Dropper Type Dual Output Regulator SI-3102S

Features

- Single input dual output <sub output (5V/0.04A), main output (5V/0.1A)>
- Main output can be externally turned ON/OFF (with ignition switch, etc.) <most suitable as memory backup power supply>
- Low standby current (≦0.8mA)
- Low dropout voltage ≦1V
- Built-in constant current type overcurrent, overvoltage and thermal protection circuits
- TO-220 equivalent 5-terminal full-mold miniature package

Absolute Maximum Ratings

(Ta=25ºC)

Parameter		Symbol	Ratings	Unit	Conditions
DC input voltage		V_{IN}	35	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}	0.04 *1	A	
	CH2	I_{O2}	0.1 *1	A	
Power Dissipation		P_{D1}	22	W	With infinite heatsink
		P_{D2}	1.8	W	Stand-alone without heatsink
Junction temperature		Tj	–40 to +150	ºC	
Operating temperature		T_{OP}	–40 to +105	ºC	
Storage temperature		Tstg	–40 to +150	ºC	
Junction to case thermal resistance		$\theta_{j\text{-}c}$	5.5	ºC/W	
Junction to ambient-air thermal resistance		$\theta_{j\text{-}a}$	66.7	ºC/W	Stand-alone without heatsink

Electrical Characteristics

(Tj=25ºC, V_{IN}=14V unless otherwise specified)

Parameter		Symbol	Ratings min	Ratings typ	Ratings max	Unit	Conditions
Input voltage		V_{IN}	6 *2		30 *1	V	
Output voltage	CH1	V_{O1}	4.80	5.00	5.20	V	I_O=0.04A
	CH2	V_{O2}	4.80	5.00	5.20	V	I_O=0.1A
Channel-channel voltage difference (V_{O1}—V_{O2})		ΔV_O	–0.3		5.3	V	V_{IN}=0 to 40V, I_{O1} and I_{O2}=0A up to load short-circuiting
Dropout voltage	CH1	V_{DIF1}			1.0	V	I_{O1}≦0.04A
	CH2	V_{DIF2}			1.0	V	I_{O2}≦0.1A
Line regulation	CH1	$\Delta V_{O\ LINE1}$		10	50	mV	V_{IN}=6 to 30V, I_O=0.04A
	CH2	$\Delta V_{O\ LINE2}$		10	50	mV	V_{IN}=6 to 30V, I_O=0.1A
Load regulation	CH1	$\Delta V_{O\ LOAD1}$		30	70	mV	I_{O1}=0 to 0.04A
	CH2	$\Delta V_{O\ LOAD2}$		40	70	mV	I_{O2}=0 to 0.1A
Ripple rejection	CH1	R_{REJ1}		54		dB	f=100 to 120Hz
	CH2	R_{REJ2}		54		dB	f=100 to 120Hz
Quiescent circuit current		Iq			0.8	mA	I_{O1}=0A, V_C=0V
Overcurrent protection starting current	CH1	$I_{(S1)\,1}$	0.06 *3			A	
	CH2	$I_{(S1)\,2}$	0.15 *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	µA	V_C=4.8V
	Output OFF	I_{CL}	–100			µA	V_C=3.2V
Overvoltage protection starting voltage		V_{OVP}	30 *4			V	
Thermal protection starting temperature		T_{TSD}	151 *5			ºC	

Notes:

*1. Since $P_D(max) = (V_{IN}-V_O) \cdot I_{O1} + (V_{IN}-V_{O2}) \cdot I_{O2} = 22$ (W), V_{IN} (max), I_{O1}(max) and I_{O2}(max) may be limited depending on operating conditions. Refer to the Ta—P_D curve to compute the corresponding values.

*2. Refer to the dropout voltage.

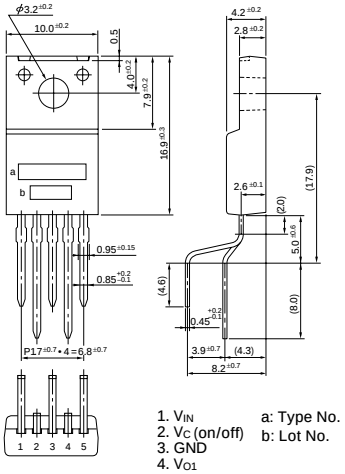
*3. I_{S1} rating shall be the point at which the output voltage V_{O1} or V_{O2} (V_{IN}=14V, I_{O1}=0.04A or I_{O2}=0.1A) drops to –5%.

*4. Overvoltage protection circuit is built only in CH2 (V_{O2} side).

*5. The indicated temperatures are junction temperatures.

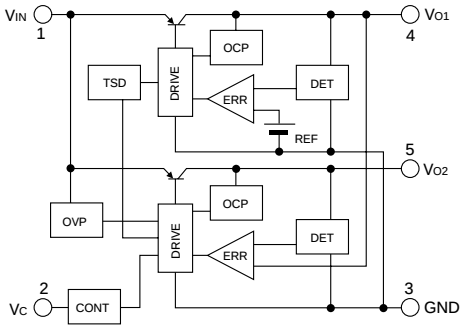
*6. All terminals, except V_{IN} and GND, are open.

External Dimensions (unit: mm)

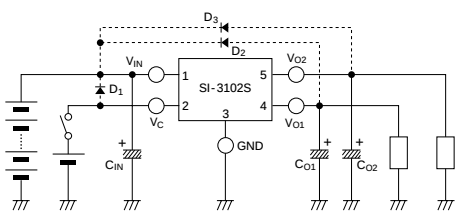


(Forming No. 1101)

Equivalent Circuit Diagram



Standard Circuit Diagram



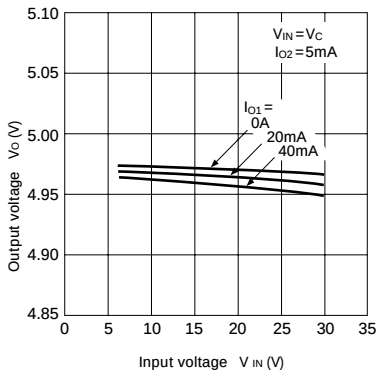
C_{O1} : Output capacitor (47 to 100µF, 50V)

C_{O2} : Output capacitor (47 to 100µF, 50V)

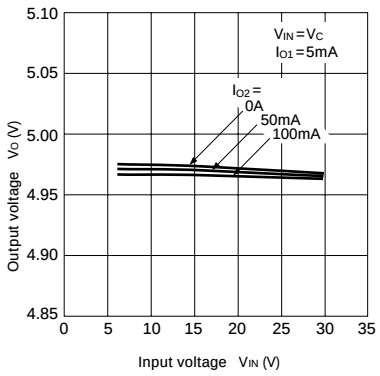
*1 C_{IN} : Anti-oscillation capacitors (approx. 47µF). Tantalum capacitors are recommended, especially at low temperatures.

*2 D_1, D_2, D_3 : Protection diode. Required as protection against reverse biasing between input and output. (Recommended diode: Sanken EU2Z.)

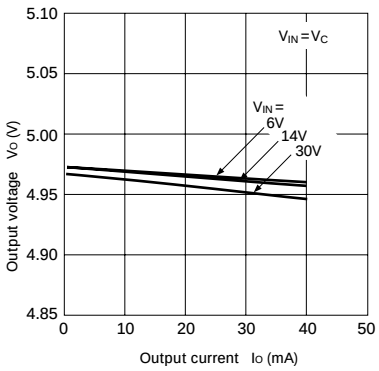
■ Line Regulation (1)



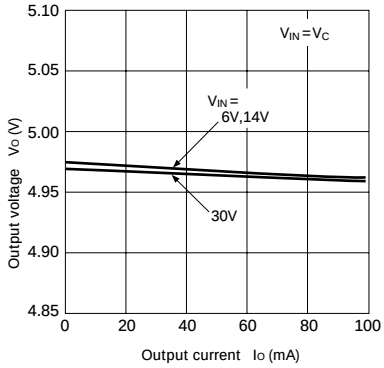
■ Line Regulation (2)



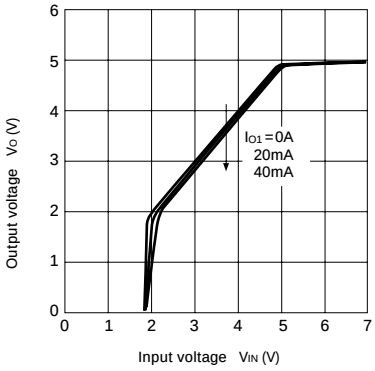
■ Load Regulation (1)



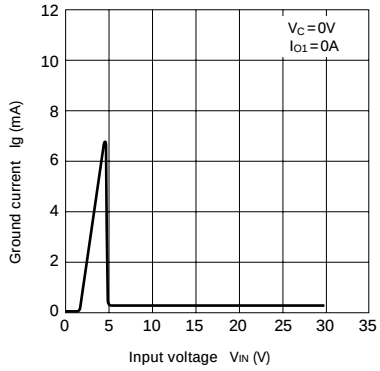
■ Load Regulation (2)



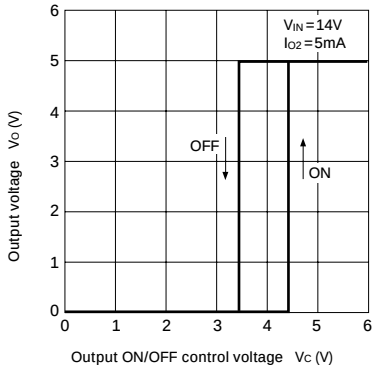
■ Rise Characteristics



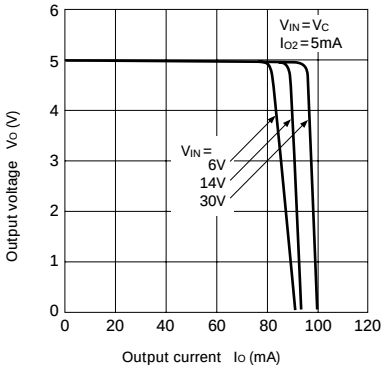
■ Circuit Current



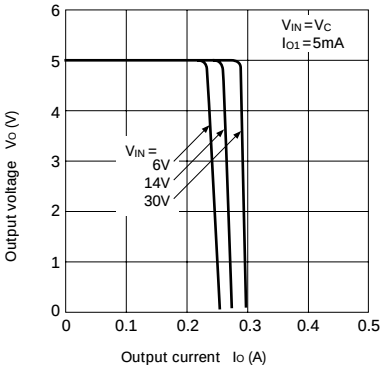
■ ON/OFF Control Characteristics



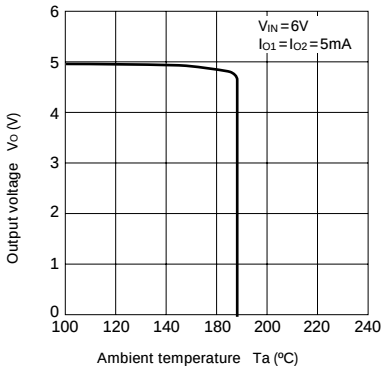
■ Overcurrent Protection Characteristics (1)



■ Overcurrent Protection Characteristics (2)

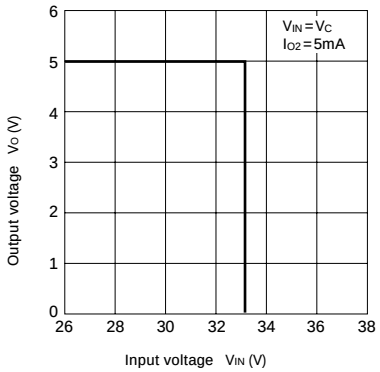


■ Thermal Protection Characteristics



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.

■ Overvoltage Protection Characteristics



■ Ta—PD Characteristics

