

# SI-3000ZD Series Surface-Mount, Low Dropout Voltage Linear Regulator ICs

## ■Features

- Compact surface-mount package (TO263-5)
- Output current: 3.0A
- Low dropout voltage:  $V_{DIF} \leq 0.6V$  (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

Parameter	Symbol	Ratings	Unit	( $T_a=25^\circ C$ )
DC Input Voltage	$V_{IN}^*$	10	V	
Output Control Terminal Voltage	$V_c$	6	V	
DC Output Current	$I_o^*$	3.0	A	
Power Dissipation	$P_D^3$	3	W	
Junction Temperature	$T_j$	-30 to +125	$^\circ C$	
Operating Ambient Temperature	$T_{op}$	-30 to +85	$^\circ C$	
Storage Temperature	$T_{stg}$	-40 to +125	$^\circ C$	
Thermal Resistance (Junction to Ambient Air)	$\theta_{j-a}$	33.3	$^\circ C/W$	
Thermal Resistance (Junction to Case)	$\theta_{j-c}$	3	$^\circ C/W$	

## ■Recommended Operating Conditions

Parameter	Symbol	Ratings	Unit	Remarks
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	Only for SI-3011ZD. Refer to the block diagram.

\*1:  $V_{IN}$  (max) and  $I_o$  (max) are restricted by the relation  $P_D = (V_{IN} - V_o) \times I_o$ .

\*2: Set the input voltage to 2.4V or higher when setting the output voltage to 2.0V or lower (SI-3011ZD).

\*3: When mounted on glass-epoxy board of 40 × 40mm (copper laminate area 100%).

## ■Electrical Characteristics

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

Parameter	Symbol	Ratings						Unit	
		SI-3011ZD (Variable type)			SI-3033ZD				
		min.	typ.	max.	min.	typ.	max.		
Output Voltage (Reference Voltage $V_{ADJ}$ for SI-3011ZD)	$V_o$ ( $V_{ADJ}$ )	1.078	1.100	1.122	3.234	3.300	3.366	V	
	Conditions	$V_{IN}=V_o+1V$ , $I_o=10mA$			$V_{IN}=5V$ , $I_o=10mA$				
Line Regulation	$\Delta V_{LINE}$		10				10	mV	
	Conditions	$V_{IN}=3.3$ to 5V, $I_o=10mA$ ( $V_o=2.5V$ )			$V_{IN}=4.5$ to 5.5V, $I_o=10mA$				
Load Regulation	$\Delta V_{LOAD}$		40				40	mV	
	Conditions	$V_{IN}=3.3V$ , $I_o=0$ to 3A ( $V_o=2.5V$ )			$V_{IN}=5V$ , $I_o=0$ to 3A				
Dropout Voltage	$V_{DIF}$		0.6				0.6	V	
	Conditions	$I_o=3A$ ( $V_o=2.5V$ )			$I_o=3A$				
Quiescent Circuit Current	$I_q$	1	1.5			1	1.5	mA	
	Conditions	$V_{IN}=V_o+1V$ , $I_o=0A$ , $V_c=2V$			$V_{IN}=5V$ , $I_o=0A$ , $V_c=2V$				
Circuit Current at Output OFF	$I_q$ (OFF)		1				1	$\mu A$	
	Conditions	$V_{IN}=V_o+1V$ , $V_c=0V$			$V_{IN}=5V$ , $V_c=0V$				
Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T_a$	$\pm 0.3$			$\pm 0.3$			$mV/^\circ C$	
	Conditions	$T_j=0$ to $100^\circ C$			$T_j=0$ to $100^\circ C$				
Ripple Rejection	$R_{REJ}$	60			60			dB	
	Conditions	$V_{IN}=V_o+1V$ , $f=100$ to 120Hz, $I_o=0.1A$			$V_{IN}=5V$ , $f=100$ to 120Hz, $I_o=0.1A$				
Overcurrent Protection Starting Current <sup>*2</sup> <sup>*4</sup>	$I_{S1}$	3.2			3.2			A	
	Conditions	$V_{IN}=V_o+1V$			$V_{IN}=5V$				
V <sub>c</sub> Terminal	Control Voltage (Output ON) <sup>*3</sup>	$V_c$ , $I_H$	2		2			V	
	Control Voltage (Output OFF) <sup>*3</sup>	$V_c$ , $I_L$		0.8			0.8		
	Control Current (Output ON)	$I_c$ , $I_H$		100			100		
	Control Current (Output OFF)	$I_c$ , $I_L$	-5	0	-5	0			
			$V_c=0V$			$V_c=0V$		$\mu A$	

\*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 condition of Output Voltage parameter.

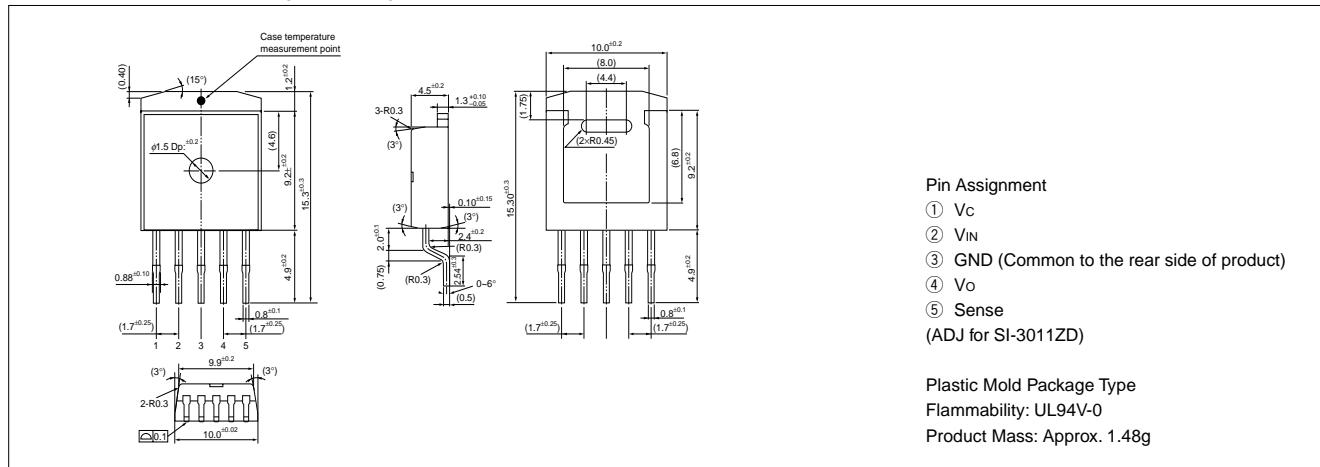
\*3: Output is OFF when the output control terminal ( $V_c$  terminal) is open. Each input level is equivalent to LS-TTL level. Therefore, the device can be driven directly by LS-TTLs.

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

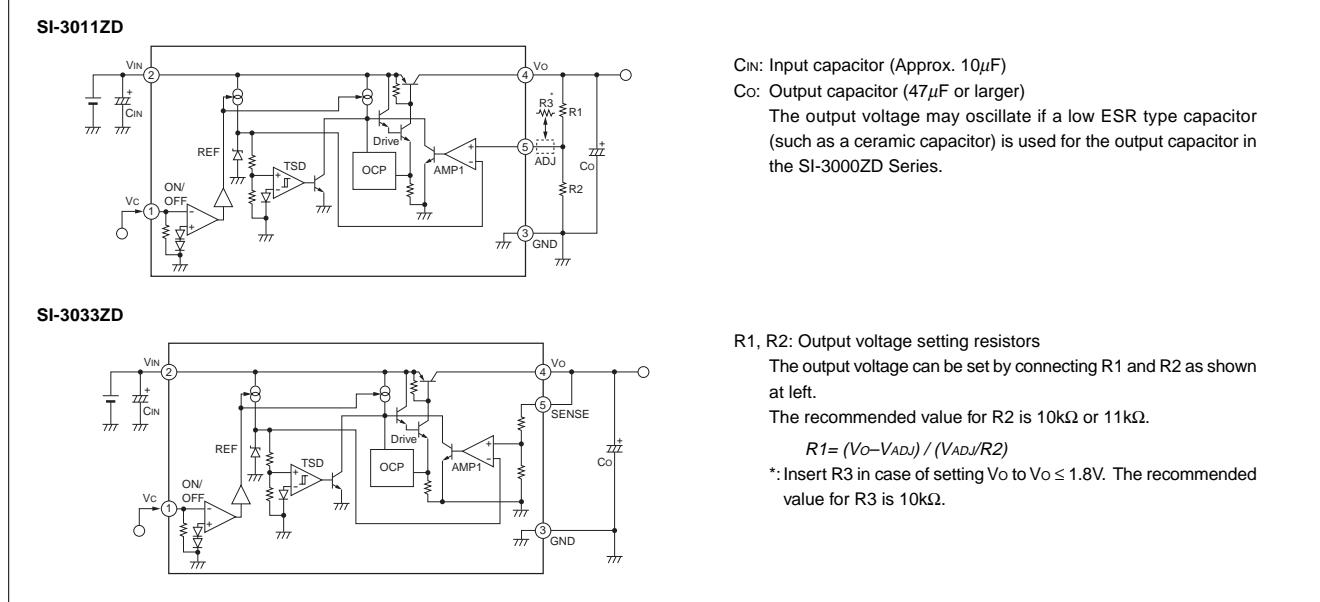
(1) Constant current load (2) Positive and negative power supply (3) Series-connected power supply (4)  $V_o$  adjustment by raising ground voltage

## ■External Dimensions (TO263-5)

(Unit : mm)

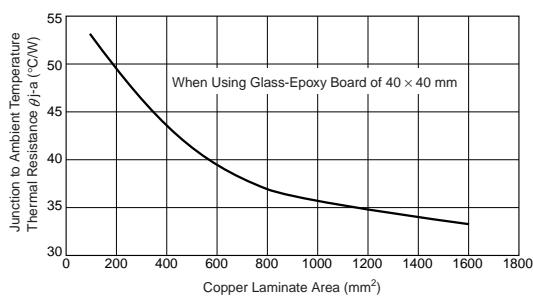


## ■Block Diagram



## ■Reference Data

**Copper Laminate Area (on Glass-Epoxy Board) vs.  
Thermal Resistance (from Junction to Ambient Temperature) (Typical Value)**



- A higher heat radiation effect can be achieved by enlarging the copper laminate area connected to the inner frame to which a monolithic IC is mounted.
- Obtaining the junction temperature  
Measure GND terminal temperature T<sub>c</sub> with a thermocouple, etc. Then substitute this value in the following formula to obtain the junction temperature.

$$T_j = P_D \cdot \theta_{J-C} + T_c \quad P_D = (V_{IN} - V_o) \cdot I_{OUT}$$