# ▅ SI-3001N Series ▅

3-Terminal, Full-Mold, Low Dropout Voltage Dropper Type

■ Features

- Compact full-mold package (equivalent to TO220)
- Output current: 1.5A
- Low dropout voltage: $V_{DIF} \leq 1V$ (at I_O=1.5A)
- Built-in foldback overcurrent, overvoltage, thermal protection circuits

■ Applications

- For stabilization of the secondary stage of switching power supplies
- Electronic equipment
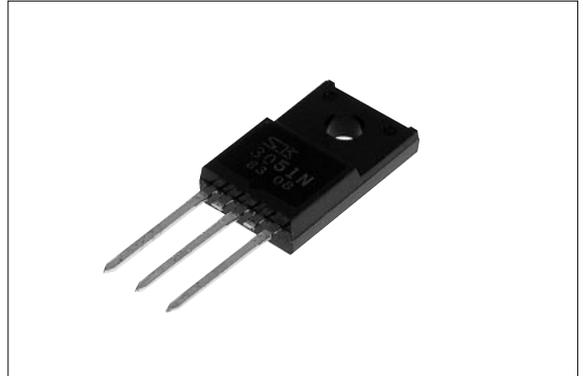
■ Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Ratings			Unit
		SI-3051N/3091N	SI-3121N/3151N	SI-3241N	
DC Input Voltage	V_{IN}	35	35	45	V
DC Output Current	I_O	1.5[*2]			A
Power Dissipation	P_{D1}	18(With infinite heatsink)			W
	P_{D2}	1.5(Without heatsink, stand-alone operation)			W
Junction Temperature	T_j	−40 to +125			°C
Ambient Operating Temperature	T_{op}	−30 to +100			°C
Storage Temperature	T_{stg}	−40 to +125			°C
Thermal Resistance (junction to case)	$R_{th(j-c)}$	5.5			°C/W
Thermal Resistance (junction to ambient air)	$R_{th(j-a)}$	66.7(Without heatsink, stand-alone operation)			°C/W

■Electrical Characteristics

(Ta=25°C unless otherwise specified)

Parameter		Symbol	SI-3051N			SI-3091N			SI-3121N			SI-3151N			SI-3241N			Unit
			min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	
Input Voltage		V_{IN}	6[*3]		30[*2]	10[*3]		30[*2]	13[*3]		30[*2]	16[*3]		30[*2]	25[*3]		40[*2]	V
Output Voltage	SI-3001N [*1]	V_O	4.80	5.00	5.20	8.64	9.00	9.36	11.52	12.00	12.48	14.40	15.00	15.60	23.04	24.00	24.96	V
	SI-3001NA		4.90	5.00	5.10	8.82	9.00	9.18	11.76	12.00	12.24	14.70	15.00	15.30	23.52	24.00	24.48	V
	Conditions		V_{IN}=8V, Io=1.0A			V_{IN}=12V, Io=1.0A			V_{IN}=15V, Io=1.0A			V_{IN}=18V, Io=1.0A			V_{IN}=27V, Io=1.0A			
Dropout Voltage		V_{DIF}			0.5			0.5			0.5			0.5			0.5	V
	Conditions		Io≤1.0A															
					1.0			1.0			1.0			1.0			1.0	
	Conditions		Io≤1.5A															
Line Regulation		ΔV_{OLINE}		10	30		18	48		24	64		30	90		48	128	mV
	Conditions		V_{IN}=6V to 15V, Io=1.0A			V_{IN}=10V to 20V, Io=1.0A			V_{IN}=13V to 25V, Io=1.0A			V_{IN}=16V to 27V, Io=1.0A			V_{IN}=25V to 38V, Io=1.0A			
Load Regulation		ΔV_{OLOAD}		40	100		70	180		93	240		120	300		120	300	mV
	Conditions		V_{IN}=8V, Io=0 to 1.5A			V_{IN}=12V, Io=0 to 1.5A			V_{IN}=15V, Io=0 to 1.5A			V_{IN}=18V, Io=0 to 1.5A			V_{IN}=27V, Io=0 to 1.5A			
Temperature Coefficient of Output Voltage		$\Delta V_O/\Delta T_a$		±0.5			±1.0			±1.5			±1.5			±2.5		mV/°C
	Conditions		V_{IN}=8V, Io=5mA,Tj=0 to 100°C			V_{IN}=12V, Io=5mA,Tj=0 to 100°C			V_{IN}=15V, Io=5mA,Tj=0 to 100°C			V_{IN}=18V, Io=5mA,Tj=0 to 100°C			V_{IN}=27V, Io=5mA,Tj=0 to 100°C			
Ripple Rejection		R_{REJ}		54			54			54			54			54		dB
	Conditions		V_{IN}=8V, f=100 to 120Hz			V_{IN}=12V, f=100 to 120Hz			V_{IN}=15V, f=100 to 120Hz			V_{IN}=18V, f=100 to 120Hz			V_{IN}=27V, f=100 to 120Hz			
Quiescent Circuit Current		I_q		5	10		5	10		5	10		5	10		5	10	mA
	Conditions		V_{IN}=8V, Io=0A			V_{IN}=12V, Io=0A			V_{IN}=15V, Io=0A			V_{IN}=18V, Io=0A			V_{IN}=27V, Io=0A			
Overcurrent Protection StartingCurrent[*4,5]		I_{S1}	1.6			1.6			1.6			1.6			1.6			A
	Conditions		V_{IN}=8V			V_{IN}=12V			V_{IN}=15V			V_{IN}=18V			V_{IN}=27V			

*1: "A" may be indicated to the right of the Sanken logo.

*2: $V_{IN(max)}$ and $I_{O(max)}$ are restricted by the relation $P_{D(max)}=(V_{IN}-V_O)\cdot I_O=18(W)$.

*3: Refer to the dropout voltage.(Refer to Setting DC Input Voltage on page 7.)

*4: I_{S1} is specified at –5(%) drop point of output voltage V_O on the condition that $V_{IN}=V_O+3V$, I_O=1A.

*5: A foldback type overcurrent protection circuit is built into the IC regulator. Therefore, avoid using it for the following applications as it may cause starting errors:

(1) Constant current load (2) Plus/minus power (3) Series power (4) V_O adjustment by raising ground voltage

■Outline Drawing

(unit:mm)

a. Part Number
b. Lot Number

① GND
② V_O
③ V_{IN}

Plastic Mold Package Type
Flammability: UL94V-0
Weight: Approx. 2.3g
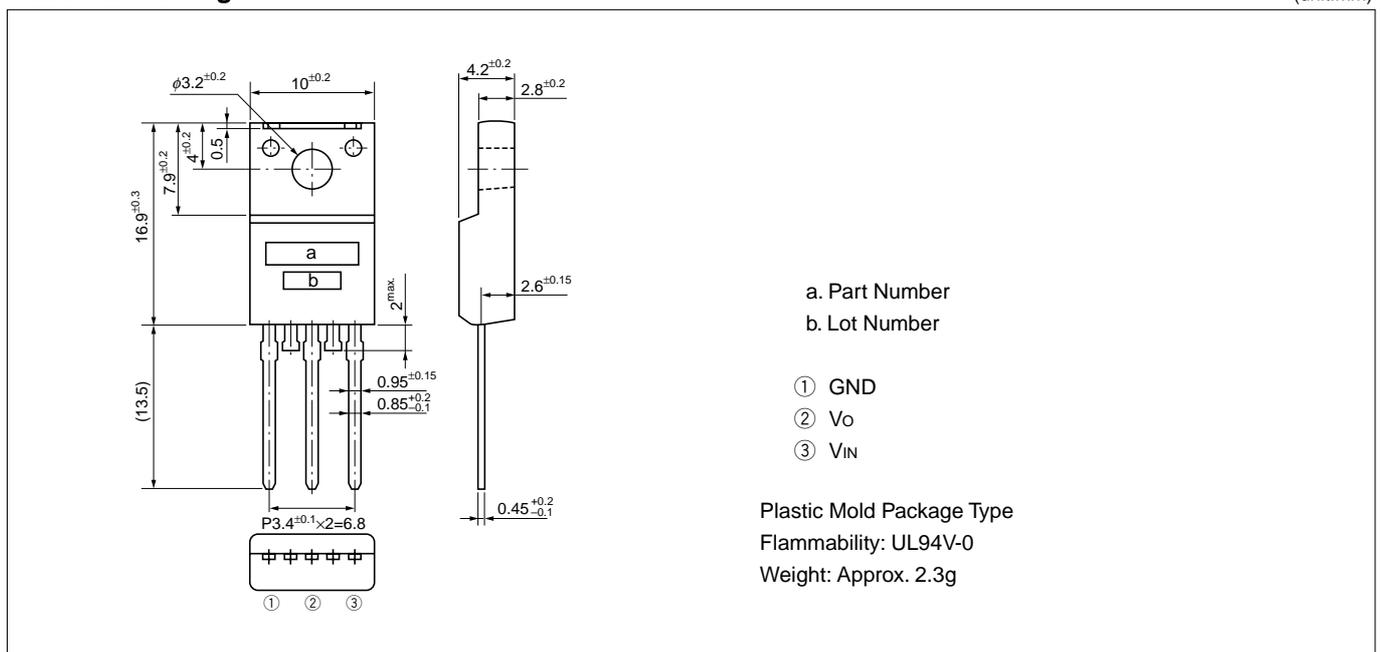
■**Block Diagram**
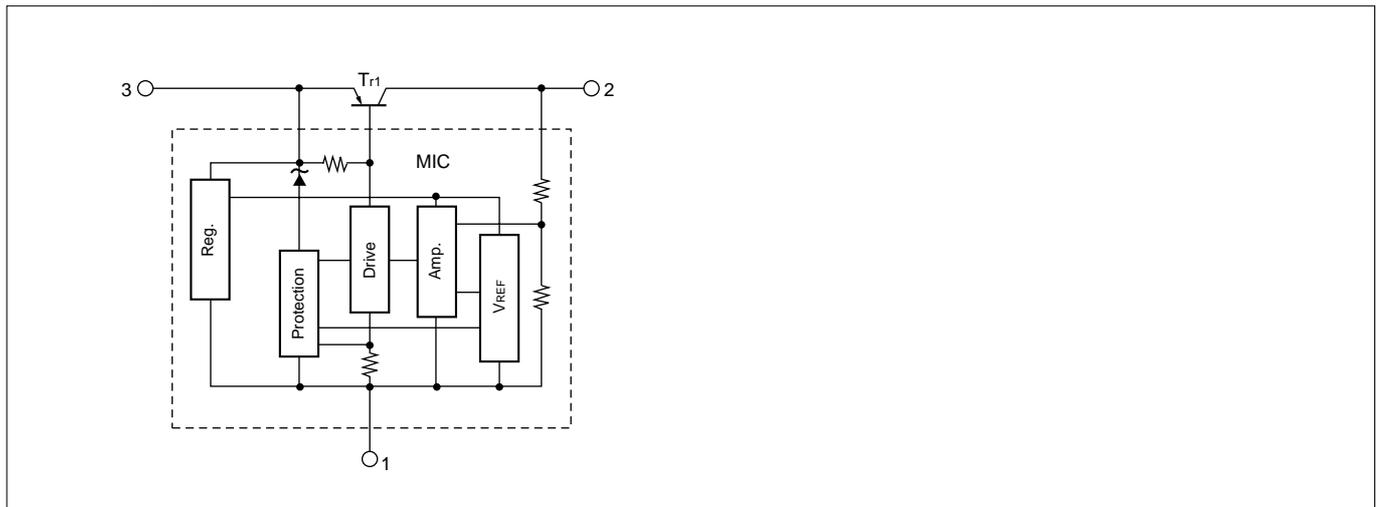
■**Standard External Circuit**

C_0 : Output capacitor (47 to 100μF)

*1 C_1 : Oscillation prevention capacitor (C_1: Approx. 47μF,
C_2 : C_2: 0.33μF)

These capacitors are required if the input line is inductive and in the case of long wiring. Tantalum capacitors are recommended for C_1 and C_0, particularly at low temperatures.

*2 D_1 : Protection diode

This diode is required for protection against reverse biasing of the input and output. Sanken EU2Z is recommended.

■**T_a-P_D Characteristics**

$$P_D = I_O \bullet [V_{IN}(mean) - V_O]$$

■Typical Characteristics

(Ta=25°C)

Io vs. VDIF Characteristics
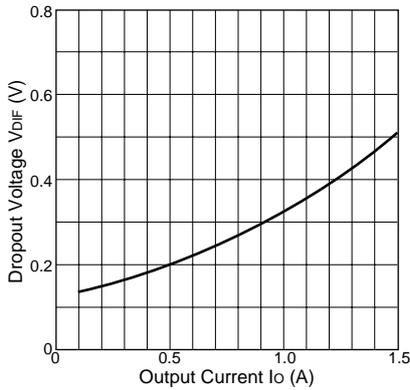
Temperature Coefficient of Output Voltage(SI-3051N)

VIN=8V
Io =0A
Vo =5V
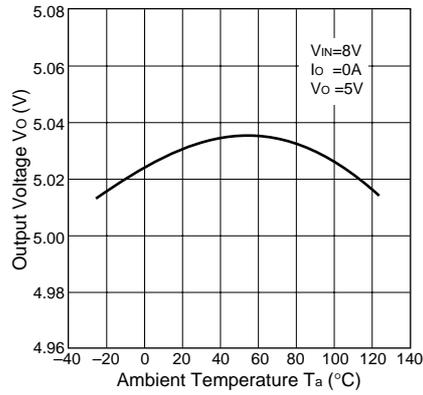
Circuit Current(SI-3051N)
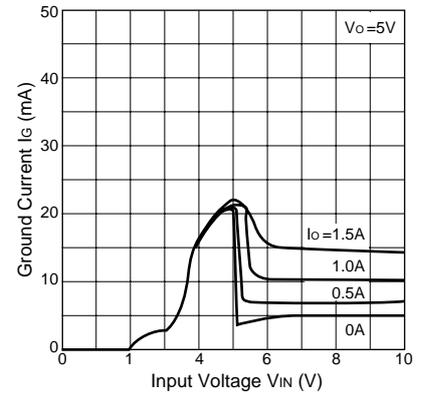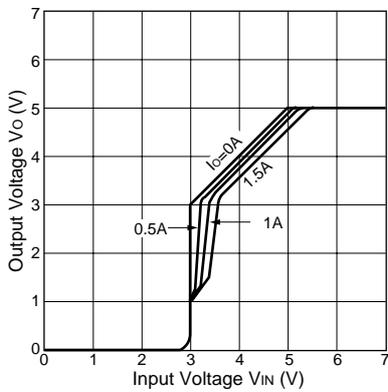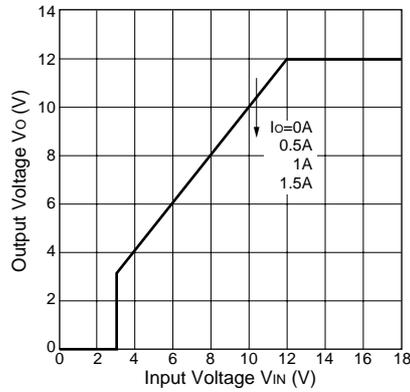
Vo =5V

Io =1.5A
1.0A
0.5A
0A

Rise Characteristics(SI-3051N)

Io=0A
1.5A
0.5A
1A

Rise Characteristics(SI-3121N)

Io=0A
0.5A
1A
1.5A

Rise Characteristics(SI-3241N)

Io=0A
0.5A
1A
1.5A

Overcurrent Protection Characteristics(SI-3051N)

VIN=30V
6V
8V
15V

Overcurrent Protection Characteristics(SI-3121N)

VIN=30V
25V
15V
20V
13V

Overcurrent Protection Characteristics(SI-3241N)

VIN=40V
35V
27V
25V
30V
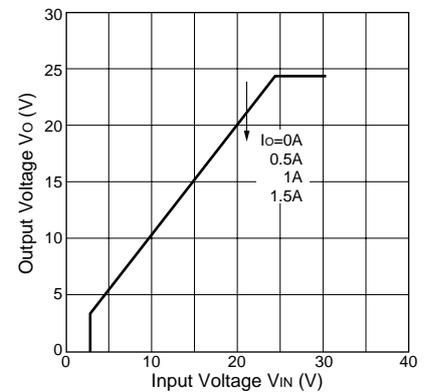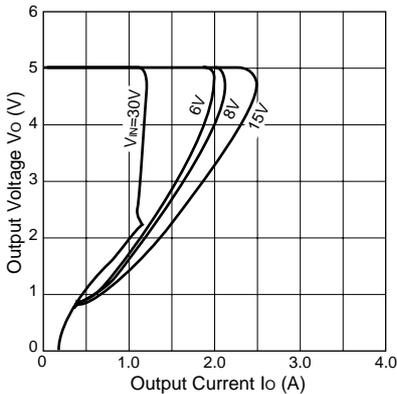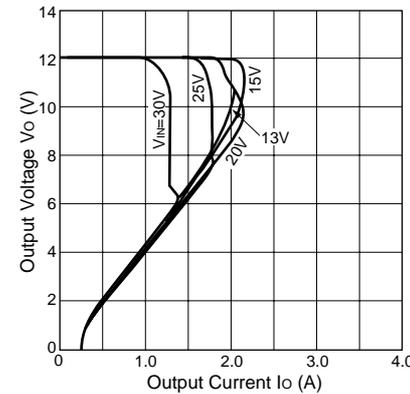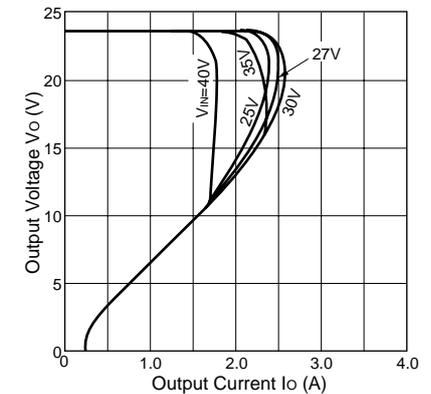
Thermal Protection Characteristics(SI-3051N)

VIN=8V
Io=10mA
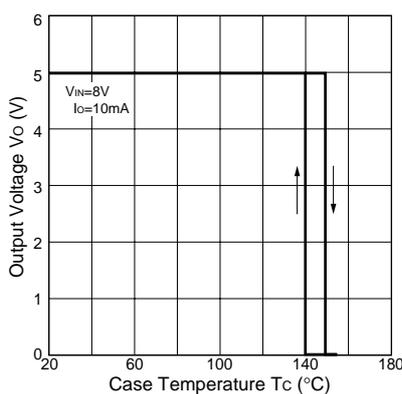
Note on Thermal Protection:

The thermal protection circuit is intended for protection against heat during instantaneous short-circuiting. Its operation is not guaranteed for short-circuiting over extended periods of time.