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SI-3000LSA Series Surface-Mount, Low Current Consumption, Low Dropout Voltage

Features

- Compact surface-mount package (SOP8)
- Output current: 1 A
- Low circuit current at output OFF: $I_{q(OFF)} \leq 1 \mu A$ ($V_C = 0 V$)
- Low dropout voltage: $V_{DIF} \leq 0.8 V$ (at $I_O = 1 A$)
 $V_{DIF} \leq 1.2 V$ ($I_O = 1 A$) for SI-3018LSA
- 4 types of output voltages (1.8 V, 2.5 V, 3.3 V, 5.0 V) available
- Output ON/OFF control terminal voltage compatible with LS-TTL
- Built-in foldback-type-overcurrent and thermal protection circuits

Absolute Maximum Ratings

($T_a = 25^\circ C$)

| Parameter | Symbol | Ratings | Unit |
|---|---------------------|-------------|--------------|
| DC Input Voltage | V_{IN} | 16 | V |
| Output control terminal voltage | V_C | V_{IN} | V |
| DC Output Current | I_O | 1 | A |
| Power Dissipation | P_{D1}^{*1} | 1.16 | W |
| | P_{D2}^{*2} | 1.1 | W |
| Junction Temperature | T_J^{*3} | -30 to +150 | $^\circ C$ |
| Operating Ambient Temperature | T_{OP} | -30 to +150 | $^\circ C$ |
| Storage Temperature | T_{STG} | -30 to +150 | $^\circ C$ |
| Thermal Resistance (Junction to Lead (pin 8)) | θ_{J-L} | 36 | $^\circ C/W$ |
| Thermal Resistance (Junction to Ambient Air) | θ_{J-a}^{*2} | 100 | $^\circ C/W$ |

*1: When mounted on glass-epoxy board 56.5 × 56.5 mm (copper laminate area 100%).

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

*3: Thermal protection circuits may be activated if the junction temperature exceeds 135 $^\circ C$.

Applications

- Auxiliary power supplies for PC
- Battery-driven electronic equipment

Recommended Operating Conditions

| Parameter | Symbol | Ratings | | | | Unit |
|--------------------------------|----------|--------------------------|------------------------------------|------------------------------------|----------------------|------------|
| | | SI-3018LSA | SI-3025LSA | SI-3033LSA | SI-3050LSA | |
| DC Input Voltage Range | V_{IN} | 3.1 to 3.5 ^{*1} | ^{*2} to 3.5 ^{*1} | ^{*2} to 5.2 ^{*1} | ^{*2} to 8.0 | V |
| DC Output Current Range | I_O | 0 to 1 | | | | A |
| Operating Junction Temperature | T_{JP} | -20 to +125 | | | | $^\circ C$ |
| Operating Ambient Temperature | T_{AP} | -30 to +85 | | | | $^\circ C$ |

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

Please calculate these values referring to the reference data on page 71.

*2: Refer to the Dropout Voltage parameter.

Electrical Characteristics

($T_a = 25^\circ C$, $V_C = 2V$, unless otherwise specified)

| Parameter | Symbol | Ratings | | | | | | | | | | Unit | | |
|---|--|---|-------|-------|---|-------|-------|---|-------|-------|---|------|------|----------------|
| | | SI-3018LSA | | | SI-3025LSA | | | SI-3033LSA | | | SI-3050LSA | | | |
| | | min. | typ. | max. | min. | typ. | max. | min. | typ. | max. | min. | | typ. | max. |
| Output Voltage | V_O | 1.764 | 1.800 | 1.836 | 2.450 | 2.500 | 2.550 | 3.234 | 3.300 | 3.366 | 4.90 | 5.00 | 5.10 | V |
| | Conditions | $V_{IN} = 3.3V, I_O = 0.5A$ | | | $V_{IN} = 3.3V, I_O = 0.5A$ | | | $V_{IN} = 5V, I_O = 0.5A$ | | | $V_{IN} = 6V, I_O = 0.5A$ | | | |
| Dropout Voltage | V_{DIF} | - | | | 0.4 | | | 0.4 | | | 0.4 | | | V |
| | Conditions | - | | | $I_O \leq 0.5A$ | | | $I_O \leq 0.5A$ | | | $I_O \leq 0.5A$ | | | |
| | Conditions | 0.6 | 1.2 | | | 0.8 | | | 0.8 | | | 0.8 | | |
| Line Regulation | ΔV_{LINE} | 2 | | | 2 | | | 3 | | | 3 | | | mV |
| | Conditions | $V_{IN} = 3.1$ to 3.5V, $I_O = 0.3A$ | | | $V_{IN} = 3.1$ to 3.5V, $I_O = 0.3A$ | | | $V_{IN} = 4.5$ to 5.5V, $I_O = 0.3A$ | | | $V_{IN} = 6$ to 7V, $I_O = 0.3A$ | | | |
| Load Regulation | ΔV_{LOAD} | 10 | | | 10 | | | 10 | | | 10 | | | mV |
| | Conditions | $V_{IN} = 3.3V, I_O = 0$ to 1A | | | $V_{IN} = 3.3V, I_O = 0$ to 1A | | | $V_{IN} = 5V, I_O = 0$ to 1A | | | $V_{IN} = 6V, I_O = 0$ to 1A | | | |
| Temperature Coefficient of Output Voltage | $\Delta V_O / \Delta T_a$ | ± 0.3 | | | ± 0.3 | | | ± 0.3 | | | ± 0.5 | | | mV/ $^\circ C$ |
| | Conditions | $V_{IN} = 3.3V, I_O = 5mA, T_J = 0$ to 100 $^\circ C$ | | | $V_{IN} = 3.3V, I_O = 5mA, T_J = 0$ to 100 $^\circ C$ | | | $V_{IN} = 5V, I_O = 5mA, T_J = 0$ to 100 $^\circ C$ | | | $V_{IN} = 6V, I_O = 5mA, T_J = 0$ to 100 $^\circ C$ | | | |
| Ripple Rejection | R_{REJ} | 60 | | | 57 | | | 55 | | | 55 | | | dB |
| | Conditions | $V_{IN} = 3.3V, f = 100$ to 120Hz | | | $V_{IN} = 3.3V, f = 100$ to 120Hz | | | $V_{IN} = 5V, f = 100$ to 120Hz | | | $V_{IN} = 6V, f = 100$ to 120Hz | | | |
| Quiescent Circuit Current | I_q | 1.7 | | | 1.7 | | | 1.7 | | | 1.7 | | | mA |
| | Conditions | $V_{IN} = 3.3V, I_O = 0A$ | | | $V_{IN} = 3.3V, I_O = 0A$ | | | $V_{IN} = 5V, I_O = 0A$ | | | $V_{IN} = 6V, I_O = 0A$ | | | |
| Circuit Current at Output OFF | $I_{q(OFF)}$ | 1 | | | 1 | | | 1 | | | 1 | | | μA |
| | Conditions | $V_{IN} = 3.3V, I_O = 0A, V_C = 0V$ | | | $V_{IN} = 3.3V, I_O = 0A, V_C = 0V$ | | | $V_{IN} = 5V, I_O = 0A, V_C = 0V$ | | | $V_{IN} = 6V, I_O = 0A, V_C = 0V$ | | | |
| Overcurrent Protection Starting Current ^{*1,3} | I_{S1} | 1.2 | | | 1.2 | | | 1.2 | | | 1.2 | | | A |
| | Conditions | $V_{IN} = 3.3V$ | | | $V_{IN} = 3.3V$ | | | $V_{IN} = 5V$ | | | $V_{IN} = 6V$ | | | |
| V_C Terminal | Control Voltage (Output ON) ^{*2} | V_C, I_H | | | 2.0 | | | 2.0 | | | 2.0 | | | V |
| | Control Voltage (Output OFF) ^{*2} | V_C, I_L | | | 0.8 | | | 0.8 | | | 0.8 | | | |
| | Control Current (Output ON) | I_C, I_H | | | 40 | | | 40 | | | 40 | | | μA |
| | Conditions | $V_C = 2V$ | | | | | | | | | | | | |
| | Control Current (Output OFF) | I_C, I_L | | | 0 | | | 0 | | | 0 | | | μA |
| Conditions | $V_C = 0V$ | | | | | | | | | | | | | |

*1: I_{S1} is specified at the 5% drop point of output voltage V_O on the condition that $V_{IN} = 3.3 V$ (5 V for SI-3033LSA), and $I_O = 0.5 A$.

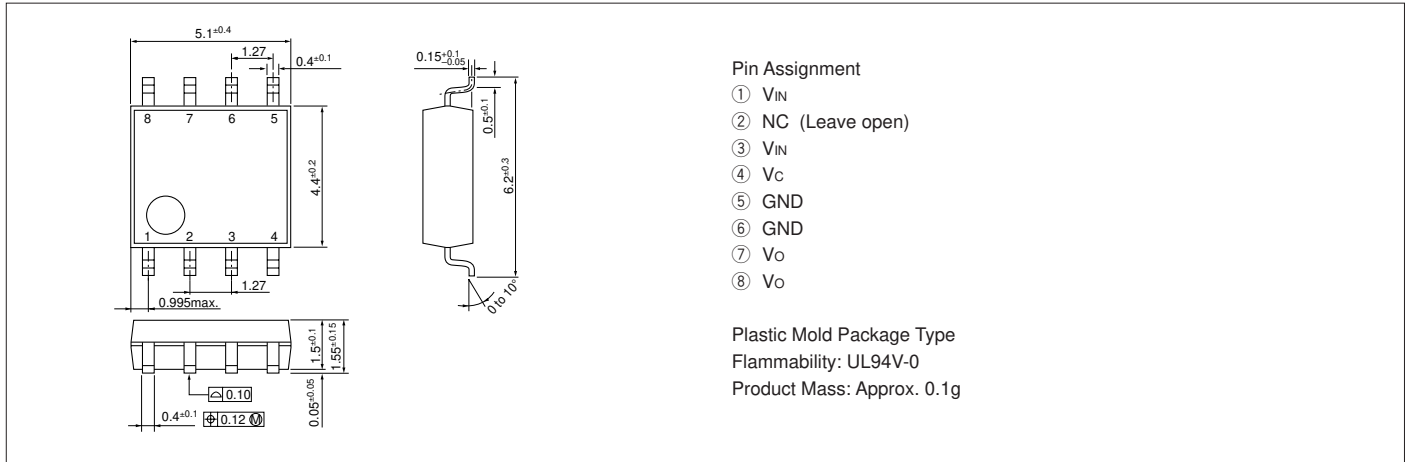
*2: Output is OFF when the output control terminal V_C is open. Each input level is equivalent to LS-TTL level. Therefore, the device can be driven directly by LS-TTLs.

*3: These products cannot be used in the following applications. Because these applications require a certain current at start-up and so the built-in foldback-type overcurrent protection may cause errors during start-up stage.

(1) Constant current load (2) Positive and negative power supply (3) Series-connected power supply (4) V_O adjustment by raising ground voltage

External Dimensions (SOP8)

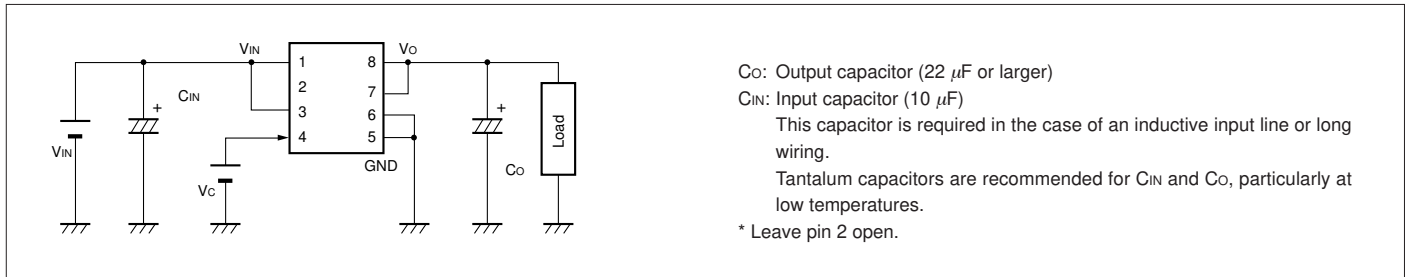
(Unit : mm)



Block Diagram



Typical Connection Diagram



Reference Data

