

RM 6, RM 6 LP Cores and accessories

Series/Type: B65807, B65808, B65821, B65659

Date: June 2013

EPCOS AG is a TDK Group Company.

[©] EPCOS AG 2015. Reproduction, publication and dissemination of this publication, enclosures hereto and the information contained therein without EPCOS' prior express consent is prohibited.



Core and accessories

	Individual parts	Part no.	Page
	——— Adjusting screw	B65659	11
	——— Core	B65807	3
	Clamps	B65808	9
	——— Insulating washer 1	B65808	9
	Coil former	B65808	5, 6
	Core	B65807	3
	Threaded sleeve (glued-in)		
FRM0048-K	Insulating washer 2	B65808	9
Example of an assembly set			
Also available:	Coil former for SMPS transf. Coil former for	B65808	7
	power applications	B65808	8
	SMD coil former	B65821	10
	Clamp	B65808	10
	RM 6 low profile:		
	Core	B65807P	12



Core B65807

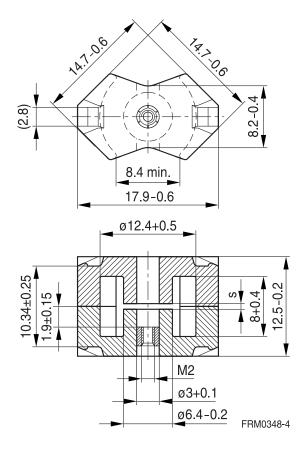
- To IEC 62317-4
- Core without center hole for transformer applications
- Delivery mode: sets

Magnetic characteristics (per set)

	with center hole	without center hole	
Σ Ι/A	0.86	0.78	mm ⁻¹
l _e	26.9	28.6	mm
I _e A _e A _{min}	31.3	36.6	mm ²
A_{min}		31	mm ²
V _e	840	1050	mm ³

Approx. weight (per set)

m	4.9	5.1	g



Gapped

Material	A _L value	s approx. mm	μ _e	Ordering code ¹⁾ -J without center hole -N with threaded sleeve -C with center hole
K1	40 ±3%	0.80	27.4	B65807+0040A001
M33	63 ±3% 100 ±3%	0.60 0.38	43.2 68.5	B65807+0063A033 B65807+0100A033
N48	160 ±3% 250 ±3% 315 ±3% 400 ±3%	0.22 0.12 0.08 0.05	109 171 215 274	B65807+0160A048 B65807+0250A048 B65807+0315A048 B65807+0400A048
N41	250 ±3%	0.17	155	B65807J0250A041

¹⁾ Replace the + by the code letter "C" or "N" for the required version. Standard version is "C".



RM 6 Core B65807

Ungapped

Material	A _L value	μ _e	P _V	Ordering code -C with center hole
	nH		W/set	-J without center hole
N48	2200 +30/–20%	1500		B65807C0000R048
N45	3500 +30/–20%	2180		B65807J0000R045
N30	4300 +30/–20%	2670		B65807J0000R030
T35	6200 +30/–20%	3860		B65807J0000R035
T38	8600 +40/–30%	5350		B65807J0000Y038
T66	12300 +40/–30%	7650		B65807J0000Y066
N49	1700 +30/–20%	1060	< 0.15 (50 mT, 500 kHz, 100 °C)	B65807J0000R049
N87	2400 +30/–20%	1490	< 0.51 (200 mT, 100 kHz, 100 °C)	B65807J0000R087
N97	2400 +30/–20%	1490	< 0.39 (200 mT, 100 kHz, 100 °C)	B65807J0000R097
N41	3100 +30/–20%	1930	< 0.16 (200 mT, 25 kHz, 100 °C)	B65807J0000R041



Accessories B65808

Coil former, squared pins

Material: GFR thermosetting plastic (UL 94 V-0, insulation class to IEC 60085:

H

max. operating temperature 180 °C), color code black

Sumikon PM 9630® [E41429 (M)], SUMITOMO BAKELITE CO LTD

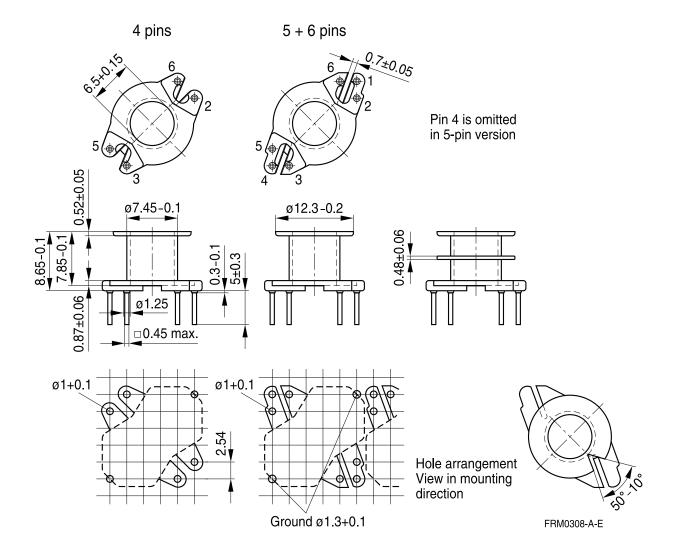
Solderability: to IEC 60068-2-20, test Ta, method 1 (aging 3): 235 °C, 2 s

Resistance to soldering heat: to IEC 60068-2-20, test Tb, method 1B: 350 °C, 3.5 s

Winding: see Data Book 2013, chapter "Processing notes, 2.1"

For matching clamp and insulating washers see page 9.

Sections	A _N mm ²	I _N mm	A_R value $\mu\Omega$	Pins	Ordering code
1	15	30	69	4 5 6	B65808N1004D001 B65808N1005D001 B65808N1006D001
2	14	30	73	4 6	B65808N1004D002 B65808N1006D002





Accessories B65808

Coil former, pins squared in the start-of-winding area

Material: GFR thermosetting plastic (UL 94 V-0, insulation class to IEC 60085:

H

max. operating temperature 180 °C), color code white

Bakelite UP 3420® [E61040 (M)], HEXION SPECIALTY CHEMICALS GMBH

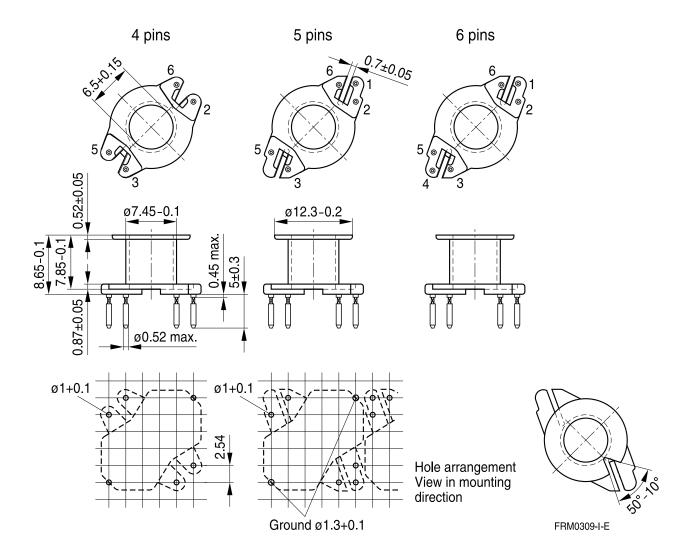
Solderability: to IEC 60068-2-20, test Ta, method 1 (aging 3): 235 °C, 2 s

Resistance to soldering heat: to IEC 60068-2-20, test Tb, method 1B: 350 °C, 3.5 s

Winding: see Data Book 2013, chapter "Processing notes, 2.1"

For matching clamp and insulating washers see page 9.

Sections	A _N mm ²	I _N mm	A_R value $\mu\Omega$	Pins	Ordering code
1	15	30	69	4	B65808P1004D001
				5	B65808P1005D001
				6	B65808P1006D001





Accessories B65808

Coil former for SMPS transformers with line isolation

The creepage distances and clearances are designed such that the coil former is suitable for use in SMPS transformers with line isolation.

Closed center flange with external wire guide

■ Pins squared in the start-of-winding area

Optimized for use with automatic winding machines

Material: GFR thermosetting plastic (UL 94 V-0, insulation class to IEC 60085:

F

max. operating temperature 155 °C), color code black

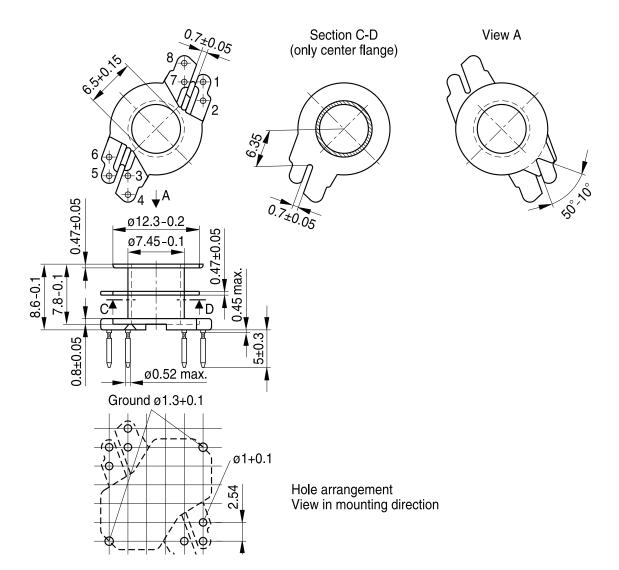
Sumikon PM 9630® [E41429 (M)], SUMITOMO BAKELITE CO LTD

Solderability: to IEC 60068-2-20, test Ta, method 1 (aging 3): 235 °C, 2 s

Resistance to soldering heat: to IEC 60068-2-20, test Tb, method 1B: 350 °C, 3.5 s

Winding: see Data Book 2013, chapter "Processing notes, 2.1"

Sections	A _N mm ²	I _N mm	A_R value $\mu\Omega$	Pins	Ordering code
2	14	30	73	8	B65808S1108D002





RM₆

Accessories B65808

Coil former for power applications with angled pins

Optimized for automatic winding

Material: GFR polyterephthalate (UL 94 V-0, insulation class to IEC 60085:

F

max. operating temperature 155 °C), color code black

Valox 420-SE0® [E45329 (M)], GE PLASTICS B V

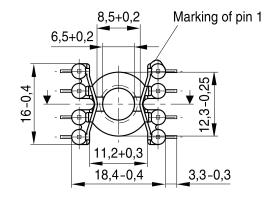
Solderability: to IEC 60068-2-20, test Ta, method 1 (aging 3): 235 °C, 2 s

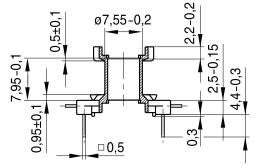
Resistance to soldering heat: to IEC 60068-2-20, test Tb, method 1B: 350 °C, 3.5 s

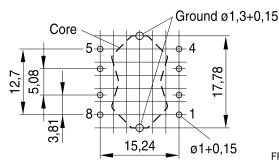
Winding: see Data Book 2013, chapter "Processing notes, 2.1"

For matching clamp and insulating washer 1 see page 9.

Sections	A _N mm ²	I _N mm	A_R value $\mu\Omega$	Pins	Ordering code
1	15	30	69	8	B65808E1508T001







Hole arrangement View in mounting direction

FRM0298-Y



Accessories B65808

Clamp

- With ground terminal, made of stainless spring steel (tinned), 0.4 mm thick
- Solderability to IEC 60068-2-20, test Ta, method 1 (aging 3): 235 °C, 2 s
- Also available as strip clamp on reels on request

Insulating washer 1 between core and coil former

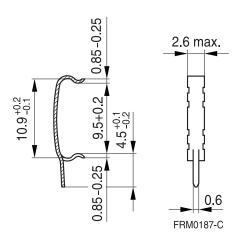
- For tolerance compensation and for insulation
- Made of polycarbonate (UL 94 V-0, insulation class to IEC 60085: E 120 °C), 0.08 mm thick Aryphan F685, [E167358 (M)], natural color, LOFO HIGH TECH FILM GMBH

Insulating washer 2 for double-clad PCBs

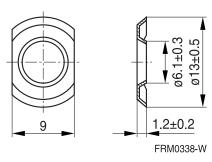
■ Made of polycarbonate (UL 94 V-0, insulation class to IEC 60085: E 120 °C), 0.25 mm thick Makrofol FR7-2, [E118859 (M)], natural color, BAYER MATERIALSCIENCE AG

	Ordering code
Clamp (ordering code per piece, 2 are required)	B65808B2203X000
Insulating washer 1 (reel packing, PU = 1 reel)	B65808A5000X000
Insulating washer 2 (bulk)	B65808C2005X000

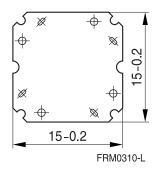
Clamp



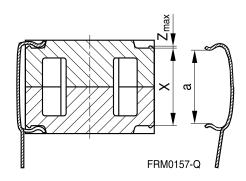
Insulating washer 1 (preliminary data)



Insulating washer 2



Clamping forces for RM 6



 F_{min} : Extension of clamp from a to $a_2 = X_{min}$ F_{max} : Extension of clamp from a to $a_1 = X_{max}$

Clamp opening a (mm)	9.5 +0.2	
Core nose Z _{max} (mm)	0.22	
Height of core pair X (m	10.1 10.6	
Clamping force F (N)	F _{min} F _{max}	7 50



Accessories B65821, B65808



SMD coil former with gullwing terminals

Material: GFR liquid crystal polymer (UL 94 V-0, insulation class to IEC 60085:

F

max. operating temperature 155 °C), color code black Vectra E 130i [E106764 (M)], POLYPLASTICS CO LTD

Vectra E 130i [E83005 (M)], TICONA

Solderability: to IEC 60068-2-58, test Td, method 6 (Group 3): 245 °C, 3 s

Resistance to soldering heat: to IEC 60068-2-58, test Td, method 6 (Group 3): 255 °C, 10 s

permissible soldering temperature for wire-wrap connection on coil former: 400 °C, 1 s

Winding: see Data Book 2013, chapter "Processing notes, 2.1"

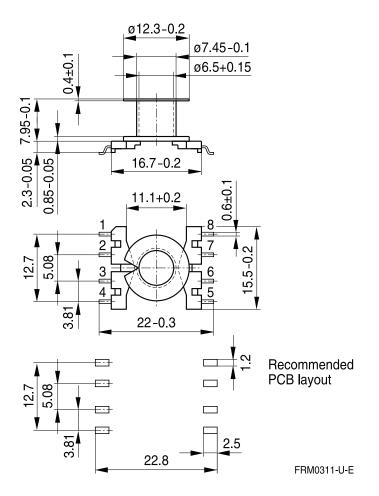
Clamp

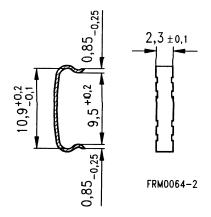
■ Without ground terminal, made of stainless spring steel, 0.435 mm thick

Also available as strip clamp on request

Sections	A _N mm ²	I _N mm	A_R value $\mu\Omega$	Terminals	Ordering code
1	16.2	31	66	8	B65821C1008T001
Clamp (ordering code per piece, 2 are required)					B65808J2204X000

Coil former Clamp





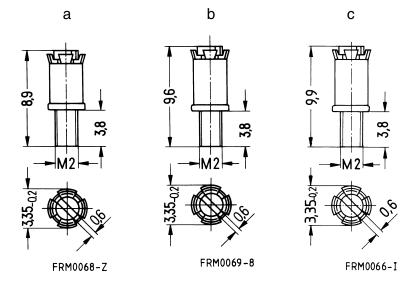


Accessories B65659

Adjusting screw

■ Tube core with thread and core brake made of GFR polyterephthalate Pocan B3235® [E245249 (M)], LANXESS AG

Figure	Tube core	Tube core		Ordering code
	$\emptyset \times \text{length (mm)}$	Material	Color code	-
a	2.62 × 3.6	N22	red	B65659F0001X023
b	2.75 × 4.4	N22	black	B65659F0003X023
С	2.82 × 4.4	N22	yellow	B65659F0004X023





RM 6 »Low Profile«

Core B65807P

■ To IEC 62317-4

■ For compact transformers

■ Without center hole

■ Delivery mode: sets

Magnetic characteristics (per set)

 $\Sigma I/A = 0.58 \text{ mm}^{-1}$

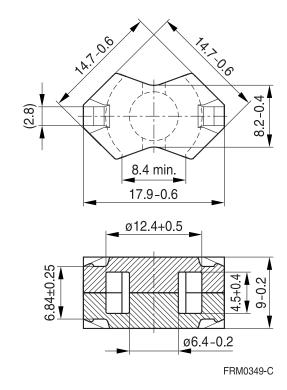
 $I_{e} = 21.8 \text{ mm}$

 $A_e = 37.5 \text{ mm}^2$

 $A_{min} = 31.2 \text{ mm}^2$

 $V_e = 820 \text{ mm}^3$

Approx. weight 4.0 g/set



Ungapped

Material	A _L value	μ _e	P _V	Ordering code
	nH		W/set	
T38	10500 +40/-30%	4860		B65807P0000Y038
N49	2200 +30/–20%	1020	< 0.14 (50 mT, 500 kHz, 100 °C)	B65807P0000R049
N92	2300 +30/–20%	1060	< 0.44 (200 mT, 100 kHz, 100 °C)	B65807P0000R092
N87	3000 +30/–20%	1390	< 0.40 (200 mT, 100 kHz, 100 °C)	B65807P0000R087



Cautions and warnings

Mechanical stress and mounting

Ferrite cores have to meet mechanical requirements during assembling and for a growing number of applications. Since ferrites are ceramic materials one has to be aware of the special behavior under mechanical load.

As valid for any ceramic material, ferrite cores are brittle and sensitive to any shock, fast changing or tensile load. Especially high cooling rates under ultrasonic cleaning and high static or cyclic loads can cause cracks or failure of the ferrite cores.

For detailed information see chapter "Definitions", section 8.1.

Effects of core combination on A_I value

Stresses in the core affect not only the mechanical but also the magnetic properties. It is apparent that the initial permeability is dependent on the stress state of the core. The higher the stresses are in the core, the lower is the value for the initial permeability. Thus the embedding medium should have the greatest possible elasticity.

For detailed information see chapter "Definitions", section 8.2.

Heating up

Ferrites can run hot during operation at higher flux densities and higher frequencies.

NiZn-materials

The magnetic properties of NiZn-materials can change irreversible in high magnetic fields.

Processing notes

- The start of the winding process should be soft. Else the flanges may be destroid.
- To strong winding forces may blast the flanges or squeeze the tube that the cores can no more be mount.
- To long soldering time at high temperature (>300 °C) may effect coplanarity or pin arrangement.
- Not following the processing notes for soldering of the J-leg terminals may cause solderability problems at the transformer because of pollution with Sn oxyd of the tin bath or burned insulation of the wire. For detailed information see chapter "Processing notes", section 8.2.
- The dimensions of the hole arrangement have fixed values and should be understood as a recommendation for drilling the printed circuit board. For dimensioning the pins, the group of holes can only be seen under certain conditions, as they fit into the given hole arrangement. To avoid problems when mounting the transformer, the manufacturing tolerances for positioning the customers' drilling process must be considered by increasing the hole diameter.

13



Symbols and terms

Symbol	Meaning	Unit
A	Cross section of coil	mm ²
A_{e}	Effective magnetic cross section	mm ²
A_L	Inductance factor; $A_L = L/N^2$	nH
A_{L1}	Minimum inductance at defined high saturation ($\triangleq \mu_a$)	nH
A _{min}	Minimum core cross section	mm ²
A _N	Winding cross section	mm ²
A_{R}	Resistance factor; $A_R = R_{Cu}/N^2$	$\mu\Omega = 10^{-6} \Omega$
В	RMS value of magnetic flux density	Vs/m ² , mT
ΔΒ	Flux density deviation	Vs/m ² , mT
Ê	Peak value of magnetic flux density	Vs/m ² , mT
ΔÂ	Peak value of flux density deviation	Vs/m ² , mT
B_DC	DC magnetic flux density	Vs/m ² , mT
B _R	Remanent flux density	Vs/m ² , mT
B _S	Saturation magnetization	Vs/m ² , mT
C_0	Winding capacitance	F = As/V
CDF	Core distortion factor	mm ^{-4.5}
DF	Relative disaccommodation coefficient DF = d/μ_i	
d	Disaccommodation coefficient	
Ea	Activation energy	J
f	Frequency	s⁻¹, Hz
f _{cutoff}	Cut-off frequency	s⁻¹, Hz
f _{max}	Upper frequency limit	s−1, Hz
f _{min}	Lower frequency limit	s⁻¹, Hz
f _r	Resonance frequency	s⁻¹, Hz
f_{Cu}	Copper filling factor	
g	Air gap	mm
Н	RMS value of magnetic field strength	A/m
Ĥ	Peak value of magnetic field strength	A/m
H_{DC}	DC field strength	A/m
H _c	Coercive field strength	A/m
h	Hysteresis coefficient of material	10 ⁻⁶ cm/A
h/μ_i^2	Relative hysteresis coefficient	10 ⁻⁶ cm/A
1	RMS value of current	Α
I_{DC}	Direct current	Α
î	Peak value of current	Α
J	Polarization	Vs/m ²
k	Boltzmann constant	J/K
k_3	Third harmonic distortion	
k _{3c}	Circuit third harmonic distortion	
L	Inductance	H = Vs/A



Symbols and terms

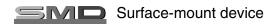
Symbol	Meaning	Unit
ΔL/L	Relative inductance change	Н
L_0	Inductance of coil without core	Н
L _H	Main inductance	Н
L_p	Parallel inductance	Н
L _{rev}	Reversible inductance	Н
Ls	Series inductance	Н
l _e	Effective magnetic path length	mm
I _N	Average length of turn	mm
N	Number of turns	
P_{Cu}	Copper (winding) losses	W
P _{trans}	Transferrable power	W
P_V	Relative core losses	mW/g
PF	Performance factor	
Q	Quality factor (Q = $\omega L/R_s$ = 1/tan δ_L)	
R	Resistance	Ω
R_{Cu}	Copper (winding) resistance (f = 0)	Ω
R_h	Hysteresis loss resistance of a core	Ω
ΔR_h	R _h change	Ω
R _i	Internal resistance	Ω
R_p	Parallel loss resistance of a core	Ω
R_s^r	Series loss resistance of a core	Ω
R_{th}	Thermal resistance	K/W
R_V	Effective loss resistance of a core	Ω
S	Total air gap	mm
Т	Temperature	°C
ΔT	Temperature difference	K
T_{C}	Curie temperature	°C
t	Time	s
t_{v}	Pulse duty factor	
tan δ	Loss factor	
tan δ_L	Loss factor of coil	
tan δ_r	(Residual) loss factor at $H \rightarrow 0$	
tan δ_e	Relative loss factor	
tan δ_h	Hysteresis loss factor	
tan δ/μ _i	Relative loss factor of material at $H \rightarrow 0$	
U	RMS value of voltage	V
Û	Peak value of voltage	V
V _e	Effective magnetic volume	mm ³
z	Complex impedance	Ω
Z_n	Normalized impedance $ Z _n = Z /N^2 \times \varepsilon (_e/A_e)$	Ω/mm



Symbols and terms

Symbol	Meaning	
α	Temperature coefficient (TK)	
α_{F}	Relative temperature coefficient of material	
α_{e}	Temperature coefficient of effective permeability	1/K
r	Relative permittivity	
Þ	Magnetic flux	
1	Efficiency of a transformer	
lB	Hysteresis material constant	
li	Hysteresis core constant	
'S	Magnetostriction at saturation magnetization	
,	Relative complex permeability	
0	Magnetic field constant	
a	Relative amplitude permeability	
арр	Relative apparent permeability	
е	Relative effective permeability	
i	Relative initial permeability	
ρ [']	Relative real (inductive) component of $\overline{\mu}$ (for parallel components)	
p	Relative imaginary (loss) component of $\overline{\mu}$ (for parallel components)	
r	Relative permeability	
rev	Relative reversible permeability	
S S	Relative real (inductive) component of $\overline{\mu}$ (for series components)	
s S	Relative imaginary (loss) component of $\overline{\mu}$ (for series components)	
tot	Relative total permeability	
	derived from the static magnetization curve	
	Resistivity	Ω m $^{-1}$
I/A	Magnetic form factor	mm ⁻¹
Cu	DC time constant $\tau_{Cu} = L/R_{Cu} = A_L/A_R$	s
)	Angular frequency; ω = 2 Π f	s ⁻¹

All dimensions are given in mm.





Important notes

The following applies to all products named in this publication:

- 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 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 lifesaving 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.
- 3. The warnings, cautions and product-specific notes must be observed.
- 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). Should you have any more detailed questions, please contact our sales offices.
- 5. We constantly strive to improve our products. Consequently, the products described in this publication may change from time to time. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order. We also reserve the right to discontinue production and delivery of products. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.
- Unless otherwise agreed in individual contracts, all orders are subject to the current version of the "General Terms of Delivery for Products and Services in the Electrical Industry" published by the German Electrical and Electronics Industry Association (ZVEI).
- 7. The trade names EPCOS, BAOKE, Alu-X, CeraDiode, CeraLink, CSMP, CSSP, CTVS, DeltaCap, DigiSiMic, DSSP, FilterCap, FormFit, MiniBlue, MiniCell, MKD, MKK, MLSC, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, SIP5D, SIP5K, ThermoFuse, WindCap are trademarks registered or pending in Europe and in other countries. Further information will be found on the Internet at www.epcos.com/trademarks.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

EPCOS:

```
B65808A5000X B65808C2005X B65807JR87 B65808E1508T1 B65807J0000Y038 B65807C0160A048
B65807C0250A048 B65807C0315A048 B65807J0000R045 B65807J0000R049 B65807J0000R097
B65807J0000Y066 B65807J0160A048 B65807J0250A041 B65807J0250A048 B65807J0315A048
B65807J0400A048 B65807N0040A001 B65807N0063A033 B65807N0100A033 B65807N0160A048
B65807N0250A048 B65807N0315A048 B65807N0400A048 B65807P0000R049 B65807P0000R087
B65807P0000R092 B65807P0000Y038 B65807P0250A087 B65808J2204X000 B65808N1004D001
B65808N1004D002 B65808N1005D001 B65808N1006D001 B65808N1006D002 B65808B2203X000
B65807N0160G048 B65807N0200A048 B65807N0500A048 B65807J0000R092
```

EPCOS / TDK:

B65808P1005D1 B65807P160A87 B65808S1108D2 B65807PR97 B65808P1004D1

ПОСТАВКА ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г. Москва, ул. Щербаковская д. 3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru moschip.ru_6 moschip.ru_4 moschip.ru_9