

## SI-3000B Series

# 5-Terminal, Multi-Function, Full-Mold, Low Dropout Voltage Dropper Type

### ■Features

- Compact full-mold package (equivalent to TO220)
- Output current: 0.27A
- Low dropout voltage:  $V_{DIF} \leq 0.5V$  (at  $I_o = 0.27A$ )
- Output ON/OFF control terminal is compatible with LS-TTL. (It may be directly driven by LS-TTL or standard CMOS logic.)
- Built-in foldback overcurrent, thermal protection circuits
- Highly accurate overcurrent protection starting current  
 SI-3157B : 0.3 to 0.7A ( $V_{IN} = 18V$ )  
 SI-3025B : 0.3 to 0.7A (When  $V_{IN} = 18V$ , setting  $V_o = 15.7V$ )  
 0.3 to 0.75A (When  $V_{IN} = 18V$ , setting  $V_o = 11.7V$ )
- Variable output voltage type (SI-3025B) also available



### ■Applications

- For BS and CS antenna power supplies
- Electronic equipment

### ■Absolute Maximum Ratings

( $T_a = 25^\circ C$ )

Parameter	Symbol	Ratings	Unit
DC Input Voltage	$V_{IN}$	35	V
Voltage of Output Control Terminal	$V_c$	$V_{IN}$	V
DC Output Current	$I_o$	0.27 <sup>*1</sup>	A
Power Dissipation	$P_{D1}$	14(With infinite heatsink)	W
	$P_{D2}$	1.5(Without heatsink, stand-alone operation)	W
Junction Temperature	$T_j$	-40 to +125	$^\circ C$
Ambient Operating Temperature	$T_{op}$	-30 to +100	$^\circ C$
Storage Temperature	$T_{stg}$	-40 to +125	$^\circ C$
Thermal Resistance (junction to case)	$R_{th(j-c)}$	7.0	$^\circ C/W$
Thermal Resistance (junction to ambient air)	$R_{th(j-a)}$	66.7(Without heatsink, stand-alone operation)	$^\circ C/W$

■Electrical Characteristics

(Ta=25°C unless otherwise specified)

Parameter	Symbol	Ratings						Unit	
		SI-3157B			SI-3025B				
		min.	typ.	max.	min.	typ.	max.		
Input Voltage	V <sub>IN</sub>	*2		27*1	6*2,6		27*1	V	
Output Voltage (SI-3025B: Reference Voltage)	V <sub>O</sub> (V <sub>REF</sub> )	14.92	15.70	16.48	2.448	2.550	2.652	V	
	Conditions	V <sub>IN</sub> =18V, I <sub>O</sub> =0.2A			V <sub>IN</sub> =V <sub>O</sub> +3V, I <sub>O</sub> =0.2A				
Dropout Voltage	V <sub>DIF</sub>			0.5			0.5	V	
	Conditions	I <sub>O</sub> ≤0.27A			I <sub>O</sub> ≤0.27A				
Line Regulation	ΔV <sub>OLINE</sub>		30	90			10	mV (3025B: mV/V)	
	Conditions	V <sub>IN</sub> =17 to 27V, I <sub>O</sub> =0.2A			V <sub>IN</sub> =(V <sub>O</sub> +1) to 27V, I <sub>O</sub> =0.27A				
Load Regulation	ΔV <sub>OLOAD</sub>		120	300			10	mV (3025B: mV/V)	
	Conditions	V <sub>IN</sub> =18V, I <sub>O</sub> =0 to 0.27A			V <sub>IN</sub> =V <sub>O</sub> +3V, I <sub>O</sub> =0 to 0.27A				
Temperature Coefficient of Output Voltage (SI-3025B: Temperature Coefficient of Reference Voltage)	ΔV <sub>O</sub> /ΔT <sub>a</sub> (ΔV <sub>REF</sub> /ΔT <sub>a</sub> )		±1.5			±0.5		mV/°C	
	Conditions	V <sub>IN</sub> =18V, I <sub>O</sub> =5mA, T <sub>J</sub> =0 to 100°C			V <sub>IN</sub> =V <sub>O</sub> +3V, I <sub>O</sub> =5mA, T <sub>J</sub> =0 to 100°C				
Ripple Rejection	R <sub>REJ</sub>		54			54		dB	
	Conditions	V <sub>IN</sub> =18V, f=100 to 120Hz			V <sub>IN</sub> =V <sub>O</sub> +3V, f=100 to 120Hz				
Quiescent Circuit Current	I <sub>q</sub>		3	10		3	10	mA	
	Conditions	V <sub>IN</sub> =18V, I <sub>O</sub> =0A			V <sub>IN</sub> =V <sub>O</sub> +3V, I <sub>O</sub> =0A				
Overcurrent Protection Starting Current*3,4	I <sub>S1</sub>	0.3		0.7	0.3		0.75	A	
	Conditions	V <sub>IN</sub> =18V			When V <sub>IN</sub> =18V, setting V <sub>O</sub> =11.7V				
					0.3		0.7		
	Conditions				When V <sub>IN</sub> =18V, setting V <sub>O</sub> =15.7V				
V <sub>C</sub> Terminal*5	Control Voltage (Output ON)	V <sub>C</sub> . IH	2.0			2.0		V	
	Control Voltage (Output OFF)	V <sub>C</sub> . IL			0.8		0.8		
	Control Current (Output ON)	I <sub>C</sub> . IH			20			20	μA
		Conditions	V <sub>C</sub> =2.7V			V <sub>C</sub> =2.7V			
	Control Current (Output OFF)	I <sub>C</sub> . IL			-0.3			-0.3	mA
		Conditions	V <sub>C</sub> =0.4V			V <sub>C</sub> =0.4V			

\*1: V<sub>IN(max)</sub> and I<sub>O(max)</sub> are restricted by the relation P<sub>D(max)</sub>=(V<sub>IN</sub>-V<sub>O</sub>)•I<sub>O</sub>=14(W).

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

\*3: I<sub>S1</sub> is specified at -5(%) drop point of output voltage V<sub>O</sub> on the condition that V<sub>IN</sub>=V<sub>O</sub>+3V, I<sub>O</sub>=0.2A.

\*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:

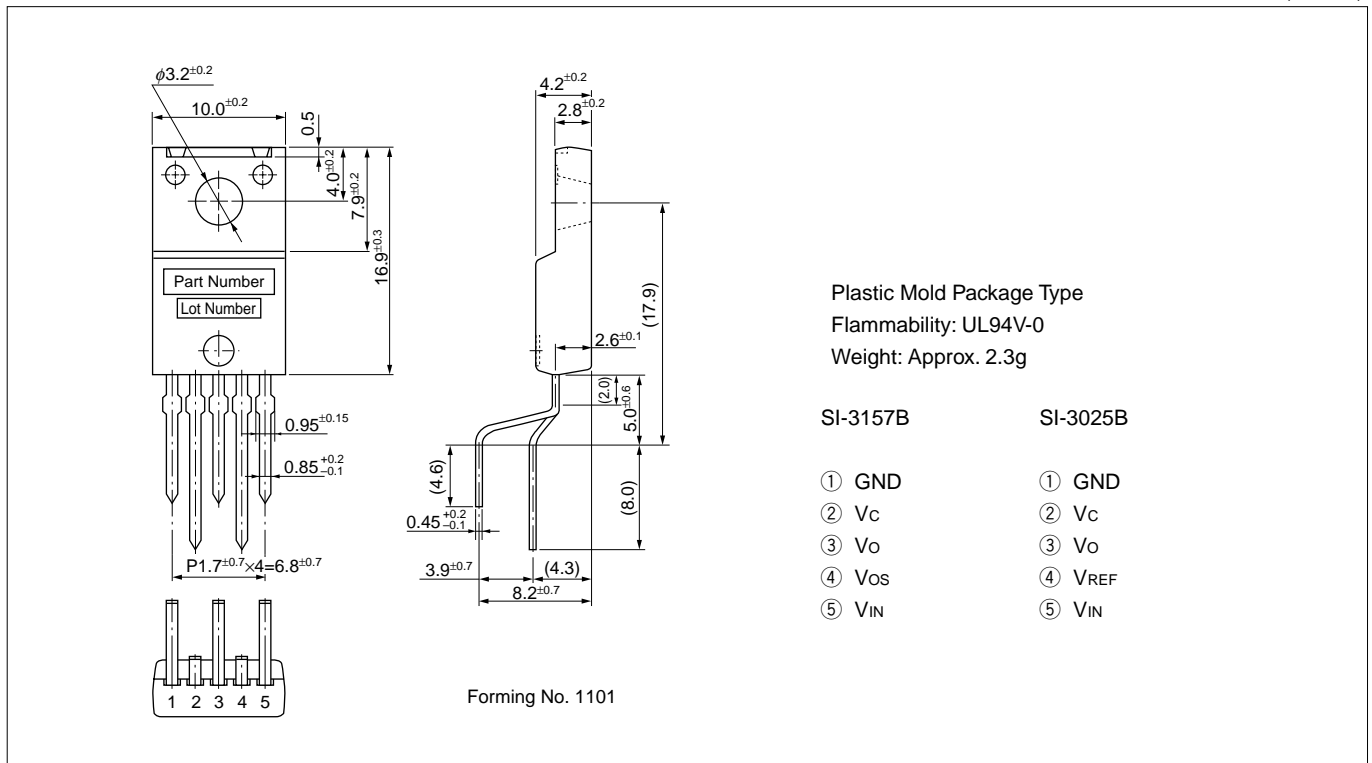
- (1) Constant current load (2) Plus/minus power (3) Series power (4) V<sub>O</sub> adjustment by raising ground voltage

\*5: Output is ON even when output control terminal V<sub>C</sub> is open. Each input level is equivalent to LS-TTL. Therefore, it may be directly driven by an LS-TTL circuit.

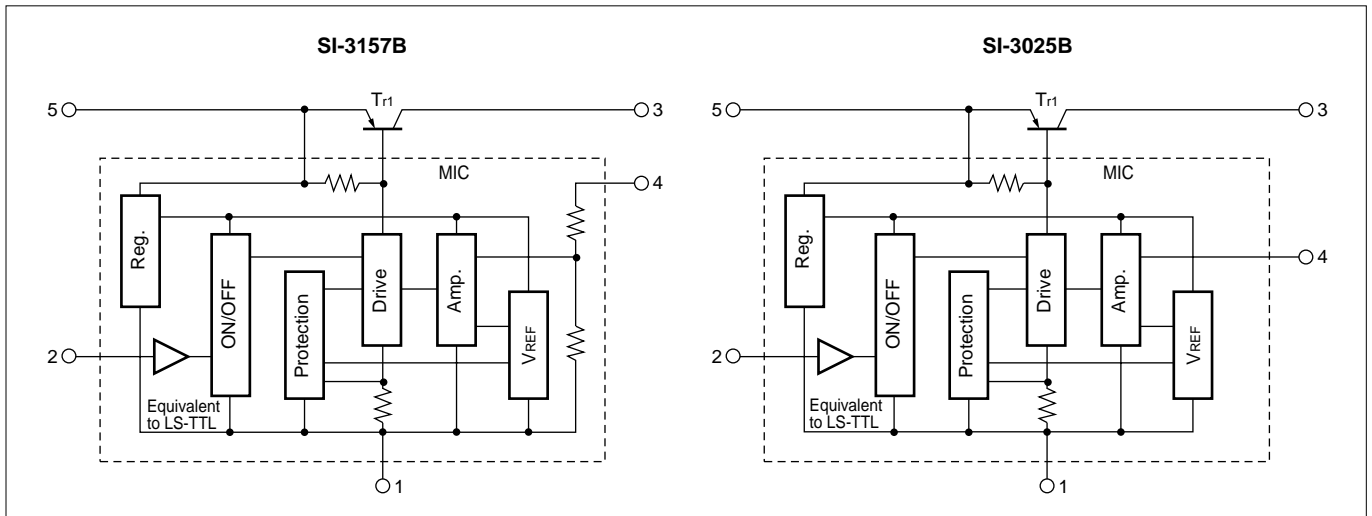
\*6. When setting output voltage to 5V or less, input voltage needs to be set to 6V or over to operate stably.

■Outline Drawing

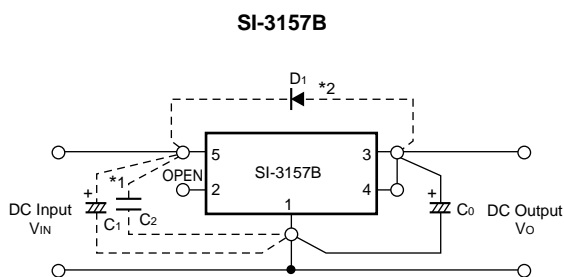
(unit:mm)



■Block Diagram



■Standard External Circuit



$C_0$  : Output capacitor (47 to 100 $\mu$ F)  
 \*1  $C_1$  } Oscillation prevention capacitor  
 $C_2$  } ( $C_1$ : Approx. 47 $\mu$ F,  $C_2$ : 0.33 $\mu$ F)

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

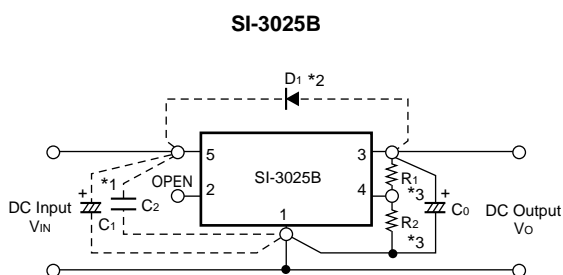
This diode is required for protection against reverse biasing of the input and output. Sanken EU2Z is recommended.

\*3  $R_1$  } External resistor for setting output voltage

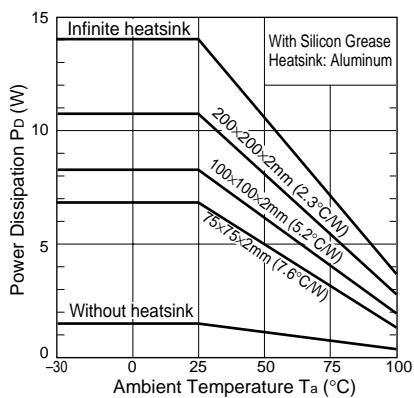
$R_2$  } Relationship between output voltage  $V_o$  and external resistors  $R_1$  and  $R_2$  is as follows.

$$V_o = V_{REF} \cdot \left( 1 + \frac{R_1}{R_2} \right) \quad (V_{REF} = 2.55V(\text{typ.}))$$

$R_2$  must be 2.55k $\Omega$  for stable operation.



■ $T_a$ - $P_d$  Characteristics

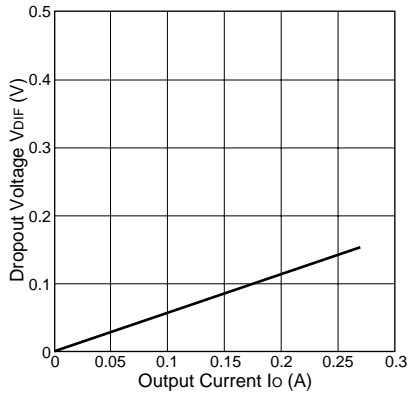


$$P_d = I_o \cdot [V_{IN}(\text{mean}) - V_o]$$

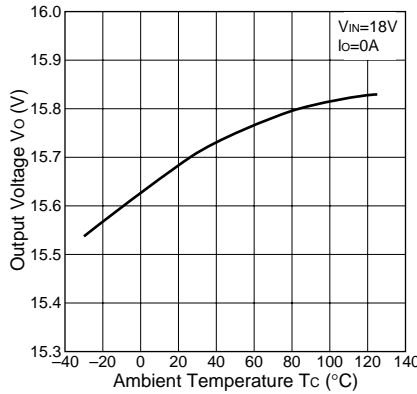
■Typical Characteristics (When setting  $V_o=15.7V$  for SI3025B)

( $T_a=25^\circ C$ )

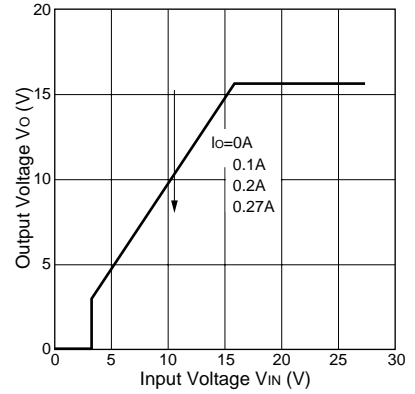
**$I_o$  vs.  $V_{DIF}$  Characteristics**



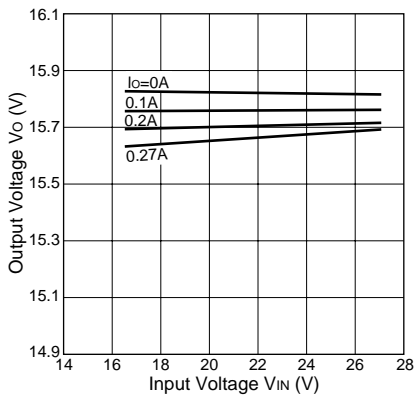
**Temperature Coefficient of Output Voltage(SI-3157B)**



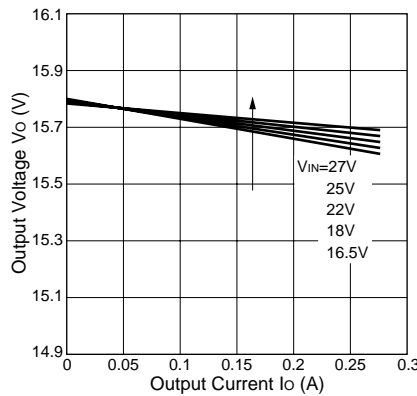
**Rise Characteristics(SI-3157B)**



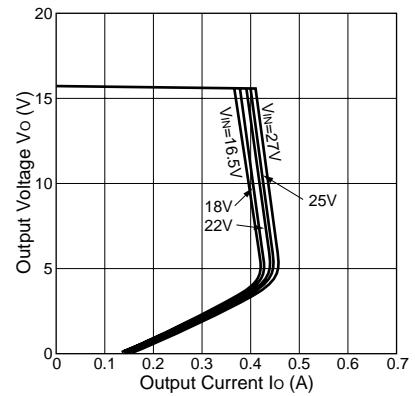
**Line Regulation**



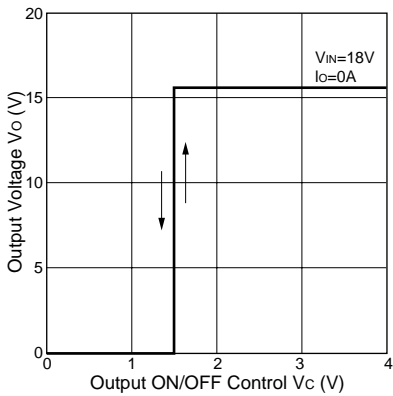
**Load Regulation**



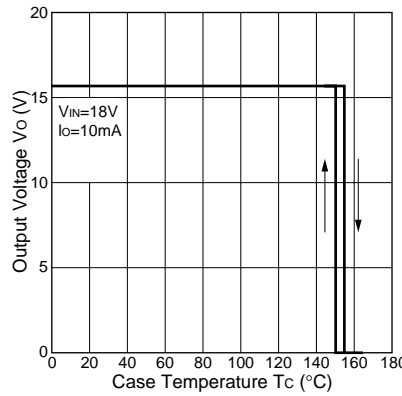
**Overcurrent Protection Characteristics(SI-3157B)**



**Output ON/OFF Control**



**Thermal Protection Characteristics**



**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.