

# SI-3000KFE Series Low Current Consumption, Low Dropout Voltage Linear Regulator ICs

## Features

- Compact full-mold package (equivalent to TO220)
- Output current: 1.0A
- Low dropout voltage:  $V_{DIF} \leq 0.5V$  (at  $I_o = 1.0A$ )
- High ripple rejection: 75dB
- 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	Remarks
		SI-3010KFE			
DC Input Voltage	$V_{IN}$	35 <sup>*1</sup>		V	
Output Control Terminal Voltage	$V_C$	$V_{IN}$		V	
DC Output Current	$I_o$	1.0		A	
Power Dissipation	$P_{D1}$	16.6		W	With infinite heatsink
	$P_{D2}$	1.72		W	Without heatsink, stand-alone operation
Junction Temperature	$T_J$	-40 to +125		$^\circ C$	
Storage Temperature	$T_{stg}$	-40 to +125		$^\circ C$	
Operating Ambient Temperature	$T_{op}$	-40 to +100		$^\circ C$	
Thermal Resistance (Junction to Case)	$\theta_{j-c}$	6.0		$^\circ C/W$	
Thermal Resistance (Junction to Ambient Air)	$\theta_{j-a}$	58		$^\circ C/W$	Without heatsink, stand-alone operation

\*1: A built-in input-overvoltage-protection circuit shuts down the output voltage at the Input Overvoltage Shutdown Voltage of the electrical characteristics.

## Recommended Operating Conditions

Parameter	Symbol	Ratings		Unit
		SI-3010KFE		
Input Voltage Range	$V_{IN}$	2.4 <sup>2</sup> to 27 <sup>1</sup>		V
Output Current Range	$I_o$	0 to 1.0 <sup>1</sup>		A
Output Voltage Variable Range	$V_{oADJ}$	1.1 to 16		V
Operating Ambient Temperature	$T_{op}$	-30 to +85		$^\circ C$
Operating Junction Temperature	$T_J$	-20 to +100		$^\circ C$

\*1:  $V_{IN}$  (max) and  $I_o$  (max) are restricted by the relationship  $P_D$  (max) =  $(V_{IN} - V_o) \times I_o = 16.6W$ .

\*2: Refer to the Dropout Voltage parameter.

## Electrical Characteristics

Parameter	Symbol	Ratings			Unit	
		SI-3010KFE				
		min.	typ.	max.		
Reference Voltage	$V_{ADJ}$	0.98	1.00	1.02	V	
	Conditions	$V_{IN}=7V, I_o=0.01A, V_C=2V, V_o=5A$				
Line Regulation	$\Delta V_{OLINE}$			30	mV	
	Conditions	$V_{IN}=6$ to 15V, $I_o=0.01A, V_C=2V, V_o=5A$				
Load Regulation	$\Delta V_{LOAD}$			75	mV	
	Conditions	$V_{IN}=7V, I_o=0$ to 1A, $V_C=2V, V_o=5A$				
Dropout Voltage	$V_{DIF}$			0.3	V	
	Conditions	$I_o=0.5A, V_C=2V, V_o=5V$				
	Conditions	$I_o=1.0A, V_C=2V, V_o=5V$				
Quiescent Circuit Current	$I_q$			600	$\mu A$	
	Conditions	$V_{IN}=7V, I_o=0A, V_C=2V$				
Circuit Current at Output OFF	$I_q$ (OFF)			1	$\mu A$	
	Conditions	$V_{IN}=7V, V_C=0V$				
Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T_a$		$\pm 0.5$		mV/ $^\circ C$	
	Conditions	$V_{IN}=7V, I_o=0.01A, V_C=2V, T_J=0$ to 100 $^\circ C, V_o=2.5V$				
Ripple Rejection	RREJ		75		dB	
	Conditions	$V_{IN}=7V, I_o=0.1A, V_C=2V, f=100$ to 120HzV $o=5V$				
Overcurrent Protection Starting Current <sup>*3</sup>	$I_{S1}$	1.1			A	
	Conditions	$V_{IN}=7V, V_C=2V$				
V <sub>C</sub> Terminal	Control Voltage (Output ON) <sup>*4</sup>	$V_C, I_H$	2		V	
		Conditions	$V_{IN}=7V$			
	Control Voltage (Output OFF)	$V_C, I_L$			0.8	V
		Conditions	$V_{IN}=7V$			
	Control Current (Output ON)	$I_C, I_H$			40	$\mu A$
		Conditions	$V_{IN}=7V, V_C=2V$			
Control Current (Output OFF)	$I_C, I_L$	-5	0		$\mu A$	
	Conditions	$V_{IN}=7V, V_C=0V$				
Input Overvoltage Shutdown Voltage	$V_{OVP}$	33			V	
	Conditions	$I_o=0.01A$				

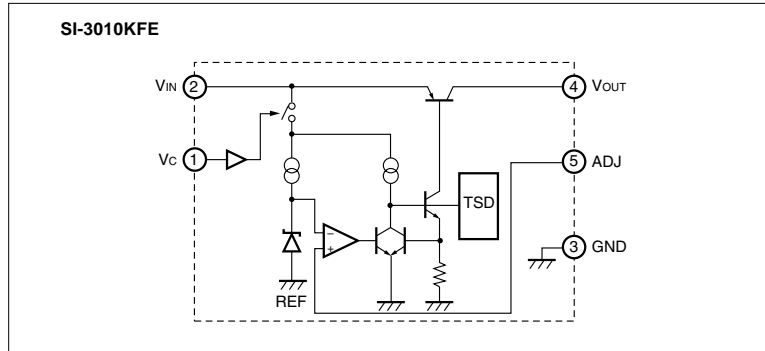
\*3:  $I_{S1}$  is specified at the 5% drop point of output voltage  $V_o$  on the condition that  $V_{IN}$  = overcurrent protection starting current,  $I_o = 10$  mA.

\*4: 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.

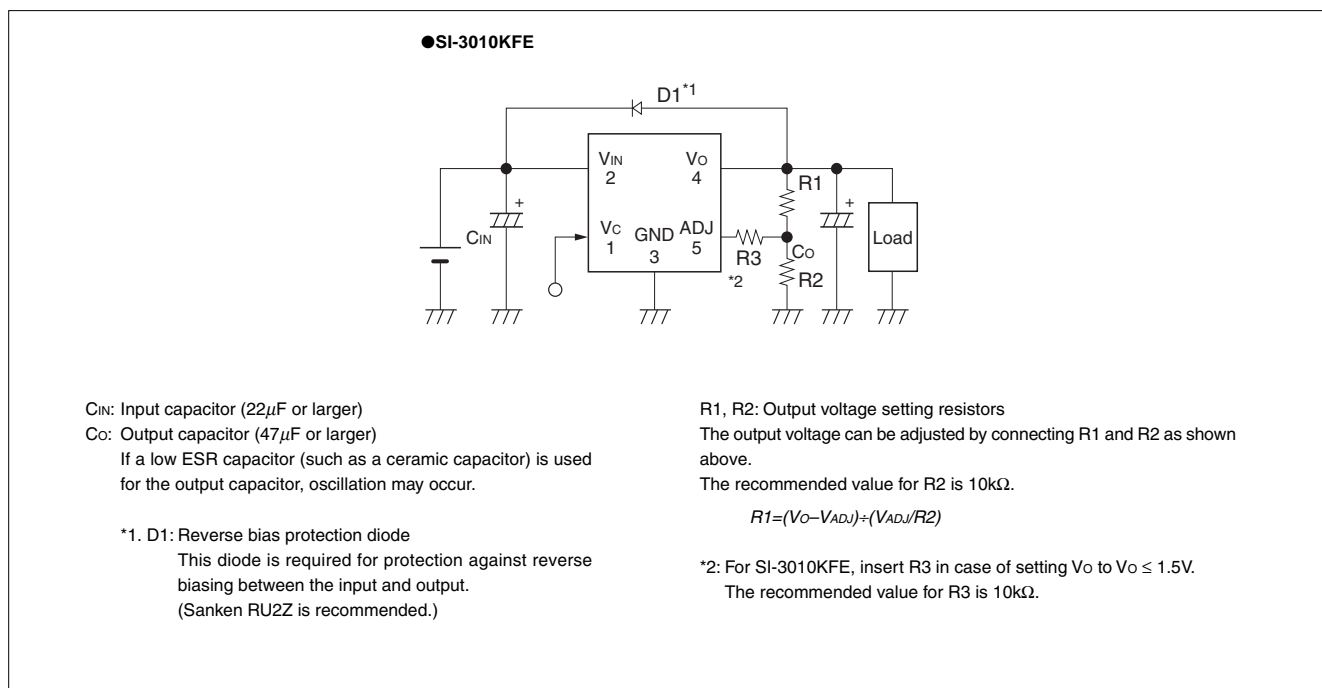
\*5: SI-3000KFE cannot be used in the following applications because the built-in foldback-type overcurrent protection may cause errors during start-up stage.

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

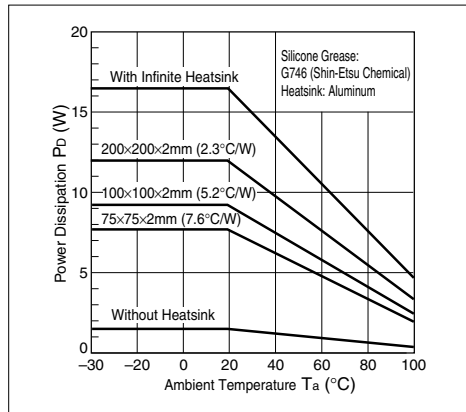
■Block Diagram



■Typical Connection Diagram



■T<sub>a</sub>-P<sub>D</sub> Characteristics



■External Dimensions (TO220F-5)

(Unit : mm)

