

# Dropper Type Dual Output Regulator SI-3101S

## Features

- Single input dual output <sub output (5V/0.07A), main output (5V/0.4A)>
- Main output can be externally turned ON/OFF (with ignition switch, etc.)  
<most suitable as memory backup power supply>
- Low standby current ( $\leq 0.8\text{mA}$ )
- Low dropout voltage  $\leq 1\text{V}$
- Built-in constant current type overcurrent, overvoltage and thermal protection circuits
- TO-220 equivalent 5-terminal full-mold package

## Absolute Maximum Ratings

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

Parameter	Symbol	Ratings	Unit	Conditions
DC input voltage	$V_{IN}$	40	V	
Battery reverse connection	$V_{INB}$	-13 *6	V	One minute
Output control terminal voltage	$V_C$	$V_{IN}$	V	
Output current	CH1	$I_{O1}$	0.07 *1	A
	CH2	$I_{O2}$	0.4 *1	A
Power Dissipation	$P_{D1}$	18	W	With infinite heatsink
	$P_{D2}$	1.5	W	Stand-alone without heatsink
Junction Temperature	$T_J$	-40 to +125	$^\circ\text{C}$	
Operating temperature	$T_{OP}$	-40 to +115	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	-40 to +125	$^\circ\text{C}$	
Junction to case thermal resistance	$\theta_{j-c}$	5.5	$^\circ\text{C/W}$	
Junction to ambient-air thermal resistance	$\theta_{j-a}$	66.7	$^\circ\text{C/W}$	Stand-alone without heatsink

## Electrical Characteristics

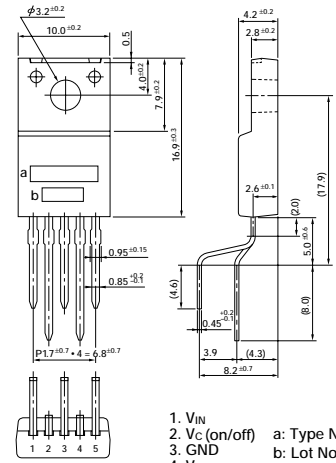
( $T_J=25^\circ\text{C}$ ,  $V_{IN}=14\text{V}$  unless otherwise specified)

Parameter	Symbol	Ratings			Unit	Conditions	
		min	typ	max			
Input voltage	$V_{IN}$	6 *2		35 *1	V		
Output voltage	CH1	$V_{O1}$	4.80	5.00	5.20	V	$I_O=0.05\text{A}$
	CH2	$V_{O2}$	4.80	5.00	5.20	V	$I_O=0.3\text{A}$
Channel-channel voltage difference ( $V_{O1}-V_{O2}$ )	$\Delta V_O$	-0.3		5.30	V	$V_{IN}=0$ to 40V, $I_{O1}$ and $I_{O2}=0\text{A}$ up to load short-circuiting	
Dropout voltage	CH1	$V_{DIF1}$		1.0	V	$I_{O1}\leq 0.05\text{A}$	
	CH2	$V_{DIF2}$		1.0	V	$I_{O2}\leq 0.4\text{A}$	
Line regulation	CH1	$\Delta V_{O LINE1}$	10	30	mV	$V_{IN}=6$ to 18V, $I_O=0.05\text{A}$	
	CH2	$\Delta V_{O LINE2}$	10	30	mV	$V_{IN}=6$ to 18V, $I_O=0.3\text{A}$	
Load regulation	CH1	$\Delta V_{O LOAD1}$	30	70	mV	$I_{O1}=0$ to 0.05A	
	CH2	$\Delta V_{O LOAD2}$	40	70	mV	$I_{O2}=0$ to 0.3A	
Ripple rejection	CH1	$R_{REJ1}$	54		dB	$f=100$ to 120Hz	
	CH2	$R_{REJ2}$	54		dB	$f=100$ to 120Hz	
Quiescent circuit current	$I_q$			0.8	mA	$I_O=0\text{A}$ , $V_C=0\text{V}$	
Overcurrent protection starting current	CH1	$I_{(S)1}$	0.1 *3		A		
	CH2	$I_{(S)2}$	0.5 *3		A		
Output control voltage	Output ON	$V_{CH}$	4.2	4.5	4.8	V	
	Output OFF	$V_{CL}$	3.2	3.5	3.8	V	
Output control current	Output ON	$I_{CH}$		100	$\mu\text{A}$	$V_C=4.8\text{V}$	
	Output OFF	$I_{CL}$	-100		$\mu\text{A}$	$V_C=3.2\text{V}$	
Overvoltage protection starting voltage	$V_{OVP}$	35 *4			V		
Thermal protection starting temperature	$T_{TSD}$	130 *5			$^\circ\text{C}$		

### Notes:

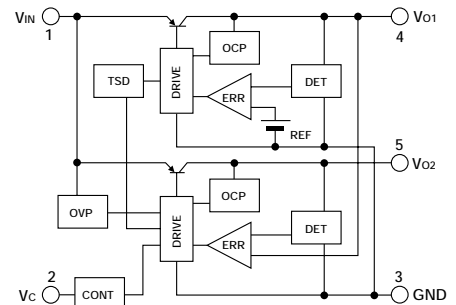
- \*1. Since  $P_D(\text{max}) = (V_{IN}-V_O) \cdot I_{O1} + (V_{IN}-V_{O2}) \cdot I_{O2} = 18\text{ (W)}$ ,  $V_{IN}(\text{max})$ ,  $I_{O1}(\text{max})$  and  $I_{O2}(\text{max})$  may be limited depending on operating conditions. Refer to the  $T_a-P_D$  curve to compute the corresponding values.
- \*2. Refer to the dropout voltage.
- \*3.  $I_{S1}$  rating shall be the point at which the output voltage  $V_{O1}$  or  $V_{O2}$  ( $V_{IN}=14\text{V}$ ,  $I_{O1}=0.05\text{A}$  or  $I_{O2}=0.3\text{A}$ ) drops to -5%.
- \*4. Overvoltage protection circuit is built only in CH2 ( $V_{O2}$  side).
- \*5. The indicated temperatures are junction temperatures.
- \*6. All terminals, except  $V_{IN}$  and GND, are open.

## External Dimensions (unit: mm)

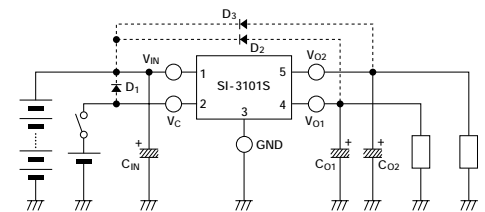


1.  $V_{IN}$
  2.  $V_C$  (on/off)
  3. GND
  4.  $V_{O1}$
  5.  $V_{O2}$
- a: Type No.  
b: Lot No.
- (Forming No. 1101)

## Equivalent Circuit Diagram

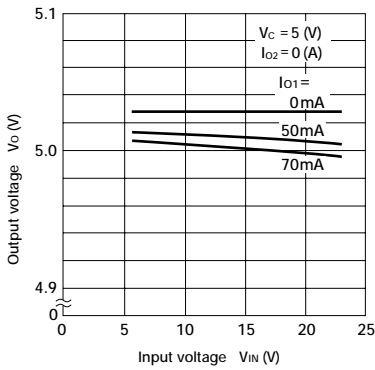


## Standard Circuit Diagram

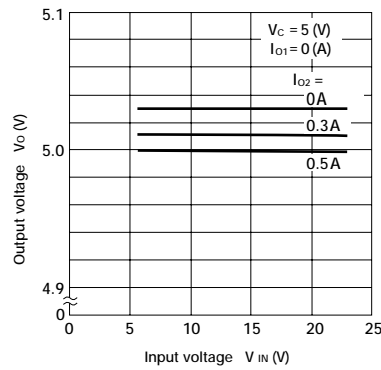


- $C_{O1}$ : Output capacitor (47 to 100 $\mu\text{F}$ , 50V)  
 $C_{O2}$ : Output capacitor (47 to 100 $\mu\text{F}$ , 50V)  
 \*1  $C_{IN}$ : Anti-oscillation capacitors (approx. 47 $\mu\text{F}$ ).  
 Tantalum capacitors are recommended, especially at low temperatures.  
 \*2  $D_1$ ,  $D_2$ ,  $D_3$ : Protection diode.  
 Required as protection against reverse biasing between input and output.  
 (Recommended diode: Sanken EU2Z.)

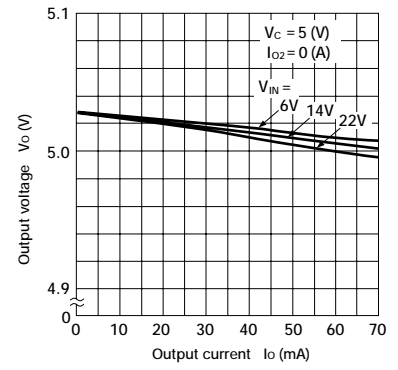
■ Line Regulation (1)



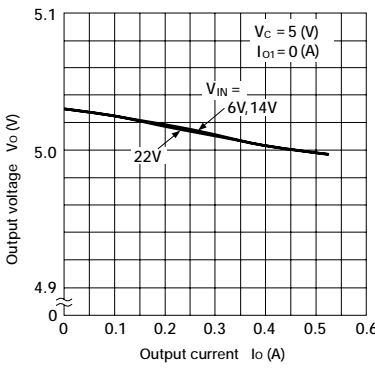
■ Line Regulation (2)



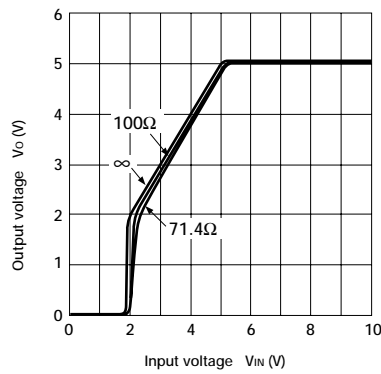
■ Load Regulation (1)



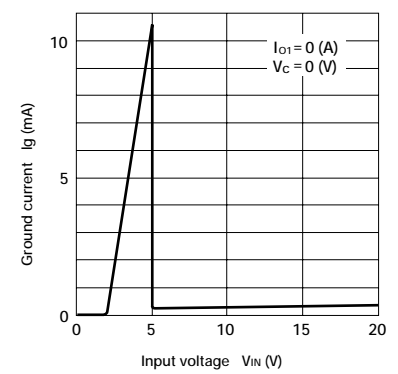
■ Load Regulation (2)



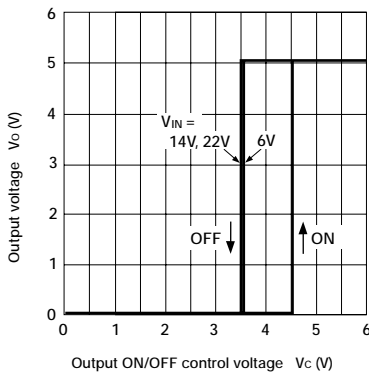
■ Rise Characteristics



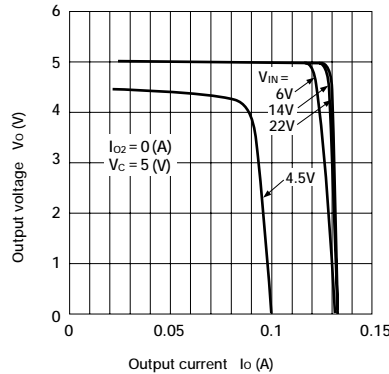
■ Circuit Current



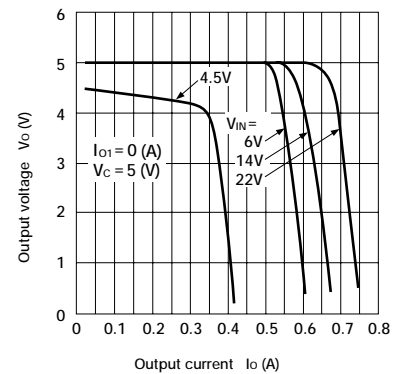
■ ON/OFF Control Characteristics



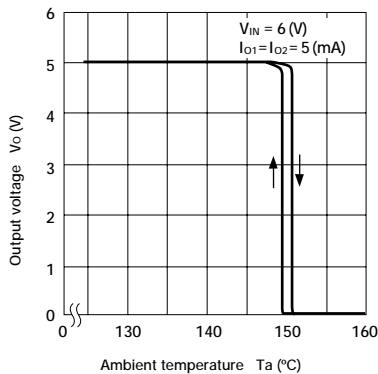
■ Overcurrent Protection Characteristics (1)



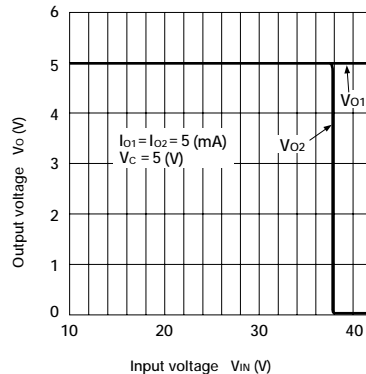
■ Overcurrent Protection Characteristics (2)



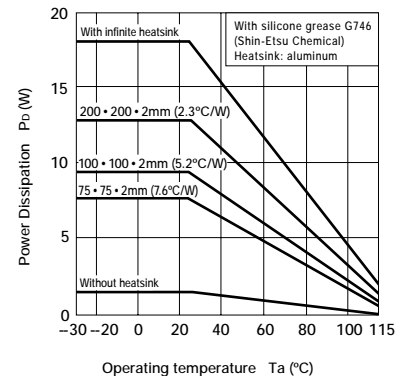
■ Thermal Protection Characteristics



■ Overvoltage Protection Characteristics



■ Ta—PD Characteristics



Note on Thermal Protection Characteristics:  
The thermal protection circuit is intended for protection against heat during instantaneous short-circuiting. Its operation, including reliability, is not guaranteed for short-circuiting over an extended period of time.