

## **Aluminum electrolytic capacitors**

### **铝电解电容器**

### **Capacitors with screw terminals**

#### **螺栓式接线柱电容器**

**Series/Type:**     **B43310, B43330 – Standard industrial – 85 °C**  
**系列/型号:**     **B43310, B43330 – 标准工业 – 85 °C**

**Date:**             August 2007  
**日期:**             2007 年 8 月

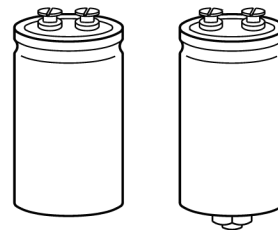
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## General purpose grade capacitors 通用电容器

### Applications 应用

- Uninterruptible power supplies  
不间断电源
- Frequency converters  
变频器



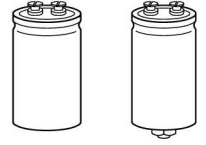
B43310 B43330

### Features 特点

- All-welded construction ensures reliable electrical contact  
全焊结构，确保可靠的电气接触性。
- High reliability and high ripple current capability  
高性能及耐高纹波

### Construction 结构

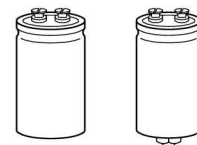
- Charge-discharge proof, polar  
充电—放电保护，带极性
- Aluminum case with insulating sleeve  
采用铝质外壳及绝缘外套设计
- Poles with screw terminal connections  
螺栓式接线柱电极连接
- Mounting with ring clips, clamps or threaded stud  
采用开口环/夹或螺栓安装
- The bases of types with threaded stud and  $d \leq 76.9$  mm are not insulated, types with  $d = 91.0$  mm have fully insulated bases.  
采用螺栓装配且  $d \leq 76.9$  mm 的型号的底板未做绝缘处理，直径为 91.0 mm 的型号底板有做绝缘处理



Standard industrial 标准工业 – 85 °C

Specifications and characteristics in brief 规格及特点简介

Rated voltage $V_R$ 额定电压 $V_R$	400 ... 450 V DC		
Surge voltage $V_S$ 浪涌电压 $V_S$	$1.10 \cdot V_R$		
Rated capacitance $C_R$ 额定电容 $C_R$	1800 ... 15000 $\mu\text{F}$		
Capacitance tolerance 电容量偏差	$\pm 20\% \triangleq M$		
Leakage current $I_{\text{leak}}$ 漏电流 $I_{\text{leak}}$ (20 °C, 5 minutes)	0.008 C·V [ $\mu\text{A}$ ] or 5 mA whichever is smaller 0.008 C·V [ $\mu\text{A}$ ] 或 5 mA 取小值 C = Rated Capacitance [ $\mu\text{F}$ ], V = Rated Voltage [V] C = 额定容值 [ $\mu\text{F}$ ], V = 额定电压 [V]		
$\tan \delta_{\text{max.}}$ (20 °C, 120 Hz) 耗角正切 $\text{max.}$ (20 °C, 120 Hz)	0.2		
Load life 负载寿命  85 °C; $V_R$ ; $I_{\text{AC,R}}$	2000 h (小时)	$\Delta C/C$ 容量变化	Less than $\pm 15\%$ of initial value 小于初始值 $\pm 15\%$
		$\tan \delta$ 损耗角正切	Not more than 175% of specified value 不超过 175%规定值
		$I_{\text{leak}}$ 漏电流	Less than specified value 小于规定值
Vibration resistance test 抗振试验	To IEC 60068-2-6, test Fc: Displacement amplitude 0.75 mm, frequency range 10 ... 55 Hz, acceleration max. 10 g, duration 3 $\times$ 2 h. Capacitor mounted by its body which is rigidly clamped to the work surface.  符合 IEC 60068-2-6, 试验 Fc: 位移幅值: 0.75 mm; 频率范围: 10 ... 55 Hz; 最大加速度: 10 g; 持续时间: 3 X 2h。 电容器本身牢固地固定在工作表面。		
IEC climatic category IEC 气候种类	To IEC 60068-1: 25/085/56 (–25 °C/+85 °C/56 days damp heat test)  符合 IEC 60068-1: 25/085/56 (–25 °C/+85 °C/56 天, 湿热试验)		
Detail specification 详细规格	Similar to CECC 30301-810 与 CECC 30301-810 相似		
Sectional specification 局部规格	IEC 60384-4		



## B43310, B43330

### Standard industrial 标准工业 – 85 °C

#### Ripple current capability

##### 纹波电流能力

Due to the ripple current capability of the contact elements, the following current upper limits must not be exceeded: 由于接触元件的纹波电流容量，不得超过以下电流上限：

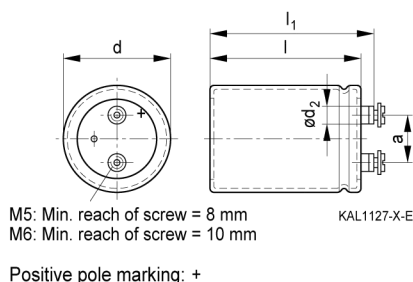
Capacitor diameter d 电容器直径 d	51.6 mm	64.3 mm	76.9 mm	91.0 mm
$I_{AC,max}$ 最大电流	34 A	45 A	57 A	80 A

#### Dimensional drawings 尺寸图

##### B43310

##### Ring clip/clamp mounting

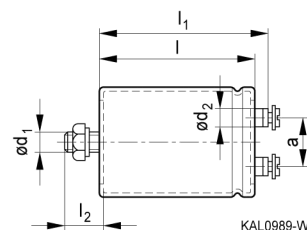
##### 开口环、夹安装



##### B43330

##### Threaded stud mounting

##### 螺栓安装



For B43330 capacitors with threaded stud and  $d \leq 76.9$  mm the base is not insulated. For details, refer to “Data Book 2007 – Aluminum Electrolytic Capacitors”,  
B43330 采用螺栓装配且  $d \leq 76.9$  mm 的型号的基板未做绝缘处理。详细信息，参考“2007 年数据手册—铝电解电容器”

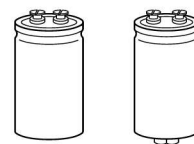
#### Dimension and weights 尺寸和重量

Terminal 端子	Dimensions (mm) with insulating sleeves 含绝缘套管的尺寸(mm)							Approx. weight (g) 大约重量 (克)
	d	l +3/-0	l <sub>1</sub> +3/-0	l <sub>2</sub> +0/-1	d <sub>1</sub>	d <sub>2</sub> max.	a +0.2/-0.4	
M5	51.6 +0/-0.8	130	136.5	17	M12	11.4	22.2	350
M5	64.3 +0/-0.8	96	102.5	17	M12	13.2	28.5	400
M5	64.3 +0/-0.8	115	121.5	17	M12	13.2	28.5	490
M5	64.3 +0/-0.8	130	136.5	17	M12	13.2	28.5	540
M6	76.9 +0/-0.7	115	120.8	17	M12	17.7	31.7	620
M6	76.9 +0/-0.7	130	135.8	17	M12	17.7	31.7	770
M6	76.9 +0/-0.7	155	160.8	17	M12	17.7	31.7	990
M6	91.0 +0/-2	157	162.5	17	M12	17.7	31.7	1400
M6	91.0 +0/-2	196	201.5	17	M12	17.7	31.7	1600
M6	91.0 +0/-2	220	225.5	17	M12	17.7	31.7	1900

Please read *Cautions*  
& *warnings and Important notes* at the end of this document.  
请阅读本文件结尾部分的敬告和警告及重要事项。

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**B43310, B43330**

**Standard industrial 标准工业 – 85 °C**

## Packing 包装

Capacitor diameter d 电容器直径 d	Packing units (pcs.) 包装单位 (个)
51.6 mm	22
64.3 mm	15
76.9 mm	12
91.0 mm	8

For ecological reasons the packing is pure cardboard.  
基于环保的原因，包装采用纯纸板包装。

## Accessories 附件

The following items are included in the delivery package, but are not fastened to the capacitors:  
出厂包装内还包括以下附件，但未固定在电容器上：

For terminals 用于接线柱	M5	A 5.1 DIN 6797	Cylinder-head screw M5 × 8 DIN 84-4.8 圆柱头螺丝 M5 × 8 DIN 84-4.8	2.0 Nm
	M6	A 6.4 DIN 6797	Cylinder-head screw M6 × 10 DIN 85-4.8 圆柱头螺丝 M6 × 10 DIN 85-4.8	2.5 Nm
For mounting 用于底部带螺栓 安装	M12	J 12.5 DIN 6797	Hex nut BM 12 DIN 439 六角螺母 BM 12 DIN 439	10 Nm

The following items must be ordered separately. For details, refer to “Data Book 2007 – Aluminum Electrolytic Capacitors”, chapter “Screw terminals – Accessories”.

以下附加必须分开订购。详细信息，参考“2007 年数据手册—铝电解电容”的“螺旋式接线柱—附件”部分。

Item 部件	Type 类型
Ring clips 开口环	B44030
Clamps for capacitors with $d \geq 64.3$ mm 用于 $d \geq 64.3$ mm 的电容器的夹子	B44030
Insulating parts 绝缘部件	B44020





**Standard industrial 标准工业 – 85 °C**

**Technical data and ordering codes 技术参数和订货号**

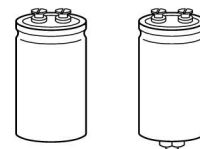
$C_R$ 120 Hz 20 °C µF	Case dimensions d × l mm	$ESR_{typ}$ 120 Hz 20 °C mΩ	$I_{AC,max}$ 120 Hz 40 °C A	$I_{AC,R}$ 120 Hz 85 °C A	Ordering code 订货号 (composition see below)
<b><math>V_R = 400 \text{ V DC}</math></b>					
2200	51.6 × 130	87	17.3	6.5	B433*0A9228M000
2200	64.3 × 96	87	17.0	6.4	B433*0C9228M000
2700	64.3 × 96	71	18.9	7.1	B433*0A9278M000
<b>3300</b>	<b>64.3 × 115</b>	<b>58</b>	<b>22.6</b>	<b>8.5</b>	<b>B433*0A9338M000</b>
3900	64.3 × 130	49	25.8	9.7	B433*0A9398M000
4700	76.9 × 115	41	28.5	10.7	B433*0A9478M000
5600	76.9 × 130	34	32.5	12.2	B433*0A9568M000
6800	76.9 × 155	28	38.8	14.6	B433*0A9688M000
8200	91.0 × 157	23	44.7	16.8	B433*0A9828M000
10000	91.0 × 157	19	49.2	18.5	B433*0A9109M000
12000	91.0 × 196	16	59.6	22.4	B433*0A9129M000
15000	91.0 × 220	13	69.7	26.2	B433*0A9159M000
<b><math>V_R = 450 \text{ V DC}</math></b>					
1800	51.6 × 130	102	16.0	6.0	B433*0A5188M000
2200	64.3 × 96	83	17.3	6.5	B433*0A5228M000
2700	64.3 × 115	68	20.7	7.8	B433*0A5278M000
3300	64.3 × 130	55	24.2	9.1	B433*0A5338M000
3900	76.9 × 115	49	25.8	9.7	B433*0A5398M000
4700	76.9 × 130	41	29.8	11.2	B433*0A5478M000
5600	76.9 × 155	34	35.4	13.3	B433*0A5568M000
6800	91.0 × 157	28	40.7	15.3	B433*0A5688M000
8200	91.0 × 157	23	44.7	16.8	B433*0A5828M000
10000	91.0 × 196	19	54.3	20.4	B433*0A5109M000
12000	91.0 × 220	16	62.5	23.5	B433*0A5129M000

**Composition of ordering code 订货号的编码规则**

\* = Mounting style 安装方式

1 = for capacitors with ring clip/clamp mounting 电容器采用开口环/夹安装

3 = for capacitors with threaded stud 电容器采用底部带螺栓

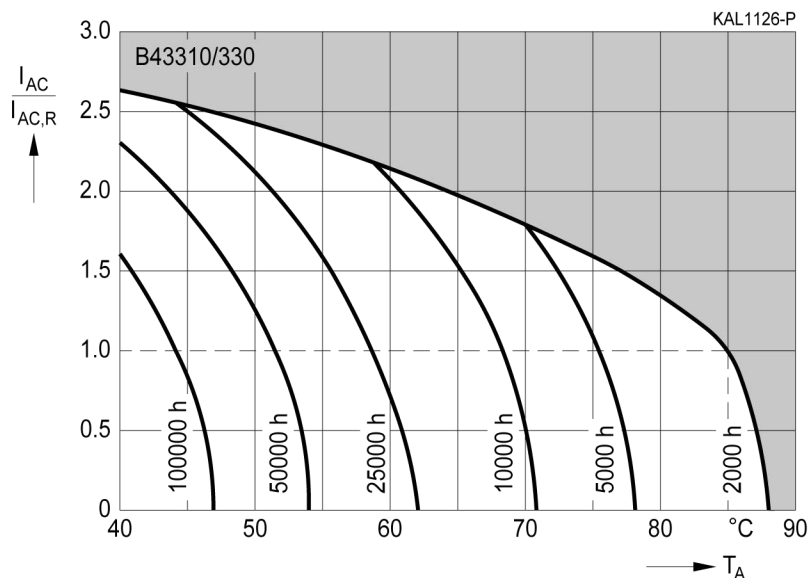


**Standard industrial 标准工业 – 85 °C**

**Load life 负载寿命**

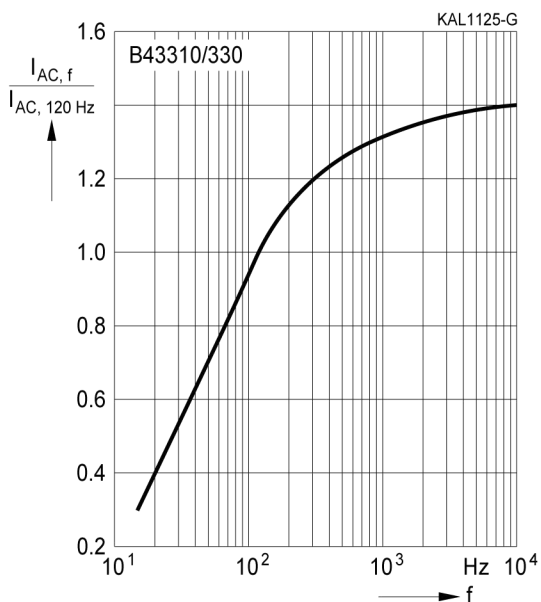
depending on ambient temperature  $T_A$  under ripple current operating conditions

在纹波电流运行条件下, 负载寿命取决于环境温度



**Frequency factor of permissible ripple current  $I_{AC}$  versus frequency  $f$**

允许纹波电流  $I_{AC}$  于频率  $f$  的关系函数



Please read **Cautions**  
& **warnings** and **Important notes** at the end of this document.

请阅读本文件结尾部分的**敬告和警告及重要事项**.

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## Cautions and warnings

### 敬告和警告

#### Personal safety

##### 人身安全

The electrolytes used by EPCOS have not only been optimized with a view to the intended application, but also with regard to health and environmental compatibility. They do not contain any solvents that are detrimental to health, e.g. dimethyl formamide (DMF) or dimethyl acetamide (DMAC).

Furthermore, part of the high-voltage electrolytes used by EPCOS is self-extinguishing. They contain flame-retarding substances which will quickly extinguish any flame that may have been ignited.

As far as possible, EPCOS does not use any dangerous chemicals or compounds to produce operating electrolytes. However, in exceptional cases, such materials must be used in order to achieve specific physical and electrical properties because no safe substitute materials are currently known. However, the amount of dangerous materials used in our products has been limited to an absolute minimum. Nevertheless, the following rules should be observed when handling Al electrolytic capacitors:

- Any escaping electrolyte should not come into contact with eyes or skin.
- If electrolyte does come into contact with the skin, wash the affected parts immediately with running water. If the eyes are affected, rinse them for 10 minutes with plenty of water. If symptoms persist, seek medical treatment.
- Avoid breathing in electrolyte vapor or mists. Workplaces and other affected areas should be well ventilated. Clothing that has been contaminated by electrolyte must be changed and rinsed in water.

爱普科斯(EPCOS)所采用的电解液基于预定应用并依据健康和环境适应性进行了优化,其中不含对健康有害的溶剂,如二甲基甲酰胺(DMF)或二甲基乙酰胺(DMAC)。

此外,在爱普科斯采用的高压电解液中,有一部分含有阻燃材料,具有自熄性,可迅速熄灭所有可能发生的火灾。

爱普科斯尽可能不使用危险性化学品或成分来生产电解液。但是某些特殊情况下,因为没有安全性代用材料,所以不得不使用上述材料以保证实现特殊的物理和电性能。但无论如何,我们已将此类危险性化学品的数量控制在最小范围内。虽然如此,用户在操作铝电解电容器时,还应遵守以下规则:

- 避免让泄漏出的电解液接触到眼睛或者皮肤。
- 如果接触到皮肤,请立刻用清水冲洗。如果接触到眼睛,使用足够的清水冲洗眼睛十分钟。如果症状持续存在,请就医。
- 避免在电解液蒸发气体或薄雾中呼吸。工作场所和其它受影响区域应保持良好通风。如果衣物粘到电解液,请立即更换并将其浸泡在水中。

注:本页内容请以英文版本为准。



## Cautions and warnings

### 敬告和警告

#### Product safety

The table below summarizes the safety instructions that must be observed without fail. A detailed description can be found in the relevant sections of Data Book 2007 – Aluminum Electrolytic Capacitors, chapter "General technical information".

Topic	Safety Information	Reference Chapter 'General technical information'
Polarity	Make sure that polar capacitors are connected with the right polarity.	1 "Basic construction of aluminum electrolytic capacitors"
Reverse voltage	Voltages polarity classes should be prevented by connecting a diode.	3.1.6 "reverse voltage"
Upper category temperature	Do not exceed the upper category temperature.	7.2 "Maximum permissible operating temperature"
Maintenance	Make periodic inspections of the capacitors. Before the inspection, make sure that the power supply is turned off and carefully discharge the electricity of the capacitors. Do not apply any mechanical stress to the capacitor terminals.	10 "Maintenance"
Mounting position of screw terminal capacitors	Do not mount the capacitor with the terminals (safety vent) upside down.	11.1. "Mounting positions of capacitors with screw terminals"
Mounting of single-ended capacitors	The internal structure of single-ended capacitors might be damaged if excessive force is applied to the lead wires. Avoid any compressive, tensile or flexural stress. Do not move the capacitor after soldering to PC board.	11.4 "Mounting considerations for single-ended capacitors"
Robustness of terminals	The following maximum tightening torques must not be exceeded when connecting screw terminals: M5: 2 Nm M6: 2.5 Nm	11.3 "Mounting torques"
Soldering	Do not exceed the specified time or temperature limits during soldering.	11.5 "Soldering"

Cautions and warnings

敬告和警告

Topic	Safety Information	Reference Chapter ‘General technical information’
Soldering, cleaning agents	Do not allow halogenated hydrocarbons to come into contact with aluminum electrolytic capacitors.	11.6 “Cleaning agents”
Passive flammability	Avoid external energy, such as fire or electricity.	8.1 “Passive flammability”
Active flammability	Avoid overload of the capacitors.	8.2 “Active flammability”
		Reference Chapter ‘Capacitors with screw terminals’
Breakdown strength of insulating sleeves.	Do not damage the insulating sleeve, especially when ring clips are used for mounting.	“Screw terminals – accessories”

Cautions and warnings

敬告和警告

产品安全性

下表总结了一定要注意的安全说明事项。详情请参见铝电解电容器数据手册 2007 “一般技术信息” 的相关部分。

主题	安全信息	参考章节 “一般技术信息”
极性	确定正确连接极性电容器。	1 “铝电解电容器的基本结构”
反向电压	应连接一个二极管以预防电压极性出现。	3.1.6 “反向电压”
上限类别温度	切勿超出上限类别温度。	7.2 “最高的容许运行温度”
维修	对电容器作定期检查。在检查之前，确定已经关闭电源并小心对电容器进行放电。切勿对电容器端子施加任何机械应力。	10 “维修”
螺丝接线端电容器的安装位置	安装电容器时，切勿倒转接线端（安全阀）。	11.1 “螺丝接线端电容器的安装位置”
单端电容器的安装	用力拉扯导线可能会导致单端电容器的内部结构损坏。 避免任何压缩应力、拉应力或弯曲应力。 切勿在电容器被焊接到印刷电路板上后移动电容器。 切勿握住所焊接的电容器提起印刷电路板。 切勿将电容器置于孔空间与规定的引线空间不同的印刷电路板。	11.4 “单端电容器安装注意事项”
端子的坚固性	连接螺栓式接线柱时，切勿超过下列最大紧固扭矩： M5: 2 Nm M6: 2.5 Nm	11.3 “安装扭矩”
焊接	焊接时切勿超过规定的时间或温度极限。	11.5 “焊接”
焊接，清洗剂	切勿让卤代烃接触到铝电解电容器。	11.6 “清洗剂”
他燃	避免外部能量输入，如火或电。	8.1 “他燃”
自燃	避免电容器超负荷。	8.2 “自燃”
		参考章节 “螺栓式接线柱电容器”
绝缘套管的击穿强度。	切勿损坏绝缘套管，特别是在用圈夹进行安装时。	“螺栓式接线柱——附件”

注：本页内容请以英文版本为准。

## Important notes

### 重要事项

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of passive 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 a passive 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 a passive electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as “hazardous”)**. Useful information on this will be found in our Material Data Sheets on the Internet ([www.epcos.com/material](http://www.epcos.com/material)). Should you have any more detailed questions, please contact our sales offices.
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## Important notes

### 重要事项

以下适用于所有上述产品：

- 1、本出版物的某些部分包括**本公司产品在特定领域的适用性声明**。这些声明基于我们对所涉及领域对产品的通用要求的了解。尽管如此，仍需明确指出的是，**此类声明并不能作为本公司产品在特定终端应用中适用性的约束性声明**。通常，爱普科斯要么不熟悉特定客户的应用，要么比客户自己了解的要少。因此，客户有责任检查和确定爱普科斯产品是否具有适用于特定应用的特性。
- 2、还需指出的是，个别情况下，即便按照规定的方法操作，现有的技术仍不能完全排除无源电子元件在**正常使用寿命前发生故障或失效**。具有很高安全要求的应用，特别是无源电子元件故障或失效可能导致生命安全或健康问题的应用（如事故预防或救生系统）中，必须采用合适的终端应用设计或必要的措施（如安装保护电路或冗余电路），确保发生无源电子元件故障或失效时不会对他人产生伤害。
- 3、**必须严格遵守所有警告、注意和产品提示**。
- 4、为满足特定技术要求，本出版物所述的有些产品可能包含特定区域内限制的物质（如，被认为“有害的”物质）。相关信息，可查看我们网站（[www.epcos.com/material](http://www.epcos.com/material)）上的“物料清单”。如果有更细节的问题，请联系我们的销售部门。
- 5、我们始终坚持产品的持续改进。因此，本出版物所述的产品会不断更新。同时，相关规格也会随之改变。所以，定购时，请查看所述产品的说明和规格是否依然适用。  
同时，我们有权停止生产和销售这些产品。因此，我们无法保证此处所述所有产品都一直有货。
- 6、除非合同另有规定，所有订货都应符合德国电子电气工业协会（ZVEI）发布的最新“电气行业产品销售和服务通用条款”的规定。
- 7、商标 EPCOS、BAOKE、Alu-X、CeraDiode、CSSP、MLSC、MiniBlue、MKK、MotorCap、PCC、PhaseCap、PhaseMod、SIFERRIT、SIFI、SIKOREL、SilverCap、SIMDAD、SIMID、SineFormer、SIOV、SIP5D、SIP5K、ThermoFuse 及 WindCap 是公司在欧洲或其他国家的注册商标或正在审查的商标。详细信息，请访问 [www.epcos.com/trademarks](http://www.epcos.com/trademarks)。

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