

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	V _O 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	V _{IN} =12V, I _O =0.5A			V _{IN} =15V, I _O =0.5A			V _{IN} =20V, I _O =0.5A			V _{IN} =24V, I _O =0.5A			
Efficiency	η		67			77			82			88		%
	Conditions	V _{IN} =12V, I _O =0.5A			V _{IN} =15V, I _O =0.5A			V _{IN} =20V, I _O =0.5A			V _{IN} =24V, I _O =0.5A			
Oscillation Frequency	f		125			125			125			125		kHz
	Conditions	V _{IN} =12V, I _O =0.5A			V _{IN} =15V, I _O =0.5A			V _{IN} =20V, I _O =0.5A			V _{IN} =24V, I _O =0.5A			
Line Regulation	ΔV _{OLINE}		25	80		25	80		40	100		60	130	mV
	Conditions	V _{IN} =8 to 30V, I _O =0.5A			V _{IN} =8 to 30V, I _O =1.0A			V _{IN} =10 to 30V, I _O =1.0A			V _{IN} =18 to 30V, I _O =1.0A			
Load Regulation	ΔV _{LOAD}		10	30		10	30		10	40		10	40	mV
	Conditions	V _{IN} =12V, I _O =0.2 to 0.8A			V _{IN} =15V, I _O =0.5 to 1.5A			V _{IN} =20V, I _O =0.5 to 1.5A			V _{IN} =24V, I _O =0.5 to 1.5A			
Temperature Coefficient of Output Voltage ³	ΔV _O /ΔT _a ⁴		±0.5			±0.5			±0.5			±1.0		mV/°C
Overcurrent Protection	I _{SI}	1.6			1.6			1.6			1.6			A
Starting Current	Conditions	V _{IN} =12V			V _{IN} =15V			V _{IN} =20V			V _{IN} =24V			V
ON/OFF ⁵ Terminal	Low Level Voltage	V _{SSL}		0.5			0.5			0.5			0.5	V
	Outflow Current	I _{SSL}		100			100			100			100	μA
	at Low Voltage	Conditions	V _{SSL} =0V			V _{SSL} =0V			V _{SSL} =0V			V _{SSL} =0V		
Quiescent Circuit Current	I _q		7			7			7			7		mA
	Conditions	V _{IN} =12V, I _O =0A			V _{IN} =15V, I _O =0A			V _{IN} =20V, I _O =0A			V _{IN} =24V, I _O =0A			
	I _q (OFF)			200			200			200			200	μA
	Conditions	V _{IN} =12V, V _{ON/OFF} =0.3V			V _{IN} =15V, V _{ON/OFF} =0.3V			V _{IN} =20V, V _{ON/OFF} =0.3V			V _{IN} =24V, V _{ON/OFF} =0.3V			

*1: Reference voltage for SI-8015JF

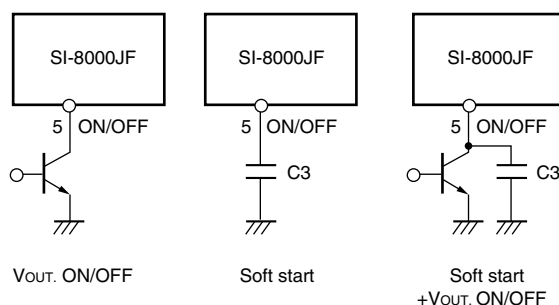
*3: Temperature Coefficient of Reference Voltage for SI-8015JF

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

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

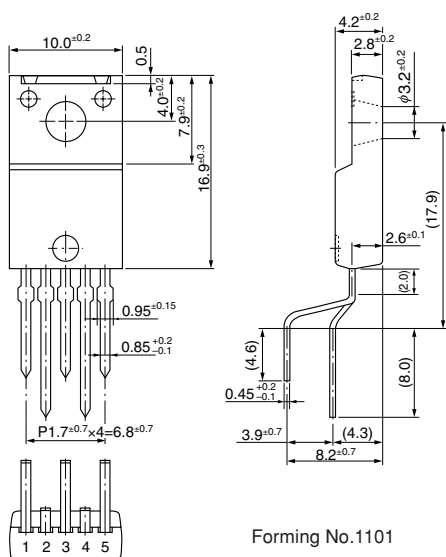
*5: Pin 5 is the ON/OFF pin. Soft start at power on can be performed with a capacitor connected to this pin.

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

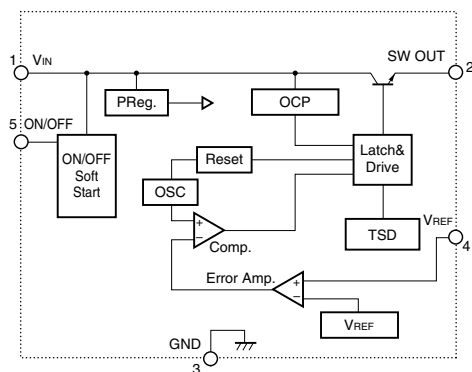
Plastic Mold Package Type

Flammability: UL94V-0

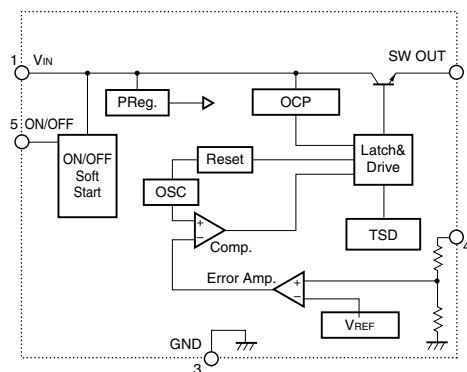
Product Mass: Approx. 2.3g

Block Diagram

SI-8015JF

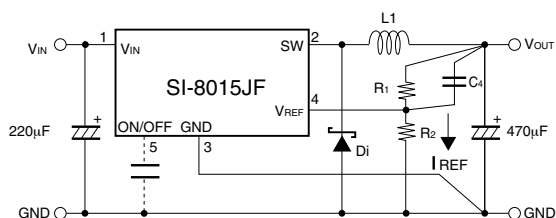


8033JF, 8050JF, 8120JF



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)

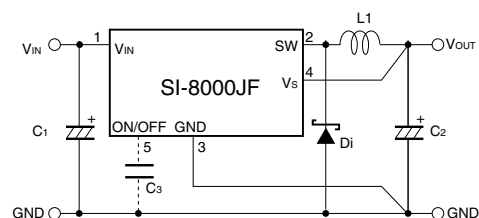
C4 : 6800pF

L1 : 100µH

Di : RK16 (Sanken)

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

8033JF, 8050JF, 8120JF



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C2 : 25V/470µF

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

L1 : 100µH

Di : RK16 (Sanken)