

20V,15A全集成同步升压转换器

20V,15A Fully-Integrated Synchronous Boost Converter

■ FEATURES

- Input voltage range V_{IN} : 2.7V to 20V
- Output voltage range V_{OUT} : 4.5V to 20V
- Programmable switch peak current limit: up to 15A
- High Efficiency
93% ($V_{IN} = 7.4V$, $V_{OUT} = 15.5V$, $I_{OUT} = 1.5A$)
- 2 modulation mode available: PFM or FPWM mode at light load
- Two modes of with fast or slow tr/tf for EMI solution
- 1.0 μ A current consumption during shutdown
- Adjustable switching frequency: 200k to 1.0MHz
- Programmable soft start
- Output overvoltage protection (at 22V), cycle-by-cycle overcurrent protection, thermal shutdown protection
- Pb-free Packages, QFN20L, 3.5*4.5mmmm
- 输入电压范围 V_{IN} : 2.7V-20V
- 输出电压范围 V_{OUT} : 4.5V-20V
- 可编程峰值电流: 15A
- 高转换效率:
93% ($V_{IN} = 7.4V$, $V_{OUT} = 15.5V$, $I_{OUT} = 1.5A$)
- 轻载条件下两种调制方式: 脉频调制 (PFM) 和强制脉宽调制 (FPWM)
- 支持两种tr/tf模式, 应对EMI挑战
- 低关断功耗, 关断电流1 μ A
- 可调节的开关频率: 200k-1.0M
- 可编程软启动
- 输出过压 (22V)、逐周期过流、热关断等保护
- QFN20L, 3.5mm *4.5mm 无铅超薄封装

■ APPLICATIONS

- Wireless/ Speakers
- Portable Speakers
- Quick Charge Power Bank
- E-Cigarette
- Power Interface (USB Type-C, Thunderbolt)
- POS Terminal
- Tablet PC/Note Book
- 无线音箱
- 便携式音箱
- 快充移动电源
- 电子烟
- USB TYPE-C 电源传输
- 拉杆音箱
- 平板电脑, 笔记本电脑
- POS机终端

DESCRIPTION

The HT71782 is a high-power density, fully integrated synchronous boost converter with a 16mΩ power switch and a 18mΩ rectifier switch to provide a high efficiency and small size solution in portable systems. The HT71782 has wide input voltage range from 2.7 V to 20V to support applications with single cell and two cell Lithium batteries. The device has 15A switch current capability and can provide an output voltage up to 20V.

The HT71782 uses adaptive constant off-time peak current control topology to regulate the output voltage. In moderate to heavy load condition, it works in the PWM mode. In light load condition, the device has two operation modes selected by the MODE pin. One is PFM mode to improve the efficiency and another one is the forced PWM mode to avoid application problems caused by low switching frequency. The switching frequency in the PWM mode is adjustable ranging from 200kHz to 1.0MHz by an external resistor.

HT71782 integrates two modes with different tr/tf to balance EMI and efficiency in different applications.

The HT71782 also implements a programmable soft-start function and an adjustable switching peak current limit function. In addition, the device provides 22V output overvoltage protection, cycle-by-cycle overcurrent protection, and thermal shutdown protection.

HT71782是一款高功率、全集成升压转换器，集成16mΩ功率开关管和18mΩ同步整流管，为便携式系统提供高效的小尺寸解决方案。

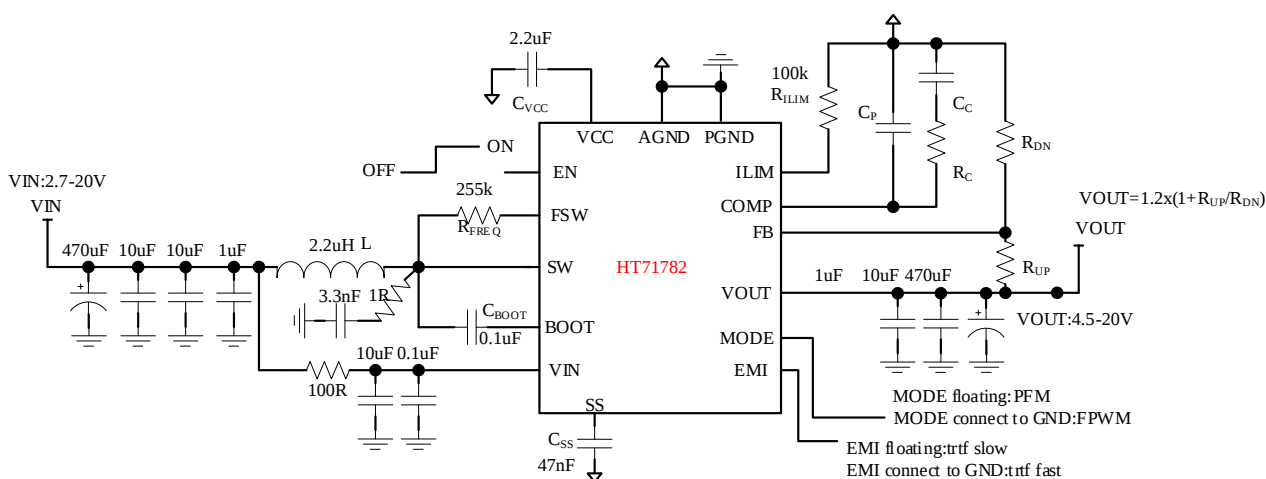
HT71782具有2.7V至20V宽输入电压范围，可为采用单节或两节锂电池的应用提供支持。该器件具备15A开关电流能力，并且能够提供20V的输出电压。

HT71782采用自适应恒定关断时间峰值电流控制拓扑结构来调节输出电压。在中等到重载条件下，HT71782工作在PWM模式。在轻负载条件下，该器件可通过MODE引脚选择下列两种工作模式之一。一种是可提高效率的PFM模式；另一种是可避免因开关频率较低而引发应用问题的强制PWM模式。PWM模式下，HT71782的开关频率可通过外部电阻调节，支持200kHz至1.0MHz的范围。

HT71782还支持可编程的软启动，以及可调节的开关峰值电流限制。另外，HT71782支持两种不同的tr/tf，以适应不同的EMI和效率需求。

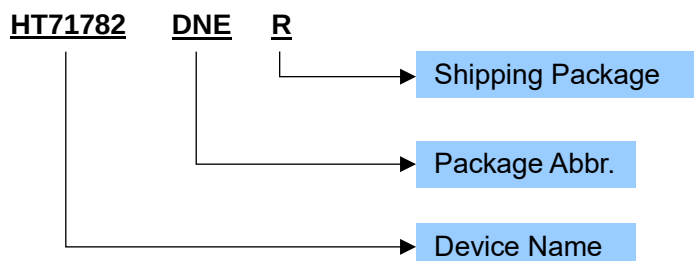
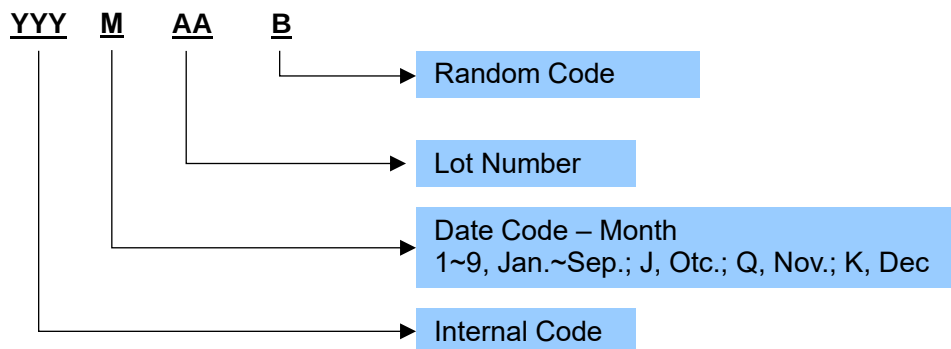
此外，该器件还提供有22V输出过压保护、逐周期过流保护和热关断保护。

TYPICAL APPLICATION



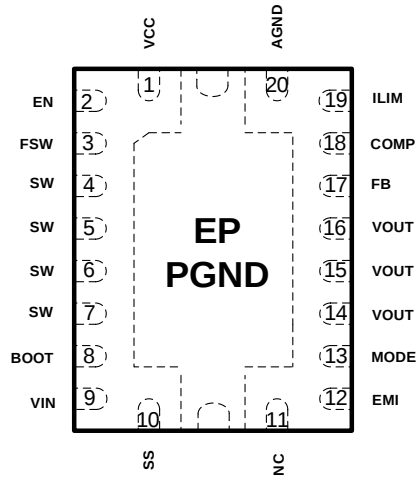
ORDERING INFORMATION

Part Number	Package Type	Package Abbr.	Marking	Shipping Package / MOQ
HT71782DNER	QFN3.5×4.5-20L	DNE	HT71782 YYYMAAB ¹	Tape and Reel / 5000

Part Number

Production Tracking Code


¹ YYYMAAB is production tracking code
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■ TERMINAL CONFIGURATION



Top View

■ TERMINAL FUNCTION

Terminal No.	Name	I/O ¹	Description
1	VCC	O	Output of the internal regulator. A ceramic capacitor of 2.2uF is required between this pin and ground. 接2.2uF到地。
2	EN	I	Enable logic input. Logic high level enables the device. Logic low level disables the device and turns it into shutdown mode. 使能输入，接高电平使能，低电平关断
3	FSW	I	The switching frequency is programmed by a resistor between this pin and the SW pin. 接电阻到SW脚，调节PWM开关频率
4,5,6,7	SW	P	The switching node pin of the converter. 升压开关节点
8	BOOT	O	Power supply for high-side MOSTFET gate driver. A ceramic capacitor of 0.1uF must be connected between this pin and the SW pin. 接0.1uF电容到SW
9	VIN	P	IC power supply input. 电源输入脚
10	SS	O	Soft-start programming pin. An external capacitor connected to ground sets the ramp rate of the internal error amplifier's reference voltage during soft-start. 接电容到地，设置软启动时间。
11	NC	I	No connection, connect to GND or floating. 无连接，接地或悬空。
12	EMI	O	Selection for fast or slow tr/tf. Tr/tf模式选择
13	MODE	I	Operation mode selection pin for the device in light load condition. When this pin is connected to ground, the device works in PWM mode. When this pin is left floating, the device works in PFM mode. 接地选择强制PWM模式，悬空选择PFM模式
14,15,16	VOUT	P	Boost converter output. 升压输出
17	FB	I	Voltage feedback. 电压反馈
18	COMP	O	Output of the internal error amplifier, the loop compensation network should be connected between this pin and the AGND pin. 接阻容补偿网络到地。
19	ILIM	O	Adjustable switch peak current limit. An external resistor should be connected between this pin and the AGND pin. 接电阻到地，调节开关峰值限制电流
20	AGND	G	Signal ground of the IC. 器件信号地
EP	PGND	G	Provides both electrical and thermal connection from the device to the board. A matching ground pad must be provided on the PCB and the device connected to it via solder. For proper electrical operation, this ground pad must be connected to the system ground. 既是地，又是散热PAD

¹ I: Input; O: Output; G: Ground; P: Power; BST: BOOT Strap; OD: Open drain

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