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_{IN}	30	V	
Power Dissipation*1	P_D	1.56	W	When mounted on glass-epoxy board measuring 70×60 mm (copper laminate area: 1310 mm^2)
Junction Temperature*2	Tj	–30 to +150	°C	
Storage Temperature	Tstg	–40 to +150	°C	
Thermal Resistance (Junction to Case)	θj-c	25	°C/W	
Thermal Resistance (Junction to Ambient Air)	θj-a	64	°C/W	When mounted on glass-epoxy board measuring 70×60 mm (copper laminate area: 1310 mm^2)

*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_{IN}	Vo+3*1 to 28	V	
Output Voltage Range	Vo	0.5 to 24	V	
Output Current Range	Io	0 to 3.5	A	
Operating Junction Temperature Range	Tjop	–30 to +125	°C	
Operating Temperature Range	Top	–30 to +85	°C	

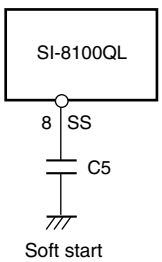
*1: The minimum value of the input voltage range is 4.75 V or Vo +3 V, whichever is higher.

■Electrical Characteristics

(When Ta=25°C and Vo=5V)

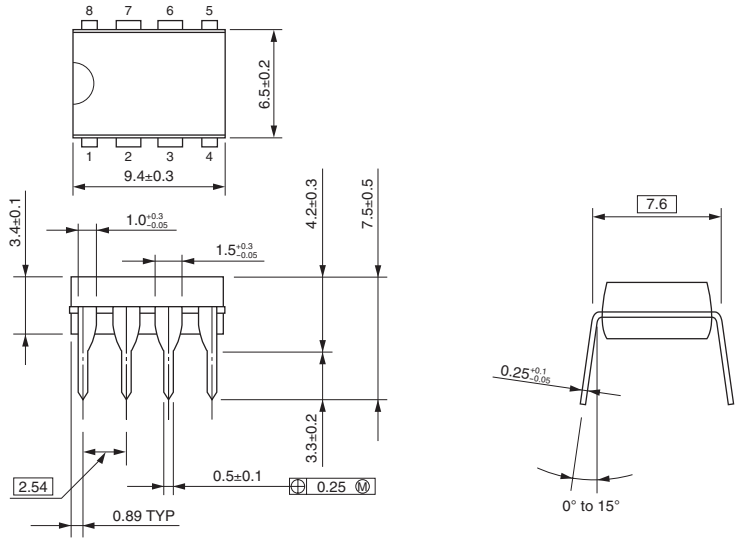
Parameter		Symbol	Ratings SI-8105QL min.	typ.	max.	Unit
Reference Voltage		V_{ADJ}	0.485	0.500	0.515	V
		Conditions	V_{IN}=12V, Io=1A			
Temperature Coefficient of Reference Voltage		$(\Delta V_{ADJ}/\Delta T)$		0.05		mV/°C
		Conditions	V_{IN}=12V, Io=1A, Ta=–40 to +85°C			
Efficiency		η		90		%
		Conditions	V_{IN}=12V, Io=1A			
Oscillation Frequency		fo	315	350	385	kHz
		Conditions	V_{IN}=16V, Io=1A			
Line Regulation		ΔV_{OLINE}		30	60	mV
		Conditions	V_{IN}=8 to 28V, Io=1A			
Load Regulation		ΔV_{OLOAD}		30	60	mV
		Conditions	V_{IN}=12V, Io=0.1 to 3.5A			
Overcurrent Protection Starting Current		Is	3.6		6.0	A
		Conditions	V_{IN}=12V			
Quiescent Circuit Current		Iq		18		mA
		Conditions	V_{IN}=12V, Io=0A, V_{EN}=open			
		$I_{q(OFF)}$			20	μA
		Conditions	V_{IN}=12V, Io=0A, V_{EN}=0V			
SS Pin	Outflow Current at Low Voltage	I_{SSL}		5		μA
		Conditions	V_{IN}=12V, V_{SSL}=0V			
EN Pin	High Level Voltage	$V_{C/EH}$	2.8			V
		Conditions	V_{IN}=12V			
	Low Level Voltage	$V_{C/EL}$			2.2	V
		Conditions	V_{IN}=12V			
	Inflow Current at Low Voltage	$I_{C/EH}$		5		μA
		Conditions	V_{EN}=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		DMAX		92		%
Minimum ON Time		DMIN		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)

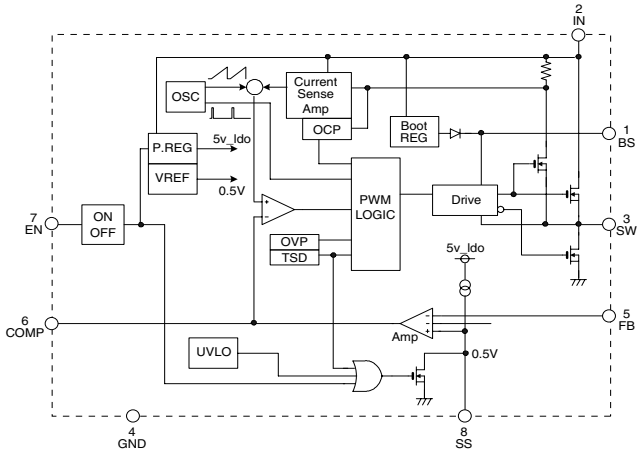
(Unit : mm)



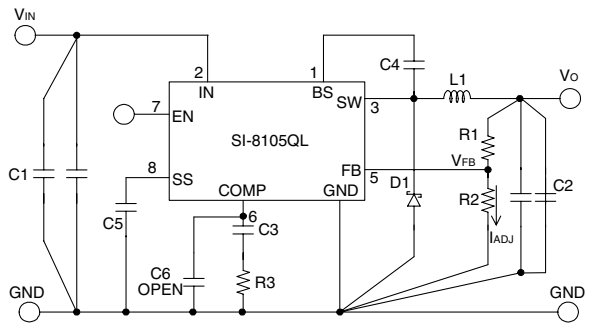
Pin Assignment
① BS
② IN
③ SW
④ GND
⑤ FB
⑥ COMP
⑦ EN
⑧ SS

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

■Block Diagram



■Typical Connection Diagram



C1:10μ F/50V
(Murata: GRM55DB31H106KA87)
C2:22μ F/16V
(Murata: GRM32ER71A226KE20)
C3:560pF
(Murata: GRM18 Type)
C4:10nF
(Murata: GRM18 Type)
C5:10nF
(Murata: GRM18 Type)
L1:10μ H
D1:SPB-G56S (Sanken)
SJPB-L4 (Sanken)
R1:46kΩ (When Vo = 5 V)
R2:5.1kΩ
R3:24kΩ