

SMT电流感应变压器

SMT Current Sense Transformers

EE 5.0 core & EE 8.3 core

系列/类型:EE5.0/8.3-***

日期:2022.12

Series/Type: EE5.0/8.3-***

Date: December 2022

应用

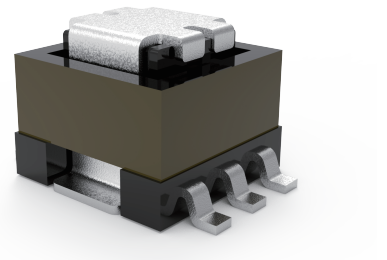
- 开关电源
- 反馈控制
- 过载感应
- 负载下降/停机检测

Application

- Switching power supplies
- Feedback control
- Overload sensing
- Load drop/shut down detection



EE 5.0



EE 8.3

特征

- 极低的直流电阻
- 不同的匝数比
- 小包装
- 其他按要求寄送
- RoHS兼容

Features

- Very low DC resistance
- Different turns ratios
- Small package
- Other pinning on request
- RoHS compatible

交货方式和包装单位

- 载带, 330毫米直径卷盘
- 纸箱包装

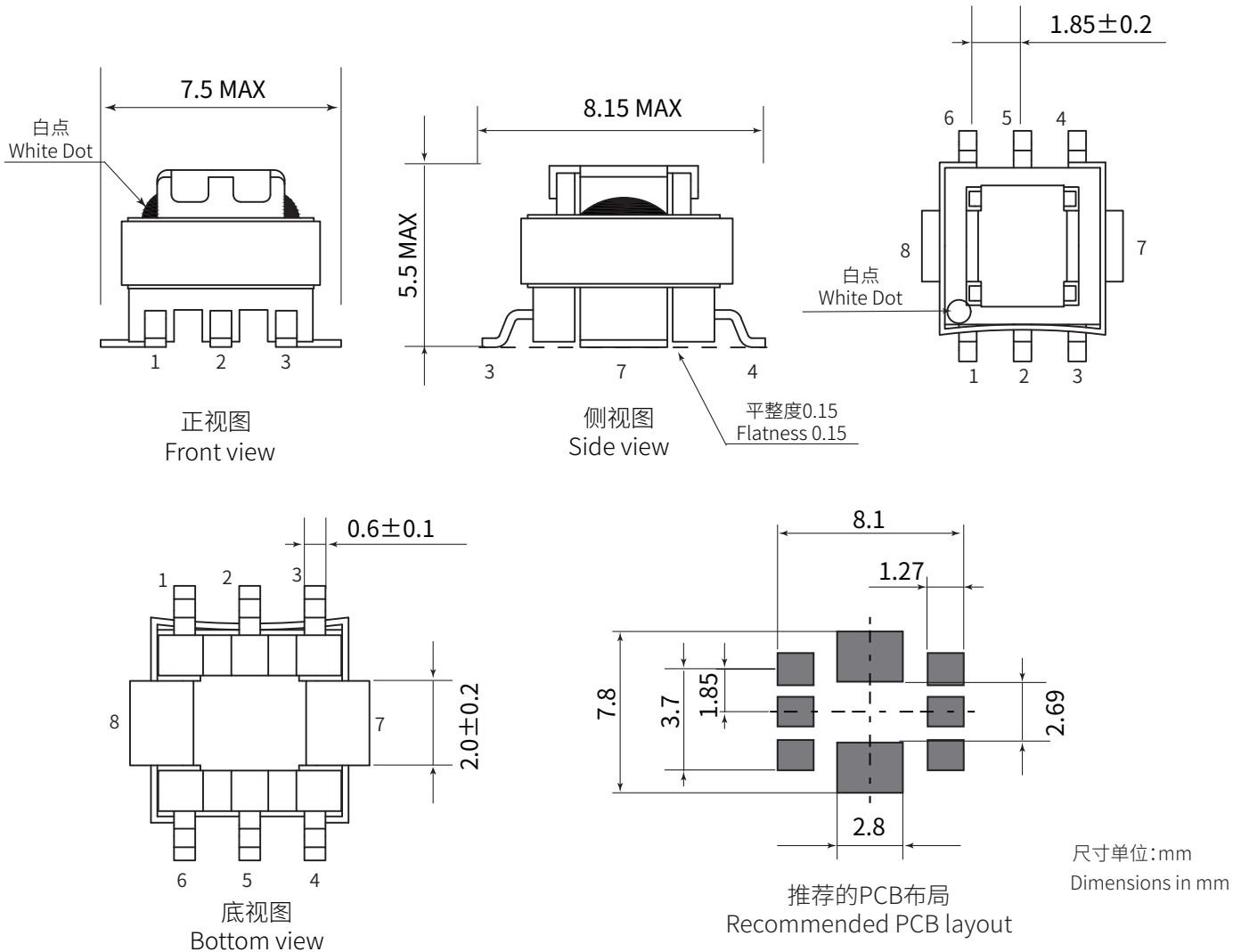
Delivery mode and packing units

- Tape, 330 mm ϕ reel
- Carton packaging

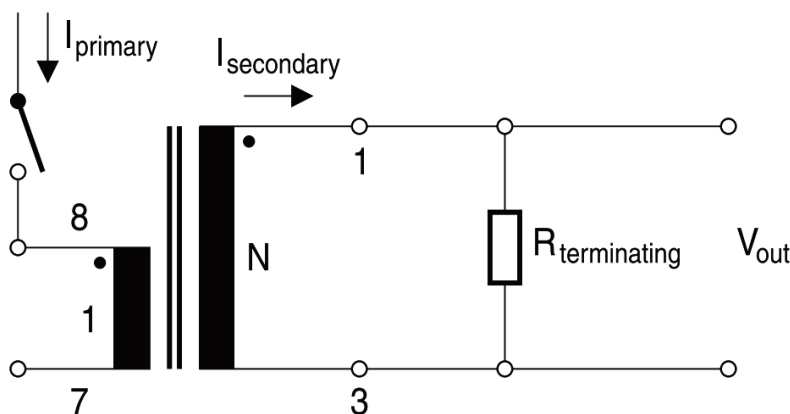
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EE 5.0 core

尺寸图 Dimensional drawing



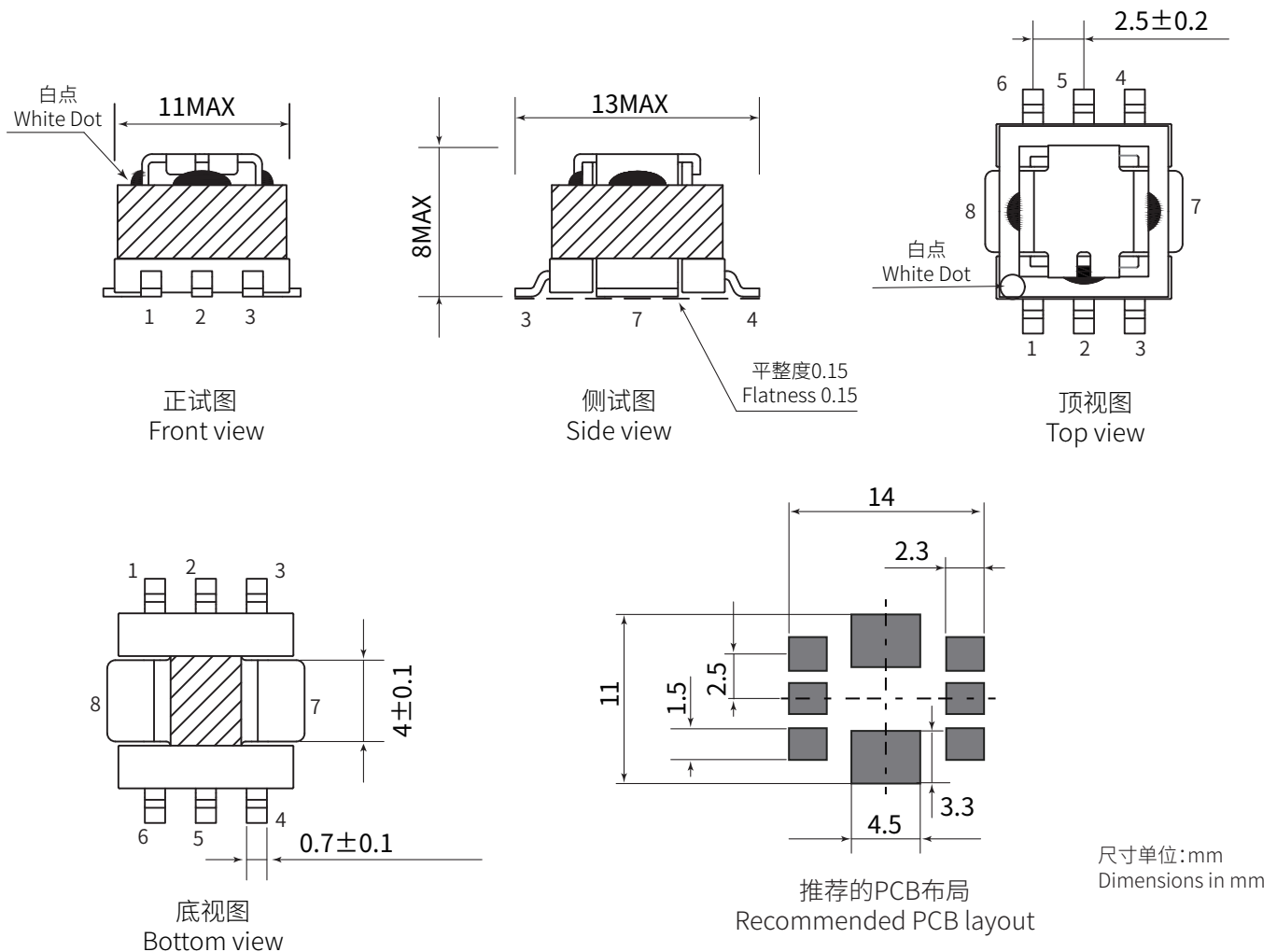
应用电路及引脚 Application circuit and pinning



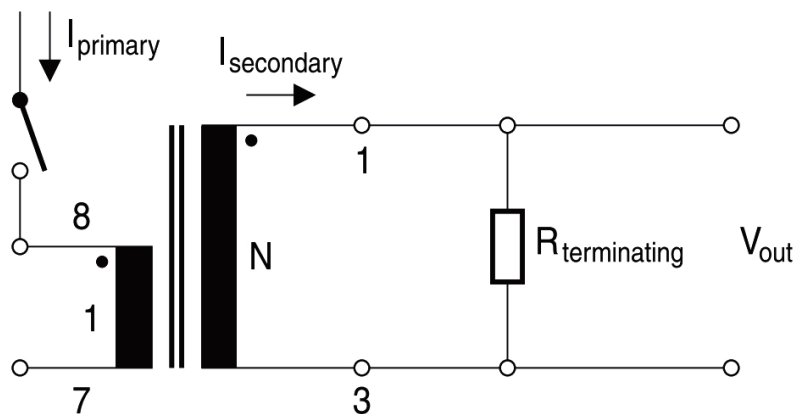
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技术数据和测量条件

频率范围	50kHz...500kHz
耐压	600伏交流电, 50赫兹, 2秒 (绕组对绕组)
电感L (1-3)	100 kHz, 100 mV, @+25°C
直流电阻Rmax	在+25°C下测量
感应电流	EE 5.0: +40°C温升下, 最大一次电流20Amax EE 8.3: +40°C温升下, 最大一次电流30Amax
可焊性	≥99.9锡, 无铅。或 Sn96.5 Ag3.0 Cu0.5: +(245±5) °C, (3±0.3) s 焊接区域的湿润≥ 95% (根据IEC 60068-2-58)
耐焊接热	+参照IEC 60068-2-58的 (260±5) °C (10±1) s
储存条件	-20°C...+40°C, ≤相对湿度75% (包装)
工作温度范围	-40°C...+125°C
重量	/

Technical data and measuring conditions

Frequency range	50 kHz ... 500 kHz
Hi-pot	600 V AC, 50 Hz, 2 s (winding to winding)
Inductance L (1-3)	100 kHz, 100 mV, @ +25 °C
DC resistance Rmax	Measured at +25 °C
Sensed current	EE5.0: The max. primary current of 20 A causes approx. +40 °C rise EE8.3: The max. primary current of 30 A causes approx. +40 °C rise
Solderability	≥99.9 Sn, lead-free. Or Sn96.5Ag3.0Cu0.5: +(245 ±5) °C, (3 ±0.3) s Wetting of soldering area ≥ 95% (to IEC 60068-2-58)
Resistance to soldering heat	+(260 ±5) °C, (10 ±1) s to IEC 60068-2-58
Storage conditions	-20 °C ... +40 °C, ≤75% RH (packaged)
Operating temperature range	-40 °C ... +125 °C
Weight	/

$$B_{\max} = \frac{V_{\text{sense, max}} \cdot \delta_{\max}}{n_s \cdot A_e \cdot f_{\text{osc}}}$$

注:

- B_{max} 最大磁通密度
- V_{sense,max} 测量信号的最大输出电压
- δ_{max} 最大占空比
- n_s 电流感应变压器二次绕组的匝数
- A_e 铁氧体磁芯的有效磁面积
- f_{osc} 工作频率
- A_e的典型值: 2.5 × 10⁻⁶ m²
- 典型B_{max}: 200 mT

With:

- B_{max} Maximum magnetic flux density in the ferrite core of the current sense transformer
- V_{sense,max} Maximum output voltage of the measurement signal
- δ_{max} Maximum duty cycle
- n_s Number of turns of the secondary winding of the current sense transformer
- A_e Effective magnetic area of the ferrite core
- f_{osc} Operating frequency of the switching operator IC
- Typical value for A_e: 2.5 × 10⁻⁶ m²
- Typical B_{max}: 200 mT

$$R_T = \frac{V_{\text{sense, max}} \cdot n_s}{I_{\text{prim, max}}}$$

注:

- R_T 负载电阻电阻
- V_{sense,max} 测量信号的最大输出电压
- n_s CT二次侧的匝数
- I_{prim,max} 最大一次电流 (峰值电流)

With:

- R_T Resistance of burden resistor
- V_{sense,max} Maximum output voltage of the measurement signal
- n_s Number of turns on the secondary side of the CT
- I_{prim,max} Maximum primary current (peak current)

特征和排序代码 Characteristics and ordering codes

EE 5.0 core

L_{\min} μH	Turns ratio 匝数比 $N_p : N_s$	DC resistance 直流电阻 R_{\max} (m Ω)		Voltage time product 电压时间积 $V \cdot \mu\text{s}$	Recomm. R_T 负载电阻 Ω	Ordering code 订货代码
		primary	secondary			
80	1:20	0.6	400	10.0	20	EE5.0-20
180	1:30	0.6	870	15.0	30	EE5.0-30
320	1:40	0.6	1140	20.0	40	EE5.0-40
500	1:50	0.6	1500	25.0	50	EE5.0-50
720	1:60	0.6	1980	30.0	60	EE5.0-60
980	1:70	0.6	3000	35.0	70	EE5.0-70
2000	1:100	0.6	5500	50.0	100	EE5.0-100
3000	1:125	0.6	6500	62.5	125	EE5.0-125
8000	1:200	0.6	33240	100.0	200	EE5.0-200

特征和排序代码 Characteristics and ordering codes

EE 8.3 core

L_{\min} μH	Turns ratio 匝数比 $N_p : N_s$	DC resistance 直流电阻 R_{\max} (m Ω)		Voltage time product 电压时间积 $V \cdot \mu\text{s}$	Recomm. R_T 负载电阻 Ω	Ordering code 订货代码
		primary	secondary			
230	1:20	0.4	295	28	40	EE8.3-20
510	1:30	0.4	426	42	60	EE8.3-30
910	1:40	0.4	689	56	80	EE8.3-40
1450	1:50	0.4	1083	70	100	EE8.3-50
2050	1:60	0.4	1322	84	120	EE8.3-60
2800	1:70	0.4	1541	98	140	EE8.3-70
5800	1:100	0.4	2800	140	200	EE8.3-100
9800	1:125	0.4	5044	175	250	EE8.3-125
22800	1:200	0.4	15300	280	400	EE8.3-200

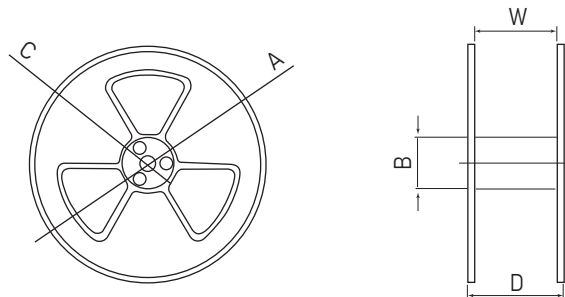
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EE 5.0 core

包装 PACKING:

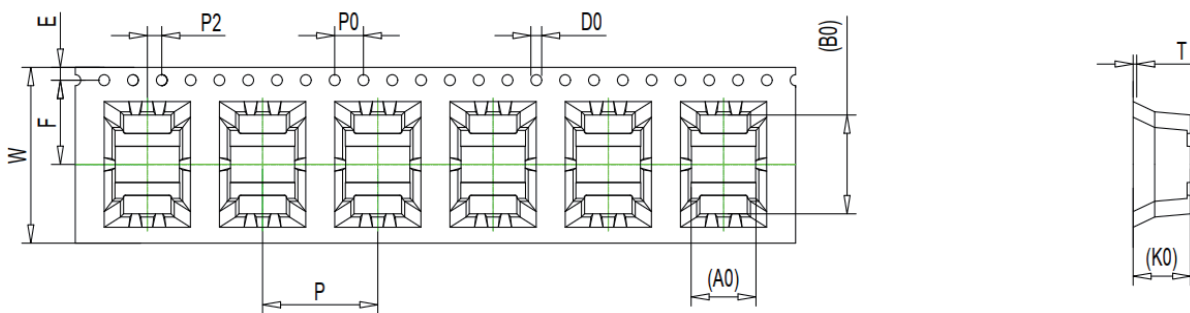
- 1.每卷包装数量1000pcs (载带开头和结尾留20cmREF不装产品, 卷轴放入PE袋内);
1. Each roll has a packaging quantity of 1000pcs (with 20cm left at the beginning and end of the tape), without any product, and the roll is placed in a PE bag);

卷轴尺寸 Reel Dimension (mm)



A	B	C	W	D
Φ330	Φ100	13	16	22

载带尺寸 Carrier size (mm)



W	A0	B0	K0	P	P0	P2	D0	F	E
16±0.3	6.15±0.1	8.2±0.1	5.5±0.1	12	4	2	Φ1.5	7.5±0.1	1.75

- 2.每啤盒装3000pcs (啤盒尺寸:335*335*80mm);
2. Each beer box is packed with 3000pcs (beer box size: 335 * 335 * 80mm);
- 3.每箱装6000pcs (外箱尺寸:355*355*165mm)。
3. Each box is packed with 6000pcs (outer box size: 355 * 355 * 165mm).

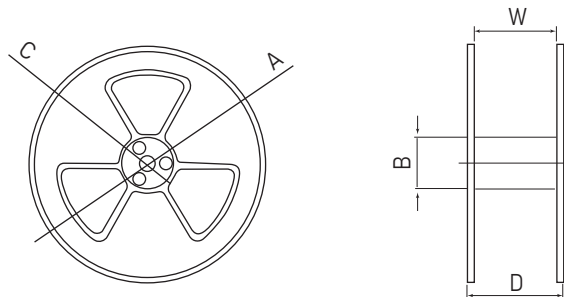
SMT电流感应变压器 SMT Current Sense Transformers

EE 8.3 core

包装 PACKING:

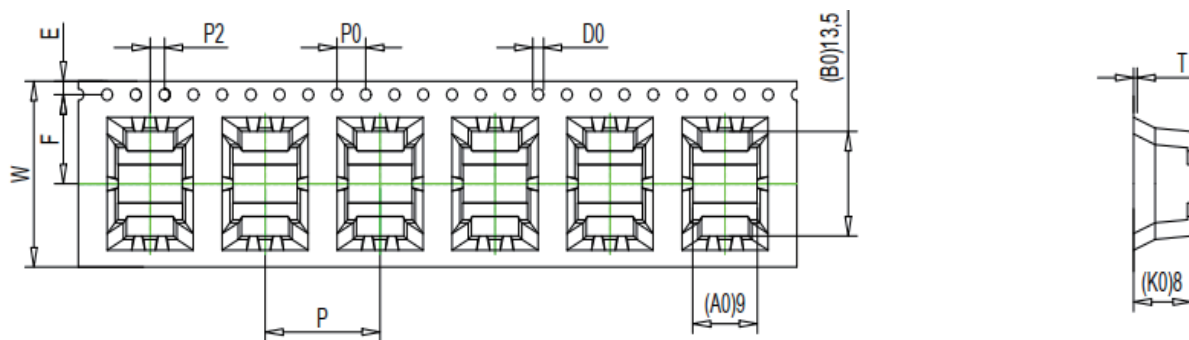
- 1.每卷包装数量550pcs (载带开头和结尾留20cmREF不装产品, 卷轴放入PE袋内) ;
1. Each roll has a packaging quantity of 550pcs (with 20cm of REF left at the beginning and end of the tape, no product is loaded, and the reel is placed in a PE bag);

卷轴尺寸 Reel Dimension (mm)



A	B	C	W	D
Φ330	Φ100	13	24	27

载带尺寸 Carrier size (mm)



W	A0	B0	K0	P	P0	P2	D0	F	E
24±0.3	10±0.1	13.5±0.1	8±0.1	16	4	2	Φ1.5	11.5±0.1	1.75

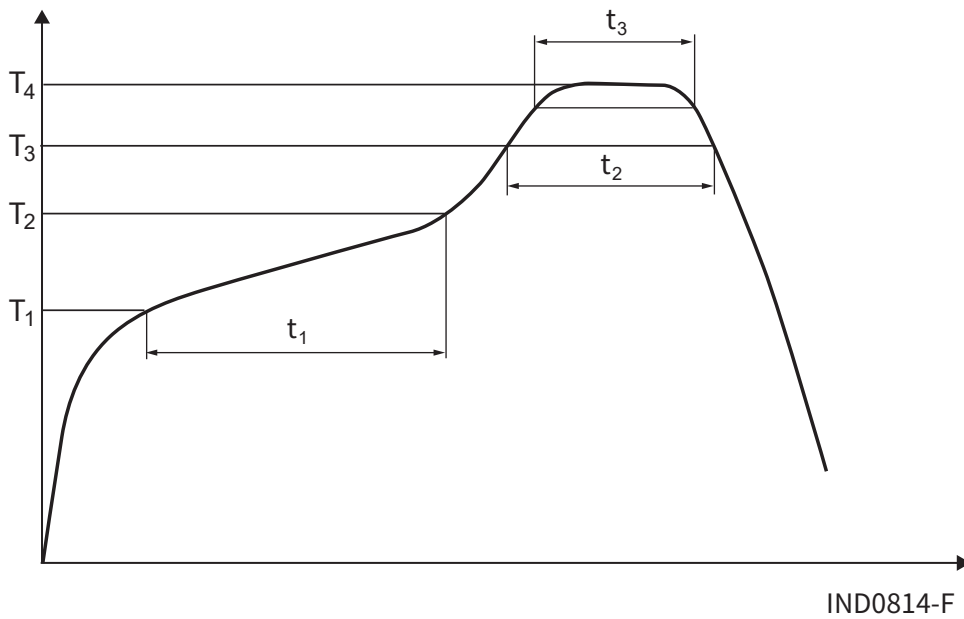
- 2.每啤盒装1650pcs (啤盒尺寸:335*335*80mm) ;
2. Each beer box is packed with 1650pcs (beer box size: 335 * 335 * 80mm);
- 3.每箱装3300pcs (外箱尺寸:355*355*165mm)。
3. Each box is packed with 3300pcs (outer box size: 355 * 355 * 165mm).

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推荐回流焊曲线 Recommended reflow soldering curve

无铅焊料 (基于JEDEC J-STD 020D)

Pb-free solder material (based on JEDEC J-STD 020D)



T_1	T_2	T_3	T_4	t_1	t_2	t_3
°C	°C	°C	°C	sec	sec	sec
150	200	217	245	<110	<90	20...40

从+25°C到T的最长时间:300秒

Max. time from +25 °C to T: 300 seconds

最多3次回焊循环

Max. 3 reflow cycles

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- 请注意我们的电感器数据手册(最新版)和数据表中的建议被单。
 - 应特别注意此处给出的降额曲线。
 - 还应遵守焊接条件。引用的与波浪有关的温度焊接指的是引脚,而不是外壳。
- Please note the recommendations in our Inductors data book (latest edition) and in the data sheets.
 - Particular attention should be paid to the derating curves given there.
 - The soldering conditions should also be observed. Temperatures quoted in relation to wave soldering refer to the pin, not the housing.
- 如果要对部件进行清洗或上漆,则有必要检查清洗是否正确所使用的清漆剂对电线绝缘、所使用的任何塑料,或者在胶合接头上。特别是,清洗清漆剂残留物可能具有长期对电线绝缘产生负面影响。清洗过程可能会因静电或循环机械故障而损坏产品负载(例如超声波清洗)。它们可能会导致产品及其零件出现裂纹,这可能会降低可靠性或寿命。
- If the components are to be washed varnished it is necessary to check whether the washing varnish agent that is used has a negative effect on the wire insulation, any plastics that are used, or on glued joints. In particular, it is possible for washing varnish agent residues to have a negative effect in the long-term on wire insulation.

Washing processes may damage the product due to the possible static or cyclic mechanical loads (e.g. ultrasonic cleaning). They may cause cracks to develop on the product and its parts, which might lead to reduced reliability or lifetime.
- 如果将部件封装在客户应用中,则必须遵守以下几点:
 - 许多灌封材料硬化时会收缩。因此,它们会对塑料施加压力住房或核心。这种压力会对电性能产生有害影响,并且极端情况可能会机械损坏芯或塑料外壳。
 - 有必要检查所使用的封装材料是否会侵蚀或破坏电线绝缘材料、塑料或胶水。
 - 封装材料的影响可能会改变组件的高频行为。
- The following points must be observed if the components are potted in customer applications:
 - Many potting materials shrink as they harden. They therefore exert a pressure on the plastic housing or core. This pressure can have a deleterious effect on electrical properties, and in extreme cases can damage the core or plastic housing mechanically.

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- It is necessary to check whether the potting material used attacks or destroys the wire insulation, plastics or glue.
- The effect of the potting material can change the high-frequency behaviour of the components.
- 铁氧体对直接冲击很敏感。这可能会导致型芯材料剥落, 或导致型芯断裂。
- Ferrites are sensitive to direct impact. This can cause the core material to flake, or lead to breakage of the core.
- 即使对于特定于客户的产品, 电路中的元件也只能由客户进行最终验证。
- Even for customer-specific products, conclusive validation of the component in the circuit can only be carried out by the customer.

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2. We also point out that in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.

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3. 必须遵守警告、注意事项和特定于产品的注意事项。

3. The warnings, cautions and product-specific notes must be observed.

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