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	V_{IN}	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	V_{IN}	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	T_{jop}	–30 to +125	°C	
Operating Temperature Range	T_{op}	–30 to +85	°C	

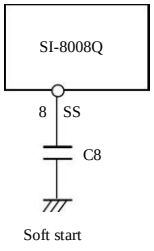
*1 : The minimum value of the input voltage range is 4.75 V or Vo +3 V, whichever is higher.

■ Electrical Characteristics

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

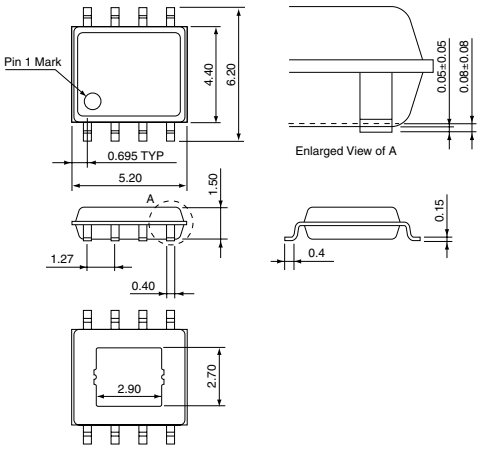
Parameter		Symbol	Rating SI-8005Q min.	typ.	max.	Unit
Reference Voltage		V_{ADJ}	0.485	0.500	0.515	V
		Conditions	V_{IN}=12V, Io=1A			
Temperature Coefficient of Reference Voltage		$\Delta V_{ADJ}/\Delta T$		0.05		mV/°C
		Conditions	V_{IN}=12V, Io=1 A, Ta=–40 to +85°C			
Efficiency		η		90		%
		Conditions	VIN=12V, Io=1A			
Oscillation Frequency		fo	450	500	550	kHz
		Conditions	V_{IN}=16V, Io=1A			
Line Regulation		ΔV_{OLNE}		30	60	mV
		Conditions	V_{IN}=8 to 28V, Io=1 A			
Load Regulation		ΔV_{OLAD}		30	60	mV
		Conditions	V_{IN}=12V, Io=0.1 to 3.5A			
Over current Protection Starting Current		I_S	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}=1 6V, V_{SSL}=0V			
EN Pin	High Level Voltage	$V_{C/N}$	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	$I_{C/E\,H}$		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)

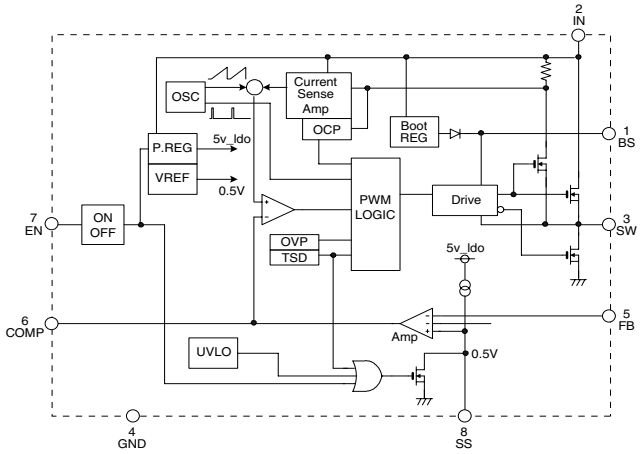
(Unit : mm)



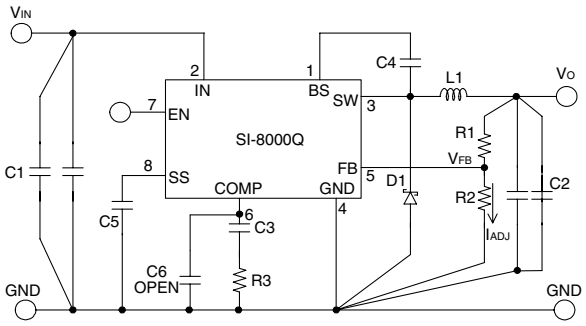
Pin Assignment
①BS
②IN
③SW
④GND
⑤FB
⑥COMP
⑦EN
⑧SS

Plastic Mold Package Type
Flammability: UL 94V-0
Product Mass: Approx. 0.1 g

■Block Diagram



■Typical Connection Diagram



C1:10μF/50V
(Murata:GRM55DB31H106KA87)
C2:22μF/16V
(Murata:GRM32ER71A226KE20)
C3:560pF*1
(Murata:GRM18 Type)
C4:10nF
(murata: GRM18 Type)
C5:10nF
(murata: GRM18 Type)
L1:10μH
D1:SJPW-T4 (Sanken)
R1:46kΩ (Vo=5V)
R2:5.1kΩ
R3:24kΩ*1

*1: When Vo=5V