

SI-3000LLSL Series

Surface-Mount, Low Current Consumption, Low Dropout Voltage

Features

- Low input voltage (1.3V) and low output voltage (1.0V)
- Compact surface-mount package (SOP8)
- Low dropout voltage:  $V_{DIF} \leq 0.3V$  (at  $I_o = 1.5A$ )
- Built-in overcurrent, input-overvoltage and thermal protection circuits
- Built-in ON/OFF function (OFF state circuit current:  $1\mu A$  max.)
- Compatible with low ESR capacitors

Absolute Maximum Ratings

( $T_a=25^{\circ}C$ )

| Parameter                                     | Symbol                | Ratings         | Unit          |
|-----------------------------------------------|-----------------------|-----------------|---------------|
| DC Input Voltage                              | $V_{IN}$              | 10              | V             |
| DC Bias Voltage                               | $V_B$                 | 10              | V             |
| Output Control Terminal Voltage               | $V_C$                 | $V_{IN}$        | V             |
| DC Output Current                             | $I_o$                 | 1.5             | A             |
| Power Dissipation                             | $P_D^{*1}$            | 1.1             | W             |
| Junction Temperature                          | $T_J$                 | $-30$ to $+125$ | $^{\circ}C$   |
| Operating Ambient Temperature                 | $T_{op}$              | $-30$ to $+100$ | $^{\circ}C$   |
| Storage Temperature                           | $T_{stg}$             | $-30$ to $+125$ | $^{\circ}C$   |
| Thermal Resistance (Junction to Lead (Pin 8)) | $\theta_{(J-L)}$      | 36              | $^{\circ}C/W$ |
| Thermal Resistance (Junction to Ambient Air)  | $\theta_{(J-a)}^{*1}$ | 100             | $^{\circ}C/W$ |

\*1: When mounted on glass-epoxy board of 40 × 40mm (copper laminate area 100%).

Applications

- On-board local power supply
- For stabilization of the secondary-side output voltage of switching power supplies

Recommended Operating Conditions

| Parameter                     | Symbol   | Ratings             | Unit        |
|-------------------------------|----------|---------------------|-------------|
|                               |          | SI-3010LLSL         |             |
| Input Voltage                 | $V_{IN}$ | 1.4 to $3.6^{*1}$   | V           |
| Bias Voltage                  | $V_B$    | 3.3 to 5.5          | V           |
| Output Current                | $I_o$    | 0 to $1.5^{*1}$     | A           |
| Operating Ambient Temperature | $T_{op}$ | $-20$ to $+85^{*1}$ | $^{\circ}C$ |

\*1:  $V_{IN}$  (max) and  $I_o$  (max) are restricted by the relation  $P_D = (V_{IN} - V_o) \times I_o$ .

Electrical Characteristics

( $T_a=25^{\circ}C$ ,  $V_C=2V$ ,  $V_{IN}=1.8V$ ,  $V_B=3.3V$ ,  $V_o=1.5V$ , unless otherwise specified)

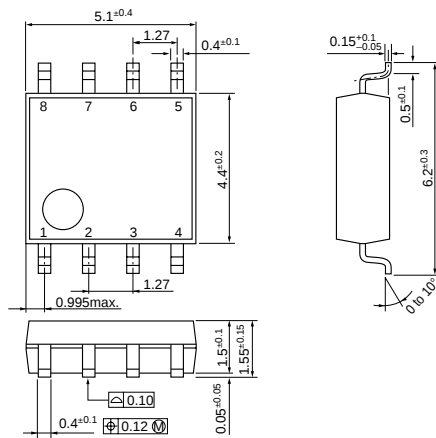
| Parameter                                             |                                           | Symbol                              | Ratings     |       |                 | Unit |
|-------------------------------------------------------|-------------------------------------------|-------------------------------------|-------------|-------|-----------------|------|
|                                                       |                                           |                                     | SI-3010LLSL |       |                 |      |
|                                                       |                                           |                                     | min.        | typ.  | max.            |      |
| Reference Voltage                                     | $V_{ADJ}$                                 | 0.980                               | 1.000       | 1.020 | V               |      |
|                                                       | Conditions                                | $I_o=10mA$                          |             |       |                 |      |
| Line Regulation                                       | $\Delta V_{OLINE}$                        |                                     |             | 10    | mV              |      |
|                                                       | Conditions                                | $V_{IN}=1.7$ to $2.5V$ , $I_o=10mA$ |             |       |                 |      |
| Load Regulation                                       | $\Delta V_{OLOAD}$                        |                                     |             | 30    | mV              |      |
|                                                       | Conditions                                | $V_{IN}=1.8V$ , $I_o=0$ to $1.5A$   |             |       |                 |      |
| Dropout Voltage                                       | $V_{DIF}$                                 |                                     |             | 0.3   | V               |      |
|                                                       | Conditions                                | $I_o=1.0A$                          |             |       |                 |      |
| Quiescent Circuit Current                             | $I_q$                                     |                                     | 500         | 800   | $\mu A$         |      |
|                                                       | Conditions                                | $I_o=0A$ , $R_z=10k\Omega$          |             |       |                 |      |
| Circuit Current at Output OFF                         | $I_q(OFF)$                                |                                     |             | 1     | $\mu A$         |      |
|                                                       | Conditions                                | $V_C=0V$                            |             |       |                 |      |
| Temperature Coefficient of Output Voltage             | $\Delta V_o/\Delta T_a$                   |                                     | $\pm 0.2$   |       | mV/ $^{\circ}C$ |      |
|                                                       | Conditions                                | $T_J=0$ to $100^{\circ}C$           |             |       |                 |      |
| Overcurrent Protection Starting Current <sup>*1</sup> | $I_{S1}$                                  | 1.6                                 |             |       | A               |      |
|                                                       | Conditions                                | $V_{IN}=1.8V$ , $V_B=3.3V$          |             |       |                 |      |
| Vc Terminal                                           | Control Voltage (Output ON) <sup>*2</sup> | $V_C$ , IH                          | 2           |       | V               |      |
|                                                       | Control Voltage (Output OFF)              | $V_C$ , IL                          |             | 0.8   | V               |      |
|                                                       | Control Current (Output ON)               | $I_C$ , IH                          |             | 50    | $\mu A$         |      |
|                                                       | Conditions                                | $V_C=2.7V$                          |             |       |                 |      |
|                                                       | Control Current (Output OFF)              | $I_C$ , IL                          |             | 10    | $\mu A$         |      |
|                                                       | Conditions                                | $V_C=0.4V$                          |             |       |                 |      |

\*1:  $I_{S1}$  is specified at the 5% drop point of output voltage  $V_o$  on the condition that  $V_{IN}$  = overcurrent protection starting current,  $I_o$  = 10 mA.

\*2: Output is OFF when the output control terminal ( $V_C$  terminal) is open. Each input level is equivalent to LS-TTL level. Therefore, the device can be driven directly by LS-TTLs.

## External Dimensions (SOP8)

(unit : mm)

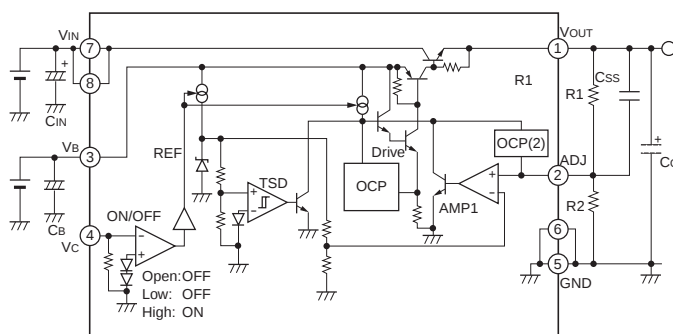


### Pin Assignment

- ①  $V_O$
- ② ADJ
- ③  $V_B$
- ④  $V_C$
- ⑤ GND
- ⑥ GND
- ⑦  $V_{IN}$
- ⑧  $V_{IN}$

Plastic Mold Package Type  
 Flammability: UL94V-0  
 Product Mass: Approx. 0.1g

## Typical Connection Diagram/Block Diagram



$C_{IN}$ ,  $C_B$ : Input and bias capacitors (Approx. 0.1 to 10 $\mu$ F)

Required when the input line contains inductance or when the wiring is long.

$C_O$ : Output capacitor (47 $\mu$ F or larger)

SI-3010LLSL is designed to use a low ESR capacitor (such as a ceramic capacitor) for the output capacitor. The recommended ESR value for an output capacitor is 500m $\Omega$  or less (at room temperature).

$R1$ ,  $R2$ : Output voltage setting resistors

The output voltage can be set by connecting  $R1$  and  $R2$  as shown at left.

The recommended value for  $R2$  is 10k $\Omega$ .

$$R1 = (V_O - V_{ADJ}) / (V_{ADJ} / R2)$$

$C_{SS}$ : Soft start capacitor

The rising time of the output voltage can be set by connecting  $C_{SS}$  between  $V_{OUT}$  and ADJ.

## Reference Data

Copper Laminate Area - Power Dissipation

