

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 $\pm 2\%$
- Low dropout voltage $\leq 1V$ at $I_O \leq 1.0A$, $\leq 0.5V$ at $I_O \leq 0.4A$
- Built-in overcurrent, overvoltage and thermal protection circuits
- Withstands external electromagnetic noises
- TO-220 equivalent full-mold package

Absolute Maximum Ratings

(Ta = 25°C)

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	T _J	-40 to +125	°C	
Operating Temperature	T _{OP}	-40 to +100	°C	
Storage Temperature	T _{stg}	-40 to +125	°C	
Junction to Case Thermal Resistance	θ_{j-c}	5.5	°C/W	
Junction to Ambient-Air Thermal Resistance	θ_{j-a}	66.7	°C/W	Stand-alone without heatsink

Electrical Characteristics

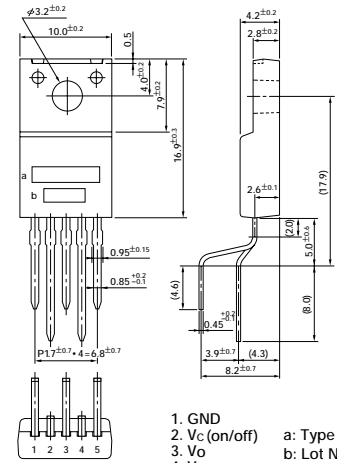
(Ta = 25°C, V_{IN} = 14V unless otherwise specified)

Parameter	Symbol	Ratings			Unit	Conditions	
		min	typ	max			
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 \leq 0.4A	
				1.0	V	I _O \leq 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/°C	I _O = 5mA, Ta = -10 to +100°C	
Ripple Rejection	R _{REJ}		54		dB	f = 100 to 120Hz	
Quiescent Circuit Current	I _q		3	10	mA	I _O = 0A	
Overcurrent Protection Starting Current	I _{S1}	1.2 *3			A		
V _C 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	μ A	V _C = 2.7V
		Output OFF	I _{C, IL}		-0.3	mA	V _C = 0.4V

Notes:

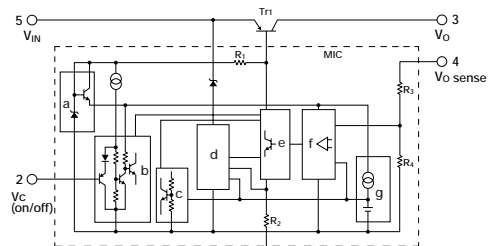
- *1. Since $P_{D(max)} = (V_{IN} - V_O) \cdot I_O = 18(W)$, V_{IN(max)} and I_{O(max)} may be limited depending on operating conditions. Refer to the Ta-P_D curve to compute the corresponding values.
- *2. Refer to the dropout voltage.
- *3. I_{S1} rating shall be the point at which the output voltage V_O (V_{IN} = 14V, I_O = 0.4A) drops to -5%.
- *4. The output control terminal V_C 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)



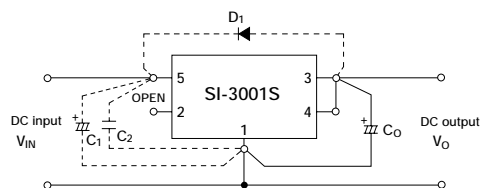
1. GND
 2. V_C (on/off)
 3. V_O
 4. V_{osense}
 5. V_{IN}
- a: Type No.
b: Lot No.
- (Forming No. 1101)

Equivalent Circuit Diagram



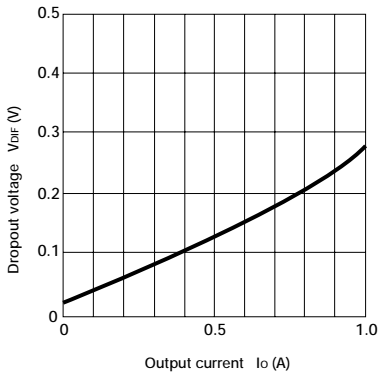
- a: Pre-regulator
- b: Output ON/OFF control
- c: Thermal protection
- d: Over-input and overcurrent protection
- e: Drive circuit
- f: Error amplifier
- g: Reference voltage

Standard Circuit Diagram

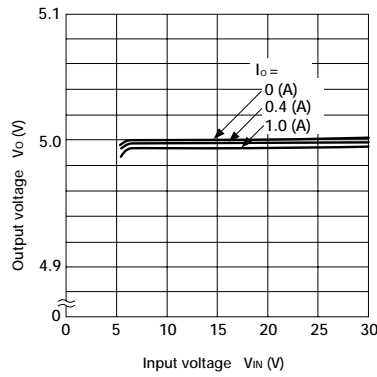


- Co: Output capacitor (47 to 100 μ F, 50V)
- C₁, C₂: Anti-oscillation capacitors (C₁: approx. 47 μ F, C₂: approx. 0.33 μ F). These are required for inductive input lines or long wiring. Tantalum capacitors are recommended for C₁ and C₂, especially at low temperatures.
- D₁: Protection diode. Required as protection against reverse biasing between input and output.
(Recommended diode: Sanken EU2Z.)

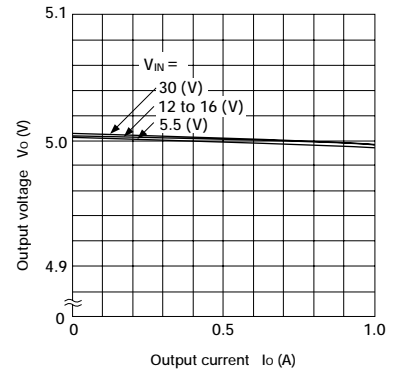
■ I_o vs V_{DIF} Characteristics



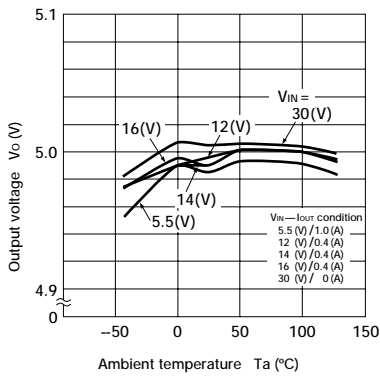
■ Line Regulation



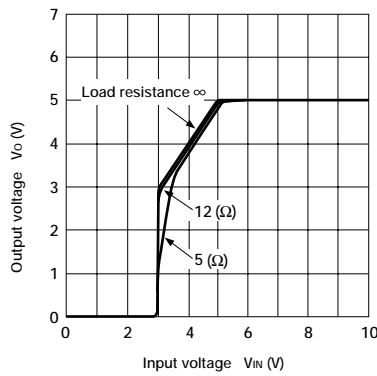
■ Load Regulation



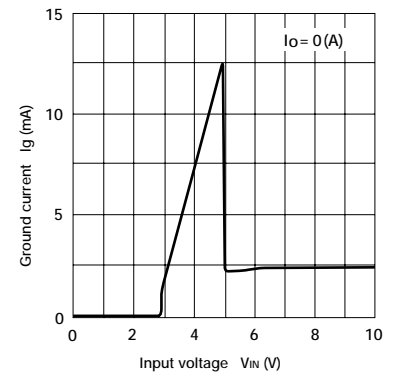
■ Output Voltage Temperature Characteristics



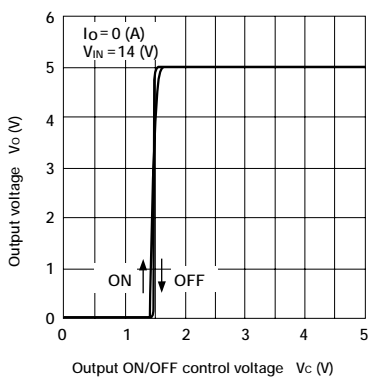
■ Rise Characteristics



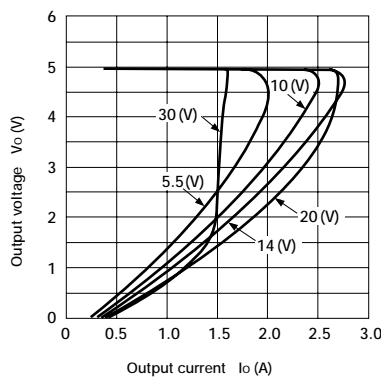
■ Circuit Current



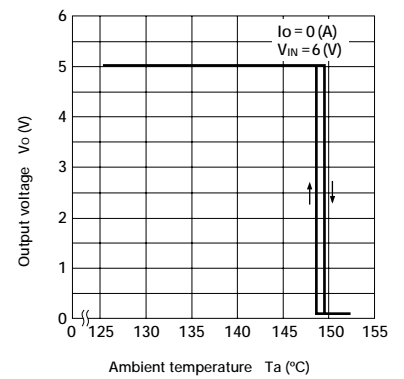
■ ON/OFF Control Characteristics



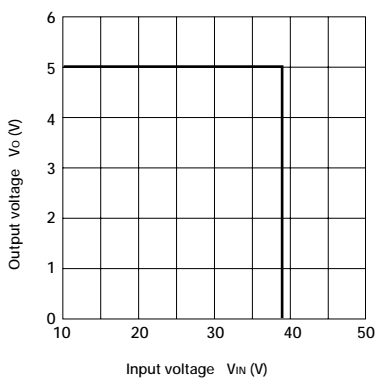
■ Overcurrent Protection Characteristics



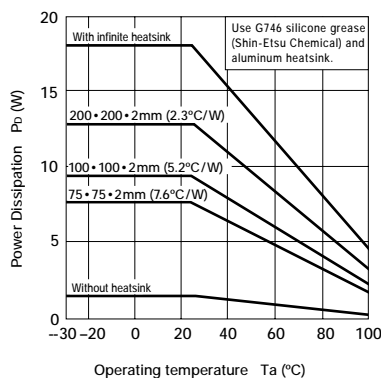
■ Thermal Protection Characteristics



■ Overvoltage Protection Characteristics



■ T_a — P_D 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.