

BST54310

1. Product Overview

The BST54310 low input voltage, high output current, synchronous step-down PWM converter integrates all the necessary active components. In addition to the listed features, the base board includes a true high-performance voltage error amplifier for maximum performance and flexible selection of output filter L and C components; an undervoltage lockout circuit to prevent startup before the input voltage reaches 3V; an internally or externally set slow start circuit to limit inrush current; and a power-good status output for processor/logic reset, fault signaling, and power sequencing.

2. Product Features

- 60mΩ MOSFET switches for high efficiency at 3 A continuous output source or sink current.
- Adjustable output voltage down to 0.9 V with 1.0% accuracy.
- Wide range of PWM frequencies: fixed 350kHz, 550kHz or adjustable from 280kHz to 700kHz.
- Synchronizable up to 700kHz.
- Loads are protected by peak current limiting and thermal shutdown.
- Integrated solution reduces board area and component count.

3. Functional Block Diagram

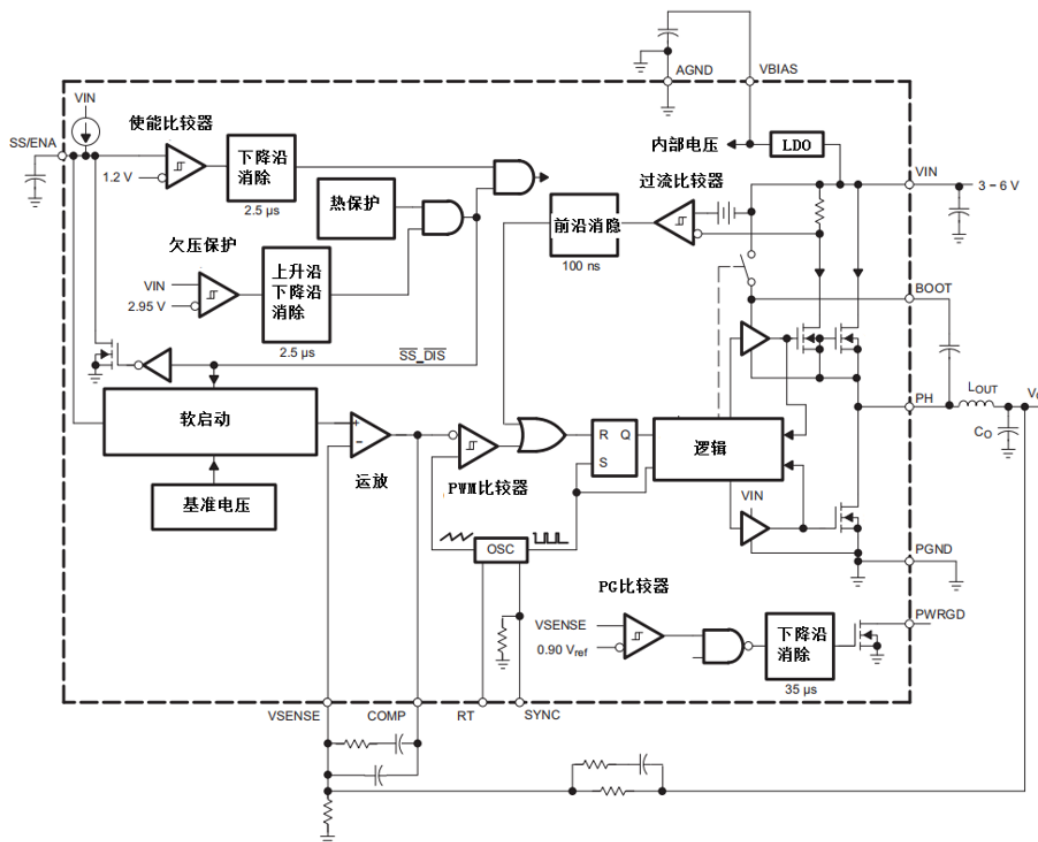


Figure 1. Functional Block Diagram

4. Pin Information

Pin Assignment Diagram

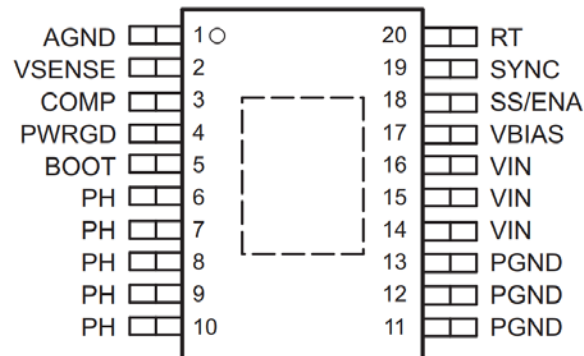


Figure 2. BST 54310 pinout

5. Pin Description

Table 1. Pin Description

Pin number	symbol	Function
AGND	1	Analog Ground
BOOT	5	Bootstrap Output
SYNC	19	Sync Input
COMP	3	Error amplifier output
PGND	11-13	Power Ground
PH	6-10	Phase output
PWRGD	4	Power Good Output
RT	20	Frequency setting resistor input
SS/ENA	18	Soft-Start /Enable Input
VBIAS	17	Internal power supply voltage output
VIN	14-16	Input Power
VSENSE	2	Error amplifier negative input

6. Absolute Maximum Ratings and Recommended Operating Ranges

Absolute Maximum Ratings

		Minimum	Maximum	unit
VI Input Voltage	VIN, SS/ENA, SYNC	-0.3	7	V
	R T	-0.3	6	
	V SENSE	-0.3	4	
	B OOT	-0.3	17	
VO Output voltage	V BIAS,PWRGD,COMP	-0.3	7	V
	P H	-0.6	10	
TJ Operating virtual junction temperature		-40	125	°C
T-type glue storage temperature		-65	150	

Recommended working range

	Minimum	Maximum	unit
Input voltage, VI	3	6	V
TJ Junction temperature	-40	125	°C

7. Electrical characteristics parameters

Table 2. Electrical properties

characteristic	symbol	Condition (Unless otherwise specified, $V_{IN}=3.0V\sim6.0V$, Other parameters are determined according to the specific circuit) $-55^{\circ}C \leq T_A \leq 125^{\circ}C$)	Group A Grouping	Limit value			unit
				Min	typical	max	
Input voltage range	V_{IN}		A1 A2 A3	3.0		6.0	V
Quiescent Current	Q	$f_s = 550\text{ kHz}$, SYNC $\geq 2.5\text{ V}$, RT floating, PH pin floating		16		twenty four	mA
		$f_s = 350\text{ kHz}$, SYNC $\leq 0.8\text{ V}$, RT floating, PH pin floating		11		16	
		Shutdown, SS/ENA=0V			1	1.4	
Input undervoltage protection threshold	V_{ST}	Input rising threshold voltage		—	2.95	3.0	V
	V_{STP}	Input falling threshold voltage		2.7	2.8	—	V
Hysteresis Voltage	V_H			0.14	0.16	—	V
BIAS output voltage	V_{OB}	$I_{VBIAS}=0V$		2.7	2.8	2.9	V
V ref accuracy				0.882	0.891	0.9	V
SYNC high threshold				2.5			V
SYNC low threshold						0.8	V
EN/SS Threshold				0.82	1.2	1.4	V
EN/SS hysteresis					0.03		V
Internal soft start time				2.6	3.35	4.1	ms
SS charging current		SS/ENA = 0 V		3	5	8	μA
SS discharge current		SS/ENA = 1.2 V, VI = 2.7 V		2	2.3	4	mA
PWGRD threshold		V sense falling edge			90		%
Output saturation voltage (PWRGD pin)	V_{OS}	$I_{sink}=2.5mA$		—		0.3	V
Leakage current (PWRGD pin)	I_L	$V_I=5.5V$		—		1.0	μA
On-resistance	$r_{DS(on)}$	$V_{in}=3V$		—	85	136	m Ω
		$V_{in}=6V$			59	88	
frequency		SYNC $\leq 0.8\text{ V}$, RT floating	A9	280	350	420	K Z
		SYNC $\geq 0.8\text{ V}$, RT floating	A10	440	550	660	
		RT = 180 k Ω	A11	252	280	308	
		RT = 100 k Ω		460	500	540	
		RT = 68 k Ω		663	700	762	
Functional testing		$V_{IN}=3.0V$ or $6.0V$, perform functional test according to the test program compiled according to the device function.	A7 A8A A8B	-			

8. Dimensions

Plastic sealed TS S OP20 package

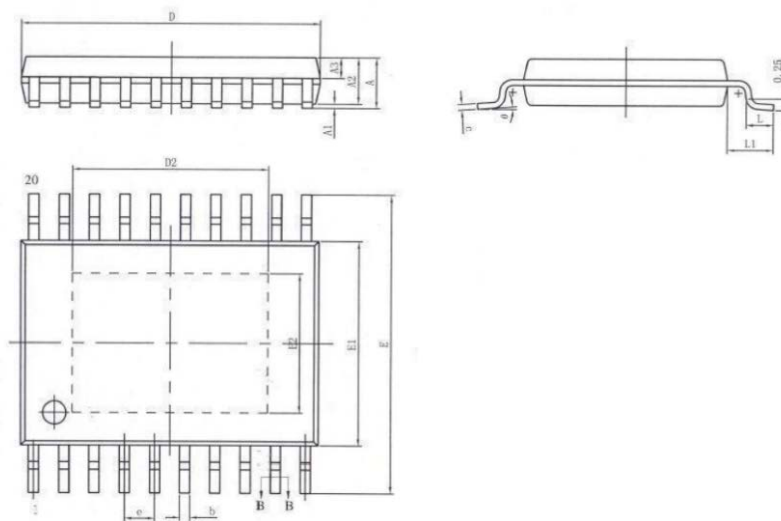


Figure 3. Dimensions

Unit is mm

Dimension symbols	Numeric		
	Minimum	Nominal	maximum
A	-	-	1.2
A1	0.05	-	0.15
A2	0.80	1.00	1.05
A3	0.39	0.44	0.49
D	6.40	6.50	6.60
D2	4.10	4.20	4.30
E2	2.90	3.00	3.10
E1	4.30	4.40	4.50
E	6.20	6.40	6.60
e	0.65 BSC		
b	0.20	-	0.29

9. Ordering Information

Table 3. Product ordering information

model	Package	Packaging materials	Quality Grade	Detailed specifications	Product Status
BST54310	TSSOP20	Plastic packaging	Military Temperature	Q/BST XXXX-XXX	Mass production