

SI-8000JF Series Full-Mold, Separate Excitation Step-down Switching Mode

Features

- Compact full-mold package (equivalent to TO220)
- Output current: 1.5A
- High efficiency: 67 to 88%
- Requires only 4 discrete components
- Internally-adjusted phase correction and output voltage
- Capable of downsize a choke-coil due to IC's high switching frequency (125kHz). (Compared with conventional Sanken devices)
- Built-in foldback-overcurrent and thermal protection circuits
- Output ON/OFF available (circuit current at output OFF: 200 μ A max.)
- Soft start available by ON/OFF pin

Lineup

Part Number	SI-8015JF	SI-8033JF	SI-8050JF	SI-8120JF
V _O (V)*	1.59	3.3	5.0	12.0
I _O (A)	1.5			

* V_{REF}(V) for SI-8015JF

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
DC Input Voltage	V _{IN}	43	V
Power Dissipation	P _{D1}	16.6 (with infinite heatsink)	W
	P _{D2}	1.5 (without heatsink, standalone operation)	W
Junction Temperature	T _j	+125	°C
Storage Temperature	T _{stg}	-40 to +125	°C
Thermal Resistance (Junction to Case)	θ_{j-c}	6.0	°C/W

Applications

- Power supplies for telecommunication equipment
- Onboard local power supplies

Recommended Operating Conditions

Parameter	Symbol	Ratings				Unit	Conditions
		SI-8015JF*	SI-8033JF	SI-8050JF	SI-8120JF		
DC Input Voltage Range	V _{IN1}	V _O +2 to 40	5.3 to 40	7 to 40	14 to 40	V	I _O =0 to 1A
	V _{IN2}	V _O +3 to 40	6.3 to 40	8 to 40	15 to 40	V	I _O =0 to 1.5A
Output Current Range	I _O	0 to 1.5				A	V _{IN} ≥V _O +3V
Operating Junction Temperature Range	T _{top}	-30 to +125				°C	

* SI-8015JF is a variable output voltage type. The variable output voltage range is from 2.5 V to 24 V.

Electrical Characteristics

(T_a=25°C)

Parameter	Symbol	Ratings												Unit
		SI-8015JF			SI-8033JF			SI-8050JF			SI-8120JF			
		min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	
Output Voltage ¹	Vo ²	1.558	1.59	1.622	3.234	3.30	3.366	4.90	5.00	5.10	11.76	12.00	12.24	V
	Conditions	VIN=12V, IO=0.5A			VIN=15V, IO=0.5A			VIN=20V, IO=0.5A			VIN=24V, IO=0.5A			
Efficiency	η	67			77			82			88			%
	Conditions	VIN=12V, IO=0.5A			VIN=15V, IO=0.5A			VIN=20V, IO=0.5A			VIN=24V, IO=0.5A			
Oscillation Frequency	f	125			125			125			125			kHz
	Conditions	VIN=12V, IO=0.5A			VIN=15V, IO=0.5A			VIN=20V, IO=0.5A			VIN=24V, IO=0.5A			
Line Regulation	ΔVOLUME	25			25			40			60			mV
	Conditions	VIN=8 to 30V, IO=0.5A			VIN=8 to 30V, IO=1.0A			VIN=10 to 30V, IO=1.0A			VIN=18 to 30V, IO=1.0A			
Load Regulation	ΔVLOAD	10			10			10			10			mV
	Conditions	VIN=12V, IO=0.2 to 0.8A			VIN=15V, IO=0.5 to 1.5A			VIN=20V, IO=0.5 to 1.5A			VIN=24V, IO=0.5 to 1.5A			
Temperature Coefficient of Output Voltage ³	ΔVo/ΔTa ⁴	±0.5			±0.5			±0.5			±1.0			mV/°C
Overcurrent Protection	IS1	1.6			1.6			1.6			1.6			A
Starting Current	Conditions	VIN=12V			VIN=15V			VIN=20V			VIN=24V			A
ON/OFF ⁵ Terminal	Low Level Voltage	VSSL			0.5						0.5			V
	Outflow Current at Low Voltage	ISSL			100						100			μA
	Conditions	VSSL=0V			VSSL=0V			VSSL=0V			VSSL=0V			
Quiescent Circuit Current	Iq	7			7			7			7			mA
	Conditions	VIN=12V, IO=0A			VIN=15V, IO=0A			VIN=20V, IO=0A			VIN=24V, IO=0A			
	Iq(OFF)	200			200			200			200			μA
Conditions	VIN=12V, VON/OFF=0.3V			VIN=15V, VON/OFF=0.3V			VIN=20V, VON/OFF=0.3V			VIN=24V, VON/OFF=0.3V				

*1: Reference voltage for SI-8015JF

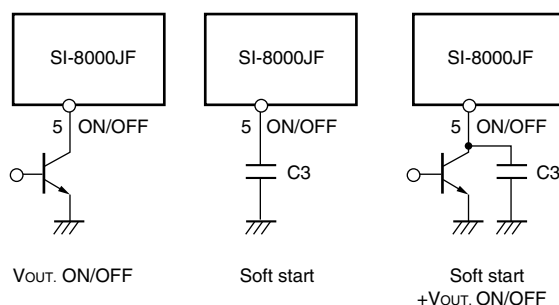
*3: Temperature Coefficient of Reference Voltage for SI-8015JF

*2: V_{REF} for SI-8015JF

*4: $\Delta V_{REF}/\Delta T_a$ for SI-8015JF

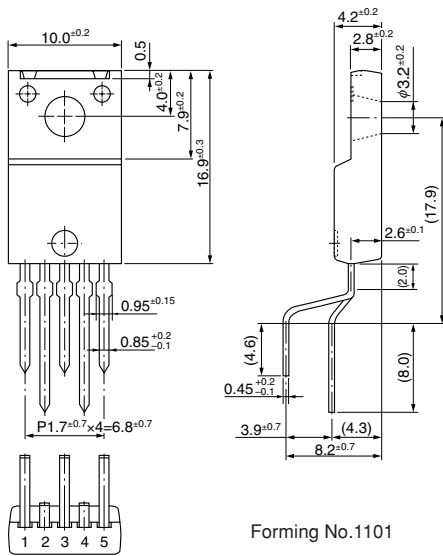
*5: Pin 5 is the ON/OFF pin. Soft start at power on can be performed with a capacitor connected to this pin.

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. ON/OFF-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 ON/OFF pin is pulled up to the power supply in the IC, so applying the external voltage is prohibited. If this pin is not used, leave it open.



■External Dimensions (TO220F-5)

(Unit : mm)



Pin Assignment

- ① V_{IN}
- ② SW_{OUT}
- ③ GND
- ④ V_{OS}
- ⑤ ON/OFF

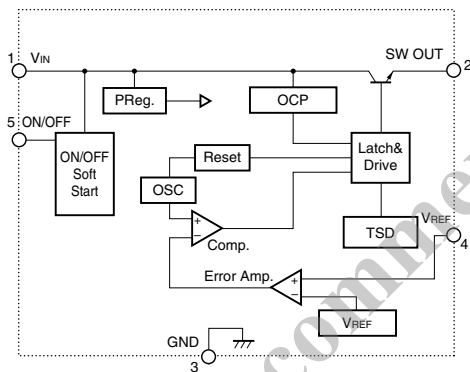
Plastic Mold Package Type

Flammability: UL94V-0

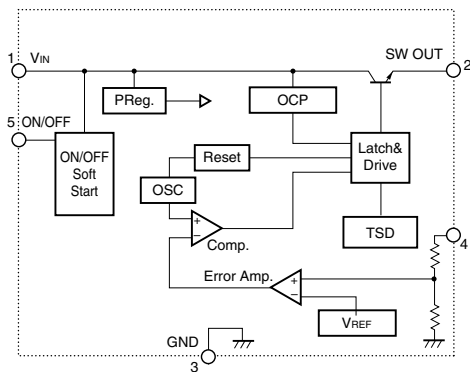
Product Mass: Approx. 2.3g

■Block Diagram

SI-8015JF

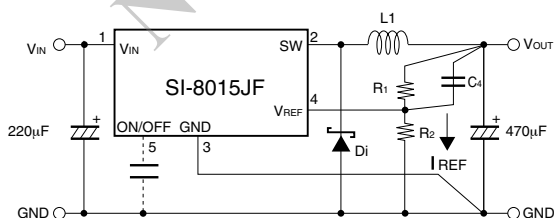


8033JF, 8050JF, 8120JF



■Typical Connection Diagram

SI-8015JF

 I_{REF} shall be approx. 2mA.

C1 : 50V/220µF

C2 : 25V/470µF

C3 : 10V/0.47µF (Only when using soft-start function)

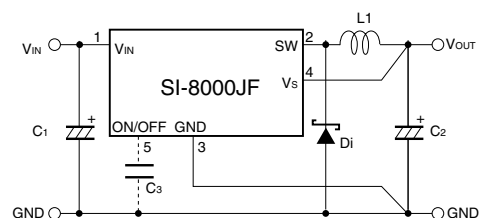
C4 : 6800pF

L1 : 100µH

Di : RK16 (Sanken)

$$V_{OUT} = \frac{V_{REF} \times (R_1 + R_2)}{R_2}$$

8033JF, 8050JF, 8120JF



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C3 : 10V/0.47µF (Only when using soft-start function)

L1 : 100µH

Di : RK16 (Sanken)