

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: $I_{q(OFF)} \leq 1 \mu\text{A}$ ($V_C = 0 \text{ V}$)
- Low dropout voltage: $V_{DIF} \leq 0.8 \text{ V}$ (at $I_O = 1 \text{ A}$)
 $V_{DIF} \leq 1.2 \text{ V}$ ($I_O = 1 \text{ A}$) 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

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

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	$^\circ\text{C}$
Operating Ambient Temperature	T_{OP}	-30 to +150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-30 to +150	$^\circ\text{C}$
Thermal Resistance (Junction to Lead (pin 8))	θ_{J-L}	36	$^\circ\text{C/W}$
Thermal Resistance (Junction to Ambient Air)	θ_{J-a}^{*2}	100	$^\circ\text{C/W}$

*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 $^\circ\text{C}$.

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				$^\circ\text{C}$
Operating Ambient Temperature	T_{AP}	-30 to +85				$^\circ\text{C}$

*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

($T_a = 25^\circ\text{C}$, $V_C = 2\text{V}$, 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	$V_{IN} = 3.3\text{V}$, $I_O = 0.5\text{A}$			$V_{IN} = 3.3\text{V}$, $I_O = 0.5\text{A}$			$V_{IN} = 5\text{V}$, $I_O = 0.5\text{A}$			$V_{IN} = 6\text{V}$, $I_O = 0.5\text{A}$				
Dropout Voltage	V_{DIF}	-			0.4			0.4			0.4			V	
	Conditions	-			$I_O \leq 0.5\text{A}$			$I_O \leq 0.5\text{A}$			$I_O \leq 0.5\text{A}$				
	Conditions	0.6	1.2				0.8			0.8			0.8		
Line Regulation	ΔV_{LINE}	2			10			3			15			mV	
	Conditions	$V_{IN} = 3.1$ to 3.5V , $I_O = 0.3\text{A}$			$V_{IN} = 3.1$ to 3.5V , $I_O = 0.3\text{A}$			$V_{IN} = 4.5$ to 5.5V , $I_O = 0.3\text{A}$			$V_{IN} = 6$ to 7V , $I_O = 0.3\text{A}$				
Load Regulation	ΔV_{LOAD}	10			20			10			20			mV	
	Conditions	$V_{IN} = 3.3\text{V}$, $I_O = 0$ to 1A			$V_{IN} = 3.3\text{V}$, $I_O = 0$ to 1A			$V_{IN} = 5\text{V}$, $I_O = 0$ to 1A			$V_{IN} = 6\text{V}$, $I_O = 0$ to 1A				
Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T_a$	± 0.3			± 0.3			± 0.3			± 0.5			mV/ $^\circ\text{C}$	
	Conditions	$V_{IN} = 3.3\text{V}$, $I_O = 5\text{mA}$, $T_J = 0$ to 100°C			$V_{IN} = 3.3\text{V}$, $I_O = 5\text{mA}$, $T_J = 0$ to 100°C			$V_{IN} = 5\text{V}$, $I_O = 5\text{mA}$, $T_J = 0$ to 100°C			$V_{IN} = 6\text{V}$, $I_O = 5\text{mA}$, $T_J = 0$ to 100°C				
Ripple Rejection	R_{REJ}	60			57			55			55			dB	
	Conditions	$V_{IN} = 3.3\text{V}$, $f = 100$ to 120Hz			$V_{IN} = 3.3\text{V}$, $f = 100$ to 120Hz			$V_{IN} = 5\text{V}$, $f = 100$ to 120Hz			$V_{IN} = 6\text{V}$, $f = 100$ to 120Hz				
Quiescent Circuit Current	I_q	1.7			1.7			1.7			1.7			mA	
	Conditions	$V_{IN} = 3.3\text{V}$, $I_O = 0\text{A}$			$V_{IN} = 3.3\text{V}$, $I_O = 0\text{A}$			$V_{IN} = 5\text{V}$, $I_O = 0\text{A}$			$V_{IN} = 6\text{V}$, $I_O = 0\text{A}$				
Circuit Current at Output OFF	$I_{q(OFF)}$	1			1			1			1			μA	
	Conditions	$V_{IN} = 3.3\text{V}$, $I_O = 0\text{A}$, $V_C = 0\text{V}$			$V_{IN} = 3.3\text{V}$, $I_O = 0\text{A}$, $V_C = 0\text{V}$			$V_{IN} = 5\text{V}$, $I_O = 0\text{A}$, $V_C = 0\text{V}$			$V_{IN} = 6\text{V}$, $I_O = 0\text{A}$, $V_C = 0\text{V}$				
Overcurrent Protection Starting Current ^{*1,3}	I_{S1}	1.2			1.2			1.2			1.2			A	
	Conditions	$V_{IN} = 3.3\text{V}$			$V_{IN} = 3.3\text{V}$			$V_{IN} = 5\text{V}$			$V_{IN} = 6\text{V}$				
V_C Terminal	Control Voltage (Output ON) ^{*2}	V_C, I_H	2.0			2.0			2.0			2.0			V
	Control Voltage (Output OFF) ^{*2}	V_C, I_L	0.8			0.8			0.8			0.8			
	Control Current (Output ON)	I_C, I_H	40			40			40			40			μA
	Conditions	$V_C = 2\text{V}$													
	Control Current (Output OFF)	I_C, I_L	0			0			0			0			μA
Conditions	$V_C = 0\text{V}$														

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

*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)

Pin Assignment

- ① V_{IN}
- ② NC (Leave open)
- ③ V_{IN}
- ④ V_c
- ⑤ GND
- ⑥ GND
- ⑦ V_o
- ⑧ V_o

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

Block Diagram



Typical Connection Diagram

C_o: Output capacitor (22 μ F or larger)
C_{IN}: Input capacitor (10 μ F)
This capacitor is required in the case of an inductive input line or long wiring.
Tantalum capacitors are recommended for C_{IN} and C_o, particularly at low temperatures.
* Leave pin 2 open.

Reference Data

