# 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°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 | °C |
| Operating Ambient Temperature | $T_{op}$ | –30 to +100 | °C |
| Storage Temperature | $T_{stg}$ | –30 to +125 | °C |
| Thermal Resistance (Junction to Lead (Pin 8)) | $\theta_{(j\text{-}L)}$ | 36 | °C/W |
| Thermal Resistance (Junction to Ambient Air) | $\theta_{(j\text{-}a)}$*1 | 100 | °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 | °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

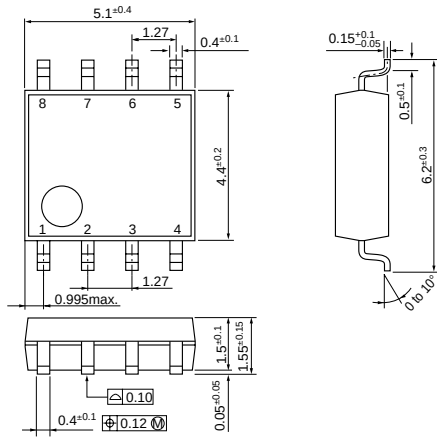
($T_a$=25°C, $V_C$=2V, $V_{IN}$=1.8V, $V_B$=3.3V, $V_O$=1.5V, unless otherwise specified)

| 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, $R_2$=10kΩ | | | |
| Circuit Current at Output OFF | | $I_{q\ (OFF)}$ | | | 1 | $\mu$A |
| | | Conditions | $V_C$=0V | | | |
| Temperature Coefficient of Output Voltage | | $\Delta V_O/\Delta T_a$ | | ±0.2 | | mV/°C |
| | | Conditions | $T_j$=0 to 100°C | | | |
| Overcurrent Protection Starting Current*1 | | $I_{S1}$ | 1.6 | | | A |
| | | Conditions | $V_{IN}$=1.8V, $V_B$=3.3V | | | |
| $V_C$ Terminal | Control Voltage (Output ON)*2 | $V_C$, 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)

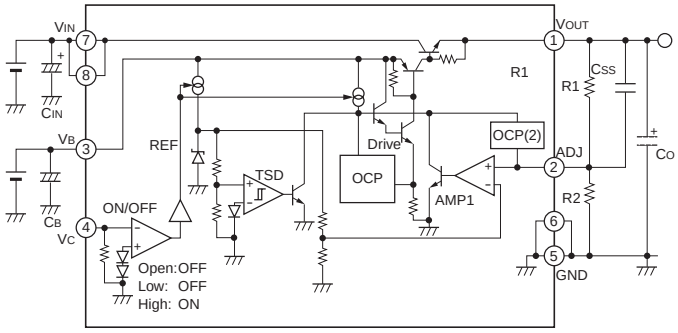
(unit : mm)




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 500mΩ 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 10kΩ.

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

$C_{SS}$: 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**