

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: $V_{\text{DIF}} \leq 0.8 \text{ V}$ (at $I_o = 1 \text{ A}$)
 $V_{\text{DIF}} \leq 1.2 \text{ V}$ ($I_o = 1 \text{ A}$) 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))	$\theta_{\text{J-L}}$	36	$^\circ\text{C/W}$
Thermal Resistance (Junction to Ambient Air)	$\theta_{\text{J-a}}^{*2}$	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°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_{op}	-20 to $+125$				$^\circ\text{C}$
Operating Ambient Temperature	T_{aop}	-30 to $+85$				$^\circ\text{C}$

- *1: V_{IN} (max) and I_o (max) are restricted by the relation $P_D = (V_{\text{IN}} - V_o) \times I_o$.
Please calculate these values referring to the reference data on page 71.
*2: Refer to the Dropout Voltage parameter.

Electrical Characteristics

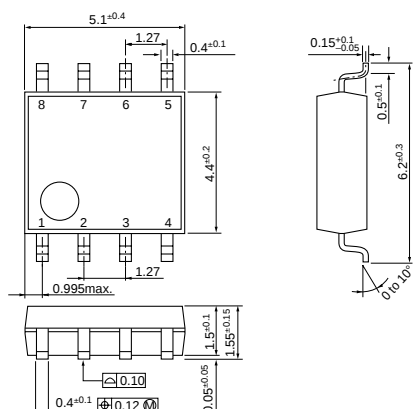
($T_a = 25^\circ\text{C}$, $V_c = 2\text{V}$, unless otherwise specified)

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} =3.3V, 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 ≤0.5A			I _O ≤0.5A			I _O ≤0.5A			
				0.6	1.2			0.8			0.8			0.8	
Line Regulation		ΔV _{LINE}		2	10		2	10		3	10		3	15	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	20		10	20		10	20		10	30	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		ΔV _O /ΔT _a		±0.3			±0.3			±0.3			±0.5	mV/°C	
		Conditions	V _{IN} =3.3V, I _O =5mA, T _J =0 to 100°C			V _{IN} =3.3V, I _O =5mA, T _J =0 to 100°C			V _{IN} =5V, I _O =5mA, T _J =0 to 100°C			V _{IN} =6V, I _O =5mA, T _J =0 to 100°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	2.5		1.7	2.5		1.7	2.5		1.7	2.5	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			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	80		40	80		40	80		40	80	μA
	Conditions	V _C =2V													
	Control Current (Output OFF)	I _C , I _L		0	−5		0	−5		0	−5		0	−5	μA
Conditions	V _C =0V														

- *1: IS_1 is specified at the 5% drop point of output voltage V_o on the condition that $V_{\text{IN}} = 3.3 \text{ V}$ (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

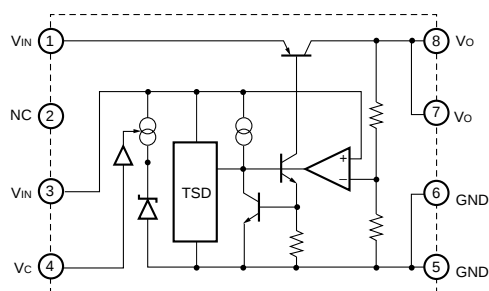
- ① V_{IN}
- ② NC (Leave open)
- ③ V_{IN}
- ④ V_C
- ⑤ GND
- ⑥ GND
- ⑦ V_O
- ⑧ V_O

Plastic Mold Package Type

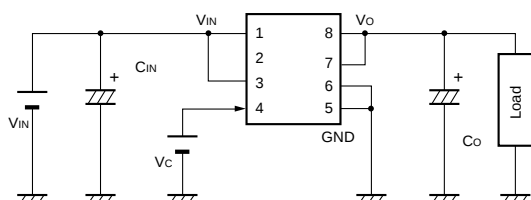
Flammability: UL94V-0

Product Mass: Approx. 0.1g

Block Diagram



Typical Connection Diagram

 C_O : Output capacitor (22 μF or larger) C_{IN} : Input capacitor (10 μF)

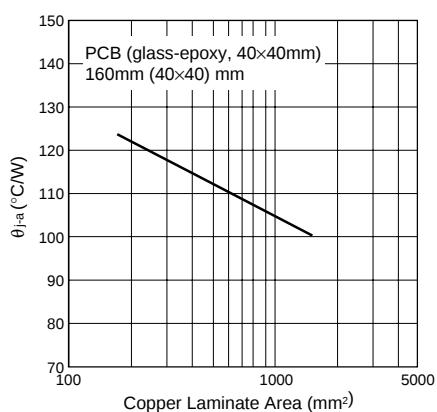
This capacitor is required in the case of an inductive input line or long wiring.

Tantalum capacitors are recommended for C_{IN} and C_O , particularly at low temperatures.

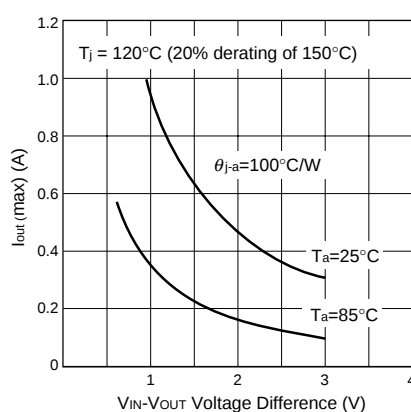
* Leave pin 2 open.

Reference Data

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



Allowable Output Current (vs. $V_{IN}-V_{OUT}$ Voltage Difference)
 $V_{IN}-I_O$ max

The inner frame stage, on which the PTR is mounted, is directly connected to the V_{OUT} pin.Therefore, enlarging the copper laminate area around the V_{OUT} pin is really effective for a heat radiation.