

**SI-8000SD Series****Surface Mount, Separate Excitation Step-down Switching Mode****■Features**

- Surface-mount package (TO263-5)
- Output current: 3.0A
- High efficiency: 79% typ. (SI-8033SD), 84% typ. (SI-8050SD)
- Requires only 4 discrete external components
- Internally-adjusted phase correction and output voltage
- Built-in reference oscillator (60kHz)
- Built-in overcurrent and thermal protection circuits
- Output ON/OFF available
- Soft start available by S.S pin

**■Lineup**

Part Number	SI-8033SD	SI-8050SD
Vo (V)	3.3	5.0
Io (A)		3

**■Absolute Maximum Ratings**

Parameter	Symbol	Ratings	Unit	Conditions
DC Input Voltage	V <sub>IN</sub>	43 <sup>*1</sup>	V	
Power Dissipation <sup>*2</sup>	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%)

<sup>\*1</sup>: 35V for SI-8033SD<sup>\*2</sup>: Limited by thermal protection circuit.**■Applications**

- Power supplies for telecommunication equipment
- Onboard local power supplies

**■Recommended Operating Conditions**

Parameter	Symbol	Ratings			Unit
		SI-8033SD	SI-8050SD		
DC Input Voltage Range	V <sub>IN1</sub>	5.5 to 28	7 to 40		V
Output Current Range*	I <sub>O</sub>	0 to 3.0			A
Operating Junction Temperature Range	T <sub>JOP</sub>	-30 to +125			°C
Operating Temperature Range*	T <sub>OP</sub>	-30 to +125			°C

\*: Limited by Ta-Pd characteristics.

**■Electrical Characteristics**(T<sub>a</sub>=25°C)

Parameter	Symbol	Ratings						Unit
		SI-8033SD			SI-8050SD			
Output Voltage	Vo	3.17	3.3	3.43	4.8	5.0	5.2	V
	Conditions	V <sub>IN</sub> =15V, I <sub>O</sub> =1A			V <sub>IN</sub> =20V, I <sub>O</sub> =1A			
Efficiency	η	79			84			%
	Conditions	V <sub>IN</sub> =15V, I <sub>O</sub> =1A			V <sub>IN</sub> =20V, I <sub>O</sub> =1A			
Oscillation Frequency	f	60			60			kHz
	Conditions	V <sub>IN</sub> =15V, I <sub>O</sub> =1A			V <sub>IN</sub> =20V, I <sub>O</sub> =1A			
Line Regulation	ΔV <sub>OLINE</sub>	25			40			mV
	Conditions	V <sub>IN</sub> =8 to 28V, I <sub>O</sub> =1A			V <sub>IN</sub> =10 to 30V, I <sub>O</sub> =1A			
Load Regulation	ΔV <sub>LOAD</sub>	10			10			mV
	Conditions	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			
Temperature Coefficient of Output Voltage	ΔV <sub>O/ΔT<sub>a</sub></sub>	±0.5			±0.5			mV/°C
Overcurrent Protection	I <sub>S1</sub>	3.1			3.1			A
	Starting Current	V <sub>IN</sub> =15V			V <sub>IN</sub> =20V			
Soft Start Pin*	V <sub>SSL</sub>	0.2			0.2			V
	I <sub>SSL</sub>	20			30			
Outflow Current at Low Voltage	V <sub>SSL</sub>	V <sub>SSL</sub> =0.2V						μA
	I <sub>SSL</sub>							

\* Pin 5 is a soft start 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.

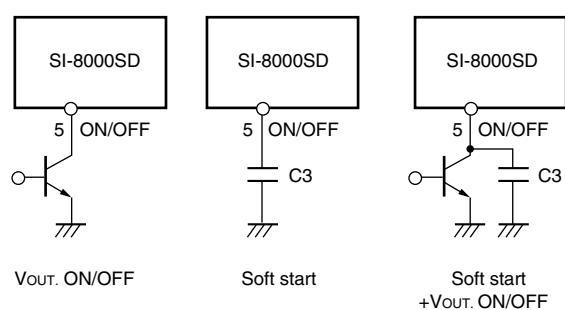
The output is stopped by setting the voltage of this pin to V<sub>SSL</sub> or lower.

Soft-start pin voltage can be changed with an open-collector drive circuit of a transistor.

When using both the soft-start and ON/OFF pins 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.

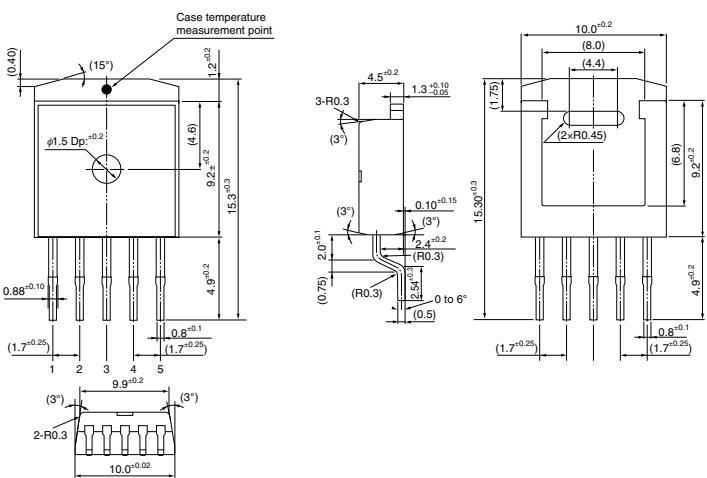
The ON/OFF pin is pulled up to the power supply in the IC, so applying the external voltage is prohibited.

If this pin is not used, leave it open.



## ■External Dimensions (TO263-5)

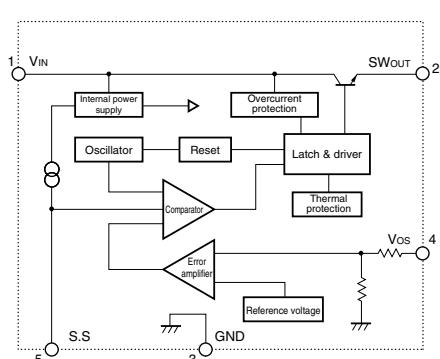
(Unit : mm)



- Pin Assignment
- ① VIN
  - ② SWout
  - ③ GND
  - ④ Vos
  - ⑤ S.S

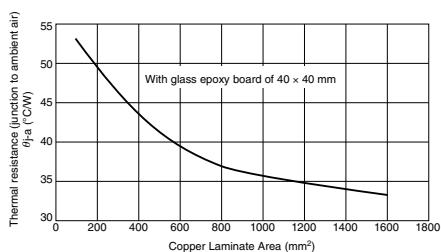
Plastic Mold Package Type  
Flammability: 94V-0  
Product Mass: Approx. 1.48g

## ■Block Diagram

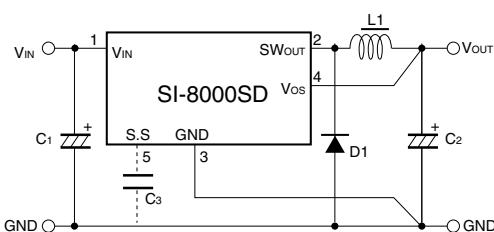


## ■Reference Data

Copper Laminate Area on Glass Epoxy Board vs.  
thermal resistance (junction to ambient air) (Typical Value)



## ■Typical Connection Diagram



- C<sub>1</sub> : 50V/1000μF
- C<sub>2</sub> : 50V/1000μF
- C<sub>3</sub> : 0.01μF  
(only when soft start function is used)
- L<sub>1</sub> : 150μH
- D<sub>1</sub> : SPB-G56 (Sanken)

### Diode D<sub>1</sub>

- Be sure to use Schottky-barrier diode as D<sub>1</sub>. If other diodes like fast recovery diodes are used, ICs may be destroyed because of the reverse voltage generated by the recovery voltage or ON voltage.

### Choke coil L<sub>1</sub>

- If the winding resistance of the choke coil is too high, the efficiency may drop below the rated value.
- As the overcurrent protection starting current is about 3.5 A, take care concerning heat radiation from the choke coil caused by magnetic saturation due to overload or short-circuited load.

### Capacitors C<sub>1</sub>, C<sub>2</sub>, and C<sub>3</sub>

- As large ripple currents flow through C<sub>1</sub> and C<sub>2</sub>, use high-frequency and low-impedance capacitors aiming for switching-mode-power-supply use. Especially when the impedance of C<sub>2</sub> is high, the switching waveform may become abnormal at low temperatures.
- For C<sub>2</sub>, do not use a capacitor with an extremely low equivalent series resistance (ESR) such as an OS capacitor or a tantalum capacitor, which may cause an abnormal oscillation.
- C<sub>3</sub> is a capacitor for soft start. Leave pin 5 open if the soft start function is not used. This pin is pulled up with a pull-up resistor inside the ICs.

◎To create the optimum operating conditions, place the components as close as possible to each other.