

# SI-3000B Series 5-Terminal, Full-Mold, Low Dropout Voltage Linear Regulator ICs

## ■ 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 can be driven directly by LS-TTL or standard CMOS logic.)
- Built-in foldback overcurrent and thermal protection circuits
- Accuracy of overcurrent protection starting current  
 SI-3157B : 0.3 to 0.7A ( $V_{IN}=18V$ )  
 SI-3025B : 0.3 to 0.7A  
 (When  $V_{IN}=18V$ , at  $V_o=15.7V$ )  
 0.3 to 0.75A  
 (When  $V_{IN}=18V$ , at  $V_o=11.7V$ )
- Variable output voltage type (SI-3025B) also available

## ■ Absolute Maximum Ratings

( $T_a=25^\circ C$ )

Parameter	Symbo	Ratings	Unit
DC Input Voltage	$V_{IN}$	35	V
Output Control Terminal Voltage	$V_c$	$V_{IN}$	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	$^\circ C$
Operating Ambient Temperature	$T_{OP}$	-30 to +100	$^\circ C$
Storage Temperature	$T_{stg}$	-40 to +125	$^\circ C$
Thermal Resistance (junction to case)	$\theta_{j-c}$	7.0	$^\circ C/W$
Thermal Resistance (junction to ambient air)	$\theta_{j-a}$	66.7(Without heatsink, stand-alone operation)	$^\circ C/W$

## ■ Applications

- For BS and CS antenna power supplies
- Electronic equipment

## ■ Electrical Characteristics

( $T_a=25^\circ C$  unless otherwise specified)

Parameter	Symbol	Ratings						Unit
		SI-3157B			SI-3025B			
		min.	typ.	max.	min.	typ.	max.	
Input Voltage	$V_{IN}$	*2		27 <sup>*1</sup>	6 <sup>*2,6</sup>		27 <sup>*1</sup>	V
Output Voltage (Reference Voltage $V_{ADJ}$ for SI-3025B)	$V_o$ ( $V_{ADJ}$ )	14.92	15.70	16.48	2.448	2.550	2.652	V
	Conditions	$V_{IN}=18V, I_o=0.2A$			$V_{IN}=V_o+3V, I_o=0.2A$			
Dropout Voltage	$V_{DIF}$			0.5			0.5	V
	Conditions	$I_o \leq 0.27A$			$I_o \leq 0.27A$			
Line Regulation	$\Delta V_{OLINE}$		30	90			10	mV
	Conditions	$V_{IN}=17$ to $27V, I_o=0.2A$			$V_{IN}=(V_o+1)$ to $27V, I_o=0.27A$			(SI-3025B:mV/V)
Load Regulation	$\Delta V_{OLOAD}$		120	300			10	mV
	Conditions	$V_{IN}=18V, I_o=0$ to $0.27A$			$V_{IN}=V_o+3V, I_o=0$ to $0.27A$			(SI-3025B:mV/V)
Temperature Coefficient of Output Voltage (SI-3025B: Temperature Coefficient of Reference Voltage)	$\Delta V_o/\Delta T_a$ ( $\Delta V_{ADJ}/\Delta T_a$ )		$\pm 1.5$			$\pm 0.5$		mV/ $^\circ C$
	Conditions	$V_{IN}=18V, I_o=5mA, T_j=0$ to $100^\circ C$			$V_{IN}=V_o+3V, I_o=5mA, T_j=0$ to $100^\circ C$			
Ripple Rejection	$R_{REJ}$		54			54		dB
	Conditions	$V_{IN}=18V, f=100$ to $120Hz$			$V_{IN}=V_o+3V, f=100$ to $120Hz$			
Quiescent Circuit Current	$I_q$		3	10		3	10	mA
	Conditions	$V_{IN}=18V, I_o=0A$			$V_{IN}=V_o+3V, I_o=0A$			
Overcurrent Protection Starting Current <sup>*3,4</sup>	$I_{S1}$	0.3		0.7	0.3		0.75	A
	Conditions	$V_{IN}=18V$			$V_{IN}=18V, \text{ at } V_o=11.7V$			
	Conditions				0.3			0.7
Vc Terminal <sup>*5</sup>	Control Voltage (Output ON)	$V_c$ : IH	2.0		2.0			V
	Control Voltage (Output OFF)	$V_c$ : IL			0.8		0.8	
	Control Current (Output ON)	$I_c$ : IH			20		20	$\mu A$
	Conditions	$V_c=2.7V$			$V_c=2.7V$			
	Control Current (Output OFF)	$I_c$ : IL			-0.3		-0.3	mA
	Conditions	$V_c=0.4V$			$V_c=0.4V$			

\*1:  $V_{IN(max)}$  and  $I_o(max)$  are restricted by the relation  $P_{D(max)}=(V_{IN}-V_o) \cdot I_o=14(W)$ .

\*2: Refer to the Dropout Voltage parameter. (Refer to Setting DC Input Voltage on page 9.)

\*3:  $I_{S1}$  is specified at the 5% drop point of output voltage  $V_o$  on the condition that  $V_{IN}=V_o+3V, I_o=0.2A$ .

\*4: These products cannot be used in the following applications because the built-in foldback-type overcurrent protection may cause errors during start-up stage.

(1) Constant current load (2) Positive and negative power supply (3) Series-connected power supply (4)  $V_o$  adjustment by raising ground voltage

\*5: Output is ON even when output control terminal  $V_c$  is open. Each input level is equivalent to LS-TTL level. Therefore, the device can be driven directly by LS-TTLs.

\*6: When setting output voltage to 5V or lower, input voltage needs to be set to 6V or higher to operate stably.

External Dimensions (TO220F-5)

(Unit : mm)

a. Part Number  
b. Lot Number

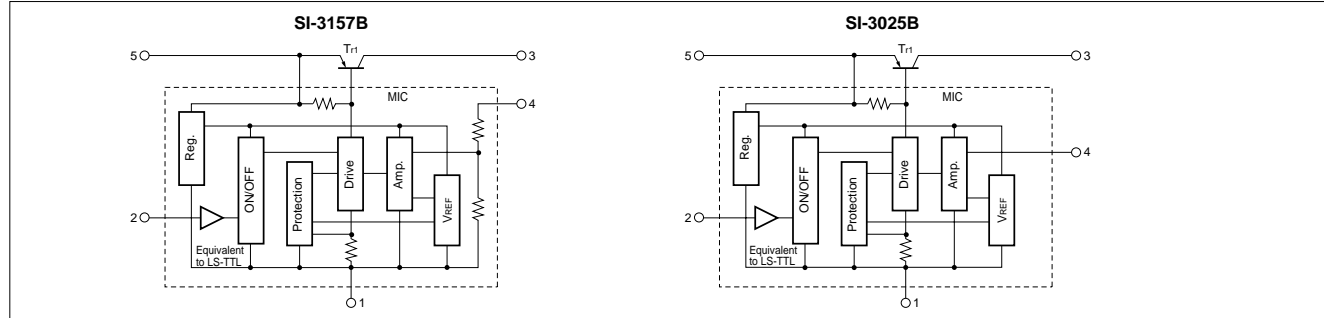
Pin Assignment

SI-3157B	SI-3025B
① GND	① GND
② Vc	② Vc
③ Vo	③ Vo
④ Sense	④ ADJ
⑤ VIN	⑤ VIN

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

Forming No. 1101

Block Diagram



Typical Connection Diagram

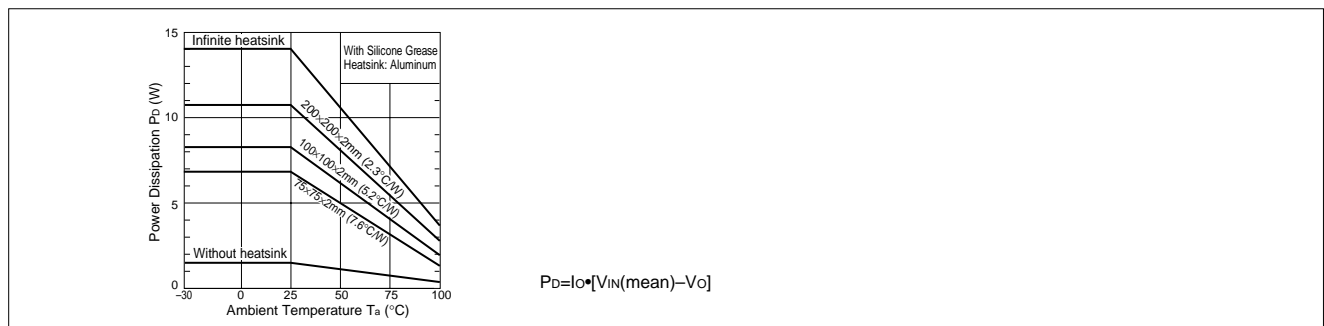
**SI-3157B**

**SI-3025B**

$C_0$  : Output capacitor (47 to 100 $\mu$ F)  
 $*1 C_1, C_2$  : Oscillation prevention capacitor (Approx.  $C_1$ : 47 $\mu$ F,  $C_2$ : 0.33 $\mu$ F)  
 These capacitors are required if the input line contains inductance or the wiring is long. Especially at low temperatures, tantalum capacitors are recommended for  $C_1$  and  $C_0$ .  
 $*2 D_1$  : Protection diode  
 This diode is required for protection against reverse biasing of the input and output. Sanken EU2Z is recommended.  
 $*3 R_1, R_2$  : External resistor for setting output voltage  
 The relation between output voltage  $V_o$  and external resistors  $R_1$  and  $R_2$  is as follows.  

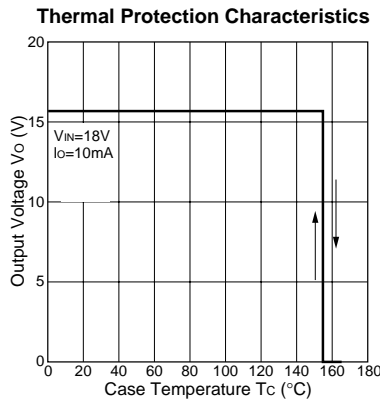
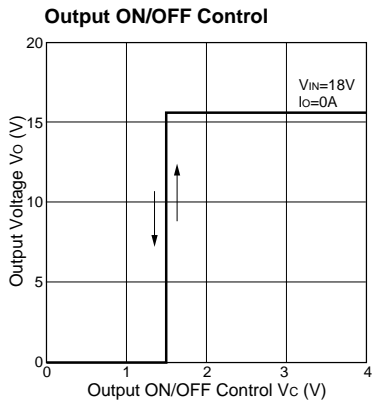
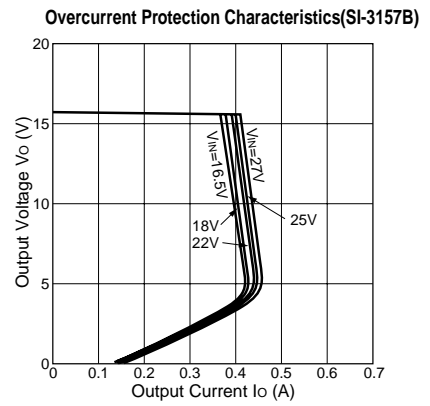
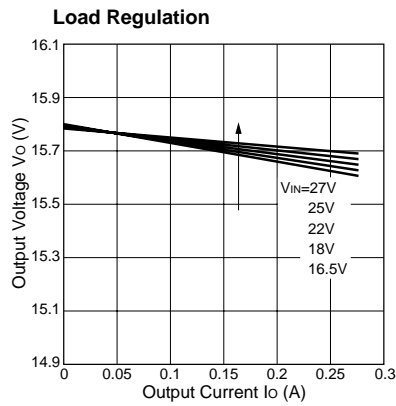
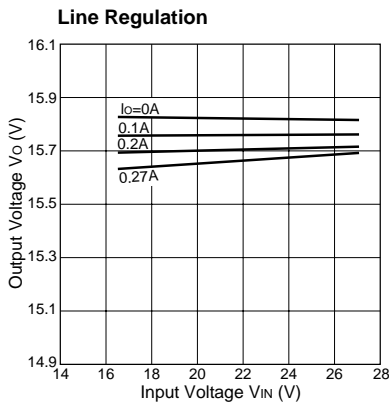
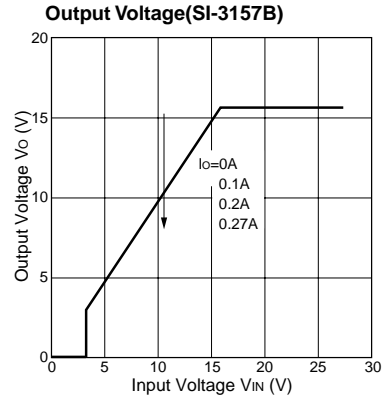
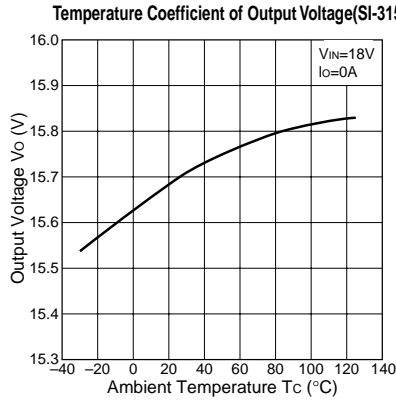
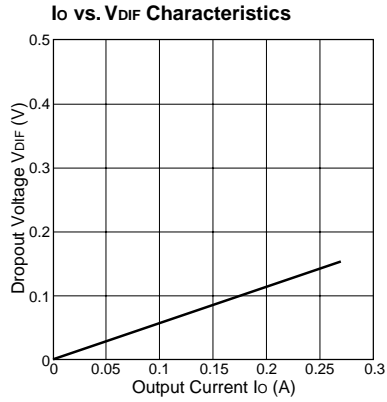
$$V_o = V_{ADJ} \cdot \left( 1 + \frac{R_1}{R_2} \right) \quad (V_{ADJ} = 2.55V(\text{typ.}))$$
  
 $R_2$  must be 2.55k $\Omega$  for stable operation.

Ta-Pd Characteristics



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

( $T_a=25^\circ C$ )



**Note on Thermal Protection:**

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