高效同步升压型2A双节/3节锂电池充电器

High Efficiency, 2-A, 2-Cell/3-Cell Synchronous Boost Battery Charger

■ FEATURES

- High-efficiency 2-A, 500kHz sync-boost Charger
- Efficiency, 94% at 5V input, 8V battery, 1A charge
- VIN supports 4V~9.5V, tolerance: 28V
- 2-cell (HTC6632) or 3-cell (HTC6631) Li-Ion battery charger, Charge voltage is selectable: 8.1V/8.2V/8.3V/8.4V (HTC6632), 12.3V/12.4V/12.5V/12.6V (HTC6631); other charge voltage can be pre-booked
- Charge current
  HTC6632H: 2.0A;
  HTC6632L: 1.2A;
  HTC6631: 1.2A;
  Other charge current can be pre-booked
- Adaptively input current limit to track the input power ability
- NTC available
- Charge Status indictor pin: LED. Different indictor styles can be pre-booked
- Robustness Features
  - Input Over voltage protection, Input Undervoltage protection, Output overcurrent protection, output overvoltage protection, output shortage protection, charge overtime protection, and Overtemperature Protection
- Packages: Pb-free Packages, ESOP8

- 内置500kHz同步升压的高效2A充电
- 效率94% (V_{IN} = 5V, V_{BAT} = 8V, I_{CHG} = 1A)
- 输入电压支持4V~9.5V，容忍最高28V输入
- 支持双节（HTC6632）或三节（HTC6631）串联充电，满电电压可设置：8.1V/8.2V/8.3V/8.4V (HTC6632), 12.3V/12.4V/12.5V/12.6V (HTC6631) 其他满电电压可定制
- 充电电流
  HTC6632H: 2.0A;
  HTC6632L: 1.2A;
  HTC6631: 1.2A;
  其他充电电流可定制
- 支持自动调节充电电流以自适应适配器负载能力
- 支持NTC保护
- LED脚支持充电状态指示，LED指示可定制
- 保护：输入过压、输入欠压、输出过流、输出过压、输出短路、充电超时、过温保护等
- ESOP8封装

■ APPLICATIONS

- Bluetooth/Wi-Fi Speakers
- Portable Speakers
- POS Printers
- Security Cameras
- 2-cell / 3-cell Battery Charging

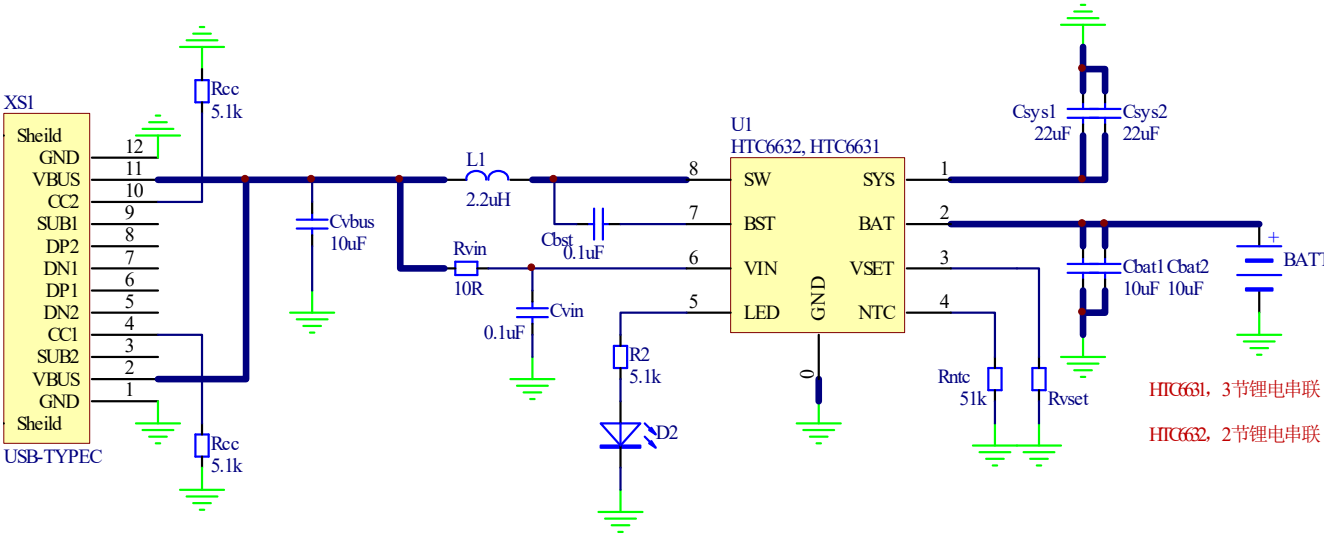
- 蓝牙/ Wi-Fi音箱
- 便携式音箱
- POS打印机
- 安全摄像机
- 2节或三节串联电池充电场合

■ DESCRIPTION

The HTC6632, 6631 is highly-integrated 2A sync-boost switch-mode battery charger for 2-cell (HTC6632) or 3-cell (HTC6631) Li-Ion and Li-polymer battery.

HTC6232, 6631是一款内置同步升压的高集成2A电池充电芯片，支持2节（HTC6632）或3节（HTC6631）串联锂电池充电。

■ TYPICAL APPLICATION



1. VSET，充电满电电压微调。如下表

R_{VSET}	Charge Voltage	
	HTC6632	HTC6631
1K	8.1V	12.3V
68K	8.2V	12.4V
120k	8.3V	12.5V
NC	8.4V	12.6V

2. NTC，设置 NTC 保护，不使用时，接 51k 电阻到地；其对外放出 20uA 电流，检测 NTC 端电压进行 NTC 保护，如下表：

V_{NTC}	Status
V_{NTC} >1.32V	Low Temperature Protection, Stop Charting
0.56V< V_{NTC} ≤1.32V	Normal
0.43V< V_{NTC} ≤0.56V	High Temperature Warning, $I_{CHG\_NTC} = I_{CHG}/2$
V_{NTC} ≤0.43V	High Temperature Protection, Stop Charging

3. LED，为充电模式指示，充电状态指示：

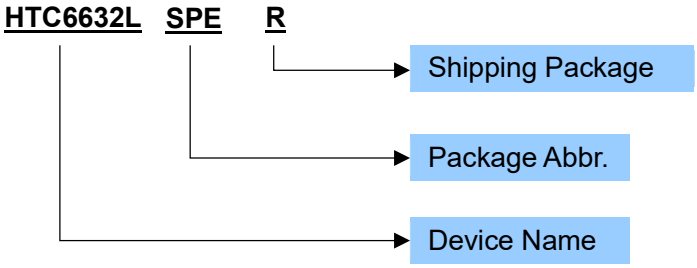
State	LED充电状态指示
亮（output high）	充电
闪烁	异常状态
灭（output low）	满电

4. VIN 端极限电压为 28V
5. 电感可使用典型 2.2uH，饱和电流 I_{SAT} 建议大于$1.4 \times \frac{8.4 \times I_{CHG}}{4.5 \times 0.9}\ (2cell)\ or\ 1.4 \times \frac{12.6 \times I_{CHG}}{4.5 \times 0.9}\ (3cell)$
6. SYS 端，靠近引脚建议放置至少两个 22uF 电容；BAT 端，靠近引脚建议放置至少 2 个 10uF 电容，并关注电容额定电压（建议>=20V）

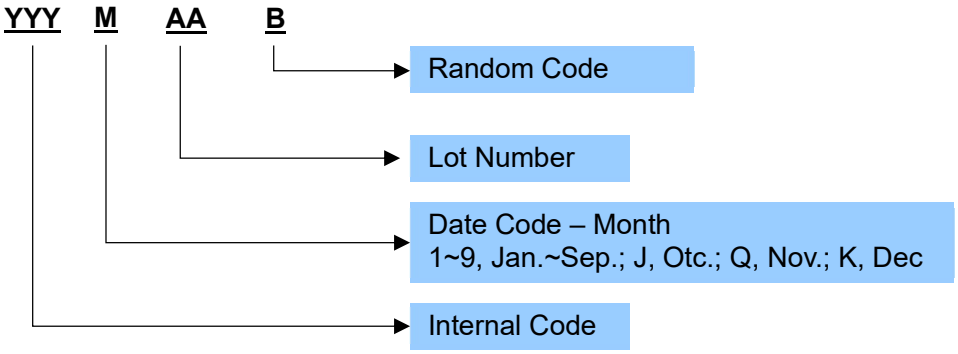
■ ORDERING INFORMATION

Part Number	Description	Package Type	Package Abbr.	MSL Level	Eco Plan	Marking	Shipping Package / MOQ
HTC6632LSPER	Charge Current = 1.2A	ESOP8	SPE	MSL3	RoHS	HTC6632 YYYMAAB[1]	Tape and Reel (R) / 2500pcs
HTC6632HSPER	Charge Current = 2A	ESOP8	SPE	MSL3	RoHS	HTC6632 YYYMAAB	Tape and Reel (R) / 2500pcs
HTC6631SPER	Charge Current = 1.2A	ESOP8	SPE	MSL3	RoHS	HTC6631 YYYMAAB	Tape and Reel (R) / 2500pcs

Part Number

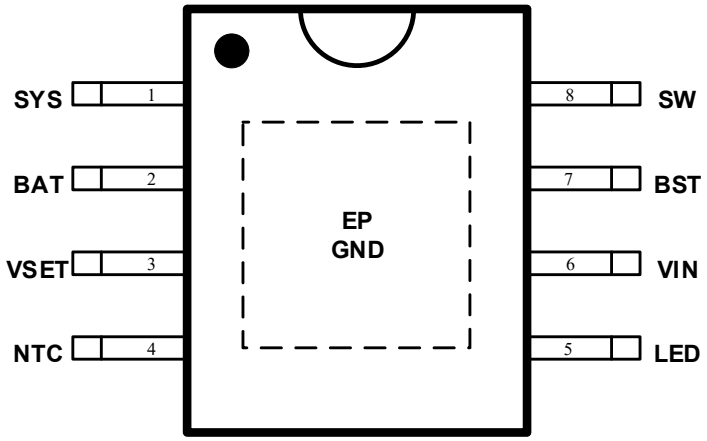


Production Tracking Code



[1] YYYMAAB is production tracking code

■ TERMINAL CONFIGURATION



Top View

■ TERMINAL FUNCTION

Terminal No.	Name	Description
1	SYS	System Connection. 升压输出中间节点
2	BAT	Battery Power Connection. 电池连接端。
3	VSET	Charge Volage Selection. 充电满电电压微调
4	NTC	Temperature Qualification Voltage. 温度保护输入端
5	LED	Charge Status Indicator. 充电状态指示
6	VIN	Power input terminal. 电源输入端
7	BST	Connection point for the bootstrap capacitor. 自举电容端
8	SW	The switching node pin of the boost converter. 开关节点，连接电感。
EP	GND	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

■ SPECIFICATIONS[1]

● Absolute Maximum Ratings [2]

PARAMETER	Symbol	MIN	TYP	MAX	UNIT
Power supply voltage for VIN, transient <10ns	V_{IN}	-0.3		28	V
Voltage for BAT, SYS, SW	V_{BAT}	-0.3		24	V
Voltage for NTC, VSET, LED	V_{NTC}			5.5	V
BST voltage	V_{BST}	-0.3		V_{SW}+5.5	V
Junction Temperature	T_J	-40		150	℃
Storage Temperature	T_{STG}	-40		150	℃

● Recommended Operating Conditions

PARAMETER	Symbol	CONDITION	MIN	TYP	MAX	UNIT
Power supply voltage for VIN	V_{IN}		4	5	9.5	V
Ambient Operating Temperature	T_a		-40	25	85	℃

● 2-cell Battery Charging, HTC6632

T_A = 25°, L1 = 2.2uH, VIN = 5V, V_{BAT} = 7.4V, unless otherwise noted

PARAMETER	Symbol	CONDITION	MIN	TYP	MAX	UNIT
Power supply voltage for VIN	V_{IN}		4.5	5	-	V
VIN falling threshold	V_{IN_UVLO}			4.65		V
VIN overvoltage protection, rising threshold	V_{IN_OV}			8.75		V
Input supply current (VIN terminal)	I_{VIN}	V_{IN} = 5V, V_{BAT} = NC, EN = H, NO LED		20		mA
Input supply current (VIN terminal) in standby mode	I_{VIN_SD}	V_{IN} = 5V, EN = L		40		uA
Battery discharge current in standby mode	I_{BAT_SD}	EN = 0V, VIN = 0V, VBAT = 7.4V		0.7		uA
Voltage Regulation						
Charge Voltage	V_{BAT_REG}	R_{VSET} = NC	8.3	8.4	8.5	V
		R_{VSET} = 120k	8.2	8.3	8.4	V
		R_{VSET} = 68k	8.1	8.2	8.3	V
		R_{VSET} = 1k	8.0	8.1	8.2	V
Recharge Voltage	V_{BATR}	R_{VSET} = NC		8.2		V
Battery voltage rising threshold to start constant current charge mode	V_{TRK_R}			6		V
Battery voltage falling threshold to stop constant current charge mode	V_{TRK_F}			5.6		V
Battery voltage rising threshold to start trickle current charge mode	V_{SHORT_R}			3.6		V
Battery voltage falling threshold to stop trickle current charge mode	V_{SHORT_F}			3.1		V
Charge Current						
Charge current for constant current charge mode	I_{CHG}	HTC6632H		2.0		A
		HTC6632L		1.2		A
Charge current for trickle current charge mode	$I_{TRICKLE}$	V_{IN} = 5V, 3.6V<=V_{BAT}<=6V		100		mA
Charge current in short mode	I_{SHORT}	V_{IN} = 5V, V_{BAT} < 3.6V		70		mA
Termination current	I_{TERM}			200		mA

[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.

● 3-cell Battery Charging, HTC6631

T_A = 25°, L1 = 2.2uH, VIN = 5V, V_{BAT} = 10.8V, unless otherwise noted

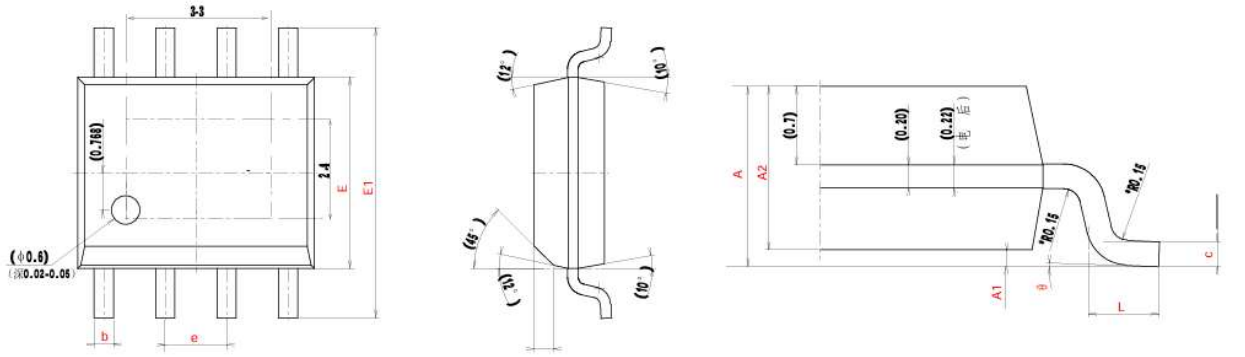
PARAMETER	Symbol	CONDITION	MIN	TYP	MAX	UNIT
Power supply voltage for VIN	V_{IN}		4.5	5	8.75	V
VIN falling threshold	V_{IN_UVLO}			4.65		V
VIN overvoltage protection, rising threshold	V_{IN_OV}			11.25		V
Input supply current (VIN terminal)	I_{VIN}	V_{IN} = 5V, V_{BAT} = NC, EN = H, NO LED		30		mA
Input supply current (VIN terminal) in standby mode	I_{VIN_SD}	V_{IN} = 5V, EN = L		40		uA
Battery discharge current in standby mode	I_{BAT_SD}	EN = 0V, VIN = 0V, VBAT = 10.8V		1.5		uA
Voltage Regulation						
Charge Voltage	V_{BAT_REG}	R_{VSET} = NC	12.5	12.6	12.7	V
		R_{VSET} = 120k	12.4	12.5	12.6	V
		R_{VSET} = 68k	12.3	12.4	12.5	V
		R_{VSET} = 1k	12.2	12.3	12.4	V
Recharge Voltage	V_{BATR}	R_{VSET} = NC		12.3		V
Battery voltage rising threshold to start constant current charge mode	V_{TRK_R}			9		V
Battery voltage falling threshold to stop constant current charge mode	V_{TRK_F}			8.4		V
Battery voltage rising threshold to start trickle current charge mode	V_{SHORT_R}			3.6		V
Battery voltage falling threshold to stop trickle current charge mode	V_{SHORT_F}			3.1		V
Charge Current						
Charge current for constant current charge mode	I_{CHG}			1.2		A
Charge current for trickle current charge mode	$I_{TRICKLE}$	V_{IN} = 5V, 3.6V<=V_{BAT}<=6V		100		mA
Charge current in short mode	I_{SHORT}	V_{IN} = 5V, V_{BAT} < 3.6V		70		mA
Termination current	I_{TERM}			200		mA

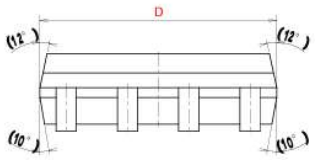
Other Electrical Characteristics

PARAMETER	Symbol	CONDITION	MIN	TYP	MAX	UNIT
Oscillator and PWM						
Switching frequency	f_{SW}			500		kHz
Power MOSFET						
RDS(ON) of LS-FET	R_{NFET_M}			35		mΩ
RDS(ON) of HS-FET	R_{NFET_R}			45		mΩ
RDS(ON) of Blocking FET	R_{NFET_M}			50		mΩ
Current Limit	I_{LIM}			6		A
I/O						
LED pin drive current	I_{LED}				5	mA
NTC pin output current	I_{NTC}			20		uA
Thermal Regulation and Thermal Shutdown						
Thermal shutdown temperature	T_{SD}	Rising threshold		135		℃
Thermal shutdown temperature	T_{SDHYS}			25		℃

■ PACKAGE OUTLINE

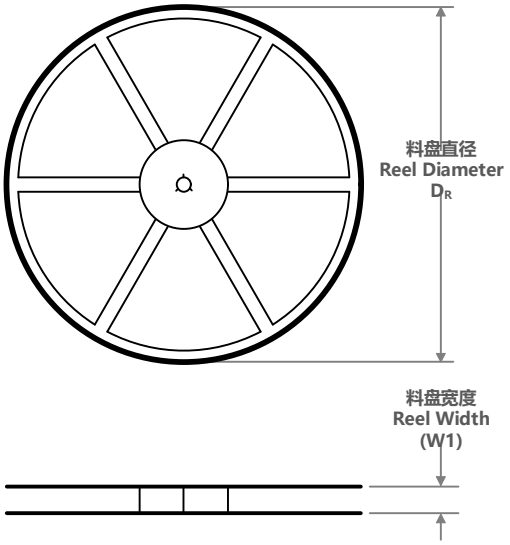
SPE (ESOP8)

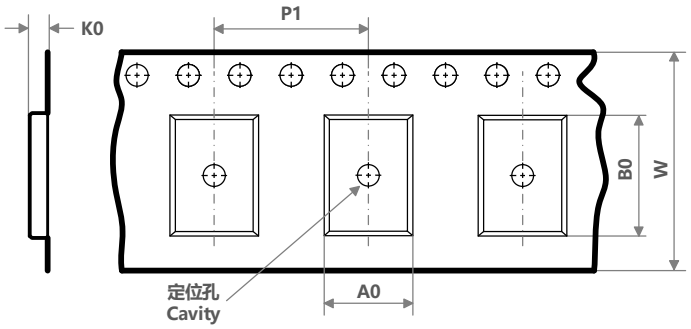




字符	Dimension millimeters		
	Min	Standard	Max
A	1.350	1.500	1.700
A1	0	0.050	0.150
A2	1.350	1.450	1.550
b	0.360	0.400	0.440
c	0.215	0.220	0.235
D	4.800	4.900	5.000
E	3.840	3.940	4.040
E1	5.900	6.000	6.100
e		1.27BSC	
L	0.400	0.550	0.700
θ	0°		8°

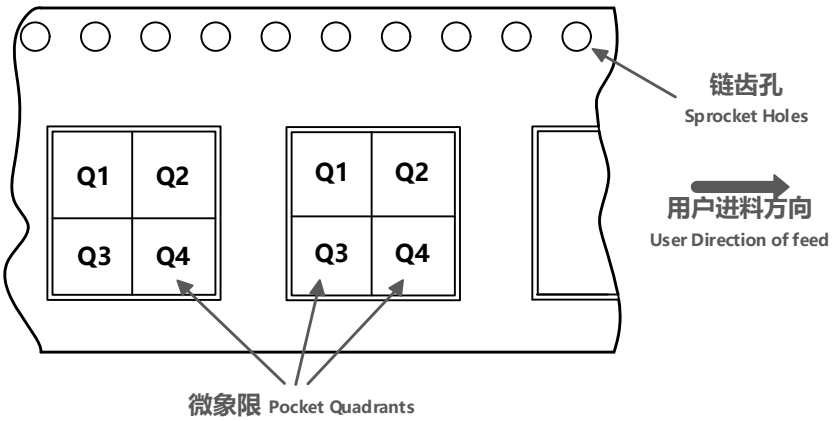
■ TAPE AND REEL INFORMATION





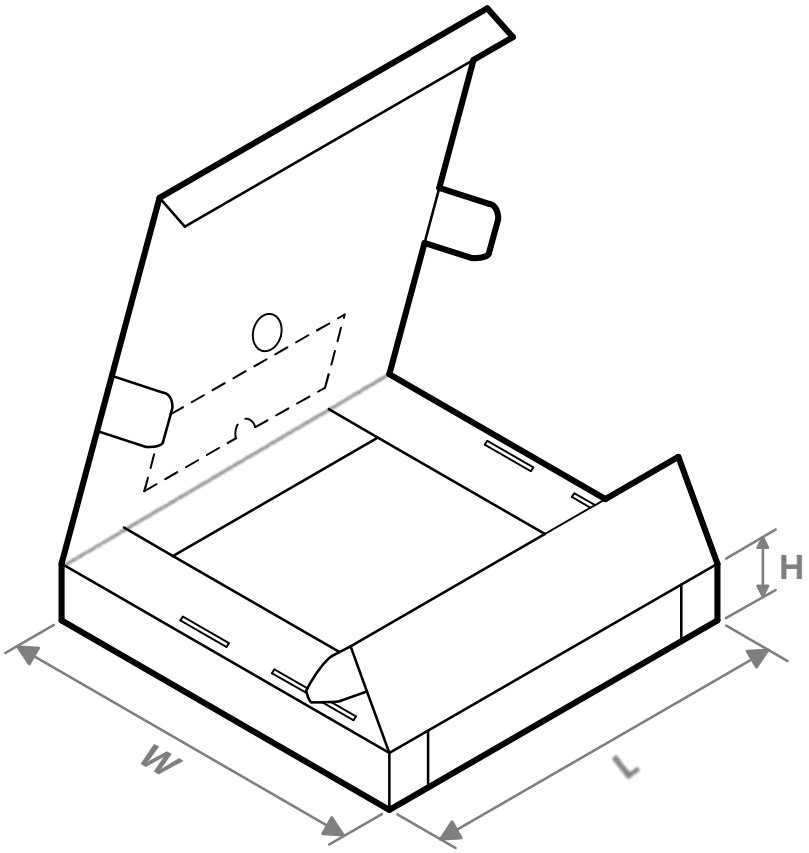
A0	Dimension designed to accommodate the component width; 料槽宽度
B0	Dimension designed to accommodate the component length; 料槽长度
K0	Dimension designed to accommodate the component thickness; 料槽厚度
W	Overall width of the carrier tape; 载带整体宽度
P1	Pitch between successive cavity centers; 相邻槽中心间距

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 Abbr.	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
HTC6632HSPER	ESOP	SPE	8	2500	330	12	6.55	5.55	1.95	8	12	Q1
HTC6632LSPER	ESOP	SPE	8	2500	330	12	6.55	5.55	1.95	8	12	Q1
HTC6631SPER	ESOP	SPE	8	2500	330	12	6.55	5.55	1.95	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 Abbr.	引脚数 Pins	SPQ	长度 Length (mm)	宽度 Width (mm)	高度 Height (mm)
HTC6632HSPER	ESOP	SPE	8	5000	360	345	65
HTC6632LSPER	ESOP	SPE	8	5000	360	345	65
HTC6631SPER	ESOP	SPE	8	5000	360	345	65

IMPORTANT NOTICE
注意

Heroic Electronic Technology (Jiaxing) Co., Ltd (HT) reserves the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any products or services. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete.

禾润电子科技（嘉兴）股份有限公司（以下简称HT）保留对产品、服务、文档的任何修改、更正、提高、改善和其他改变，或停止提供任何产品和服务的权利。客户在下单和生产前应确保所得到的信息是最新、最完整的。

HT assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using HT components.

HT对相关应用的说明和协助以及客户产品的板级设计不承担任何责任。

HT products are not authorized for use in safety-critical applications (such as life support devices or systems) where a failure of the HT product would reasonably be expected to affect the safety or effectiveness of that devices or systems.

HT的产品并未授权用于诸如生命维持设备等安全性极高的应用中。

The information included herein is believed to be accurate and reliable. However, HT assumes no responsibility for its use; nor for any infringement of patents or other rights of third parties which may result from its use.

本文中的相关信息是精确和可靠的，但HT并不对其负责，也不对任何可能的专利和第三方权利的侵害负责。

Following are URLs and contacts where you can obtain information or supports on any HT products and application solutions:

下面是可以联系到我公司的相关链接和联系方式：

禾润电子科技（嘉兴）股份有限公司
Heroic Electronic Technology (Jiaxing) Co., Ltd.
地址: 浙江省嘉兴市南湖区亚太路906号科创CBD园区21号楼11层
Add: 11th floor, Building 21, No. 906, Yatai Road, Jiaxing, Zhejiang Province
Sales: 0573-82586608, sales@heroic.com.cn
Support: 0573-82586151, support@heroic.com.cn
Website: www.heroic.com.cn; wap.heroic.com.cn
Wechat MP: HEROIC_JX
请及时关注禾润官方微信公众号，随时获取最新产品信息和技术资料！