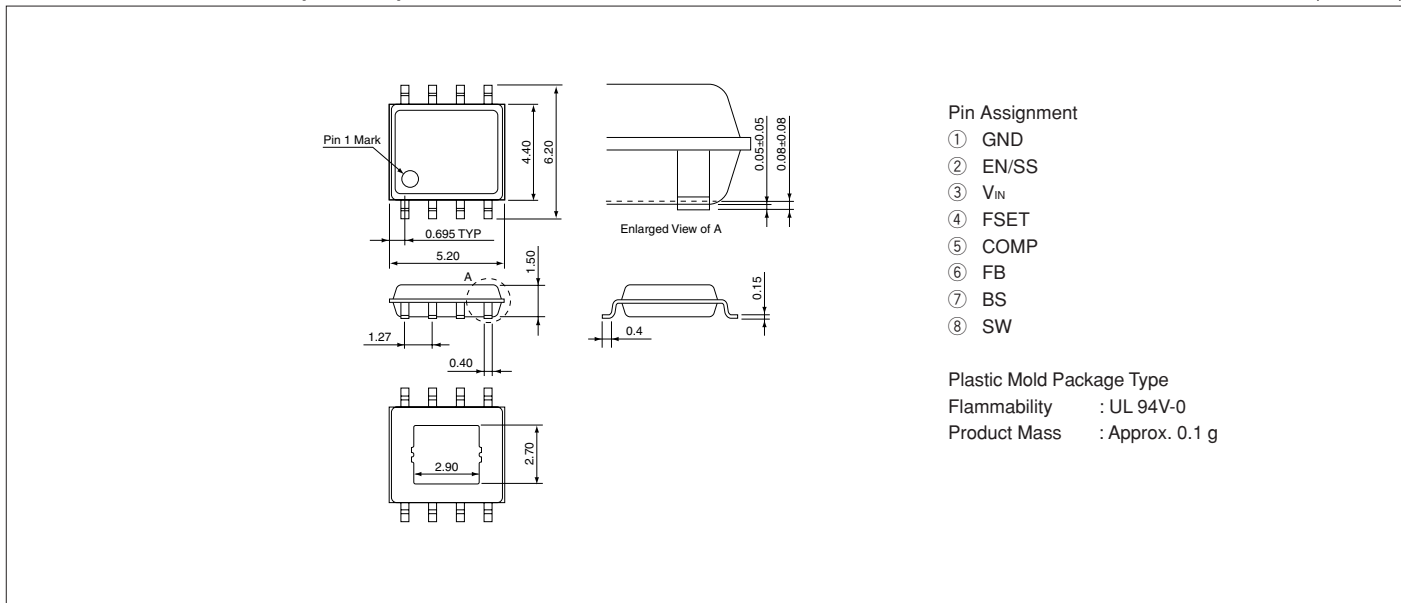
## ■ Electrical Characteristics

( $T_a = 25^\circ\text{C}$  and  $f_o = 500\text{kHz}$ , unless otherwise specified)

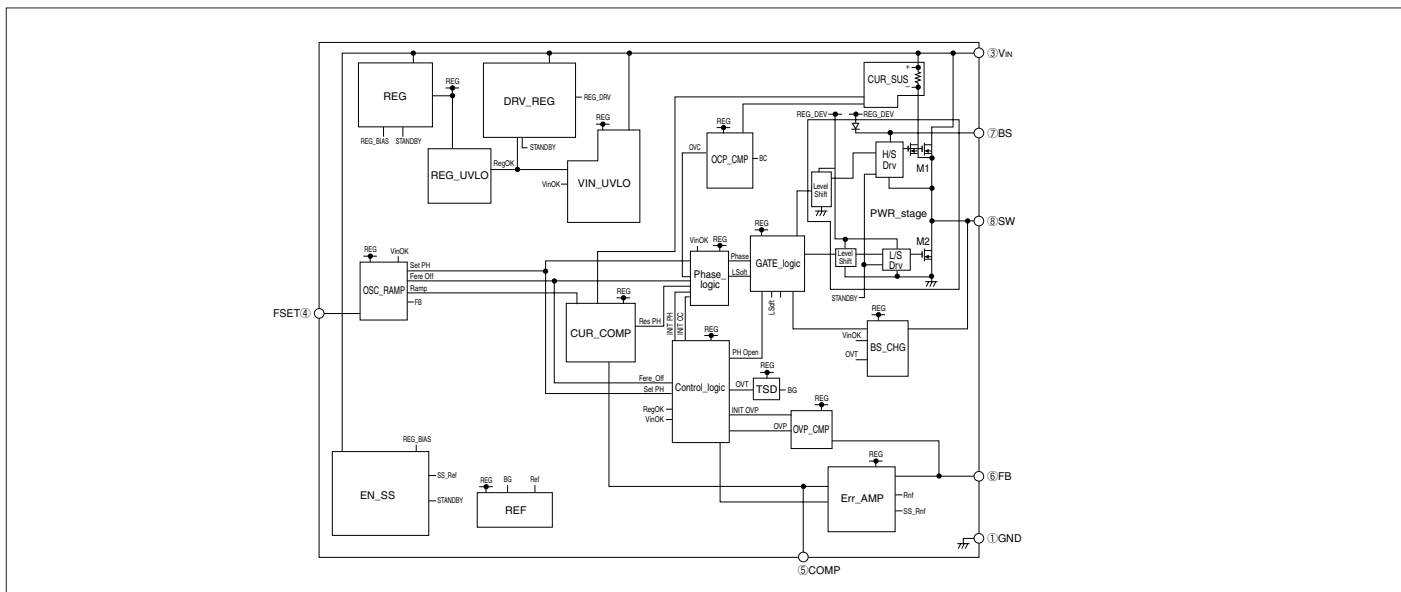
| Parameter                                    | Symbol                         | Ratings     |            |       | Unit            | Conditions   |              |
|--|--------------------------------|-------------|------------|-------|-----------------|--|--------------|
|  |                                | min.        | typ.       | max.  |                 |  |              |
| Reference Voltage                            | $V_{ref}$                      | 0.495       | 0.500      | 0.505 | V               | $V_{IN}=12V, I_o=1.0A$                                 |              |
| Temperature Coefficient of Reference Voltage | $\Delta V_{REF}/\Delta T$      |             | $\pm 0.05$ |       | mV/°C           | $V_{IN}=12V, I_o=1.0A, T_a=-40$ to $+85^\circ\text{C}$ |              |
| Efficiency                                   | $\eta$                         |             | 90         |       | %               | $V_{IN}=12V, V_o=5V, I_o=1.0A$                         |              |
| Oscillation Frequency 1                      | $f_{o1}$                       |             | 200        |       | kHz             | $V_{IN}=12V, V_o=5V, I_o=1A, R_{fset}=375k\Omega$      |              |
| Oscillation Frequency 2                      | $f_{o2}$                       |             | 1          |       | MHz             | $V_{IN}=12V, V_o=5V, I_o=1A, R_{fset}=75k\Omega$       |              |
| Line Regulation                              | $\Delta V_{OLINE}$             |             | 50         |       | mV              | $V_{IN}=8$ to $43V, V_o$ to $5V, I_o=1A$               |              |
| Load Regulation                              | $\Delta V_{OLOAD}$             |             | 50         |       | mV              | $V_{IN}=12V, V_o=5V, I_o=0.1$ to $3.0A$                |              |
| Overcurrent Protection Starting Current      | $I_s$                          | 3.1         |            | 6.0   | A               | $V_{IN}=12V, V_o=5V$                                   |              |
| Quiescent Circuit Current                    | $I_{IN}$                       |             | 8          |       | mA              | $V_{IN}=12V, V_{comp}=0V$                              |              |
|  | $I_{IN(OFF)}$                  |             |            | 40    | $\mu\text{A}$   | $V_{IN}=12V, V_{EN/SS}=0V$                             |              |
| EN/SS Pin                                    | Outflow Current at Low Voltage | $I_{EN/SS}$ | 5          |       | $\mu\text{A}$   | $V_{EN/SS}=0V, V_{IN}=12V$                             |              |
|  | Open Voltage                   | $V_{SSH}$   | 3.0        | 4.5   | 6.0             | V  | $V_{IN}=12V$ |
|  | On Threshold Voltage           | $V_{C/IEH}$ | 0.6        | 1.3   | 2.0             | V  | $V_{IN}=12V$ |
| OVP Start Voltage                            | $V_{ovp}$                      | 0.57        | 0.60       | 0.63  | V               |  |              |
| Thermal Protection Start Temperature         | $T_J$                          | 151         | 160        |       | °C              |  |              |
| Error Amplifier Voltage Gain                 | AEA                            |             | 800        |       | V/V             |  |              |
| Error Amplifier Transformer Conductance      | GEA                            |             | 800        |       | $\mu\text{A}/V$ |  |              |
| Current Sense Amplifier Impedance            | GCS                            |             | 3.33       |       | A/V             |  |              |
| Maximum ON Duty                              | DMAX                           | 80          | 90         |       | %               | $V_{IN}=12V$   |              |
| Minimum ON Time                              | DMIN                           |             | 150        |       | nsec            | $V_{IN}=12V$   |              |

External Dimensions (HSOP8)

(Unit : mm)



Block Diagram



Typical Connection Diagram

