# 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: $V_{DIF}≤0.5V$ (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 overcurent 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
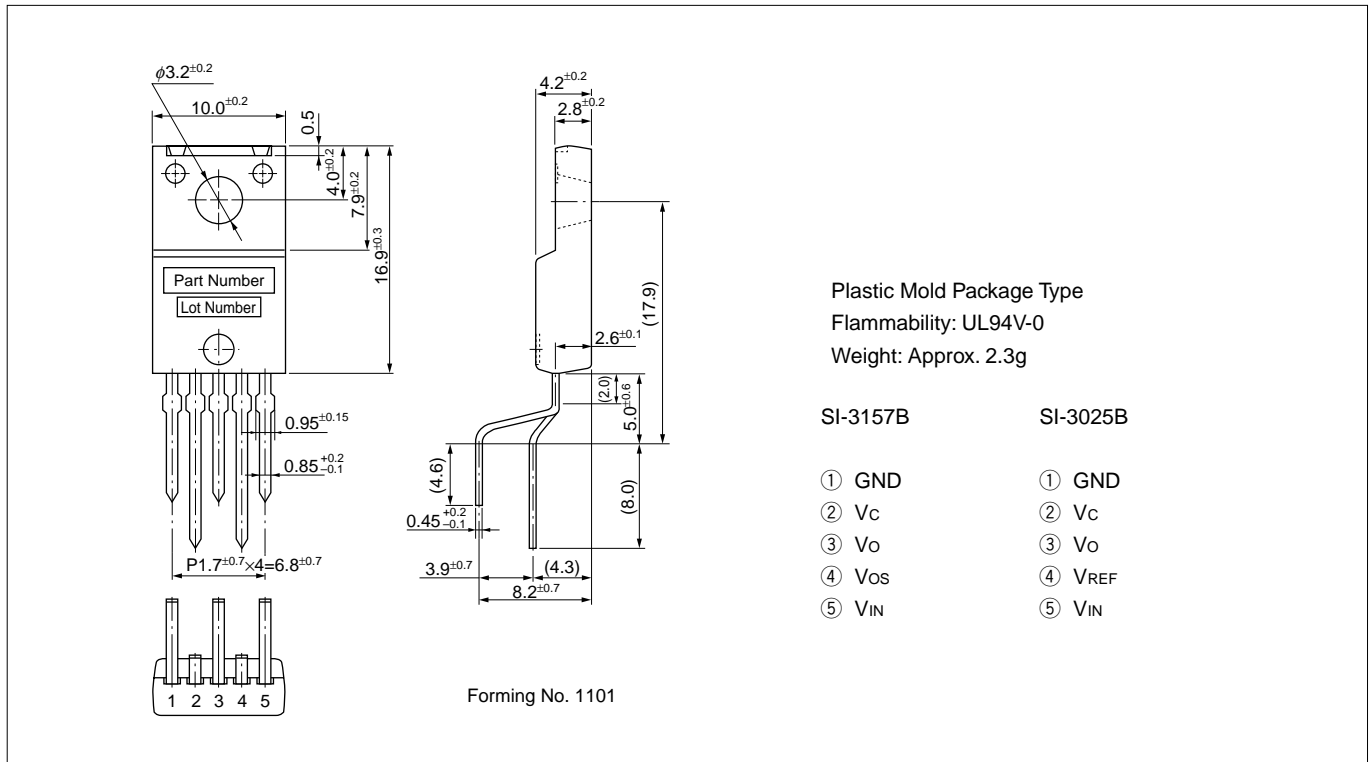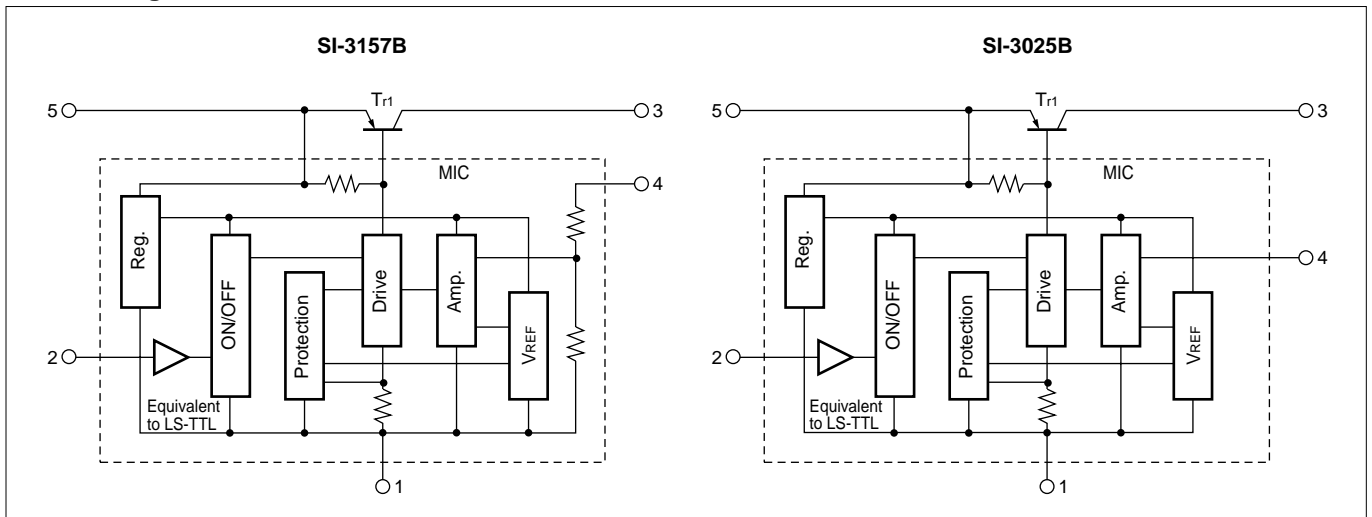- Electronic equipment

## ■Absolute Maximum Ratings

(Ta=25°C)

| Paarameter | 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[*1] | 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 | °C |
| Ambient Operating Temperature | $T_{op}$ | −30 to +100 | °C |
| Storage Temperature | $T_{stg}$ | −40 to +125 | °C |
| Thermal Resistance (junction to case) | $R_{th(j-c)}$ | 7.0 | °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-3157B | | | SI-3025B | | | |
| | | | min. | typ. | max. | min. | typ. | max. | |
| Input Voltage | | $V_{IN}$ | *2 | | 27[*1] | 6[*2,6] | | 27[*1] | V |
| Output Voltage (SI-3025B: Reference Voltage) | | $V_O$ ($V_{REF}$) | 14.92 | 15.70 | 16.48 | 2.448 | 2.550 | 2.652 | V |
| | | Conditions | $V_{IN}$=18V, Io=0.2A | | | $V_{IN}$=Vo+3V, Io=0.2A | | | |
| Dropout Voltage | | $V_{DIF}$ | | | 0.5 | | | 0.5 | V |
| | | Conditions | Io≤0.27A | | | Io≤0.27A | | | |
| Line Regulation | | $\Delta V_{OLINE}$ | | 30 | 90 | | | 10 | mV (3025B: mV/V) |
| | | Conditions | $V_{IN}$=17 to 27V, Io=0.2A | | | $V_{IN}$=(Vo+1) to 27V, Io=0.27A | | | |
| Load Regulation | | $\Delta V_{OLOAD}$ | | 120 | 300 | | | 10 | mV (3025B: mV/V) |
| | | Conditions | $V_{IN}$=18V, Io=0 to 0.27A | | | $V_{IN}$=Vo+3V, Io=0 to 0.27A | | | |
| Temperature Coefficient of Output Voltage (SI-3025B: Temperature Coefficient of Reference Voltage) | | $\Delta V_O/\Delta T_a$ ($\Delta V_{REF}/\Delta T_a$) | | ±1.5 | | | ±0.5 | | mV/°C |
| | | Conditions | $V_{IN}$=18V, Io=5mA, Tj=0 to 100°C | | | $V_{IN}$=Vo+3V, Io=5mA, Tj=0 to 100°C | | | |
| Ripple Rejection | | $R_{REJ}$ | | 54 | | | 54 | | dB |
| | | Conditions | $V_{IN}$=18V, f=100 to 120Hz | | | $V_{IN}$=Vo+3V, f=100 to 120Hz | | | |
| Quiescent Circuit Current | | $I_q$ | | 3 | 10 | | 3 | 10 | mA |
| | | Conditions | $V_{IN}$=18V, Io=0A | | | $V_{IN}$=Vo+3V, Io=0A | | | |
| Overcurrent Protection Starting Current[*3,4] | | $I_{S1}$ | 0.3 | | 0.7 | 0.3 | | 0.75 | A |
| | | Conditions | $V_{IN}$=18V | | | When $V_{IN}$=18V, setting Vo=11.7V | | | |
| | | | | ——— | | 0.3 | | 0.7 | |
| | | Conditions | | | | When $V_{IN}$=18V, setting Vo=15.7V | | | |
| Vc Terminal[*5] | 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 | μA |
| | | 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.(Refer to Setting DC Input Voltage on page 7.)

*3: Is1 is specified at −5(%) drop point of output voltage Vo on the condition that $V_{IN}$=Vo+3V, Io=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) Vo adjustment by raising ground voltage

*5: Output is ON even when output control terminal Vc 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)



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

| SI-3157B | SI-3025B |
|---|---|
| ① GND | ① GND |
| ② Vc | ② Vc |
| ③ Vo | ③ Vo |
| ④ Vos | ④ VREF |
| ⑤ VIN | ⑤ VIN |

Forming No. 1101

## ■Block Diagram



SI-3157B

SI-3025B

## ■Standard External Circuit

**SI-3157B**



**SI-3025B**



$C_0$ : Output capacitor (47 to 100μF)

*1 $\left.\begin{array}{l} C_1 \\ C_2 \end{array}\right\}$ : 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.

*3 $\left.\begin{array}{l} R_1 \\ R_2 \end{array}\right\}$ : External resistor for setting output voltage

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

$$V_O = V_{REF} \cdot \left(1 + \frac{R_1}{R_2}\right) \quad (V_{REF} = 2.55V(typ.))$$
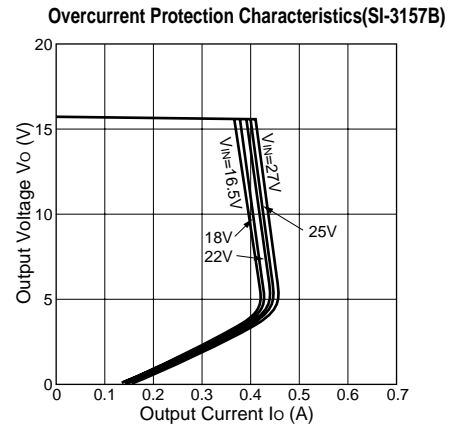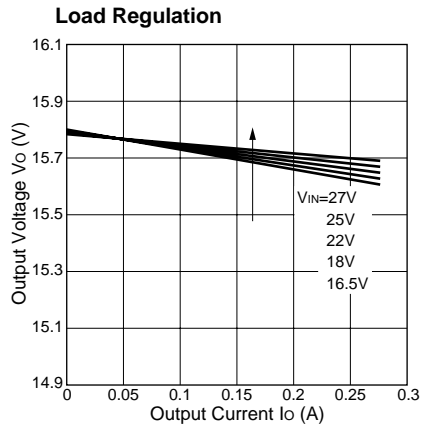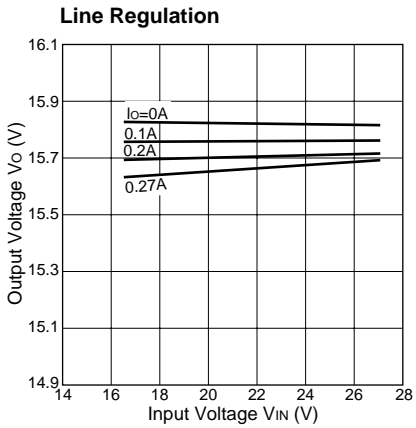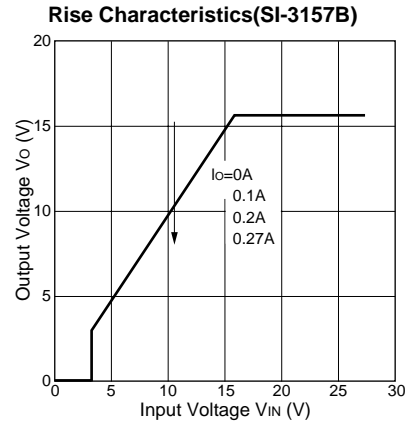
$R_2$ must be 2.55kΩ for stable operation.
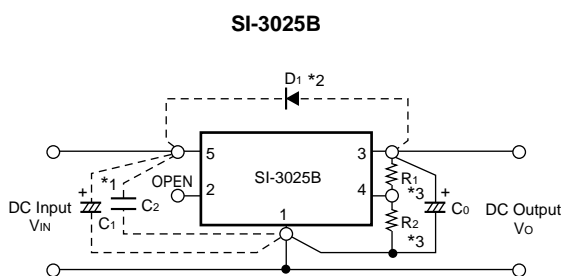
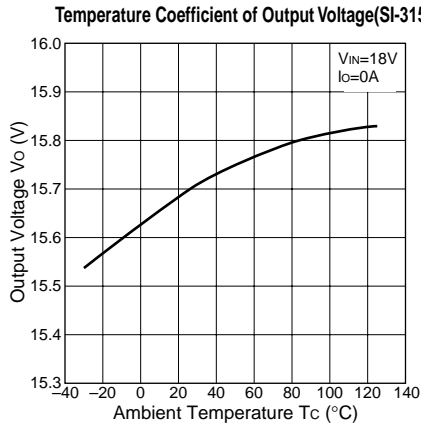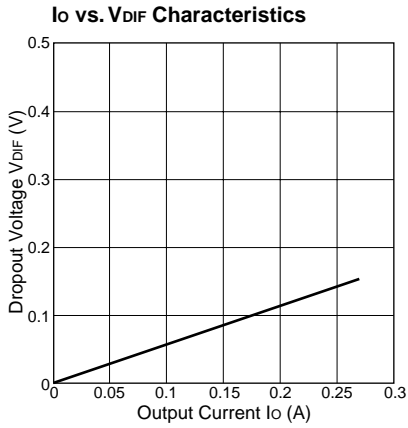## ■$T_a$-$P_D$ Characteristics
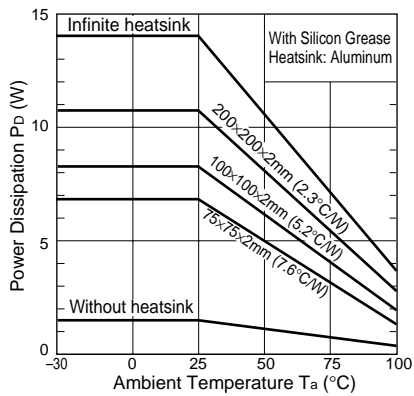


$$P_D = I_O \cdot [V_{IN}(mean) - V_O]$$

## ■Typical Characteristics (When setting Vo=15.7V for SI3025B)

(Ta=25°C)

### Io vs. Vdif Characteristics

Dropout Voltage Vdif (V) vs. Output Current Io (A)

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

VIN=18V
Io=0A

Output Voltage Vo (V) vs. Ambient Temperature Tc (°C)

### Rise Characteristics(SI-3157B)

Io=0A
0.1A
0.2A
0.27A

Output Voltage Vo (V) vs. Input Voltage VIN (V)

### Line Regulation

Io=0A
0.1A
0.2A
0.27A

Output Voltage Vo (V) vs. Input Voltage VIN (V)

### Load Regulation

VIN=27V
25V
22V
18V
16.5V

Output Voltage Vo (V) vs. Output Current Io (A)

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

VIN=16.5V
VIN=27V
18V
22V
25V

Output Voltage Vo (V) vs. Output Current Io (A)

### Output ON/OFF Control

VIN=18V
Io=0A

Output Voltage Vo (V) vs. Output ON/OFF Control Vc (V)

### Thermal Protection Characteristics

VIN=18V
Io=10mA

Output Voltage Vo (V) vs. Case Temperature Tc (°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 short-circuiting over extended periods of time.