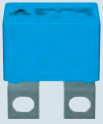




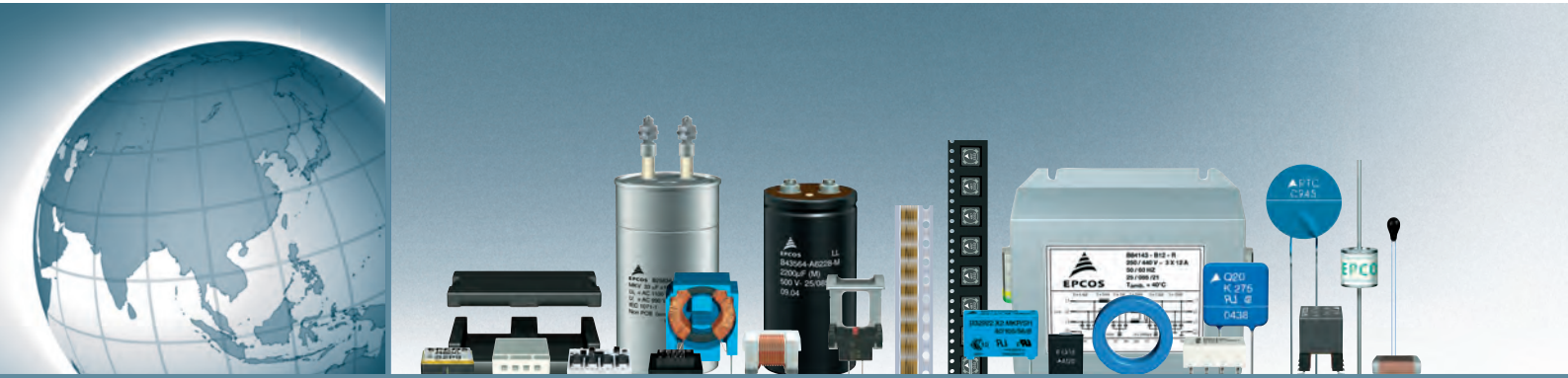
Application Guide 2008



Industrial

Electronic Components for
Industrial Applications

Welcome to the World of Electronic Components and Modules



EPCOS is a leading manufacturer of electronic components and modules and provides one-stop shopping for a comprehensive range of products. Our portfolio includes capacitors and inductors, ceramic components, arresters, and surface and bulk acoustic wave components. As an innovative technology-driven company, EPCOS focuses on fast-growing and technologically demanding markets in the areas of information and communications technology, automotive, industrial, and consumer electronics. We offer our customers both standard components as well as application-specific solutions.

EPCOS has design, manufacturing and marketing facilities in Europe, Asia and the Americas. Increasingly, we are expanding our global research and development network by intensifying R&D activities at our production locations, primarily in Eastern Europe, China and India. With our global presence we are able to provide our customers with local development know-how and support in the early phases of their projects.

EPCOS is continually improving its processes and thus the quality of its products and services. The Group is ISO/TS 16949 certified and remains committed to constantly reviewing and systematically improving its quality management system.

EPCOS Components for Industrial Applications



In the demanding industrial electronics market EPCOS is more than just a provider of components. With its Power Quality Solutions (PQS), for example, EPCOS offers expertise in complete solutions and consulting. Power factor correction (PFC) illustrates this capability perfectly. The portfolio includes not only PFC capacitors, but also capacitor contactors, controllers, thyristor modules and active filters to compensate harmonics in dynamic PFC applications.

EPCOS also has a wide range of capacitor technologies in its portfolio for DC link solutions. This includes, for example, very low inductive aluminum electrolytic capacitors with an ESL of just 10 nH. Moreover, EPCOS features one of the world's broadest product ranges for overvoltage protection and electromagnetic compatibility.

On the following pages you will find further special features that distinguish our products and solutions for use in industrial electronics applications.

EPCOS Components for Industrial Applications



Special Features

Aluminum Electrolytic Capacitors

- Long-term stability
- High ripple current capability
- Operating temperature up to +140 °C
- Very low ESR and ESL
- Long useful life
- High vibration resistance
- Self-extinguishing electrolyte
- Compact can size

EMC Filters

- Wide current range of standard filters up to 2500 A
- Rated voltage up to 760 V AC and 2000 V DC
- Various terminal styles
- UL/CSA/ENEC approval
- SineFormer sine-wave EMC output filters for frequency converters supersede shielded motor cables
- Customer-specific solutions upon request

- EPCOS also runs its own accredited EMC laboratory in Regensburg/Germany which can perform all necessary tests and issue the necessary documentation to obtain CE-conformity

Ferrites

- Wide range of core shapes, sizes, materials and accessories
- Epoxy-coated ring cores are standard

Film Capacitors

- Long-term reliability
- High ripple current capability
- Operating temperature up to +125 °C
- Low ESR
- Self-healing

Inductors

Powerline chokes

Common-mode chokes

- High current handling capability (housing design up to 16 A)
- High temperature stability (up to +125 °C)
- Suppression of asymmetrical interference coupled onto lines

- High frequency parts of the symmetrical data signal are significantly minimized

Differential-mode chokes

- High current handling capability
- High temperature stability
- Suppression of symmetrical interference coupled onto lines

SIMID, power inductors, high current chokes

- High current handling capability
- Wide temperature range -55 °C to +150 °C
- Energy storage in DC/DC converters
- Suppression of electromagnetic interference
- Suitable for lead-free soldering profiles acc. to JEDEC J-STD 020C

Leaded RF/VHF chokes

- High current handling capability
- Wide temperature range -55 °C to +125 °C
- Suppression of electromagnetic interference
- Energy storage in DC/DC converters

EPCOS Components for Industrial Applications



Special Features

Multilayer Ceramic Capacitors Multilayer Serial Capacitors

- Long-term stability
- High ripple current capability
- Operating temperature from $-55\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$
- Low ESR, low ESL
- Suitable for lead-free soldering
- Termination for glue mounting available
- Qualified acc. to AEC-Q200

NTC Thermistors

- High measuring accuracy and long-term stability
- Fast response time
- Temperature measurement up to $+260\text{ }^{\circ}\text{C}$
- Heat resistant and highly stable
- Rugged design
- Compact dimensions

PFC Capacitors & PFC Key Components

- Tuned and detuned PFC systems
- Harmonic filtering for 690/880 V grids
- Automatic PFC equipment and systems for reducing labor costs
- Additional key components for conventional PFC systems and harmonic filters

Power Capacitors

- Long lifetime expectancy
- High capacitance stability
- Low ESR, ESL and R_{th} values
- High peak- and RMS current capability
- For miniaturizing and system integration
- Solutions for traction up to automotive

PTC Thermistors

- Various PTC sensors for heat sensing, overcurrent protection and switching applications as well as charging of DC-link capacitors

Surge Arresters

- Applicable as L-N and N-PE protection
- EN 61643-11 class I, II and III
- Very high discharge current
- High protection level performance
- Stable performance over useful life
- Very high insulation resistance

Transformers

- High creepage distance ($> 8\text{ mm}$)
- Very good dielectric strength (3.75 kV)

Varistors

- SMD varistors suitable for ESD protection and high energy absorption
- Leaded varistors 5 to 25 mm
- Strap varistors
- Block varistors
- ThermoFuse varistors (ETFV)

EPCOS Components for Industrial Applications

Portfolio overview											
	Power supply & conversion				Power quality solutions				Ballast systems		
	Battery charger	Frequency converter	Power supply/ Switch mode power supply (SMPS)	Uninterruptible power supply (UPS)	Electronic power meter	Ground fault circuit interruptor	Power factor correction facilities	Surge protection modules	Electronic ballast	Energy saving lamps	Magnetic ballast
Aluminum electrolytic capacitors											
Screw terminals		●	●	●							
4-pin snap-in terminals / solder pins		●	●	●							
Snap-in		●	●	●							
Single-ended	●	●	●	●	●				●	●	
Axial-lead									●		
EMC filters											
1-line filters			●								
2-line filters	●	●	●	●							
3-line filters	●	●	●	●							
4-line filters	●	●	●	●							
SineFormer (sine-wave EMC output filters)		●									
Ferrites											
E, ETD, EFD cores	●	●	●	●			●		●	●	
ELP, ER, EQ cores		●	●								
U, PM cores	●		●	●							
RM cores	●	●	●	●							
Ring cores		●	●	●	●	●	●		●	●	
Film capacitors											
MKP DC link		●									
MKP snubber		●		●							
MKP PFC	●		●				●		●		
MKP, MFP		●	●	●	●				●	●	●
MKT, silver									●	●	
X2	●	●	●	●	●				●		●
Y2	●	●	●	●					●		

EPCOS Components for Industrial Applications

Portfolio overview											
	Power supply & conversion				Power quality solutions				Ballast systems		
	Battery charger	Frequency converter	Power supply/ Switch mode power supply (SMPS)	Uninterruptible power supply (UPS)	Electronic power meter	Ground fault circuit interruptor	Power factor correction facilities	Surge protection modules	Electronic ballast	Energy saving lamps	Magnetic ballast
Inductors											
Ring core chokes, double		●	●	●	●				●		
D, FC, E core chokes			●						●		
I, ring core chokes			●				●				
SIMID 1210 ... 2220	●		●	●							
Power inductors	●		●	●	●						
High current chokes (HPI13, ERU25)			●						●		
Leaded RF chokes	●		●	●					●	●	
Leaded VHF chokes			●	●							
Multilayer ceramic capacitors											
Standard, Advanced and HighCV	●	●	●	●	●				●	●	
MLSC	●		●	●	●						
Arrays	●		●	●							
Feedthrough			●	●							
NTC thermistors											
V*	●		●	●							
S8*, S9*, K1*, K2*, M8*	●	●	●	●			●		●	●	●
G5*	●	●	●	●			●				
M703		●	●	●			●				
K45		●	●	●			●				
S1*, S2*, S3*, S4*	●	●	●	●			●		●	●	●
PFC capacitors & PFC key components											
MKK		●					●				
MKP				●			●				
MKV		●		●			●				
PFC key components							●				



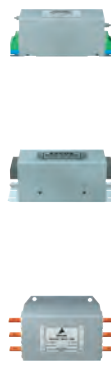

EPCOS Components for Industrial Applications

Portfolio overview											
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Power capacitors											
MKK		•									
MKP				•							
MKV		•	•	•							
PTC thermistors											
A601	•		•	•					•		
D901			•	•							
J20		•	•	•							
Overcurrent protection, chip	•		•								
Overcurrent protection, leaded	•	•	•	•		•			•	•	
Lamp start switching PTC									•	•	
Surge arresters											
LN3, H3, L1								•			
V1	•			•				•			
A8 ... XP, A81								•			
M5 ... XP								•	•		
EF	•		•	•	•						
A7			•	•							
EM			•	•					•		
Transformers											
EV15 ... EV25			•						•		
EFD20 ... EFD30			•				•		•		
EF13 ... EF42	•	•	•	•			•		•	•	
Varistors											
MLV 0402 ... 2220	•								•	•	
CU varistors			•		•	•					
S05 ... S20	•	•	•	•	•	•	•	•	•		•
S25		•	•	•			•	•			
Q14, Q20		•	•	•	•			•			
LS40 ... LS42								•			
B32 ... B80		•	•	•			•				
ETFV14 ... ETFV25		•	•	•	•	•		•	•		











EPCOS Components for Industrial Applications

Characteristics				
Series		Technical data	Features	Ordering code / Type
Aluminum electrolytic capacitors				
Screw terminals		Low voltage V_R : 16 ... 100 V DC C_R : 1500 ... 220000 μ F	Low voltage Useful life up to +125 °C, 2500 h +105 °C, 10000 h +85 °C, 12000 h	B41550/B41570 B41554 B41456/B41458 B41560/B41580
		High voltage V_R : 200 ... 500 V DC C_R : 560 ... 33000 μ F	High voltage Useful life up to +105 °C, 8000 h +85 °C, 15000 h	B43454/B43474 B43455/B43457 B43456/B43458 B43560/B43580 B43564/B43584 B43750/B43770
4-pin snap-in terminals/ solder pins		High voltage V_R : 350 ... 500 V DC C_R : 330 ... 2700 μ F	High voltage Useful life up to +105 °C, 3000 h +85 °C, 12000 h	B43510/B43520 B43511/B43521 B43514/B43524
Snap-in		Low voltage V_R : 10 ... 100 V DC C_R : 560 ... 47000 μ F	Low voltage Useful life up to +105 °C, 5000 h +85 °C, 10000 h	B41303 B41505/B43505 B43305
		High voltage V_R : 160 ... 450 V DC C_R : 47 ... 3300 μ F	High voltage Useful life up to +105 °C, 5000 h +85 °C, 10000 h	B43501 B43504 B43508 B43540
Single-ended		Low voltage V_R : 6.3 ... 100 V DC C_R : 0.1 ... 12000 μ F	Useful life up to +105 °C, from 2000 h up to 12500 h +125 °C, 2000 h +140 °C, 1000 h	B41851/B43851 B41858 B41888 B41889 B43858 B43866 B43867 B43888 B43890
		High voltage V_R : 160 ... 450 V DC C_R : 2.2 ... 330 μ F		
Axial-lead		High voltage V_R : 450 V DC C_R : 6.8 ... 47 μ F	Useful life up to +105 °C, 15000 h High voltage capability up to 550 V DC / +85 °C / 5000 h 500 V DC / +105 °C / 10000 h	B43697 B43698 B43699








EPCOS Components for Industrial Applications

Characteristics			
Series	Technical data	Features	Ordering code / Type
EMC filters			
1-line filters Feedthrough capacitors Feedthrough filters	 V_R : 75 ... 600 V AC / V DC I_R : 16 ... 500 A Feedthrough capacitors C_R : 0.00125 ... 4.7 μ F Feedthrough filters C_R : 0.0025 ... 2 x 4.7 μ F	Feedthrough capacitors and feed-through filters <ul style="list-style-type: none"> • MKP technology (dry, self-healing) • Solderless production technology • Terminals as axial leads, screw connectors, soldering tags or tab connectors • Metal case, polyurethane potting (UL 94 V-0) 	B85121 B85321
2-line filters	 V_R : 250 ... 520 V AC V_R : 250 ... 2000 V DC I_R : 0.5 ... 1000 A	Suppression of differential and common-mode disturbances Modular SIFI filter system with various cases and insertion loss performances Medical versions with very low leakage current 1 or 2 stage filters Ambient temperature up to +100 °C Filters for traction applications and frequency converters Filters for PCB mounting	B84110 B84111F ... B84112G ... B84113H ... B84142A****R ... B84142A****S ...
3-line filters	 V_R : 440 ... 760 V AC I_R : 6 ... 2500 A	Main filters for 3-phase applications with symmetrical load Optimized leakage current Book size or compact filters *R106 for short motor cable lengths *R105 for converter applications with medium motor cable lengths *D*R127 for long motor cable lengths up to 300 m *S80/*S81 for high currents and short motor cable lengths *S20/S21/S24 for long motor cable lengths *R410 for regenerative units (Active Front End Converters) with high saturation-proof chokes	B84143
4-line filters	 V_R : 440 ... 530 V AC I_R : 6 ... 1600 A	For 3-phase applications with unsymmetrical load, space saving design B84108*: chassis filters B84131*: for power supplies B84144A*R120 with terminal blocks B84144B*S120 with bus bars, standard performance B84144B*S121 with bus bars, extended performance	B84108 B84131 B84144
SineFormer Sine-wave EMC output filters	 V_R : 440 ... 600 V AC I_R : 6 ... 320 A Clock frequency 4 ... 8 kHz (11 ... 180 A) 2.5 ... 3 kHz (320 A)	Sine-wave EMC output filters with SineFormer technology for frequency converters <ul style="list-style-type: none"> • No shielded motor cables necessary • Reduce bearing currents and eddy current losses as well as motor noise • Forming a sinusoidal phase to phase voltage • Motor noise reduction • Dv/dt reduction Dv/dt chokes upon request 	B84143V****R127

EPCOS Components for Industrial Applications

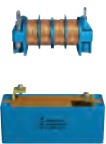
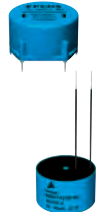




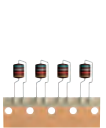

Characteristics				
Series		Technical data	Features	Ordering code / Type
Ferrites				
E cores ETD cores EFD cores		Material: N30, N87, N97 A _L : 69 ... 9700 nH	Wide range of core shapes, sizes and accessories available	E5 ... E80 ETD29 ... ETD59 EFD15 ... EFD30
ELP cores ER cores EQ cores		Material: N49, N87, N92, N97 A _L : 160 ... 5000 nH	Flat mounting height Board integrated	EPL14 ... ELP64 ER9.5 ... ER32 EQ13 ... EQ30
U cores PM cores		Material: N27, N87 A _L : 250 ... 16000 nH	Maximum transmissible power Maximum magnetic cross section Large volume cores Accessories for PM cores available	U93 ... U126 PM50 ... PM114
RM cores		Material: N49, N87, N97 A _L : 250 ... 6000 nH	Without center hole Compact design Accessories available	RM6 ... RM14
Ring cores		Material: N30, N87, T35, T37, T38 A _L : 560 ... 13900 nH	Epoxy-coated ring cores are standard	R9.53 ... R202
Film capacitors				
MKP DC link		V _R : 450 ... 1050 V DC C _R : 0.47 ... 60 µF	Operating temperature up to +100 °C High vibration resistance due to 4-pin terminals Useful life 200000 h at 1.0 · V _R , +40 °C 2 and 4-pin versions Lead spacing 27.5 ... 52.5 mm	B32674 ... B32678
MKP snubber		V _R : 850 ... 2000 V DC C _R : 0.047 ... 2.2 µF V _R : 1000 ... 2000 V DC C _R : 0.022 ... 68 µF	Operating temperature up to +100 °C Useful life 200000 h at 1.0 · V _R , +40 °C Six different terminal versions	B32656S ... B32686S ...
MKP PFC		V _R : 450 ... 630 V DC C _R : 0.047 ... 2.2 µF	Operating temperature up to +110 °C Specially designed for PFC stage Lead spacing 15 and 22.5 mm	B32672Z ... B32673Z ...
MKP		V _R : 250 ... 2000 V DC C _R : 1 nF ... 4.7 µF	Operating temperature up to +105 °C 2 and 4-pin versions Lead spacing 10 ... 37.5 mm	B32651 ... B32656 B32671 B32672
MFP		V _R : 630 ... 3000 V DC C _R : 0.47 nF ... 0.68 µF	Operating temperature up to +110 °C High dv/dt High vibration resistance due to 4 pin terminals 2 and 4-pin versions Lead spacing 15 ... 37.5 mm	B32632 ... B32634 dipped B32686A ... B32686C ... boxed

EPCOS Components for Industrial Applications





Characteristics			
Series	Technical data	Features	Ordering code / Type
Film capacitors			
MKT, silver 	V_R : 63 ... 1000 V DC C_R : 1 nF ... 33 μ F	Operating temperature up to +125 °C High dv/dt Miniaturized versions Lead spacing 7.5 ... 27.5 mm	B3256 ...
X2 	V_R : 305 V AC C_R : 10 nF ... 10 μ F	Operating temperature up to +125 °C Approved acc. to international standards Lead spacing 10 ... 37.5 mm	B32921 ... B32926
Y2 	V_R : 300 V AC C_R : 1 nF ... 1 μ F	Operating temperature up to +110 °C Approved acc. to international standards Lead spacing 10 ... 37.5 mm	B3202 ...
Inductors			
Ring core chokes, double 	L_R : 0.4 ... 82 mH I_R : 0.25 ... 42 A	High resonance frequency owing to special winding technique Plastic case with terminals Higher current chokes on baseplate, winding wire serves as solder terminal Approx. 1% stray inductance for symmetrical interference suppression	B8272 ... B82791G2 ... B82791H2 ...
D core chokes 	L_R : 3.3 ... 100 mH I_R : 0.35 ... 4.6 A	High resonance frequency due to 2-section winding Low leakage due to closed core shape High pulse strength Low whirring noise Approx. 1% stray inductance for symmetrical interference suppression	B82731 B83732 B82734
Framecore chokes (FC) 	L_R : 10 ... 100 mH I_R : 0.45 ... 2.3 A	Closed magnetic circuit with frame construction 4-section winding High stray inductance, excellent differential mode suppression High pulse-handling capability Low height allows usage in lamp ballasts Optional: magnetic bypass to increase stray inductance	B82732F ... B82733F ...
E core chokes 	L_R : 3.3 ... 100 mH I_R : 0.3 ... 1.8 A	High resonance frequency due to 2-section winding High pulse strength Low whirring noise Approx. 2% stray inductance for symmetrical interference suppression	B82731T ...


EPCOS Components for Industrial Applications

Industrial







Characteristics				
Series		Technical data	Features	Ordering code / Type
Inductors				
I core chokes		L_R : 0.015 ... 82 mH I_R : 0.2 ... 82 A	Low power dissipation Broadband interference suppression Laminated iron-silicon core Compact design	B82502 ... B82523
Ring core chokes		L_R : 0.025 ... 40 mH I_R : 0.3 ... 10 A	Iron powder core Single and double chokes Plastic case, fully potted High differential attenuation at low frequencies Double choke: max. 50% of rated inductance can reduce asymmetrical interference	B82615 B82617 B8262 ...
Ring core chokes, triple, quad		L_R : 0.12 ... 6 mH I_R : 6 ... 200 A	High power Available in plastic or aluminum case (fully potted) or on baseplate Ferrite core	B8274 ... B8276 ...
SIMID 1210 ... 2220 SMD		L_R : 8.2 nH ... 10 mH I_R : up to 2.5 A	Laser-welded, molded High current handling capability	B82422 B82432 B82442
Power inductors SMD		L_R : 0.82 ... 1000 μ H I_R : up to 11 A	Shielded and unshielded versions Low-profile versions down to 1 mm height High current handling capability Low DC resistance	B8246 ... B8247 ...
High current chokes, helically wound SMD		L_R : 0.5 ... 10 μ H I_R : 12 ... 71 A	Very high rated current Low DC resistance Very low profile and small footprint Suitable for pick and place processes	B82559
Leaded RF chokes		L_R : 0.1 μ H ... 100 mH I_R : up to 2.5 A	High current handling capability Low DC resistance Very good saturation characteristics Axial and radial leaded versions	B781 ... B8214 ...
Leaded VHF chokes		L_R : 1 ... 3900 μ H I_R : up to 10 A	High current handling capability Low DC resistance Insulating sleeve B82114: broadband interference suppression	B82111 B82114 B8213 ... B82500

EPCOS Components for Industrial Applications







Characteristics						
Series		Ceramic	Size	Technical data	Features	Ordering code / Type
Multilayer ceramic capacitors, Multilayer serial capacitors (MLSC)						SMD
Standard, Advanced and HighCV		X7R	0603 ... 1206	V _R : 16 ... 50 V DC C _R : 220 pF ... 2.2 μF	Qualified acc. to AEC-Q200	B37931 B37941 B37872
		C0G	0402 ... 1206	V _R : 50 ... 100 V DC C _R : 1 pF ... 5.6 nF		B37920 B37930 B37940 B37871
MLSC		X7R	0603	V _R : 50 V DC C _R : 1 ... 10 nF	Fail-safe design helps to prevent short circuits in case of fractured component Qualified acc. to AEC-Q200	B37931
		X7R	0805	V _R : 50 ... 100 V DC C _R : 10 ... 220 nF		B37941
Arrays		X7R	0405/0508/0612 2-fold, 4-fold	V _R : 16 ... 50 V DC C _R : 1 ... 22 nF	Space-saving EMI protection Qualified acc. to AEC-Q200	B37831R ... B37941R ... B37872R ...
		C0G	0405/0508/0612 2-fold, 4-fold	V _R : 25 ... 50 V DC C _R : 10 pF ... 1 nF		B37830R ... B37940R ... B37871R ...
Feedthrough		X7R	1206	V _R : 50 V DC C _R : 2.2 ... 10 nF	Outstanding performance for signal filtering and EMI suppression up to the GHz frequency spectrum Qualified acc. to AEC-Q200	B37872U ...

Characteristics				
Series		Technical data	Features	Ordering code / Type
NTC thermistors				
V2		Temperature range: -55 ... +125 °C (+150 °C) Rated resistance at 25 °C: 47 Ω ... 470 kΩ Resistance tolerance: ±3, ±5 %; ±1% upon request Case sizes: 0402/0603/0805	Wide range of resistances and tolerances Multilayer SMD NTC with inner electrodes Very good aging stability in high-temperature environment Very good resistance stability during soldering (change < 1%) Range for automotive series acc. to AEC-Q200-Rev. C	B572**V ...
V3				B573**V ...
V4				B574**V ...
SMD				





EPCOS Components for Industrial Applications

Characteristics				
Series		Technical data	Features	Ordering code / Type
NTC thermistors				
S86 S87 S88 S962 K1150 K220		Temperature range: -55 ... +155 °C Rated resistance at 25 °C: 2 ... 100 kΩ Resistance tolerance: ±1 ... ±5 %	Nonstandard lead configurations Taped versions for automatic processing Lead spacing 2.5 and 5.0 mm (S87, S88) UL approval (S86) Leadless types (K1150, K220)	B5786*S ... B5787*S ... B5788*S ... B57962S ... B57150K1 ... B57220K ...
M891		Temperature range: -40 ... +125 °C Rated resistance at 25 °C: 1 ... 470 kΩ Resistance tolerance: ±5, ±10%	Wide resistance range Lead spacing 2.5 mm Taped versions for automatic processing Cost-effective	B57891M ...
G541 G551 G561		Temperature range: -55 ... +260 °C (G541: +250 °C) Rated resistance at 25 °C: 10 kΩ Resistance tolerance: ±1 ... ±5 % Insulation resistance: > 100 MΩ 500 V DC (1s)	High-temperature resistant Insulated wires with high insulation voltage Nonstandard wire configurations	B57541G ... B57551G ... B57561G ...
M703		Temperature range: -55 ... +125 °C Rated resistance at 25 °C: 5 ... 30 kΩ Resistance tolerance: ±2%	Easy mounting Good thermal coupling through metal-tag UL approval (E69802)	B57703M0103G040 B57703M0303G040 B57703M0502G040
K45		Temperature range: -55 ... +125 °C Rated resistance at 25 °C: 1 ... 150 kΩ Resistance tolerance: ±10%	Electrically isolated aluminum case Tinned copper leads Good thermal coupling through case Cost effective	B57045K0102K000 B57045K0222K000 B57045K0472K000 B57045K0682K000
Inrush current limiters S153 S235 S236 S237 S238 S364 S464		Rated resistance at 25 °C: 1 ... 80 Ω I _{max} : up to 20 A V _{RMS} : 265 V	Limiting of inrush current Taped versions for automatic processing UL approval (E69802) High accuracy and easy mounting Lead spacing 5 and 7.5 mm	B57***S****M ...

EPCOS Components for Industrial Applications

Characteristics			
Series	Technical data	Features	Ordering code / Type
PFC capacitors & PFC key components			
PhaseCap MKK	 Voltage range: 230 ... 525 V Output range: 5 ... 33 kvar Frequency: 50/60 Hz Useful life: up to 115000 h	High pulse current with standability up to $200 \cdot I_R$ Concentric winding Triple safety system Impregnation inert gas	B25667B****A ...
PhaseCap HD MKK	 Voltage range: 400, 440, 525 V Output range: 40 ... 60 kvar Frequency: 50/60 Hz Useful life: up to 130000 h	High pulse current with standability up to $200 \cdot I_R$ Stacked winding Triple safety system Impregnation inert gas	B25669A****J ...
WindCap MKK	 Voltage range: 690, 765, 800 V Output range: 5 ... 36 kvar Frequency: 50/60 Hz Useful life: up to 130000 h	High pulse current with standability up to $300 \cdot I_R$ Concentric winding Triple safety system Impregnation inert gas	B25668A****A ... B25668A****J ...
PhiCap MKP	 Voltage range: 230 ... 525 V Output range: 0.5 ... 30 kvar Frequency: 50/60 Hz Useful life: up to 100000 h	High pulse current with standability up to $200 \cdot I_R$ Stacked winding Triple safety system Impregnation resin	B32340C****A ... B32343C****A ... B32344D****A ...
MKV capacitors	 Voltage range: 400, 525, 600, 690 V Output range: 5.0 ... 15 kvar Frequency: 50/60 Hz	Maximum pulse current withstand capability up to $300 \cdot I_R$ Dual safety system Stacked windings Impregnation oil In applications with high thermal loading	B25836B****A305
PoleCap MKK/MKP	 Voltage range: 400, 440, 525 V Output range: 0.5 ... 30 kvar Frequency: 50/60 Hz	Pole mounted PFC, i.e. for outdoor applications For surroundings with high dust or moisture concentration	B25671A****A ...

EPCOS Components for Industrial Applications








Characteristics				
Series		Technical data	Features	Ordering code / Type
PFC capacitors & PFC key components				
Controllers BR604 BR6000		Supply voltage: 230 V Measurement voltage: 30 ... 300 V phase to neutral Fundamental frequency: 50/60 Hz	4, 6 and 12 steps available Optionally with interface Menu-driven handling Self-optimizing control capability	B44066R****E230
Capacitor contactors J230 N230		Voltage range: 400 ... 690 V Output range: 12.5 ... 75 kvar Auxiliary contacts: included (normally open)	Damping of inrush current in low-voltage PFC systems Soft switching of capacitors to increase life expectancy of PFC system Series J230 with pre-charge resistors for conventional PFC systems without reactors Series N230 without pre-charge resistors for detuned PFC systems only	B44066S****J230 B44066S****N230
Thyristor modules TSM		Voltage range: 400, 690 V Output range at 400 V: 10, 25, 50, 200 kvar Output range at 690 V: 50 kvar	Main supply networks with high load fluctuations for dynamic PFC Permanent self-controlling of various parameters Low losses Very short reaction time Module ready for connection Compact design Easy installation: usage similar to a contactor	B44066T ...
Harmonic filter reactors		Voltage range: 400, 440, 480 V Output range: 10 ... 100 kvar Frequency: 50 or 60 Hz Detuning factor: 5.67%, 7%, 14%	Temperature protection microswitch (NC) Avoidance of resonance conditions Tuned and detuned harmonic filters High harmonic loading capability Very low losses Low noise emission	B44066D ...

EPCOS Components for Industrial Applications







Industrial

Characteristics				
Series		Technical data	Features	Ordering code / Type
Power capacitors				
MKK DC MKK DCI PCC HP		V_R : 700 ... 6000 V C_R : 100 ... 30000 μ F	DC link and series resonant circuits Discharge IGBT converters Impulse applications	B25650 B25655 B25750
MKK PCC LP		V_R : 300 ... 1400 V C_R : 50 ... 2000 μ F	DC link for converters Hybrid and electrical vehicles	B25655
MKP		V_R : 350 ... 680 V C_R : 3 ... 600 μ F	UPS and general AC applications	B3236 ...
MKV		V_R : 500 ... 2100 V C_R : 1 ... 220 μ F	General AC applications Damping Commutation	B25834 B25835 B25856
PTC thermistors				
Temperature sensor chip A601 SMD		Sensing temperature: 75 ... 135 °C in steps of 10 °C Rated resistance: 470 Ω Tolerances: \pm 3, \pm 5 °C	EIA 0603 Lead-free tinned terminations	B59601A ...
Temperature sensor probe D901		Sensing temperature: 60 ... 130 °C in steps of 10 °C Rated resistance: \leq 100 Ω	Sensor with epoxy resin coating Metal tag for easy mounting Good thermal contact Short response time	B59901D ...
Self-protecting resistor J20		Rated resistance: 20 Ω , V_{max} : 550 V Rated resistance: 56 Ω , V_{max} : 650 V Rated resistance: 100 Ω , V_{max} : 800 V	Very robust design	B59201J0140B010 B59202J0135B010 B59204J0130B010

EPCOS Components for Industrial Applications

Characteristics				
Series		Technical data	Features	Ordering code / Type
PTC thermistors				
Overcurrent protection, chip		Rated resistance: 27 Ω, V _{max} : 30 V	EIA 1210	B59606A0110A062
A606		Rated resistance: 55 Ω, V _{max} : 30 V	Lead-free tinned termination	B59607A0120A062
A607		Rated resistance: 125 Ω, V _{max} : 80 V	Short response time	B59707A0120A062
A707		Rated resistance: 400 Ω, V _{max} : 265 V		B59807A0090A062
A807		Rated resistance: 1500 Ω, V _{max} : 400 V		B59907A0120A062
A907				
SMD				
Overcurrent protection, leaded		Various rated resistance versions available V _{max} : up to 1000 V	Broad product range UL approval VDE approval	B404, B406, B1405 B750 ... B774 C810 ... C890 C884 ... C886
Lamp start switching PTC		Various rated resistance versions available V _{max} : up to 550 V	Broad product range Customized designs upon request	C1118 C1119 S1076 S1082 S1097
Surge arresters				
LN3		Operating voltage V _{RMS} at 50/60 Hz: 255 V Protection level at 1.2/50 μs, 6 kV: < 1500 V Nominal discharge current 8/20 μs: 50 kA Impulse current 10/350 μs: 50 kA Follow current: up to 10 kA	EN 61643-11 class I Phase to neutral Stable performance over lifetime Self quenching at high follow currents	B88069X6691 ... B88069X7031 ...
H3		Operating voltage V _{RMS} at 50/60 Hz: 255 V Protection level at 1.2/50 μs, 6 kV: < 1500 V Nominal discharge current 8/20 μs: 100 kA Impulse current 10/350 μs: 100 kA	EN 61643-11 class I Neutral to PE High insulation resistance	B88069X6821 ...
L1		Operating voltage V _{RMS} at 50/60 Hz: 255 V Protection level at 1.2/50 μs, 6 kV: < 1500 V Nominal discharge current 8/20 μs: 50 kA Impulse current 10/350 μs: 50 kA	EN 61643-11 class I & II Neutral to PE High insulation resistance	B88069X5451 ... B88069X5731 ... B88069X6551 ...
V1		Operating voltage V _{RMS} at 50/60 Hz: 255 V Protection level at 1.2/50 μs, 6 kV: < 1500 V Nominal discharge current 8/20 μs: 40 kA Class I: Impulse current 10/350 μs: 12 kA Class II: Impulse current 8/20 μs: 65 kA		B88069X4380 ... B88069X4390 ... B88069X4400 ... B88069X6940 ...





EPCOS Components for Industrial Applications

Characteristics			
Series	Technical data	Features	Ordering code / Type
Surge arresters			
A8 ... XP	 <p>Operating voltage V_{RMS} at 50/60 Hz: 255 V Protection level at 1.2/50 μs, 6 kV: < 1500 V Nominal discharge current 8/20 μs: 10 kA Impulse current 8/20 μs: 20 kA</p>	High insulation resistance RoHS-compatible Stable performance over lifetime Small size With and without lead wires	B88069X5691 ...
			B88069X5701 ...
			B88069X6811 ...
A81	 <p>DC breakdown voltage: 90, 150 V Maximum discharge current 8/20 μs: 20 kA</p>	Very high discharge current High isolation resistance Application in series with MOV Compact size	B88069X1380 ...
			B88069X2840 ...
M5 ... XP	 <p>Operating voltage V_{RMS} at 50/60 Hz: 255 V Protection level at 1.2/50 μs, 6 kV: < 1500 V Nominal discharge current 8/20 μs: 3 kA Impulse current 8/20 μs: 3 kA</p>	High insulation resistance RoHS-compatible Stable performance over lifetime Very small size With and without lead wires	B88069X4781 ...
EF	 <p>DC breakdown voltage: 270, 470, 600, 800, 1500, 2500 V Maximum discharge current 8/20 μs: 10 kA</p>	High discharge current and isolation resistance High follow current High voltage types available Small size	B88069X2641 ...
			B88069X4131 ...
			B88069X4301 ...
			B88069X5080 ...
			B88069X5690 ...
			B88069X6461 ...
A7	 <p>DC breakdown voltage: 800, 1000, 1400 V Maximum discharge current 8/20 μs: 10 kA</p>	Fast response time High isolation resistance Application in series with MOV High discharge current High voltage types available Compact size	B88069X2140 ...
			B88069X2180 ...
			B88069X3820 ...
EM	 <p>DC breakdown voltage: 2500, 2700, 3600 V Nominal discharge current 8/20 μs: 2 kA</p>	Very fast response time High isolation resistance Application in series with MOV IEC 60950 Compact size	B88069X2500 ...
			B88069X4241 ...
			B88069X7051 ...

EPCOS Components for Industrial Applications

Characteristics				
Series		Technical data	Features	Ordering code / Type
Transformers				
EV15 ... EV25		Power: up to 70 W	Low profile	B784 ... Upon request
EFD20 ... EFD30		Power: up to 90 W	Low profile	B7832 ... Upon request
EF13 ... EF42	 	Power: up to 200 W	Types with > 8 mm creepage and clearance distance available	B783 ... Upon request
Varistors				
MLV 0402 ... 2220 SMD		Operating voltage V_{RMS} : 4 ... 60 V Surge current up to 1200 A Operating temperature up to +125 °C	Bidirectional clamping Stable protection level Minimum leakage current Low inductance For ESD protection	B72500 B72510 B72520 B72530 B72540 B72580 B72590
CU varistors SMD		Operating voltage V_{RMS} : 11 ... 460 V	Cylindrical varistor element Electrical equivalents to leaded SIOV S05 and S07 Encapsulated thermoplast Low inductance Stable protection level UL and CSA approved	B72650 B72660
S05		I_{max} 8/20 μ s: up to 800 A	Operating voltage V_{RMS} : 11 ... 1100 V High surge current ratings up to 12 kA High energy ratings (2 ms) up to 440 J For high energy absorption	B72205S ...
S07		I_{max} 8/20 μ s: up to 1750 A		B72207S ...
S10		I_{max} 8/20 μ s: up to 3.5 kA		B72210S ...
S14		I_{max} 8/20 μ s: up to 6 kA		B72214S ...
S20		I_{max} 8/20 μ s: up to 12 kA		B72220S ...
S25		I_{max} 8/20 μ s: 20 kA	Operating voltage V_{RMS} : 130 ... 750 V High surge current up to 20 kA High energy ratings (2 ms) up to 1025 J For high energy absorption	B72225S ...

EPCOS Components for Industrial Applications

Characteristics				
Series	Technical data	Features	Ordering code / Type	
Varistors				
Q14	 I_{max} 8/20 μ s: 8 kA	Operating voltage V_{RMS} : 11 ... 320 V Maximum load capacity at minimum component Height miniaturization High surge current rating up to 15 kA	B72214Q ...	
Q20			I_{max} 8/20 μ s: 15 kA	B72220Q ...
LS40	 I_{max} 8/20 μ s: 40 kA	Operating voltage V_{RMS} : 11 ... 750 V High surge current ratings up to 65 kA High energy ratings (2 ms) up to 1650 J Bent or straight terminals possible	B72240L ...	
LS41			I_{max} 8/20 μ s: 50 kA	B72241L ...
LS42			I_{max} 8/20 μ s: 65 kA	B72242L
B32	 I_{max} 8/20 μ s: 25 kA	Operating voltage V_{RMS} : 11 ... 1100 V Disk-shaped varistor element potted in plastic housing Housing and potting flame retardant to UL 94 V-0 Screw terminals	B72232B ...	
B40			I_{max} 8/20 μ s: 40 kA	B72240B ...
B60			I_{max} 8/20 μ s: 70 kA	B72260B ...
B80			I_{max} 8/20 μ s: 100 kA	B72280B ...
ETFV14	 I_{max} 8/20 μ s: 6 kA	Operating voltage V_{RMS} : 130 ... 420 V Disk varistor and fuse in one housing Space saving Monitoring option with 3rd lead UL approval (1449)	B72214T ...	
ETFV20			I_{max} 8/20 μ s: 10 kA	B72220T ...
ETFV25			I_{max} 8/20 μ s: 20 kA	B72225T ...

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