

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 70x60 mm (copper laminate area: 1310 mm ²) |
| Junction Temperature ^{*2} | T _J | -30 to +150 | °C | |
| Storage Temperature | T _{stg} | -40 to +150 | °C | |
| Thermal Resistance (Junction to Case) | θ _{J-C} | 25 | °C/W | |
| Thermal Resistance (Junction to Ambient Air) | θ _{J-a} | 64 | °C/W | When mounted on glass-epoxy board measuring 70x60 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 | V _O | 0.5 to 24 | | V | |
| Output Current Range | I _O | 0 to 3.5 | | A | |
| Operating Junction Temperature Range | T _{jop} | -30 to +125 | | °C | |
| Operating Temperature Range | T _{op} | -30 to +85 | | °C | |

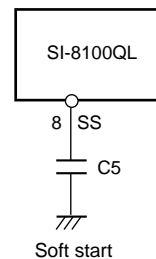
*1: The minimum value of the input voltage range is 4.75 V or Vo +3 V, whichever is higher.

■Electrical Characteristics

(When Ta=25°C and Vo=5V)

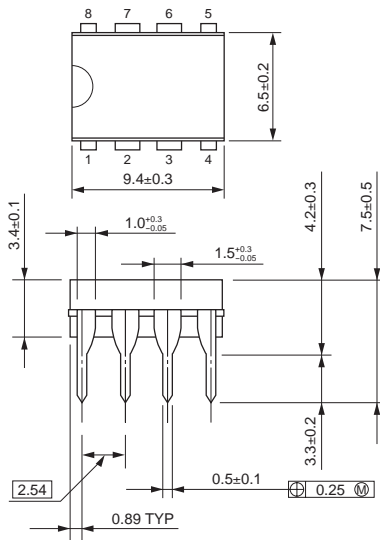
| Parameter | Symbol | Ratings | | | Unit |
|--|---|---|--|-------|-------|
| | | SI-8105QL | | | |
| | | min. | typ. | max. | |
| Reference Voltage | V _{ADJ} | 0.485 | 0.500 | 0.515 | V |
| | Conditions | V _{IN} =12V, I _O =1A | | | |
| Temperature Coefficient of Reference Voltage | (ΔV _{ADJ} /ΔT) | | 0.05 | | mV/°C |
| | Conditions | V _{IN} =12V, I _O =1A, Ta=-40 to +85°C | | | |
| Efficiency | η | | 90 | | % |
| | Conditions | V _{IN} =12V, I _O =1A | | | |
| Oscillation Frequency | f _o | 315 | 350 | 385 | kHz |
| | Conditions | V _{IN} =16V, I _O =1A | | | |
| Line Regulation | ΔV _{OLINE} | | 30 | 60 | mV |
| | Conditions | V _{IN} =8 to 28V, I _O =1A | | | |
| Load Regulation | ΔV _{OLOAD} | | 30 | 60 | mV |
| | Conditions | V _{IN} =12V, I _O =0.1 to 3.5A | | | |
| Overcurrent Protection Starting Current | I _S | 3.6 | | 6.0 | A |
| | Conditions | V _{IN} =12V | | | |
| Quiescent Circuit Current | I _q | | 18 | | mA |
| | Conditions | V _{IN} =12V, I _O =0A, V _{EN} =open | | | |
| | I _{q(OFF)} | | | 20 | μA |
| Conditions | V _{IN} =12V, I _O =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 |
| 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 | D _{MAX} | | 92 | | % |
| Minimum ON Time | D _{MIN} | | 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)

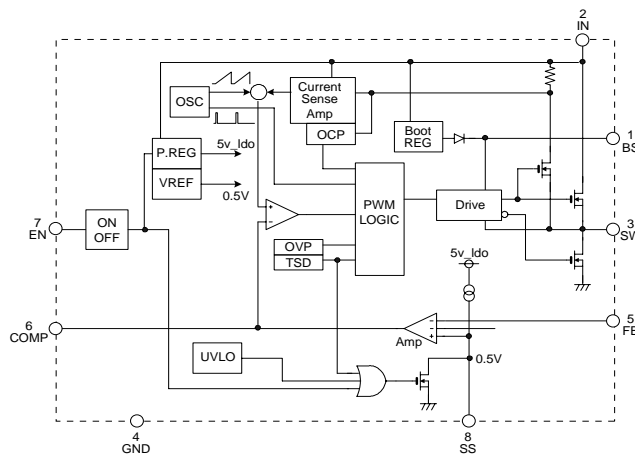


Pin Assignment

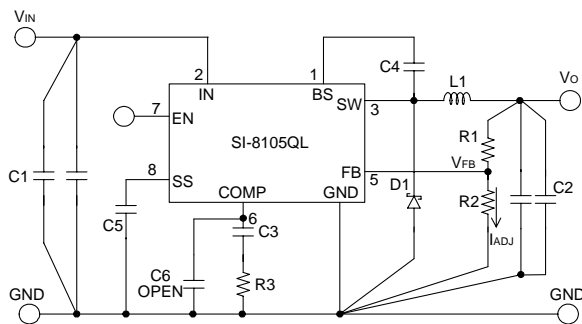
- ① BS
- ② IN
- ③ SW
- ④ GND
- ⑤ FB
- ⑥ COMP
- ⑦ EN
- ⑧ SS

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)
- C3:560pF¹
(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 V_O = 5 V)
- R2:5.1kΩ
- R3:24kΩ¹

*1: When V_O=5V