

## SI-3000ZFE Series 5-Terminal, Low Dropout Voltage Linear Regulator ICs

### Features

- Compact full-mold package (equivalent to TO220)
- Output current: 3.0A
- Low dropout voltage:  $V_{DIF} \leq 0.7V$  (at  $I_o = 3.0A$ )
- Low circuit current at output OFF:  $I_q$  (OFF)  $\leq 1\mu A$
- Built-in overcurrent and thermal protection circuits

### Applications

- Secondary stabilized power supply (local power supply)

### Absolute Maximum Ratings

(T<sub>a</sub> = 25°C)

| Parameter                                    | Symbol                       | Ratings  | Unit |
|--|------------------------------|--|------|
| DC Input Voltage                             | V <sub>IN</sub> <sup>1</sup> | 10   | V    |
| Output Control Terminal Voltage              | V <sub>C</sub>               | 6  | V    |
| DC Output Current                            | I <sub>O</sub> <sup>1</sup>  | 3.0  | A    |
| Power Dissipation                            | P <sub>D1</sub>              | 20 (With infinite heatsink)                    | W    |
|  | P <sub>D2</sub>              | 1.5 (Without heatsink, stand-alone operation)  | W    |
| Junction Temperature                         | T <sub>J</sub>               | -30 to +125                                    | °C   |
| Operating Ambient Temperature                | T <sub>OP</sub>              | -30 to +100                                    | °C   |
| Storage Temperature                          | T <sub>STG</sub>             | -30 to +125                                    | °C   |
| Thermal Resistance (Junction to Case)        | θ <sub>J-C</sub>             | 5.0  | °C/W |
| Thermal Resistance (Junction to Ambient Air) | θ <sub>J-A</sub>             | 66.7 (Without heatsink, stand-alone operation) | °C/W |

### Recommended Operating Conditions

| Parameter                      | Symbol              | Ratings                        | Unit |
|--------------------------------|---------------------|--------------------------------|------|
| Input Voltage                  | V <sub>IN</sub>     | <sup>2</sup> to 6 <sup>1</sup> | V    |
| Output Current                 | I <sub>O</sub>      | 0 to 3                         | A    |
| Operating Ambient Temperature  | T <sub>OP (a)</sub> | -20 to +85                     | °C   |
| Operating Junction Temperature | T <sub>OP (j)</sub> | -20 to +100                    | °C   |
| Output Voltage Variable Range  | V <sub>OADJ</sub>   | 1.2 to 5                       | V    |

\*1: V<sub>IN</sub> (max) and I<sub>O</sub> (max) are restricted by the relationship  $P_D = (V_{IN} - V_O) \times I_O$ .

\*2: Set the input voltage to 2.4V or higher when setting the output voltage to 2.0V or lower.

### Electrical Characteristics

(T<sub>a</sub> = 25°C, V<sub>C</sub> = 2V unless otherwise specified)

| Parameter   | Symbol                                     | SI-3011ZFE  |                      |       | Unit  |    |
|---|--|---|----------------------|-------|-------|----|
|   |  | min.  | typ.                 | max.  |       |    |
| Reference Voltage                                     | V <sub>ADJ</sub>                           | 1.078   | 1.100                | 1.122 | V     |    |
|   | Conditions                                 | V <sub>IN</sub> =V <sub>O</sub> +1V, I <sub>O</sub> =10mA                   |                      |       |       |    |
| Line Regulation                                       | ΔV <sub>OLINE</sub>                        |   |                      | 10    | mV    |    |
|   | Conditions                                 | V <sub>IN</sub> =3.3 to 5V, I <sub>O</sub> =10mA (V <sub>O</sub> =2.5V)     |                      |       |       |    |
| Load Regulation                                       | ΔV <sub>OLOAD</sub>                        |   |                      | 40    | mV    |    |
|   | Conditions                                 | V <sub>IN</sub> =3.3V, I <sub>O</sub> =0 to 3A (V <sub>O</sub> =2.5V)       |                      |       |       |    |
| Dropout Voltage                                       | V <sub>DIF</sub>                           |   |                      | 0.7   | V     |    |
|   | Conditions                                 | I <sub>O</sub> =3A (V <sub>O</sub> =2.5V)                                   |                      |       |       |    |
| Quiescent Circuit Current                             | I <sub>q</sub>                             |   | 1                    | 1.5   | mA    |    |
|   | Conditions                                 | V <sub>IN</sub> =V <sub>O</sub> +1V, I <sub>O</sub> =0A, V <sub>C</sub> =2V |                      |       |       |    |
| Circuit Current at Output OFF                         | I <sub>q</sub> (OFF)                       |   |                      | 1     | μA    |    |
|   | Conditions                                 | V <sub>IN</sub> =V <sub>O</sub> +1V, V <sub>C</sub> =0V                     |                      |       |       |    |
| Temperature Coefficient of Output Voltage             | ΔV <sub>O</sub> /ΔT <sub>a</sub>           |   | ±0.3                 |       | mV/°C |    |
|   | Conditions                                 | T <sub>J</sub> =0 to 100°C  |                      |       |       |    |
| Ripple Rejection                                      | R <sub>REJ</sub>                           |   | 60                   |       | dB    |    |
|   | Conditions                                 | V <sub>IN</sub> =V <sub>O</sub> +1V, f=100 to 120Hz, I <sub>O</sub> =0.1A   |                      |       |       |    |
| Overcurrent Protection Starting Current <sup>*2</sup> | I <sub>S1</sub>                            | 3.2   |                      |       | A     |    |
|   | Conditions                                 | V <sub>IN</sub> =V <sub>O</sub> +1V   |                      |       |       |    |
| V <sub>C</sub> Terminal                               | Control Voltage (Output ON) <sup>*3</sup>  | V <sub>C, IH</sub>  | 2                    |       | V     |    |
|   | Control Voltage (Output OFF) <sup>*3</sup> | V <sub>C, IL</sub>  |                      | 0.8   |       |    |
|   | Control Current (Output ON)                | I <sub>C, IH</sub>  |                      |       | 100   | μA |
|   |  | Conditions  | V <sub>C</sub> =2.7V |       |       |    |
|   | Control Current (Output OFF)               | I <sub>C, IL</sub>  | -5                   | 0     |       | μA |
|   |  | Conditions  | V <sub>C</sub> =0V   |       |       |    |

\*1: Set the input voltage to 2.4V or higher when setting the output voltage to 2.0V or lower.

\*2: I<sub>S1</sub> is specified at the 5% drop point of output voltage V<sub>O</sub> under the Output Voltage parameter conditions.

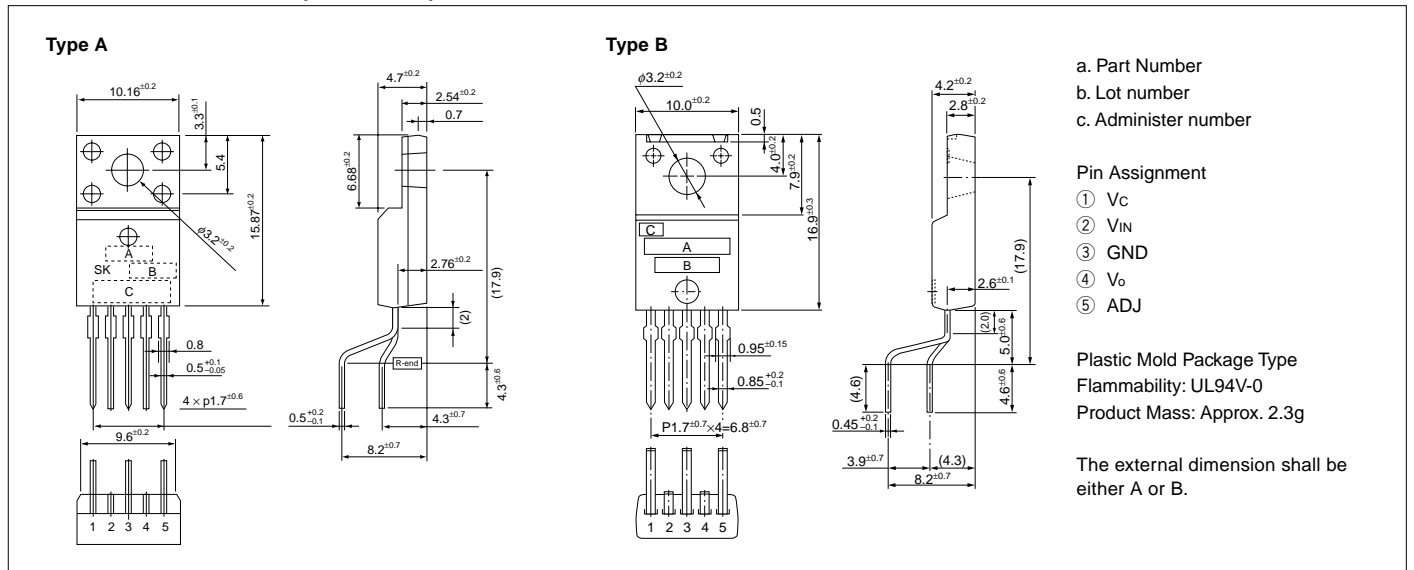
\*3: Output is OFF when the output control terminal V<sub>C</sub> is open. Each input level is equivalent to LS-TTL level. Therefore, the device can be driven directly by LS-TTLs.

\*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.

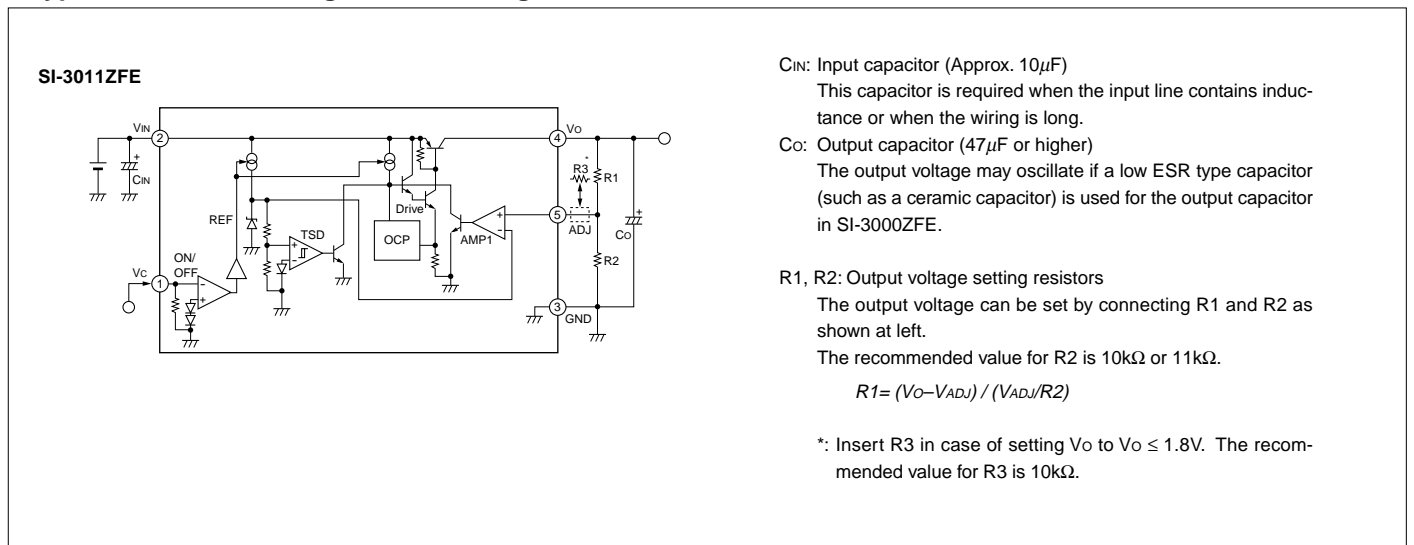
(1) Constant current load (2) Positive and negative power supply (3) Series-connected power supply (4) V<sub>O</sub> adjustment by raising ground voltage

External Dimensions (TO220F-5)

(unit : mm)



Typical Connection Diagram/Block Diagram



T<sub>a</sub>-P<sub>d</sub> Characteristics

