

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
 - 1.0 μ A current consumption during shutdown
 - Fixed switching frequency: ~400kHz
 - Programmable soft start
 - Output overvoltage protection (at 22V), cycle-by-cycle overcurrent protection, thermal shutdown protection
 - Pb-free Packages, ESOP10
- 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)
 - 低关断功耗, 关断电流1 μ A
 - 内部固定开关频率: ~400kHz
 - 可编程软启动
 - 输出过压 (22V)、逐周期过流、热关断等保护
 - ESOP10, 无铅封装

■ 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
 - 快充移动电源
 - USB TYPE-C 电源传输
 - 平板电脑, 笔记本电脑
 - 便携式音箱
 - 电子烟
 - 拉杆音箱
 - POS机终端

DESCRIPTION

The HT71763 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 HT71763 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 HT71763 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 fixed.

The HT71763 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.

HT71763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。

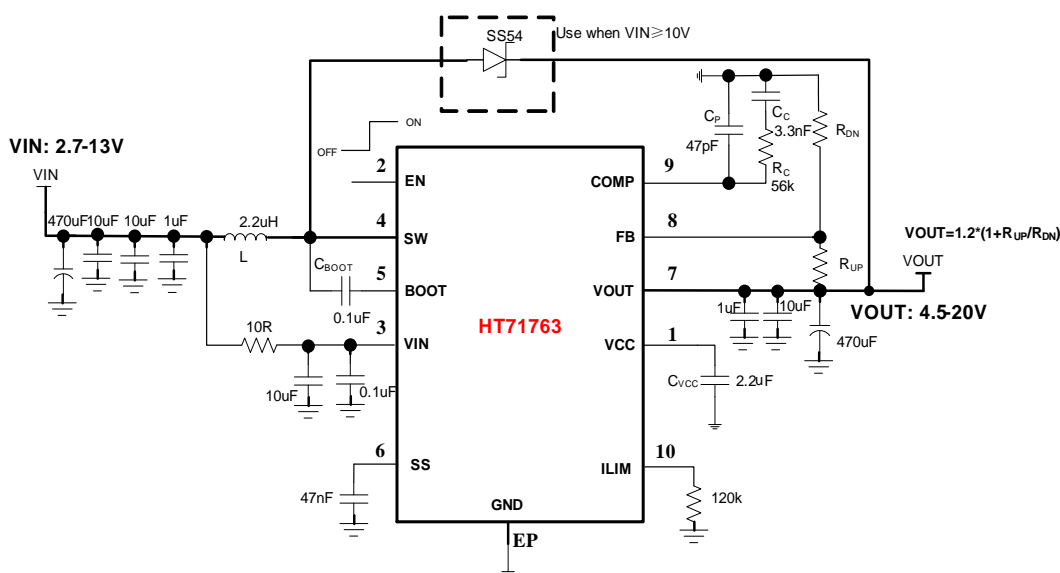
HT71763具有2.7V至20V宽输入电压范围,可为采用单节或两节锂电池的应用提供支持。该器件具备15A开关电流能力,并且能够提供20V的输出电压。

HT71763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。在中等到重负载条件下,HT71763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,HT71763的开关频率内部固定。

HT71763还支持可编程的软启动,以及可调节的开关峰值电流限制。

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。

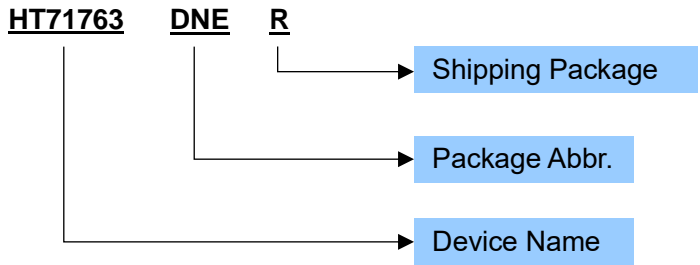
TYPICAL APPLICATION



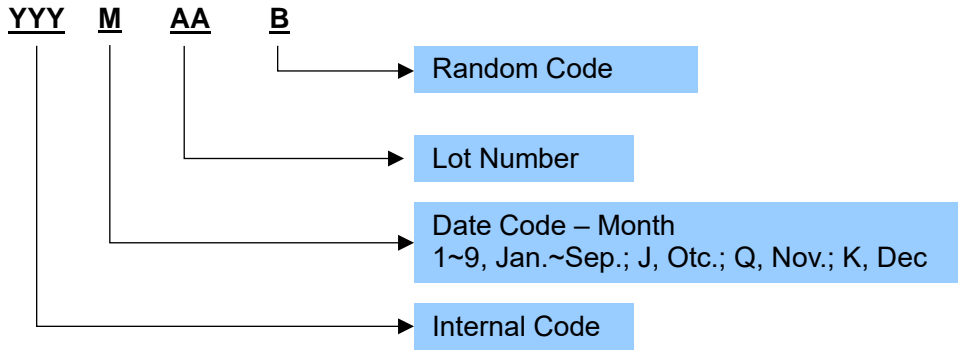
ORDERING INFORMATION

Part Number	Package Type	Package Abbr.	Marking	Shipping Package / MOQ
HT71763SPER	ESOP10	SPE	HT71763 YYYMAAB ¹	Tape and Reel / 2500

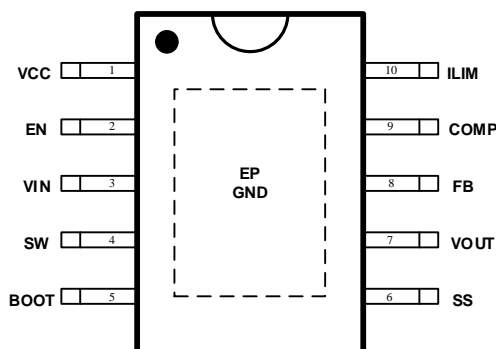
Part Number



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	VIN	P	IC power supply input. 电源输入脚
4	SW	P	The switching node pin of the converter. 升压开关节点
5	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
6	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。
7	VOUT	P	Boost converter output. 升压输出
8	FB	I	Voltage feedback. 电压反馈
9	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。
10	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
EP	GND	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

■ SPECIFICATIONS¹

● Absolute Maximum Ratings²

PARAMETER		Symbol	MIN	MAX	UNIT
Voltage range	BOOT	/	-0.3	SW+7	V
	EN, SW, FSW, V _{OUT} , V _{IN}		-0.3	22	
	VCC, SS, COMP		-0.3	7	
	ILIM, FB		-0.3	3.6	
Operating temperature range		T _A	-40	85	°C
Operating junction temperature range		T _J	-40	150	°C
Storage temperature range		T _{STG}	-50	150	°C

● Recommended Operating Conditions

PARAMETER	Symbol	CONDITION	MIN	TYP	MAX	UNIT
IC power supply voltage range	V _{IN}		2.7		20	V
Output voltage range	V _{OUT}		4.5		20	V
Inductance, effective value	L		0.47	2.2	10	μH
Input capacitance, effective value	C _I		10			μF
Output capacitance, effective value	C _O		6.8	47	1000	μF
Operating temperature	T _a		-40	25	85	°C
Operating junction temperature	T _J		-40		125	°C

¹ Depending on parts and PCB layout, characteristics may be changed.

² Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

● **Electrical Characteristics¹**

Condition: Ta = 25°C, VIN = 2.7V-20V, VOUT=4.5-20V, unless otherwise specified.

Power Supply

PARAMETER	Symbol	CONDITION	MIN	TYP	MAX	UNIT
IC power supply voltage range	VIN		2.7		20	V
Under-voltage lockout (UVLO) threshold	VIN_UVLO	VIN rising		2.5		V
		VIN falling		2.3		V
VIN UVLO hysteresis	VIN_HYS			200		mV
VCC UVLO threshold	VCC_UVLO			2.1		V
Operating quiescent current from VIN	Iq	IC enabled, no load, VFB = 1.3V, VOUT = 12V		1		uA
Operating quiescent current from VOUT				150		
Shutdown current into VIN	ISD	IC disabled, no load, no feedback resistor divider		1		uA
VCC regulation	VCC	VIN = 4.0V, VOUT = 12V, light load		5.249		V
		VIN = 4.0V, VOUT = 12V, ILOAD = 1A		5.008		V

EN, Mode and EMI Input

PARAMETER	Symbol	CONDITION	MIN	TYP	MAX	UNIT
EN high threshold voltage	VENH				1.5	V
EN low threshold voltage	VENL		0.3			V
EN internal pull-down resistance	REN			1300		kΩ

OUTPUT

PARAMETER	Symbol	CONDITION	MIN	TYP	MAX	UNIT
Output voltage range	VOUT		4.5		20	V
Output overvoltage protection	VOVP			22		V
Reference voltage at the FB pin	VREF		1.17	1.204	1.23	V
Soft-start charging current	ISS			5		uA

¹ Depending on parts and pattern layout, characteristics may be changed

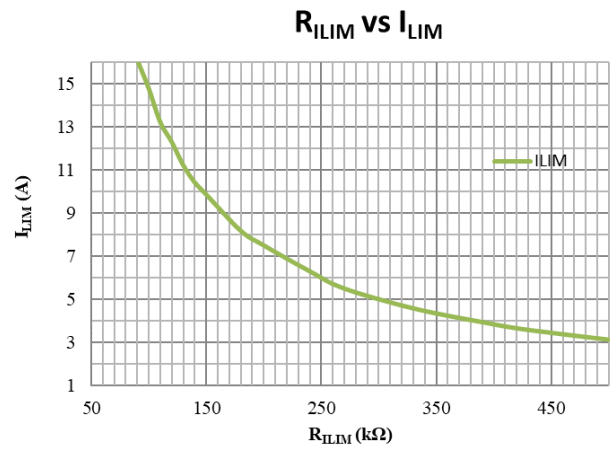
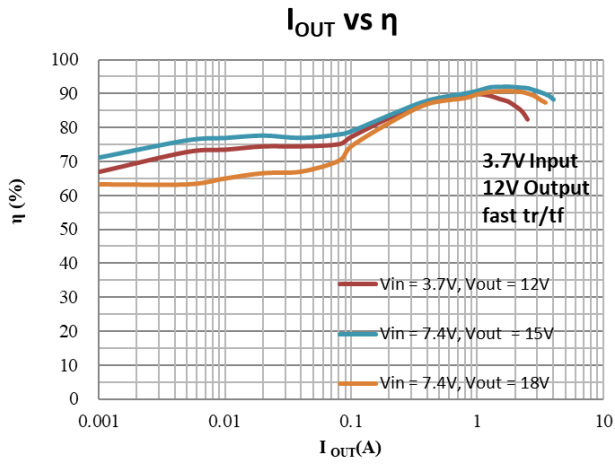
ERROR AMPLIFIER

PARAMETER	Symbol	CONDITION	MIN	TYP	MAX	UNIT
COMP pin sink current	ISINK	$V_{FB} = V_{REF} + 200 \text{ mV}, V_{COMP} = 1.5 \text{ V}$		20		uA
COMP pin source current	ISOURCE	$V_{FB} = V_{REF} - 200 \text{ mV}, V_{COMP} = 1.5 \text{ V}$		20		uA
High clamp voltage at the COMP pin	VCC_LPH	$V_{FB} = 1 \text{ V}, R_{ILIM} = 100 \text{ k}\Omega$		2.1		V
Low clamp voltage at the COMP pin	VCC_LPL	$V_{FB} = 1.4 \text{ V}, R_{ILIM} = 100 \text{ k}\Omega,$		0.95		V
Error amplifier transconductance	GEA	$V_{COMP} = 1.5 \text{ V}$		204		uA/V

PARAMETER	Symbol	CONDITION	MIN	TYP	MAX	UNIT
POWER SWITCH						
MOSFET on-resistance	R _{D_{S(on)}}	High-side MOSFET		18		mΩ
		Low-side MOSFET		16		mΩ
CURRENT LIMIT						
Peak switch current limit	I _{LIM}	R _{ILIM} = 120 kΩ		12		A
		R _{ILIM} = 100 kΩ		15		
Reference voltage at the ILIM pin	V _{ILIM}			1.204		V
SWITCHING FREQUENCY						
Switching frequency	f _{SW}	$V_{IN} = 3.7\text{V}, V_{OUT} = 12\text{V}$		410		kHz
Minimum on-time	t _{ON_min}	$V_{IN} = 3.7\text{V}, V_{OUT} = 12\text{V}$		230		ns
THERMAL SHUTDOWN						
Thermal shutdown threshold	T _{SD}			160		°C
Thermal shutdown hysteresis	T _{SD_HYS}			20		°C

TYPICAL OPERATING CHARACTERISTICS

Condition: $L = 2.2\mu\text{H}$, $R_{\text{ILIM}} = 100\text{k}$, $RC (1\Omega + 3.3\text{nF})$ from SW to GND, otherwise specified.



APPLICATION INFORMATION

1 Enable and Startup (EN and SS pin)

The HT71763 has an adjustable soft start function to prevent high inrush current during start-up. To minimize the inrush current during start-up, an external capacitor, connected to the SS pin and charged with a constant current, is used to slowly ramp up the internal positive input of the error amplifier. The larger the capacitance at the SS pin, the slower the ramp of the output voltage and the longer the soft-start time. A 47-nF capacitor is usually sufficient for most applications.

When the EN pin is pulled into logic low, the HT71763 goes into the shutdown mode and stops switching. Only when EN pin is pulled into logic high, the HT71763 works.

HT71763 具有软起动功能，防止启动时的高浪涌电流。SS 脚需外界电容到地，一般 47nF，SS 使用恒定电流对该电容充电，电容越大，充电时间越长，即软起动时间越长。

EN 为芯片使能脚，EN 拉低，芯片进入关断模式，停止开关；EN 拉高，芯片进入工作状态。

2 Switching Frequency

This device features a fix switching frequency. The switching frequency is determined by V_{in} and V_{out} . The switching frequency is usually around 400kHz.

HT71763 的开关频率内部固定，与 V_{in} 和 V_{out} 相关。其频率一般约为 400kHz。

3 Adjustable Peak Current Limit (ILIM pin)

To avoid an accidental large peak current, an internal cycle-by-cycle current limit is adopted. The low-side switch is turned off immediately as soon as the switch current touches the limit. The peak switch current limit can be set by a resistor (R_{ILIM}) at the ILIM pin to ground. The relationship between the current limit and the resistance is as follows:

芯片采用逐周期电流限制，避免意外的大峰值电流。当开关电流达到设置的限流值，低侧开关管立即断开。峰值开关电流限制（限流值 I_{LIM} ）可以通过 ILIM 引脚对地接 R_{ILIM} 进行设置。限制值 I_{LIM} 和电阻 R_{ILIM} 之间的关系如下：

$$I_{LIM} = \frac{1500000}{R_{ILIM}} \quad \text{Equation 1}$$

4 Output Voltage Setting (FB pin)

The output voltage is set by an external resistor divider (R_{UP} , R_{DN} in the Typical Application Circuit):

输出电压由外部电阻分压器（ R_{UP} ，典型应用电路中的 R_{DN} ）设置：

$$V_{OUT} = V_{REF} \times \left(1 + \frac{R_{UP}}{R_{DN}}\right) \quad \text{Equation 2}$$

Where $V_{REF} = 1.204V$.

其中 $V_{REF} = 1.204V$ 。

Some typical output voltages can be set as the following parameters.

部分典型电压可参考如下：

Table 1 Typical Output Voltage Settings

$V_{OUT}(V)$	$R_{UP}(\Omega)$	$R_{DN}(\Omega)$
7.3	510k	100k
9.4	510k	75k
12.2	510k	56k
15.5	510k	43k

18.3	510k	36k
19.5	510k	33k

5 Inductor Selection (SW pin)

The inductor is the most important component in switching power regulator design. Three most important specifications to the performance of the inductor are the inductor value, DC resistance, and saturation current.

To be simplified, the inductor value can be set as 2.2uH which can be used in most cases.

The rated current, especially the saturation current should be larger than the peak current during the whole operation. The peak current can be calculated as follows.

$$I_{Lpeak} = I_{DC} + \frac{I_{PP}}{2}$$

Equation 3

$$I_{DC} = \frac{V_{OUT} \times I_{OUT}}{V_{IN} \times \eta}$$

Equation 4

$$I_{PP} = \frac{1}{L \times \left(\frac{1}{V_{OUT} - V_{IN}} + \frac{1}{V_{IN}} \right) \times f_{SW}}$$

Equation 5

Boost converter efficiency is affected significantly by the inductor's DC resistance (DCR), equivalent series resistance (ESR) at the switching frequency, and the core loss. An inductor with lower DCR and ESR would increase the efficiency significantly.

The inductor should be placed as close as possible to the SW pin. For a lower EMI radiation, connecting a resistor and a capacitor in series to the ground would be helpful. 1ohm resistor and 3.3nF capacitor would be recommended in most cases.

6 Input Capacitor Selection (VIN, VCC pin)

For good input voltage filtering and small voltage ripple, we recommend low-ESR capacitors of 1uF//10uF//10uF//220uF (“//” represents paralleled) be placed as close as possible to the inductor.

The VIN pin is the power supply for the HT71763, a 1uF paralleled with 10uF ceramic capacitor should be placed as close as possible to the VIN pin. A resistor of 100R is recommended between input power supply and VIN pin so that the power supply of HT71763 would be more stable. An extensive power supply such as the logic power supply connecting to VIN would be another choice.

The VCC pin is the output of internal LDO. A ceramic capacitor of 2.2uF is required at the VCC pin to get a stable operation of LDO.

电感是该芯片的关键器件,影响性能的主要是其电感值,直流阻抗,饱和电流。

对于电感值,使用 2.2uH 的电感可以满足大部分应用。

对于额定电流,特别是饱和电流,必须大于所有工作条件下的最大峰值电流,最大峰值电流计算如下:

升压效率受电感的直流阻抗、开关频率下的等效 ESR、磁心损耗等影响。选择小的 DCR 和 ESR 可提升效率。

电感应尽可能靠近 SW 引脚放置,并靠近 SW 引脚放置 1ohm 串联 3.3nF 到地。

为了良好的储能和滤波以及减小电压波动,建议电源输入端使用 1uF//10uF//10uF//220uF 组合,放置在靠近电感的大电流路径上。

VIN 脚是 HT71763 的电源供电端,1uF 并联 10uF 对地电容放置在靠近 VIN 脚。输入电源和 VIN 脚之间可以串联 1 个 100R 电阻,已稳定 VIN 电压。VIN 还可以有系统中的逻辑电源供电。

VCC 是内部 LDO 输出,接 2.2uF 电容到地。

7 Output Capacitor Selection (VOUT pin)

To be simplified, we recommend low-ESR capacitors of 1uF//10uF//10uF//470uF (“//” represents paralleled) be placed as close as possible to VOUT pin for small output voltage ripple.

In detail, for the require output voltage ripple, use the following equations to calculate the minimum required effective capacitance C_{OUT}

$$V_{ripple_dis} = \frac{(V_{OUT} - V_{IN_MIN}) \times I_{OUT}}{V_{OUT} \times f_{SW} \times C_{OUT}} \quad \text{Equation 6}$$

$$V_{ripple_ESR} = I_{Lpeak} \times R_{C_ESR} \quad \text{Equation 7}$$

Where

- Vripple_dis is output voltage ripple caused by charging and discharging of the output capacitor.
- Vripple_ESR is output voltage ripple caused by ESR of the output capacitor.
- V_{IN_MIN} is the minimum input voltage of boost converter..
- V_{OUT} is the output voltage..
- I_{OUT} is the output current.
- I_{Lpeak} is the peak current of the inductor.
- f_{SW} is the converter switching frequency.
- R_{C_ESR} is the ESR of the output capacitors.

简单来说, 升压输出到地滤波电容建议使用 1uF//10uF//10uF//470uF 的组合, 尽量靠近 Vout 引脚放置。

具体的, 可以根据需要的输出电压纹波, 得到需要的输出电容值:

其中:

- Vripple_dis 是对电容充放电引起的输出电压纹波.
- Vripple_ESR 是输出电容ESR引起的输出电压纹波.
- V_{IN_MIN} 是最小输入电压.
- V_{OUT} 是输出电压.
- I_{OUT} 是输出电流.
- I_{Lpeak} 是电感峰值电流.
- f_{SW} 是开关频率.
- R_{C_ESR} 是输出电容 ESR.

8 Loop Stability (COMP pin)

The HT71763 requires external compensation, which allows the loop response to be optimized for each application. The COMP pin is the output of the internal error amplifier. An external compensation network comprised of resistor R_C , ceramic capacitors C_C and C_P is connected to the COMP pin.

To be simplified, R_C is 56k Ω , C_C is 3.3nF, and C_P is 47pF. But notice that this setting can only be adopted in most cases. In detail, the compensation network parameters can be calculated as follows.

(1) Set the cross over frequency, f_c

The first step is to set the loop crossover frequency, f_c . The higher crossover frequency, the faster the loop response is. It is generally accepted that the loop gain cross over no higher than the lower of either 1/10 of the switching frequency, f_{SW} , or 1/5 of the RHPZ frequency, f_{RHPZ} . It's proper to use a fixed parameter of 10kHz for f_c .

HT71763 需要外部补偿, 在 COMP 引脚外接 R_C , C_C , C_P 。简单来说, $R_C=56k\Omega$, $C_C=3.3nF$, $C_P=47pF$ 可以满足大部分应用。以下是补偿网络的计算过程:

(1) 设置交叉频率 f_c

f_c 越大, 响应越快。一般其设置为开关频率的 1/10 或 1/5 的 f_{RHPZ} , 或直接为 10kHz.

$$f_{RHPZ} = \frac{R_O \times (1-D)^2}{2\pi \times L} \quad \text{Equation 8}$$

(2) Set the compensation resistor, R_C .

(2) 设置补偿网络 R_C

$$R_C = \frac{2\pi \times V_{OUT} \times R_{sense} \times f_C \times C_O}{(1-D) \times V_{REF} \times G_{EA}} \quad \text{Equation 9}$$

(3) Set the compensation resistor, C_C .

(3) 设置补偿网络 C_C

$$C_C = \frac{R_O \times C_O}{2 \times R_C} \quad \text{Equation 10}$$

(4) Set the compensation resistor, C_P .

(4) 设置补偿网络 C_P

$$C_P = \frac{R_{ESR} \times C_O}{R_C} \quad \text{Equation 11}$$

If the C_P is less than 10pF, it can be left open.

如果 C_P 小于 10pF，可以悬空。

- R_O is the output load resistance.
- D is the switching duty cycle. $1 - D = V_{IN} / V_{OUT}$
- R_{sense} is the equivalent internal current sense resistor, which is 0.091 Ω .
- C_O is output capacitor.
- V_{REF} is the reference voltage at the FB pin, which is 1.204V.
- G_{EA} is the amplifier's transconductance, which is 204uA/V.
- R_{ESR} is the equivalent series resistance of the output capacitor.

其中 R_O 是输出负载；

D 是占空比， $1 - D = V_{IN} / V_{OUT}$

R_{sense} 是内部等效电流感应电阻，0.076 Ω

C_O 是输出电容

V_{REF} 是 FB 电压，1.204V

G_{EA} 是跨导，204uA/V

R_{ESR} 是输出电容的等效串联电阻。

9 Selecting the Bootstrap Capacitor (BOOT pin)

The bootstrap capacitor (C_{BST}) between the BOOT and SW pin supplies the gate current to charge the high-side FET device gate during each cycle's turn-on and supplies charge for the bootstrap capacitor. The recommended value of the bootstrap capacitor is 0.1 μ F to 1 μ F. C_{BST} should be a good quality, low ESR, ceramic capacitor located at the pins of the device to minimize potentially damaging voltage transients caused by trace inductance. A value of 0.1 μ F can be used in most cases.

BOOT 和 SW 之间需放置一个 C_{BST} 电容，用于高端管开启时的栅极驱动。一般使用 0.1 μ F~1 μ F，大部分情况下可使用 0.1 μ F 电容。

10 Protection Function

10.1 Under-voltage Lockout (UVLO)

The UVLO circuit prevents the device from malfunctioning at low input voltage and the battery from excessive discharge. The HT71763 has both VIN UVLO function and VCC UVLO function. It disables the device from switching when the falling voltage at the VIN pin trips the UVLO threshold V_{IN_UVLO} , which is typically 2.3V. The device starts operating when the rising voltage at the VIN pin is 200mV above the V_{IN_UVLO} . It also disables the device when the falling voltage at the VCC pin trips the UVLO threshold V_{CC_UVLO} , which is typically 2.1V.

HT71763 具有 VIN 和 VCC 欠压保护。当 VIN 小于 V_{IN_UVLO} (典型 2.3V) 时，器件停止开关，直至 VIN 大于 V_{IN_UVLO} (典型 2.5V)，器件重新工作。当 VCC 小于 V_{CC_UVLO} (典型 2.1V) 时，器件同样停止工作。

10.2 Over-voltage Protection

If the output voltage at the VOUT pin is detected above 22 V (typical value), the HT71763 stops switching immediately until the voltage at the VOUT pin drops the hysteresis value lower than the output overvoltage protection threshold. This function prevents overvoltage on the output and secures the circuits connected to the output from excessive overvoltage.

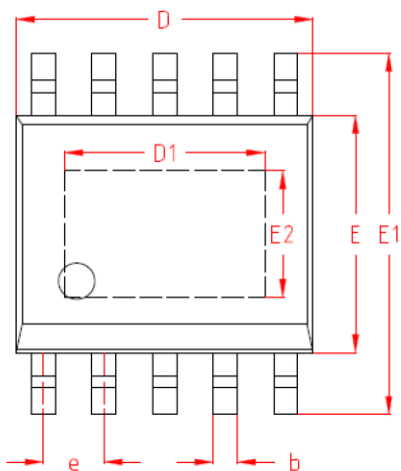
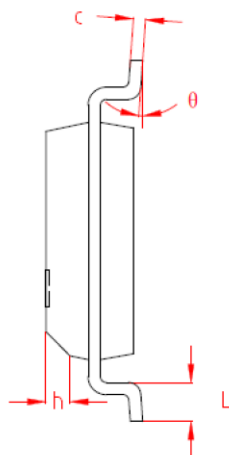
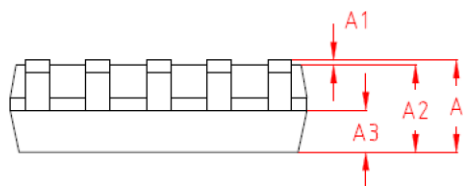
当 VOUT 电压高于 22V (典型值), HT71763 停止工作, 直到 VOUT 低于 21.5V (典型值)。

10.3 Thermal Shutdown

A thermal shutdown is implemented to prevent damages due to excessive heat and power dissipation. Typically, the thermal shutdown happens at a junction temperature of 160°C. When the thermal shutdown is triggered, the device stops switching until the junction temperature falls below typically 140°C, then the device starts switching again.

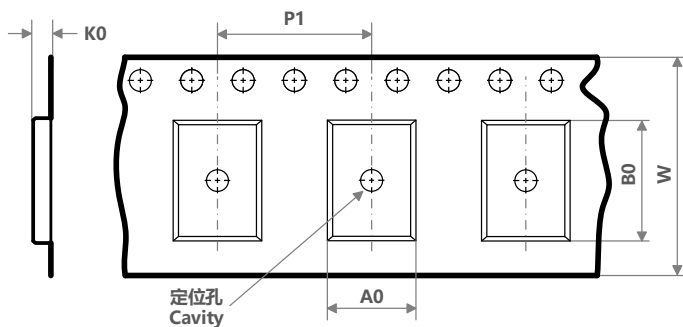
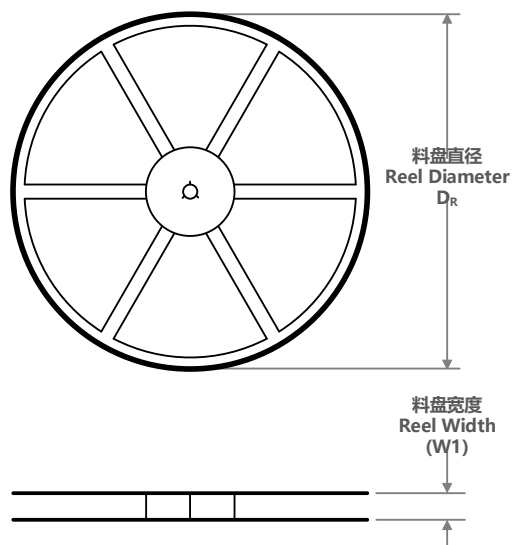
芯片具有过温关断保护功能。当结温大于 160°C (典型值), 芯片关断; 当结温低于 140°C (典型值), 芯片恢复工作。

PACKAGE OUTLINE

 TOP VIEW
 正视图

 SIDE VIEW
 侧视图

 SIDE VIEW
 侧视图


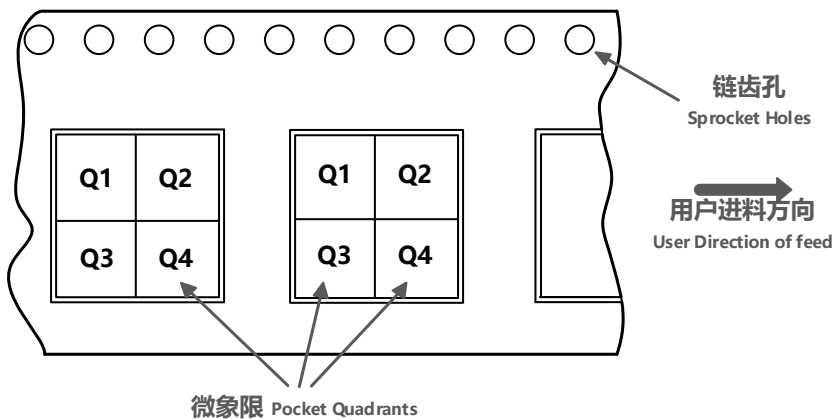
机械尺寸/mm Dimensions			
字符 SYMBOL	最小值 MIN	典型值 NOMINAL	最大值 MAX
A	1.50	1.60	1.70
A1	0.04	-	0.12
A2	1.35	1.45	1.55
A3	0.65	0.70	0.75
b	0.35	-	0.50
c	0.19	-	0.25
D	4.80	4.90	5.00
D1	3.20	3.30	3.40
E	3.80	3.90	4.00
E1	5.80	6.00	6.20
E2	2.00	2.10	2.20
e	1.00 BSC		
h	0.30	-	0.50
L	0.50	-	0.80
θ	0°	-	8°

TAPE AND REEL INFORMATION

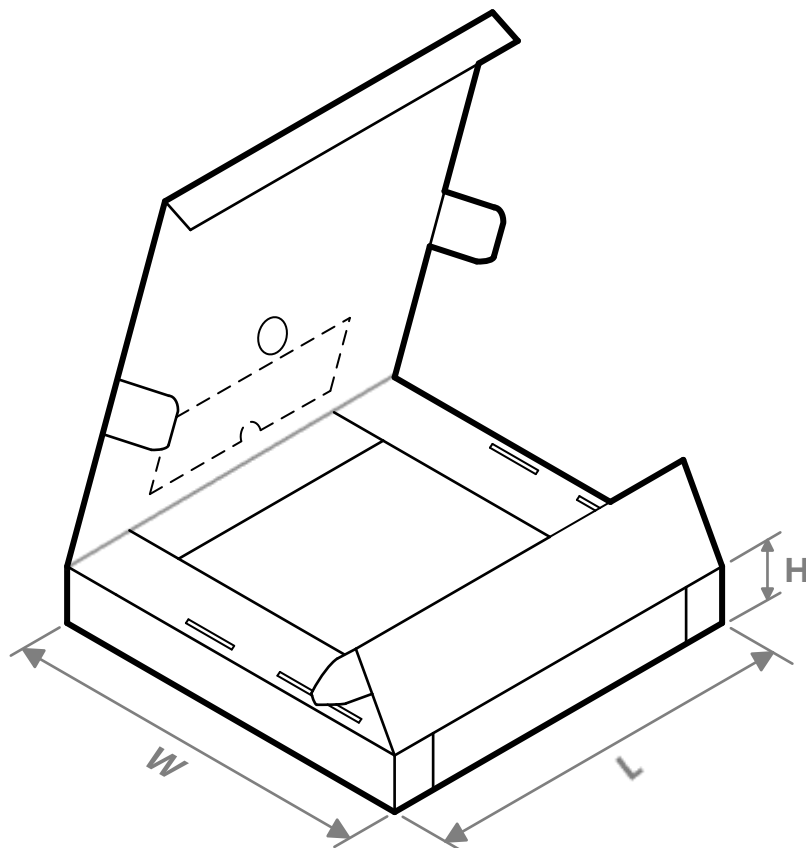


A0	Dimension designed to accommodate the component width; 料槽宽度
B0	Dimension designed to accommodate the component length; 料槽长度
K0	Dimension designed to accommodate the component thickness; 料槽厚度
W	Overall width of the carrier tape; 载带整体宽度
P1	Pitch between successive cavity centers; 相邻槽中心间距

编带 PIN1 方位象限分配
Quadrant Assignments for Pin1 Orientation in Tape



器件料号 Part No.	封装类型 Package Type	封装标识 Package Code	引脚数 Pins	SPQ	料盘直径 D_R (mm)	料盘宽度 $W1$ (mm)	$A0$ (mm)	$B0$ (mm)	$K0$ (mm)	$P1$ (mm)	W (mm)	Pin1 象限 Quadrant
HT71763SPER	ESOP	SPE	10	2500	330	12.5	6.55	5.25	2	8	12	Q1

TAPE AND REEL BOX INFORMATION


器件料号 Part No.	封装类型 Package Type	封装标识 Package Code	引脚数 Pins	SPQ	长度 Length (mm)	宽度 Width (mm)	高度 Height (mm)
HT71763SPER	ESOP	SPE	10	5000	380	340	60

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