

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

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, VIN = 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 ≤0.4A
						1.0	V	I _O ≤1.0A
Line Regulation			ΔV _{O LINE}			30	mV	I _O =0.4A, V _{IN} =6 to 16V
Load Regulation			ΔV _{O LOAD}			100	mV	I _O =0 to 0.4A
Output Voltage Temperature Coefficient			ΔV _O /ΔT		±0.5		mV/°C	I _O =5mA, T _a = -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	μA	V _C =2.7V
		Output OFF	I _{C, IL}			-0.3	mA	V _C =0.4V

Notes:

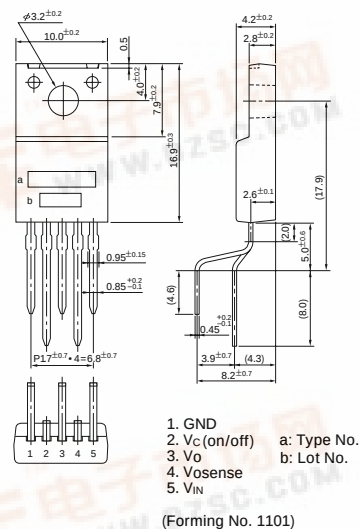
*1. Since $P_D(\max) = (V_{IN} - V_O) \cdot I_O = 18(W)$, $V_{IN}(\max)$ and $I_O(\max)$ may be limited depending on operating conditions. Refer to the T_a - P_D curve to compute the corresponding values.

*2. Refer to the dropout voltage.

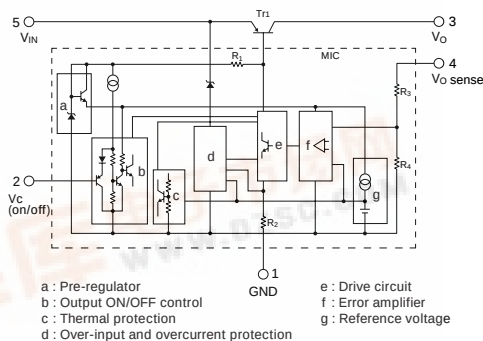
*3. Is1 rating shall be the point at which the output voltage V_O ($V_{IN} = 14V$, $I_O = 0.4A$) drops to -5% .

*4. The output control terminal 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.

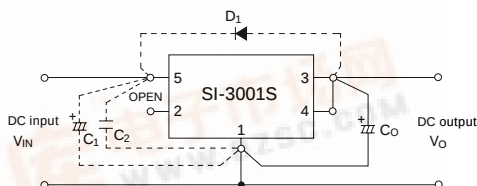
External Dimensions (unit: mm)



Equivalent Circuit Diagram



Standard Circuit Diagram

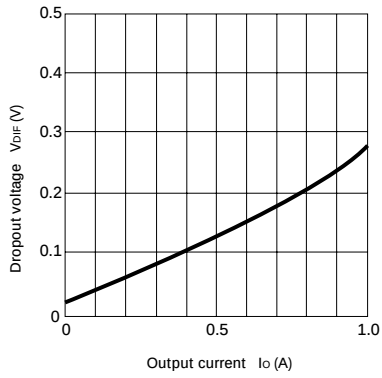


Co : Output capacitor (47 to 100 μ F, 50V)

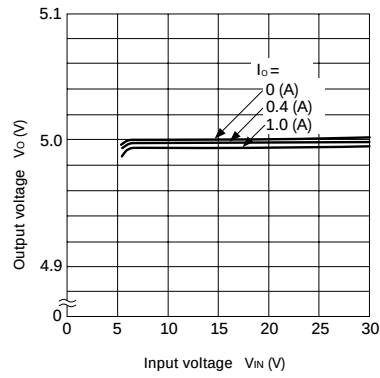
C₁, C₂: Anti-oscillation capacitors (C₁: approx. 47μF, C₂: approx. 0.33μF). These are required for inductive input lines or long wiring. Tantalum capacitors are recommended for C₂ and C_o, especially at low temperatures.

D₁: Protection diode. Required as protection against reverse biasing between input and output.
(Recommended diode: Sanken EU2Z.)

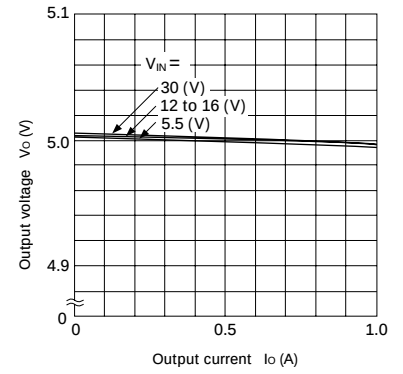
■ I_O vs V_{DIF} Characteristics



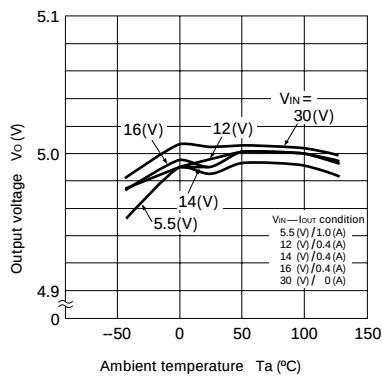
■ Line Regulation



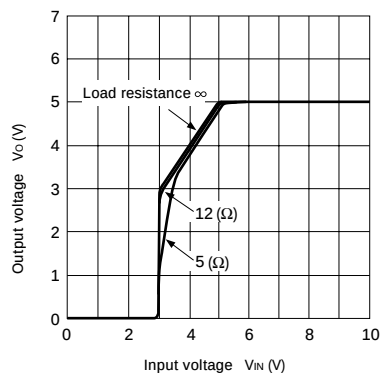
■ Load Regulation



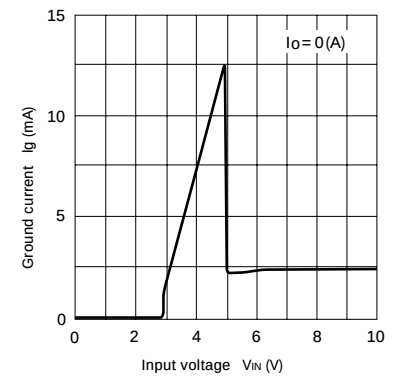
■ Output Voltage Temperature Characteristics



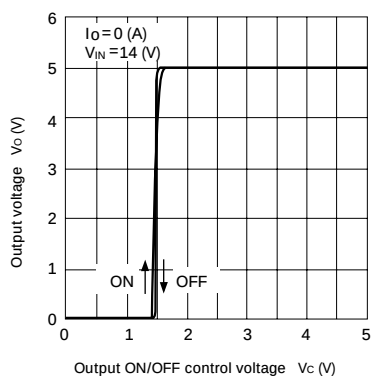
■ Rise Characteristics



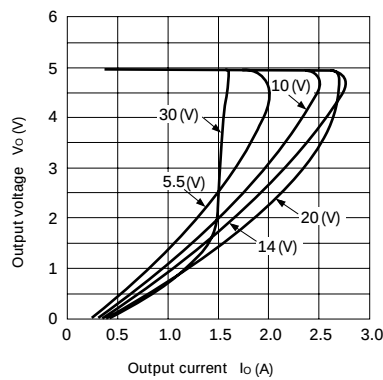
■ Circuit Current



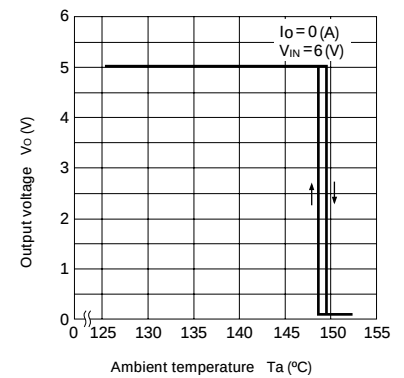
■ ON/OFF Control Characteristics



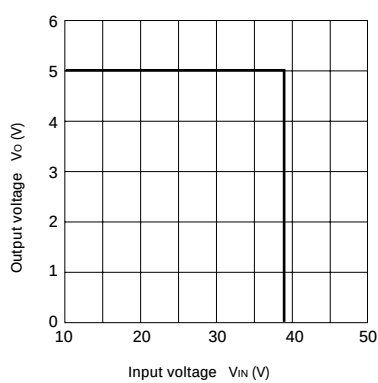
■ Overcurrent Protection Characteristics



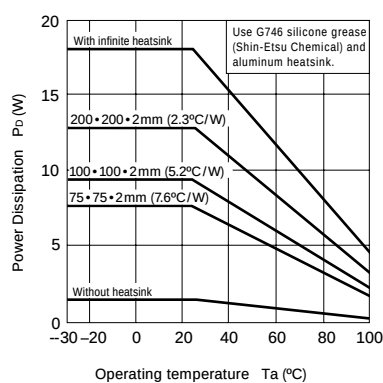
■ Thermal Protection Characteristics



■ 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.