Dropper Type Regulator with Output On/Off Control SI-3001S

Features

- Output current of 1.0A
- 5-terminal type <output on/off control, variable output voltage (rise only)>
- Voltage accuracy of ±2%
- Low dropout voltage ≦1V at I_O ≦1.0A, ≦0.5V at I_O≦0.4A
- Built-in overcurrent, overvoltage and thermal protection circuits
- Withstands external electromagnetic noises
- TO-220 equivalent full-mold package

Absolute Maximum Ratings

(Ta = 25ºC)

Parameter	Symbol	Ratings	Unit	Conditions
DC Input Voltage	V_{IN}	35	V	
Output Control Terminal Voltage	V_C	V_{IN}	V	
Output Current	I_O	1.0 *1	A	
Power Dissipation	P_{D1}	18	W	With infinite heatsink
	P_{D2}	1.5	W	Stand-alone without heatsink
Junction Temperature	Tj	−40 to +125	ºC	
Operating Temperature	T_{OP}	−40 to +100	ºC	
Storage Temperature	Tstg	−40 to +125	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

(Ta = 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			V_O	4.90	5.00	5.10	V	V_{IN} = 12 to 16V, I_O = 0.4A
Dropout Voltage			V_{DIF}			0.5	V	I_O≦0.4A
						1.0	V	I_O≦1.0A
Line Regulation			$\Delta V_{O\ LINE}$			30	mV	I_O = 0.4A, V_{IN} = 6 to 16V
Load Regulation			$\Delta V_{O\ LOAD}$			100	mV	I_O = 0 to 0.4A
Output Voltage Temperature Coefficient			$\Delta V_O/\Delta T$		±0.5		mV/ºC	I_O = 5mA, Ta = −10 to +100ºC
Ripple Rejection			R_{REJ}		54		dB	f = 100 to 120Hz
Quiescent Circuit Current			Iq		3	10	mA	I_O = 0A
Overcurrent Protection Starting Current			I_{S1}	1.2 *3			A	
Vc Terminal	Control Voltage	Output ON	$V_{C,\ IH}$	2.0 *4			V	
		Output OFF	$V_{C,\ IL}$			0.8	V	
	Control Current	Output ON	$I_{C,\ IH}$			20	µA	V_C = 2.7V
		Output OFF	$I_{C,\ IL}$			−0.3	mA	V_C = 0.4V

Notes:

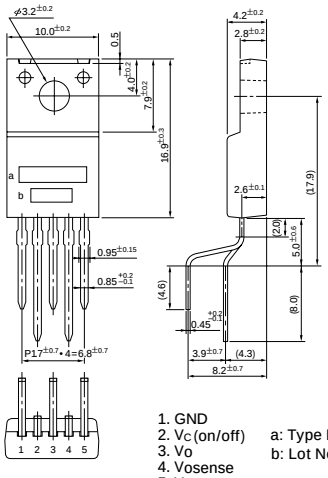
*1. Since $P_{D(max)} = (V_{IN} - V_O) \cdot I_O = 18$(W), $V_{IN(max)}$ and $I_{O(max)}$ may be limited depending on operating conditions. Refer to the Ta-P_D curve to compute the corresponding values.

*2. Refer to the dropout voltage.

*3. I_{S1} rating shall be the point at which the output voltage V_O (V_{IN} = 14V, Io = 0.4A) drops to −5%.

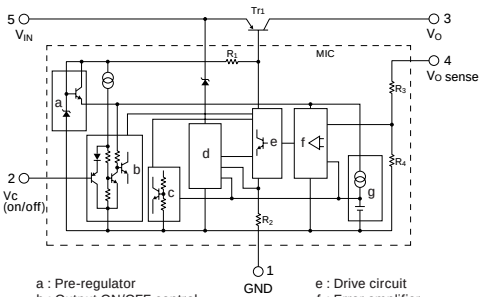
*4. The output control terminal Vc is pulled up inside the IC. Each input level can be directly driven with LS-TTL ICs. Thus, LS-TTL direct driving is also possible.

External Dimensions (unit: mm)

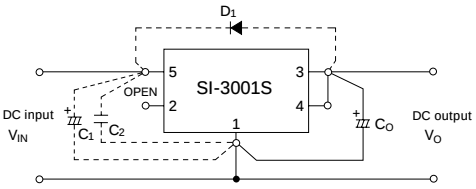


(Forming No. 1101)

Equivalent Circuit Diagram



Standard Circuit Diagram

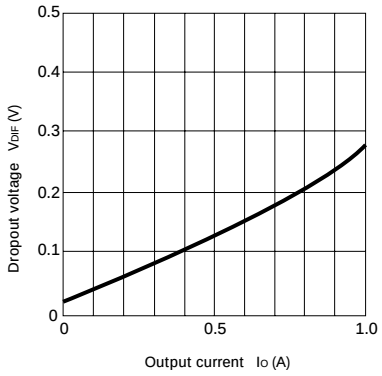


Co : Output capacitor (47 to 100µF, 50V)

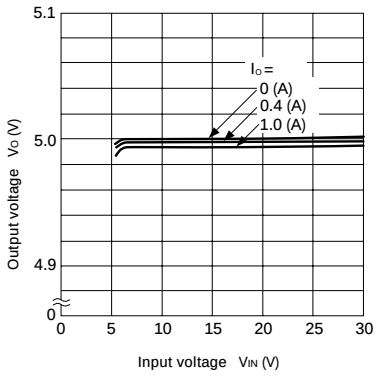
C_1, C_2 : Anti-oscillation capacitors (C_1: approx. 47µF, C_2: approx. 0.33µF). These are required for inductive input lines or long wiring. Tantalum capacitors are recommended for C_1 and Co, especially at low temperatures.

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

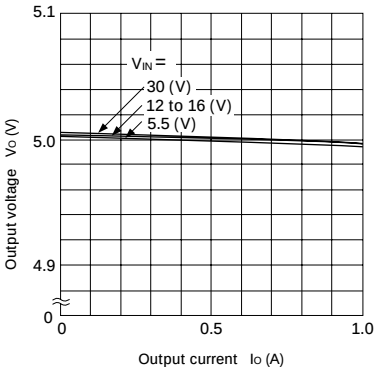
■ I_O vs V_{DIF} Characteristicsc



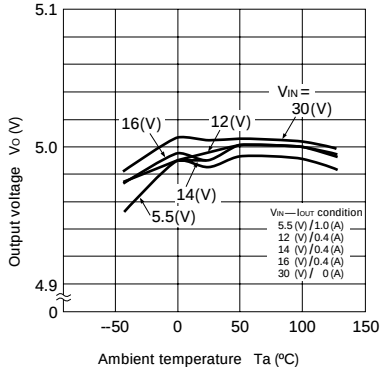
■ Line Regulation



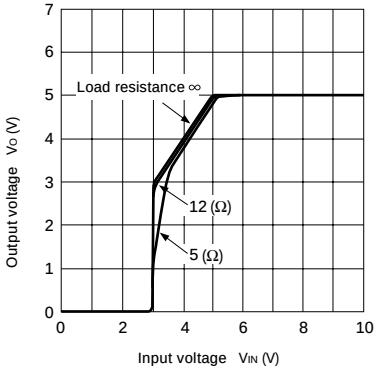
■ Load Regulation



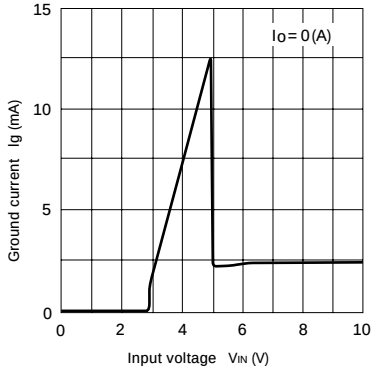
■ Output Voltage Temperature Characteristics



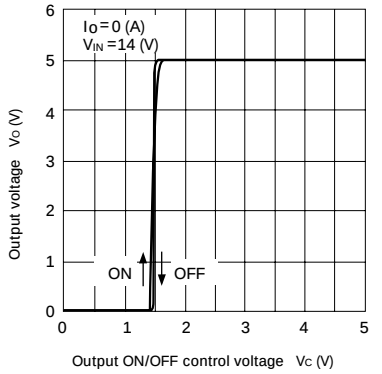
■ Rise Characteristics



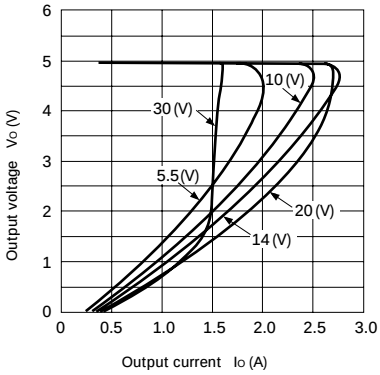
■ Circuit Current



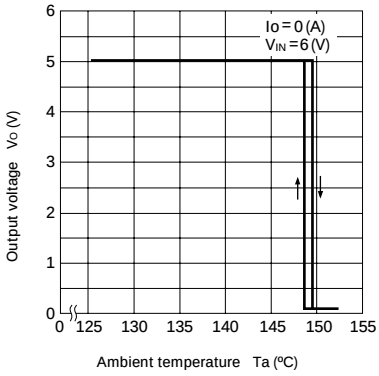
■ ON/OFF Control Characteristics



■ Overcurrent Protection Characteristics

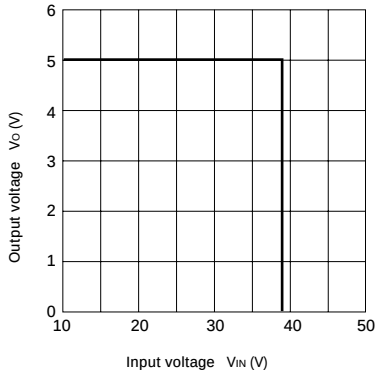


■ Thermal Protection Characteristics



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—P_D Characteristics