

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: $I_q(\text{OFF}) \leq 1 \mu\text{A}$ ($V_c = 0 \text{ V}$)
- 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

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	°C
Operating Ambient Temperature	T_{op}	-30 to +150	°C
Storage Temperature	T_{stg}	-30 to +150	°C
Thermal Resistance (Junction to Lead (pin 8))	θ_{j-L}	36	°C/W
Thermal Resistance (Junction to Ambient Air)	θ_{j-a}^{*2}	100	°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°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_{jop}		-20 to +125			°C
Operating Ambient Temperature	T_{op}		-30 to +85			°C

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

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					
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
	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		
	Conditions	—			$I_o \leq 0.5\text{A}$			$I_o \leq 0.5\text{A}$			$I_o \leq 0.5\text{A}$		
Line Regulation	ΔV_{LINE}	2			2			3			3		
	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			10			10			10		
	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		
	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		
	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			2.5			1.7			2.5		
	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	$I_q(\text{OFF})$	1			1			1			1		
	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		
	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		
	Control Voltage (Output OFF) ^{*2}	V_c, I_L			0.8			0.8			0.8		
Control Current (Output ON)	I_c, I_H	40			80			40			40		
	Conditions	$V_c=2\text{V}$			40			80			80		
Control Current (Output OFF)	I_c, I_L	0			-5			0			0		
	Conditions	$V_c=0\text{V}$			0			-5			-5		

*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 $I_o = 0.5 \text{ A}$.

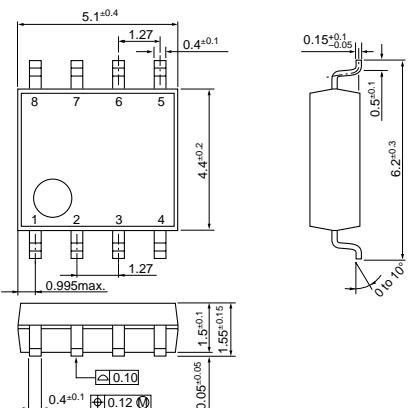
*2: Output is OFF when the output control terminal V_c is open. Each input level is equivalent to LS-TTL level. Therefore, the device can be driven directly by LS-TTls.

*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

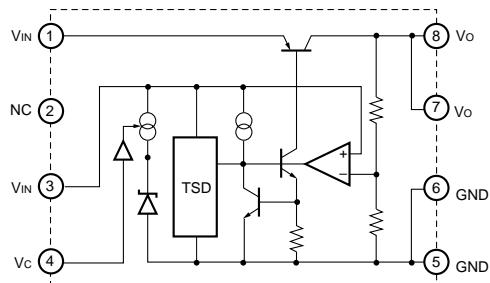
- ① VIN
- ② NC (Leave open)
- ③ VIN
- ④ Vc
- ⑤ GND
- ⑥ GND
- ⑦ Vo
- ⑧ Vo

Plastic Mold Package Type

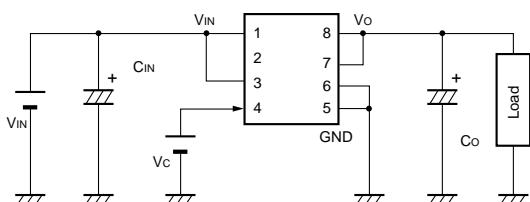
Flammability: UL94V-0

Product Mass: Approx. 0.1g

■Block Diagram



■Typical Connection Diagram



Co: Output capacitor (22 µF or larger)

Cin: Input capacitor (10 µF)

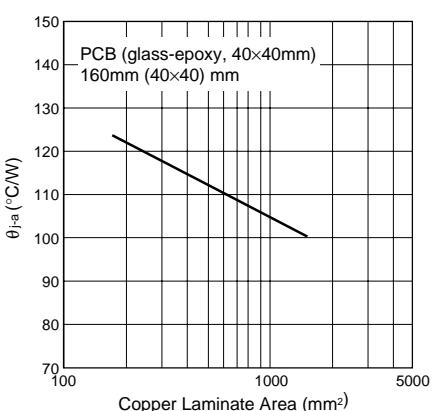
This capacitor is required in the case of an inductive input line or long wiring.

Tantalum capacitors are recommended for Cin and Co, particularly at low temperatures.

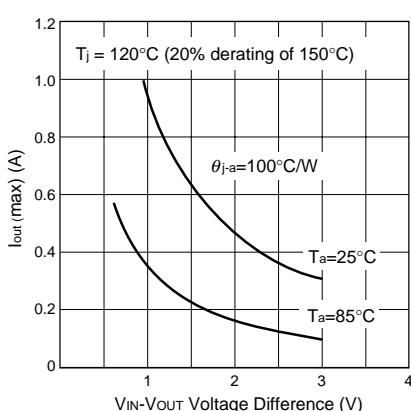
* Leave pin 2 open.

■Reference Data

PCB Copper Laminate Area vs. Junction to Ambient Air Thermal Resistance



Allowable Output Current (vs. VIN-Vout Voltage Difference) VIN-Io max



The inner frame stage, on which the PTr is mounted, is directly connected to the Vout pin.

Therefore, enlarging the copper laminate area around the Vout pin is really effective for a heat radiation.