

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% ($V_o = 5\text{ V}$, $V_{IN} = 15\text{ V}$, $I_o = 2\text{ A}$)
- 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

■Lineup

Part Number	SI-8001FDE	SI-8001FDL
V_o (V)	Variable(0.8 to 24)	
I_o (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 40x40 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 40x40 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 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.

■Applications

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

■Recommended Operating Conditions

Parameter	Symbol	Ratings		Unit
		SI-8001FDE	SI-8001FDL	
Input Voltage Range	V_{IN}	$V_o + 3^{*1}$ to 40		V
Output Voltage Range	V_o	0.8 to 24		V
Output Current Range	I_o	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 $V_o + 3\text{ V}$, whichever is higher.

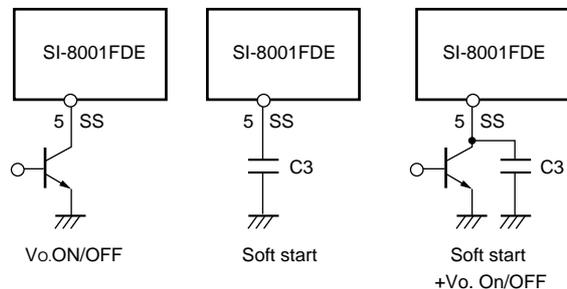
■Electrical Characteristics

($R_1=4.2\text{ k}\Omega$, $R_2=0.8\text{ k}\Omega$ when $T_a = 25^\circ\text{C}$ and $V_o=5\text{V}$)

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
Temperature Coefficient of Reference Voltage	$\Delta V_{ADJ}/\Delta T$	± 0.1			± 0.1			mV/°C
	Conditions	$V_{IN}=15\text{V}, I_o=0.2\text{A}, T_c=0$ to 100°C			$V_{IN}=15\text{V}, I_o=0.2\text{A}, T_c=0$ to 100°C			
Efficiency	η	83			83			%
	Conditions	$V_{IN}=15\text{V}, I_o=2\text{A}$			$V_{IN}=15\text{V}, I_o=2\text{A}$			
Oscillation Frequency	f_o	270	300	330	270	300	330	kHz
	Conditions	$V_{IN}=15\text{V}, I_o=2\text{A}$			$V_{IN}=15\text{V}, I_o=2\text{A}$			
Line Regulation	ΔV_{OLINE}	80			80			mV
	Conditions	$V_{IN}=10$ to $30\text{V}, I_o=2\text{A}$			$V_{IN}=10$ to $30\text{V}, I_o=2\text{A}$			
Load Regulation	ΔV_{LOAD}	50			50			mV
	Conditions	$V_{IN}=15\text{V}, I_o=0.2$ to 3.5A			$V_{IN}=15\text{V}, I_o=0.2$ to 3.5A			
Overcurrent Protection Starting Current	I_s	3.6			3.6			A
	Conditions	$V_{IN}=15\text{V}$			$V_{IN}=15\text{V}$			
SS Pin ^{*1}	Low Level Voltage	V_{SSL}		0.5	—	—	—	V
	Outflow Current at Low Voltage	I_{SSL}	6	30	—	—	—	μA
	Conditions	$V_{IN}=15\text{V}, V_{SS}=0\text{V}$						
ON/OFF Pin ^{*2}	ON/OFF Control Voltage (Output on)	V_c, IH	—	—	—	0.8		V
	ON/OFF Control Voltage (Output off)	V_c, IL	—	—	2.0			V
	ON/OFF Control Current (Output on)	I_c, IH	—	—	—	6	100	μA
Quiescent Circuit Current	I_q		6			6		mA
	Conditions	$V_{IN}=15\text{V}, I_o=0\text{A}$			$V_{IN}=15\text{V}, I_o=0\text{A}$			
	I_q (OFF)		200	600		30	200	μA
	Conditions	$V_{IN}=15\text{V}, V_{SS}=0\text{V}$			$V_{IN}=15\text{V}, V_c=2\text{V}$			

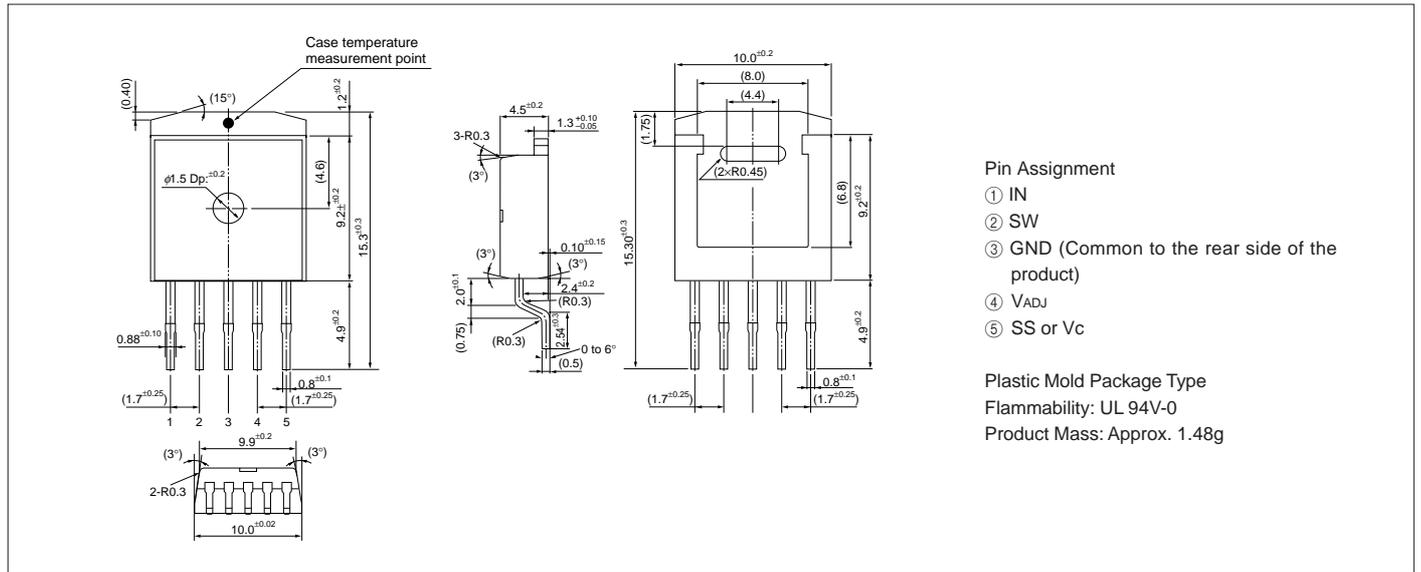
*1: Pin 5 is the SS pin. Soft start at power on can be performed with a capacitor connected to this pin. The output can also be turned ON/OFF with this pin. The output is stopped by setting the voltage of this pin to V_{SSL} or lower. SS-pin voltage can be changed with an open-collector drive circuit 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.

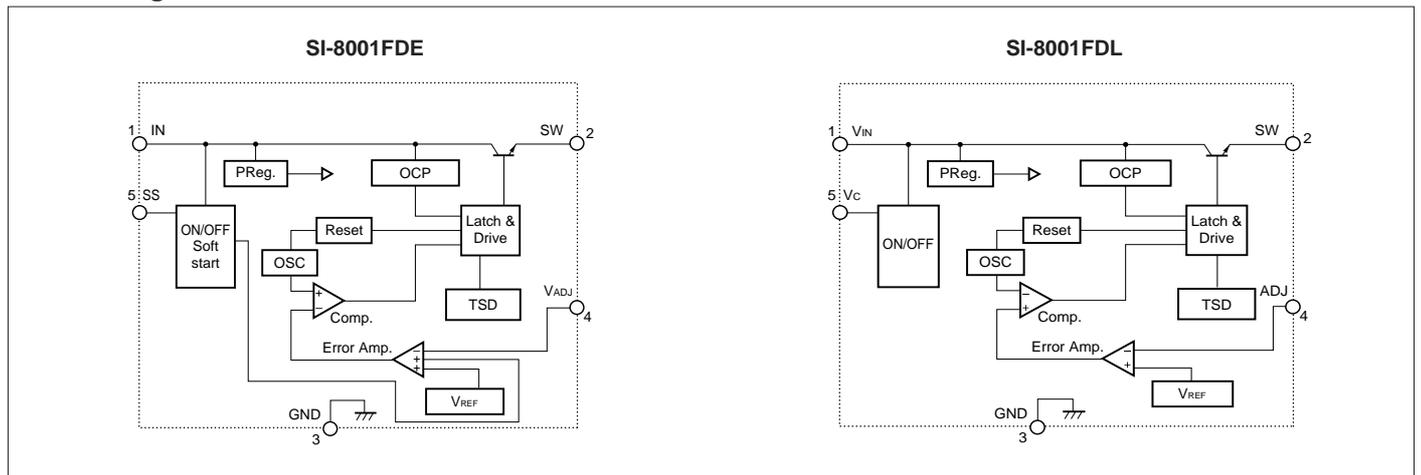


External Dimensions (TO263-5)

(Unit : mm)



Block Diagram



Typical Connection Diagram

