SI-3002N Series

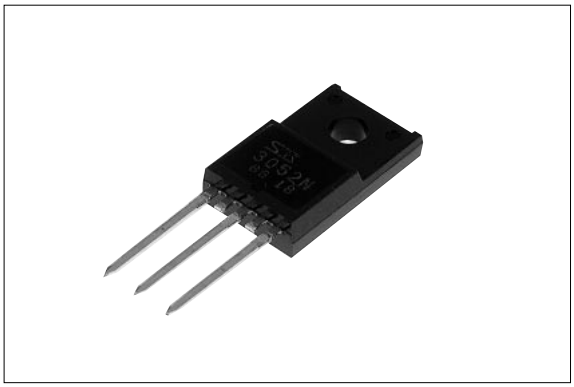
3-Terminal, Full-Mold, Low Dropout Voltage Dropper Type

■Features

- Compact full-mold package (equivalent to TO220)
- Output current: 2.0A
- Low dropout voltage: $V_{DIF} \leq 1V$ (at I_O=2.0A)
- Built-in foldback overcurrent, overvoltage, thermal protection circuits

■Applications

- For stabilization of the secondary stage of switching power supplies
- Electronic equipment



■Absolute Maximum Ratings

(T_a=25°C)

Parameter	Symbol	Ratings			Unit
		SI-3052N	SI-3092N	SI-3122N/3152N	
DC Input Voltage	V_{IN}	25	30	35	V
DC Output Current	I_O	2.0*1			A
Power Dissipation	P_{D1}	20(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)	$R_{th(j-c)}$	5.0			°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	Ratings												Unit
		SI-3052N			SI-3092N			SI-3122N			SI-3152N			
		min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	
Input Voltage	V_{IN}	6*2		15*1	10*2		25*1	13*2		27*1	16*2		27*1	V
Output Voltage	V_O	4.90	5.00	5.10	8.82	9.00	9.18	11.76	12.00	12.24	14.70	15.00	15.30	V
	Conditions	V_{IN}=8V, I_O=1.0A			V_{IN}=12V, I_O=1.0A			V_{IN}=15V, I_O=1.0A			V_{IN}=18V, I_O=1.0A			
Dropout Voltage	V_{DIF}			0.5			0.5			0.5			0.5	V
	Conditions	I_O≤1.5A												
				1.0			1.0			1.0			1.0	
	Conditions	I_O≤2.0A												
Line Regulation	ΔV_{OLINE}		10	30		18	48		24	64		30	90	mV
	Conditions	V_{IN}=6 to 15V, I_O=1.0A			V_{IN}=10 to 20V, I_O=1.0A			V_{IN}=13 to 25V, I_O=1.0A			V_{IN}=16 to 25V, I_O=1.0A			
Load Regulation	ΔV_{OLOAD}		40	100		70	180		93	240		120	300	mV
	Conditions	V_{IN}=8V, I_O=0 to 2.0A			V_{IN}=12V, I_O=0 to 2.0A			V_{IN}=15V, I_O=0 to 2.0A			V_{IN}=18V, I_O=0 to 2.0A			
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T_a$		±0.5			±1.0			±1.5			±1.5		mV/°C
	Conditions	V_{IN}=8V, I_O=5mA, T_j=0 to 100°C			V_{IN}=12V, I_O=5mA, T_j=0 to 100°C			V_{IN}=15V, I_O=5mA, T_j=0 to 100°C			V_{IN}=18V, I_O=5mA, T_j=0 to 100°C			
Ripple Rejection	R_{REJ}		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			
Quiescent Circuit Current	I_q		3	10		3	10		3	10		3	10	mA
	Conditions	V_{IN}=8V, I_O=0A			V_{IN}=12V, I_O=0A			V_{IN}=15V, I_O=0A			V_{IN}=18V, I_O=0A			
Overcurrent Protection Starting Current*3.4	I_{S1}	2.1			2.1			2.1			2.1			A
	Conditions	V_{IN}=8V			V_{IN}=12V			V_{IN}=15V			V_{IN}=18V			

*1: $V_{IN(max)}$ and $I_{O(max)}$ are restricted by the relation $P_{D(max)}=(V_{IN}-V_O)\cdot I_O=20$(W).

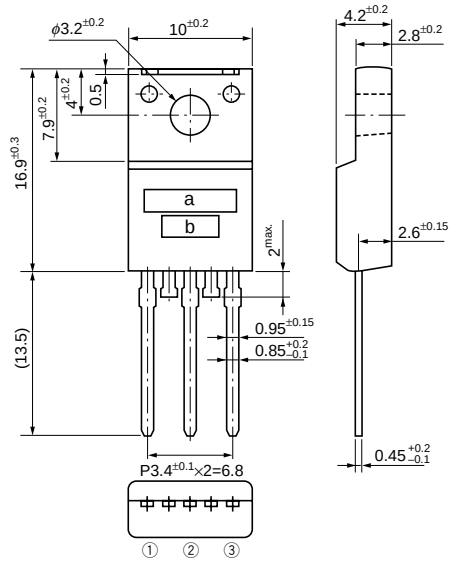
*2: Refer to the dropout voltage.(Refer to Setting DC Input Voltage on page 7.)

*3: I_{S1} is specified at –5(%) drop point of output voltage V_O on the condition that $V_{IN}=V_O+3V$, I_O=1.0A.

*4: 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)

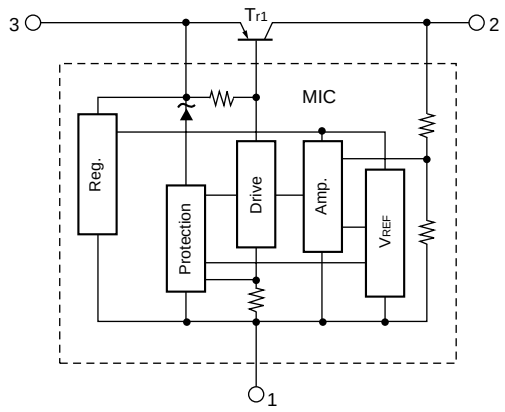


a. Part Number
b. Lot Number

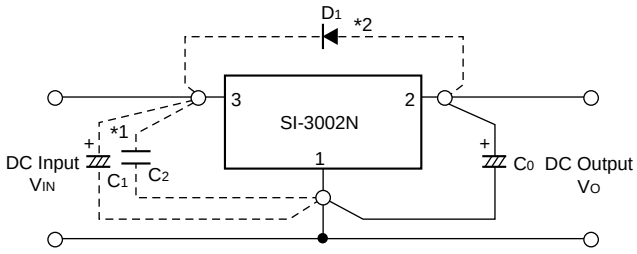
① GND
② V_O
③ V_{IN}

Plastic Mold Package Type
Flammability: UL94V-0
Weight: Approx. 2.3g

■Block Diagram



■Standard External Circuit

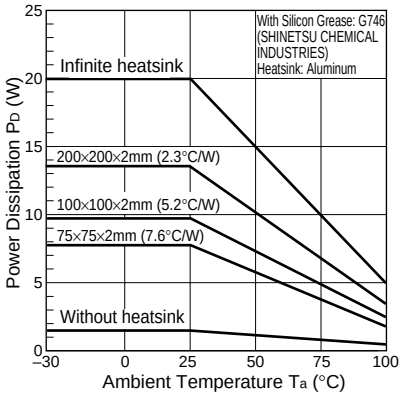


C_0 : Output capacitor (47 to 100μF)

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

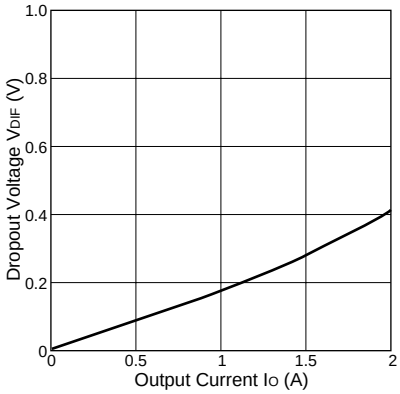


$P_D = I_O \bullet [V_{IN}(mean) - V_O]$

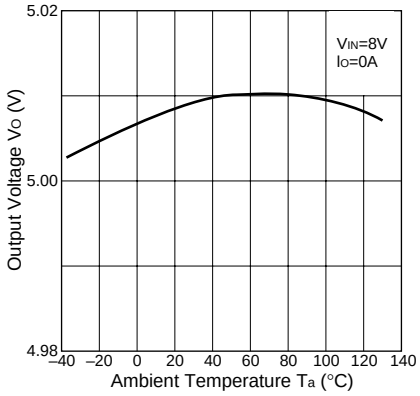
■Typical Characteristics

(T_a=25°C)

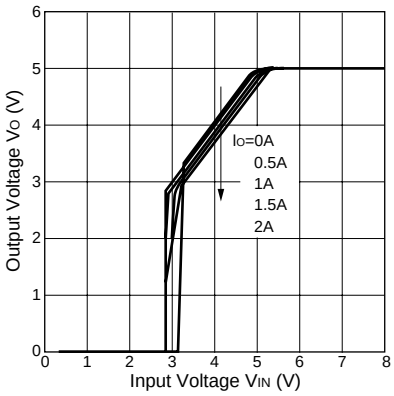
Io vs. VDIF Characteristics



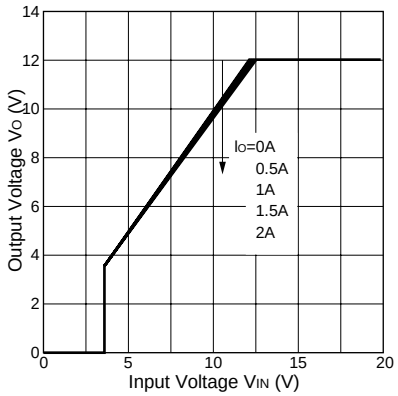
Temperature Coefficient of Output Voltage(SI-3052N)



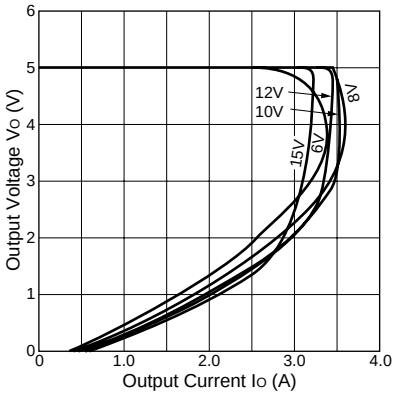
Rise Characteristics(SI-3052N)



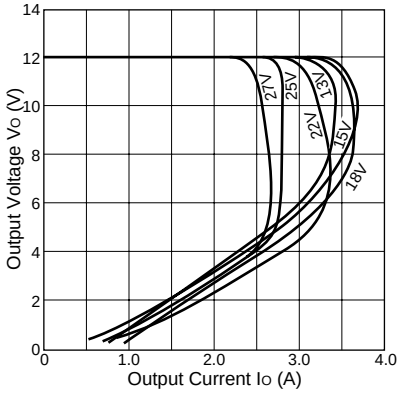
Rise Characteristics(SI-3122N)



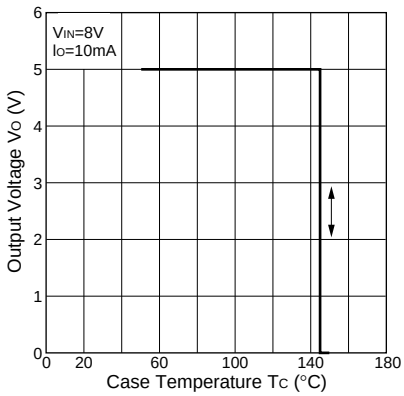
Overcurrent Protection Characteristics(SI-3052N)



Overcurrent Protection Characteristics(SI-3122N)



Thermal Protection Characteristics(SI-3052N)



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.