BST22676

1. Product Overview

The BST22676 switching regulator provides all the functions required to implement a high-efficiency, high-voltage buck regulator using a minimum of external components. This regulator is easy to use and integrates a 42V N-channel metal oxide semiconductor field effect transistor (MOSFET) switch, can provide up to 3A load current. And it features excellent line and load regulation and high efficiency (> 90%). Voltage mode control provides a short minimum on-time, thus achieving the widest ratio between input and output voltage. Internal loop compensation means that the user does not have to bear the work of calculating loop compensation components. This regulator provides an adjustable output voltage as low as 1.285V. The switching frequency of 500kHz makes it possible to use small external components and achieve good transient response. The precision enable input simplifies regulator control and system power sequencing. In shutdown mode, the regulator current consumption is only 25 μA (typical). The built-in soft-start function (typical value 500 μs) saves external components. The BST22676 also has thermal shutdown and current limiting functions to prevent the device from accidental overload.

2. Product Features

- Wide input range: 4.5V to 42V.
- Internally Compensated Voltage Mode Control.
- Stable with low equivalent series resistance (ESR) ceramic capacitors.
- Low on-resistance.
- The output voltage is adjustable, the minimum is 1.285V.
- ± 1.5% Feedback Reference Accuracy.
- Switching frequency is 500KHz.
- -55 °C to 125 °C operating junction temperature range.
- Integrated soft start.
- Integrated bootstrap diode.
- Precision Enable Pin.

3. Functional Block Diagram

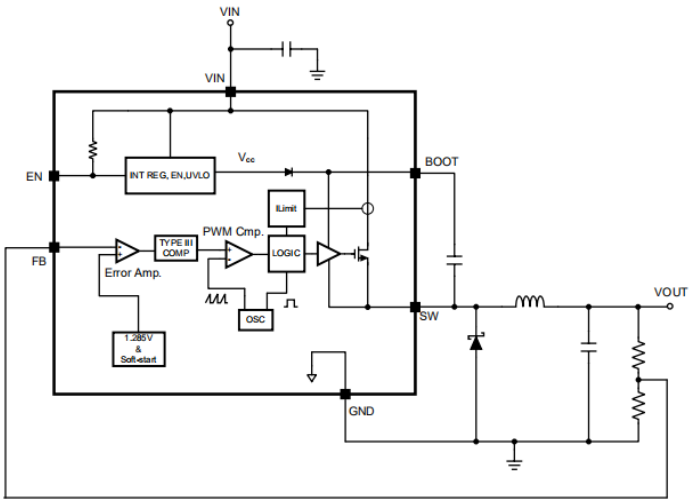


Figure 1. BST22676 functional block diagram

Pin Information

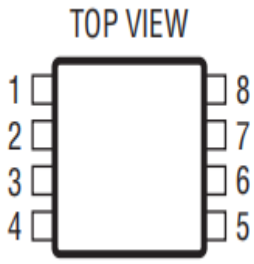


Figure 2. BST 22676 top view with pins

Table 1. Pin Function Description

Pin number	Pinout Symbol	Functional Description
1	BOOT	Bootstrap voltage input terminal, providing gate voltage for high-side power tube switch
2	NC	No internal connection
3	NC	No internal connection
4	FB	Feedback
5	EN	Enable terminal, controls the opening and closing of the rectifier
6	GND	Land
7	VIN	Input
8	SW	Output

Absolute Maximum Ratings and Recommended Operating Ranges

parameter	scope
Maximum supply voltage (V_{IN})	4 3 V [1]
Enable Input Voltage (V_{EN})	-0.5 ~ 6V
Switch output terminal (V_{SW})	- 5 ~ V_{IN} V
Maximum bootstrap voltage (V_{BOOT})	V_{SW} +7V
Feedback Voltage (V_{FB})	-0.5 ~ 7 V
Storage temperature range (T_{stg})	- 65 °C～150 °C
Maximum junction temperature (T_J) [2]	150 °C
Recommended working conditions: working environment temperature TA = -55 °C ~ 125 °C	

Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating conditions for extended periods may affect device reliability and lifetime.

Note 2: This IC includes overtemperature protection to protect the device from momentary overload conditions. When the overtemperature protection is activated, the junction temperature will exceed 150°C. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

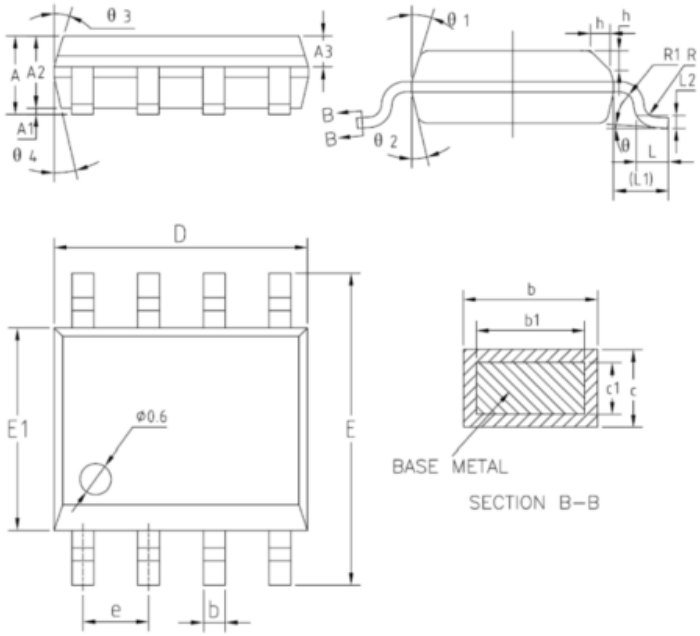
4. Electrical characteristics parameters

Table 2. BST22676 electrical characteristics
(unless otherwise specified, -55°C ≤TA≤125°C, VIN = 12V)

Parameter name	symbol	Test conditions (Unless otherwise specified, V_{IN} = 12 V, -55 °C ≤ T_J ≤ 125 ℃)	Limit value			unit
			Minimum	Typical Value	Maximum	
Supply voltage	V_{IN}		4.5		42	V
Feedback voltage	V_{FB}	V_{IN} =4.5V~42V	1.259	1.285	1.311	V
Quiescent Current	Q	VFB = 5V	—	3.4m	6m	A
Standby current	I_{STDBY}	EN=0V	—	25u	40u	A
Current Limit	I_{CL}		3.35	4.2	5.5	A
Oscillation frequency	fo		400	500	600	kHz
Minimum opening time	T_{ONMIN}		—	100n	—	s
Minimum off time	T_{OFFMIN}		100n	200n	300n	s
Feedback bias current	I_{BIAS}	VFB = 1.3V	—	230	—	nA
Enable threshold (falling)	V_{EN}		1.3	1.6	1.9	V
Enable hysteresis	V_{ENHYST}		—	0.6	—	V
Enable input current	I_{EN}	EN=0V	—	6	—	μ A
Power tube on resistance	$R_{DS(ON)}$		—	120	220	mΩ
Thermal Shutdown Threshold	T_S			170		
Output leakage current	I_{Leak}				2	μA
					3	

5. Dimensions

The device package category is ESOP8, the package form is ESOP88, and the dimensions are shown in Figure 3.



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0.10	0.15	0.25
A2	1.25	1.40	1.65
A3	0.50	0.60	0.70
b	0.38	–	0.51
b1	0.37	0.42	0.47
c	0.18	–	0.25
c1	0.17	0.20	0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.17	1.27	1.37
L	0.45	0.60	0.80
L1	1.04REF		
L2	0.25BSC		
R	0.07	–	–
R1	0.07	–	–
h	0.30	0.40	0.50
θ	0°	–	8°
θ1	15°	17°	19°
θ2	11°	13°	15°
θ3	15°	17°	19°
θ4	11°	13°	15°

Figure 3. Dimensions (unit is mm)

6. Ordering Information

Product Model	Package	Packaging materials	Quality Grade	Detailed specifications	Product Status
BST 22676	ESOP8	Plastic packaging	Military temperature level	Q/BST 600 XX -2021	