TDK and EPCOS Product Survey 2017

Electronic Components, Modules and Systems

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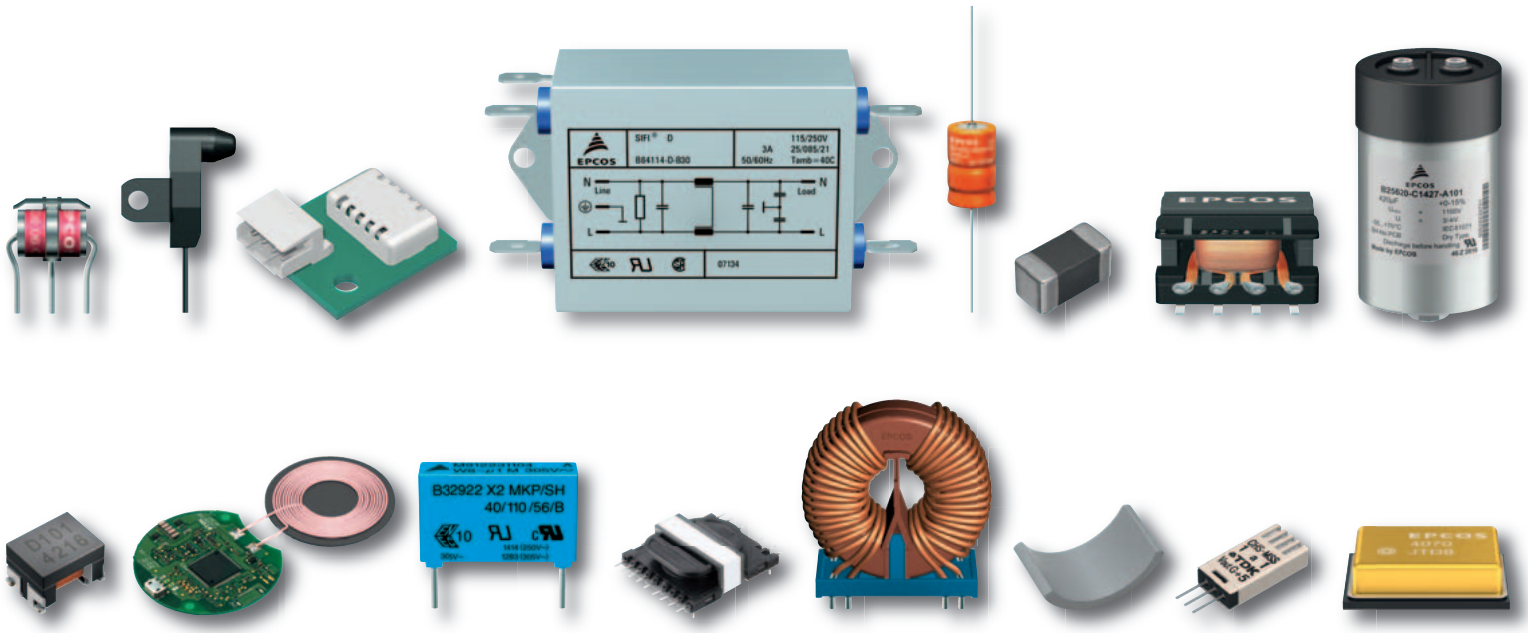

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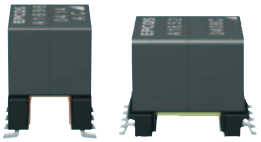
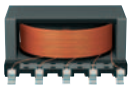
Transformers

				
Series	EP6 shielded – SMD	EHR – SMD	EP7 … EP13 – SMD	ER11 – SMD
Technical data	Output voltage (typ.): 80 … 140 V Size (l x w x h): 9 x 7.6 x 7.4 mm	Power: 20 … 50 W	Size (l x w x h): EP7: 10 x 8.0 x 10.9 mm EP10: 12.6 x 14.4 x 13.6 mm EP13: 13.6 x 18.3 x 13.2 mm	Power: up to 1 W Size (l x w x h): 12 x 13 x 6 mm
Features	– High turns ratio – Low leakage inductance – High frequencies – Insensitive to external fields – AEC-Q200 approved	– High saturation currents – Low leakage inductance – High frequencies – AEC-Q200 approved	– Low leakage inductance – Compact design – Supplementary/ reinforced insulation levels	– Low stray inductance – High power density – High operating frequencies
Applications	Park Distance Control units (PDC)	Xenon lights LED headlights Piezo fuel injection systems	Power supplies Power over Ethernet (PoE)	Power supplies DC/DC converters

Transformers

				
Series	EF12.6 … EF25	Current-sense transformers – SMD B82801	Current-sense transformers – EP7 / EP10 CTEM series – SMD	Power chokes – PCEM series
Technical data	Power: up to 20 W Size (l x w x h): 15.5 x 14.5 x 12.5 … 28.5 x 28.9 x 21 mm	Sensed current 7… 40 A Turns ratio: 1:20 … 1:200	I_{sense}: up to 30 A_{RMS} Turns ratio: 1:50 up to 1:180	L_R: 1 … 3 µH I_R: up to 210 A
Features	– Pin-to-Hole (PTH) – High creepage distance – High dielectric strength – Types with 8 mm creepage and clearance distance available	– Standard designs in SMD – Three different sizes available – Very low DC resistance, losses and high reliability – Ruggedness and simple implementation – Customized designs	– AEC-Q200 approved – Basis isolation	– Basic isolation – Low DC resistance – AEC-Q200 approved
Applications	Power supplies	Compact DC/DC converters for midrange power	– Electric car applications (xEV) – Switch-mode power supplies	Electric car applications (xEV)

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Please read *Important notes* on page 76.

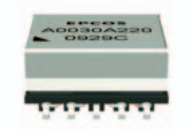
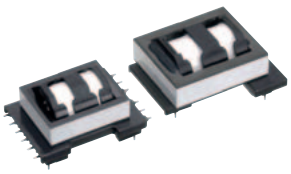
Magnetics

Transformers

Transformers

			
Series	Power transformers PTEM series	Gate-drive transformers – SMD B82804	Push-Pull transformer – SMD
Technical data	Power: 1800 … 3000 W $V_{in, typ}$: 240 … 420 V $V_{out, typ}$: 14 … 18 V	Isolation voltage: 1500 V DC Height: max. 5.4 mm Footprint: max. 8.1 x 6.7 mm	– 5 off-the-shelf types with different transformation ratios – Typical voltage ratios of 5 V to 5 V or 3.3 V to 12 V – High voltage test: Np/Ns: V = 500 V AC – Typical switching frequency > 250 kHz
Features	– Basic isolation – Innovative cooling concept – AEC-Q200 approved	– Standard designs in SMD – Low leakage inductance – Low inter-winding capacitance – High SRF value – High isolation between primary and secondary	– Different turns ratios – Small SMD package – Center tap on primary and secondary windings
Applications	Electric car applications (xEV)	General purpose isolated AC/DC, DC/DC converters	– Switch-mode power supplies – Isolated interface power supplies – Industrial automation – Process control

Transformers

			
Series	Flyback transformers – SMD B82802	Flyback transformers ECO series	Resonant transformers SRX series
Technical data	Power: 12 … 55 W Input voltage: 36 … 60 V DC Frequency: 100 kHz Output voltage: 5, 12 or 3.3, 5, 12 V Isolation voltage: 1500 V AC Suitable for ambient temperature: up to +85 °C Operating temperature: up to +125 °C	<u>Vertical type</u> Power: 12 … 68 W Frequency: 50 kHz <u>Horizontal type</u> Power: 5 … 59 W Frequency: 50 … 100 kHz Operating temp: –30 … +120 °C	<u>Horizontal type</u> Power: 100 … 300 W Frequency: 60, 80, 100 kHz Number of outputs: 2, 3
Features	– Low profile SMT packages – Industry standard footprints – Customized designs	– Pin terminal type (for multiple outputs) – Downsized – Compliant with worldwide safety standards – Supports automatic winding – Reduced characteristic variations – Halogen-free	– Pin terminal type (Resonant type, Through-hole) – Low height (15 … 31.5 mm) – High power in compact dimensions – Supports automatic winding
Applications	DC/DC converters (isolated buck) Power over Ethernet (PoE)	Switching power supplies	Switching power supplies

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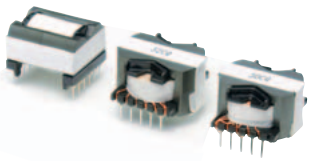
Magnetics

Transformers

Transformers

			
Series	Resonant transformers SRV series	Flyback transformers SRW series	Choke coils PFC series
Technical data	Vertical type Power: 160 … 250 W Frequency: 100 kHz Number of outputs: 2	For multiple outputs (vertical type) Power: 51 … 83 W Frequency: 50 … 100 kHz Operating temp: –30 … +120 °C For multiple outputs (horizontal type) Power: 58 … 72 W Frequency: 50 … 100 kHz Operating temp: –30 … +120 °C	Power: 75 … 300 W Frequency: 50, 65 kHz Inductance: 150 … 600 µH Rated peak current: 2.4 … 11.1 A Turns ratio: 9.0 … 10.8 Np/Npd Operating temp.: –30 … +120 °C
Features	– Pin terminal type (Resonant type, Through-hole) – Low height (15 … 16 mm) – High power in compact dimensions – Supports automatic winding	– Pin terminal type for multiple outputs – New high B, low loss PC47 material – Adopts new EGG cores developed for power transformers – Ideal for small, multiple output switching power supplies – Perfect balance between core volume	– Pin terminal type – Low height (15.5 … 27 mm) – High current in compact dimensions
Applications	Switching power supplies	Switching power supplies	General purpose isolated AC/DC, DC/DC converters

Transformers

		
Series	Energy management system CCT series	Gate-drive transformers VGT series – SMD
Technical data	Size: 261631, 272440, 323047, 354571, 406393 Inner diameter: 6 … 36 mm Operating temperature: –20 … +60 °C Current transformation ratio: 3000:1 Maximum AC current: 30 … 600 A Max. output current ±1%: 10 … 200 mA Secondary winding resistance: 64 … 492 Ω	Inductance: 10 µH ± 20% (100 kHz, 1V) Leakage inductance: 0.2 µH max. (100 kHz, 1V, NF, NS shorted) Withstanding voltage: NP, NF – NS: 2.6 kV_{RMS} Operating temperature: –40 … +130 °C
Features	– Clamp type for easy installation on existing power equipment – Accommodates automatic process from wire wrapping and winding to soldering, ensuring high quality and stable supply – Equipped with a built-in open-circuit protective device	– High flux density cores have been adopted to achieve miniaturization – Dielectric strength voltage is 2.6 kV
Applications	Energy management systems (EMS) for buildings, factories, stores and communities (BEMS, FEMS, SEMS, CEMS)	Automotive: IPM drive of motor inverters.

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Please read *Important notes* on page 76.

Magnetics

Transformers, Power Inductors

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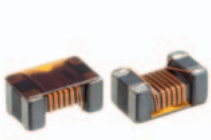
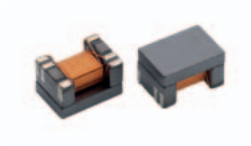
Transformers

		
Series	Current sense transformers VST series – SMD	Balun transformers – SMD ATB series
Technical data	Inductance NS: 4.0 mH DC resistance: NP 0.5 max mΩ NS 3.2 ± 30% Rated current NP: 30 max A_{RMS} Withstanding voltage: 2.0 kV_{RMS}/1 min. Maximum ET constant: 120 V-µS Operating temperature: –40 … +125 °C	Size: 2012 … 3225 DC resistance: 0.5 … 1.0 Ω Rated current: 0.15 … 0.28 A Withstanding voltage: 125 V Operating temperature: –40 … +85 °C
Features	– High flux density cores have been adopted to achieve miniaturization – Maximum 30 Arms can be measured	– Small size enables a reduction of mounting surfaces – Stable charging characteristics – High reliability
Applications	Automotive: Switching current detection in on-board DC/DC converters and chargers	TVs Mobile devices Set Top Box

Transformers

Power Inductors

		
Series	Pulse transformers for LAN – SMD ALT series	Power inductors – SMD A and G versions B82471 … B82479
Technical data	Size: 3232, 4532 Inductance (at 100 kHz/DC bias = 8 mA) 170 … 200 µH min. Insertion loss (0.1 … 100 MHz): 1.5 … 2.5 db max. Interwinding stray capacitance (100 kHz): 35 pF max. Operating temperature: –40 … +85 °C	Rated inductance: 1 … 1000 µH Rated current: 0.18 … 9.8 A Temperature: up to +125 °C Size: 6.1 x 5.5 … 18.5 x 15.24 mm Height: 3.5 … 7.25 mm
Features	– Compatible with 10BASE-T, 100BASE-TX, and 1000BASE-T – High-quality product with automatic winding	– Shielded and unshielded construction – High rated current – Low DC resistance – Suitable for lead-free reflow soldering
Applications	LAN interface portion of various devices like network devices, communication devices and digital home appliances	Filtering of supply voltages Coupling, decoupling DC/DC converters Consumer and industrial electronics

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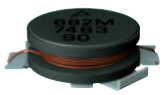
Power Inductors

Power Inductors

	 	 
Series	Power inductors – SMD A and G versions B82462, B82464	Power inductors – SMD P, R and M versions B82464 … B82477
Technical data	Rated inductance: 0.82 … 1000 µH Rated current: 0.11 … 7.6 A Temperature: up to +150 °C Size: 6 x 6 and 10 x 10 mm Height: 3.0 … 4.8 mm	Rated inductance: 0.82 … 1000 µH Rated current: 0.2 … 11 A Temperature: up to +150 °C Size: 7.3 x 7.3 … 12.5 x 12.5 mm Height: 4.5 … 8.5 mm
Features	– Shielded and unshielded construction – High rated current – Low DC resistance – Qualified to AEC-Q200 – Suitable for lead-free reflow soldering as referenced in JEDEC J-STD 020D	– Shielded and unshielded construction – High mechanical stability – High rated current – Low DC resistance – Qualified to AEC-Q200 – Suitable for lead-free reflow soldering as referenced in JEDEC J-STD 020D
Applications	Filtering of supply voltages Coupling, decoupling DC/DC converters Automotive and industrial electronics	Filtering of supply voltages Coupling, decoupling DC/DC converters Automotive electronics LED lighting

Power Inductors

	 	
Series	ERU chokes – SMD Helically wound B82559	Buck/Boost choke BCEM series – ERU33
Technical data	Rated inductance: 0.5 … 35 µH Saturation current: 9.3 … 71 A Size: 13.2 x 11, 19.9 x 20.5, 22.5 x 22 and 25.3 x 23.5 mm Height: 4.95 … 14.6 mm	Rated inductance: 3.2 … 10 µH Saturation current: 34 … 90 A (+25 °C) Size: 33 x 33 mm Height: 15 mm
Features	– Flat wire winding – Self-leaded construction under body termination – Very high rated current – Extremely low DC resistance – Suitable for pick-and-place process – Suitable for lead-free reflow soldering as referenced in JEDEC J-STD 020D	– Flat wire winding – PTH (PinThrough Hole) with self-leaded pins – Additional fixation to be considered by customer – High rated current – Low DC resistance – AEC-Q200 under preparation
Applications	Energy storage chokes for DC/DC converters VRM modules POL converters	Buck/Boost choke for 48 Volt boardnet converters

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Power Inductors

Power Inductors

		
Series	Dual inductors – SMD B82472D … B82477D B82477C	General use – SMD SLF series
Technical data	Rated inductance: 2.0 …100 µH (inductance per winding) Rated current: 1.35 … 7.05 A Temperature: up to +150 °C Size: 7.3 x 7.3 … 12.5 x 12.5 mm Height: 4.6 … 10.5 mm	Size: 6025 … 12575 Inductance: 1.2 … 150 µH Rated current: 0.13 … 8.2 A
Features	– Two windings – 1:1 transformer – Shielded construction – Special winding technology for low stray inductance – High coupling factor – Qualified to AEC-Q200 – Suitable for lead-free reflow soldering as referenced in JEDEC J-STD 020D	– Magnetic shield type wound inductor for power circuits – Product line up allows various usages
Applications	SEPIC, CUK and flyback topologies Class D amplifiers DC/DC converters Automotive electronics LED lighting	Thin-screen TV, LCDs, AV equipment, gaming equipment, other electrical devices

Power Inductors

		
Series	Automotive general use – SMD CLF-NI-D series	General use – SMD VLCF series
Technical data	Size: 6045, 7045, 10060, 12577 Inductance: 1 … 470 µH Rated current: 280 mA … 8.5 A Temperature: up to +150 °C	Size: 4018 … 5028 Inductance: 1.2 … 470 µH Rated current: 140 … 2710 mA
Features	– High rated DC current – High reliability with welding connection – Ferrite shielded component	– General use for portable DC/DC converter line – High magnetic shield construction
Applications	Automotive (generic automotive DC/DC converter line)	DC/DC converters for communications Consumer electronics PCs

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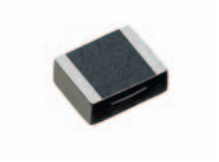
Power Inductors

Power Inductors

			
Series	General use – SMD SPM series	High current – SMD VLB series	Thin-Film – metal composite core technology – SMD TFM-GHM, TFM-ALM series
Technical data	Size: 3012 … 12565 Inductance: 0.18 … 10 µH Rated current: 1.3 … 46 A Temperature: –40 … +125 °C	Size: 7050 … 12065 Inductance: 90 … 360 nH Rated current: 14 … 68 A Temperature: –40 … +125 °C	Size 2016 Inductance: 0.47 … 2.2 µH Rated current: 1.9 … 4.5 A
Features	– High power handling capability: Small copper loss Using large saturation induction of Fe-based metals – High Curie temperature of about 550 °C means low inductance temperature variance	– High output processing capacity: Minimal copper loss – High saturation current and low DC resistance – High operating frequency up to 2 MHz	– Low height of 1.0 mm – Superior DC-bias characteristics – Consists of original fine copper pattern with micro-processing technology – Coil pattern coated with metal magnetic material
Applications	Mobile communications, consumer electronics, servers, VRM	Servers Notebooks PCs VRMs VRDs	Generic use for DC/DC converter of mobile communication devices

Power Inductors

			
Series	Thin-Film – metal composite core technology – SMD TFM-ALMA	Semi-shielded – SMD VLS-EX, VLS-E series	Small size, low profile, shielded – SMD VLS-CX series
Technical data	Size: 2016 … 2520 Inductance: 0.47 … 2.2 µH Rated current: 1.9 … 3.9 A Temperature: –40 °C … +150 °C	Size: 3010 … 6045 Inductance: 1 … 220 µH Rated current: 0.31 … 13.5 A	Size: 2016 … 2520 Inductance: 0.24 … 22 µH Rated current: 0.38 … 3.08 A
Features	– Low height of 1.0 mm and 1.2 mm (2520 only) – AEC-Q200 qualified – Excellent DC-bias characteristics – Consists of original fine copper pattern with micro-processing technology – Coil pattern coated with metal magnetic material	– General use for portable DC/DC converter lines	– Magnetic shield type wound inductor for power circuits using ferrite magnetic material – High magnetic shield construction and compatible with high-density mounting
Applications	Automotive (ECM, airbags, headlights, electronic power steering, meters, ABS, others)	Consumer electronics Notebooks Mobile communications	Mobile communications Consumer electronics LCD displays HDDs

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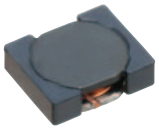
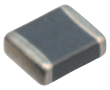
Power Inductors

Power Inductors

		
Series	Small size, low profile – SMD VLF-MT series	Multilayer technology – SMD MLP series
Technical data	Size: 3025 … 4032 Inductance: 0.47 … 22 µH Rated current: 0.38 … 3.01 A	Size: 1005 … 2520 Inductance: 0.47 … 10 µH Rated current: 0.5 … 2.3 A
Features	– DC/DC converter with top class voltage conversion efficiency – Low profile – Generic use for portable DC/DC converter – High magnetic shield construction	– Most suitable for power lines with low output – Optimized ferrite materials enables the reduction of losses – DC superposition characteristics have been substantially improved
Applications	Mobile communications LCD displays HDDs DVC DSC	Mobile communications Power supply modules DSC PCs HDDs

Power Inductors

		
Series	Small size, low profile, semi-shielded, metal core – SMD VLS-HBX series	Multilayer technology – SMD MLD series
Technical data	Size: 2016 … 2520 Inductance: 0.24 … 2.2 µH Rated current: 1.9 … 4.6 A	Size: 2016 Inductance: 1 … 4.7 µH Rated current: 0.2 … 1.4 A Temperature: –40 … +125 °C
Features	– General use for portable DC/DC converter lines – High magnetic shield construction actualizes high resolution for EMC protection	For compact DC/DC converters – Most suitable for power lines with low output – Optimized ferrite materials enables the reduction of losses
Applications	Mobile communications Consumer electronics LCD displays HDDs	Automotive applications: Camera modules Car multimedia Car accessories Connectivity

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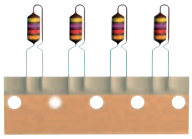
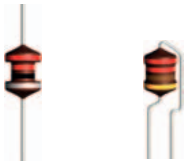
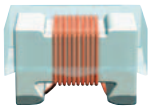
Magnetics

Power Inductors, Signal Use Inductors

Power Inductors

			
Series	Leaded RF chokes Axial and radial versions B781 …, B821 …	Leaded RF chokes PLUS families, axial and radial versions B781x8E, B82144F2/B2	Leaded VHF chokes Axial version B821 …, B82500
Technical data	Rated inductance: 1.0 … 100 000 µH Rated current: 0.085 … 2.5 A	Rated inductance: 0.1 … 470 µH Rated current: 0.6 … 7.5 A	Rated inductance: 1 … 3900 µH Rated current: 0.1 … 10 A
Features	– Wide inductance range – Suitable for wave soldering	– Low inductance, high rated current – Low DC resistance – Suitable for wave soldering	– High resonant frequency – Suitable for wave soldering
Applications	LF and HF decoupling of signal and control units Lighting technology Industrial, automotive, entertainment electronics Household appliances	DC-DC converter Filtering of supply voltages RF blocking and filtering Decoupling and interference surpression Class D amplifiers LED and energy-saving lamps Entertainment electronics	RF blocking and filtering Interference suppression in small appliances Decoupling in telecommunication and entertainment electronics

Signal Use Inductors

			
Series	SIMID 0603-C – SMD B82496C …	SIMID 0805-F – SMD B82498F …	SIMID 1210-H – SMD B82422H …
Technical data	Size (EIA): 0603 Inductance: 1 … 220 nH Rated current: 110 … 1800 mA Temperature: up to +150 °C	Size (EIA): 0805 Inductance: 2.7 … 6800 nH Rated current: 80 … 1000 mA	Size (EIA): 1210 Inductance: 1.0 … 680 µH Rated current: 61 … 1150 mA Temperature: up to +150 °C
Features	– High resonance frequency – Narrow inductance tolerances – High mechanic stability – Qualified to AEC-Q200	– Ceramic and ferrite core versions – High resonance frequency – Narrow inductance tolerance – Ceramic core version qualified to AEC-Q200	– Very high current handling capability – Qualified to AEC-Q200
Applications	Multimedia appliances Wireless communication systems Car access systems Tire Pressure Monitoring System (TPMS) GPS Digital cameras	Multimedia appliances Antenna amplifiers Wireless communication systems Car access systems GPS	Filtering of supply voltages, coupling, decoupling DC/DC converters, power supplies Automotive electronics Telecommunications Consumer and information technology Industrial electronics

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Magnetics

Signal Use Inductors

Signal Use Inductors

			
Series	SIMID 1210-100 – SMD B82422A …	SIMID 1812-T/C – SMD B82432T…, B82432C …	SIMID 2220-T – SMD B82442T…
Technical data	Size (EIA): 1210 Inductance: 0.0082 … 100 µH Rated current: 65 … 800 mA Temperature: up to +125 °C	Size (EIA): 1812 Inductance: 1 … 1000 µH Rated current: 55 … 1300 mA Temperature: up to +150 °C	Size (EIA): 2220 Inductance: 1 … 10 000 µH Rated current: 46 … 3510 mA Temperature: up to +150 °C
Features	– High resonance frequency – High Q factor – Qualified to AEC-Q200	– High current handling capability – High Q factor – Qualified to AEC-Q200	– Very high current handling capability – High inductance values – Qualified to AEC-Q200
Applications	Filtering of supply voltages, coupling, decoupling Antenna systems Automotive electronics Telecommunications Consumer and information technology Industrial electronics	Filtering of supply voltages, coupling, decoupling DC/DC converters Antenna systems Automotive electronics Telecommunications Industrial electronics	Filtering of supply voltages, coupling, decoupling DC/DC converters/power supplies Automotive electronics Telecommunications Consumer electronics Industrial electronics

Signal Use Inductors

			
Series	X/Y Transponder coils – SMD B82450A …, B82450H …	Z Transponder coils – SMD B82451L …	3D Transponder coils – SMD B82453C …
Technical data	Size 8 mm: B82450A … E … Size 11 mm: B82450A … A … High Q 11 mm: B82450H … A … Inductance: 1 … 26 mH Sensitivity: 10 … 51 mV/µT	Size: 7.7 x 7.4 x 2.65 mm Inductance: 1 … 10 mH Sensitivity: 23 mV/µT	Size: 11.5 x 12.5 x 3.6 mm Inductance range 125 kHz: 1 … 13.2 mH Inductance range 21.8 kHz: 30 … 55 mH Sensitivity range 125 kHz: 49 … 100 mV/µT Sensitivity range 21.8 kHz: 22 … 25 mV/µT
Features	– Rugged construction for high mechanical stability when exposed to shock, drop and bending tests – High Q version available – Low profile version available – Qualified to AEC-Q200	– Rugged construction for high mechanical stability when exposed to shock, drop and bending tests – Qualified to AEC-Q200	– Long receiving distance at 125 kHz – High Sensitivity in all orientations (X/Y/Z) – Rugged construction for high mechanical stability when exposed to shock, drop and bending tests – Qualified to AEC-Q200
Applications	Car access systems Immobilisers Passive Entry Passive Start (PEPS) Tire Pressure Monitoring System (TPMS) Heart rate monitoring devices Goods tracking systems	Passive Entry, Passive Start (PEPS) RFID (radio-frequency identification) systems at low frequency (LF) range e.g. 125 kHz	Passive Entry Passive Start (PEPS): wake-up and immobilizer LF antenna coil

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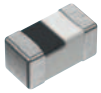
Magnetics

Signal Use Inductors, Multilayer Inductors

Signal Use Inductors

			
Series	Standard circuits – SMD NL(V) series	Standard circuits – SMD NLFV series	Decoupling circuits – SMD NLC(V) series
Technical data	Size: 2520 … 3225 Inductance: 0.01 … 1000 µH Rated current: 25 … 530 mA	Size: 2520, 3225 Inductance: 1 … 1000 µH Rated current: 20 … 750 mA	Size: 2520 … 4532 Inductance: 0.1 … 330 µH Rated current: 70 … 2850 mA
Features	– Good heat durability that withstands lead-free compatible reflow soldering conditions – Lead-free material is used for the plating on the terminal – Metal terminals provide excellent connection reliability – Highly heat-resistant thermoplastic resin is used to form the exterior package		
Applications	Consumer electronics Automotive (car audio and ECU systems) HDDs and ODDs	Consumer electronics Communications Automotive (car audio and ECU systems) HDDs and ODDs	

Multilayer Inductors

			
Series	High frequency for standard circuits – SMD MLG-S series	High frequency – High Q – SMD MLG-Q series	High frequency – High Q – SMD MLG-P, MLG-PPA series
Technical data	Size: 0603 … 1005 Inductance: 0.3 … 390 nH Rated current: 50 … 1000 mA	Size: 0402 Inductance: 0.2 … 33 nH Rated current: 120 … 350 mA Temperature: –55 … +125 °C	Size: 0402, 0603 Inductance: 0.2 … 120 nH Rated current: 80 … 1000 mA Temperature: –55 … +125 °C
Features	– Advanced monolithic structure is formed using multilayering and sintering process with ceramic and conductive materials for high frequency	– Optimal product for fine-pitch circuits	– Q is higher than in a conventional product; particulary at more than 800 MHz
Applications	High frequency applications such as mobile communications, high-frequency modules (PA, VCO, FEM), Bluetooth, WLAN, UWB and tuners		

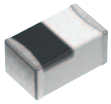
TDK EPCOS

Please read *Important notes* on page 76.

Magnetics

Multilayer Inductors, Signal EMC Filters

Multilayer Inductors

			
Series	High frequency – SMD MLK series	High frequency – Super High Q – SMD MHQ-P, MHQ-PSA series	Signal line – Narrow tolerance – SMD MLF-J series
Technical data	Size: 0603 … 1005 Inductance: 1 … 330 nH Rated current: 70 … 500 mA	Size: 0402 …1005 Inductance: 1 … 150 nH Rated current: 400 … 1200 mA	Size: 1005, 1608 Inductance: 0.16 … 0.56 µH Rated current: 250 … 400 mA
Features	– Giga-spiral laminated structure – High self-resonant frequency – Limited decrease of Q in the GHz band	– Achieves high Q characteristics equivalent to an air-core wire wound inductor – Inductance is provided in small increments, taking advantage of the multilayer technique	– Inductance tolerance ±5% or ±10% (J-tolerance and K-tolerance respectively) – Temperature stress (drift variance percentage) for soldering ±3%
Applications	High frequency applications such as mobile communications, high-frequency modules (PA, VCO, FEM), Bluetooth, WLAN, UWB and tuners		NFC circuit for smart phones and PCs, power supply lines for various electronic devices

Multilayer Inductors / Signal EMC Filters

			
Series	Signal line for standard circuits – SMD MLF series	Decoupling circuits – SMD MLZ series	Noise suppression filter for audio lines, for cellular bands – SMD MAF series
Technical data	Size: 1005 … 2012 Inductance: 0.047 … 100 µH Rated current: 2 … 300 mA Tolerance: ±5%, ±10% and ±20%	Size: 1005 … 2012 Inductance: 0.1 … 100 µH Rated current: 30 … 1000 mA	Size 1608 Impedance: 60 Ω (100 MHz) Rated current: 1600 mA Temperature: –55 … +125 °C
Features	– Magnetically shielded configuration suitable for high-density mounting	– Best DC superimposition characteristics – Lowest DC resistance – Excellent effect mainly on the decoupling of power circuits – Suitable for audio lines, due to its low DC resistance	– Accomodates high currents – Distortions are greatly reduced insertion with the adoption of newly-developed low distortion ferrite materials – Small reductions in volume due to its low resistance, and optimal for devices which requires high sound quality – Excellent effects in measures against the deterioration of the of the receiving sensitivity of wireless devices due to high attenuation characteristics in the cellular band
Applications	Signal processing modules for mobile communications and tuners Automotive equipment	Modules for mobile communications and consumer electronics Automotive equipment	Sound lines for devices such as smartphones and tablets (earphones, microphones and speakers) Sound lines for portable game machines

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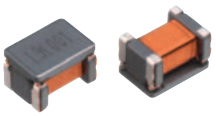
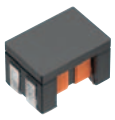
Magnetics

Signal EMC Filters

Signal EMC Filters

			
Series	Common-mode filters for CAN bus, FlexRay – SMD ACT1210	Common-mode filters for CAN bus, FlexRay – SMD ACT45B, ACT45C, ACT45R series	Common-mode filters for BroadR-Reach / 100Base-T1 – SMD ACT1210L
Technical data	Size (EIA): 1210 (3.2 x 2.5 mm) Rated inductance: 11 … 100 µH Impedance: 300 … 5800 Ω (10 MHz) Rated current: 0.15 … 0.25 A Temperature: –40 … +150 °C	Size (EIA): 1812 (4.5 x 3.2 mm) Rated inductance: 11 … 100 µH Impedance: 300 … 5800 Ω (10 MHz) Rated current: 0.15 … 0.25 A Temperature: –40 … +150 °C Temperature: –40 … +125 °C (ACT45C)	Size (EIA): 1210 (3.2 x 2.5 mm) Inductance: 200 µH Rated current: 70 … 0.15 mA Temperature: –40 … +125 °C
Features	– ACT1210 for CAN and FlexRay – Non-soldered internal construction provides excellent heat resistance to ensure effective circuit board mounting – Robust lead frame termination – Qualified to AEC-Q200 – Suitable for lead-free soldering profiles acc. to JEDEC J-STD 020D	– ACT45B/C for CAN-Bus – ACT45R for FlexRay – Non-soldered internal construction provides excellent heat resistance to ensure effective circuit board mounting – Robust lead frame termination – Qualified to AEC-Q200 – Suitable for lead-free soldering profiles acc. to JEDEC J-STD 020D	– ACT1210L for 100Base-T1 – Provides excellent balance parameter (symmetry) – Non-soldered internal construction provides excellent heat resistance to ensure effective circuit board mounting – Robust lead frame termination – Qualified to AEC-Q200 – Suitable for lead-free soldering profiles acc. to JEDEC J-STD 020D
Applications	Automotive electronics: CAN/FlexRay bus on space critical applications	Automotive electronics: CAN/FlexRay bus	Automotive electronics: CAN/FlexRay bus on space critical applications

Signal EMC Filters

			
Series	Common-mode filters for BroadR-Reach / 100Base-T1 – SMD ACT45L	Data line chokes – SMD SIMDAD 1812 B82789C0…, B82789S0…	Data line chokes – SMD B82793C0…, B82793S0…
Technical data	Size (EIA): 1812 (4.5 x 3.2 mm) Inductance: 200 µH Rated current: 100 mA Temperature: –40 … +105 °C	Size (EIA): 1812 Rated inductance: 11 … 100 µH Rated current: up to 300 mA Temperature: up to +150 °C	Size: 9 x 6 x 4.8 mm Rated inductance: 5 µH … 47 mH Rated current: up to 1.2 A Temperature: up to +125 °C
Features	– ACT45L for 100Base-T1 – Provides excellent balance parameter (symmetry) – Qualified to AEC-Q200 – Suitable for lead-free soldering profiles acc. to JEDEC J-STD 020D	– For reflow soldering and gluing – Qualified to AEC-Q200 – Suitable for lead-free soldering profiles acc. to JEDEC J-STD 020D	– High inductance range – Qualified to AEC-Q200 – Suitable for lead-free soldering profiles based on JEDEC J-STD 020D
Applications	Automotive electronics: CAN/FlexRay bus	Automotive electronics: CAN/FlexRay bus	Automotive electronics: CAN/FlexRay bus Industrial electronics xDSL applications

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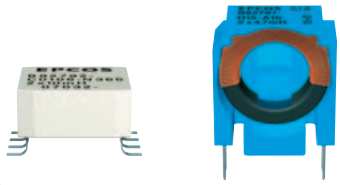
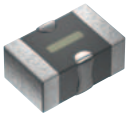
Magnetics

Signal EMC Filters

Signal EMC Filters

			
Series	Double/quad chokes B82792, B82794, B82791, B82720	Chip beads for signal line – SMD MMZ series	Chip beads for signal line – High frequency, large impedance – SMD MMZ-E, MMZ-V series
Technical data	Rated inductance: 0.1 … 0.7 A Rated current: 0.47… 68 mH Rated voltage: 42 V	Size: 1005 … 2012 Impedance: 10 … 2500 Ω (100 MHz) Rated current: 100 … 1500 mA Temperature: –55 … +125 °C	Size: 0603 … 1005 Impedance: 47… 2200 Ω (100 MHz) Rated current: 150 … 300 mA
Features	– SMD and PTH available – Very low stray inductance – Very good symmetry features	– High reliability – Closed magnetic circuit structure – Low DC resistance structure of electrode	– Broad-band impedance values for higher frequency ranges – High reliability – Closed magnetic circuit structure – Low DC resistance structure of electrode
Applications	Telecom and automatization applications	Elimination of signal line noises for mobile communications, consumer electronics, automotive electronics	Elimination of signal line noises for mobile communications, consumer electronics

Signal EMC Filters

			
Series	Chip beads for power line – SMD MPZ-E, MPZ-V, MPZ-N series	Common beads for audio/USB1.1 signal line – SMD MCZ1210-D series	3-terminal filters for signal line – SMD MEM-S/SC/P, MEM-D/V/F series
Technical data	Size: 0603 … 2012 Impedance: 10 … 1000 Ω (100 MHz) Rated current: 0.5 … 6 A	Size: 1210 Impedance: 90 … 1000 Ω (100 MHz) Rated current: 50 mA … 0.5 A	Size: 1608 … 2012 Insertion loss: 20 dB (70 … 2000 MHz) 30 dB (70 … 2500 MHz) Rated current: 100 … 250 mA
Features	– Best-in-class energy-saving in the low DC resistance range – No crosstalk with closed magnetic circuit structural design	– Compact size, low R_{DC} (0.75 Ω max.) – Capable of removing both common and differential mode noise – Closed magnetic circuit structure allows high-density installation, while preventing crosstalk between circuits	– Multilayer chip EMC filter utilizing a T-type circuit – High reliability – Closed magnetic circuit architecture enables high-density installation and prevents crosstalk – Highly effective noise suppression
Applications	Elimination of power line noise for mobile communications, consumer electronics, automotive electronics	Elimination of power line noise for mobile communications and consumer electronics	MEM-S/P series: general signal lines (consumer, office applications) MEM-D series: high-speed signal lines (consumer, office applications)

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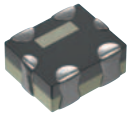
Magnetics

Signal EMC Filters

Signal EMC Filters

			
Series	3-terminal filters for signal line – SMD ACF series	3-terminal filter arrays for multi-line – SMD MEA series	3-terminal feedthrough filters for signal line – SMD YFF Series
Technical data	Size: 3225 Insertion loss: 25 dB (11 … 700 MHz) Rated current: 300 mA Temperature: –25 … +85 °C	Size: 1210 … 2010 Cut-off frequency: 50 … 500 MHz Capacitance: 4 … 36 pF Rated current: 100 mA	Size: 0402 … 0805 Temperature: up to +125 °C Rated voltage: 16 … 50 V Capacitance: 22 pF … 47 µF
Features	– T-type filter circuit is magnetically shielded with ferrite: Superior attenuation characteristics – Offers even greater attenuation characteristics when used in a stable circuit on the ground – Ideal for high-density circuit design space	– Array type: LC filter for 2 or 4 lines – Effective as a sensitivity suppression technique – Post-filter processing, base oval waveform signal – Suited for high-speed signal lines	– Optimized for noise bypass with signal source circuits – Ideal for use at higher frequencies due to low parasitic inductance
Applications	Consumer electronics Office automation equipment Factory automation equipment Automotive electronics	Mobile communications Consumer electronics General signal line (Cellular Band, DVB-H Band): MEA-L, MEA-LC, MEA-PE High-Speed signal line, RGB and signal lines (Cellular Band, DVB-H Band): MEA-D, MEA-PH, MEA-LD, MEA-LE	Communications Consumer electronics Renewable energy

Signal EMC Filters

			
Series	3-terminal feedthrough filters for power line – SMD YFF Series	Common-mode filters for signal line – SMD TCM-G/S/R series	Common-mode filters for signal line – SMD ACM series
Technical data	Size: 0402 … 1206 Temperature: up to +125 °C Rated voltage: 4 … 50 V Capacitance: 0.1 µF to 22 µF	Size: 0403 … 1608 Impedance: 12 … 200 Ω (100 MHz) Rated current: 0.1 Idc A	Size: 2012 … 2520 Impedance: 90 … 1000 Ω (100 MHz) Rated current: 150 … 400 mA
Features	– Optimized for noise bypass with power source circuits – Ideal for use at higher frequencies due to low parasitic inductance	– Thin-film common-mode filter with a large bandwidth – Suppresses radiation noise due to common-mode noise, without affecting the transmission of high-speed differential signals by realizing a higher cut-off frequency	– Miniaturized wire-wound chip-type filter – Extremely effective noise suppression – Minimal effect upon high speed signals, due to low differential mode impedance
Applications	Communications Consumer electronics Renewable energy	High-speed differential signal lines (USB 2.0, LVDS)	High-speed differential signal lines (USB 2.0, LVDS)

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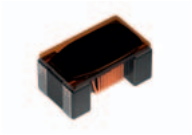
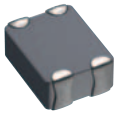
Please read *Important notes* on page 76.

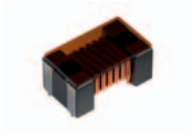
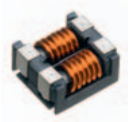
Magnetics

Signal EMC Filters

Signal EMC Filters

			
Series	Common-mode filters for automotive signal line – SMD ACM series	Common-mode filters for signal line – SMD TCE-G/S series	Common-mode filters for signal line – SMD MCZ-AH, MCZ-CH, MCZ-DH series
Technical data	Size: 2012 Impedance: 90 … 360 Ω (100 MHz) Rated current: 220 … 400 mA Temperature: –40 … +105 °C	Size: 0806 … 1608 Impedance: 12 … 90 Ω (100 MHz) Rated current: 0.10 A	Size: 0605 … 2010 Impedance: 24 … 300 Ω (100 MHz) Rated current: 100 … 200 mA
Features	– High reliability – Impedance variation: 4 types of impedance values are prepared to correspond to the various applications – Suppresses the common mode EMI without waveform distortion	– Component can be used for suppressing common-mode noise and ESD – Wide bandwidth (cut-off frequency 3 GHz min.) for differential mode	– Minimum effect for high-speed differential signals due to wide bandwidth for differential mode – Suppresses radiated emissions MCZ-CH series: – Differential mode signal transmission band has been extended to 3.5 GHz – Differential mode characteristic impedance is 100 Ω
Applications	Radiation noise suppression for car multimedia interface (MOST, USB 2.0, IDB-1394)	Ultra high-speed differential signal line (HDMI, DVI, Display port, USB 3.0)	MCZ-AH series: High-speed differential signal line (USB 2.0, LVDS) MCZ-CH/DH series: Ultra high-speed differential signal line (HDMI, DVI, Display port, USB 3.0)

Signal EMC Filters

			
Series	Common-mode filters for power line – SMD ACM series	Common-mode filters for automotive power line – SMD ACM-V series	Common-mode filters for power line – SMD ACP3225 series
Technical data	Size: 4520 … 1513 Impedance: 180 … 1400 Ω (100 MHz) Rated current: 1.0 … 10 A	Size: 4520 … 1211 Impedance: 180 … 1400 Ω (100 MHz) Rated current: 1 … 8 A Temperature: –40 … +125 °C	Size: 3225 Impedance: 500, 1000 Ω (100 MHz) Rated current: 1.2 A
Features	– Noise is strongly suppressed – Best-in-class highest current handling up to 10 A – Lightweight choke coil	– High impedance characteristic has achieved superior common mode noise suppression – Products have serialized a large current product up to 8 A corresponding to various DC power lines – Due to the low profile design, it is suitable for surface mounting	– Capable of achieving reduction in power consumption and improvement of noise suppression effect, due to its low DC resistance and high common-mode impedance – Low profile and compact shape makes it suited for surface mounting
Applications	Used for power line noise suppression for electronic devices Suitable for portable devices	Automotive: Common-mode noise countermeasures for DC power lines of electronic control equipment Multimedia equipment in automotive applications	Power line noise suppression of electronic devices Noise suppression of adapter lines or battery lines of PCs

TDK EPCOS

Magnetics

Signal EMC Filters,
Power EMC Filters, Reactors and Chokes

Signal EMC Filters

		
Series	Clamp filters (Ferrite cores with case) ZCAT, ZCAT-A, ZCAT-B, ZCAT-D/DT series	Clamp filters (Ferrite cores with case) for ECU in automotive ZCAT-V-BK series
Technical data	Impedance range: 20 … 80 Ω (10 … 100 MHz) 50 … 150 Ω (100 … 500 MHz) 30 … 35 Ω (50 … 500 MHz) Temperature: –40 … +85 °C	Impedance range: 120 … 140 Ω (100 MHz) Temperature: –40 … +125 °C
Features	– Unique plastic case ensures simple, convenient installation and features a self-holding mechanism – Ferrite core provides excellent absorption of high-frequency EMC and is highly effective as countermeasure against common-mode EMC	– Can easily be attached without cutting the cable – Plastic case has a self-sustaining mechanism that prevents slipping on the cable after being clamped – Excellent high-frequency noise absorption effect – Works against common-mode noise, allowing for noise suppression without affecting signal quality
Applications	Communications Consumer electronics PCs	ECUs in automotive

Power EMC Filters, Reactors and Chokes

			
Series	Feedthrough capacitors Feedthrough filters B85121, B85321	IEC inlet filters B8477*	2-line filters for single-phase or DC applications B8411…, B84142
Technical data	Rated voltage: 250 V AC Rated voltage: 350 … 600 V DC Rated current: 16 … 500 A Feedthrough capacitors Rated capacitance: 0.5 … 4.7 µF Feedthrough filters Rated capacitance: 2x 0.0025 … 2x 4.7 µF	Rated voltage: 250 V AC/DC Rated current: 1 … 20 A	Rated voltage: 250 … 520 V AC Rated voltage: 250 … 1500 V DC Rated current: 0.5 … 1600 A
Features	– MKP technology (dry, self-healing) – Solderless production technology – Terminals as axial leads, screw connectors, soldering tags or tab connectors	– IEC connector – Version with fuse holder – Version with fuse holder and switch – Medical versions	– Modular SIFI filter system – One or multi-stage filters – High-voltage versions
Applications	Communications Shielded rooms Power supplies Medical appliances	Communications Industrial Medical appliances Power supplies	Communications Industrial, solar inverters Medical appliances Power supplies

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Please read *Important notes* on page 76.

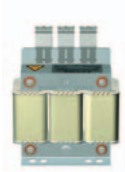
Magnetics

Power EMC Filters, Reactors and Chokes

Power EMC Filters, Reactors and Chokes

			
Series	Filters for three-phase systems B84143, B84144	Filters for three-phase systems B84243*	Converter chokes B86305, B86301
Technical data	Rated voltage: 440 … 760 V AC Rated current: 8 … 2500 A	Rated voltage: 530 V AC Rated current: 3 … 280 A	Rated voltage: 520 V AC Rated current: 4 … 1500 A
Features	– Filters without/with neutral line – One or multi-stage – Compact filters	– Typical performance according to EN 61800-3: C1 up to 25 m respectively C2 up to 50 m motor cable length – Low leakage current – Discharge time up to 44 A types: < 60 V within 1 s	– Line reactors – dv/dt chokes – DC chokes
Applications	Industrial applications Solar and wind power Medical appliances Frequency converters and power supplies	Industrial applications Frequency converters and power supplies Medical applications	Industrial applications Frequency converters Solar and wind power LCL filters

Power EMC Filters, Reactors and Chokes

			
Series	Line reactor for active infeed converters B86306*	Output filters, LCL filters B84143V …, B84143G/Q …	3-line filters Sine-wave output filters B84143V****R227, R229, R230
Technical data	Rated voltage: 520 V AC Rated current: 14 … 418 A	Rated voltage: 440 … 760 V AC Rated current: 4 … 400 A Clock frequency: 2.4 … 16 kHz	Rated voltage: 520 … 690 V AC Rated current: 4 … 390 A
Features	– Decoupling of powerline to PWM converters – Reduction of THD – Compact design – UL approved insulation system T-EIS-CF1 E320370	– dv/dt filters – Sine-wave EMC output filters (SineFormer) – LCL filters	– Reduction of motor noise and eddy current losses – Generation of sinusoidal phase-to-phase voltage with low ripple – dv/dt reduction – Optional housing for IP21 can be ordered separately (B84143Q*R229)
Applications	Active infeed converters e.g. in tooling machines, pumps, conveyor systems, HVAC systems (heating, ventilation and air conditioning)	Industrial applications Frequency converters	Active infeed converters e.g. in tooling machines, pumps, conveyor systems, HVAC systems (heating, ventilation and air conditioning

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Magnetics

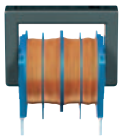
Power EMC Filters, Reactors and Chokes

TDK EPCOS

Power EMC Filters, Reactors and Chokes

			
Series	Filters for shielded rooms B84299, B84312	EMC services	Ring core chokes (current compensated) B82720 … B82725, B82791
Technical data	Rated voltage: 100 … 690 V AC Rated voltage: 100 … 1000 V DC Rated current: 0.1 … 2000 A Insertion loss: >100 dB from 14 kHz … 40 GHz	EMC laboratory offers comprehensive consulting, pre-compliance investigations and conformity testing	Rated current: 0.25 … 16 A Rated inductance: 0.2 … 100 mH Rated voltage: 250 V
Features	– Power line filters – Filters for data, telephone or control lines	– Accredited laboratory – In-house or on-site testing – Measurement of conducted and radiated emissions	– High resonance frequency owing to special winding technique – Approx. 1% stray inductance for symmetrical interference suppression – Potted versions possible – B82720 also available in SMD – Plastic case with terminals
Applications	EMC laboratories Shielded rooms	Industrial applications Converters Solar and wind power	Power supplies

Power EMC Filters, Reactors and Chokes

			
Series	Ring core chokes (current compensated) B82725S … B82726E/S …, B82727E …	Ring core chokes (current compensated) B82724J*U*	D core chokes (current compensated) B82731 … B82734
Technical data	Rated current: 5.4 … 56 A Rated inductance: 0.19 … 7.8 mH Rated voltage: 250 … 300 V AC 300 … 1000 V DC (DC link)	Rated current: 4.3 … 10 A Rated inductance: 0.5 … 6.8 mH Rated voltage: 250 V	Rated inductance: 3.3 … 100 mH Rated current: 0.35 … 4.6 A Rated voltage: 250 V
Features	– High resonance frequency – Approx. 1% stray inductance for symmetrical interference suppression – On baseplate, winding wire serves as solder terminal	– High resonance frequency owing to special winding technique – Approx. 1% stray inductance for symmetrical interference suppression – Plastic case with terminals – High rated temperatures	– High resonance frequency due to 2-section winding – Approx. 1% stray inductance for symmetrical interference suppression – Low leakage due to closed core shape – High pulse strength – Low whirring noise – Low-height horizontal versions
Applications	Power supplies of high power applications, such as solar inverters, drives, household appliances	Inverter applications in home appliance, e.g. washing machine, dryer	Power supplies Ballasts

TDK EPCOS

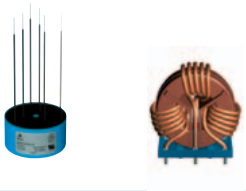
Please read *Important notes* on page 76.

Magnetics

Power EMC Filters, Reactors and Chokes, Ferrites

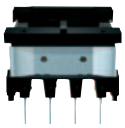
TDK EPCOS

Power EMC Filters, Reactors and Chokes

			
Series	U core chokes (current compensated) B82730	Frame core chokes (FC) (current compensated) B82732F …, B82733F…	Ring core chokes, triple/quad (current compensated) B8274 … B8276
Technical data	Rated inductance: 0.33 … 15 mH Rated current: 0.4 … 2.6 A Rated voltage: 300 V	Rated inductance: 10 … 100 mH Rated current: 0.45 … 2.3 A Rated voltage: 250 V	Rated inductance: 0.35 … 6.2 mH Rated current: 6 … 62 A Rated voltage: 440 … 690 V
Features	– High resonance frequency – Approx. 1.3% stray inductance for symmetrical interference suppression – Low whirring noise – Low saturation effects – Low-height horizontal versions feasible on request – Compact design	– 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	– High power handling – Available in plastic case (fully potted) or on baseplate
Applications	Compact power supplies Ballasts Household appliances	Power supplies Ballasts	Power supplies of high power applications, such as solar inverters, drives

Power EMC Filters, Reactors and Chokes

Ferrites

		
Series	Ring core (iron powder) chokes B826 …	E, EFD, ETD, EV cores
Technical data	Rated inductance: 0.033 … 20 mH Rated current: 0.3 … 6 A Rated voltage: 250 V	Core shape: E5 … E100 ETD29 … ETD59 EFD10 … EFD30 EV15 … EV36 Material: N49, N87, N92, N95, N97
Features	– Iron powder core – Single and double chokes – High thermal stability – High differential attenuation at low frequencies	– Wide range of core shapes, sizes and accessories – Cost optimized – Optimum performance ratio at small volume – Small cores available with SMD coil former – Flat transformer design – Large volume design – Distributed air gap
Applications	PFC and reduction of harmonics in power supplies	Power supplies AC/DC converters, DC/DC converters SMP transformers Storage chokes EMI suppressions chokes

TDK EPCOS

Magnetics

Ferrites

Ferrites

			 
Series	ELP, ER, EQ cores	PQ cores	U, PM cores
Technical data	Core shape: ELP14 … ELP102 ER9.5 … ER32 EQ13 … EQ30 Material: N49, N87, N92, N95, N97	Core shape: PQ16 … PQ50 Material: N49, N87, N92, N95, N97	Core shape: U26 … U141 PM50 … PM114 QU30 … QU155 Material: N27, N87, N97
Features	– Flat mounting height – Planar solution – Board integrated	– Compact design – Ferrite cores for power transformers and chokes – Bobbins available	– Max. transmissible power – Max. magnetic cross section – Large volume cores – Accessories for PM cores available
Applications	Power supplies AC/DC converters DC/DC converters		

Ferrites

			
Series	RM cores	EP, EPX cores - SMD	P cores
Technical data	Core shape: RM4 … RM14 Material: N49, N87, N97, K1, M33, N48	Core shape: EP5 … EP20 EPX7 … EXP10 EPO13 Material: T38, T57, N92	Core shape: P3.3 … P59 PS7.35 … PS68 PCH14 … PCH150 Material: K1, M33, N48, N30, T38
Features	– With/without center hole – Compact design – Accessories available	– Low hysteresis loss coefficient – Low THD	– With/without center hole – Optimized shielding – Accessories available
Applications	Power supplies AC/DC converters DC/DC converters	xDSL applications	Signal transformers Proximity switches

TDK EPCOS

Please read *Important notes* on page 76.

Magnetics

Ferrites

TDK EPCOS

Ferrites

			
Series	Ring cores	Ferrite cores for EMI suppression	Ferrite cores for switching power supplies
Technical data	Core shape: R2.5 … R202 Material: K10, T57, N30, N87, T35, T37, T38, T65	Core shape: BB, MH, RID, RH, RU, SH, SP, SU Initial permeability (typ.): 45 … 50 000 µi NiZn ferrites	Core shape: EE, EEM, EF, EI, EIR, EL, ELT, EP, EPC, ER, ETD, LP, PQ, PQI, RM, T Initial permeability (typ.): 2200 … 12 000 µi Material: PC47, PC90, PC95, HS72, HS10, HS12 MnZn ferrites
Features	– Parylene-coated – Epoxy-coated	– Suitable for one-hole ferrite beads – Various materials, shapes and packaging styles available	– Suitable for various transformers of general-purpose DC/DC converters
Applications	Power supplies AC/DC converters DC/DC converters	Noise suppression for video, acoustic, office automation and communication equipment, automotive electronics	Main transformers Drive transformers Choke coils

Ferrites

			
Series	Ferrite cores for telecommunication	Large size ferrite cores for high power	Ferrite cores for coils
Technical data	Core shape: P, RM, EP, EPC, ER, EE, EEM, T Initial permeability (typ.): 3300 … 15 000 µi Material: H5A, H5B2, H5C2, H5C3, HP5, DNW45 MnZn ferrites	Core shape: EC, EE, EI, EIC, PQ, SP, T, UU Initial permeability (typ.): 1800 … 2300 µi Material: PE22, PC40, PE90 MnZn ferrites	Initial permeability (typ.): 1 … 1500 µi Material: GT1, GT2, GT3, GT4, GT5, GT6, GT7, GT8, GT9, GT10, L2H, L5, L6, L6N, L7H, L8F, L9H, L11H, L17H, L18H, L20H, T2F, T6F, T7F, T9F, Sy20, SY22 NiZn ferrites
Features	– Toroidal cores are suitable for pulse transformers and sensors – Epoxy and paraxylylene insulation coating is available	– Large size ferrite cores developed for reactors and transformers used in high power units	– Mountable with lead-free soldering (+260 °C max.) – Excellent common-mode noise suppression – High-quality and wide-band ferrite cores for LAN
Applications	Filters Sensors Transformers	Transfomers (high frequency inductive heater, UPS, EV, automated warehouse) Reactor chokes (general purpose inverters, trains)	Inductors, transformers, antennas, and other coil products

TDK EPCOS

Magnetics

Noise Suppressing Sheets

Noise Suppressing Sheets

	
Series	Magnetic sheets for noise suppression Flexield – IFL10M, IFL12, IFL16 Material
Technical data	High μ / High characteristic Dimensions: 300 x 200 mm Thickness: 0.05, 0.1, 0.2 mm Recommended frequency range: 5 MHz … 3 GHz Initial permeability at 1 MHz typ: 180 μi Resistivity (Ω/square) min: 100 k
Features	– Highly flexible and shock-resistant – Noise suppression across a wide frequency range – Excellent flexibility in fabrication
Applications	Noise reduction for flexible cables used in mobile devices Reduction of noise emitted from a wide variety of electronic devices (including noise from CPU) Reduction of specific absorbed radiation (SAR) from cellular phones Reduction of internal EMI (resonance, crosstalk) inside a shielded casing

Noise Suppressing Sheets

		
Series	Magnetic sheets for RFID Flexield – IFL04 Material	Magnetic sheets for RFID Flexield – IBF15 Material
Technical data	High performance Dimensions: 300 x 200 mm Thickness: 0.05, 0.1, 0.2 mm Initial permeability at 13.56 MHz: 45 μ' / 1.3 μ" Resistivity (Ω/square) min: 10 k	Ferrite plate High permeability, low dissipation Dimensions: 125 x 125 mm Thickness: 0.1, 0.18 mm Initial permeability at 13.56 MHz: 150 μ' / 5 μ" Resistivity (Ω/square) min: 1 G
Features	– Highly flexible and shock-resistant – Highly effective – Extensive line-up of sizes and dimensions – Excellent permeability – Excellent magnetic convergence	
Applications	For improving reception performance of RFID readers/writers Integrating IC cards with metal Integrating IC tags with metal Improved antenna reception sensitivity	

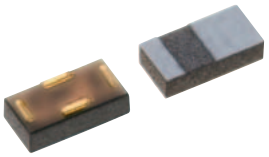
TDK EPCOS

Please read *Important notes* on page 76.

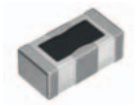
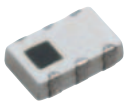
SAW Components

Ceramic and Thin-Film RF Components

Ceramic and Thin-Film RF Components

			
Series	Multilayer band pass filters – SMD DEA series	Multilayer band pass filters – SMD (Balance Output Type) DEA series	Thin-Film band pass filters – SMD TFSB series
Technical data	Size (l x w x t): 1.6 x 0.8 x 0.6 … 2.5 x 2.0 x 1.5 mm	Size (l x w x t): 1.6 x 0.8 x 0.5 … 2.5 x 2.0 x 1.0 mm	Size (l x w x t): 1.0 x 0.5 x 0.3 mm
Features	– Compact lightweight, and thin type – Low loss in the passband – High attenuation in the attenuated band	– Compact lightweight, and thin type – Low loss in the passband – High attenuation in the attenuated band – IC impedance compatible design available	– Small size – Low profile
Applications	2.4 GHz WLAN/Bluetooth 5.0 GHz WLAN 5.0 GHz Digital cordless WiMAX up to 3.6 GHz	2.4 GHz WLAN/Bluetooth 5.0 GHz WLAN 2.5 GHz WiMAX 3.5 GHz WiMAX ZigBee	2.4 GHz WLAN/Bluetooth 5.0 GHz WLAN

Ceramic and Thin-Film RF Components

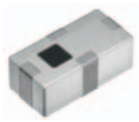
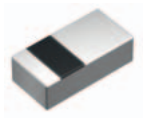
			
Series	Multilayer low pass filters – SMD DEA series	Multilayer high pass filters – SMD DEA series	Multilayer phase shifters – SMD (Delay Lines) DEA series
Technical data	Size (l x w x t): 1.0 x 0.5 x 0.4 … 2.0 x 1.25 x 0.6 mm	Size (l x w x t): 1.6 x 0.8 x 0.6 … 2.0 x 1.25 x 1.0 mm	Size (l x w x t): 1.0 x 0.5 x 0.52 mm
Features	– Compact lightweight and thin type – Low loss in the passband – High attenuation in the attenuated band	– Compact lightweight and thin type – Low loss in the passband – High attenuation in the attenuated band	– Compact lightweight and thin type – Low loss – Phase can be shifted according to the frequency band of each system
Applications	2.4 GHz WLAN/Bluetooth 5.0 GHz WLAN DVB-H/ISDB-T GSM900 GSM850/GSM900 Tx DCS DCS/PCS GSM/DCS/PCS Tx & Rx PCS Tx & Rx WiMAX	2.4 GHz WLAN/Bluetooth	DCS/PCS GSM800

TDK EPCOS

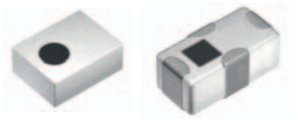
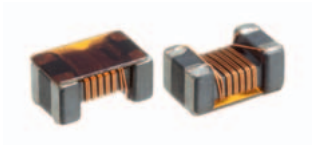
SAW Components

Ceramic and Thin-Film RF Components

Ceramic and Thin-Film RF Components

			
Series	Multilayer diplexers – SMD DPX series	Thin-Film diplexers – SMD TFSD series	Multilayer triplexers – SMD TPX series
Technical data	Size (l x w x t): 1.6 x 0.8 x 0.4 ... 2.0 x 1.25 x 1.0 mm	Size (l x w x t): 1.0 x 0.5 x 0.3 mm	Size (l x w x t): 2.0 x 1.25 x 0.9 … 2.5 x 2.0 x 1.2 mm
Features	– Compact lightweight and thin type – Low loss in the passband – High attenuation in the attenuated band	– Ultra-small form-factor – Low-loss type – High-attenuation types	– Flexible band combinations – Low loss – High isolation
Applications	2.4 GHz WLAN/Bluetooth 2.4/5.0 GHz WLAN WiMAX GSM850/900/DCS/PCS Tx & Rx GSM850/900/PCS Tx & Rx/GPS GSM850/PCS Tx & Rx WCDMA800/WCDMA2000 WCDMA800/WCDMA1900 GPS & 2.4 GHz/Bluetooth UWB	2.4 GHz WLAN/Bluetooth 5 GHz WLAN	GPS/2.4 GHz WLAN/Bluetooth 5 GHz WLAN/Cellular

Ceramic and Thin-Film RF Components

			
Series	Multilayer balun transformers – SMD HHM series	Wound chip baluns – SMD ATB series	Thin-Film balun transfomers – SMD TFSZ series
Technical data	Size (l x w x t): 1.0 x 0.5 x 0.4 … 2.0 x 1.25 x 0.95 mm	Size (l x w x t): 2.0 x 1.2 x 1.0 mm … 3.2 x 2.5 x 2.3 mm	Size (l x w x t): 0.65 x 0.50 x 0.25 mm
Features	– Compact lightweight and thin type – Low loss	– Chip balun transformer developed for 50, 75 impedance system – Impedance ration 1:1	– Low loss – Wide frequency line-up – Ultra-minature and low-profile
Applications	2.4 GHz WLAN/Bluetooth 5.0 GHz WLAN WiMAX GSM850 Tx & Rx GSM900 Tx & Rx DCS Tx & Rx PCS Rx WCDMA Tx & Rx DCS/PCS Tx & Rx UWB GSM LOCAL DVB-H/ISDB-T LTE Wide band balun	Tuner for TV, mobile devices (e.g. DVB-T/H, ISDB-T) Power divider for STB and tuners	For 2300-2690MHz (50-100 Ω) For 1930-1990MHz (50-100 Ω)

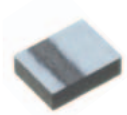
TDK EPCOS

Please read *Important notes* on page 76.

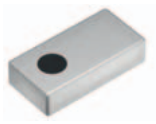
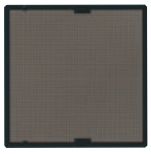
SAW Components

Ceramic and Thin-Film RF Components, LTCC Substrates for LED

Ceramic and Thin-Film RF Components

			
Series	Multilayer directional couplers – SMD HHM series	Multilayer directional couplers – SMD (Dual-Band) HHM series	Thin-Film directional couplers – SMD TFSC series
Technical data	Size (l x w x t): 1.0 x 0.5 x 0.4 ... 2.0 x 1.25 x 0.95 mm	Size (l x w x t): 2.0 x 1.25 x 0.95 mm	Size (l x w x t): 0.65 x 0.50 x 0.25 mm
Features	– Compact lightweight and thin type – Low loss – High isolation	– Compact lightweight and thin type – Low loss – High isolation	– Wide-band – Cellular attenuators included – Ultra-minature and low-profile
Applications	2.4 GHz WLAN 2.4 GHz WLAN Divider 5 GHz WLAN GSM900 Tx; DCS TX; PCS; PCS Tx; GSM/DCS Tx; GSM/DCS/PCS Tx; GSM850/DCS/PCS Tx; GSM850/GSM900 Tx; GSM850/GSM Tx; WCDMA Tx; DCS/PCS Tx; PDC1500 Tx; GSM850/PCS Tx	GSM850/DCS/PCS Tx	2.4 GHz WLAN/Bluetooth

Ceramic and Thin-Film RF Components / LTCC Substrates for LED

		
Series	Multilayer chip antennas – SMD ANT series	LTCC substrates
Technical data	Size (l x w x t): 1.6 x 0.8 x 0.4 mm, 8.0 x 3.0 x 1.0 mm	Integrated ESD protection IEC 61000-4-2: level 4 with 8 kV contact Panel format 8 x 8"
Features	– Suitable for installation on modular substrates – Monopole type allows high acquisition	– Thermal conductivity: > 25 W/mK – Mounting techniques: compatible with most standards – flip mount – wire bond – glue – solder – Surface finishing: Ag, Au, Cu variants available
Applications	2.4 GHz WLAN/Bluetooth: Single and Dual Band GPS/2.4 GHz: Dual Band IEEE802.11 a/b/g/n	Bare die LEDs LED components and LED modules

TDK EPCOS

MEMS Devices

MEMS Devices for Mobile Communications and Information Technology

MEMS Devices for Mobile Communications and Information Technology

		
Series	MEMS microphones – SMD	MEMS pressure and humidity sensors – SMD
Technical data	Up to 65 dB (A) SNR Acoustic Overload Point (AOP) up to 135 dB SPL	Barometric pressure sensor Relative humidity sensor 300 … 1100 hPa 16 … 20 bit resolution
Features	– Analog or digital – Very small size – Excellent EMI shielding – Very high PSR – Omnidirectional	– Factory calibrated – I2C and SPI interface – Very small size – High accuracy – Low noise
Applications	Handsets/accessories Notebooks MP3 players Cameras	HDDs Navigation devices Altimeters Handsets/accessories Wearables

◣TDK ◣EPCOS

Please read *Important notes* on page 76.

Micro Modules

Bluetooth V4.1 Smart Single Mode Module

Bluetooth V4.1 Smart Single Mode Module

	
Series	BLE V4.1 (Bluetooth Low Energy) module – SMD SESUB-PAN-D14580
Technical data	Communication standards: 2.4 GHz Bluetooth V4.1 low energy Transmitter output power: 0 dBm typ. Receiver sensitivity level: –94 dBm Host Interface: UART (2ch) / SPI+ / I2C (100 k/400 kHz) Peripheral Interface: 10 bits ADC (4ch) / Pin-configurable GPIO Current consumption: 5.0 mA (Tx), 5.4 mA (Rx), 0.8 µA (Deep Sleep mode)
Features	– Ultra small package, ideal for for wearable devices (3.5 x 3.5 x 1.0 mm typ.) – Packaged in 36-pin solder bumped BGA with 0.5 mm pitch – Compatible with Bluetooth Smart Ready products – ARM Cortex-M0 32-bit high performance microcontroller – 32 kB OTP programmable memory, 84 kB ROM for BT stack – 42 kB System SRAM, 8 kB Retention SRAM – Including IC (Dialog Semiconductor : DA14580), Crystal (16 MHz), Inductor, and Capacitor in this module
Applications	– Health care, sports and fitness devices – Wearable computers – Home and entertainment devices – PC accessories

TDK EPCOS

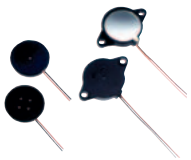
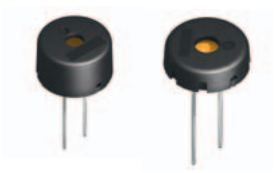
Piezo and Protection Devices

Piezo Actuators for Automotive, Piezo Receivers, Buzzers

Piezo Actuators for Automotive

			
Series	Cu actuators 30 mm	Injection actuators 30 mm	Injection actuators 45 mm
Technical data	Displacement: 40 µm Driving voltage: 160 V Useful life: > 3E9 cycles	Displacement: 40 µm Driving voltage: 160 V Useful life: > 1E9 cycles	Displacement: 60 µm Driving voltage: 160 V Useful life: > 1E9 cycles
Features	– Proprietary piezo technology with copper inner electrodes – Stress release technology	– AgPd technology	– AgPd technology
Applications	Diesel injection systems	Diesel injection systems	Gasoline injection systems

Piezo Actuators for Automotive | Piezo Receivers | Buzzers

			
Series	Piezo actuator in high active stack technology Encapsulated stack, 5.2 x 5.2 x 30 mm	Piezoelectric receiver RU	Piezoelectric buzzers PS
Technical data	Stack surface temperature: –40 … 160 °C Voltage range: –10 … +180 V Current range: –30 … +30 A Stroke at 160 V (s): 59 µm ±10 % Charge at 160 V (Q): 1.0 mC ±10 % Useful life: >3E9 cycles	Sound pressure: 108 ± 3 dB Maximum input voltage E_{rms}: 5 V (Ep-p: 14 V) Operating temperature range: –20 … +70 °C	Sound pressure: 60 … 90 dBA/10 cm min. (2 … 4 kHz)
Features	– High active stack technology – Highly efficient actuator design thanks to smallest insulation zones – Robust design that avoids polarization cracks – High melting metal bond – High reliability – Highest cycles stability at high temperatures – Outstanding resistance against humidity	– Compact, thin sounding body using unimorph piezoelectric vibration plate – No leakage flux	– Pin terminal/ lead, without oscillator circuit – High-performance buzzers that employ unimorph piezoelectric elements – Designed for easy incorporation into various circuits – Extremely low power consumption in comparison to electromagnetic units – Can be used as a musical tone oscillator or buzzer
Applications	Injection systems, metering systems, positioning systems	Cordless phones	Washing machines, computer terminals, various devices that require speech synthesis output

TDK EPCOS

Please read *Important notes* on page 76.

Piezo and Protection Devices

Buzzers, Surge Arresters

Buzzers

			
Series	Electromagnetic buzzers SD	Electromagnetic buzzers SDC	Electromagnetic buzzers – SMD SDR
Technical data	Rated voltage: 3 … 12 V (Eo-p) Sound pressure: 80 … 85 dBA/10 cm min. (2048 … 4096 Hz) Operating temperature: –40 … +85/–10 … +70 °C	Rated voltage: 5 … 12 V DC Sound pressure: 85 dBA/10 cm min. (1900 … 2400 Hz) Operating temperature: –10 … +70 °C	Rated voltage: 3 V (Eo-p) Sound pressure: 97 dBA/10 cm typ. (2670 Hz) Operating temperature: –40 … +85 °C
Features	– Pin type terminal construction enables direct mounting onto printed circuit boards	– Built-in oscillator circuits: output can be produced by merely connecting to a DC power supply – Circuitry utilizes chip-type components for significantly reduced size and high reliability	– Without oscillator circuit – High output level of sound pressure due to high quality parts (yoke and magnets) – Good frequency response and high quality sound
Applications	Clocks, travel watches Keyboards Toys Various alarms of automotive equipment	Personal computers Office automation equipment Medical equipment Household appliances (e.g. microwave ovens, electronic jars)	Mobile phones Pagers

Surge Arresters

			
Series	S20, S30, S50, S80 – SMD	LN8 – Arrester stack – SMD	EHV
Technical data	DC spark-over voltage: 90 … 500 V Size and footprint (l x w x h): S20: 3.2 x 1.6 x 1.6 mm S30: 4.5 x 3.2 x 2.7 mm S50: 5.7 x 5 x 5 mm S80: 6 x 8.4 x 8.4 mm Nom. discharge current 8/20 µs: 0.5; 2; 5; 20 kA	Max. DC operating voltage: 60 V Nom. discharge current 8/20 µs: 20 kA Nom. discharge current 10/350 µs: 4 kA Size and footprint (l x w x h): 16.3 x 8.4 x 9.5 mm	DC spark-over voltage: 2500 … 4500 V Max. discharge current 8/20 µs: 5 kA Size: Ø 6 x 7 mm
Features	– 2-electrode square design – SMD mounting – Low capacitance – High insulation resistance	– 2-electrode stacked surge arrester – SMD mounting – Excellent follow current limiting characteristic	– High voltage surge arrester – High insulation resisitance – Very small size
Applications	Overvoltage protection in telecommunication appliances, xDSL modems, cable modems, electronic circuits	Protection of DC power supply circuits in telecommunication systems	AC power supply units Photovoltaic systems Automotive (electric and hybrid vehicles)

TDK EPCOS

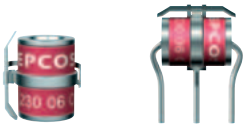
Piezo and Protection Devices

Surge Arresters

Surge Arresters

			
Series	M5	A8	T8
Technical data	DC spark-over voltage: 75 … 1400 V DC Nom. discharge current: 5 kA Size: Ø 5 x 5 mm	DC spark-over voltage: 75 … 600 V DC Nom. discharge current: 20 kA Size: Ø 8 x 6 mm	DC spark-over voltage: 90 … 600 V DC Nom. discharge current: 10 kA Size: Ø 8 x 10 mm
Features	– 2-electrode SMD and leaded version – Low capacitance – High insulation resistance	– 2-electrode SMD and leaded version – Very high discharge current – High insulation resistance	– 3-electrode arresters – High discharge current – High insulation resistance
Applications	Overvoltage protection in telecommunication appliances, xDSL- and cable modems, wireless networks, electronic circuits and industrial applications	Overvoltage protection in telecommunication appliances, fixed line network, wireless networks, electronic circuits and industrial applications	Overvoltage protection in telecommunication appliances, fixed line network, wireless networks and electronic circuits

Surge Arresters

			
Series	T8 – with failsafe	T9 – SMD with and w/o failsafe	TQ90 – SMD
Technical data	DC spark-over voltage: 90 … 600 V DC Nom. discharge current: 10 kA Size: Ø 8 x 10 mm	DC spark-over voltage: 75 … 420 V DC Nom. discharge current: 10 kA Size: Ø 5 x 7.6 mm	DC spark-over voltage: 90 V DC Nom. discharge current: 10 kA Size: 5 x 5 x 7.6 mm
Features	– 3-electrode arresters with failsafe – High discharge current – High insulation resistance	– 3-electrode arresters in SMD and failsafe option – High insulation resistance	– 3-electrode arresters in SMD – High insulation resistance
Applications	Overvoltage protection in telecommunication appliances, fixed line networks, wireless networks and electronic circuits		

TDK EPCOS

Please read *Important notes* on page 76.

Piezo and Protection Devices

Surge Arresters, PTC Thermistors

Surge Arresters

			
Series	H38M	L1	V13 and V10
Technical data	DC spark-over voltage: > 600 V DC Protection level at 1.2/50 µs, 6 kV: < 1500 V Impulse current (10/350 µs): 100 kA Size: Ø 30 x 30 mm	DC spark-over voltage: > 600 V DC Protection level at 1.2/50 µs, 6 kV: < 1500 V Impulse current (10/350 µs): 50 kA Size: Ø 30 x 12 mm	DC spark-over voltage: > 600 V DC, > 1100 V DC Protection level at 1.2/50 µs, 6 kV: < 1500 V, < 2500 V Max. discharge current: 60 kA Impulse current (10/350 µs): 12 kA Size: Ø 12 x 17 mm
Features	– High impulse current (10/350 µs) – Temporary overvoltage withstand capability – IEC 61643-11		– High insulation resistance – Temporary overvoltage withstand capability – IEC 61643-11
Applications	AC line protection 230/400 V AC, class I, N-PE		AC line protection 230/400 V AC, class I & II, N-PE Power supplies Photovoltaic systems

Surge Arresters / PTC Thermistors

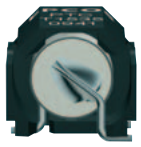
			
Series	EF	Overcurrent protection	Overcurrent protection Lead-free series
Technical data	DC breakdown voltage: 270 … 3300 V Max. discharge current: 10 kA Size: Ø 8 x 6 mm	Max. voltage: 20 … 1 000 V Rated resistance: 0.3 … 7500 Ω Rated current: 8 … 2100 mA	Max. voltage: 265 V Rated resistance: 10 … 120 Ω Rated current: 50 … 220 mA
Features	– High insulation resistance – Temporary overvoltage withstand capability – IEC 61643-11 – UL 1449 (E319264)	– High thermal stability – No resistance drift for 100 switching cycles	– High thermal stability – No lead contained in ceramic or solder joint – No resistance drift for 100 switching cycles
Applications	AC line protection 230/400 V AC Device protection Power supplies Photovoltaic systems	Overcurrent protection in automotive electronics, power supplies, entertainment and household electronics	

TDK EPCOS

Piezo and Protection Devices

PTC Thermistors

PTC Thermistors

			
Series	Overcurrent protection – SMD	Overcurrent protection Telecom	Telecom pair protectors – SMD
Technical data	Max. voltage: 30 … 400 V Rated current: 12 … 310 mA Size (EIA): 0402 … 4032	Max. fault voltage: 245 V Rated resistance: 6 … 55 Ω Matching: 1 … 3 Ω	Max. fault voltage: 245 V Rated resistance: 9 … 50 Ω
Features	– High thermal stability – No resistance drift for 100 switching cycles	– Compliant with ITU standards – No resistance drift after switching	– Compliant with ITU standards – Matched pair in one housing
Applications	Overcurrent protection in automotive electronics, power supplies, entertainment and household electronics	Overcurrent protection in central office linecards, base stations and customer premises equipment	

PTC Thermistors

			
Series	Telecom pair protectors for GR1089 central office	Switching applications Plastic case	Motor start
Technical data	Max. fault voltage: 600 V Rated resistance: 70 Ω	Max. voltage: 265 V Rated resistance: 500 … 5000 Ω	Rated voltage: 120 … 230 V AC Max. current.: 5 … 12 A
Features	– Compliant with GR1089 central office – Matched pair in one housing	– Useful life up to 100 000 switching cycles	– Useful life > 100 000 switching cycles
Applications	Overcurrent protection in central office linecards	General purpose delayed switching in entertainment, household and industrial electronics	Delayed switch-off of the starter auxiliary winding in single-phase induction motors (e.g. in refrigerators and air conditioners)

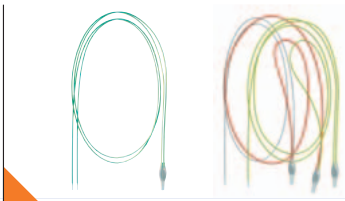
TDK EPCOS

Please read *Important notes* on page 76.

Piezo and Protection Devices

PTC Thermistors

PTC Thermistors

			
Series	Point level sensors	Motor protection Single or triple sensors	Limit temperature sensors
Technical data	Max. voltage: 18 … 25 V N = 5000 switching cycles	Max. voltage: 30 V Rated resistance: <100 … ≦300 Ω	Max. voltage: 30 V Rated resistance: <100 … ≦330 Ω T_{sense}: 60 … 160 °C
Features	– Liquid level detection for oil and water – Hermetically sealed glass case or stainless steel case	– Characteristics for sensing temperatures compliant with DIN 44081/44082 – Customer specific lead lengths on request	– Available as leaded disks or assembly probe
Applications	Level sensors for indoor and outdoor tanks Industrial and home applications	Industrial motors and machines protection	Power supplies Lighting equipment

PTC Thermistors

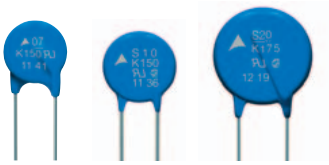
			
Series	Limit temperature sensors – SMD	Heating elements	High voltage heating elements
Technical data	Max. voltage: 32 V Rated resistance: 470 … 10 000 Ω Temperature tolerance: ±3 … ±5 °C Sensing temperature: 70 … 140 °C Size (EIA): 0402 … 0805	Max. voltage: 24 … 265 V $T_{surface}$: 40 … 280 °C	Customized solutions upon request Max. voltage: up to 600 V
Features	– Fast and reliable response – UL approval	– Available in round and rectangular shape – Al or Ag electrode	– Available in rectangular shape – Al electrode
Applications	Automotive electronics Entertainment and household electronics Battery packs LED lighting	Automotive air heating systems Electrothermal actuators Cabinet heating	Automotive air or water heating systems Hybrid and electric vehicles

TDK EPCOS

Piezo and Protection Devices

Varistors

Varistors

			
Series	Ring varistors VAR-18-P (Plane surface electrode type) VAR-18-S (Side surface electrode type)	S5, S7, S10, S14, S20	S25
Technical data	Varistor voltage (E10 mA): 2.0 ... 38.0 V Rated power: 500 mW Capacitance: 1 … 100 nF (at 1 kHz)	S05: I_{max} 8/20 µs: up to 800 A S07: I_{max} 8/20 µs: up to 1750 A S10: I_{max} 8/20 µs: up to 3.5 kA S14: I_{max} 8/20 µs: up to 6 kA S20: I_{max} 8/20 µs: up to 12 kA Operating voltage V_{RMS}: 11 … 1100 V	I_{max} 8/20 µs: up to 20 kA Operating voltage V_{RMS}: 130 … 750 V
Features	– Positive temperature characteristics of the varistor voltage (E10 value): prevents the varistor voltage from decreasing at high temperatures and large currents flowing through the varistor	– Leaded varistors 5 to 20 mm – High surge current ratings – High energy ratings (2 ms) up to 595 J – For high energy absorption – UL 1449 ed.4	– Leaded varistors 25 mm – High surge current ratings up to 20 kA – High energy ratings (2 ms) up to 1025 J – For high energy absorption – UL 1449 ed.4
Applications	For micro-motors (this lineup includes side-surface electrode varistors that can be used with ultra-compact micro motors)	Industrial applications Power supplies Photovoltaic systems Household electronics Telecommunications	Industrial applications Power supplies Inverters Photovoltaic systems

Varistors

				
Series	Q14, Q20	ETFV/T-series	CU varistors – SMD	SNF10, SNF14, SNF20
Technical data	Q14: I_{max} 8/20 µs: 8 kA Q20: I_{max} 8/20 µs: 15 kA Operating voltage V_{RMS}: 130 … 680 V	T14: I_{max} 8/20 µs: 6 kA T20: I_{max} 8/20 µs: 10 kA ETFV25: I_{max} 8/20 µs: 20 kA Operating voltage V_{RMS}: T14: 130 … 420 V T20: 130 … 1000 V ETFV25: 115 … 420 V	Size (EIA): 3225, 4032, 4948 Operation voltage V_{RMS}: 14 … 300 V Max. surge current (8/20 µs): 3500 A Max. energy absorption: 82 J (2 ms); Max. power dissipation: 400 mW	Operating voltage V_{RMS}: 130 … 625 V SNF10: I_{max} 8/20 µs up to 3.5 kA SNF14: I_{max} 8/20 µs up to 6 kA SNF20: I_{max} 8/20 µs up to 12 kA
Features	– Leaded varistors 14 and 20 mm – Max. load capacity vs. height – High surge current ratings up to 15 kA – For high energy absorption – UL 1449 ed.4	– ThermoFuse (varistor and fuse in one housing) – Size Ø 14, 20 and 25 mm disks – Space saving – Monitoring option with 3rd lead – UL 1449 ed.4	– Electrically equivalent to leaded types S05, S07, S10 – Lead-free soldering – UL 1449 ed.4	– Operating temperature +125 °C – No flame or rupture – Heat resistance and flame-retardant to UL 94 V-0 – UL 1449 ed.4
Applications	Industrial applications Power supplies Inverters Photovoltaic systems	Industrial applications Power supplies Inverters Power meters	Surge current protection in SMD package for automotive, industrial and telecom applications	Consumer electronics Power supplies

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Please read *Important notes* on page 76.

Piezo and Protection Devices

Varistors

TDK EPCOS

Varistors

			
Series	LS40, LS41, LS42	LS40-E7	LS50
Technical data	LS40: I_{max} 8/20 µs: 40 kA LS41: I_{max} 8/20 µs: 50 kA LS42: I_{max} 8/20 µs: 65 kA Operating voltage V_{RMS}: 130 … 750 V	I_{imp} 10/350 µs: 6.5 kA I_{max} 8/20 µs: 40 kA Operating voltage V_{RMS}: 130 … 460 V	I_{max} 8/20 µs: up to 75 kA Operating voltage V_{RMS}: 130 … 550 V
Features	– Strap terminals – High surge current ratings – High energy ratings (2 ms) up to 1200 J – Designed to requirements of IEC 61643-11 – UL 1449 ed.4	– Strap terminals – High surge current ratings at 10/350 µs – Designed to requirements of IEC 61643-11 – UL 1449 ed.4	– Strap terminals – High surge current ratings – High energy ratings (2 ms) up to 1820 J – UL 1449 ed.4
Applications	Power supplies Photovoltaic systems Wind power Surge protection devices		

Varistors

			
Series	B32, B40, B60, B80	S-AUTO	Energy varistors E32, E41
Technical data	B32: I_{max} 8/20 µs: 25 kA B40: I_{max} 8/20 µs: 40 kA B60: I_{max} 8/20 µs: 70 kA B80: I_{max} 8/20 µs: 100 kA Operating voltage V_{RMS}: 75 … 1100 V	S07: I_{max} 8/20 µs: up to 250 A S10: I_{max} 8/20 µs: up to 500 A S14: I_{max} 8/20 µs: up to 1 kA S20: I_{max} 8/20 µs: up to 2 kA Operating voltage: 16 … 48 V DC Operating temperature: +125 °C	E32: I_n 8/20 µs: 5 kA E41: I_n 8/20 µs: 10 kA Cont. operating voltage: 2.45 … 4.9 kV
Features	– Disk shaped varistor element potted in plastic housing – Screw terminals – Housing and potting flame retardant to UL94 V-0 – UL 1449 ed.4	– Leaded varistors 7 to 20 mm – High energy absorption – Coating flame retardant to UL 94 V-0	– Size Ø 34 and Ø 42 mm – Glass collar passivation
Applications	Power supplies Photovoltaic systems Wind power Inverters	Automotive electronics Jump-start Load dumps	Gapless arresters Distribution class

TDK EPCOS

Piezo and Protection Devices

Inrush Current Limiters, Multilayer Varistors,
Ceramic Transient Voltage Suppressors (CTVS)

Inrush Current Limiters

			
Series	S153, S235, S236, S237, S238, P11, P13, S364, S464, P27	Plastic case	Leaded disks
Technical data	Operating voltage V_{RMS}: 265 V Rated resistance at +25 °C: 1 … 120 Ω I_{max}: up to 30 A Load capacitance: up to 16 000 pF	Max. voltage: 280 … 560 V AC Rated resistance: 22 … 100 Ω	Max. voltage: 260 … 560 V AC Rated resistance: 25 … 500 Ω
Features	– NTC thermistors – Limiting of inrush current – Wide resistance range – Lead spacing 5 and 7.5 mm – UL 1434	– PTC thermistor – Operating cycles at V_{max} (charging of capacitor): >100 000 – J213, J215, J217, J219 qualification based on AEC-Q200, Rev D	– PTC thermistor – Operating cycles at V_{max} (charging of capacitor): >100 000
Applications	Power supplies Soft-start motors	Power supplies Household electronics Pumps Drives OnBoard charger EV	

Multilayer Varistors, CTVS

		
Series	Multilayer chip protectors – SMD SGNE	SHCV
Technical data	Size: 0402 (EIA01005)/0603 (EIA0201) Maximum continuous voltage: 4.3/4.3, 15 V DC Breakdown voltage (1 mA): 8 (6.4 … 9.6) V/8 (6.4 … 9.6), 27 (21.6 … 32.4) V Capacitance (1 MHz): 15 (10.5 … 19.5) pF/15 (10.5 … 19.5), 6.8 (4.8 ... 8.8) pF Leakage current: 20 micro-A max. V DC ESD clamp voltage: 25/25, 60 max. V Average voltage (IEC61000-4-2, 8kV)	Size (EIA): 1206 … 2220 Operating voltage: 16 … 45 V DC Surge current: ≦1200 A Load dump energy: ≦12 J Nominal capacitance: ≦4700 nF Operating temperature: ≦125 °C
Features	– For ESD protection solutions which is using a semiconductor ceramic – Possible replacement of TVS diode for ESD protection – Outstanding ESD absorption and excellent ESD protection characteristic (based on IEC61000-4-2, Contact-8kV)	– Lead-free soldering
Applications	– ESD protection such as signal lines, audio lines – Filter for EMI protection – For e.g. smart phone, tablet PC, portable music player, note PC	Combined protection against transient and RFI suppression in a single component for DC motors

TDK EPCOS

Please read *Important notes* on page 76.

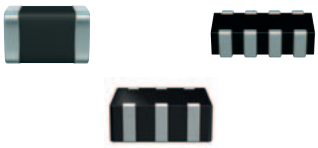
Piezo and Protection Devices

Multilayer Varistors, Ceramic Transient Voltage Suppressors (CTVS)

Multilayer Varistors, CTVS

		
Series	Multilayer chip varistors – SMD AVRL	Multilayer chip varistors – SMD AVRM
Technical data	Size: 0402/0603/1005/1608 Varistor voltage: 27 … 90 V typ. (DC 1 mA) Maximum continuous voltage V DC: 10 … 25 V Capacitance: 1.1 (0.8 … 1.4) … 6.8 (4.8 … 8.8) pF (1 MHz, 1 V RMS) Insulation resistance: 10 MΩ min. (3 V RMS)	Size: 0402/0603/1005/1608/2012 Varistor voltage: 6.8 (4.76 … 8.84) … 39 (35 … 43) V DC (1 mA) Maximum continuous voltage V DC: 3.5 … 28 V Clamping voltage: 14 (1 A) … 69 (2 A) V (8/20 micro-s) Maximum energy: 0.003 … 0.3 J (10/1000 micro-s) Maximum peak current: 1 … 100 A (8/20 micro-s) Capacitance: 15 … 1050 pF typ. (1 kHz, 1 Vrms)
Features	– No polarity, due to symmetrical current-voltage characteristics – Excellent electrostatic absorption capability – Adopted inner electrode lamination structure	– No polarity, due to symmetrical current-voltage characteristics – Excellent electrostatic absorption capability – Adopted inner electrode lamination structure
Applications	Countermeasure for surge and static electricity	Countermeasure for surge and static electricity

Multilayer Varistors, CTVS

			
Series	CeraDiodes – SMD Standard, High speed and LED series	Multilayer chip varistors – SMD Standard and high surge series	Multilayer chip varistors – SMD Automotive E series
Technical data	Size (EIA): 0201 … 1003 (single) 0506 … 1012 (array) Operating voltage: 5.5 … 200 V DC Typical capacitance: 0.6 … 470 pF No derating up to +85 °C	Size (EIA): 0201 … 2220 Operating voltage: 5.5 … 170 V DC Surge current: ≦6000 A Energy absorption: ≦12 J High surge load capability acc. to IEC 61000-4-5 UL approval No derating up to +125 °C	Size (EIA): 0402 … 2220 Operating voltage: 16 … 56 V DC Load dump energy: 1 … 25 J Qualified based on AEC-Q200, Rev. C No derating up to +150 °C
Features	– Bidirectional protection – Lead-free soldering – ESD capability to IEC 6100-4-2, level 4 (8 kV contact discharge, 15 kV air discharge) – 100% lead-free		
Applications	ESD protection of high-speed data lines (e.g. USB, Ethernet, video), industrial, lighting and wireless applications	Protection against ESD, surge, burst, switching inductive load and temporary overvoltage for industrial and telecom applications	ESD protection of bus lines (e.g. LIN, CAN, Flexray, Ethernet), Protection against automotive high transient pulses (e.g. load dump, jumpstart)

TDK EPCOS

Piezo and Protection Devices

NTC Thermistors, Nebulizer Units

NTC Thermistors

		
Series	Chip NTC thermistors – SMD Standard series	Chip NTC thermistors – SMD Automotive series
Technical data	Size (EIA): 0402 … 0805 $B_{25/100}$ values: 3455 K … 4575 K R values: 1 … 680 kΩ R tolerance*: ≧ ±1% B tolerance*: ≧ ±1% Operating voltage: –55/+125 °C *Tighter tolerances on request	Size (EIA): 0402 … 0805 $B_{25/100}$ values: 3455 K … 4480 K R values: 4.7 … 100 kΩ R tolerance*: ≧ ±1% B tolerance*: ≧ ±1% Operating voltage: –40/+150 °C *Tighter tolerances on request
Feature	– Ni barrier termination – Lead-free soldering – UL approval	– Ni barrier termination – Lead-free soldering – Qualified based on AEC-Q200 Rev. D
Applications	Temperature measurement and compensation in consumer electronics, information technology, industrial and wireless applications	Temperature measurement and compensation in automotive electronics

NTC Thermistors / Nebulizer Units

		
Series	NTCG – SMD	Ultrasonic nebulizer units NB
Technical data	Size: 0603 … 2012 B constant: 3250 … 4750 K ±3% (+25/+85 °C) Nominal resistance value: 30 Ω to 1.0 MΩ (+25 °C) Operating temperature: –40 … +125°C	Rated input voltage: 48 V AC/ 12 V DC DC Power consumption: 13.2 max./ 30 W Mist output ratio: 150 … 450 ml/h Ultrasonic frequency: 1600 … 1750 kHz 2350 … 2600 kHz
Features	– Lead (Pb) free product – Lead-less terminal electrodes and electroplating (Ni-Sn), excellent solderability and soldering heat resistance – Product series provides a wide range of resistances and B constants – Good stability of resistance value after soldering – Attains less that low floating capacitance (using TCXO) in the high frequency region	– Compact, with highly reliable circuitry – Separate transducer and drive circuit sections provide superior layout versatility
Applications	Temperature measurement and compensation	Household appliances Medical appliances

TDK EPCOS

Please read *Important notes* on page 76.

Sensors

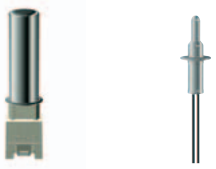
NTC Sensors

TDK EPCOS

NTC Sensors

			
Series	NTC thermistors with lead spacing	Mini sensors with bendable wires	Glass-encapsulated sensors
Technical data	Operating temperature: –55/+155 °C Resistance value: 1 … 470 kΩ Accuracy (%): $\Delta R_R/R_R = 1$, $\Delta R_B/R_B = 1$ Head size: 2.5 … 4.5 mm Diameter of lead wires: 0.4 … 0.6 mm Lead spacing: 2.5 or 5.0 mm Delivery mode: tape & reel; bulk Coating: epoxy	Operating temperature: –55/+155 °C Resistance value: 2 … 100 kΩ Accuracy (%): $\Delta R_R/R_R = 1$, $\Delta R_B/R_B = 1$ Head size: 2.41 … 2.8 mm Diameter of lead wires: 0.25 mm Delivery mode: bulk Coating: epoxy	Operating temperature: –55/+300 °C (+250 °C) (G1540 from 5 kΩ and up to +250 °C) Resistance value: 2 … 230 kΩ Accuracy (%): 1 and 1 Head size: 0.9 … 2.5 mm Diameter of lead wires: 0.15 … 0.3 mm Delivery mode: bulk Coating: glass
Features	– Available with insulated leads – High measuring accuracy – Lead-spacing – Rugged design – Cost effective	– Available with insulated leads – Special version with improved resistance to humidity available – High measuring accuracy – Tight B value tolerance available – Available with long bendable leads – UL approval (S861, S867)	– High measuring accuracy – Very short response time
Applications	Temperature measurement and compensation	Temperature measurement	

NTC Sensors

			
Series	Glass-encapsulated sensors with insulation	Cable-bound temperature sensors	Water temperature sensors
Technical data	Operating temperature: –55/+260 °C (G1541 from 5 kΩ and up to +250 °C) Resistance value: 2 … 230 kΩ Accuracy (%): 1 and 1 Head size: 1.4 … 3.0 mm Diameter of lead wires: 0.15 … 0.3 mm Delivery mode: bulk Coating: glass Insulation voltage: 500 V/1 s	Operating temperature: –40/+80 °C Resistance value: 5 kΩ Accuracy (%): $\Delta R_R/R_R = 2$, $\Delta R_B/R_B = 1.5$ Head size: 5.4, 7, 8, 9 mm Cable length: up to 2800 mm	Operating temperature: –10/+200 °C Resistance value: 4.8 … 48 kΩ Accuracy (%): $\Delta R_R/R_R = 2$, $\Delta R_B/R_B = 1$
Features	– With insulation of head and leads for specified media resistance – Tests with several medias specified (e.g. oil, fuel) – High measuring accuracy – Very short response time	– Highly resistant to water/moisture – Construction based on DIN EN 60 730-1/VDE protection class 2 (M2020) – UL approved (M2020: file E69802)	– Suitable for use in corrosive environments – Highly resistant to water/moisture – UL approved (K276) – VDE approval (K276: DIN EN 60 539-1:2002)
Applications	Temperature measurement		

TDK EPCOS

Sensors

NTC Sensors

NTC Sensors

			
Series	Screw-on temperature sensors	Pipe mounted temperature sensors	Evaporator sensors
Technical data	Operating temperature: –55/+200 °C Resistance: 5 … 230 kΩ Accuracy (%): $\Delta R_R/R_R = 2$, $\Delta R_B/R_B = 1$	Operating temperature: +5/+100 °C Resistance: 10 kΩ Accuracy (%): $\Delta R_R/R_R = 3$, $\Delta R_B/R_B = 1$ For pipe diameter: 13.5 … 22 mm Insulation voltage: 500 V AC	Operating temperature: –40/+90 °C Resistance: 2 … 10 kΩ Accuracy (%): $\Delta R_R/R_R = 1$, $\Delta R_B/R_B = 1$
Features	– Maximum temperature at sensor head +300 °C – Good thermal coupling through metal tag – Thermistor encapsulated in metal tag case – M703: UL approval (E69802)	– Fast and easy mounting – Short response time – Good thermal coupling to pipes	Special version with glass-encapsulated NTC: – Very short response time < 3 s in water and < 4 s in air 5 m/s – Highly humidity-resistant
Applications	Surface temperature measurement	Temperature measurement of fluids in pipes	Temperature measurement at evaporator

NTC Sensors

			
Series	Air duct sensors	Ambient temperature sensors	Solar sensors
Technical data	Operating temperature: –40/+90 °C Resistance value: 2 … 30 kΩ Accuracy (%): $\Delta R_R/R_R = 1$, $\Delta R_B/R_B = 1$	Operating temperature: –40/+85 °C Resistance value: 2 … 30 kΩ Accuracy (%): $\Delta R_R/R_R = 1$, $\Delta R_B/R_B = 1$	Operating temperature: –40/+100 °C Tolerance: ±15%
Features	Plastic version with clip mounting – Fast response time – Reduction of weight – Simplified recycling – Clips for mounting (no sealing)	– Humidity resistant over-molded design – High resistance to water splashes IPx9k – Cable-based design – Designed for 2000 h water immersion at +80 °C	– Mono and dual-zone sensors – High resolution and sensitivity – Measurement of solar radiation on the passenger compartment for the HVAC system – Angular characteristics – Analog signal
Applications	Measurement of average air temperature	Outside temperature measurement	Measurement of solar radiation and direction

TDK EPCOS

Please read *Important notes* on page 76.

Sensors

NTC Sensors

NTC Sensors

			
Series	NTC sensors (Assembly) NTCGP series	NTC sensors (Assembly) NTCDP series	NTC sensors (Assembly) – ABS Plastic case NTCDP series
Technical data	Nominal resistance value: R_{25} = 15 kΩ ±3% …50 kΩ ±3% B constant: $B_{25/50}$ = 3950 K ±2%, ±3% Operating temperature: –20 … +80 °C (resin dip) –40 … +125 °C (lug terminal) Thermal time constant: 6 s max. in still water. Heat dissipation constant: 2.8 … 3 mW/°C (in still air)	Nominal resistance: R_{25} = 10 kΩ ±3%, ±5% B constant: $B_{25/85}$ = 4000 K ±2% Operating temperature: –40 … +150 °C Thermal time constant: 15 s max. in still water Heat dissipation constant: 3.3 mW/°C in still air	Nominal resistance: R3 = 5.6 kΩ ±0.2 kΩ (3 °C) B constant: B3/5 0= 3850 K ±100 K Operating temperature: –40 … +85 °C Thermal time constant: 30 s max. in still water Heat dissipation constant: 2.5 mW/°C in still air
Features	– Resin DIP type with built-in multilayer element – Good heat responsiveness due to its small size	– Excellent reliability, high responsiveness, high heat resistance – Three types are available Epoxy (Ø 5.5 mm) type: Priority given to heat responsiveness Epoxy (Ø 6.0 mm) type: Compatible with copper case type of Ø 6.0 mm Epoxy screw fix type: Superior surface temperature detection	– Plastic case that is compliant to Food Hygiene Act – Highly waterproof – Inexpensive
Applications	Temperature measurement	Temperature measurement Surface temperature detection	Home appliances Consumer electronics

NTC Sensors

			
Series	NTC sensors (Assembly) – Plastic case type, oil temperature sensor NTCDP series	NTC sensors (Assembly) – ATF oil temperature sensor NTCDP	NTC sensors (Assembly) – NTCGF series NTCRP
Technical data	Nominal resistance: R140 = 0.072 kΩ ±5% (140 °C) B constant: $B_{20/80}$ = 3520 K ±2% Operating temperature: –40 … +150 °C Thermal time constant: 60 s max. in still oil Heat dissipation constant: 5 mW/°C in still air	Nominal resistance: R145 = 0.111 kΩ ±2.5% (145 °C) B constant: $B_{25/85}$ = 3528 K ±2% Operating temperature: –40 … +150 °C Thermal time constant: 15 s max. in still oil Heat dissipation constant: 3.5 mW/°C in still air	Nominal resistance: R25 = 49.12 kΩ ±5% B constant: $B_{25/80}$ = 3992 K ±2% Operating temperature: –40 … +200°C Thermal time constant: 10 s max. in still oil Heat dissipation constant: 1.9 mW/°C (25 °C in still air) Heating time constant: 3.3 seconds (25 °C ... 85°C/1 in oil)
Features	– High heat resistance – Excellent oil resistance	– High heat resistance – Excellent oil resistance and ATF resistance – Detection portion is sealed by an O-ring allowing for direct detection of oil temperature	– Excellent ATF resistance – Fast heat responsiveness due to its small size
Applications	Automotive electronics Temperature measurement of oil	Oil temperature detection for e.g. ATF, transmission oil, oil heaters	Coil temperature detection for EV, HEV and PHEV drive motor Inner temperature detection for the servomotor used for various industries

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Sensors

NTC Sensors

NTC Sensors

		
Series	NTC sensors (Element) NTCDS series	NTC sensors (Element) NTCGF series
Technical data	Size: 3.0 x Ø 1.8 mm … 4.0 x Ø 2.0 mm Operating temperature: –40 ... +250 °C (Lead wire Ni plating), –40 ... +160 °C (Lead wire Sn plating) Heat dissipation constant: 1 … 2 mW/°C in still air Thermal time constant: 10 … 20 s max. in still air Insulation resistance between lead and glass: 50 MΩ min. (DC500 V)	Size: 6.0 x Ø 3.5 mm, resin DIP type Operating temperature: –40 … +125°C Heat dissipation constant: 4 mW/°C (in still air) Thermal time constant: 30 s max. (in still air) Insulation resistance between lead and thermistor: 5 MΩ min. DC 500 V
Features	– Glass-sealed construction identical to that of DHDs (Double Heatsink Diodes) – Highly reliable and resistant to high relative humidity – Tight tolerances are maintained in resistance vs. temperature characteristics – The application of semiconductor mass production techniques has resulted in considerable size reduction and improved consistency	– Glass-sealed construction identical to that of DHDs (Double Heatsink Diodes) – Highly reliable and resistant to high relative humidity – Tight tolerances are maintained in resistance vs. temperature characteristics – The application of semiconductor mass production techniques has resulted in considerable size reduction and improved consistency
Applications	Automotive electronics, home appliances, consumer electronics	Automotive electronics, home appliances, consumer electronics

NTC Sensors

		
Series	E-Motor temperature sensor	Battery temperature sensor
Technical data	Operating temperature: –40 … +200 °C Resistance value: 10 kΩ/25 °C	Operating temperature: –40 … +100 °C Resistance value: 10 kΩ/25 °C
Features	– Measurement directly in the winding of the motor – Mechanically protected by plastic housing – High insulation voltage up to 2000 V – Available with different connectors, RT-curves and cable lengths	– Screw-on sensor for battery – Mechanically protected by plastic housing – Easy mounting and good thermal coupling – Available with different connectors, RT-curves and cable lengths
Applications	Temperature measurement in stator of electric motor	Temperature measurement of batteries in electric cars

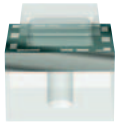
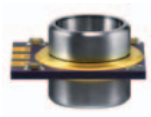
TDK EPCOS

Please read *Important notes* on page 76.

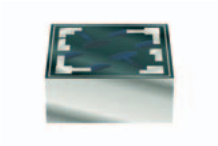
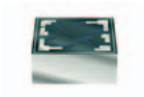
Sensors

Pressure Sensors

Pressure Sensors

		
Series	Sensor dies C32	MiniCell
Technical data	Pressure: 400 mbar … 40 bar Operating temp.: –40 … +135 °C Non-linearity: typ. 0.2% FS Output span: typ. 120 mV Size: 1.65 x 1.65 mm	Pressure: 0.5 … 10 bar Operating temp.: –40 … +140 °C Non-linearity: typ. ±1.5% FS Analog ratiometric output or digital signal
Features	– Available for absolute, gauge and back side absolute measurements – Various features on request as gold bond pads and backside metallization for soldering – Single side bond pad layout available	– Differential pressure measurement – Pressure transmitter with high media resistance for both pressure ports with stainless steel diaphragms
Applications	Industrial and automotive applications	Industrial and automotive applications

Pressure Sensors

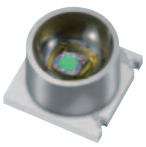
		
Series	Sensor dies C33	Sensor dies C39
Technical data	Pressure: 1.2 … 12 bar Operating temp.: –40 … +135 °C Non-linearity: typ. 0.2% FS Output span: typ. 100 mV Size: 1.0 x 1.0 mm	Pressure: 1.2 bar Operating temp.: –40 … +135 °C Non-linearity: typ. 0.2% FS Output span: typ. 80 mV Size: 0.65 x 0.65 mm
Features	– Available with gold bond pads for high corrosion resistance – Various pressure ranges available	– Miniaturized design for portable devices – High signal stability
Applications	Automotive and consumer applications	Consumer applications

◣TDK ◣EPCOS

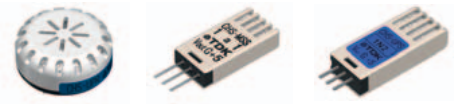
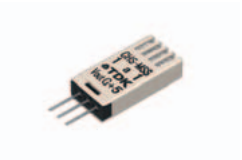
Sensors

Pressure Sensors, Humidity Sensors

Pressure Sensors

		
Series	ASB/ASA/ASR – SMD	Transmitters AK
Technical data	Pressure: 1.2 … 2.5 bar Operating temp.: –40 … +125 °C Non-linearity: typ. 0.1% FS Supply voltage: 2.7… 5.5 V Size: 4.3 x 4.3 x 2.4 mm for absolute and 4.3 x 7.9 x 3.0 mm for gauge measurement	Pressure: 25 mbar … 25 bar Operating temp.: –30 … +85 °C Non-linearity: typ. 0.5% FS
Features	– Analog V1 or VR voltage output – Minimized pressure transmitter	– Tube or thread connection – Packaged pressure sensor die for low pressure ranges – For gauge measurement
Applications	Industrial, medical and automotive applications	Industrial, medical and automotive applications

Humidity Sensors

		
Series	Humidity sensor units (Assembly) CHS-U	Humidity sensor units (Assembly) CHS-MSS
Technical data	Operating range: 5 … 95% RH (0 … +50 °C) Accuracy assurance range: 5 … 95% RH at +25 °C Nominal accuracy: ±3, ±5% RH Operating voltage: DC 5 V Output voltage: 0 … 1 V	Operating range: 5 … 95% RH (0 … +50 °C) Accuracy assurance range: 50% RH at +25 °C Nominal accuracy: ±7% RH Operating voltage: DC 5 V Output voltage: 0 … 2 V
Features	– Sensor units with built-in circuits – Highly accurate – Characteristics are stable over a wide temperature range – Dry and wet characteristics exhibit virtually no hysteresis – Highly cost-effective and compact, requiring extremely little mounting space – Low current consumption	– Sensor units with built-in circuits – Highly accurate – Characteristics are stable over a wide temperature range – Dry and wet characteristics exhibit virtually no hysteresis – Highly cost-effective and compact, requiring extremely little mounting space – Low current consumption
Applications	Refrigerators (the dew condensation prevention) Air conditioners (indoor humidity control) PPCs, LBP printers (image quality control) Industrial electronic humidity sensors, air conditioners for factories	Refrigerators (the dew condensation prevention) Air conditioners (indoor humidity control) PPCs, LBP printers (image quality control) Industrial electronic humidity sensors, air conditioners for factories

◣TDK ◣EPCOS

Please read *Important notes* on page 76.

Sensors

Humidity Sensors, Applied Sensors

Humidity Sensors

		
Series	Humidity sensor units (Assembly) CHS-C	Humidity sensor units (Element) CHS-ESS
Technical data	Operating range: 5 … 95% RH (0 … +50 °C) Accuracy assurance range: 20 … 85% RH at +25 °C Nominal accuracy: ±5% RH Operating voltage: DC 5 V Output voltage: 0 … 1V	Operating range: 5 … 95% RH (0 …. +50 °C) Accuracy assurance range: 50% RH at +25 °C Nominal accuracy: ±5% RH Operating voltage: AC 5 V RMS Impedance: 1 … 80 000 kΩ (AC 1 V/1 kHz)
Features	– Sensor units with built-in circuits – Highly accurate – Characteristics are stable over a wide temperature range – Dry and wet characteristics exhibit virtually no hysteresis – Highly cost-effective and compact, requiring extremely little mounting space – Low current consumption	– Variable resistance humidity sensor with superior water and gas resistance in a small package – Large impedance change in response to humidity changes and exhibits excellent responsiveness and sensitivity – Measurement accuracy of ±5% RH at a humidity of 50% RH – Hysteresis of dry and wet characteristics is suppressed at about 1% RH
Applications	Refrigerators (the dew condensation prevention) Air conditioners (indoor humidity control) PPCs, LBP printers (image quality control) Industrial electronic humidity sensors, air conditioners for factories	Refrigerators (the dew condensation prevention) Air conditioners (indoor humidity control) PPCs, LBP printers (image quality control) Industrial electronic humidity sensors, air conditioners for factories

Applied Sensors

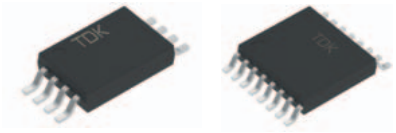
		
Series	Toner density/quantity sensors TS-A, TS-K, TS-Z	Powder level sensors TSP
Technical data	Rated voltage: 24 V ±5% Power supply current: 20 mA max. Rated control voltage: 7 V Control current: 10 mA max. Analog output voltage: 2 … 2.5 V Digital output voltage: 0.5 … 4.5 V	Operating voltage: 5 V ±5% Input current: 20 mA max. Sensor level: 5 mm ± 3 mm Output voltage: high 4.5 V min./low 0.5 V max.
Features	– Use a high performance ferrite core differential transformer with an adjustable control lead wires – Sensor adjustment point can be installed at any location – Operating point can be reset easily – Microprocessor in the printer or copier can vary the control lead voltage for automatic adjustment	– 2-terminal type separate excitation oscillation formula – Piezoelectric ceramic sensor element – Die cast finish – Highly resistant to external vibrations – Stable detection characteristics – Can detect both magnetic and non-magnetic powders
Applications	Toner density sensors for two-component system developers used for color copiers or color laser printers, toner quantity sensors for one component system magnetic developers, proximity switches/counters or minute displacement measuring devices for various magnetic bodies and conductors	Toner detectors for e.g. copiers, laser printers Detectors for coffee and other powders in automatic beverage vending machines, detectors for powders

TDK EPCOS

Sensors

Applied Sensors

Applied Sensors

		
Series	Angle sensors TAS	Gear-tooth sensors PS-HR series
Technical data	Output: 1.5 … 3.0 Vp-p (5 V) Angular accuracy: ±0.6 deg. (1.5 Vp-p differential output at 5 V), ±0.8 deg. (3.0 Vp-p differential output at 5 V) Detections can be made from 0 to 360°	Operating temperature: –30 … +150 °C Operating power source voltage: 4.75 … 16 V Output voltage: VHIGH-VCC –0.5 V/VLOW 0.4 V Response frequency: 0 … 12 kHz
Features	– Magnetic angle sensor including TMR (Tunnel Magneto-Resistance) based on magnetic record sensing technology in HDD head – High-output, high-accuracy, and high-stability with low aging deterioration. – Innovative TMR sensors are available in a compact package – Low temperature drifts – Low power consumption	– Low cost sensor – Measures the rotation angle of the cam crank – Highly precise digital output due to integration of components into an IC package – Designed to tolerate extreme temperatures (–30 … +150 °C) – Probe distance can be varied over a wide range – Built-in surge voltage suppression circuit
Applications	– Steering angles – Pedal opening, throttle valve opening – Brushless motors – Motors for wipers	Automotive: angle, speed sensing

Applied Sensors

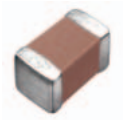
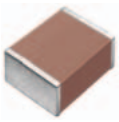
	
Series	Surface potential sensors Feed-back type EFS
Technical data	Measured voltage range Ve: –1000 … 0 V Power supply voltage Vcc: 24 V ±10% Output voltage (measured voltage) V0: 0 (0), 2.5 (–500), 4.5 (–900) V Output variation ΔV0: ±0.05 Response time: 20 ms max. Temperature range operating : 0 … +50 °C
Features	– Stable output performance is maintained for long periods – Quick responsiveness of high speed 11 ms (typ.) realized – Through the action of TDK's unique feedback circuit – Range of detector output (0 to 4.5 V range) fluctuations is limited to less than ±0.05 V
Applications	Surface electrical potential measurements in various equipment, including the drum or paper in a copier, laser printer

TDK EPCOS

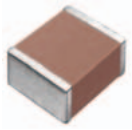
Ceramic Capacitors

Multilayer Ceramic Capacitors

Multilayer Ceramic Capacitors

			
Series	General use – SMD C, CGA series	Mid voltage – SMD C, CGA series	High voltage – SMD C series
Technical data	Size: 0402 … 5750 Temp. characteristic: CH, C0G, JB, SL, X7S, X7R, X5R, X6S Rated voltage: 4 … 50 V Capacitance: 0.5 pF … 100 µF	Size: 1005 … 5750 Temp. characteristic: C0G, X7R, X7S, X6S, X7T Rated voltage: 100 … 630 V Capacitance: 100 pF … 15 µF	Size: 3216 … 5750 Temp. characteristic: C0G, X7S, X7R Rated voltage: 1 … 3 kV Capacitance: 10 pF … 47 nF
Features	– Wide range of case size and superior dimension precision – Available in EIA class 1 and 2 dielectrics up to 50 V	– Unique design allows for higher voltage in smaller case size – Available in 100, 250, 450 and 630 V	– Advance design provides improved withstanding voltage – Available rating up to 3000 V
Applications	Automotive electronics Communications Consumer electronics Industrial applications Renewable Energy	Automotive electronics Communications Consumer electronics Industrial applications Renewable Energy	Industrial applications Renewable Energy

Multilayer Ceramic Capacitors

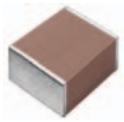
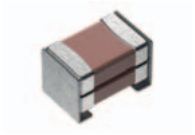
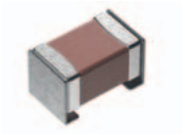
		
Series	High temperature – SMD C, CGA series	Serial design – SMD CEU series
Technical data	Size: 1005 … 3225 Temp. characteristic: X8R, NP0 Rated voltage: 25 … 100 V Capacitance: 100 pF … 10 µF	Size: 1608, 2012 Temp. characteristic: X7R Rated voltage: 50, 100 V Capacitance: 1 … 100 nF
Features	– Stable temperature characteristics up to +150 °C – Highly precise temperature performance (±7.5%) up to +125 °C	– 2 series-connected capacitors in one component – Improved bending resistance and temperature cycle performance – Ultra high reliability design for automotive battery line applications
Applications	Automotive electronics Industrial applications Renewable Energy	Automotive electronics Communications Consumer electronics Industrial applications Renewable Energy

TDK EPCOS

Ceramic Capacitors

Multilayer Ceramic Capacitors

Multilayer Ceramic Capacitors

		 
Series	Soft termination – SMD C series, CGA series	Megacap type – SMD CKG series
Technical data	Size: 1608 … 7563 Temp. characteristic: X7R, X7S, X7T Rated voltage: 6.3 … 630 V Capacitance: 1 nF … 100 µF	Size: 3225 … 7563 Temp. characteristic: X5R, X7R, X7S, X7T Rated voltage: 16 … 630 V Capacitance: 47 nF … 100 µF
Features	– Improved bending resistance and temperature cycle performance – Termination technology available for most case sizes including arrays	– Advance design for twice the capacitance on single footprint – Improved vibration and thermal/mechanical stress performance – Lower ESR and ESL than ALU and TA capacitors
Applications	Automotive electronics Communications Consumer electronics Industrial applications Renewable Energy	Automotive electronics Communications Consumer electronics Industrial applications Renewable Energy

Multilayer Ceramic Capacitors

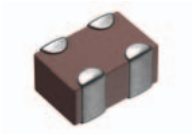
		
Series	Flip type – SMD C series	2-in-1 array; 4-in-1 array – SMD CKC series
Technical data	Size: 0510 … 1632 Temp. characteristic: X6S, X7R, X5R, X7S Rated voltage: 4 … 50 V Capacitance: 10 nF … 10 µF	Size: 1410 … 3216 Temp. characteristic: C0G, X7R, X5R Rated voltage: 6.3 … 100 V Capacitance: 10 pF … 2.2 µF
Features	– Flipped geometry permits lower inductance than standard capacitor – Special design allows for adequate high frequency current to IC	– Allows for reduction of PCB space and mounting time – Unique electrode design reduces crosstalk – Also available in soft termination for higher reliability performance
Applications	Communications Consumer electronics	Communications Consumer electronics

TDK EPCOS

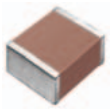
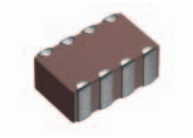
Ceramic Capacitors

Multilayer Ceramic Capacitors

Multilayer Ceramic Capacitors

		
Series	Open mode – SMD CGA series	2-in-1 array & soft termination – SMD CKG series
Technical data	Size: 2012 … 5750 Temp. characteristic: X8R, X7R Rated voltage: 16 … 630 V Capacitance: 1000 pF … 22 µF	Size: 1410, 2012 Temp. characteristic: C0G, X7R, X5R, X8R Rated voltage: 6.3 … 100 V Capacitance: 10 pF … 2.2 µF
Features	– Unique design allows increased resistance to mechanical bending – Improved performance in vibration and electrical stresses	– Improved ruggedness against mechanical stress (e.g. bending, dropping) – Allows reduction of PCB space and mounting time
Applications	Automotive electronics	Automotive electronics Communications Consumer electronics

Multilayer Ceramic Capacitors

		
Series	Conductive epoxy – SMD CGA series	Ultra low inductance – SMD CLL series
Technical data	Size: 1005 … 3225 Temp. characteristic: C0G, X7R, X8R Rated voltage: 6.3 … 100 V Capacitance: 1 pF … 10 µF	Size: 1608 … 2012 Temp. characteristic: X7R, X7S, X6S Rated voltage: 4 … 10 V Capacitance: 47 nF … 6.8 µF
Features	– AgPdCu termination for conductive glue mounting – Improved mechanical/thermal strength when used with conductive glue	– Unique internal structure allows cancelation of magnetic fields to reduce equivalent series inductance – Eight-sided terminal electrode design in one capacitor
Applications	Automotive electronics	Communications Consumer electronics

TDK EPCOS

Ceramic Capacitors

Leaded Ceramic Capacitors, Ultra-High Voltage Capacitors

Leaded Ceramic Capacitors

		
Series	Dipped radial FK series	Mid-high voltage CK45 series
Technical data	Temp. characteristic: C0G, X7R, X5R, C0G, X7R (mid voltage) Rated voltage: 6.3 … 50 V (general use) 100 … 630 V (mid voltage) Capacitance: 1 pF … 100 µF	Temp. characteristic: B, E Rated voltage: 1 … 3 kV Capacitance: 100 pF … 10 nF
Features	– Dipped radial leaded ceramic capacitors are multilayer ceramic capacitors attached with solder coated wire leads and dipped with UL94V-0 approved resin – Provides large electrostatic capacitance – Leads are formed with a “kink” to achieve consistent insertion heights and to facilitate the release of gases during soldering for dramatically improved solderability – Taping specifications for automatic insertions can be met	– High reliability – Low dissipation factor, and decreased self-heating temperature in high frequency and high voltage applications – Halogen-free external resin coating
Applications	General use	

Leaded Ceramic Capacitors / Ultra-High Voltage Capacitors

		
Series	Mid-high voltage CD/ CS series	Ultra-high voltage UHV series
Technical data	CD series Temp. characteristic: B, SL, Z5U Rated voltage: Eac X1/440 V, Y1/400 V Capacitance: 10 pF … 4.7 nF CS series Temp. characteristic: B, SL, Z5U, F Rated voltage: Eac X1/440 V, Y2/300 V Capacitance: 10 pF … 10 nF	Temp. characteristic: Z5T Rated voltage: 20 … 50 kV Capacitance: 100 … 4000 pF
Features	– Compliant with safety standards – Flame-resistant, reinforced outer insulation prevents fires, electrical shock, and other potential hazards – Halogen-free external resin coating	– Low dissipation and excellent voltage/capacitance characteristics – Epoxy-encapsulated to meet requirements of high voltage applications
Applications	AC lines	High voltage power supplies Laser equipment

TDK EPCOS

Film Capacitors

Medium Power Film Capacitors

Medium Power Film Capacitors

		 
Series	MKT boxed B32520 … B32529	MKT uncoated (SilverCap) B3256 …, B3257…
Technical data	Rated capacitance: 1.0 nF … 220 µF Rated voltage: 50 … 630 V DC 32 … 400 V AC	Rated capacitance: 1.0 nF … 33 µF Rated voltage: 63 … 1000 V DC 40 … 500 V AC
Features	Dielectric polyester (PET) offers: – Higher density of capacitance/mm³ and +125 °C operating temperature vs polypropylene (PP) dielectric – Lower dissipation factor, higher current capability (RMS and peak), long useful life and parameter stability	
	– Plastic case and epoxy resin sealing (UL94V-0) – Mechanical and environmental strength	– Shape flexibility – Special dimensions on request – B3257… for ignition
Applications	General purpose, blocking, coupling, decoupling, bypassing, electronic, ignition in industrial (SMPS, converter), lighting, automotive and household appliances	

Medium Power Film Capacitors

	
Series	MKP boxed B32652 …, B32658 …
Technical data	Rated capacitance: 1.0 nF … 24 µF Rated voltage: 250 … 2000 V DC 160 … 1000 V AC
Features	Dielectric: Polypropylene (PP) offers: – Higher dielectric strength vs. polyester (PET) dielectric – Lower dissipation factor, higher current capability (RMS and peak) and parameter stability vs. polyester dielectric – Epoxy resin sealing and plastic box case are UL94V-0 flame retardant materials – Mechanical stability – High RMS and peak current capability – Good self-healing properties
Applications	General purpose, snubbering, resonance, ignition, AC and DC filtering in industrial, lighting, automotive and household appliances

◣TDK ◣EPCOS

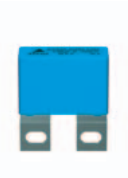
Film Capacitors

Medium Power Film Capacitors

Medium Power Film Capacitors

		
Series	MKP boxed (PFC) B32671P…, B32673P… B32671Z…, B32676Z…	MKP boxed (high V AC-temp.) B32671L…, B32672L…
Technical data	Rated capacitance: 10 nF … 20 µF Rated voltage: 450 … 630 V DC 160 … 310 V AC	Rated capacitance: 0.68 nF … 1 µF Rated voltage: 250 … 2000 V DC 160 … 900 V AC
Features	Dielectric: Polypropylene (PP) offers: – Higher dielectric strength vs. polyester (PET) dielectric – Lower dissipation factor, higher current capability (RMS and peak) and parameter stability vs. polyester dielectric – Epoxy resin sealing and plastic box case are UL94V-0 flame retardant materials	
	– Very compact design – High frequency	– Very small dimensions – For high frequency AC loads and pulses – High pulse withstand capability
Applications	Power factor correction, decoupling, coupling, switching in industrial (power supplies, converter), lighting (LED ballasts), automotive and household appliances	SMPS, electronic ballasts, pulse circuits

Medium Power Film Capacitors

			
Series	MKP DC link High Density B32774 … B32778	MKP DC link High Power B32674 … B32678	MKP snubber B32656S… B32658S
Technical data	Rated capacitance: 1.5 … 480 µF Rated voltage: 450 … 1300 V DC	Rated capacitance: 470 nF … 270 µF Rated voltage: 450 … 1050 V DC	Rated capacitance: 68 nF … 5.6 µF Rated voltage: 850 … 2000 V DC 450 … 800 V AC
Features	Dielectric: Polypropylene (PP) offers: – Higher dielectric strength vs. polyester (PET) dielectric – Lower dissipation factor, higher current capability (RMS and peak) and parameter stability vs. polyester dielectric – Epoxy resin sealing and plastic box case are UL94V-0 flame retardant materials		
	– High density of capacitance per volume – Low losses with high current capability	– High power: density of I_{RMS} current per capacitance – High frequency ripple current	– Very low ESL, ESR – Thermal, mechanical stability – 17 terminal options
Applications	DC link, DC filtering, decoupling in industrial, lighting, automotive and household appliances		Snubbering IGBT module in industrial appliances

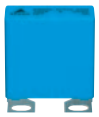
TDK EPCOS

Film Capacitors

Medium Power Film Capacitors

TDK EPCOS

Medium Power Film Capacitors

		
Series	MFP boxed B32682 … B32686	MFP snubber B32686S…
Technical data	Rated capacitance: 0.47 nF … 1.5 µF Rated voltage: 400 … 2500 V DC, 250 … 750 V AC	Rated capacitance: 22 nF … 0.68 µF Rated voltage: 1000 … 2000 V DC, 400 … 500 V AC
Features	– Polypropylene (PP) film dielectric metallized on one side and metal foil electrodes – It allows maximum pulse handling capability together with maximum ripple current and frequency – Very high dv/dt	– Polypropylene (PP) film dielectric metalized on one side and metal foil electrodes – Provides maximum pulse handling capability together with the maximum ripple current and frequency – Very low ESL, ESR – Thermal, mechanical stability
Applications	Smothing, snubbering, high frequency AC loads in industrial, lighting and medical electronics with very high pulse, frequency and current demand	Snubbering IGBT module in industrial, medical electronics with very high pulse, frequency and current demand

Medium Power Film Capacitors

				
Series	X2 EMI suppression B32921 … B32928	X1 EMI suppression B32911 … B32918	Y2 EMI suppression B32021 … B32026	Y1 EMI suppression B81123
Technical data	Rated capacitance: 10 nF … 30 µF Rated voltage: 305 V AC	X1 330 V: Rated capacitance: 10 nF … 6.8 µF Rated voltage: 330 V AC X1 530 V: Rated capacitance: 1 nF … 5.6 µF Rated voltage: 530 V AC	Rated capacitance: 1 nF … 1 µF Rated voltage: 300 V AC	Rated capacitance: 1 … 10 nF Rated voltage: 250 V AC
Features	– Standard EMI suppression capacitor for EMC filtering – Good self-healing properties – High voltage capability – Very small dimensions		– Standard EMI suppression capacitor for EMC filtering – Good self-healing properties – High voltage capability – Very small dimensions	
Applications	Across-the-line applications in industrial, lighting, medical, household appliances		Line-to-ground applications in industrial, lighting, medical, household appliances	

TDK EPCOS

Film Capacitors

Medium Power Film Capacitors, DC Link, DC Filtering Film Capacitors,
AC Output/Input Filters

Medium Power Film Capacitors

		
Series	MKT AC Heavy Duty B32932 … B32936	X2 Humidity B32922H/J … B32926H/J
Technical data	Rated capacitance: 47 nF … 2.2 µF Rated voltage: 305 V AC	Rated capacitance: 0.1 … 15 µF Rated voltage: 305 V AC
Features	+85 °C/85% RH/1000 h/240 V AC X2 safety class per UL/IEC (C ≤ 2.2 µF) High stability on capacitance value Internal series connection +40 °C/93% RH/2000 h/305 V AC	+85 °C/85% RH/1000 h/240 V AC X2 safety class per UL/IEC High stability of capacitance value +60 °C/95% RH/1000 h/240 V AC
Applications	Capacitive power supplies AC voltage dividers Serial connection with mains For severe ambient conditions	Across-the-line applications in industrial, medical, household appliances For severe ambient conditions Also for serial connection with mains

DC Link, DC Filtering Film Capacitors

AC Output/Input Filters

		
Series	X2 internal series B32924A/B4 … B32926A/B4	Box type B32354S …
Technical data	Rated capacitance: 0.47 … 10 µF Rated voltage: 350 V AC	Rated capacitance: 20 … 22 µF*) Rated voltage: 350 V AC*)
Features	X2 safety class per UL/IEC Very high stability of capacitance value +85 °C/85% RH/1000 h/330 V AC Internal series construction	– Plastic can – Terminals: 4 pin, 2 pin as option – Optimized for PCB mounting – Segmented film safety function – +85 °C, 85% rel. humidity, 1000 h, V_R compatible as option – UL approval as option
Applications	For severe ambient conditions Across the line and series applications	Designed for AC input and AC output filters e.g. UPS

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*) others on request

Please read *Important notes* on page 76.

Film Capacitors

AC Film Capacitors

AC Film Capacitors

			
Series	MotorCap S0 (P0) plastic B3232 …	MotorCap S3 (P2) compact B3235 …	Super MotorCap S2 (P2) Alu B3233 …
Technical data	Rated voltage: 250 … 480 V AC Rated capacitance: 1 … 60 µF Plastic can	Rated voltage: 400, 450 V AC Rated capacitance: 2 … 20 µF Plastic can	Rated voltage: 450 V AC Rated capacitance: 1 … 60 µF Aluminum can
Features	– Useful life: Up to 10 000 h/class B – Terminals: Fast-on (single/double) Insulated wire Twin core cable – Safety class: S0 (P0) – Approvals: UL, VDE, IS	– Useful life: Up to 30 000 h/class A – Terminals: Fast-on (single/double) Insulated wire Twin core cable – Safety class: S3 (P2) – Approvals: UL, VDE	– Useful life: Up to 30 000 h/class A – Terminals: Fast-on (single/double) Twin core cable – Safety class: S3 (P2) – Approvals: UL, VDE, CQC, TÜV – New 25 mm diameter version
Applications	General sine wave applications, mainly as motor run capacitor	Mainly as motor run capacitor, e.g. for refrigeration units, pumps, home convenience drives	Mainly as motor run capacitor, e.g. for household appliances, heat pumps

AC Film Capacitors

			
Series	Dual MotorCap S2 (P2) B32335	MotorCap S2 (P2) Alu B3333 …	
Technical data	Rated voltage: 450 V AC Rated capacitance: 10+1 … 60+10 µF Aluminum can	Rated voltage: 450 V AC Rated capacitance: 1 … 80 µF Aluminum can Rated capacitance (dual): 12+1.5 … 60+8 µF Rated capacitance (single): 2 … 50 µF	
Features	– Useful life: Up to 10 000 h/class B – Terminals: Fast-on (single/double/quadruple) – Safety class: S2 (P2) – Approvals: UL, TÜV	– Useful life: Up to 30 000 h/class A – Terminals: Fast-on (single/double) Twin core cable – Safety class: S2 (P2) – Approvals: UL, VDE, CQC	
Applications	Mainly as motor run capacitor, e.g. for air conditioning	Mainly as motor run capacitor, e.g. for household appliances, heat pumps Version for general AC purpose	

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Film Capacitors

PFC Capacitors and Key Components for Power Quality Solutions

PFC Capacitors and Key Components for Power Quality Solutions

				
Series	PhaseCap Energy B25674/B25675	PhaseCap Compact B25673	PhaseCap Premium B25667	PhaseCap HD B25669
Technical data	Power: 5.0 … 33 kvar Rated voltage: 230 … 690 V AC Inrush current: up to 500 • I_R	Power: 5.0 … 33 kvar Rated voltage: 230 … 1000 V AC Inrush current: up to 400 • I_R	Power: 5.0 … 33 kvar Rated voltage: 230 … 800 V AC Inrush current: up to 300 • I_R	Power: 40 … 60 kvar Rated voltage: 400 … 525 V AC Inrush current: up to 300 • I_R
Features	– Useful life: up to 180 000 to 200 000 h at temp. class –40/D, depending on the type	– Useful life: Up to 200 000 h at temp. class –40/C Up to 150 000 h at temp. class –40/D	– Useful life: Up to 180 000 h at temp. class –40/C Up to 130 000 h at temp. class –40/D	– Useful life: Up to 180 000 h at temp. class –40/C Up to 130 000 h at temp. class –40/D
Applications	Automatic PFC equipment Individual fixed PFC Group fixed PFC Tuned and detuned capacitor banks Dynamic PFC	Automatic PFC equipment Individual fixed PFC Fixed PFC Tuned and detuned capacitor banks Types from 690 to 1000 V for usage in wind turbine and industrial applications with heavy harmonic loads	Automatic PFC equipment Individual fixed PFC Fixed PFC Tuned and detuned capacitor banks 690 V and 800 V series for usage in harsh applications with heavy harmonic loads	Automatic PFC equipment Individual fixed PFC Fixed PFC Detuned capacitor banks

PFC Capacitors and Key Components for Power Quality Solutions

				
Series	DeltaCap B32300, B32301, B32303, B32304	PhiCap B32340C****A***, B32343C, B32344E	HomeCap B32340C…J…	PoleCap B25671
Technical data	Power: 0.5 … 30 kvar Rated voltage: 230 … 525 V AC Inrush current: up to 200 • I_R	Power: 0.5 … 30 kvar Rated voltage: 230 … 525 V AC Inrush current: up to 200 • I_R	Power: 0.02 … 1.99 kvar Rated voltage: 400 V AC (Application voltage: 127 … 400 V AC) Inrush current: up to 100 • I_R	Power: 0.5 … 30 kvar Rated voltage: 400 … 525 V AC Inrush current: up to 200 • I_R
Features	– Useful life: Up to 150 000 h at temp. class –40/C Up to 115 000 h at temp. class –40/D	– Useful life: Up to 135 000 h at temp. class –40/C Up to 100 000 h at temp. class –40/D	– Useful life: Up to 100 000 h at temp. class –40/D	– Useful life: Up to 100 000 h at temp. class –40/C
Applications	Automatic capacitor banks Fixed PFC Detuned PFC systems	Automatic capacitor banks Fixed PFC Detuned PFC systems	Residential PFC	Outdoor low voltage applications For installation in surroundings with high dust or moisture concentration

TDK EPCOS

Please read *Important notes* on page 76.

Film Capacitors

PFC Capacitors and Key Components for Power Quality Solutions

PFC Capacitors and Key Components for Power Quality Solutions



Series	PF controllers B44066R …
Technical data	Supply voltage: BR604: 230 V AC BR6000 (from V5.0 onwards), BR7000/BR7000-I, BR7000-I-TH/BR7000-I-TH/S: 110 … 230 V AC Measuring voltage: BR604 = supply voltage 230 V AC BR6000: 30 … 525 V AC (L-N) or (L-L) BR7000/BR7000-T: 3 x 30 … 440 V AC (L-N); 3 x 50 … 760 V AC (L-L) BR7000-I: 30 … 440 V AC (L-N); 50 … 760 V AC (L-L) BR7000-I-TH/BR7000-I-TH/S: 30 … 440 V AC (L-N) / 50 … 760 V AC (L-L)
Features	Output stages: BR604: 4 relay outputs BR6000: depending on the type 6 to 12 relay outputs BR6000-T6: 6 transistor outputs BR7000: 15 relay outputs for capacitor switching BR7000-T: 15 transistor outputs for capacitor switching or dynamic PFC BR7000-I: 12 or 13 switching outputs BR7000-I-TH/BR7000-I-TH/S: 12 relay and 12 transistor outputs Menue languages: BR604: EN/ES/G/PT BR6000-series/BR7000-I-series: CZ/EN/ES//GER/NL/PL/PT/RU/TR BR7000-series: E/ES/GER/RU/TR
Applications	Controlling of actual power factor Connecting/disconnecting capacitor steps

PFC Capacitors and Key Components for Power Quality Solutions



Series	Measuring devices B44066M …
Technical data	Supply voltage: MMI6000: 230 V AC MMI7000: 110 … 230 V AC MMI8003: 24 V DC (via external terminal) Measuring voltage: MMI6000: 230 V AC MMI7000: 3 x 30 … 440 V AC (L-N) 3 x 50 … 760 V AC (L-L) MMI8003: 3 x 30 … 440 V AC (L-N) 3 x 50 … 690 V AC (L-L)
Features	– Compact dimensions – Panel mounting instrument – LCD display, MMI8003 no display – Menu languages: MMI6000: DE/E MMI7000: DE/E/ES/RU/TR MMI8003: n/a
Applications	Accessory for PF controller BR-series with interface MMI6000: 1-phase measuring and display of grid parameters MMI7000: 3-phase measuring and display of grid parameters MMI8003: 3-phase measuring, display via PC or external control device

TDK EPCOS

Film Capacitors

PFC Capacitors and Key Components for Power Quality Solutions

PFC Capacitors and Key Components for Power Quality Solutions

			
Series	Grid analysis tool B44066M7777E230	Contactors B44066S … J …/N …	TSM modules B44066T …
Technical data	Operating voltage: 110 … 230 V AC Measuring current: 30, 300, 3000 A Measuring voltage: 3 x 30 … 440 V AC 3 x 50 … 760 V AC	Voltage: 400 … 690 V Output range: 12.5 … 100 kvar	Voltage range: TSM-LC(X): 230 … 690 V, depending on type TSM-HV: 690 V Output range: TSM-LC(X): 10 … 200 kvar, depending on type TSM-HV: 200 kvar
Features	– Comfortable measuring tool – 1 GB memory card included – PC software for evaluation of measured values included	– Series J110/J230 for usage in PFC systems with and without reactors – Series N110/N230 for usage in PFC systems with reactors – cUL approval – CCC approval	– Fast electronically controlled thyristor switch – Easy installation – Very short switching times
Applications	Three-phase measuring, display and storage of electric parameters in LV grids	Damping of inrush current in low voltage PFC systems For PFC systems with/without reactors	Main supply networks with high load fluctuations for dynamic PFC systems, e.g. presses, welding machines, elevators, cranes, wind turbines

PFC Capacitors and Key Components for Power Quality Solutions

		
Series	Reactors B44066D …	PQSine P series – Active harmonic filter and power optimizer B44066F****N****
Technical data	Voltage: 220 … 690 V Output range: 10 … 100 kvar Detuning factor: 5.67, 7, 14% Frequency: 50 or 60 Hz	Input voltage: 3-wire: 180 V … 525 V 4-wire: 180 V … 460 V Rated filter current: 60 … 600 A Wall and floor mounting variants Modular system
Features	– High harmonic loading capability – Very low losses – Low noise emission – Temperature protection by microswitch (NC)	– Harmonic mitigation up to the 50th order – Active load balancing – Ultra-fast reactive power factor compensation (inductive and capacitive) – Compact design – Advanced digital control
Applications	Avoiding of resonance conditions Tuned and detuned harmonic filters Reduction of power losses	Datacenters, UPS systems, Renewable energy power generation (e.g. Photovoltaic and Wind turbines), Industrial production facilities, office buildings and shopping centres

TDK EPCOS

Please read *Important notes* on page 76.

Film Capacitors

Power Capacitors

TDK EPCOS

Power Capacitors

		
Series	MKK DC/DCi/DCi-H, DCi-R/DC-R B25650 (gas), B25640 (resin), B25750 (oil)	PCC LP B25655J …, B25655M …, B25655P …
Technical data	Rated capacitance: 100 µF … 20 mF Nominal voltage: 800 … 6500 V Operating temperature: –55 … +80 °C Gas impregnation (DC) Oil impregnation (DCi/DCi-H) Resin impregnation (DCi-R, DC-R)	Rated capacitance: 50 … 3000 µF Rated voltage: 200 … 900 V DC Operating temperature: –40 … +110 °C
Features	– High peak current handling capability – Low losses – Long useful life – Very high reliability – Rectangular case – Flat windings – Overpressure switch possible, self-healing	– Low self-inductivity – High volume fill factor – Very good self-healing – Compact size – Flexible dimensions – Customer specific designs
Applications	DC link Resonant filters Power modules for HVDC	DC link for LV converters, specially HEV applications

Power Capacitors

		
Series	MKP DC B2562 …	MKP AC B3236 …
Technical data	Rated capacitance: 40 … 1500 µF Rated voltage: 700 … 2000 V DC Operating temperature: –55 … +85 °C	Rated capacitance: 10 … 600 µF Rating voltage: 250 … 480 V_{RMS} Operating temperature: –40 … +70 °C
Features	– High RMS current handling capability – Self-healing – Aluminum can – Customized configurations – UL certification	– High peak current handling capability – Overpressure disconnector – Self-healing – UL certification
Applications	DC link capacitor for voltage converters in renewable energies	Filtering for e.g. uninterruptible power supplies, renewable energies

TDK EPCOS

Film Capacitors

Power Capacitors

Power Capacitors

			
Series	Filtercap MKD AC B3237…	Filtercap –MKP AC HP	MKK HP B25610
Technical data	Rated capacitance: 5 … 600 µF Rated voltage: 350 … 850 V_{RMS} 1-phase/3-phase available	Rated capacitance: 10 … 150 µF Rated voltage: 1000 … 1500 V_{RMS}	Rated capacitance: from 3 x 50 µF on wards Rated voltage: up to 690 V AC Operating temp.: –55 … +80 °C
Features	– High peak current capability – Customized configurations – Overpressure disconnector – Self-healing – UL certification (pending)	– High peak current capability – Customized configurations – Overpressure disconnector – Self-healing	– Low ESR – Self-healing – Reduces high THD – Delta or star connected – Rectangular case – Customer specific design – Aluminum or stainless steel case – Compact size
Applications	Industrial and general, AC filter applications, renewable energies	Industrial and general, AC filter applications, renewable energies	High performance output filtering, especially in wind power applications

Power Capacitors

		
Series	MKK DCR B25640	MKP DC LSI B2563 …
Technical data	Rated capacitance: up to 20 mF Rated voltage: up to 1500 V DC Operating temperature: –25 … +80 °C	Rated capacitance: 50 … 280 µF Rated voltage: 600 … 1200 V DC Operating temperature: –55 … +85 °C
Features	– Very low ESL – Self-healing – Open capacitors – Rectangular case – Customer specific design – Compact size (flat winding) – Resin filled – Cost optimized	– Different terminal types – IEC1071 approved – High peak current capability – Customized configurations – Self-healing – Low self inductance – Plastic can
Applications	DC link, industrial and renewable energies	Compact DC link applications

TDK EPCOS

Please read *Important notes* on page 76.

Aluminum Electrolytic Capacitors

Aluminum Electrolytic Capacitors

			
Series	Screw terminals	4-/5-pin snap-in terminals Solder-pin terminals	Snap-in terminals
Technical data	Rated voltage: 16 … 600 V Rated capacitance: 560 … 680 000 µF Dimensions: 35.7 x 55.7 … 90 x 221 mm	Rated voltage: 350 … 500 V Rated capacitance: 220 … 3300 µF Dimensions: 35 x 40 … 50 x 100 mm	Rated voltage: 10 … 600 V Rated capacitance: 47 … 68 000 µF Dimensions: 22 x 25 … 35 x 55 mm
Features	– High ripple current capability – Long operational useful life (up to >20 years) – Self-extinguishing electrolyte upon request – Special designs for base cooling – Optional PET insulation – Compact can size	– High ripple current capability – Long operational useful life (up to >20 years) – Optional PET insulation – Optional PET insulation cap on terminal side – Compact can size	– High ripple current capability – Long operational useful life (up to >20 years) – Optional PET insulation – Optional PET insulation cap on terminal side – Compact can size
Applications	Frequency converters DC link for wind energy and solar inverters Uninterruptible power supplies Professional power supplies	Frequency converters DC link for solar inverters Uninterruptible power supplies Professional power supplies	Frequency converters DC link for solar inverters Uninterruptible power supplies Professional power supplies

Aluminum Electrolytic Capacitors

			 
Series	Large-size	Axial-lead	Soldering star
Technical data	Rated voltage: 25 … 63 V; 450 V (HV) Rated capacitance: 150 … 27 000 µF Dimensions: 22 x 40 … 35 x 55 mm	Rated voltage: 25 … 250 V Rated capacitance: 22 … 10 000 µF Dimensions: 12 x 30 … 21 x 49 mm	Rated voltage: 25 … 250 V Rated capacitance: 22 … 10 000 µF Dimensions: 12 x 30 … 21 x 49 mm
Features	– High vibration stability up to 40 *g* – High ripple current capability – Low ESR – Long useful life up to 10 000 h at +125 °C and (HV) useful life up to 3000 h at +105 °C	– High vibration stability up to 60 *g* – High ripple current capability – Low ESR at high temperatures – Long useful life up to 10 000 h at +125 °C – High temperature range up to +150 °C	– High vibration stability up to 60 *g* – Low inductance – High ripple current capability – Long useful life up to 10 000 h at +125 °C – High temperature range up to +150 °C – Low ESR at high temperatures
Applications	High energy efficiency in automotive applications e.g. power steering, motor management (HV) onboard charger spectrum (HV = High Voltage series)	High energy efficiency in automotive applications e.g. motor management, power steering, fan control, transmission control, DC-link inverter 48 V boardnet for HEV	High energy efficiency in automotive applications e.g. motor management, power steering, fan control, transmission control, DC-link inverter 48 V boardnet for HEV

TDK EPCOS

Aluminum Electrolytic Capacitors

Aluminum Electrolytic Capacitors

		
Series	Single-ended	Pulse applications
Technical data	Rated voltage: 10 … 450 V Rated capacitance: 2.2 … 10 000 µF Dimensions: 8 x 11.5 … 18 x 40 mm	Rated voltage: 300 … 500 V Rated capacitance: 200 … 6600 µF Dimensions: 25 x 45 … 50 x 100 mm
Features	– High temperature range up to +135 °C – Low impedance at high frequency – Different terminal configurations – Compact designs	– High charge/discharge proof – Low dissipation factor – Compact designs
Applications	Automotive e.g. motor management, power steering, fan control	Professional flashlights Mobile X-ray generators Welding machines Hair removal devices

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Electric Double Layer Capacitors

Electric Double Layer Capacitors

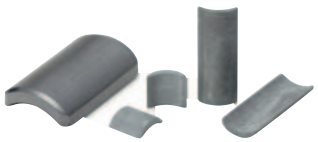
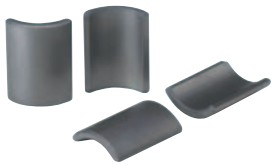
			
Series	Thin type EDLC041720	Low profile type EDLC212520 EDLC262520	Small footprint type EDLC351420
Technical data	Size (l x w x h): 20 x 17 x 0.4 mm Capacitance: 5 … 15 mF typ. Rated voltage: 3.2 V (continuous), 5 V (peak) Impedance: 7 Ω typ. (AC 1 kHz)	Size (l x w x h): 20 x 25 x 2.1/2.6 mm, without lead Capacitance: 350, 500 mF typ. Rated voltage: 4.2 V (continuous), 5 V (peak) Impedance: 55, 35 mΩ typ. (AC 1 kHz)	Size (l x w x h): 20 x 14 x 3.3 mm, without lead Capacitance: 500 mF typ. Rated voltage: 4.2 V (continuous), 5 V (peak) Impedance: 40 mΩ typ. (AC 1 kHz)
Features	– High capacitance and low impedance – Very thin small size – High bending strength – Long-life – Clean materials – Safety property – Compliant with ISO standards	– High capacitance and low impedance – Very thin small size – High bending strength – Long-life – Clean materials – Safety property – Compliant with ISO standards (dimensions, bending, torsion tests)	– High capacitance and low impedance – Very thin small size – High bending strength – Long-life – Clean materials – Safety property – Compliant with ISO standards (dimensions, bending, torsion tests)
Applications	– Secondary power supply it has built-in in an IC card – Storage element of energy harvesting	– Secondary power supply it has built-in in an IC card – Storage element of energy harvesting	– Secondary power supply it has built-in in an IC card – Storage element of energy harvesting

◣TDK ◣EPCOS

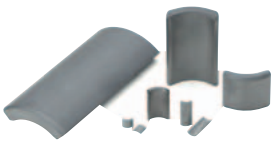
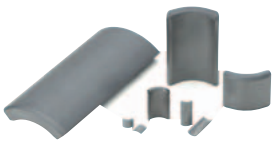
Magnets

Ferrite Magnets

Ferrite Magnets

		
Series	FB series – FB12B, FB12H material	FB series – FB9B, FB9H, FB9N material
Technical data	Residual flux density: 460 ±10 … 470 ±10 mT Coercive force: 340 ±12 … 345 ±15 kA/m Intrinsic coercive force: 380 ±12 … 430 ±15 kA/m Maximum energy product (BH) max: 41.4 ±1.6 … 43.1 ±1.6 kJ/m³	Residual flux density: 430 ±10 … 460 ±10 mT Coercive force: 278.5 ±12 … 342.2 ±12 kA/m Intrinsic coercive force: 286.5 ±12 … 397.1 ±12 kA/m Maximum energy product (BH) max: 35.0 ±1.6 … 40.4 ±1.6 kJ/m³
Features	– Wet-molded anisotropic ferrite magnet – Further improved coercive force HCJ temperature coefficient	– Wet-molded anisotropic ferrite magnets – Energy product with a substantially improved coercive force HCJ temperature coefficient
Applications	Automotive electronics Home appliances: electrical motors, actuators, appliance motors	Automotive electronics Home appliances: electrical motors, actuators, appliance motors

Ferrite Magnets

		
Series	FB series – FB6B, FB6E, FB6H, FB6N material	FB series – FB5B, FB5D, FB5DH, FB5H material
Technical data	Residual flux density: 380 ±10 … 440 ±10 mT Coercive force: 258.6 ±12 … 302.4 ±12 kA/m Intrinsic coercive force: 262.6 ±12 … 393.9 ±12 kA/m Maximum energy product (BH) max: 27.5 ±1.6 … 36.7 ±1.6 kJ/m³	Residual flux density: 400 ±10 … 420 ±10 mT Coercive force: 254.6 ±12 … 298.4 ±12 kA/m Intrinsic coercive force: 262.6 ±16 … 322.3 ±12 kA/m Maximum energy product (BH) max: 30.3 ±1.6 … 33.4 ±1.6 kJ/m³
Features	– Good balance of B_r and H_c values at high levels – Particularly suited for high powered motors with large demagnetizing fields	– Deliver high B_r and a relatively high level of H_c. – Excellent cost performance – Suitable for a diverse range of small, high-performance motors
Applications	Automotive electronics Home appliances: electrical motors, actuators, appliance motors	Automotive electronics Home appliances: electrical motors, actuators, appliance motors

TDK EPCOS

Please read *Important notes* on page 76.

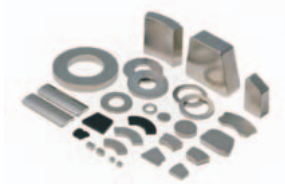
Magnets

Rare Earth Magnets – Nd-Fe-B Magnets

Rare Earth Magnets – Nd-Fe-B Magnets

	
Series	NEOREC series – NEOREC53B material
Technical data	Residual flux density: 1450 ±20 mT Coercive force: 1120 ±48 kA/m Intrinsic coercive force: ≧1114 kA/m Maximum energy product (BH) max: 406 ±16 kJ/m³
Features	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before
Applications	Renewable Energy (Wind power) Home appliances Automotive electronics

Rare Earth Magnets – Nd-Fe-B Magnets

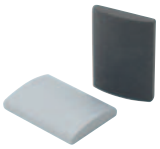
		
Series	NEOREC series – NEOREC50B, NEOREC50H material	NEOREC series – NEOREC47B, NEOREC47H material
Technical data	Residual flux density: 1420 ±20 mT Coercive force: 1074 ±48 … 1097 ±48 kA/m Intrinsic coercive force: ≧1114 … ≧1353 kA/m Maximum energy product (BH) max: 390 ±16 kJ/m³	Residual flux density: 1390 ±20 … 1390 ±30 mT Coercive force: 1035 ±56 … 1067 ±48 kA/m Intrinsic coercive force: ≧1114 … ≧1273 kA/m Maximum energy product (BH) max: 366 ±16 … 374 ±16 kJ/m³
Features	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before
Applications	Renewable Energy (Wind power) Home appliances Automotive electronics	Renewable Energy (Wind power) Home appliances Automotive electronics

TDK EPCOS

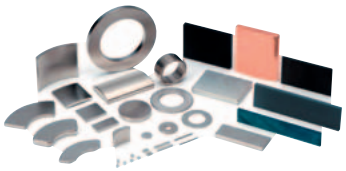
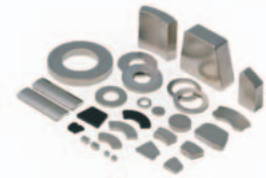
Magnets

Rare Earth Magnets – Nd-Fe-B Magnets

Rare Earth Magnets – Nd-Fe-B Magnets

		
Series	NEOREC series – NEOREC46HF, NEOREC46HG material	NEOREC series – NEOREC45SH material
Technical data	Residual flux density: 1350 ±20 … 1380 ±30 mT Coercive force: 1043 ±48 … 1066 ±56 kA/m Intrinsic coercive force: ≧1273 … ≧1432 kA/m Maximum energy product (BH) max: 352 ±16 … 368 ±16 kJ/m³	Residual flux density: 1360 ±30 mT Coercive force: 1051 ±56 kA/m Intrinsic coercive force: ≧1671 kA/m Maximum energy product (BH) max: 357 ±16 kJ/m³
Features	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before	– Magnetic characteristics reach 49MGOe in maximum energy product(BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before
Applications	Renewable Energy (Wind power) Home appliances Automotive electronics	Renewable Energy (Wind power) Home appliances Automotive electronics

Rare Earth Magnets – Nd-Fe-B Magnets

		
Series	NEOREC series – NEOREC44H material	NEOREC series – NEOREC43SX material
Technical data	Residual flux density: 1360 ±30 mT Coercive force: 1003 ±56 kA/m Intrinsic coercive force: ≧1353 kA/m Maximum energy product (BH) max: 350 ±16 kJ/m³	Residual flux density: 1310 ±30 mT Coercive force: 1012 ±56 kA/m Intrinsic coercive force: ≧1830 kA/m Maximum energy product (BH) max: 331 ±16 kJ/m³
Features	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before
Applications	Renewable Energy (Wind power) Home appliances Automotive electronics	Renewable Energy (Wind power) Home appliances Automotive electronics

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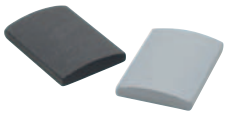
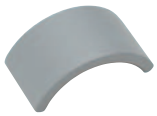
Please read *Important notes* on page 76.

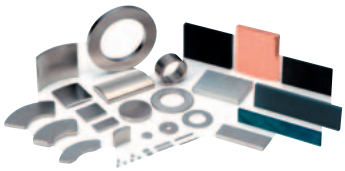
Magnets

Rare Earth Magnets – Nd-Fe-B Magnets

Rare Earth Magnets – Nd-Fe-B Magnets

		
Series	NEOREC series – NEOREC42B,NEOREC42SH material	NEOREC series – NEOREC41H material
Technical data	Residual flux density: 1300 ±30 … 1330 ±30 mT Coercive force: 979 ±56 … 987 ±56 kA/m Intrinsic coercive force: ≧1114 … ≧1671 kA/m Maximum energy product (BH) max: 326 ±16 … 334 ±16 kJ/m³	Residual flux density: 1300 ±30 mT Coercive force: 971 ±56 kA/m Intrinsic coercive force: ≧1353 kA/m Maximum energy product (BH) max: 326 ±16 kJ/m³
Features	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before
Applications	Renewable Energy (Wind power) Home appliances Automotive electronics	Renewable Energy (Wind power) Home appliances Automotive electronics

Rare Earth Magnets – Nd-Fe-B Magnets

		
Series	NEOREC series – NEOREC40H, NEOREC40TH NEOREC40UH material	NEOREC series – NEOREC38UH material
Technical data	Residual flux density: 1285 ±30 … 1330 ±30 mT Coercive force: 971 ±56 … 995 ±56 kA/m Intrinsic coercive force: ≧1353 … ≧2109 kA/m Maximum energy product (BH) max: 310 ±16 … 319 ±16 kJ/m³	Residual flux density: 1260 ±30 mT Coercive force: 963 ±56 kA/m Intrinsic coercive force: ≧1990 kA/m Maximum energy product (BH) max: 294 ±16 kJ/m³
Features	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before
Applications	Renewable Energy (Wind power) Home appliances Automotive electronics	Renewable Energy (Wind power) Home appliances Automotive electronics

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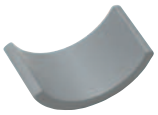
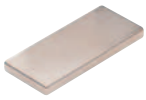
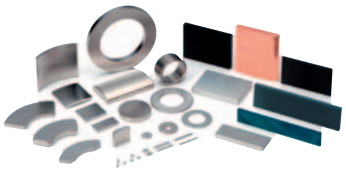
Magnets

Rare Earth Magnets – Nd-Fe-B Magnets

Rare Earth Magnets - Nd-Fe-B Magnets

		
Series	NEOREC series – NEOREC37H material	NEOREC series – NEOREC35NX, NEOREC35UX material
Technical data	Residual flux density: 1240 ±30 mT Coercive force: 923 ±56 kA/m Intrinsic coercive force: ≧1353 kA/m Maximum energy product (BH) max: 294 ±16 kJ/m³	Residual flux density: 1200 ±30 mT Coercive force: 920 ±56 … 923 ±56 kA/m Intrinsic coercive force: ≧2626 … ≧2388 kA/m Maximum energy product (BH) max: 271 ±16 … 278 ±16 kJ/m³
Features	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g /cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before	– Magnetic characteristics reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – Specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before
Applications	Renewable Energy (Wind power) Home appliances Automotive electronics	Renewable Energy (Wind power) Home appliances Automotive electronics

Rare Earth Magnets – Nd-Fe-B Magnets

	
Series	NEOREC series – NEOREC30EV material
Technical data	Residual flux density: 1140 ±30 mT Coercive force: 867 ±56 kA/m Intrinsic coercive force: ≧756 kA/m Maximum energy product (BH) max: 231 ±16 kJ/m³
Features	– Magnetic characteristics at the mass production level reach 49MGOe in maximum energy product (BH) max. achieving 50 to 80% higher performance than rare-earth cobalt magnet – The specific gravity is 7.4 g/cm³ more than 10% lower than that of rare-earth cobalt magnet. Ideal for meeting miniaturization and weight reduction needs – Higher mechanical strength such as bending and tensile strength than rare-earth cobalt magnets, making handling easier than before – Since the main raw materials are neodymium and iron, both abundant resources, stable supply is assured
Applications	Renewable Energy (Wind power) Home appliances Automotive electronics

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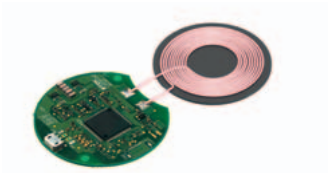
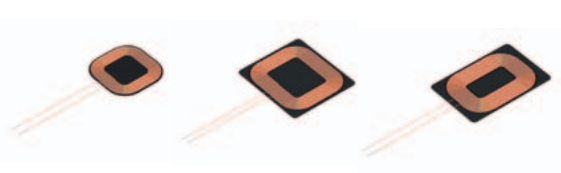
Wireless Charging

Wireless Charging

		
Series	Tx Coil units (WPC Compliant) WT505090-20K2-A10-G, WT505090-10K2-A11-G, WT525225-20K2-A1-G, WT1005690-12K2-A6-G	Small Tx Coil units WT151512-22F2-ID, WT202012-15F2-ID, WT303012-12F2-ID
Technical data	Size: ⌀50 mm 52.0 x 52.0/100.0 x 56.0 mm Inductance: 6.3 … 24.0 µH DC resistance: 0.06 … 0.10 Ω	Size: ⌀15.3 … 30.0 mm Inductance: 6.2 … 6.8 µH DC resistance: 0.095 … 0.18 Ω
Features	– Tx coil units for WPC low-power (5W) specification – Got WPC approval for ferrite sheet – Thinner flexible ferrite sheet type is available for durable construction – Performance had been confirmed based on WPC equipment	– Flexible sheet type is used – Custom design is available based on each design requirements
Applications	Various types of battery chargers (WPC compliant)	Smartphones, cellular phones, handheld mobile terminals, DSCs and wearable products.

Wireless Charging

		
Series	Tx Coil modules WTM505090-10K2-5V-G1	Rx Coil units WR303050-15F5-G, WR444025-17M6-G, WR444030-16F3-G WR483245-15F5-G, WR483265-15F5-G
Technical data	Size: ⌀50 mm Inductance: 6.3 µH DC resistance: 0.06 Ω	Size: 29.6 x 30.0/32.2 x 48.2/43.5 x 39.5 mm Inductance: 12.3 … 19.0 µH DC resistance: 0.2 … 0.7 Ω
Features	– This is Tx turnkey solution including transmitter coil. – Fully WPC compliant, including foreign object detection (FOD) method – 5V operation with wireless power consortium (WPC1.1) type A11 transmitter system – Pre cracked ferrite is available for durable construction	– Pre cracked ferrite is available for durable construction – Flexible sheet type is available – Custom design is available based on each design requirements
Applications	Smartphones, cellular phones, handheld mobile terminals, and DSCs	Smartphones, cellular phones, handheld mobile terminals, and DSCs

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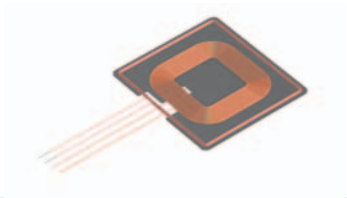
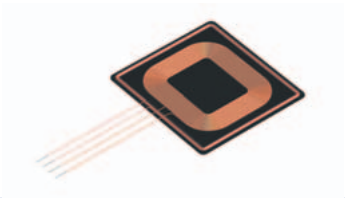
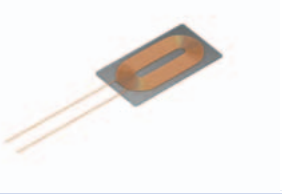
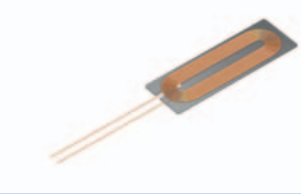
Wireless Charging

Wireless Charging

	 
Series	NFC Antenna combo Rx coil units WR524830-16F3-NF-G WR524825-17M6-NF-G
Technical data	Size: 52.0 x 48.0 mm Inductance: 16.8 … 19.5 µH DC resistance: 0.75 … 0.8 Ω
Features	– Receiving coils with wireless charging and NFC (Near Field Communication) antenna – Pre cracked ferrite is available for durable construction – Flexible sheet type is available – Custom design is available based on each design requirements
Applications	Smartphones, cellular phones, handheld mobile terminals, and DSCs

Wireless Charging

	  
Series	Small Rx coil units WR121210-27M8-ID, WR202010-18M8-ID, WR222230-26M8-G, WR221230-36M8-G, WR301025-19M8-G, WR303050-12F5-ID
Technical data	Size: ⌀12.0 … 22.0 mm 22.0 x 12.0/30.0 x 10.0/30.0 x 29.6 mm Inductance: 8.23 … 27.9 µH DC resistance: 0.28 … 1.27 Ω
Features	– Flexible sheet type is used – Custom design is available based on each design requirements
Applications	Smartphones, cellular phones, handheld mobile terminals, DSCs and wearable products.

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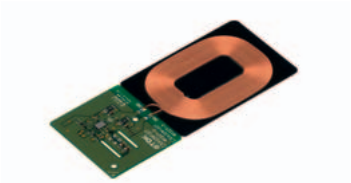
Please read *Important notes* on page 76.

Wireless Charging

Wireless Charging

	
Series	Rx Coil modules WRM483245-15F5-5V-G1 WRM483245-15F5-5V-G2
Technical data	Size: 76.0 x 32.0 mm Inductance: 13 µH DC resistance: 0.27 Ω
Features	– This is Rx turnkey solution including receiving coil with attractor and module for wireless charging – To achieve 5V x 1A output and operating fully WPC compliant – Pre cracked ferrite is available for durable construction – Flexible sheet type is available
Applications	Smartphones, cellular phones, handheld mobile terminals, and DSCs

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