### SI-8000SD Series Surface Mount, Separate Excitation Step-down Switching Mode

SI-8033SD

3.3

#### ■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

### Applications

- · Power supplies for telecommunication equipment
- Onboard local power supplies

## Recommended Operating Conditions

Parameter	Symbol	Ra		
		SI-8033SD	SI-8050SD	Unit
DC Input Voltage Range	VIN1	5.5 to 28	7 to 40	V
Output Current Range*	lo	0 t	A	
Operating Junction Temperature Range	Tjop	-30	°C	
Operating Temperature Range*	Top	-30 to +125 °C		

\*: Limited by Ta-PD characteristics.

### Electrical Characteristics

				Po	tingo			
Parameter Sy	Ormahad	Ratings					Unit	
	Symbol		SI-8033SD			SI-8050SD		
		min.	typ.	max.	min.	typ.	max.	
	Vo	3.17	3.3	3.43	4.8	5.0	5.2	
Output Voltage Conditions		VIN=15V, IO=1A			VIN=20V, Io=1A			- V
	η		79			84		
Efficiency		VIN=15V, IO=1A			VIN=20V, Io=1A			%
	f		60			60		
Oscillation Frequency Conditions		VIN=15V, IO=1A			VIN=20V, IO=1A			- kHz
			25	80		40	100	
Line Regulation	Conditions	ons VIN=8 to 28V, Io=1A			VIN=10 to 30V, Io=1A			- mV
	ΔVoload		10	30		10	40	
Load Regulation Conditions		VIN=15V, Io=0.5 to 1.5A			VIN=20V, Io=0.5 to 1.5A			- mV
Temperature Coefficient of Output Voltage	ΔVo/ΔTa		±0.5			±0.5		mV/°C
Overcurrent Protection	ls1	3.1			3.1			
Starting Current	Conditions	V <sub>IN</sub> =15V			VIN=20V			A
Low-Level Voltage	Vssl		0.2			0.2		V
Soft Outflow Current at	Issl	20	30	40	20	30	40	
Start Pin <sup>*</sup> Low Voltage	Conditions	Vsst=0.2V					μΑ	

 $^{\ast}$  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.

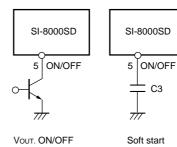
The output is stopped by setting the voltage of this pin to VssL or lower.

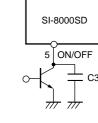
Soft-start pin voltage can be changed with an open-collector drive circuit of a transistor. When using both the soft-start and ON/OFF functions together, the discharge current from C $_3$ flows into the ON/OFF control transistor. Therefore, limit the current securely to protect the

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.





СЗ

(Ta=25°C)

Soft start +VOUT. ON/OFF

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	Conditions
DC Input Voltage	Vin	43* <sup>1</sup>	V	
Power Dissipation*2	PD	3	W	When mounted on glass-epoxy board 40 × 40 mm (copper area: 100%)
Junction Temperature	Tj	+125	°C	
Storage Temperature	Tstg	-40 to +125	°C	
Thermal Resistance (Junction to Case)	θj-c	3	°C/W	
Thermal Resistance (Junction to Ambient Air)	θj-a	33.3	°C/W	When mounted on glass-epoxy board 40 × 40 mm (copper area: 100%)

3

SI-8050SD

5.0

\*1: 35V for SI-8033SD

■Lineup

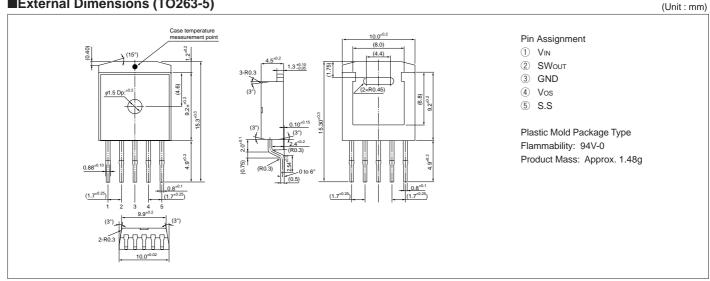
Part Numbe

Vo(V)

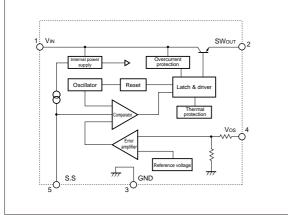
lo (A)

\*2: Limited by thermal protection circuit.

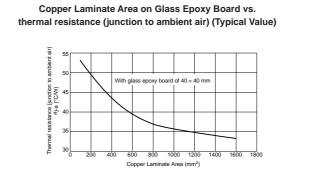
## ■External Dimensions (TO263-5)



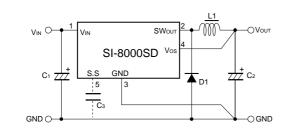
### Block Diagram



# ■Reference Data



## ■Typical Connection Diagram





- C2 : 50V/1000 µF
- C3 : 0.01 µF
  - (only when soft start function is used)
- L1 : 150µH
- D1 : SPB-G56 (Sanken)

Diode D1

- Be sure to use Schottky-barrier diode as D1.
- 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 L1

- 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 C1, C2, and C3

• As large ripple currents flow through C1 and C2, use high-frequency and low-impedance capacitors aiming for switching-mode-power-supply use. Especially when the impedance of C2 is high, the switching waveform may become abnormal at low temperatures.

For C2, 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.

• C3 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.