

**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 $\mu$ A max.)
- Soft start available by ON/OFF pin

**■Lineup**

Part Number	SI-8015JF	SI-8033JF	SI-8050JF	SI-8120JF
V <sub>o</sub> (V)*	1.59	3.3	5.0	12.0
I <sub>o</sub> (A)			1.5	

\* V<sub>REF</sub>(V) for SI-8015JF**■Absolute Maximum Ratings**

Parameter	Symbol	Ratings	Unit
DC Input Voltage	V <sub>IN</sub>	43	V
Power Dissipation	P <sub>D1</sub>	16.6 (with infinite heatsink)	W
Junction Temperature	T <sub>j</sub>	+125	°C
Storage Temperature	T <sub>stg</sub>	-40 to +125	°C
Thermal Resistance (Junction to Case)	θ <sub>j-c</sub>	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			
DC Input Voltage Range	V <sub>IN1</sub>	V <sub>o</sub> +2 to 40		5.3 to 40		7 to 40		14 to 40	V
	V <sub>IN2</sub>	V <sub>o</sub> +3 to 40		6.3 to 40		8 to 40		15 to 40	
Output Current Range	I <sub>o</sub>	0 to 1.5						A	V <sub>IN</sub> ≥V <sub>o</sub> +3V
Operating Junction Temperature Range	T <sub>jop</sub>	-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<sub>a</sub>=25°C)

Parameter	Symbol	Ratings								Unit	
		SI-8015JF		SI-8033JF		SI-8050JF		SI-8120JF			
Output Voltage <sup>1</sup>	V <sub>o</sub> <sup>2</sup>	1.558	1.59	1.622	3.234	3.30	3.366	4.90	5.00	5.10	V
	Conditions	V <sub>IN</sub> =12V, I <sub>o</sub> =0.5A		V <sub>IN</sub> =15V, I <sub>o</sub> =0.5A		V <sub>IN</sub> =20V, I <sub>o</sub> =0.5A		V <sub>IN</sub> =24V, I <sub>o</sub> =0.5A			
Efficiency	$\eta$	67		77		82		88		%	
	Conditions	V <sub>IN</sub> =12V, I <sub>o</sub> =0.5A		V <sub>IN</sub> =15V, I <sub>o</sub> =0.5A		V <sub>IN</sub> =20V, I <sub>o</sub> =0.5A		V <sub>IN</sub> =24V, I <sub>o</sub> =0.5A			
Oscillation Frequency	f	125		125		125		125		kHz	
	Conditions	V <sub>IN</sub> =12V, I <sub>o</sub> =0.5A		V <sub>IN</sub> =15V, I <sub>o</sub> =0.5A		V <sub>IN</sub> =20V, I <sub>o</sub> =0.5A		V <sub>IN</sub> =24V, I <sub>o</sub> =0.5A			
Line Regulation	$\Delta V_{OLINE}$	25		80		25		100		mV	
	Conditions	V <sub>IN</sub> =8 to 30V, I <sub>o</sub> =0.5A		V <sub>IN</sub> =8 to 30V, I <sub>o</sub> =1.0A		V <sub>IN</sub> =10 to 30V, I <sub>o</sub> =1.0A		V <sub>IN</sub> =18 to 30V, I <sub>o</sub> =1.0A			
Load Regulation	$\Delta V_{LOAD}$	10		30		10		40		mV	
	Conditions	V <sub>IN</sub> =12V, I <sub>o</sub> =0.2 to 0.8A		V <sub>IN</sub> =15V, I <sub>o</sub> =0.5 to 1.5A		V <sub>IN</sub> =20V, I <sub>o</sub> =0.5 to 1.5A		V <sub>IN</sub> =24V, I <sub>o</sub> =0.5 to 1.5A			
Temperature Coefficient of Output Voltage <sup>3</sup>	$\Delta V_o/\Delta T_a$ <sup>4</sup>	$\pm 0.5$		$\pm 0.5$		$\pm 0.5$		$\pm 1.0$		mV/°C	
	Conditions	V <sub>IN</sub> =12V, I <sub>o</sub> =0.2 to 0.8A		V <sub>IN</sub> =15V, I <sub>o</sub> =0.5 to 1.5A		V <sub>IN</sub> =20V, I <sub>o</sub> =0.5 to 1.5A		V <sub>IN</sub> =24V, I <sub>o</sub> =0.5 to 1.5A			
Overcurrent Protection	I <sub>s1</sub>	1.6		1.6		1.6		1.6		A	
	Conditions	V <sub>IN</sub> =12V		V <sub>IN</sub> =15V		V <sub>IN</sub> =20V		V <sub>IN</sub> =24V			
ON/OFF <sup>5</sup>	V <sub>SSL</sub>	0.5		0.5		0.5		0.5		V	
	I <sub>SSL</sub>	100		100		100		100			
Quiescent Circuit Current	I <sub>Q</sub>	7		7		7		7		mA	
	Conditions	V <sub>IN</sub> =12V, I <sub>o</sub> =0A		V <sub>IN</sub> =15V, I <sub>o</sub> =0A		V <sub>IN</sub> =20V, I <sub>o</sub> =0A		V <sub>IN</sub> =24V, I <sub>o</sub> =0A			
Current	I <sub>Q(OFF)</sub>	200		200		200		200		$\mu$ A	
	Conditions	V <sub>IN</sub> =12V, V <sub>ON/OFF</sub> =0.3V		V <sub>IN</sub> =15V, V <sub>ON/OFF</sub> =0.3V		V <sub>IN</sub> =20V, V <sub>ON/OFF</sub> =0.3V		V <sub>IN</sub> =24V, V <sub>ON/OFF</sub> =0.3V			

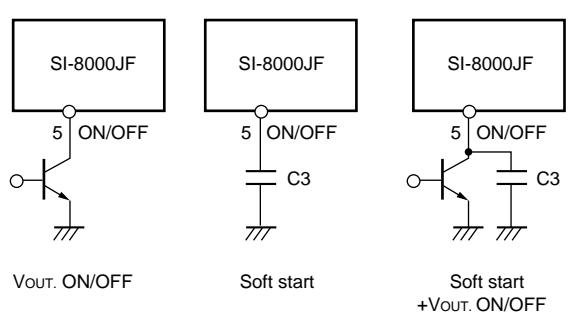
\*1: Reference voltage for SI-8015JF

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

\*2: V<sub>REF</sub> for SI-8015JF\*4:  $\Delta V_{REF}/\Delta T_a$  for SI-8015JF

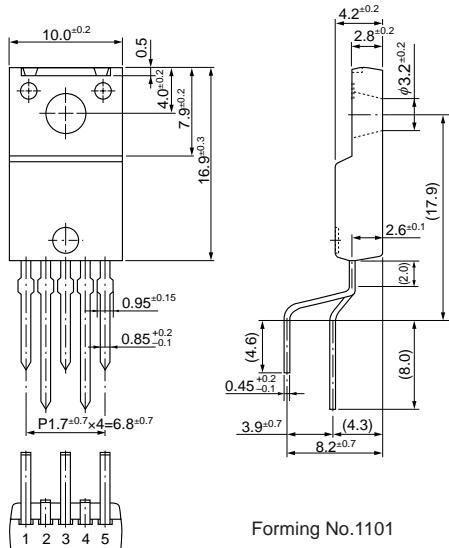
\*5: Pin 5 is the ON/OFF pin. Soft start at power on can be performed with a capacitor connected to this pin.

The output can also be turned ON/OFF with this pin. The output is stopped by setting the voltage of this pin to V<sub>SSL</sub> 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 C<sub>3</sub> flows into the ON/OFF control transistor. Therefore, limit the current securely to protect the transistor if C<sub>3</sub> 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

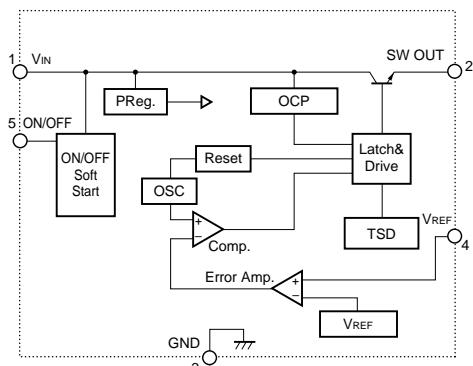
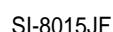
- ① VIN
  - ② SWOUT
  - ③ GND
  - ④ Vos
  - ⑤ ON/OFF

#### Plastic Mold Package Type

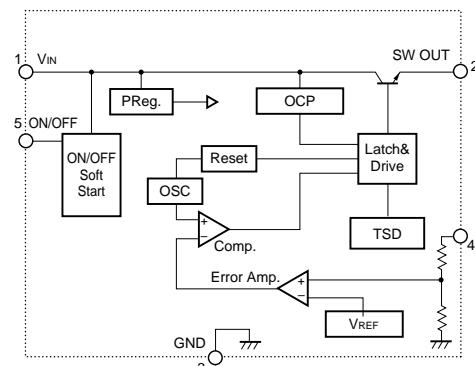
Flammability: UL94V-0

Product Mass: Approx. 2.3g

## ■ Block Diagram

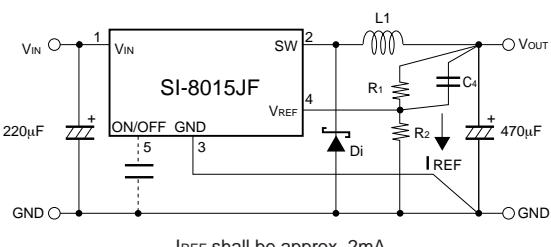


8033.JF, 8050.JF, 8120.JF



## ■ Typical Connection Diagram

SI-8015JF



I<sub>REF</sub> shall be approx. 2mA.

C<sub>1</sub> : 50V/220μF

C<sub>2</sub> : 25V/470μF

C<sub>3</sub> : 10V/0.47μF (Only when using soft-start function)

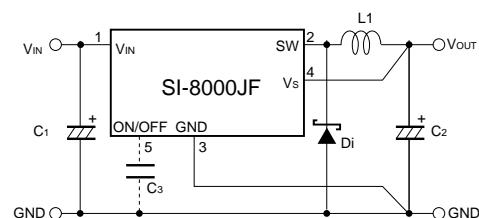
C<sub>4</sub> : 6800pF

L<sub>1</sub> : 100μH

Di : RK16 (Sanken)

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

8033JF, 8050JF, 8120JF



C<sub>1</sub> : 50V/220μF

C<sub>2</sub> : 25V/470μF

C<sub>3</sub> : 10V/0.47μF (Only when using soft-start function)

$L_1 : 100\mu H$

Di : RK16 (Sanken)