

SI-8511NVS Surface-Mount, Synchronous Rectifier Step-down Switching Mode Control ICs

■ Features

- Surface-mount package (TSSOP24)
- High efficiency due to synchronous rectification: 92% (at $V_{IN} = 5V$, $I_o = 1A$, $V_o = 2.5V$)
- Capable of downsize a choke-coil due to IC's high switching frequency (400kHz typ, On Time Control). (Compared with conventional Sanken devices)
- Low reference voltage (V_{ref}) of 1.1V. The output voltage is variable from 1.1V to 6V.
- High-speed response to a load
- Compatible with low ESR capacitors
- Soft start and output ON/OFF available
- Built-in overcurrent and output-overvoltage protection circuits
- PWRGD function to indicate the output voltage status
- High precision reference voltage: $1.1V \pm 1.2\%$

■ Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Ratings	Unit
Control-System DC Input Voltage	V _{CC}	7	V
DC Input Voltage	V _{IN}	25	V
Boost Block Input Voltage	V _H	30	V
EN Terminal Input Voltage	V _{EN}	V _{CC}	V
PWRGD Terminal Applied Voltage	V _{PWRGD}	7	V
Junction Temperature	T _J	+150	°C
Storage Temperature	T _{Stg}	-40 to +150	°C

■ Applications

- Power supplies for notebook PCs and mobile devices
- Onboard local power supplies
- OA equipment
- For stabilization of the secondary-side output voltage of switching power supplies

■ Recommended Operating Conditions

Parameter	Symbol	Ratings	Unit
Control System Input Voltage Range	V _{CC}	4.5 to 5.5	V
Input Voltage Range	V _{IN}	3 to 18	V
Output Voltage Range	V _O	1.1 to 6	V
Operating Temperature Range	T _{OP}	-20 to +85	°C

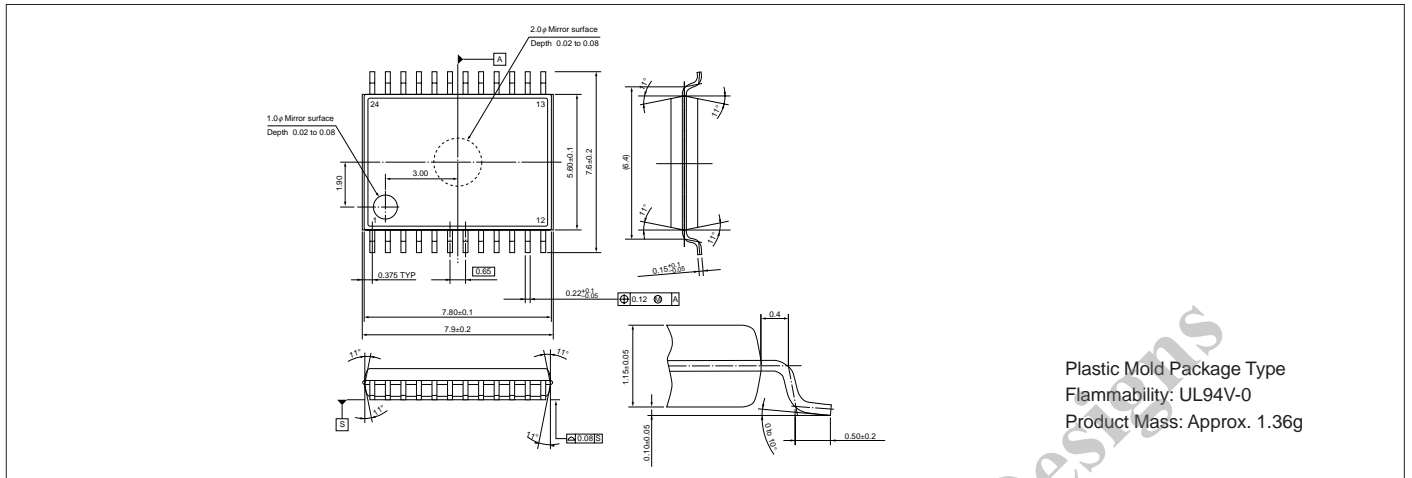
■ Electrical Characteristics

(Ta=25°C unless otherwise specified)

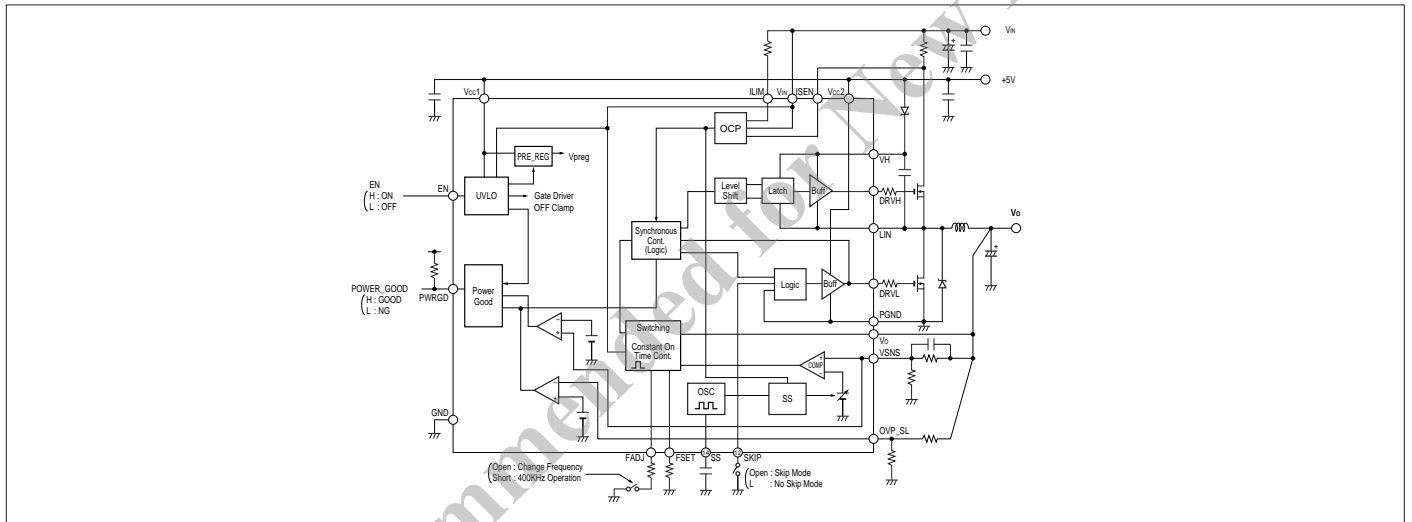
Parameter	Symbol	Ratings			Unit	Conditions	
		min.	typ.	max.			
Dynamic Characteristics	Output Voltage	V _O	-1.2%	1.1	+1.2%	V	V _{IN} =5V, V _{CC} =5V, VSNS connected to V _O , I _O =0A
	Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T$		±0.03		mV/°C	V _{IN} =5V, V _{CC} =5V, VSNS connected to V _O , I _O =0A, T _a =0 to 85°C
Circuit Current	Circuit Current (V _{CC} Terminal)	I _{OP}			6	mA	V _{CC} =5V, EN=H, FADJ=open
	Circuit Current (V _{IN} Terminal)	I _{OP}			1	mA	V _{IN} =5V, EN=H
	Standby Current 1 (V _{CC} Terminal)	I _{st1}			100	μA	V _{CC} =5V, EN=L
	Standby Current 2 (V _{IN} Terminal)	I _{st2}			50	μA	V _{IN} =5V, EN=L
Undervoltage Lockout	UVLO Operating Voltage 1 (V _{CC} Terminal)	V _{UVLO1}	3.7		4.45	V	V _{IN} =5V
	UVLO Operating Voltage 2 (V _{IN} Terminal)	V _{UVLO2}	2.5		2.9	V	V _{CC} =5V
On Time Control	On Time	T _{ON}		1.27		μS	V _{CC} =5V, V _{IN} =5V, V _O =2.5V
	Minimum Off Time	T _{OFF}		0.7		μS	V _{CC} =5V
	REF Terminal Voltage	V _{REF}	1.1	1.2	1.3	V	V _{CC} =5V
	REF Terminal Source Current	I _{REF}			100	μA	V _{CC} =5V
High Side Drive	On Resistance (high side)	R _{ONHH}		5.5		Ω	V _H -V _{LIN} =5V
	On Resistance (low side)	R _{ONHL}		5.5		Ω	V _H -V _{LIN} =5V
Low Side Drive	On Resistance (high side)	R _{ONLH}		5.5		Ω	V _{CC} =5V
	On Resistance (low side)	R _{ONLL}		5.5		Ω	V _{CC} =5V
Bootstrap	Bootstrap Voltage	V _H -V _{LIN}	4.5	5	5.5	V	
Protection System	Current for Current Limit Detection	I _{lim}	90	100	110	μA	V _{CC} =5V, V _{IN} =5V
	Soft Start Terminal Current	I _{SS}		±20		μA	V _{CC} =5V
	EN Low Level Voltage	V _{CELO}	0		0.8	V	V _{CC} =5V
	EN High Level Voltage	V _{CEHI}	2.4		V _{CC}	V	V _{CC} =5V
	EN Bias Level Current	ICE			5	μA	V _{CC} =5V, EN=5V
	PWRGD Good Voltage (high side)	V _{SENS}		1.32		V	V _{CC} =5V
	PWRGD Good Voltage (low side)	V _{SENS}		0.88		V	V _{CC} =5V
	PWRGD Low Output Voltage	V _{PWRGD}			0.4	V	V _{CC} =5V, I _{PWRGD} =120μA
	PWRGD Terminal Current	I _{PWRGD}			120	μA	V _{CC} =5V, V _{PWRGD} =0.4V
	PWRGD Leakage Current	I _{PWRGD}			5	μA	V _{PWRGD} =5V

External Dimensions (TSSOP24)

(Unit : mm)



Block Diagram (Pin Assignment)



Typical Connection Diagram

