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: Iq (OFF) ≤ 1μA
- Built-in overcurrent and thermal protection circuits

■Applications

- Secondary stabilized power supply (local power supply)

■Absolute Maximum Ratings

(T_a = 25°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	°C
Operating Ambient Temperature	T_{op}	–30 to +100	°C
Storage Temperature	T_{stg}	–30 to +125	°C
Thermal Resistance (Junction to Case)	θ_{j-c}	5.0	°C/W
Thermal Resistance (Junction to Ambient Air)	θ_{j-a}	66.7 (Without heatsink, stand-alone operation)	°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	°C
Operating Junction Temperature	$T_{op\,(j)}$	–20 to +100	°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°C, V_C = 2V unless otherwise specified)

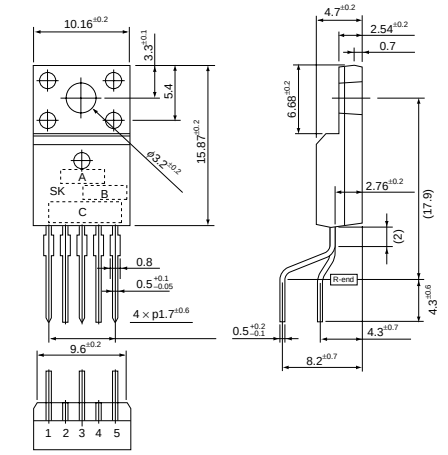
Parameter		Symbol	SI-3011ZFE min.	SI-3011ZFE typ.	SI-3011ZFE max.	Unit
Reference Voltage		V_{ADJ}	1.078	1.100	1.122	V
		Conditions	$V_{IN}=V_O+1V$, I_O=10mA			
Line Regulation		ΔV_{OLINE}			10	mV
		Conditions	V_{IN}=3.3 to 5V, I_O=10mA (V_O=2.5V)			
Load Regulation		ΔV_{OLOAD}			40	mV
		Conditions	V_{IN}=3.3V, 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 *4		I_{S1}	3.2			A
		Conditions	$V_{IN}=V_O+1V$			
V_C 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

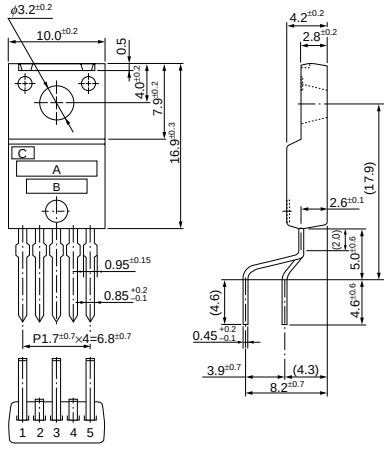
■External Dimensions (TO220F-5)

(unit : mm)

Type A



Type B



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

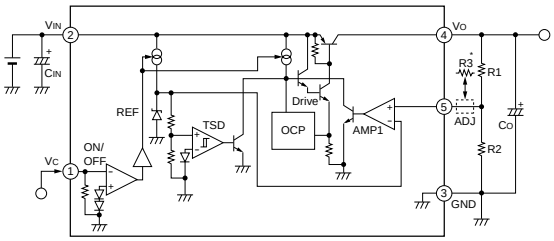
Pin Assignment
① V_C
② V_{IN}
③ GND
④ V_O
⑤ ADJ

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 $V_O \leq 1.8V$. The recommended value for R3 is 10kΩ.

■T_a-P_D Characteristics