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, V_{IN} = 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

■Lineup

Part Number	SI-8001FDE	SI-8001FDL
V_O(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	V_{IN}	43		V	
ON/OFF Control Voltage	V_C	–	V_{IN}	V	
Power Dissipation*1	P_D	3		W	When mounted on glass-epoxy board measuring 40×40 mm (copper laminate area: 100%)
Junction Temperature*2	T_j	+150		°C	
Storage Temperature	T_{stg}	–40 to +150		°C	
Thermal Resistance (Junction to Case)	θ_{j-c}	3*1		°C/W	When mounted on glass-epoxy board measuring 40×40 mm (copper laminate area: 100%)
Thermal Resistance (Junction to Ambient Air)	θ_{j-a}	33.3*1		°C/W	When mounted on glass-epoxy board measuring 40×40 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.

■Recommended Operating Conditions

Parameter	Symbol	Ratings		Unit
		SI-8001FDE	SI-8050FDL	
Input Voltage Range	V_{IN}	Vo+3*1 to 40		V
Output Voltage Range	V_O	0.8 to 24		V
Output Current Range	Io	0 to 3.5		A
Operating Junction Temperature Range	T_{jop}	–30 to +100		°C
Operating Temperature Range	T_{op}	–30 to +85		°C

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

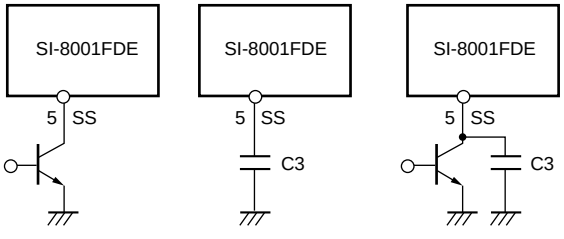
■Electrical Characteristics

(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, Io=0.2A			V_{IN}=15V, Io=0.2A			
Temperature Coefficient of Reference Voltage		$\Delta V_{ADJ}/\Delta T$		±0.1			±0.1		mV/°C
		Conditions	V_{IN}=15V, Io=0.2A, Tc=0 to 100°C			V_{IN}=15V, Io=0.2A, Tc=0 to 100°C			
Efficiency		η		83			83		%
		Conditions	V_{IN}=15V, Io=2A			V_{IN}=15V, Io=2A			
Oscillation Frequency		fo	270	300	330	270	300	330	kHz
		Conditions	V_{IN}=15V, Io=2A			V_{IN}=15V, Io=2A			
Line Regulation		ΔV_{OLINE}			80			80	mV
		Conditions	V_{IN}=10 to 30V, Io=2A			V_{IN}=10 to 30V, Io=2A			
Load Regulation		ΔV_{OLOAD}			50			50	mV
		Conditions	V_{IN}=15V, Io=0.2 to 3.5A			V_{IN}=15V, Io=0.2 to 3.5A			
Overcurrent Protection Starting Current		Is	3.6			3.6			A
		Conditions	V_{IN}=15V			V_{IN}=15V			
SS Pin*1	Low Level Voltage	V_{SSL}			0.5	–	–	–	V
	Outflow Cuurent 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)	Vc, IH	–	–	–			0.8	V
	ON/OFF Control Voltage (Output off)	Vc, IL	–	–	–	2.0			V
	ON/OFF Controll Current (Output on)	Ic, IH	–	–	–		6	100	μA
		Conditions	–			Vc=2V			
Quiescent Circuit Current		Iq		6			6		mA
		Conditions	V_{IN}=15V, Io=0A			V_{IN}=15V, Io=0A			
		Iq(OFF)		200	600		30	200	μA
		Conditions	V_{IN}=15V, Vss=0V			V_{IN}=15V, Vc=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.

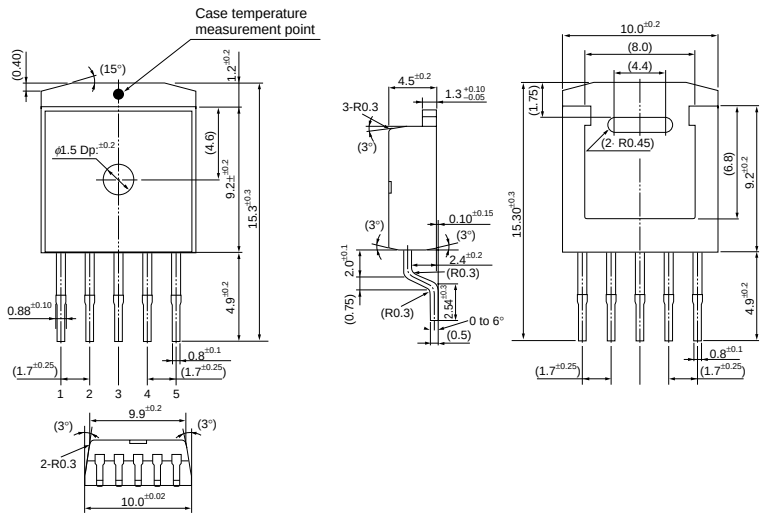
*2: Output is OFF when the output control terminal VC is open. Each input level is equivalent to LS-TTL. Therefore, the device can be driven directly by LS-TTLs.



Vo.ON/OFF　　Soft start　　Soft start +Vo. On/OFF

■External Dimensions (TO263-5)

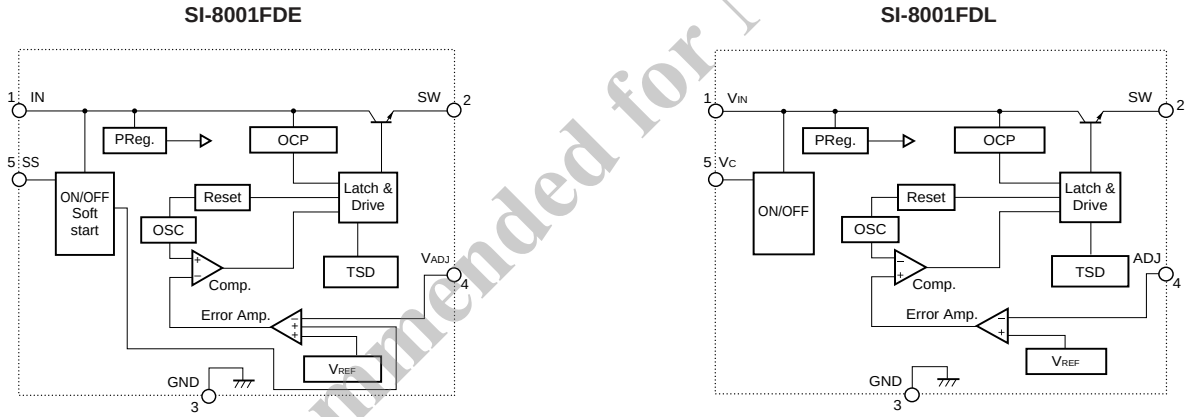
(Unit : mm)



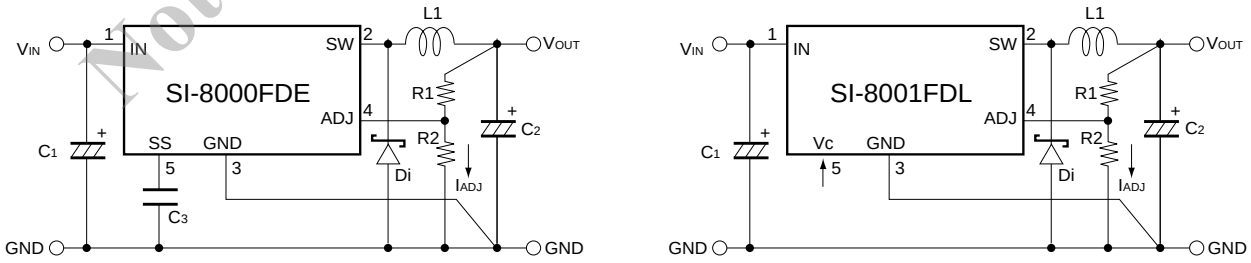
Pin Assignment
① IN
② SW
③ GND (Common to the rear side of the product)
④ V_{ADJ}
⑤ SS or Vc

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

■Block Diagram



■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)