

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

($T_a = 25^{\circ}C$)

Parameter	Symbol	Ratings	Unit
DC Input Voltage	V_{IN}^{*1}	10	V
Output Control Terminal Voltage	V_c	6	V
DC Output Current	I_o^{*1}	3.0	A
Power Dissipation	P_{D1}	20 (With infinite heatsink)	W
	P_{D2}	1.5 (Without heatsink, stand-alone operation)	W
Junction Temperature	T_j	-30 to +125	$^{\circ}C$
Operating Ambient Temperature	T_{op}	-30 to +100	$^{\circ}C$
Storage Temperature	T_{stg}	-30 to +125	$^{\circ}C$
Thermal Resistance (Junction to Case)	θ_{j-c}	5.0	$^{\circ}C/W$
Thermal Resistance (Junction to Ambient Air)	θ_{j-a}	66.7 (Without heatsink, stand-alone operation)	$^{\circ}C/W$

Recommended Operating Conditions

Parameter	Symbol	Ratings	Unit
Input Voltage	V_{IN}	*2 to 6 *1	V
Output Current	I_o	0 to 3	A
Operating Ambient Temperature	$T_{op} (a)$	-20 to +85	$^{\circ}C$
Operating Junction Temperature	$T_{op} (j)$	-20 to +100	$^{\circ}C$
Output Voltage Variable Range	V_{OAdj}	1.2 to 5	V

*1: V_{IN} (max) and I_o (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

($T_a = 25^{\circ}C$, $V_c = 2V$ unless otherwise specified)

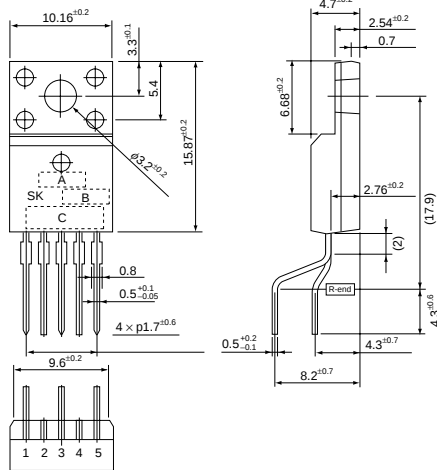
Parameter		Symbol	SI-3011ZFE			Unit
			min.	typ.	max.	
Reference Voltage	V_{ADJ}	1.078	1.100	1.122	V	
	Conditions	$V_{IN}=V_o+1V$, $I_o=10mA$				
Line Regulation	ΔV_{OLINE}			10	mV	
	Conditions	$V_{IN}=3.3$ to 5V, $I_o=10mA$ ($V_o=2.5V$)				
Load Regulation	ΔV_{OLOAD}			40	mV	
	Conditions	$V_{IN}=3.3V$, $I_o=0$ to 3A ($V_o=2.5V$)				
Dropout Voltage	V_{DIF}			0.7	V	
	Conditions	$I_o=3A$ ($V_o=2.5V$)				
Quiescent Circuit Current	I_q		1	1.5	mA	
	Conditions	$V_{IN}=V_o+1V$, $I_o=0A$, $V_c=2V$				
Circuit Current at Output OFF	I_q (OFF)			1	μA	
	Conditions	$V_{IN}=V_o+1V$, $V_c=0V$				
Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T_a$		± 0.3		mV/°C	
	Conditions	$T_j=0$ to 100°C				
Ripple Rejection	R_{REJ}		60		dB	
	Conditions	$V_{IN}=V_o+1V$, $f=100$ to 120Hz, $I_o=0.1A$				
Overcurrent Protection Starting Current ^{*2}	I_{S1}	3.2			A	
	Conditions	$V_{IN}=V_o+1V$				
Vc Terminal	Control Voltage (Output ON) ^{*3}	V_c , IH	2		V	
	Control Voltage (Output OFF) ^{*3}	V_c , IL		0.8		
	Control Current(Output ON)	I_c , IH		100	μA	
	Conditions	$V_c=2.7V$				
	Control Current(Output OFF)	I_c , IL	-5	0	μA	
	Conditions	$V_c=0V$				

*1: Set the input voltage to 2.4V or higher when setting the output voltage to 2.0V or lower.
*2: I_{S1} is specified at the 5% drop point of output voltage V_o under the Output Voltage parameter conditions.
*3: Output is OFF when the 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.
*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

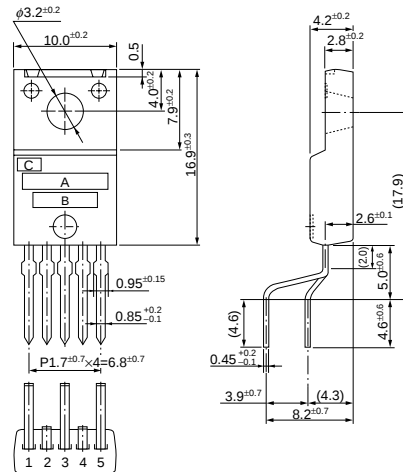
External Dimensions (TO220F-5)

(unit : mm)

Type A



Type B



- a. Part Number
b. Lot number
c. Administer number

Pin Assignment

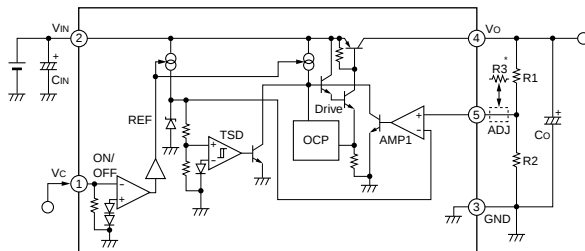
- ① V_C
② V_{IN}
③ GND
④ V_O
⑤ ADJ

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

The external dimension shall be either A or B.

Typical Connection Diagram/Block Diagram

SI-3011ZFE



C_{IN}: Input capacitor (Approx. 10μF)

This capacitor is required when the input line contains inductance or when the wiring is long.

C_O: Output capacitor (47μF or higher)

The output voltage may oscillate if a low ESR type capacitor (such as a ceramic capacitor) is used for the output capacitor in SI-3000ZFE.

R₁, R₂: Output voltage setting resistors

The output voltage can be set by connecting R₁ and R₂ as shown at left.

The recommended value for R₂ is 10kΩ or 11kΩ.

$$R1 = (V_O - V_{ADJ}) / (V_{ADJ} / R2)$$

*: Insert R₃ in case of setting V_O to V_O ≤ 1.8V. The recommended value for R₃ is 10kΩ.

T_a-P_D Characteristics

