

# SI-8100QL Series Current Mode Control Step-down Switching Mode

## ■Features

- DIP8 package
- Introduction of current mode control method
- Output current: 3.5A
- High efficiency: 90% (Vo=5V)
- Built-in reference oscillator (350kHz)
- Built-in drooping-type overcurrent and thermal protection circuits
- Built-in soft start circuit
- Built-in on/off function (Active Hi)
- Low current consumption during off

## ■Applications

- DVD recorder, FPD-TV
- Onboard local power supplies
- OA equipment

## ■Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	Conditions
Input Voltage	V <sub>IN</sub>	30	V	
Power Dissipation <sup>*1</sup>	P <sub>D</sub>	1.56	W	When mounted on glass-epoxy board measuring 70x60 mm (copper laminate area: 1310 mm <sup>2</sup> )
Junction Temperature <sup>*2</sup>	T <sub>J</sub>	-30 to +150	°C	
Storage Temperature	T <sub>stg</sub>	-40 to +150	°C	
Thermal Resistance (Junction to Case)	θ <sub>J-C</sub>	25	°C/W	
Thermal Resistance (Junction to Ambient Air)	θ <sub>J-a</sub>	64	°C/W	When mounted on glass-epoxy board measuring 70x60 mm (copper laminate area: 1310 mm <sup>2</sup> )

\*1: Limited by thermal protection circuit

\*2: Note that the detect temperature for thermal protection is about 140°C.

## ■Recommended Operating Conditions

Parameter	Symbol	Ratings		Unit	Conditions
		SI-8105QL			
Input Voltage Range	V <sub>IN</sub>	Vo+3 <sup>*1</sup> to 28		V	
Output Voltage Range	V <sub>O</sub>	0.5 to 24		V	
Output Current Range	I <sub>O</sub>	0 to 3.5		A	
Operating Junction Temperature Range	T <sub>jop</sub>	-30 to +125		°C	
Operating Temperature Range	T <sub>op</sub>	-30 to +85		°C	

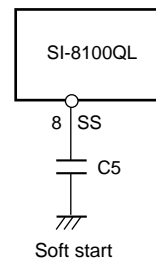
\*1: The minimum value of the input voltage range is 4.75 V or Vo +3 V, whichever is higher.

## ■Electrical Characteristics

(When Ta=25°C and Vo=5V)

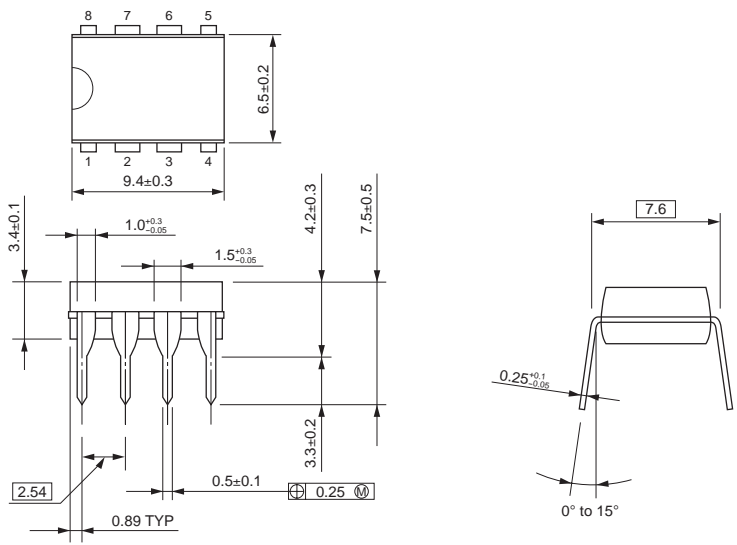
Parameter	Symbol	Ratings			Unit
		SI-8105QL			
		min.	typ.	max.	
Reference Voltage	V <sub>ADJ</sub>	0.485	0.500	0.515	V
	Conditions	V <sub>IN</sub> =12V, I <sub>O</sub> =1A			
Temperature Coefficient of Reference Voltage	(ΔV <sub>ADJ</sub> /ΔT)		0.05		mV/°C
	Conditions	V <sub>IN</sub> =12V, I <sub>O</sub> =1A, Ta=-40 to +85°C			
Efficiency	η		90		%
	Conditions	V <sub>IN</sub> =12V, I <sub>O</sub> =1A			
Oscillation Frequency	f <sub>o</sub>	315	350	385	kHz
	Conditions	V <sub>IN</sub> =16V, I <sub>O</sub> =1A			
Line Regulation	ΔV <sub>OLINE</sub>		30	60	mV
	Conditions	V <sub>IN</sub> =8 to 28V, I <sub>O</sub> =1A			
Load Regulation	ΔV <sub>OLOAD</sub>		30	60	mV
	Conditions	V <sub>IN</sub> =12V, I <sub>O</sub> =0.1 to 3.5A			
Overcurrent Protection Starting Current	I <sub>S</sub>	3.6		6.0	A
	Conditions	V <sub>IN</sub> =12V			
Quiescent Circuit Current	I <sub>q</sub>		18		mA
	Conditions	V <sub>IN</sub> =12V, I <sub>O</sub> =0A, V <sub>EN</sub> =open			
	I <sub>q(OFF)</sub>			20	μA
Conditions	V <sub>IN</sub> =12V, I <sub>O</sub> =0A, V <sub>EN</sub> =0V				
SS Pin	Outflow Current at Low Voltage	I <sub>SSL</sub>	5		μA
		Conditions	V <sub>IN</sub> =12V, V <sub>SSL</sub> =0V		
EN Pin	High Level Voltage	V <sub>C/EH</sub>	2.8		V
		Conditions	V <sub>IN</sub> =12V		
	Low Level Voltage	V <sub>C/EL</sub>		2.2	V
Inflow Current at Low Voltage	I <sub>C/EH</sub>		5		μA
		Conditions	V <sub>EN</sub> =0V		
Error Amplifier Voltage Gain	AEA		1000		V/V
Error Amplifier Transformer Conductance	GEA		800		μA/V
Current Sense Amplifier Impedance	1/GCS		0.35		V/A
Maximum ON Duty	D <sub>MAX</sub>		92		%
Minimum ON Time	D <sub>MIN</sub>		100		nsec.

\*: Pin 8 is the SS pin. Soft start at power on can be performed with a capacitor connected to this pin. The SS pin is pulled up to the power supply in the IC, so applying the external voltage is prohibited.



External Dimensions (DIP8)

(Unit : mm)

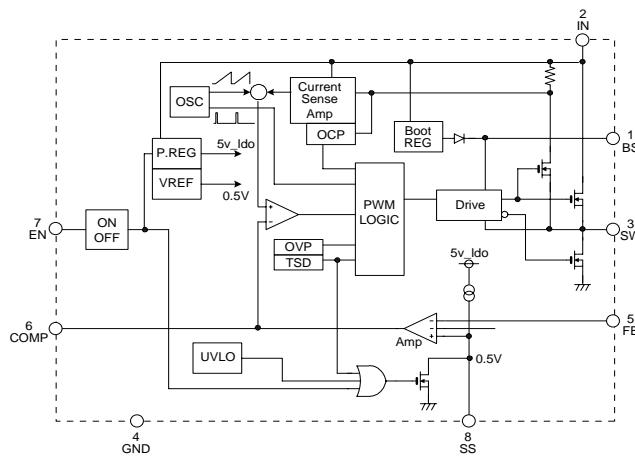


Pin Assignment

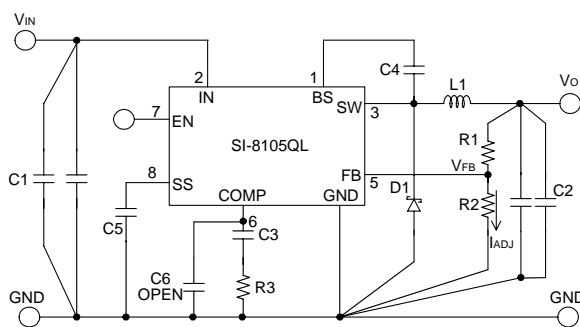
- ① BS
- ② IN
- ③ SW
- ④ GND
- ⑤ FB
- ⑥ COMP
- ⑦ EN
- ⑧ SS

Plastic Mold Package Type  
 Flammability: UL 94V-0  
 Product Mass: Approx. 0.49 g

Block Diagram



Typical Connection Diagram



- C1:10 $\mu$  F/50V  
(Murata: GRM55DB31H106KA87)
- C2:22 $\mu$  F/16V  
(Murata: GRM32ER71A226KE20)
- C3:560pF<sup>1</sup>  
(Murata: GRM18 Type)
- C4:10nF  
(Murata: GRM18 Type)
- C5:10nF  
(Murata: GRM18 Type)
- L1:10 $\mu$  H
- D1:SPB-G56S (Sanken)  
SJPB-L4 (Sanken)
- R1:46k $\Omega$  (When  $V_o = 5V$ )
- R2:5.1k $\Omega$
- R3:24k $\Omega$ <sup>1</sup>

\*1: When  $V_o=5V$