EPCOS Application Guide

Industrial Electronics

Electronic Components for Green Power Generation

www.epcos.com

EPCOS Components
for Green Power Generation

In the demanding market for green energy TDK is more than just a provider of components. Based on many years of experience in industrial electronics we offer a broad portfolio of reliable solutions. Aluminum electrolytic capacitors for example, offer high ripple current capabilities and useful lifetimes for inverters in solar power generation. Alternatively, the PCC® (power capacitor chip) can also be designed into such applications. This compact power capacitor features extremely low ESR and ESL values and can be mounted directly onto the IGBT module. Transformers and power inductors also play a key role in inverters. Our capacitors and inductors are used in the DC link circuits of frequency converters because of their high quality and reliability.

Power quality is essential in all systems for the generation of renewable energy. The broad spectrum of components and systems for power factor correction, for example, helps to significantly improve the efficiency of wind power plants.
PTC thermistors protect the systems from overcurrent and overtemperature. Thanks to our broad spectrum of EMC filters and customer-specific solutions, we offer reliable protection against electromagnetic interference (EMI) as well.

As power grids become ever more intelligent, our proven SAW filters will play a key role in the required advanced metering infrastructures (AMI).

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EPCOS Components for Green Power Generation

Special Features

AC Capacitors

- MKP technology with metallized polypropylene film
- High safety class according to IEC 60252-1 2001-02
- Self-healing
- High insulation resistance
- Low dissipation factor
- Flame-retardant materials to IEC 60335-1
- Dry type
- Maintenance-free
- Standard products available

Aluminum Electrolytic Capacitors

- High ripple current capability
- Operating temperature up to +125 °C
- Very low ESR and ESL
- Long operational useful life (up to > 20 years)
- Optimized thermal concept
- Special design for base cooling
- Self-extinguishing electrolyte upon request
- Compact can size

CeraDiodes

- Bidirectional ESD protection acc. to IEC 61000-4-2, level 4
- Operating temperature up to +85 °C without temperature derating
- Short response time < 0.5 ns
- Replacement of semiconductor diodes

Ceramic Transient Voltage Suppressors (CTVS)

- Multilayer varistors (MLVs) with case sizes 0402 to 2220
- Protection against wide overvoltage range
- Bidirectional components
- No temperature derating up to +125 °C/+150 °C (depending on type)
- E-series for operation up to +150 °C

EMC Filters and Chokes

Power line filters

- Wide current range up to 2500 A
- Rated voltage up to 760 V AC and 2000 V DC
- Different terminals (tab connectors, litz wires, threaded studs, terminal blocks, pins, IEC connectors, bus bars)
- UL / CSA / ENEC approvals

Output filters

- dv/dt filters, sine-wave filters, sine-wave EMC filters
- Solutions for long motor cables and unshielded motor cables
- Current up to 1500 A
- Rated voltage up to 760 V AC

Line reactors, output chokes

- Line reactors for Active Infeed Converters
- Current up to 900 A

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High voltage common-mode chokes

- High DC voltage capability
- High current handling capability
- Suppression of asymmetrical interferences coupled in on lines. The high-frequency portions of the symmetrical data signal are decreased so far that EMC problems can be significantly reduced
- Customized designs
- UL 1446 Class 155 (F) Insulation system

High current common-mode chokes (power line)

- Wide current range up to 62 A
- High current-handling capability
- One- and three-phase design available
- Suppression of asymmetrical interferences coupled in on lines. The high-frequency portions of the symmetrical data signal are decreased so far that EMC problems can be significantly reduced
- Customized designs
- UL 1446 Class 155 (F) Insulation system applicable

Standard common-mode chokes

- Suppression of asymmetrical interference coupled in on lines. The high-frequency portions of the symmetrical data signal are decreased so far that EMC problems can be significantly reduced
- Wide range of different core shapes and sizes available, with specific properties
- High current-handling capability
- High temperature stability
- Standard and customized designs
- UL and VDE certified

Ferrites

- Wide range of ferrite materials, core shapes and accessories
- Customized shapes

Film Capacitors (Medium Power)

- Long-term stability and reliability
- High peak and RMS current capability
- Overvoltage capability (self-healing)
- DC and AC voltage operation
- Very low ESR/ESL
- UL94V-0 epoxy and plastic resin sealing for boxed types

Inductors

SIMID, power inductors

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

High current chokes

- Suppression of electromagnetic interferences
- Energy storage in DC/DC converters
- High current-handling capability
- High temperature stability

Storage chokes / Reactors

- Conversion and Output-filtering for switch-mode power supply circuits and low power inverters
- Designed to customer's requirements

EPCOS Components for Green Power Generation

Special Features

NTC Thermistors

- Long-term stability
- High measuring accuracy
- Short response time
- Heat resistant and highly stable
- Compact dimensions
- Rugged design
- Customer-specific solutions upon request
- Various screw-on sensors with cable outlet
- Bondable chip sensors
- NTC thermistors as inrush current limiters
- SMD NTC case size 0402 … 0805

Power Capacitors (PEC)

- High peak current capability
- Overpressure disconnector
- Self-healing
- Maintenance free
- Customized configurations
- Standard products available
- MKP AC capacitors for input and output filtering
- MKP DC capacitors for DC link and pitch control
- PCC LP for DC link
- MKK HP for high performance filtering
- MKK DC for DC link

Power Capacitors (PFC) and Key Components

- Capacitors for power factor correction and harmonic filtering applications with long service life, high inrush current withstandability, suitable for tough ambient conditions and high ambient temperatures
- Broad range of key components for PFC in all kind of industrial applications
- Key components for conventional, dynamic, tuned and detuned PFC allow customized solutions

Pressure Sensors

- Piezoresitive silicon technology
- High measurement accuracy
- Various packaging forms
- Absolute, differential and gauge pressure measurement

PTC Thermistors

- For overcurrent protection, limit temperature protection and heating
- Exponential rise of resistance after specified reference temperature by several decades
- Very high mechanical strength
- Customer-specific solutions upon request

SAW Components

LT filter

- Wideband filters (bandwidth: 1 to 30 MHz)

Quartz filter

- Narrowband filters (bandwidth: 0.1 to 0.6 MHz)

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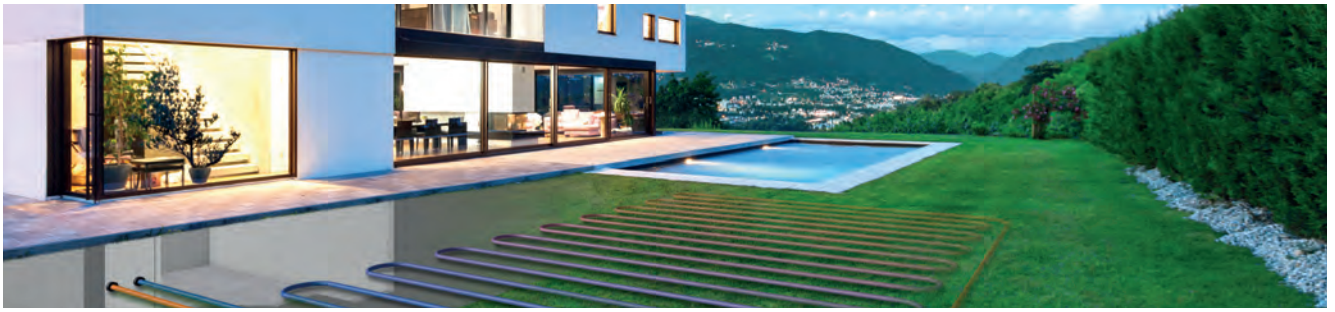

Surge Arresters

H3, L1

- AC mains 230/400 V AC
- N-PE protection
- IEC 61643-11 class I
- Suitable for direct strikes

V1

- AC mains 230/400 V AC
- N-PE protection
- IEC 61643-11 class I & II

EF

- AC mains 230/400 V AC
- IEC 61643-11 class III
- Device protection
- High ignition voltage

A7

- AC mains 230/400 V AC
- IEC 61643-11 class III
- Device protection
- High ignition voltage

A8

- ITU-T K.12
- Protection of telecom and signalling lines
- 2-electrode

T8

- Protection of telecom and signalling lines
- ITU-T K.12
- 3-electrode

T83…F

- Protection of telecom and signalling lines
- ITU-T K.12
- 3-electrode
- With fail-safe

Transformers

Magnetics for LAN applications

- 10/100 Base-T
- 1000 Base-T
- Power over Ethernet

Flyback transformers

- Power supply for control circuits and micro inverters
- Wide range of different core shapes and core-materials available
- Customized designs

Push-Pull transformers

- SMPS and isolated interface power supplies
- Standard design in SMD

Gate drive transformers

- IGBT gate drive
- Wide range of different core shapes and core-materials available
- Customized designs

Power transformers

- Isolating PV to power grid
- Wide range of different core shapes and core materials available
- Customized designs
- Isolated versions available

Current sense transformers

- Standard designs in SMD
- Three different sizes available
- Very low losses and high reliability, ruggedness and simple implementation
- Customized designs possible
- Isolated version available

Varistors

- Leaded varistors with 5 to 25 mm disk
- Strap varistors
- Block varistors
- ThermoFuse varistors
- SMD disk varistors for surge current protection

EPCOS Components for Green Power Generation

Portfolio overview

	Wind energy														
	Drive technology		Overvoltage protection		Power generation, conversation & transformation							Power quality solutions			
	Electric drives (pitch control, nacelle adjust)	Drive control	Lightning protection	Overvoltage protection for electronic devices	Generator	Gearbox	DC filtering	DC link	Snubbering	Output filtering	Outdoor cabinet heating	Electronic power meter	Ground fault circuit interruptor	Power factor correction facilities	Surge protection modules
AC capacitors															
MotorCap S0															
MotorCap Compact S3															
MotorCap S2															
Aluminum electrolytic capacitors															
Screw terminals	●							●							
4-/5-pin snap-in terminals & solder pins	●														
Snap-in	●														
Ceramic transient voltage suppressors (CTVS) and CeraDiodes															
Multilayer varistors (MLV)			●	●								●			●
CeraDiodes												●			
EMC filters and chokes															
2-line filters								●							
3-line filters	●									●					
4-line filters	●									●					
Output filters										●					
Reactors/ chokes							●	●		●				●	
High voltage common-mode chokes								●		●				●	
High current/ Standard common-mode chokes		●								●		●		●	

Please read *Important notes* on page 34.

EPCOS Components for Green Power Generation

						Photovoltaic systems														Heat exchanger systems			
Sensor technology service			Teleservice				Power conversion & transformation											Solar heat systems / shallow ground heat technologies / deep geothermal systems			
Barometric pressure measurement	Current sensing	Temperature measurement	Advanced Metering Infrastructure (AMI)	Infrastructure systems	Control electronics	Overvoltage protection	DC EMI filtering	Boost converter	Transformer / galvanic isolation	DC link	IGBT bridge	Snubbering	Output filtering	AC EMI output filtering	Power supply	Control electronics	Cold and hot water pumps	Heat exchanger	Steam power generator	Control electronics
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	Wind energy														
	Drive technology		Overvoltage protection		Power generation, conversation & transformation							Power quality solutions			
	Electric drives (pitch control, nacelle adjust)	Drive control	Lightning protection	Overvoltage protection for electronic devices	Generator	Gearbox	DC filtering	DC link	Snubbering	Output filtering	Outdoor cabinet heating	Electronic power meter	Ground fault circuit interruptor	Power factor correction facilities	Surge protection modules
Ferrites															
E, EFD, ETD cores	●	●													
ELP, ER, EQ cores	●	●										●			
PQ cores	●	●													
U, PM cores										●					
Ring cores	●	●										●			
Film capacitors (medium power)															
MKP, MKT for DC link	●						●	●							
MKP snubber	●								●						
MKP for general purpose	●								●						
MKT AC heavy duty												●			
X2 humidity	●		●									●			
X2, X1	●		●												
Y2, Y1	●		●												
MKP PFC power factor correction														●	
MKP AC for output filtering	●									●				●	
MMKP															
Inductors															
SIMID 0603 … 2220												●			
Power inductors, High current chokes		●					●					●			
Storage chokes, Reactors							●			●				●	
NTC thermistors															
SMD NTC	●		●		●	●						●		●	
S86*, S87*, S88*, S964, S971, S981	●		●		●	●					●	●		●	
G1541, G1551, G1561	●		●		●	●					●	●		●	
Bondable chip	●		●		●	●					●	●		●	
M703*, M1703*	●		●		●	●					●	●		●	
K45*	●		●		●	●								●	
T120*															
K301*															
Inrush current limiters	●	●													

Please read *Important notes* on page 34.

EPCOS Components for Green Power Generation

						Photovoltaic systems													Heat exchanger systems			
Sensor technology service			Teleservice				Power conversion & transformation											Solar heat systems / shallow ground heat technologies / deep geothermal systems			
Barometric pressure measurement	Current sensing	Temperature measurement	Advanced Metering Infrastructure (AMI)	Infrastructure systems	Control electronics	Overvoltage protection	DC EMI filtering	Boost converter	Transformer / galvanic isolation	DC link	IGBT bridge	Snubbering	Output filtering	AC EMI output filtering	Power supply	Control electronics	Cold and hot water pumps	Heat exchanger	Steam power generator	Control electronics
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EPCOS Components for Green Power Generation

Portfolio overview

	Wind energy														
	Drive technology		Overvoltage protection		Power generation, conversation & transformation							Power quality solutions			
	Electric drives (pitch control, nacelle adjust)	Drive control	Lightning protection	Overvoltage protection for electronic devices	Generator	Gearbox	DC filtering	DC link	Snubbering	Output filtering	Outdoor cabinet heating	Electronic power meter	Ground fault circuit interruptor	Power factor correction facilities	Surge protection modules
Power capacitors (PEC)															
MKP AC, MKP AC HP	●									●					
MKP DC, MKP DC LSI	●						●	●							
PCC LP	●						●	●							
MKK HP	●									●					
MKK DC	●						●	●							
Power capacitors (PFC) & key components															
PhaseCap	●									●				●	
DeltaCap	●									●				●	
PhiCap	●									●				●	
PFC key components	●									●				●	
Pressure sensors															
ASB 1200						●									
PTC thermistors															
Limit temperature sensors, sizes 0402, 0603, 0805	●	●			●	●						●			
Motor protection sensors					●										
Overcurrent protection, sizes 0603 and 1210		●										●			
Overcurrent protection, sizes 3225 and 4032		●													
Overcurrent protection, SMD disks		●										●			
Overcurrent protection, leaded disks		●										●			
Heating elements											●				
Inrush current limiters, leaded disks	●							●							
Inrush current limiters, phenolic resin plastic case	●							●							

Please read *Important notes* on page 34.

EPCOS Components for Green Power Generation

							Photovoltaic systems														Heat exchanger systems			
Sensor technology service			Teleservice				Power conversion & transformation														Solar heat systems / shallow ground heat technologies / deep geothermal systems			
Barometric pressure measurement	Current sensing	Temperature measurement	Advanced Metering Infrastructure (AMI)	Infrastructure systems	Control electronics	Overvoltage protection	DC EMI filtering	Boost converter	Transformer / galvanic isolation	DC link	IGBT bridge	Snubbering	Output filtering	AC EMI output filtering	Power supply	Control electronics	Cold and hot water pumps	Heat exchanger	Steam power generator	Control electronics
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EPCOS Components for Green Power Generation

Portfolio overview

	Wind energy														
	Drive technology		Overvoltage protection		Power generation, conversation & transformation							Power quality solutions			
	Electric drives (pitch control, nacelle adjust)	Drive control	Lightning protection	Overvoltage protection for electronic devices	Generator	Gearbox	DC filtering	DC link	Snubbering	Output filtering	Outdoor cabinet heating	Electronic power meter	Ground fault circuit interruptor	Power factor correction facilities	Surge protection modules
SAW components															
European ISM bands, f_c: 869 MHz, 433.92 MHz															
NAFTA ISM bands, f_c: 915 MHz, 315 MHz															
Custom SAW filters for licensed bands															
Surge arresters															
2-electrode arresters H3, L1			●	●											●
2-electrode arresters V1			●	●											●
2-electrode arresters EF, A7			●	●								●			
2-electrode arresters A8				●											
3-electrode arresters T8				●											
Transformers															
Magnetics modules for LAN applications															
Flyback transformers		●										●			
Push-Pull transformers															
Gate drive transformers															
Power transformers															
Current sense transformers		●													
Varistors															
Leaded round disks, S05 … S25	●	●	●	●								●	●		
Leaded square disks, Q14, Q20	●	●	●	●								●	●		●
Strap varistors, LS40 … LS42			●												●
Strap varistors, LS40 … QE7			●												●
Block varistors, B32 … B80			●		●			●							
ThermoFuse varistors, T14, T20, ETFV25			●									●	●		●
SMD disk varistors (CU)	●		●	●						●		●	●		

Please read *Important notes* on page 34.

EPCOS Components for Green Power Generation

Sensor technology service			Teleservice			Photovoltaic systems											Heat exchanger systems			
						Power conversion & transformation											Solar heat systems / shallow ground heat technologies / deep geothermal systems			
Barometric pressure measurement	Current sensing	Temperature measurement	Advanced Metering Infrastructure (AMI)	Infrastructure systems	Control electronics	Overvoltage protection	DC EMI filtering	Boost converter	Transformer / galvanic isolation	DC link	IGBT bridge	Snubbering	Output filtering	AC EMI output filtering	Power supply	Control electronics	Cold and hot water pumps	Heat exchanger	Steam power generator	Control electronics
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EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
AC capacitors				
MotorCap - S0		C_R: 1 … 60 µF V_{RMS}: 400 … 480 V AC T_{op}: –25 … +85 °C Terminals: – fast-on – flexible wires – twin core cable	Safety Class S0 acc. to IEC 60252-1 Life expect. 10000 h/Class B Compact size VDE approved IEC 60252-1 / IEC 60335-1 Plastic can	B32323 B32328 B32329
MotorCap Compact - S3		C_R: 2 … 20 µF V_R: 400/450 V AC T_{op}: –25 … +85 °C Terminals: – fast-on – flexible wires – twin core cable	Safety Class S3 acc. to IEC 60252-1 Life expect. 30000 h/Class A Flexible mounting options VDE approved IEC 60252-1 / IEC 60335-1 Plastic can	B32352 B32355 B32356
MotorCap - S2		C_R: 1 … 60 µF V_R: 250 … 450 V AC T_{op}: –25 … +85 °C Terminals: – fast-on – twin core cable	Safety Class S2 acc. to IEC 60252-1 Life expect. 30000 h/Class A Compact size VDE approved IEC 60252-1 / IEC 60335-1 Aluminum can	B32330 B32332 B32333
Aluminum electrolytic capacitors				
Screw terminals		Low voltage V_R: 16 … 100 V DC C_R: 1500 … 680000 µF Useful life up to +125 °C, 5000 h +105 °C, 20000 h +85 °C, 12000 h High voltage V_R: 200 … 600 V DC C_R: 560 … 33000 µF Useful life up to +105 °C, 8000 h +85 °C, 15000 h	High ripple current capability Long operational useful life (up to > 20 years) Compact can size Special design for base cooling Self-extinguishing electrolyte upon request	Low voltage B41554 B41560/B41580 B41550/B41570 B41456/B41458 High voltage B43741/B43761 B43752/B43772 B43701/B43721 B43712/B43732 B43703/B43723 B43704/B43724 B43705/B43725 B43713/B43733 B43700/B43720
4-/5-pin snap-in terminals & solder pins		High voltage V_R: 350 … 500 V DC C_R: 220 … 3300 µF Useful life up to +105 °C, 3000 h +85 °C, 10000 h	High ripple current capability Long operational useful life (up to > 20 years) Compact can size	B43516 B43526 B43512 B43522 B43513 B43523

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
Aluminum electrolytic capacitors				
Snap-in		Low voltage V_R: 10 … 100 V DC C_R: 560 … 68000 µF Useful life up to +105 °C, 5000 h +85 °C, 2000 h High voltage V_R: 200 … 600 V DC C_R: 39 … 3300 µF Useful life up to +105 °C, 8000 h +85 °C, 8000 h	High ripple current capability Long operational useful life (up to > 20 years) Compact can size	Low voltage B41252 B41505 B41231 High voltage B43640 B43509 B43642 B43644 B43544 B43545 B43547 B43630 B43624 B43634 B43541
Ceramic transient voltage suppressors (CTVS) and CeraDiodes				SMD
Multilayer varistors (MLV)		Operating voltage V_{RMS}: up to 150 V Surge current capability (8/20 µs): up to 6000 A Operating temperature: up to +150 °C Case sizes 0402 … 2220	Bidirectional multilayer protection components with very short response time < 0.5 ns Protection against ESD, surge, burst, switching inductive load, temporary overvoltage (depending on type) UL approved	B725**T … B725**V … B725**E …
CeraDiodes	  	C_{typ}: 0.6 … 470 pF Case sizes single components: 0402 (SOT-723), 0603 (SOD-523), 1003 (SOD-323) Case sizes array components: 0508, 0612	Ultra low capactiance down to 0.6 pF for ESD protection of high-speed data lines such as USB, Ethernet, video Specific arrays for ESD protection of USB and Ethernet	B725**D … B725**A …
EMC filters				
2-line filters	 	V_R: 250 … 520 V AC V_R: 250 … 1500 V DC I_R: 0.5 … 1600 A	Suppression of differential and common-mode disturbances Modular SIFI filter system with various cases and insertion loss performances 1 or 2 stage filters Ambient temperature up to +100 °C Filters for frequency converters	B84110 B84111F … B84112G … B84113H … B84142A****R … B84142A****S … B84142C****S …

Please read *Important notes* on page 34.

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
EMC filters				
3-line filters	  	V_R: 440 … 760 V AC I_R: 8 … 2500 A	Mains filters for 3-phase applications with symmetrical load Optimized leakage current Book size or compact filters B84243*****000 high attenuation B84143D****R127 for very high attenation *S80/*S81 for high currents and high attenuation *S20/S21/S24 for high currents and very high attenuation	B84143
4-line filters	  	V_R: 440 … 530 V AC I_R: 6 … 600 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 busbars, standard performance B84144B****S121 with busbars, extended performance	B84108 B84131 B84144
Output filters Sine-wave EMC output filters (SineFormer)		V_R: 520 … 760 V AC I_R: 6 … 1500 A Clock frequency: 2.5 … 16 kHz	dv/dt filters Sine-wave output filters Low-cost sine-wave output filters Sine-wave EMC output filters (SineFormer) 520 V AC (R127 series) 760 V AC (R290 series)	B84143U****R000 B84143U****S000 B84143V****R027 B84143V****R127 B84143V*****227 B84143V*****229 B84143V*****230 B84143V****R290
Reactors/ Chokes		V_R: 520 V AC I_R: 6 … 900 A	Line reactors (also for Active Infeed Converters) dv/dt chokes DC chokes	B86301U****R000 B86301U****S000 B86305L****R000 B86305L****S000 B86306A****R000 B86306A****S000
High voltage common-mode chokes	 	V_R: 1000 V DC / 600 V AC L_R: 0.42 … 3.3 mH I_R: 20 … 50 A	Special mechanical design for improved electrical strength and long creepage distances Approx. 0.3 …1% stray inductance for symmetrical interference suppression High current chokes on baseplate, winding wire serves as solder terminal UL 1446 Class 155 (F) Insulation system	B82726E6 … B82727E6 … B82747E6 … Upon request

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EPCOS Components for Green Power Generation

Characteristics

Series		Technical data		Features	Ordering code/ type
EMC filters					
High current common-mode chokes (power line)		V_R: L_R: I_R:	250 … 300 V AC / 440 … 500 V AC 0.43 …. 7.8 mH 5.4 … 56 A	Approx. 0.3 … 1% stray inductance for symmetrical interference suppression Higher current chokes on baseplate Winding wire serves as solder terminal UL 1446 Class 155 (F) Insulation system applicable	B82725S … B82726S … B82746S … B82747S … B82767S4 … Upon request
Standard common-mode chokes		V_R: L_R: I_R:	250 … 300 V AC 0.2 … 100 mH 0.25 … 16 A	High resonance frequency owing to special winding technique Approx. 1… 2 % stray inductance for symmetrical interference suppression Ring-and D-Core-Design: optimized impedance due to closed core Framecore (FC)-Design: High stray inductance, excellent differential mode suppression, low height UL and VDE certified	B82720 … B82725 B82730 … B82734
Ferrites					
E cores EFD cores ETD cores		Material: A_L:	N87, N97 69 … 14000 nH	Wide range of core shapes, sizes and accessories Cost optimized	E5 … E80 EFD15 … EFD30 ETD29 … ETD59
ELP cores ER cores EQ cores		Material: A_L:	N49, N87, N92, N95, N97 160 … 5000 nH	Flat mounting height Planar solution Board integrated	ELP14 … ELP64 ER9.5 … ER32 EQ13 … EQ30
PQ cores		Material: A_L:	N49, N87, N92, N95, N97 1900 … 7600 nH	Compact design Ferrite cores for power transformers and chokes	PQ16 … PQ35
U, PM cores		Material: A_L:	N27, N87, N97 250 … 16000 nH	Large volume cores	U93 … U141 PM50 … PM114
Ring cores for chokes		Material: AL:	N30, T35, T37, T38, T46 700 … 21300 nH	Epoxy coated	R10 … R87

Please read *Important notes* on page 34.

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
Film capacitors				
MKP DC link		V_R: 450 … 1300 V DC C_R: 1.5 … 480 µF	High-density series. compact Operating temperature up to +105 °C Useful life 100000 h at 1.0 • V_R, +70 °C High vibration resistance due to 4-pin terminals 2 and 4-pin versions Lead spacing 27.5 … 52.5 mm	B32774 … B32778
		V_R: 450 … 1050 V DC C_R: 0.47 … 270 µF	High power: higher RMS current capability than B3277x Operating temperature up to +105 °C Useful life 200000 h at 1.0 • V_R, +85 °C High vibration resistance due to 4-pin terminals 2 and 4-pin versions Lead spacing 27.5 … 52.5 mm	B32674 … B32678
MKT		V_R: 63 … 630 V DC C_R: 1 nF … 220 µF	Low voltage DC-link applications Operating temperature up to +125 °C Useful life 200000 hat 1.0 • V_R, +85 °C Lead spacing 5 … 37.5 mm	B32520 … B32529
MKP snubber	 	V_R: 850 … 2000 V DC C_R: 0.068 … 5.6 µF	Operating temperature up to +110 °C Useful life 200000 h at 1.0 • V_R, +85 °C 17 different terminal versions High dv/dt and current/ frequency capability	B32656S
MKP general purpose	 	V_R: 250 … 2000 V DC C_R: 1 nF … 8.2 µF	For snubber, resonant or switching Operating temperature up to +110 °C Lead spacing 10 … 37.5 mm Possibility of AC and/or DC operation High dv/dt and RMS current capability	B32652 … B32656 B32671L … B32672L
MKT AC heavy duty		V_{RMS}: 305 V AC C_R: 47 nF … 2.2 µF	+85 °C/85% RH/1000 h/240 V AC +40 °C/93% RH/2000 h/305 V AC For severe ambient conditions Between the lines and series application X2 safety class per UL/IEC High stability on capacitance	B32932 … B32936

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
Film capacitors				
X2 humidity		V_{RMS}: 305 V AC C_R: 0.1 … 15 µF	+85 °C/85% RH/1000 h/240 V AC +60 °C/95% RH/1000 h/240 V AC For severe ambient conditions Between the lines and series application X2 safety class per UL/IEC High stability on capacitance	B32922H/J … B32926H/J
X2		V_{RMS}: 305 V AC C_R: 10 nF … 30 µF	X2 class for interference suppression and EMC Approved acc. to international standards Across the line connection Lead spacing 10 … 52.5 mm	B32921 … B32928
X1		V_{RMS}: 330 V AC C_R: 10 nF … 6.8 µF	X1 class for interference suppression and EMC Approved acc. to international standards Across the line connection Lead spacing 10 … 37.5 mm	B32911 … B32916
Y2		V_{RMS}: 300 V AC C_R: 1 nF … 1 µF	Y2 class for interference supression and EMC Approved acc. to international standards Line to ground connection Lead spacing 10 … 37.5 mm	B32021 … B32026
Y1		V_{RMS}: 250 V AC C_R: 1 … 10 nF	Y1 class for interference supression and EMC Approved acc. to international standards Line to ground connection Lead spacing 15 … 22.5 mm	B81123
MKP PFC		V_R: 450 … 630 V DC C_R: 0.068 … 2.2 µF	Operating temperature up to +125 °C Super miniaturized	B32671P … B32673P
MKP AC Output filtering		V_R: 220 … 310 V AC C_R: 10 nF … 20 µF	Operating temperature up to +125 °C High current, PFC	B32671Z … B32676Z
MMKP		V_R: 630, 1000 V DC C_R: 4.7 … 150 nF	Operating temperature up to +110 °C Double sided metallized	B32641 … B32642

Please read *Important notes* on page 34.

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
Inductors				
SIMID 0603 … 2220 SMD	 	L_R: 1 nH … 10 mH I_R: up to 3.5 A	Laser-welded, molded High current handling capability SIMID 0603-C: Laser-cut technology Narrow tolerances High resonant frequency Temperature –55 … +150 °C SIMID 0805 … 2220: Laser welded, molded Temperature up to +150 °C	B82496C … B82498F … B82422 B82432 B82442
Power inductors SMD	 	L_R: 0.39 … 1000 µH I_R: up to 11 A	Shielded and unshielded versions High current capability Low DC resistance	B8246 … B8247 …
High current chokes, helically wound SMD	 	L_R: 0.44 … 10 µH I_{sat}: up to 71 A	Highly rated current Very low DC resistance Very low profile and smallest possible footprint Suitable for pick and place processes	B82559
Storage chokes / Reactors	  	I_R: 0.5 … 48 A Frequency: up to 75 kHz	Specific inductance over current and losses behaviour	B826 … B78 … Upon request
NTC thermistors				
SMD NTC SMD		Case size: 0402 … 0805 $B_{25/100}$ values: 3435 … 4480 K R values: 1.0 Ω … 680 kΩ	Operating temperature up to +150 °C UL approval	B57***V …
S86* S87* S88* S964 S971 S981		Temperature range: –55 … +155 °C Rated resistance at +25 °C: 2 … 100 kΩ Resistance tolerance: ±1 … ±5%	Taped versions for automatic processing UL approval (S88*) Lead spacing 2.5 and 5.0 mm (S87*, S88*) Customer-specific lead geometrics available	B5786*S … B5787*S … B5788*S … B57964S … B57971S … B57981S …

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EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
NTC thermistors				
G1541 G1551 G1561		Temperature range: –55 … +260 °C (G1541: +250 °C) Rated resistance at +25 °C: 2 … 100 kΩ Resistance tolerance: ±1 … ±3% Insulation resistance: > 100 MΩ Insulation voltage: 500 V DC (1 s)	High temperature resistance Insulated wires with high insulation voltage Customer-specific lead geometrics available	B57541G1 … B57551G1 … B57561G1 …
Bondable chip SMD		Chip size: 0.3 × 0.3 mm … 2 × 2 mm Temperature range: –40 … +150 °C Nominal resistance: 5 … 100 kΩ Resistance tolerance: ±3% … ±5%	UL approval (E69802) Sinterable, solderable and bondable Tightest tolerance at +100 °C possible Packaging on 8-inch frame	B57860S …
M703		Temperature range: –55 … +125 °C Rated resistance at +25 °C: 5 … 30 kΩ Resistance tolerance: ±2 … ±5%	Customizable sensor design Insulation voltage up to 2500 V AC Good thermal coupling Fast and simple installation UL approval (E69802)	B57703M0 …
M1703		Temperature range: –20 … +200 °C Rated resistance at +25 °C: 10 … 230 kΩ Resistance tolerance: ±2 … ±3%	Maximum temperature at sensor head +300 °C UL approval (E69802) Easy mounting Good thermal coupling through metal-tag	B57703M1 …
K45		Temperature range: –55 … +125 °C Rated resistance at +25 °C: 1 … 150 kΩ Resistance tolerance: ±10%	Insulation voltage 2500 V AC Tinned copper leads Good thermal coupling through screw-type case (thread M3) Cost-effective for heatsink design in parallel to pcb	B57045K0 …

Please read *Important notes* on page 34.

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
NTC thermistors				
T120		Temperature range: +5 … +110 °C Rated resistance at +25 °C: 10 kΩ Rated resistance at +60 °C: 2.5 … 3.0 kΩ Resistance tolerance: ±3%	Pipe mounted clip-on sensor to measure fluid temperature Short response time due to glass-encapsulated NTC thermistor NTC (T_a, surface < 3 s) Fast and easy mounting For pipes with diameter 13.5, 15, 18, 19 and 22 mm 2.8 × 0.5 or 4.8 × 0.8 mm plug terminals	B58100A0439A000 B58100A0506A000 B58100A0507A000 B58100A0527A000 B58100A0531A000 B58100A0628A000 B58100A0629A000
K301		Temperature range: –30 … +110 °C Rated resistance at +25 °C: 10 kΩ Resistance tolerance: ±2%	Temperature measurement in heating water NTC in brass housing Short response time in water (T_a, water approx. 5 s) Sealing with O-ring Fast and easy mounting (G1/8” thread) Tab connector and mini-module connector variants	B57301K0103A001 B57301K0103A003
Inrush current limiters S153 S235 S236 P11 P13 S237 S238 S364 S464 P27		Rated resistance at +25 °C: 1 … 120 kΩ I_{max}: up to 30 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***P****M …
Power capacitors (PEC)				
MKP AC MKP AC HP	 	C_R: 3 … 600 µF V_{RMS}: 220 … 600 V AC T_{op}: –40 … +70 °C Different terminal types Aluminum can IEC1071, UL E106388 approved	High peak current capability Customized configurations Overpressure disconnector Self-healing	B32361 B32362 B32364

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
Power capacitors (PEC)				
MKP DC MKP DC LSI	 	C_R: 30 … 1500 µF V_R: 700 … 1980 V DC T_{op}: –55 … +60 °C Six different terminal types Aluminum can / plastic case IEC1071 approved	High peak current capability Customized configurations Self-healing Low self-inductance	B25620 B25621 B25622 B25623 B25624 B25625 B25631
PCC LP		C_R: 300 … 3800 µF V_R: 450 … 1500 V DC T_{op}: –25 … +85 °C IEC1071 approved	Compact size Self-healing High volume fill factor Customer specific designs	B25655J … B25655M …
MKK HP		C_R: from 3 • 50 µF V_R: up to 1000 V AC T_{op}: –40 … +70 °C Delta or star connected Aluminum or stainless steel Rectangular case IEC1071 approved	Compact size Low ESR Self-healing Supports high THD Customer specific design	B25610
MKK DC		C_R: up to 15000 µF V_R: up to 1500 V DC T_{op}: –25 … +70 °C Open capacitors Rectangular case IEC1071 approved	Compact size Low ESL Self-healing Customer specific design	B25640 B25650 B25750
Power capacitors (PFC)				
PhaseCap Energy Gas filled Resin filled		Q_R: 5 … 33 kvar V_R: 230 … 690 V AC f_R: 50/60 Hz MKK-technology Extruded aluminum can with stud Provided with ceramic discharge module or discharge module block Gas or resin filled	High pulse current withstandability up to 500 • I_R Self-healing Overpressure disconnector for all three phases Mean life expectancy (temp. class –40/D): - up to 180000 h for gas filled types - up to 20000 h for resin filled types	B25674A … B25675A …
PhaseCap Premium		Q_R: 5 … 33 kvar V_R: 230 … 800 V AC f_R: 50/60 Hz MKK-technology Extruded aluminum can with stud Concentric winding Optimized capacitor safety terminal Ceramic discharge resistor premounted up to 690 V; external discharge module for 765 and 800 V	High pulse current withstandability up to 300 • I_R Triple safety system: self healing, overpressure disconnector, dry technology Mean life expectancy up to 180000 h at temp. class –40/C cUL file E238746 up to 690 V GOST	B25667

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EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
Power capacitors (PFC)				
PhaseCap Compact		Q_R: 5 … 33 kvar V_R: 230 … 1000 V AC f_R: 50/60 Hz MKK-technology Extruded aluminum can with stud Concentric winding Optimized capacitor safety terminal Ceramic discharge resistor pre-mounted up to 690 V; external discharge module for > 690 V	High pulse current withstandability up to 400 • I_R Dual safety system: self healing, overpressure disconnector Mean life expectancy up to 200000 h at temp. class –40/C	B25673
PhaseCap HD		Q_R: 40 … 60 kvar V_R: 400 … 525 V AC f_R: 50/60 Hz MKK-technology Extruded aluminum can with stud Stacked winding SIGUT™ safety terminal Pre-mounted discharge module	High pulse current withstandability up to 300 • I_R Triple safety system: self healing, overpressure disconnector, dry type Mean life expectancy up to 180000 h at temp. class –40/C GOST	B25669
DeltaCap		C_R: 3 … 510 µF Q_R: 0.5 … 33.7 kvar V_R: 400 … 525 V AC f_R: 50/60 Hz MKD-technology 3-phase or singles phase Extruded aluminum can with stud Stacked winding Optimized capacitor safety terminal for B32304-series; fast-on terminals for B32300- and B32303-series Ceramic discharge resistor pre-mounted for B32304A****B*** series; included in the delivery for other series	High pulse current withstandability up to 200 • I_R Dual safety system: self healing, overpressure disconnector Mean life expectancy up to 150000 h at temp. class –40/C VDE	B32300 B32301 B32303 B32304 B32305
PhiCap		Q_R: 0.5 … 30 kvar V_R: 230 … 525 V AC f_R: 50/60 Hz MKP-technology Extruded aluminum can with stud Stacked winding Optimized capacitor safety terminal for B32344-series; fast-on terminals for B32340- and B32343-series	High pulse current withstandability up to 200 • I_R Dual safety system: self healing, overpressure disconnector Mean life expectancy up to 135000 h at temp. class –40/C cUL file E106388 CSA file C22.2 No. 190 MC236094 (diameter up to 85 mm)	B32340 B32343 B32344

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EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
PFC key components				
PF controller		Supply voltage: 110 … 230 V AC Measurement voltage range: 30 … 760 V AC (L-N) or (L-L) f_R: 50/60 Hz Output stages: 4 and 15 steps	Intelligent control behaviour Menu driven handling (plain language)	B44066R6 …
Measuring devices		Supply voltage: 110 … 230 V AC Single or three phase measuring	Compact dimensions LCD display, panel mounting	B44066M …
Grind analysis tool		Operating voltage: 110 … 230 V AC Measuring current: 30, 300, 3000 A Measuring voltage: 3 × 30 … 440 V AC, 3 × 50 … 760 V AC	Comfortable measuring tool PC software for evaluation included	B44066M7777E230
Capacitor contactors		Q_R: 12.5 … 100 kvar V_R: 400 … 690 V f_R: 50/60 Hz cUL file 224924 CCC up to 75 kvar for J110/J230 series AC6b utilization category for J110/J230 series	Series J110/J230 for PFC systems without reactors Series N110/N230 for PFC systems with reactors only	B44066S****J110/ N110 B44066S****J230/ N230
Thyristor modules TSM-series		Q_R: 10 … 200 kvar V_R: 230 … 690 V depending on type f_R: 50/60 Hz Fast electronically controlled self-observing thyristor-switches for dynamic PFC Switching of capacitors within 5 ms	Easy installation Display of various system parameters For usage with dynamic PF-controller	B44066T****E402 B44066T****E690
Harmonic filter reactors		Q_R: 10 … 100 kvar V_R: 400 and 440 V (other voltages on request) f_R: 50 and 60 Hz Detuning factor: 5.67%, 7% and 14% High harmonic loading capability Temperature protection by microswitch (NC) Low noise emission	Easy installation Ambient temperature +40 °C High linearity to avoid choke tilt	B44066D****I … B44066D****M … B44066D …
PQSine - Active harmonic filter and power optimizer		Input voltage: 3-wire: 180 … 525 V 4-wire: 180 … 460 V Rated filter current: 60 … 600 A Wall and floor mounting variants Modular system	Compact design Advanced digital control Harmonig mitigation up to 50th order Active load balancing Ultra-fast reactive power factor compensation (inductive and capacitive)	B44066F …

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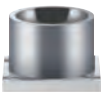
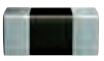
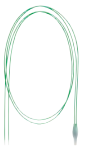
EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
Pressure sensors				
ASB1200		Rated pressure: 0.2 … 1.2 bar, absolute Voltage output: 0 … 1 V or ratiometric to VCC Measured media: Air, non-aggresive gases (gas humidity 0 … 100% r.h., short term dewing admissible). Dimensions: 4 × 4 × 2.5 mm	Compact packaged sensor SMT ceramic package for PCB mounting Piezoresistive MEMS technology Gel protected Halogen-free	B58620A0010A001 B58620A0010A002
PTC thermistors				
Limit temperature sensor, chip SMD		Sensing temperature: +70 … +130 °C in steps of 10 °C +75 … +145 °C in steps of 10 °C Rated resistance: 470/680 Ω Case sizes: 0402, 0603, 0805	Superior series Lead free tinned terminations Suitable for reflow soldering	B59421A0**5A062 B59641A0**5A062 B59721A0**0A062
Temperature sensors for motor protection, Single and triple sensors	 	Sensing temperature: +60 … +180 °C in steps of 10 °C (single sensor) +100 ... +180 °C in steps of 10 °C (triple sensor) Standard lead length: 500 … 520 mm Customized sensors upon request	Thermistor pellets with insulating encapsulation in series connection (triple sensor) Silver-plated and PTFE-insulated AWG 26 litz wires Characteristics for sensing temperatures T_{sense} = +90 °C up to +160 °C conform with DIN 44081 / DIN 44082 Color coding of litz wires to DIN 44081 / DIN 44082 UL approval to UL 1434	B59100M1**0A070 B59300M1**0A070
Overcurrent protection, chip SMD		Rated current: 12 … 90 mA Operating voltage: 30 … 400 V DC Rated resistance: 27 … 1500 Ω Case sizes: 0402, 0603, 1210	Lead-free tinned termination Short response time	B59407A0115A062 B59606A0110A062 B59607A0120A062 B59622A0090A062 B59623A0090A062 B59707A0120A062 B59807A0090A062 B59907A0120A062
Overcurrent protection, chip SMD		Rated current: 85 … 310 mA Operating voltage: 24 … 63 V DC or V AC Rated resistance: 3.1 … 55 Ω Case sizes: 3225, 4032	Molded epoxy encapsulation, lead-free tinned solder terminals Suitable for wave and reflow soldering	B59101P1**0A062 B59201P1**0A062 B59301P1**0A062 B59115P1**0A062 B59215P1**0A062 B59315P1**0A062
Overcurrent protection, leaded		Rated current: 12 … 1800 mA Operating voltage: 12 … 500 V AC Various rated resistance versions available	Broad product range UL approval	B599**C0**0A070 B598**C0**0A070 B597**B01**A070 B597**C01**A070
Heating elements		Surface temperature: +40 … +280 °C Max. operating voltage: 24 … 265 V DC, other voltage ratings upon request	Metallization for clamping Different voltage ratings, reference temperatures and geometries upon request	B59041R0**0A010 B59053A0**0A010 B59060A0**0A010 B59102R0**0A010

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
PTC thermistors				
Inrush current limiters, leaded disks		Max. DC-link voltage: 370 … 800 V DC Rated resistance: 25 … 1100 Ω Operating cycles: 100000	Inrush current limiters are not damaged when directly connected to V_{max} even without additional current limitation	B59750C0120A070 B59751C0120A070 B59752C0120A070 B59753C0120A070 B59754C0120A070 B59755C0150A070 B59770C0120A070 B59771C0120A070 B59772C0120A070 B59773C0120A070 B59774C0120A070 B59412C1130B070 B59451C1130B070
Inrush current limiters, phenolic resin and PBT plastic case		Max. DC-link voltage: 400 … 800 V DC Rated resistance: 22 … 100 Ω Operating cycles: 100000	Inrush current limiters are not damaged when directly connected to V_{max} even without additional current limitation	B59105J0130A020 B59107J0130A020 B59109J0130A020 B59213J0130A020 B59215J0130A020 B59217J0130A020 B59219J0130A020
SAW components				SMD
LT filters		Chip: lithium tantalate substrate Input / output: 50 Ω Low insertion attenuation Qualified to AEC-Q200 Temperature range: –40 … +125 °C (1000 temp. cycles) 85% rel. humidity tested (1000 h)	Center frequency: 2448.5 MHz Usable bandwith: 97.0 MHz	B39242B3912U410
			Center frequency: 2441.75 MHz Usable bandwith: 83.5 MHz	B39242B3918U410
			Center frequency: 315.00 MHz Usable bandwidth: 0.6 MHz	B39321B3711U410
			Center frequency: 315.00 MHz Usable bandwidth: 1.0 MHz	B39321B3722U410
			Center frequency: 433.92 MHz Usable bandwidth: 1.6 MHz	B39431B3721U410
			Center frequency: 433.92 MHz Usable bandwidth: 0.4 MHz	B39431B3925U410
			Center frequency: 869.00 MHz Usable bandwidth: 2.0 MHz	B39871B3440U410
		Chip: lithium tantalate substrate Input / output: 50 Ω Low insertion attenuation Qualified to AEC-Q200 Temperature range: –40 ... +85°C (1000 temp. cycles) 85% rel. humidity tested (1000 h)	Center frequency: 869.00 MHz Usable bandwidth: 2.0 MHz	B39871B4316P810
			Center frequency: 915.00 MHz Usable bandwidth: 26.0 MHz	B39921B3588U410
			Center frequency: 915.00 MHz Usable bandwidth: 26.0 MHz	B39921B4301F210
			Center frequency: 915.00 MHz Usable bandwidth: 10.0 MHz	B39921B3726U410
			Center frequency: 1575.00 MHz Usable bandwidth: 6.0 MHz	B39162B3524B710
			Center frequency: 1582.00 MHz Usable bandwidth: 47.0 MHz	B39162B4327P810

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EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
SAW components				SMD
Quarz filters		Chip: quartz substrate Input / output: 50 Ω w/ matching Excellent selectivity Qualified to AEC-Q200 –40 … +125 °C (1000 temp. cycles) 85% rel. humidity tested (1000 h)	Center frequency: 315.00 MHz Usable bandwidth: 0.360 MHz	B39321B3741H110
			Center frequency: 315.00 MHz Usable bandwidth: 0.550 MHz	B39321B3781Z810
			Center frequency: 433.92 MHz Usable bandwidth: 0.360 MHz	B39431B3740H110
			Center frequency: 433.92 MHz Usable bandwidth: 0.340 MHz	B39431B3743H110
			Center frequency: 868.30 MHz Usable bandwidth: 0.300 MHz	B39871B3734H110
			Center frequency: 869.30 MHz Usable bandwidth: 0.600 MHz	B39871B3744H110
Surge arresters				
H3		Operating voltage V_{RMS}: 255 V Protection level at 1.2/50 µs, 6 kV: < 1500 V I_N 8/20 µs: 100 kA I_{imp} 10/350 µs: 100 kA	High insulation resistance Temporary overvoltage withstand	B88069X3993 …
L1		Operating voltage V_{RMS}: 255 V Protection level at 1.2/50 µs, 6 kV: < 1500 V I_N 8/20 µs: 50 kA I_{imp} 10/350 µs: 50 kA	High insulation resistance Temporary overvoltage withstand	B88069X5731 … B88069X6551 …
V1	 	Operating voltage V_{RMS}: 255 V Protection level at 1.2/50 µs, 6 kV: < 1500 V I_N 8/20 µs: 40 kA class I: I_{imp} 10/350 µs: 12.5 kA class II: I_{max} 8/20 µs: 65 kA	High insulation resistance Temporary overvoltage withstand	B88069X4390 … B88069X4400 … B88069X6940 …
EF		DC breakdown voltage: 270 … 3300 V Max. discharge current 8/20 µs: 10 kA	High discharge current High isolation resistance High follow current High voltage types available Small size	B88069X2641 … B88069X4131 … B88069X4301 … B88069X5080 … B88069X5690 … B88069X6461 … B88069X8691 …

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
Surge arresters				
A7		DC breakdown voltage: 700 … 6300 V Maximum discharge current 8/20 µs: 10 kA	Short response time High isolation resistance Application in series with MOV High discharge current High voltage types available Compact size	B88069X2140 … B88069X2180 … B88069X3820 … B88069X9391
A8	 	DC breakdown voltage: 90 V, 230 V, 350 V, 500 V, 600 V, 800 V Maximum discharge current 8/20 µs: 20 kA	Short response time High isolation resistance High discharge current SMD and leaded version	B88069X1380 … B88069X1620 … B88069X1630 … B88069X2250 … B88069X2380 … B88069X6471 … B88069X2900 … B88069X7661 …
T8	 	DC breakdown voltage: 90 V, 230 V, 350 V, 420 V, 600 V Maximum discharge current 8/20 µs: 15 kA	Short response time High isolation resistance High discharge current	B88069X3651 … B88069X8300 … B88069X8690 … B88069X8910 …
T8, fail-safe	 	DC breakdown voltage: 90 V, 230 V, 350 V, 420 V Maximum discharge current 8/20 µs: 15 kA	Short response time High isolation resistance High discharge current	B88069X8080 … B88069X8680 … B88069X8720 … B88069X8750 … B88069X4091 …

Please read *Important notes* on page 34.

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data	Features	Ordering code/ type
Transformers				
Magnetics modules for LAN applications SMD		Single, dual and quad port solutions Standard temperature range: 0 … +70 °C Extended temperature range: –40 … +85 °C	Fully compliant with IPC / JEDEC J-STD-020D / EEE 802.3 Optimized for all major transceiver ICs Industry standard footprint	B78476A****A003
Flyback transformers		> 8 mm creepage and clearance distance available	High dielectric strength Low cost Low stray inductance	B78 … Upon request
Push-Pull transformers SMD		∫Vdt V · µs (+25 °C bipolar): 12.5 … 42 Turn ratio: 1:1:1.1:1.1 ... 1:1:3.8:3.8	Different turn ratios Small SMD package Typ. switching frequency > 250 kHz	B82805
Gate drive transformers		> 8 mm creepage and clearance distance available 600 … 1000 V separation	High dielectric strength SMD reflow solderable	B78 … Upon request
Power transformers		up to 5000 W	Low stray inductance High power capability	B78 … Upon request
Current sense transformers SMD	  	Sensed current 7 … 40 A Turn ratio 1:20 … 1:200	Very low DC resistance Different turn ratios Very small package	B78412 B78419 B82801 B78417

EPCOS Components for Green Power Generation

Characteristics

Series		Technical data		Features	Ordering code/ type
Varistors					
S05		I_{max} 8/20 µs:	up to 800 A	High surge current ratings	B72205S …
S07		I_{max} 8/20 µs:	up to 1750 A	High energy ratings (2 ms) up to 440 J	B72207S …
S10		I_{max} 8/20 µs:	up to 3.5 kA		B72210S …
S14		I_{max} 8/20 µs:	up to 6 kA	For high energy absorption	B72214S …
S20		I_{max} 8/20 µs:	up to 12 kA		B72220S …
		Operating voltage V_{RMS}:	11 … 1100 V		
S25		I_{max} 8/20 µs:	20 kA	High surge current up to 20 kA	B72225S …
		Operating voltage V_{RMS}:	130 … 750 V	High energy ratings (2 ms, 185 up to 1025 J)	
Q14		I_{max} 8/20 µs:	8 A	Maximum load capacity at minimum component	B72214Q …
Q20		I_{max} 8/20 µs:	15 kA	Height miniaturization	B72220Q …
		Operating voltage V_{RMS}:	130 … 320 V		
LS40		I_{max} 8/20 µs:	40 kA	High surge current ratings	B72240L …
LS41		I_{max} 8/20 µs:	50 kA	High energy ratings (2 ms) up to 1200 J	B72241L …
LS42		I_{max} 8/20 µs:	65 kA		B72242L …
		Operating voltage V_{RMS}:	130 … 750 V		
LS40 … QE7		I_{imp} 10/350 µs:	6.5 kA	IEC 61643-11 class I	B72240L7 …
		I_{max} 8/20 µs:	40.0 kA	High surge current ratings at 10/350µs	
		Operating voltage V_{RMS}:	130 … 460 V	High energy ratings (2 ms) up to 960 J	
B32		I_{max} 8/20 µs:	25 kA	Disk shaped varistor element potted in plastic housing	B72232B …
B40		I_{max} 8/20 µs:	40 kA		B72240B …
B60		I_{max} 8/20 µs:	70 kA	Housing and potting flame retardant to UL94 V-0	B72260B …
B80		I_{max} 8/20 µs:	100 kA		B72280B …
		Operating voltage V_{RMS}:	75 … 1100 V	Screw terminals	
T14		I_{max} 8/20 µs:	6 kA	ThermoFuse (varistor and fuse in one housing)	B72214T …
T20		I_{max} 8/20 µs:	10 kA		B72220T …
ETFV25		I_{max} 8/20 µs:	20 kA	Space saving	B72225T …
		Operating voltage V_{RMS}:	130 … 1000 V	Monitoring option with third lead	
		Operating voltage V_{DC}:	170 … 1465 V	UL 1449 approved	
SMD disk varistors (CU) SMD		Operating voltage V_{RMS}:	up to 300 V	Case sizes 3225 … 4032	B726*0M****K …
		Surge current capability (8/20 µs):	up to 1200 A	Encapsulated disk varistors (5 and 7 mm) for SMD mounting	
		Operating temperature:	up to +85 °C	For surge current protection	
				Bidirectionality	
				UL and CSA approved	

Please read *Important notes* on page 34.

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