

SI-8000Q Series

Surface Mount, Current Mode Control Step-down Switching Mode

■ Features

- Compact surface-mount package (HSOP8)
- Introduction of current mode control method
- Output current: 3.5A
- High efficiency: 90% (Vo = 5 V)
- Built-in reference oscillator (500 kHz)
- A ceramic capacitor can be used for output
- Built-in drooping-type over current and thermal protection circuits
- Built-in soft start circuit
- Built-in on/off function (Active Hi)
- Low current consumption during off

■ Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	Conditions
Input Voltage	VIN	30	V	
Power Dissipation*1	PD	1.35	W	When mounted on glass-epoxy board, 30×30 mm (copper laminate area : 25×25 mm)
Junction Temperature*2	Tj	−30 to +1 50	°C	
Storage Temperature	Tstg	−40 to +1 50	°C	
Thermal Resistance (junction to case)	θj-c	40	°C/W	
Thermal Resistance (junction to ambient air)	θj-a	74	°C/W	When mounted on glass epoxy board, 30×30mm (copper laminate area : 25×25 mm)

*1 : Limited by thermal protection circuit
*2: Note that the detection temperature for thermal protection is about 140°C.

■ Applications

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

■ Recommended Operating Conditions

Parameter	Symbol	Ratings	Unit	Conditions
		SI-8005Q		
DC Input Voltage Range	VIN	Vo+3*1 to 28	V	
Output Voltage Range	VO	0.5 to 24	V	
Output Current Range	IO	0to3.5	A	
Operating Junction Temperature Range	Tjop	−30 to +125	°C	
Operating Temperature Range	Top	−30 to +85	°C	

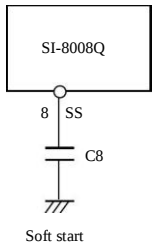
*1 : The minimum value of the input voltage range is 4.75 V or Vo +3 V, whichever is higher.

■ Electrical Characteristics

(R1=46kΩ, R2=5.1kΩ when Ta = 25°C and Vo=5V)

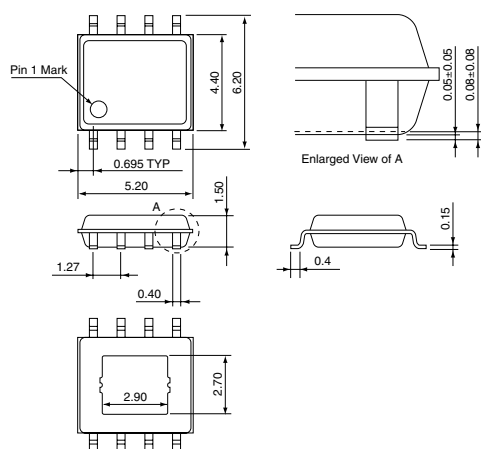
Parameter		Symbol	Rating			Unit
			SI-8005Q			
			min.	typ.	max.	
Reference Voltage		V _{ADJ}	0.485	0.500	0.515	V
		Conditions	V _{IN} =12V, I _o =1A			
Temperature Coefficient of Reference Voltage		ΔV _{ADJ} /ΔT		0.05		mV/°C
		Conditions	V _{IN} =12V, I _o =1 A, T _a =−40 to +85°C			
Efficiency		η		90		%
		Conditions	V _{IN} =12V, I _o =1A			
Oscillation Frequency		f _o	450	500	550	kHz
		Conditions	V _{IN} =16V, I _o =1A			
Line Regulation		ΔV _{OLNE}		30	60	mV
		Conditions	V _{IN} =8 to 28V, I _o =1 A			
Load Regulation		ΔV _{OLAD}		30	60	mV
		Conditions	V _{IN} =12V, I _o =0.1 to 3.5A			
Over current 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} =1.6V, V _{SSL} =0V			
EN Pin	High Level Voltage	V _{c/H}	2.8			V
		Conditions	V _{IN} =12V			
	Low Level Voltage	V _{c/L}			2.2	V
		Conditions	V _{IN} =12V			
	Inflow Current at Low Low Voltage	I _{CE/H}		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 (HSOP8)

(Unit : mm)



Pin Assignment

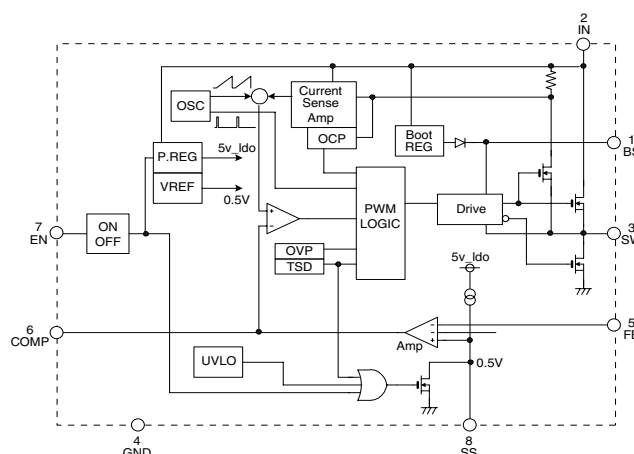
- ① BS
- ② IN
- ③ SW
- ④ GND
- ⑤ FB
- ⑥ COMP
- ⑦ EN
- ⑧ SS

Plastic Mold Package Type

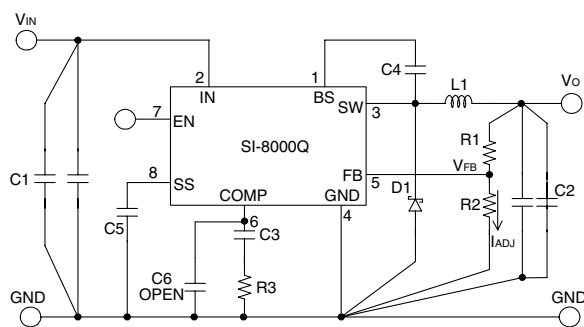
Flammability: UL 94V-0

Product Mass: Approx. 0.1 g

Block Diagram



Typical Connection Diagram



- C1:10 μ F/50V
(Murata:GRM55DB31H106KA87)
- C2:22 μ F/16V
(Murata:GRM32ER71A226KE20)
- C3:560pF^{*1}
(Murata:GRM18 Type)
- C4:10nF
(murata: GRM18 Type)
- C5:10nF
(murata: GRM18 Type)
- L1:10 μ H
- D1:SJPW-T4 (Sanken)
- R1:46k Ω (Vo=5V)
- R2:5.1k Ω
- R3:24k Ω ^{*1}

*1: When Vo=5V