

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: 3.5 A
- High efficiency: 90% ($V_o = 5\text{ V}$)
- Built-in reference oscillator (500 kHz)
- A ceramic capacitor can be used for output
- 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

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	Conditions
Input Voltage	V_{IN}	30	V	
Power Dissipation ^{*1}	P_D	1.35	W	When mounted on glass-epoxy board, 30x30 mm (copper laminate area: 25x25 mm)
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}	40	°C/W	
Thermal Resistance(junction to ambient air)	θ_{j-a}	74	°C/W	When mounted on glass-epoxy board, 30x30 mm (copper laminate area: 25x25 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}	$V_o + 3^{*1}$ 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	

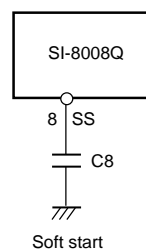
*1: The minimum value of the input voltage range is 4.75 V or $V_o + 3\text{ V}$, whichever is higher.

Electrical Characteristics

($R_1=4.2\text{ k}\Omega$, $R_2=0.8\text{ k}\Omega$ when $T_a = 25^\circ\text{C}$ and $V_o=5\text{V}$)

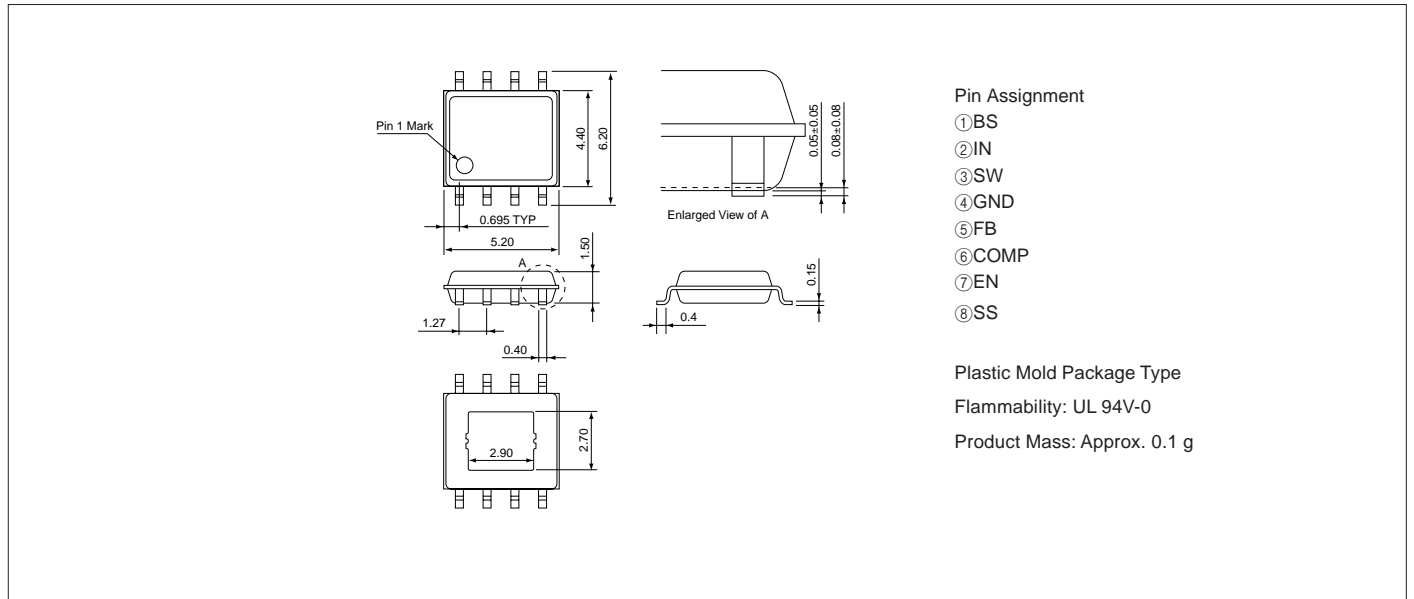
Parameter	Symbol	Rating			Unit
		SI-8005Q			
		min.	typ.	max.	
Reference Voltage	V_{ADJ}	0.485	0.500	0.515	V
	Conditions	$V_{IN}=12\text{V}$, $I_o=1\text{A}$			
Temperature Coefficient of Reference Voltage	$\Delta V_{ADJ}/\Delta T$		0.05		mV/°C
	Conditions	$V_{IN}=12\text{V}$, $I_o=1\text{A}$, $T_a=-40$ to $+85^\circ\text{C}$			
Efficiency	η		90		%
	Conditions	$V_{IN}=12\text{V}$, $I_o=1\text{A}$			
Oscillation Frequency	f_o	450	500	550	kHz
	Conditions	$V_{IN}=16\text{V}$, $I_o=1\text{A}$			
Line Regulation	ΔV_{OLINE}		30	60	mV
	Conditions	$V_{IN}=8$ to 28V , $I_o=1\text{A}$			
Load Regulation	ΔV_{OLOAD}		30	60	mV
	Conditions	$V_{IN}=12\text{V}$, $I_o=0.1$ to 3.5A			
Overcurrent Protection Starting Current	I_s	3.6		6.0	A
	Conditions	$V_{IN}=12\text{V}$			
Quiescent Circuit Current	I_q		18		mA
	Conditions	$V_{IN}=12\text{V}$, $I_o=0\text{A}$, $V_{EN}=\text{open}$			
	$I_{q(\text{OFF})}$			20	μA
SS Pin	Outflow Current at Low Voltage	I_{SSL}	5		μA
		Conditions	$V_{IN}=16\text{V}$, $V_{SSL}=0\text{V}$		
EN Pin	High Level Voltage	V_{CEN}	2.8		V
		Conditions	$V_{IN}=12\text{V}$		
	Low Level Voltage	V_{CEL}			2.2
Inflow Current at Low Voltage	I_{CIEH}		5		μA
	Conditions	$V_{EN}=0\text{V}$			
Error Amplifier Voltage Gain	AEA		1000		V/V
Error Amplifier Transformer Conductance	GEA		800		$\mu\text{A}/\text{V}$
Current Sense Amplifier Impedance	$1/\text{GCS}$		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.

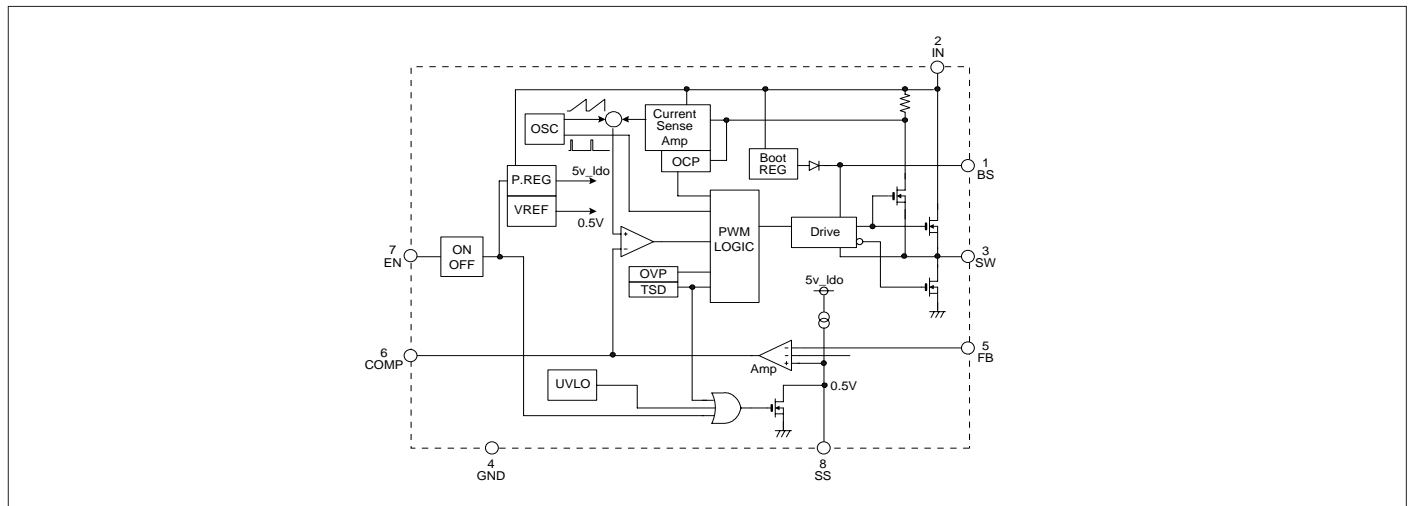


External Dimensions (HSOP8)

(Unit : mm)



Block Diagram



Typical Connection Diagram

