

SI-8000FD Series Surface Mount, Separate Excitation Step-down Switching Mode

Features

- Surface-mount package (TO263-5)
- Output current: 3.5 A
- High efficiency: 83% (Vo = 5 V, VIN = 15 V, Io = 2 A)
- Requires only 6 discrete components
- Built-in reference oscillator (300 kHz)
- Built-in drooping-type overcurrent and thermal protection circuits
- Built-in soft start circuit (Output ON/OFF available)
 - SI-8001FDE
- Built-in on/off function (active Low)
 - SI-8001FDL
- Low current consumption during off
 - SI-8001FDL

Applications

- DVD recorder, FPD-TV
- OA equipment, such as printers
- Onboard local power supplies

Recommended Operating Conditions

Parameter	Symbol	Ratings		Unit
		SI-8001FDE	SI-8050FDL	
Input Voltage Range	VIN	Vo+3*1 to 40		V
Output Voltage Range	Vo	0.8 to 24		V
Output Current Range	Io	0 to 3.5		A
Operating Junction Temperature Range	Tjop	-30 to +100		°C
Operating Temperature Range	Top	-30 to +85		°C

*1: The minimum value of the input voltage range is 4.5 V or Vo + 3 V, whichever is higher.

Electrical Characteristics

(R1=4.2kΩ, R2=0.8kΩ when Ta = 25°C and Vo=5V)

Parameter		Symbol	Ratings						Unit
			SI-8001FDE			SI-8001FDL			
			min.	typ.	max.	min.	typ.	max.	
Reference Voltage	V _{ADJ}	0.784	0.800	0.816	0.784	0.800	0.816	V	
	Conditions	V _{IN} =15V, I _o =0.2A			V _{IN} =15V, I _o =0.2A				
Temperature Coefficient of Reference Voltage	ΔV _{ADJ} /ΔT		±0.1			±0.1		mV/°C	
	Conditions	V _{IN} =15V, I _o =0.2A, T _c =0 to 100°C			V _{IN} =15V, I _o =0.2A, T _c =0 to 100°C				
Efficiency	η		83			83		%	
	Conditions	V _{IN} =15V, I _o =2A			V _{IN} =15V, I _o =2A				
Oscillation Frequency	f _o	270	300	330	270	300	330	kHz	
	Conditions	V _{IN} =15V, I _o =2A			V _{IN} =15V, I _o =2A				
Line Regulation	ΔV _{OLINE}			80			80	mV	
	Conditions	V _{IN} =10 to 30V, I _o =2A			V _{IN} =10 to 30V, I _o =2A				
Load Regulation	ΔV _{OLOAD}			50			50	mV	
	Conditions	V _{IN} =15V, I _o =0.2 to 3.5A			V _{IN} =15V, I _o =0.2 to 3.5A				
Overcurrent Protection Starting Current	I _s	3.6			3.6			A	
	Conditions	V _{IN} =15V			V _{IN} =15V				
SS Pin ¹	Low Level Voltage	V _{SSL}		0.5	—	—	—	V	
	Outflow Current at Low Voltage	I _{SSL}	6	30	—	—	—	μA	
		Conditions	V _{IN} =15V, V _{SS} =0V			—			
ON/OFF Pin ²	ON/OFF Control Voltage (Output on)	V _c , I _H	—	—	—		0.8	V	
	ON/OFF Control Voltage (Output off)	V _c , I _L	—	—	—	2.0		V	
	ON/OFF Control Current (Output on)	I _c , I _H	—	—	—		6	100	μA
		Conditions	—			V _c =2V			
Quiescent Circuit Current	I _q		6			6		mA	
		Conditions	V _{IN} =15V, I _o =0A			V _{IN} =15V, I _o =0A			
	I _q (OFF)		200	600		30	200	μA	
		Conditions	V _{IN} =15V, V _{SS} =0V			V _{IN} =15V, V _c =2V			

*1: Pin 5 is the SS pin. Soft start at power on can be performed with a capacitor connected to this pin. The output can also be turned ON/OFF with this pin. The output is stopped by setting the voltage of this pin to VSSL or lower. SS-pin voltage can be changed with an open-collector drive circuit of a transistor. When using both the soft-start and ON/OFF functions together, the discharge current from C3 flows into the ON/OFF control transistor. Therefore, limit the current securely to protect the transistor if C3 capacitance is large. The SS pin is pulled up (3.7 V typ.) to the power supply in the IC, so applying the external voltage is prohibited. If this pin is not used, leave it open.

*2: Output is OFF when the output control terminal VC is open. Each input level is equivalent to LS-TTL. Therefore, the device can be driven directly by LS-TTLs.

Lineup

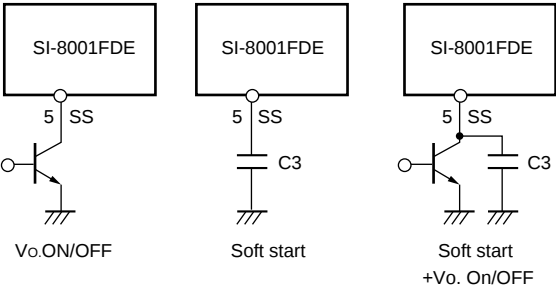
Part Number	SI-8001FDE	SI-8001FDL
Vo(V)	Variable(0.8 to 24)	
Io(A)	3.5	
Function	Soft start	ON/OFF

Absolute Maximum Ratings

Parameter	Symbol	Ratings		Unit	Conditions
		SI-8001FDE	SI-8001FDL		
Input Voltage	VIN	43		V	
ON/OFF Control Voltage	Vc	—	VIN	V	
Power Dissipation*1	PD	3		W	When mounted on glass-epoxy board measuring 40x40 mm (copper laminate area: 100%)
Junction Temperature*2	Tj	+150		°C	
Storage Temperature	Tstg	-40 to +150		°C	
Thermal Resistance (Junction to Case)	θj-c	3*1		°C/W	When mounted on glass-epoxy board measuring 40x40 mm (copper laminate area: 100%)
Thermal Resistance (Junction to Ambient Air)	θj-a	33.3*1		°C/W	When mounted on glass-epoxy board measuring 40x40 mm (copper laminate area: 100%)

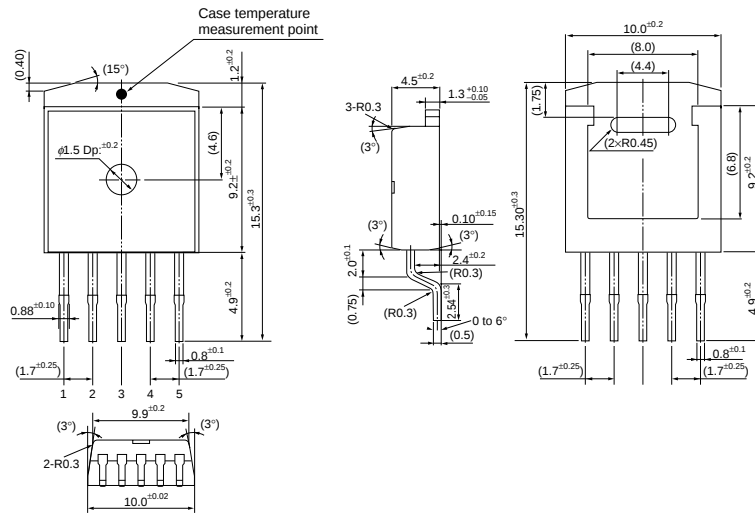
*1 : Limited by thermal protection circuit

*2 : This product has built-in thermal protection circuits that may activate when the junction temperature exceeds 130°C. The recommended design for the junction temperature during IC operation is below 125°C.



External Dimensions (TO263-5)

(Unit : mm)



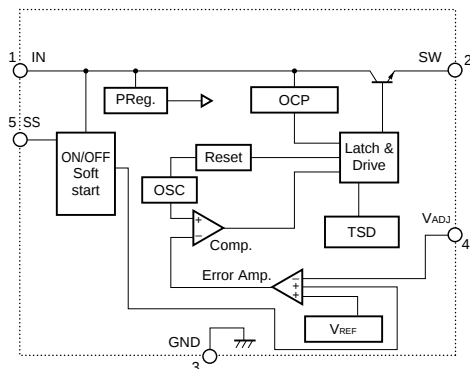
Pin Assignment

- ① IN
- ② SW
- ③ GND (Common to the rear side of the product)
- ④ V_{ADJ}
- ⑤ SS or V_c

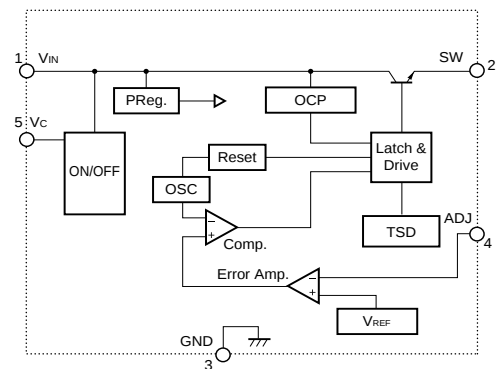
Plastic Mold Package Type
 Flammability: UL 94V-0
 Product Mass: Approx. 1.48g

Block Diagram

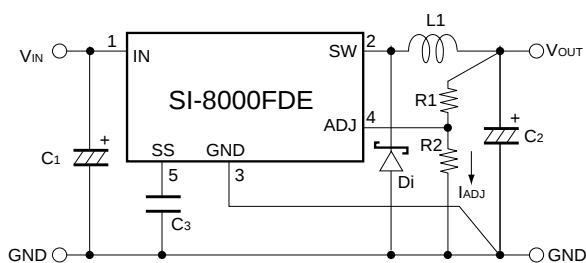
SI-8001FDE



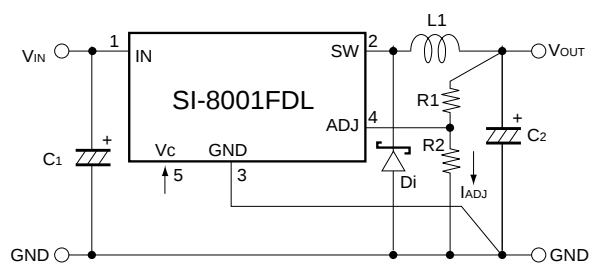
SI-8001FDL



Typical Connection Diagram



- C1 : 470μF
- C2 : 680μF
- C3 : 0.1μ (Only when using soft-start function)
- L1 : 47μH
- Di : SPB-G56S (Sanken)



- C1 : 470μF
- C2 : 680μF
- L1 : 47μH
- Di : SPB-G56S (Sanken)