

BST54315

1. Product Overview

The BST54315 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.
- Fixed output voltage 2.5 V with 3.0 % 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

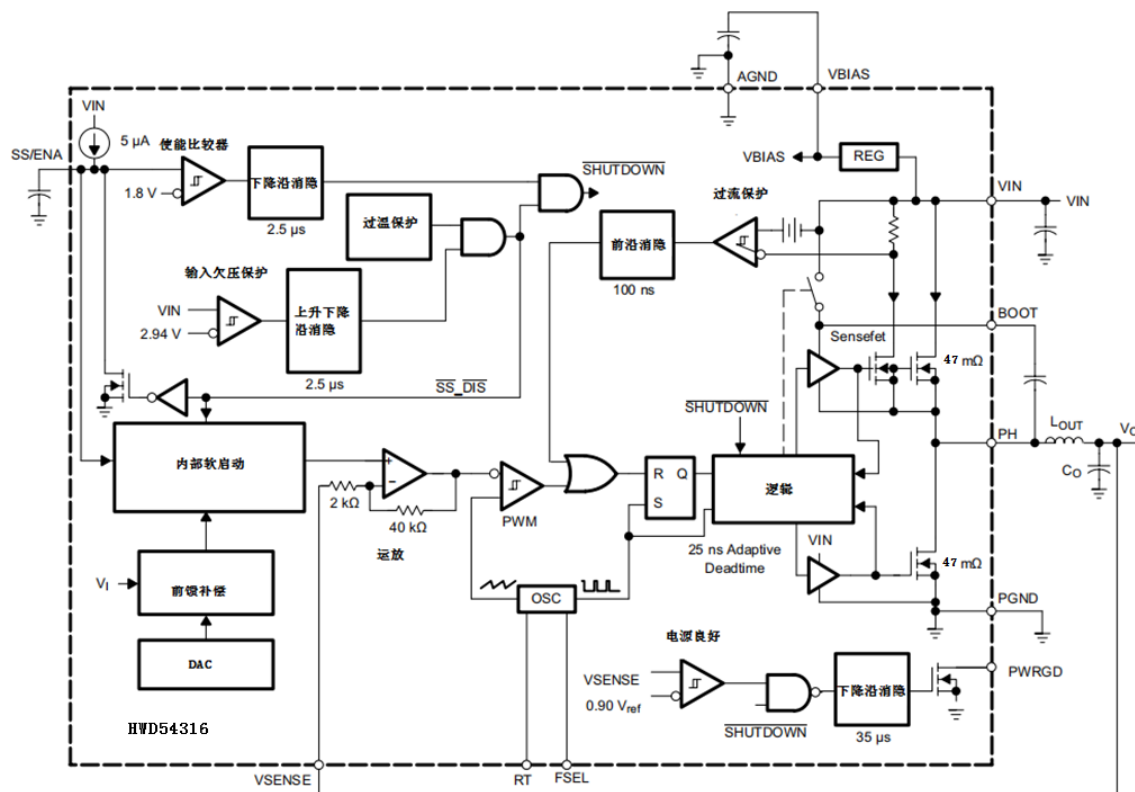
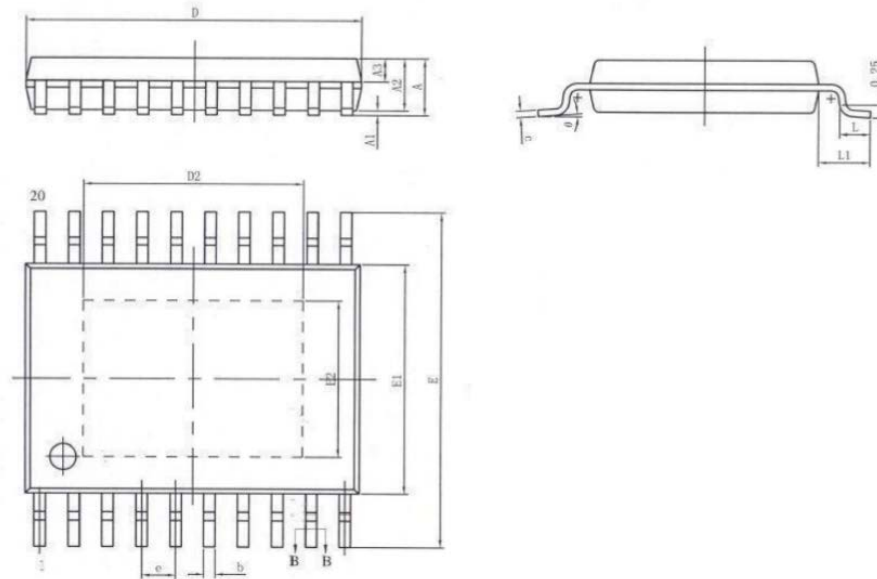


Figure 1. Functional Block Diagram

4. Pin Information

BST54315PSSOP2 0 package shape and pin arrangement are shown in the figure below.



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

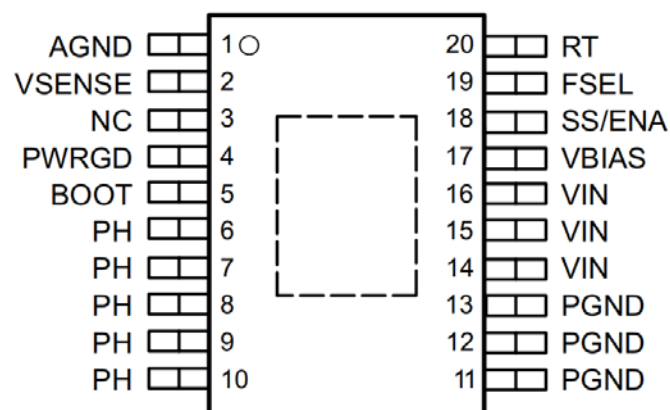


Figure 2. BST54315 pinout diagram

The BST54315PSSOP20 pin description is shown in the following table.

Table 1. Pin Description

Pin number	symbol	Function
AGND	1	Analog Ground
BOOT	5	Bootstrap Output
FSEL	19	Frequency selection
NC	3	NC
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

5. Absolute Maximum Ratings and Recommended Operating Ranges

Absolute Maximum Ratings

		Minimum	Maximum	unit
VI Input Voltage	VIN, SS/ENA, FSEL	-0.3	7	V
	RT	-0.3	6	
	VSENSE	-0.3	4	
	BOOT	-0.3	17	
VO Output voltage	VBIAS, PWRGD	-0.3	7	V
	PH	-0.6	10 -2	
TJ Operating virtual junction temperature		-40	125	°C
T-type glue storage temperature		-65	150	

Recommended working range

	Minimum	Maximum	unit
Input voltage, VI	4	6	V
TJ Junction temperature	-40	125	°C

6. Electrical characteristics parameters

Table 2. Electrical properties

characteristic	symbol	Condition (Unless otherwise specified, $V_{IN}=5.0V$, $-55^{\circ}C \leq T_A \leq 125^{\circ}C$)	Limit value			unit
			Minimum	typical	maximum	
Input voltage range	V_{IN}		3.0		6.0	V
Quiescent Current	Q	fs = 550kHz, FSEL $\geq$ 2.5 V, RT floating, PH pin floating	0		twenty four	mA
		fs = 350 kHz, FSEL $\leq$ 0.8 V, RT floating, PH pin floating	0		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
Output voltage		$4V \leq VIN \leq 6V$, $T_A = 25^{\circ}C$	3.23	3.3	3.37	V
FSEL High Threshold			2.5			V
FSEL low threshold					0.4	V
EN/SS Threshold	V_{EN-H}		2.5			V
EN/SS hysteresis	V_{EN-L}				0.4	V
Internal soft start time			3	6.1	8	ms
SS charging current		SS/ENA = 0 V	3	5	8	μA
SS discharge current		SS/ENA = 1.2 V, $V_I = 2.7 V$	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	$r_{DS(on)}$	$V_{in}=6V$		59	88	m Ω
frequency		FSEL $\leq$ 0.4 V, RT floating	280	350	420	K Z
		FSEL $\geq$ 2.5 V, RT floating	440	550	660	
		RT = 180 k Ω	252	280	308	
		RT = 100 k Ω	460	500	540	
		RT = 68 k Ω	663	700	762	

7. Ordering Information

Table 3. Product Ordering Information

Serial number	model	Package	Packaging materials	Device level	Lead material	Weight (g)	Typical size (mm) (Length $\times$ Width $\times$ Height)	Detailed specifications
1	BST54315PSSOP20E	PSSOP20	plastic	Military Temperature	Copper tinning	0.08	6.5 $\times$ 6.4 $\times$ 1	
2	BST54315PSSOP20M3	PSSOP20	plastic	N1	Copper tinning	0.08	6.5 $\times$ 6.4 $\times$ 1	

Note 1:

N /N1 level devices meet the N /N1 level screening requirements of GJB 7400 "General Specification for Semiconductor Integrated Circuits for Qualified Manufacturer Certification "

Military temperature grade devices meet the screening requirements of Q / BST40020-2018 "General Specifications for Huawei Military Temperature Grade Products", and their operating environment temperature range should be $-55^{\circ}C \sim +125^{\circ}C$.

Note 2: The product ordering information is for our existing products or devices that have been confirmed to be developed. We can develop devices in other packaging forms according to user needs.