

# SI-8000JD Series

# Surface-Mount, Separate Excitation Step-down Switching Mode Regulator ICs

## ■ Features

- Surface-mount package (TO263-5)
- Output current: 1.5A
- High efficiency: 77 to 88%
- Requires only 4 discrete components
- Internally-adjusted phase correction and output voltage
- Capable of downsizing a choke-coil due to IC's high switching frequency (125 kHz). (Compared with conventional Sanken devices)
- Built-in foldback-overcurrent and thermal protection circuits
- Output ON/OFF available (Circuit current at output OFF: 200μA max)
- Soft start available by ON/OFF pin Conditions

## ■ Lineup

Part Number	SI-8033JD	SI-8050JD	SI-8090JD	SI-8120JD
Vo(V)	3.3	5.0	9.0	12.0
Io(A)	1.5			

## ■ Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	Conditions
DC Input Voltage	V <sub>IN</sub>	43	V	
Output Current	I <sub>o</sub>	1.5	A	
Power Dissipation*	P <sub>D</sub>	3	W	When mounted on glass-epoxy board 40 × 40 mm (copper area 100%)
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>	3	°C/W	
Thermal Resistance (Junction to Ambient Air)	θ <sub>J-A</sub>	33.3	°C/W	When mounted on glass-epoxy board 40 × 40 mm (copper area 100%)

\*: Limited by thermal protection circuit

## ■ Applications

- Power supplies for telecommunication equipment
- Onboard local power supplies, etc.

## ■ Recommended Operating Conditions

Parameter	Symbol	Ratings				Unit	Conditions
		SI-8033JD	SI-8050JD	SI-8090JD	SI-8120JD		
DC Input Voltage Range	V <sub>IN1</sub>	5.3 to 40	7 to 40	11 to 40	14 to 40	V	I <sub>o</sub> =0 to 1A
	V <sub>IN2</sub>	6.3 to 40	8 to 40	12 to 40	15 to 40		I <sub>o</sub> =0 to 1.5A
DC 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>top</sub>	-30 to +125				°C	
Operating Temperature Range*	T <sub>op</sub>	-30 to +125				°C	

\*: Limited by Ta-P<sub>D</sub> characteristics

## ■ Electrical Characteristics

(T<sub>a</sub>=25°C)

Parameter	Symbol	Ratings												Unit	
		SI-8033JD			SI-8050JD			SI-8090JD			SI-8120JD				
		min.	typ.	max.	min.	typ.	max.	min.	typ.	max.	min.	typ.	max.		
Output Voltage	V <sub>O</sub>	3.234	3.30	3.366	4.90	5.00	5.10	8.82	9.00	9.18	11.76	12.00	12.24	V	
	Conditions	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> =21V, I <sub>o</sub> =0.5A			V <sub>IN</sub> =24V, I <sub>o</sub> =0.5A				
Efficiency	η	77			82			86			88			%	
	Conditions	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> =21V, 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> =15V, I <sub>o</sub> =0.5A			V <sub>IN</sub> =20V, I <sub>o</sub> =0.5A			V <sub>IN</sub> =21V, I <sub>o</sub> =0.5A			V <sub>IN</sub> =24V, I <sub>o</sub> =0.5A				
Line Regulation	ΔV <sub>OLINE</sub>	25 80			40 100			50 120			60 130			mV	
	Conditions	V <sub>IN</sub> =8 to 30V, I <sub>o</sub> =0.5A			V <sub>IN</sub> =10 to 30V, I <sub>o</sub> =0.5A			V <sub>IN</sub> =15 to 30V, I <sub>o</sub> =0.5A			V <sub>IN</sub> =18 to 30V, I <sub>o</sub> =0.5A				
Load Regulation	ΔV <sub>OLOAD</sub>	10 30			10 40			10 40			10 40			mV	
	Conditions	V <sub>IN</sub> =15V, I <sub>o</sub> =0.2 to 0.8A			V <sub>IN</sub> =20V, I <sub>o</sub> =0.2 to 0.8A			V <sub>IN</sub> =21V, I <sub>o</sub> =0.2 to 0.8A			V <sub>IN</sub> =24V, I <sub>o</sub> =0.2 to 0.8A				
Temperature Coefficient of Output Voltage	ΔV <sub>O</sub> /ΔT <sub>a</sub>	±0.5			±0.5			±1.0			±1.0			mV/°C	
Overcurrent Protection Starting Current	I <sub>st</sub>	1.6			1.6			1.6			1.6			A	
	Conditions	V <sub>IN</sub> =15V			V <sub>IN</sub> =20V			V <sub>IN</sub> =21V			V <sub>IN</sub> =24V				
ON/OFF* Pin	Low Level Voltage	V <sub>SSL</sub>			0.5			0.5			0.5			V	
	Outflow Current at Low Voltage	I <sub>SSL</sub>			100			100			100				
Quiescent Circuit Current	I <sub>q</sub>	7			7			7			7			mA	
		Conditions			V <sub>IN</sub> =15V, I <sub>o</sub> =0A			V <sub>IN</sub> =20V, I <sub>o</sub> =0A			V <sub>IN</sub> =21V, I <sub>o</sub> =0A				V <sub>IN</sub> =24V, I <sub>o</sub> =0A
	I <sub>q(OFF)</sub>	200			200			200			200			μA	
		Conditions			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> =21V, V <sub>ON/OFF</sub> =0.3V				V <sub>IN</sub> =24V, V <sub>ON/OFF</sub> =0.3V

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

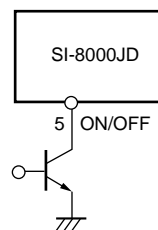
The output can also be turned ON/OFF with this pin.

The output is stopped by setting the voltage of this pin to V<sub>SSL</sub> or lower.

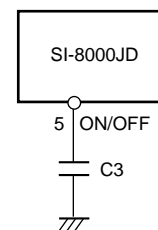
ON/OFF-pin voltage can be changed with an open-collector drive circuit of a transistor.

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.

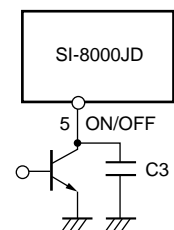
The ON/OFF pin is pulled up to the power supply in the IC, so applying the external voltage is prohibited.



V<sub>OUT. ON/OFF</sub>



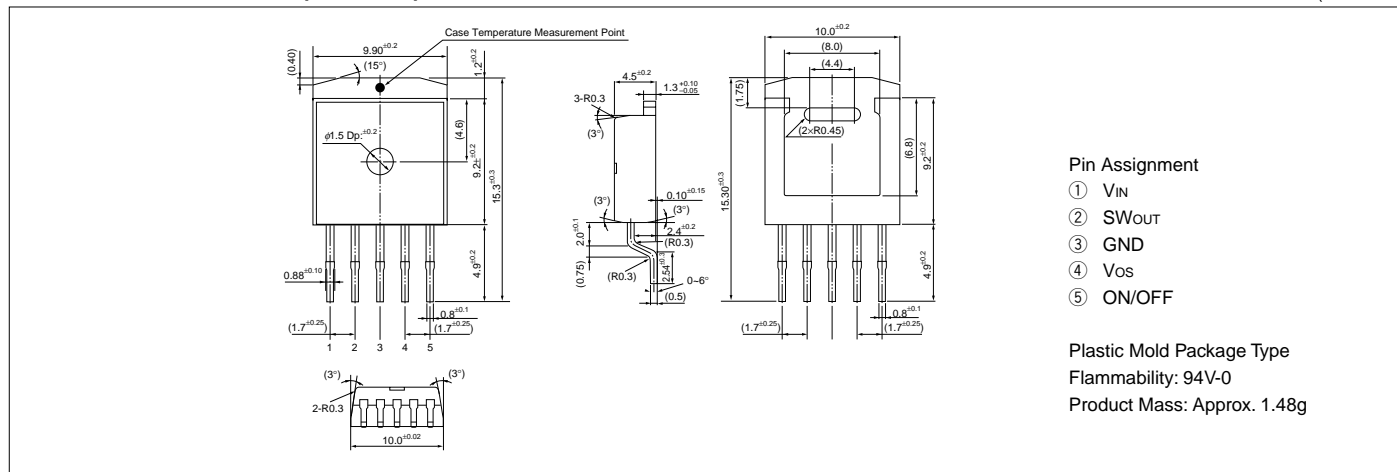
Soft Start



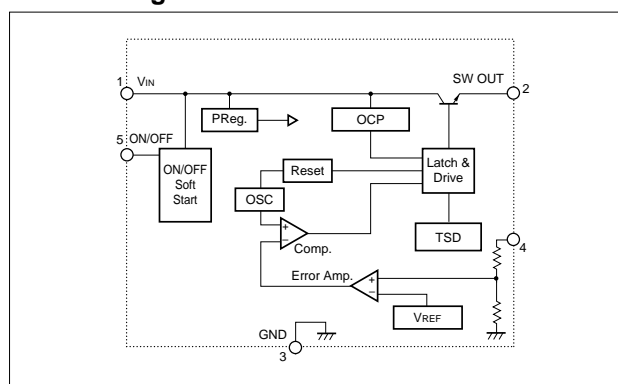
Soft Start + V<sub>OUT. ON/OFF</sub>

External Dimensions (TO263-5)

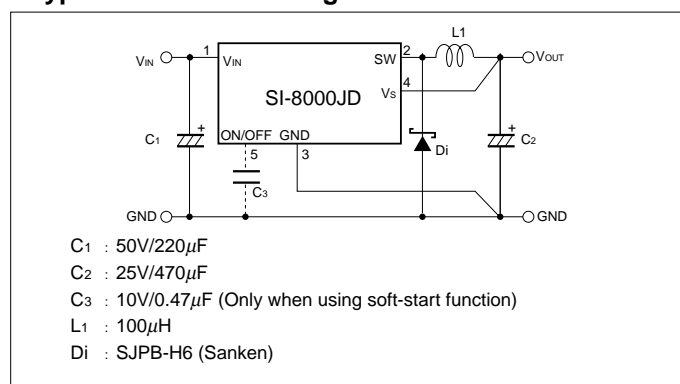
(Unit : mm)



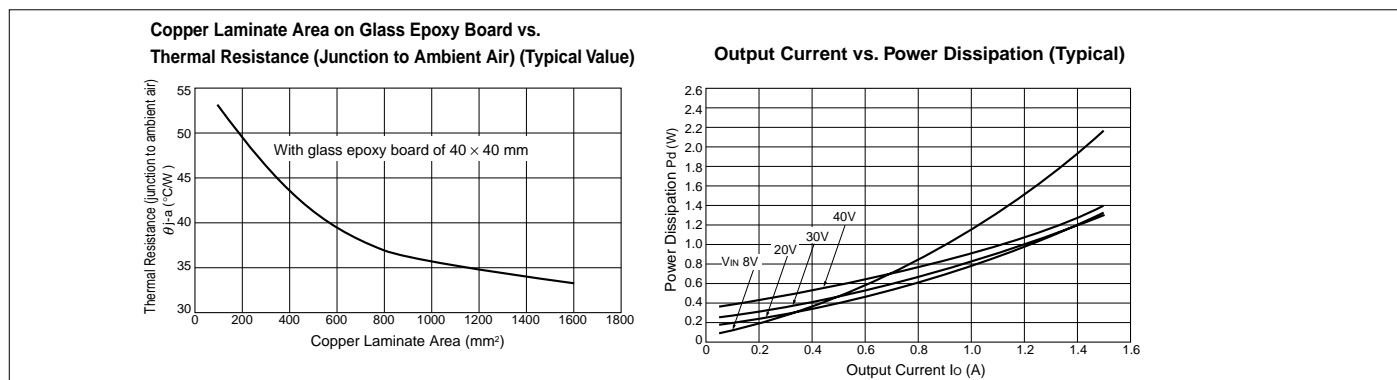
Block Diagram



Typical Connection Diagram



Reference Data



T<sub>a</sub>-P<sub>D</sub> Characteristics

