

## Range of exhibits according to product groups

25th International Trade Fair, New Munich Trade Fair Centre, 13–16 Nov 2012, Tel. (+49 89) 9 49-2 03 31/2 03 13, info@electronica.de, www.electronica.de

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|-------------------------------------|---|---|---|
| <b>1</b> Semi-conductors            | <ul style="list-style-type: none"> <li>1.1 Diodes (including diode networks)</li> <li>1.2 Transistors</li> <li>1.3 Power semiconductor components</li> <li>1.4 Opto semiconductor components</li> <li>1.5 Accessories for discrete semiconductors</li> <li>1.6 Logic circuits</li> <li>1.7 Microprocessors (see Embedded systems)</li> <li>1.8 Memory (see Embedded systems)</li> <li>1.9 Application-specific ICs (ASSP)</li> <li>1.10 Data/signal transformer ICs</li> <li>1.11 ICs, special designs (including ASICs/CSICs)</li> </ul>                               | <b>9</b> Electro-mechanics/<br>System peripherals | <ul style="list-style-type: none"> <li>9.1 Switches and keyboards</li> <li>9.1.1 Switches for continuous connection</li> <li>9.1.2 Switches with additional functions</li> <li>9.1.3 Electrical keys</li> <li>9.1.4 Detector components</li> <li>9.1.5 Detector and signaling devices</li> <li>9.1.6 Keyboards</li> <li>9.1.7 Components and accessories for keyboards</li> <li>9.1.8 Initiation devices, manually activated</li> <li>9.1.9 Relays</li> <li>9.2 Interconnection components/systems</li> <li>9.2.1 Standardized connectors</li> <li>9.2.2 Connectors for specific handling</li> <li>9.2.3 Connectors, PCB-mountable</li> <li>9.2.4 Sockets</li> <li>9.2.5 Connectors, application-oriented</li> <li>9.2.6 Connectors for telecommunications</li> <li>9.2.7 Cables with connectors</li> <li>9.2.8 Connectors with additional functions</li> <li>9.2.9 Connectors, specific forms</li> <li>9.2.10 Miscellaneous connectors</li> <li>9.2.11 Accessories for connectors</li> <li>9.2.12 Specialized connection/connecting components</li> <li>9.2.13 Cables</li> <li>9.3 Specialized connection/connecting components</li> <li>9.3.1 System racks</li> <li>9.3.2 Build-in and desktop housings</li> <li>9.3.3 Small-scale housings</li> <li>9.3.4 Special housings</li> <li>9.3.5 Accessories for housings</li> <li>9.3.6 Thermal management</li> <li>9.3.7 Electronic protection devices (EMI/ESD)</li> </ul> |
| <b>2</b> Embedded systems           | <ul style="list-style-type: none"> <li>2.1 Development tools, software</li> <li>2.2 Development tools, hardware</li> <li>2.3 Hardware</li> <li>2.4 Peripheral systems</li> <li>2.5 DDI and other network-technology components</li> <li>2.6 Memories and memory peripherals</li> <li>2.7 System solutions</li> </ul>  | <b>10</b> Power supplies                          | <ul style="list-style-type: none"> <li>10.1 Transformers</li> <li>10.2 Coilware for specific applications</li> <li>10.3 Accessories for coilware</li> <li>10.4 Power supplies, DC output</li> <li>10.5 Power supplies, AC output</li> <li>10.6 Frequency converters</li> <li>10.7 UPS systems</li> <li>10.8 Special power supplies</li> <li>10.9 Batteries</li> <li>10.10 Static current supplies, miscellaneous</li> <li>10.11 Power management systems</li> <li>10.12 Accessories</li> </ul>  |
| <b>3</b> Displays                   | <ul style="list-style-type: none"> <li>3.1 Liquid Crystal Display (LCD)</li> <li>3.2 Plasma Display Panel (PDP)</li> <li>3.3 Cathode Ray Tube (CRT)</li> <li>3.4 Vacuum Fluorescent Display (VFD)</li> <li>3.5 Organic Light-Emitting Diode (OLED)</li> <li>3.6 EL Display</li> <li>3.7 Field Emission Display (FED)</li> <li>3.8 Light Emitting Diode (LED)</li> <li>3.9 Surface Conduction Emitter Display (SED)</li> <li>3.10 Projection display</li> <li>3.11 E-Paper</li> <li>3.12 Peripheral equipment for displays</li> </ul>                                    | <b>11</b> PCBs, other circuit carriers and EMS    | <ul style="list-style-type: none"> <li>11.1 Non-PTH single- and double-sided PCBs</li> <li>11.2 Double-sided PCBs, PTH</li> <li>11.3 Multilayer PCBs (ML)</li> <li>11.4 Special PCBs</li> <li>11.5 Ceramic PCBs</li> <li>11.6 PCBs for backplanes/bus systems</li> <li>11.7 EMS Electronic manufacturing services</li> <li>11.8 Prototyping</li> <li>11.9 Accessories for PCBs</li> </ul>   |
| <b>4</b> Micronano-systems          | <ul style="list-style-type: none"> <li>4.1 Microsystems</li> <li>4.2 MEMS</li> <li>4.3 Nanotechnologie</li> </ul>   | <b>12</b> Assemblies and subsystems               | <ul style="list-style-type: none"> <li>12.1 Assemblies for control applications</li> <li>12.2 Printer assemblies</li> <li>12.3 Assemblies, miscellaneous</li> <li>12.4 Hybrid modules (including multi-chip modules)</li> <li>12.5 Servo-technology/Drive elements</li> </ul>   |
| <b>5</b> Sensor technology          | <ul style="list-style-type: none"> <li>5.1 Sensors for geometrical parameters</li> <li>5.2 Sensors for mechanical parameters</li> <li>5.3 Sensors for time and time-based parameters</li> <li>5.4 Sensors for temperature and caloric parameters</li> <li>5.5 Sensors for climatic parameters</li> <li>5.6 Sensors for optical and acoustic parameters</li> <li>5.7 Sensors for electrical and magnetical parameters</li> <li>5.8 Sensors for chemical parameters</li> <li>5.9 Sensors for biological parameters</li> <li>5.10 Sensor elements by technology</li> </ul> | <b>13</b> Automotive                              | <ul style="list-style-type: none"> <li>13.1 Drive (engine and gears)</li> <li>13.2 Chassis/Steering</li> <li>13.3 Brake</li> <li>13.4 Interior/Comfort</li> <li>13.5 Body/Safety</li> <li>13.6 Active safety</li> <li>13.7 Electrical on-board power supply</li> <li>13.8 Construction and test</li> </ul>  |
| <b>6</b> Test and measurement       | <ul style="list-style-type: none"> <li>6.1 Measuring/testing of geometric parameters</li> <li>6.2 Measuring/testing of geometric parameters</li> <li>6.3 Time and time-based parameters</li> <li>6.4 Thermal units</li> <li>6.5 Environmental parameters</li> <li>6.6 Chemical and biological parameters</li> <li>6.7 Optical and acoustical parameters</li> <li>6.8 Image/pattern recognition and processing</li> <li>6.9 Electrical parameters</li> <li>6.10 Specialized laboratory/test equipment</li> </ul>   | <b>14</b> Wireless                                | <ul style="list-style-type: none"> <li>14.1 Cellular systems</li> <li>14.2 Non-cellular systems</li> <li>14.3 Wireless applications</li> <li>14.4 Business partners</li> </ul>  |
| <b>7</b> Electronic Design (ED/EDA) | <ul style="list-style-type: none"> <li>7.1 CAD/CAE tools</li> <li>7.2 Generation software</li> <li>7.3 Test software</li> <li>7.4 Software for special applications</li> <li>7.5 Peripheral equipment for ED/EDA environments</li> <li>7.6 ED/EDA services</li> <li>7.7 Design and development systems</li> </ul>   | <b>15</b> Information gathering and services      | <ul style="list-style-type: none"> <li>15.1 Information</li> <li>15.2 Approval testing and other services</li> <li>15.3 Start-up Forum</li> </ul>   |
| <b>8</b> Passive components         | <ul style="list-style-type: none"> <li>8.1 Inductors and accessories</li> <li>8.2 Capacitors</li> <li>8.3 Resistors (including R networks)</li> <li>8.4 Radiofrequency and microwave components</li> <li>8.5 Polymer components</li> <li>8.6 Nonlinear high-voltage components</li> <li>8.7 Passive components, miscellaneous</li> <li>8.8 Piezoelectric components</li> <li>8.9 Magnetic and electronic ceramic products</li> </ul>  |   |   |

<b>1.1</b>	<b>Diodes (including diode networks)</b>	1.3.4.7	Relay drivers	1.9.4.3	Video ICs, mixed signal
1.1.1	Tuner diodes	1.3.4.8	Semiconductor relays	1.9.4.4	Multimedia chip sets
1.1.2	Avalanche diodes	<b>1.4</b>	<b>Opto semiconductor components</b>	1.9.4.5	Speech processing ICs
1.1.3	Diode networks	1.4.1	LEDs	1.9.4.6	Microphone amplifiers
1.1.4	Rectifier diodes, RF	1.4.2	Laser diodes	1.9.4.7	Audio frequency amplifier ICs
1.1.5	Gunn diodes	1.4.3	Photo ASICs	<b>1.9.5</b>	<b>ICs with switch/control function</b>
1.1.6	Capacitance diodes	1.4.4	Photodetectors	1.9.5.1	Switching regulator ICs
1.1.7	Low signal diodes	1.4.5	Photodiodes	1.9.5.2	Battery backup switch ICs
1.1.8	Microwave diodes	1.4.6	Photo logic	1.9.5.3	ICs with switch/control function
1.1.9	Mixer diodes	1.4.7	Photosensor fields	<b>1.9.6</b>	<b>Application-specific ICs, miscellaneous</b>
1.1.10	Mains diodes	1.4.8	Phototransistors	1.9.6.1	Low-power ICs
1.1.11	PIN diodes	1.4.9	Photo reproduction equipment	1.9.6.2	Low-voltage ICs
1.1.12	Reference diodes	1.4.10	Photovoltaic elements	1.9.6.3	High-voltage circuits (HVICs)
1.1.13	Current-regulated diodes (CRD)	1.4.11	Photoresistors	1.9.6.4	ICs for electric clocks
1.1.14	Switching diodes	1.4.12	Infrared products	1.9.6.5	Chip sets, miscellaneous
1.1.15	Schottky diodes	1.4.13	Integrated optical products, miscellaneous	<b>1.10</b>	<b>Data/signal transformer ICs</b>
1.1.16	Signal diodes	1.4.14	Laser components	<b>1.10.1</b>	<b>Signal converter ICs</b>
1.1.17	Stabilizer diodes	1.4.15	Luminescent foils	1.10.1.1	Analog/digital converter ICs
1.1.18	Step-recovery diodes	1.4.16	Opto couplers	1.10.1.2	Digital/analog converter ICs
1.1.19	Universal diodes	1.4.17	Photonics components, miscellaneous	1.10.1.3	Frequency converter ICs with analog output
1.1.20	Varactor diodes	1.4.18	Transceivers, electro-optical	1.10.1.4	Voltage/frequency converter ICs
1.1.21	Four-layer diodes	1.4.19	CCD components	<b>1.10.2</b>	<b>Power ICs</b>
1.1.22	Z diodes	1.4.20	Optomos switches	1.10.2.1	DC/DC converter ICs
1.1.23	Rectifier bridges	1.4.21	Opto semiconductor components, miscellaneous	1.10.2.2	Converter ICs, miscellaneous
1.1.24	Infrared diodes (IRED)	<b>1.5</b>	<b>Accessories for discrete semiconductors</b>	<b>1.10.3</b>	<b>Amplifier ICs</b>
1.1.25	Light-emitting diodes (LED)	1.5.1	Transistor clips	1.10.3.1	Measurement amplifier ICs
1.1.26	Photodiodes	1.5.2	Accessories, other	1.10.3.2	Log amplifier ICs
1.1.27	Diodes, miscellaneous	<b>1.6</b>	<b>Logic circuits</b>	1.10.3.3	Sample and hold amplifier ICs
<b>1.2</b>	<b>Transistors</b>	<b>1.6.1</b>	<b>ECL circuits</b>	1.10.3.4	Line driver ICs
1.2.1	Field effect transistors (FET/MOSFET)	1.6.1.1	Programmable logic circuits (PLD/PAL)	1.10.3.5	Repeater ICs
1.2.2	GaAs transistors	1.6.1.2	Standard ECL circuits, miscellaneous	1.10.3.6	Power amplifier ICs
1.2.3	Low-frequency transistors	1.6.1.3	Driver ICs	1.10.3.7	Amplifier ICs, miscellaneous
1.2.4	High-frequency transistors	<b>1.6.2</b>	<b>TTL circuits</b>	<b>1.11</b>	<b>ICs, special designs (including ASICs/CSICs)</b>
1.2.5	Microwave transistors	1.6.2.1	Erasable, programmable logic circuits (EPLD)	<b>1.11.1</b>	<b>Passive ICs</b>
1.2.6	High-voltage transistors	1.6.2.2	Standard TTL circuits, miscellaneous	1.11.1.1	Digital potentiometer ICs
1.2.7	Low-signal transistors	1.6.2.3	Driver ICs	1.11.1.2	Standard cell ICs
1.2.8	Circuit transistors	<b>1.6.3</b>	<b>MOS and CMOS circuits</b>	1.11.1.3	Mixed-mode ASICs
1.2.9	SM-capable transistors	1.6.3.1	Gate arrays	<b>1.11.2</b>	<b>Active ICs</b>
1.2.10	Transistors, miscellaneous	1.6.3.2	Erasable, programmable logic circuits (EPLD)	1.11.2.1	Embedded control ICs
<b>1.3</b>	<b>Power semiconductor components</b>	1.6.3.3	Programmable logic circuits (PLD/PAL)	1.11.2.2	SmartCard products
<b>1.3.1</b>	<b>Power transistors</b>	1.6.3.4	Standard ECL circuits, miscellaneous	1.11.2.3	Controller ICs, analog
1.3.1.1	Bipolar transistors	1.6.3.5	Driver ICs	<b>1.11.3</b>	<b>RF and microwave ICs</b>
1.3.1.2	Darlington transistors	<b>1.6.4</b>	<b>Logic circuits, miscellaneous</b>	1.11.3.1	GaAs ASICs
1.3.1.3	IGBTs	1.6.4.1	FPGA ASICs	1.11.3.2	Mixer ICs
1.3.1.4	IEGTs	1.6.4.2	Freely programmable logic (FPLA)	1.11.3.3	Delay lines, active
1.3.1.5	FETs	<b>1.7</b>	<b>Microprocessors (see Embedded systems)</b>	1.11.3.4	Filter ICs
1.3.1.6	MOSFETs	<b>1.8</b>	<b>Memory (see Embedded systems)</b>	1.11.3.5	RF amplifier ICs
1.3.1.7	Power MOSFETs	<b>1.9</b>	<b>Application-specific ICs (ASSP)</b>	1.11.3.6	Coupler ICs
1.3.1.8	Switching transistors	<b>1.9.1</b>	<b>Multiplexer ICs</b>	1.11.3.7	RF and microwave ICs, miscellaneous
1.3.1.9	GaAs transistors	1.9.1.1	Multiplexer ICs for digital signals	<b>1.11.4</b>	<b>Customized ICs</b>
1.3.1.10	RF power transistors	1.9.1.2	Multiplexer ICs for analog signals	1.11.4.1	Customized analog ICs
1.3.1.11	High-voltage transistors	<b>1.9.2</b>	<b>Radio link ICs</b>	1.11.4.2	Customized digital ICs
1.3.1.12	Transistors, miscellaneous	1.9.2.1	Transceiver ICs	1.11.4.3	Application-specific ICs (ASICs)
<b>1.3.2</b>	<b>Thyristors</b>	1.9.2.2	Transponder ICs	1.11.4.4	Building block ICs
1.3.2.1	TRIAC sets	1.9.2.3	Receiver circuits	1.11.4.5	Control circuits, application-specific
1.3.2.2	DIACs	<b>1.9.3</b>	<b>Telecom ICs</b>	1.11.4.6	Flip chip ICs
1.3.2.3	SCRs	1.9.3.1	Mixed-signal ICs	<b>1.11.5</b>	<b>Linear special circuits</b>
1.3.2.4	Thyristors, miscellaneous	1.9.3.2	Data switching ICs	1.11.5.1	Comparator ICs
<b>1.3.3</b>	<b>Power semiconductor modules</b>	1.9.3.3	ISDN-ICs	1.11.5.2	ICs for analog/linear tasks, miscellaneous
1.3.3.1	IGBT modules	1.9.3.4	Filter ICs	1.11.5.3	Inverter ICs
1.3.3.2	MOSFET modules	1.9.3.5	PLL Clock synthesizers for SONET	1.11.5.4	Regulator ICs (static signal)
1.3.3.3	Power hybrid modules	1.9.3.6	Signal conditioning ICs, miscellaneous	1.11.5.5	Voltage regulator ICs
1.3.3.4	RF power modules	1.9.3.7	CDMA chip sets		
1.3.3.5	Diode/thyristor modules	1.9.3.8	DBV chip sets		
1.3.3.6	MCT modules	1.9.3.9	Modem ICs		
1.3.3.7	IPMs	1.9.3.10	Telecom ICs, miscellaneous		
1.3.3.8	Power semiconductor modules, miscellaneous	<b>1.9.4</b>	<b>ICs for audio/video applications</b>		
<b>1.3.4</b>	<b>Power semiconductor components, miscellaneous</b>	1.9.4.1	Video decoder ICs		
1.3.4.1	Charge controller ICs	1.9.4.2	Video ICs, analog		
1.3.4.2	SmartPower components				
1.3.4.3	Power diodes				
1.3.4.4	Power factor correction ICs				
1.3.4.5	Selenium rectifiers				
1.3.4.6	Motor drivers				

<b>2.1</b>	<b>Development tools, software</b>	2.3.4.5	Digital filter ICs	<b>2.6</b>	<b>Memories and memory peripherals</b>
2.1.1	Real-time operating systems	2.3.4.6	Interpolation circuits	<b>2.6.1</b>	<b>Memories for workstations and PCs</b>
2.1.2	Compilers	2.3.4.7	DSPs (Digital Signal Processors)	2.6.1.1	Dynamic RAMs (DRAM)
2.1.3	Cross software	<b>2.4</b>	<b>Peripheral systems</b>	2.6.1.2	Static RAMs (SRAM)
2.1.4	Debuggers	<b>2.4.1</b>	<b>CPU peripheral assemblies</b>	2.6.1.3	Cache RAMs
2.1.5	Simulators	2.4.1.1	Magnetic card readers	2.6.1.4	RAMs (read/write memories)
2.1.6	Network access/embedded networking	2.4.1.2	Scanners	2.6.1.5	Video memories
2.1.7	Software documentation and quality assurance	2.4.1.3	Chip card interfaces	2.6.1.6	Combo memory modules
2.1.8	Real-time high-level language debuggers	2.4.1.4	Chip card readers	2.6.1.7	Memories, miscellaneous
2.1.9	IEC 1131-3 development systems	2.4.1.5	CD-ROM drives	<b>2.6.2</b>	<b>Memories for other uses</b>
2.1.10	CASE tools	2.4.1.6	Disk drives	2.6.2.1	Memory cards
2.1.11	Real-time software tools	2.4.1.7	Hard disks	2.6.2.2	FIFO memories
2.1.12	HLL debuggers for emulators	2.4.1.8	CPU peripheral assemblies, miscellaneous	2.6.2.3	Nonvolatile memories
2.1.13	Embedded TCP/IP stacks	2.4.1.9	Computer main boards	2.6.2.4	Programmable read-only memories (PROM/EPROM)
2.1.14	Development tools for Internet applications for windowing systems	2.4.1.10	Interface converters for serial interfaces	2.6.2.5	Erasable read-only memories (EROM/EEROM/E2ROM)
2.1.15	In-system programming (FLASH/OTP)	2.4.1.11	Graphics subsystems	2.6.2.6	Registers and other memory products
2.1.16	Microprocessor development systems	2.4.1.12	Memory boards	2.6.2.7	ROMs (read-only memories), miscellaneous
2.1.17	Development systems, software, miscellaneous	2.4.1.13	VME bus assemblies/modules	<b>2.7</b>	<b>System solutions</b>
<b>2.2</b>	<b>Development tools, hardware</b>	2.4.1.14	CAN bus modules	2.7.1	Fully equipped industrial PCs
2.2.1	Starter kits	2.4.1.15	LIN bus modules	2.7.2	PC assemblies
2.2.2	Development assemblies	2.4.1.16	Input/output modules	2.7.3	VME bus PCs
2.2.3	Development systems	2.4.1.17	PC-card modules	2.7.4	Compact PCI Systems
2.2.4	Programming equipment	2.4.1.18	Assemblies/modules, miscellaneous	2.7.5	Real-time platforms
2.2.5	In-circuit simulators	<b>2.4.2</b>	<b>Modulators</b>	2.7.6	Industrial PCs, miscellaneous
2.2.6	Background debug mode tools	2.4.2.1	Modems, single-chip	2.7.7	Memory modules
2.2.7	Microprocessor tracers	2.4.2.2	QPSK modulators	2.7.8	Modems
2.2.8	Pentium processor debug tools	<b>2.4.3</b>	<b>Coders/decoders</b>	2.7.9	Carriers
2.2.9	Development tools, hardware, miscellaneous	2.4.3.1	MPEG coder/decoder ICs	2.7.10	Software
<b>2.3</b>	<b>Hardware</b>	2.4.3.2	Voice coder/decoder ICs	2.7.11	I/O modules
<b>2.3.1</b>	<b>Microprocessors</b>	2.4.3.3	CODEC ICs, miscellaneous	2.7.12	CAN bus modules
2.3.1.1	8 bit processors	2.4.4	<b>ICs for bus systems</b>	2.7.13	Ethernet modules
2.3.1.2	16 bit processors	2.4.4.1	Ethernet chip sets	2.7.14	PC cards, miscellaneous
2.3.1.3	32 bit processors	2.4.4.2	LAN controllers		
2.3.1.4	64 bit processors	2.4.4.3	Bus controller ICs		
2.3.1.5	RISC processors	2.4.4.4	Transmission systems chip sets		
2.3.1.6	Crypto-controllers	2.4.4.5	ATM chip sets		
2.3.1.7	Multiprocessor ICs	2.4.4.6	PCI interface ICs		
2.3.1.8	Microprocessor cores	2.4.4.7	PCI bridge chips		
2.3.1.9	x86 processors	2.4.4.8	USB ICs		
2.3.1.10	Processors with Multi Media Extention, MMX	2.4.4.9	Bus-oriented ICs, miscellaneous		
2.3.1.11	Graphics processors	<b>2.5</b>	<b>DDI and other network-technology components</b>		
2.3.1.12	Coprocessors	<b>2.5.1</b>	<b>Network subsystems</b>		
2.3.1.13	Microprocessors, miscellaneous	2.5.1.1	LAN assemblies		
<b>2.3.2</b>	<b>Microcontrollers</b>	2.5.1.2	Wireless LAN configurations		
2.3.2.1	8 bit microcontrollers	2.5.1.3	Field-bus assemblies		
2.3.2.2	16 bit microcontrollers	2.5.1.4	Profibus assemblies		
2.3.2.3	32 bit microcontrollers	2.5.1.5	CAN interfaces		
2.3.2.4	64 bit microcontrollers	2.5.1.6	Fiberglass/plastic components		
2.3.2.5	Application-specific controllers	2.5.1.7	ATM network components		
2.3.2.6	CAN controllers	2.5.1.8	Fiber-optic terminal devices		
2.3.2.7	ARINC controllers	2.5.1.9	Fiber-optic cables/leads		
2.3.2.8	Controllers, miscellaneous	2.5.1.10	Fiber-optic multi-fiber connectors		
<b>2.3.3</b>	<b>Microcomputers</b>	2.5.1.11	Fiber-optic rotary couplers		
2.3.3.1	Embedded PCs	2.5.1.12	Fiber-optic interfaces		
2.3.3.2	PC 14 boards	2.5.1.13	Fiber-optic splice connectors		
2.3.3.3	DSP boards	2.5.1.14	Fiber-optic connection systems, miscellaneous		
2.3.3.4	Single-board computers	2.5.1.15	Wireless LAN configurations		
<b>2.3.4</b>	<b>Digital signal processors</b>	2.5.1.16	Profibus assemblies		
2.3.4.1	Digital signal processors (DSP)	2.5.1.17	Subsystems, miscellaneous		
2.3.4.2	FPGA-based DSPs	<b>2.5.2</b>	<b>Interfaces</b>		
2.3.4.3	Real-time clock ICs	2.5.2.1	LON assemblies		
2.3.4.4	Supervisory ICs	2.5.2.2	SCSI interfaces		
		2.5.2.3	WAN assemblies		
		2.5.2.4	Interfaces, miscellaneous		

## 3 Displays

<b>3.1</b>	<b>Liquid Crystal Display (LCD)</b>	3.5.3	LEP displays	<b>3.11</b>	<b>E-Paper</b>
3.1.1	LCD monitors	3.5.4	Polymer light-emitting diodes (PLED)	3.11.1	EP monitors
3.1.2	LCD displays, passive (STN, DSTN)	3.5.5	Small-molecule OLEDs (SMOLED)	3.11.2	EP display elements
3.1.3	LCD displays, active (TFT)	<b>3.6</b>	<b>EL Display</b>	<b>3.12</b>	<b>Peripheral equipment for displays</b>
3.1.4	Liquid crystal display elements	3.6.1	ELD monitors	3.12.1	Signaling and illuminating elements
<b>3.2</b>	<b>Plasma Display Panel (PDP)</b>	3.6.2	EL display elements	3.12.1.1	Light emitting diodes (LED)
3.2.1	Plasma monitors	<b>3.7</b>	<b>Field Emission Display (FED)</b>	3.12.1.2	Bicolor display elements
3.2.2	Plasma display elements	3.7.1	FED monitors	3.12.1.3	Cold Cathode Fluorescent Lamp (CCFL)
<b>3.3</b>	<b>Cathode Ray Tube (CRT)</b>	3.7.2	Field emission display elements	3.12.1.4	EL lamps
3.3.1	CRT monitors	<b>3.8</b>	<b>Light Emitting Diode (LED)</b>	3.12.1.5	Background lighting for LCD
3.3.2	Cathode Ray Tube	3.8.1	LED monitors	3.12.2	Display mountings
<b>3.4</b>	<b>Vacuum Fluorescent Display (VFD)</b>	3.8.2	LED display elements	3.12.3	AD signal processor
3.4.1	VFD monitors	<b>3.9</b>	<b>Surface Conduction Emitter Display (SED)</b>	3.12.4	Touch panel
3.4.2	Vacuum Fluorescent Display Elements	3.9.1	SED monitors	3.12.5	Inverter LCD
<b>3.5</b>	<b>Organic Light-Emitting Diode (OLED)</b>	3.9.2	SE display elements	3.12.6	Inverter TFT
3.5.1	OLED monitors	<b>3.10</b>	<b>Projection display</b>	3.12.7	Display interconnection systems/components
3.5.2	OLED displays	3.10.1	Projection display monitors	3.12.8	Power supplies
		3.10.2	Projection display elements	3.12.9	Display filters

## 4 Micronano-systems

<b>4.1</b>	<b>Microsystems</b>	<b>4.2</b>	<b>MEMS</b>	4.2.4.3	Linear microactuators
4.1.1	Microswitches	4.2.1	RF MEMS	4.2.4.4	MEMS actuators, miscellaneous
4.1.2	Micro-optics	4.2.1.1	Switches	4.2.5	<b>Bio MEMS</b>
4.1.2.1	Glasses	4.2.1.2	Capacitors	4.2.5.1	Microfluidic
4.1.2.2	Polymers	4.2.1.3	Tunable capacitors	4.2.5.2	Microelectrode for organic materials
4.1.2.3	Fiber optics	4.2.1.4	Micromechanical resonators	4.2.5.3	Bio sensors
4.1.2.4	Mirror systems	4.2.1.5	Cavity resonators	4.2.5.4	Electrochemical sensors
4.1.2.5	Micro-optics, miscellaneous	4.2.1.6	FBAR resonators	4.2.5.5	Bio MEMS, miscellaneous
4.1.3	Mounting, housing and bonding technology	4.2.1.7	Micromachined antennas	4.2.6	<b>MEMS packaging technology and services</b>
4.1.4	Microsensor systems	4.2.1.8	Phase shifters	4.2.6.1	Single-Chip Packaging (SCP)
4.1.4.1	GMR magnetic bridge sensors	4.2.1.9	RF MEMS, miscellaneous	4.2.6.2	Wafer-based SCP
4.1.4.2	Optical sensors	4.2.2	<b>Optical MEMS</b>	4.2.6.3	Wafer Level Packaging
4.1.4.3	Chemical FET	4.2.2.1	2D optical switches	4.2.6.4	MEMS packaging technology and services, miscellaneous
4.1.4.4	Metal-oxide film gas sensors	4.2.2.2	3D optical switches	<b>4.3</b>	<b>Nanotechnologie</b>
4.1.4.5	Microsensor systems, miscellaneous	4.2.2.3	OXC Optical Cross Connects		
4.1.5	Microactuators	4.2.2.4	VOA (Variable Optical Attenuators)		
4.1.5.1	Electrostatic MAs	4.2.2.5	Mux/Demux modules		
4.1.5.2	Electromagnetic MAs	4.2.2.6	Add/Drop modules		
4.1.5.3	Piezoelectric MAs	4.2.2.7	AWG (Arrayed Waveguides)		
4.1.6	Microactuators, miscellaneous	4.2.2.8	V grooves		
4.1.7	Microsubsystems	4.2.2.9	Fibre-alignment parts		
4.1.7.1	Microvalves	4.2.2.10	Microoptical lenses		
4.1.7.2	Micropumps	4.2.2.11	Optical bench		
4.1.7.3	Micromixers	4.2.2.12	Micromirrors		
4.1.7.4	Microspectrometers	4.2.2.13	Microspectrometer		
4.1.7.5	Microgears	4.2.2.14	Image sensors		
4.1.7.6	Microsubsystems, miscellaneous	4.2.2.15	Optical MEMS, miscellaneous		
4.1.8	Development and simulation tools for microsystems	4.2.3	<b>MEMS sensors</b>		
4.1.8.1	Layout systems, 3D	4.2.3.1	Single-axis accelerometers		
4.1.8.2	Hardware description languages	4.2.3.2	Multiple-axis accelerometers		
4.1.8.3	Simulation of production processes	4.2.3.3	Angular accelerometers		
4.1.8.4	Component simulation and analysis	4.2.3.4	Gyroscopes (rotation)		
4.1.8.5	Functional simulation	4.2.3.5	Piezoresistive pressure		
4.1.8.6	System simulation	4.2.3.6	Capacitive pressure		
4.1.8.7	EMI simulation	4.2.3.7	Mass flow (gas)		
4.1.8.8	Development and simulation tools for microsystems, miscellaneous	4.2.3.8	Mass flow (liquid)		
4.1.9	Test and measurement equipment for microsystems	4.2.3.9	Fingerprint sensors		
4.1.10	Components for sensors and microsystems	4.2.3.10	Micromachined microphones		
		4.2.3.11	MEMS sensors, miscellaneous		
		4.2.4	<b>MEMS actuators</b>		
		4.2.4.1	Micronozzles		
		4.2.4.2	Microvalves		

## 5 Sensor technology

<b>5.1</b>	<b>Sensors for geometrical parameters</b>	<b>5.4</b>	<b>Sensors for temperature and caloric parameters</b>	<b>5.7</b>	<b>Sensors for electrical and magnetical parameters</b>
5.1.1	Angle, location	5.4.1	Temperature, temperature distribution	5.7.1	Voltage, current
5.1.2	Rotary encoders	5.4.2	Heat, heat distribution, thermal conductivity	5.7.2	Charge, capacitance
5.1.3	Inclination, tilt	5.4.3	Other parameters	5.7.3	Field strength
5.1.4	Distance, length, elevation	<b>5.5</b>	<b>Sensors for climatic parameters</b>	5.7.4	Resistance, conductivity
5.1.5	Level, depth	5.5.1	Humidity (gas), evaporation, precipitation, dew point, condensation	5.7.5	Inductivity
5.1.6	Coat thickness, roughness	5.5.2	Humidity (solid matter)	5.7.6	Power, energy
5.1.7	Position, contour (2D/3D)	5.5.3	Particle density	5.7.7	Other parameters
5.1.8	Other parameters	5.5.4	Wind direction, wind force, wind velocity	<b>5.8</b>	<b>Sensors for chemical parameters</b>
<b>5.2</b>	<b>Sensors for mechanical parameters</b>	5.5.5	Barometric pressure	<b>5.9</b>	<b>Sensors for biological parameters</b>
5.2.1	Force, torque, torsion, stress	5.5.6	Room climate	<b>5.10</b>	<b>Sensor elements by technology</b>
5.2.2	Pressure (gauge, absolute, differential)	5.5.7	Other parameters	5.10.1	Potentiometer and resistive sensor elements
5.2.3	Mass, density, volume	5.5.8	CO2 sensor	5.10.2	Inductive
5.2.4	Extension, tension	<b>5.6</b>	<b>Sensors for optical and acoustic parameters</b>	5.10.3	Capacitive
5.2.5	Hardness, elasticity, viscosity	5.6.1	Light intensity	5.10.4	Optoelectronic
5.2.6	Other parameters	5.6.2	Radiation	5.10.5	Magnetic
<b>5.3</b>	<b>Sensors for time and time-based parameters</b>	5.6.3	Opacity, absorption, transmission	5.10.6	Piezo electrical
5.3.1	Time, duration, time constants	5.6.4	Refraction, reflexion, remission, brilliancy	5.10.7	Ultrasonic
5.3.2	Wavelength, frequency, oscillation, rmp	5.6.5	Chromaticity	5.10.8	UV and IR
5.3.3	Speed	5.6.6	Image detection, image evaluation	5.10.9	Laser
5.3.4	Acceleration, vibration, shock	5.6.7	Sound, solid-borne sound, volume	5.10.10	Radar
5.3.5	Event counting, occurrence	5.6.8	Other parameters	5.10.11	X-rays
5.3.6	Flow, volume, current (gases)			5.10.12	Biometric
5.3.7	Flow, volume, current (liquids)			5.10.13	Other technologies
5.3.8	Other parameters				

## 6 Test and measurement

<b>6.1</b>	<b>Measuring/testing of geometric parameters</b>		recognition	6.9.1.4.7	Detectors
6.1.1	Linear measurement devices	6.8.4	Optical inspection systems	6.9.1.4.8	Power splitters
6.1.2	GPS positioning systems	6.8.5	Technical endoscopes	6.9.1.4.9	Couplers
<b>6.2</b>	<b>Measuring/testing of geometric parameters</b>	6.8.6	Equipment for image/pattern recognition and processing, miscellaneous	6.9.1.4.10	Test sets
6.2.1	Torque measurement equipment	<b>6.9</b>	<b>Electrical parameters</b>	6.9.1.4.11	Noise generators
6.2.2	Force meters	<b>6.9.1</b>	<b>Analog measurement techniques</b>	6.9.1.4.12	RF measurement cables
6.2.3	Pressure meters	<b>6.9.1.1</b>	<b>RF measurement equipment</b>	6.9.1.5	<b>Audio measurement equipment</b>
6.2.4	Scale equipment	6.9.1.1.1	Frequency counters	6.9.1.5.1	Level meters
6.2.5	Mechanical parameters, miscellaneous	6.9.1.1.2	Power meters	6.9.1.5.2	Distortion factor measurement devices
<b>6.3</b>	<b>Time and time-based parameters</b>	6.9.1.1.3	Spectrum analyzers	6.9.1.5.3	Signal analyzers, also FFT
6.3.1	Acceleration meters	6.9.1.1.4	Reflectometers	6.9.1.5.4	Signal generators
6.3.2	RPM measurement	6.9.1.1.5	Measurement receivers	<b>6.9.1.6</b>	<b>General-purpose measurement equipment</b>
6.3.3	Speed measurement	6.9.1.1.6	Network analyzers, scalar	6.9.1.6.1	Voltmeters
6.3.4	Time/frequency distribution equipment (networks)	6.9.1.1.7	Network analyzers, vector	6.9.1.6.2	Current meters
6.3.5	Time counters	6.9.1.1.8	Signal generators	6.9.1.6.3	Power meters
6.3.6	Frequency and time standards	6.9.1.1.9	Sweep generators	6.9.1.6.4	Multimeters, voltmeters
<b>6.4</b>	<b>Thermal units</b>	6.9.1.1.10	Noise-figure meters	6.9.1.6.5	Signal generators
6.4.1	Temperature meters	6.9.1.1.11	Measurement equipment for electrical/magnetic parameters, miscellaneous	6.9.1.6.6	Function generators
6.4.2	Micro-thermographs without contact	<b>6.9.1.2</b>	<b>Microwave measurement equipment</b>	6.9.1.6.7	Pulse generators
<b>6.5</b>	<b>Environmental parameters</b>	<b>6.9.1.3</b>	<b>EMI measurement techniques</b>	6.9.1.6.8	Arbitrary waveform generators
6.5.1	Humidity meters, relative air	6.9.1.3.1	EMI measurement receivers	6.9.1.6.9	Oscilloscopes
6.5.2	Shock, vibration meters	6.9.1.3.2	EMI test systems	6.9.1.6.10	Resistance meters
<b>6.6</b>	<b>Chemical and biological parameters</b>	6.9.1.3.3	EMC test-site equipment	6.9.1.6.11	Impedance meters
<b>6.7</b>	<b>Optical and acoustical parameters</b>	6.9.1.3.4	Field-strength measurement devices	6.9.1.6.12	Capacitance meters
6.7.1	Optical spectrum analyzers	6.9.1.3.5	Probes	6.9.1.6.13	Inductance meters
6.7.2	Optical time domain reflectometers	6.9.1.3.6	Antennas	6.9.1.6.14	Transient-value recorders
6.7.3	Optical power meters	6.9.1.3.7	ESD testers	6.9.1.6.15	Transmission-time measurement devices
6.7.4	Optical network analyzers	6.9.1.3.8	Magnetic-field measurement equipment	6.9.1.6.16	Energy-consumption measurement
6.7.5	Optical polarization analyzers	6.9.1.3.9	Standards for electrical/magnetic parameters	6.9.1.6.17	Powerline measurement equipment IEC 1000-3-3
6.7.6	Optical signal generators	6.9.1.3.10	LISNs	6.9.1.6.18	Power analyzers/disturbance analyzers
6.7.7	Optical amplifiers	6.9.1.3.11	Power amplifiers	6.9.1.6.19	Measurement equipment, miscellaneous
6.7.8	Optical multimeters	6.9.1.3.12	Surge and burst test equipment	<b>6.9.1.7</b>	<b>Current sinks</b>
6.7.9	Fiber optic measurement equipment, miscellaneous	6.9.1.3.13	Testing electrical/magnetic properties, other devices for	6.9.1.7.1	Resistive loads
6.7.10	Sound level meters	<b>6.9.1.4</b>	<b>Accessories for RF and <math>\mu</math>W measurement equipment</b>	6.9.1.7.2	Inductive loads
<b>6.8</b>	<b>Image/pattern recognition and processing</b>	6.9.1.4.1	Measurement bridges	6.9.1.7.3	Capacitive loads
6.8.1	Image-processing software	6.9.1.4.2	Reflection bridges	6.9.1.7.4	Variable loads
6.8.2	Identification systems	6.9.1.4.3	Calibration kits	6.9.1.7.5	Programmable loads
6.8.3	Lighting systems for image/pattern	6.9.1.4.4	Power sensors	<b>6.9.1.8</b>	<b>Hand-held measurement equipment</b>
		6.9.1.4.5	High-frequency test tips	6.9.1.8.1	Multimeters
		6.9.1.4.6	Attenuators	6.9.1.8.2	Oscilloscopes
				6.9.1.8.3	LWL multimeters
				<b>6.9.2</b>	<b>Digital measurement equipment</b>
				6.9.2.1	Logic analyzers

## 6 Test and measurement

6.9.2.2	Logic generators, word generators	6.9.6.6	In-circuit testers	6.9.8.9	Measured-value amplifiers
6.9.2.3	Embedded software and verification tools	6.9.6.7	Functional testers	6.9.8.10	Probes
6.9.2.4	Digital measurement equipment, miscellaneous	6.9.6.8	Combination testers (in-circuit & function)	6.9.8.11	Differential probes
<b>6.9.3</b>	<b>Communication test equipment</b>	6.9.6.9	VXI bus test systems	6.9.8.12	Testing aids, miscellaneous
6.9.3.1	Sonet/SDH test equipment	6.9.6.10	VME bus test systems	6.9.8.13	Adapters for component testing
6.9.3.2	ATM analyzers	6.9.6.11	Benchtop ATEs, miscellaneous	6.9.8.14	Probe cards
6.9.3.3	LAN analyzers	6.9.6.12	Real-time measured-value acquisition systems	6.9.8.15	Bed-of-nails adapters
6.9.3.4	WAN analyzers	6.9.6.13	Adapters for assembly testing	6.9.8.16	Test fixtures, miscellaneous
6.9.3.5	PCI bus analyzers and measurement adapters	6.9.6.14	Test systems without adapters	6.9.8.17	Test pins
6.9.3.6	USB analyzers	6.9.6.15	Measurement-data acquisition systems with distributed sensors	6.9.8.18	Test pin arrays
6.9.3.7	Data analyzers	6.9.6.16	Multiple-channel measurement systems (loggers)	6.9.8.19	Connection testers
6.9.3.8	Bus testers	6.9.6.17	Computer-aided measurement/analysis systems (CAMA)	6.9.8.20	Measurement cables/leads
6.9.3.9	Fiber-optic measurement equipment	6.9.6.18	Component testers for electronics (hardware-specific)	6.9.8.21	Measurement data-transmission equipment
6.9.3.10	Precision frequency sources	6.9.6.19	Power supply test equipment	6.9.8.22	PC instrumentation
6.9.3.11	TV and radio measurement equipment	6.9.6.20	Cable test systems	6.9.8.23	Peripheral equipment, miscellaneous
<b>6.9.4</b>	<b>Mobile radio measurement equipment</b>	6.9.6.21	Test systems, miscellaneous	<b>6.10</b>	<b>Specialized laboratory/test equipment</b>
6.9.4.1	Test systems for analog mobile radios	<b>6.9.7</b>	<b>Software tools for test systems</b>	6.10.1	Aging test equipment
6.9.4.2	Test systems for digital mobile radios	6.9.7.1	Data evaluation tools for measurement purposes	6.10.2	Burn-in equipment
6.9.4.3	Signal generators for digital mobile radio transmission	6.9.7.2	Databases, measurement technologies	6.10.3	Identification tools
6.9.4.4	Analyzers for digital mobile radio transmission	6.9.7.3	Simulators	6.10.4	Shielded rooms
6.9.4.5	Geographical radio-coverage analysis systems	6.9.7.4	Simulation software	6.10.5	Measurement cabinets and chambers
6.9.4.6	Type-approval test systems	6.9.7.5	ATE software	6.10.6	Mains filters for laboratory purposes
<b>6.9.5</b>	<b>Protective-measure test devices</b>	<b>6.9.8</b>	<b>Peripheral equipment</b>	6.10.7	Programming equipment
6.9.5.1	Ground test equipment	6.9.8.1	DSP cards	6.10.8	Visual inspection (with image processing)
6.9.5.2	Insulation testers	6.9.8.2	A/D converter cards	6.10.9	Environmental simulation/test equipment
6.9.5.3	High-voltage testers	6.9.8.3	D/A converter cards	6.10.10	Radiation sources for measurement purposes
6.9.5.4	Short-circuit localization devices	6.9.8.4	Laboratory instrumentation accessories	6.10.11	Reference voltage sources
6.9.5.5	Safety testers, multitesters	6.9.8.5	Laboratory mains equipment	6.10.12	Reference current sources
<b>6.9.6</b>	<b>Test systems</b>	6.9.8.6	Standards for measurement/testing	6.10.13	Time standards
6.9.6.1	Semiconductor test systems	6.9.8.7	Calibration equipment, passive	6.10.14	Hand tools
6.9.6.2	IC testers	6.9.8.8	Measurement/analysis devices for laboratory examinations, miscellaneous	6.10.15	Special electronics hand tools
6.9.6.3	Mixed-signal test systems			6.10.16	ESD hand tools
6.9.6.4	Board testers			6.10.17	Lab furniture
6.9.6.5	Boundary scan board test systems			6.10.18	ESD benches
				6.10.19	Specialized laboratory/test equipment, miscellaneous

## 7 Electronic Design (ED/EDA)

<b>7.1</b>	<b>CAD/CAE tools</b>	<b>7.4</b>	<b>Software for special applications</b>	7.6.1.6	Gate-array design for ASICs
7.1.1	Development software	7.4.1	Software design programs, CASE tools	7.6.1.7	Standard-cell design for ASICs
7.1.1.1	CAD/CAM interface software	7.4.2	Software for electronic labs	7.6.1.8	ASIC design services for other architectures
7.1.1.2	Chip design programs	7.4.3	System integration programs	7.6.1.9	Miniaturization development
7.1.1.3	Design programs, miscellaneous/specialized	7.4.4	Thermoanalysis software	7.6.1.10	Customized circuit development, digital, analog, mixed-signal design
7.1.1.4	Design-to-test software	7.4.5	Software packages/tools, miscellaneous	7.6.1.11	Customized circuit development, RF and $\mu$ W design
7.1.1.5	RF design programs	7.4.6	Compilers	7.6.1.12	PGA design for ASICs
7.1.1.6	VHDL development systems	7.4.7	Libraries/databases	7.6.1.13	Characterization and optimization of magnetic components
<b>7.2</b>	<b>Generation software</b>	7.4.8	Real-time operating systems	7.6.1.14	Development of synthesis-capable functional models
7.2.1	Circuit optimization routines	7.4.9	Emulators	7.6.1.15	Development services, miscellaneous
7.2.2	Layout editors	7.4.10	Customized software	<b>7.6.2</b>	<b>Manufacturing services</b>
7.2.3	Routers for EDA	<b>7.5</b>	<b>Peripheral equipment for ED/EDA environments</b>	7.6.2.1	Prototype construction, housings
7.2.4	Modeling programs	7.5.1	Data terminals	7.6.2.2	Burn-in services
7.2.5	Board design programs	7.5.2	Card readers	7.6.2.3	Operating life testing
7.2.6	Synthesis tools	<b>7.6</b>	<b>ED/EDA services</b>	<b>7.7</b>	<b>Design and development systems</b>
7.2.7	Debuggers	7.6.1	Development services	7.7.1	ASIC design tools
<b>7.3</b>	<b>Test software</b>	7.6.1.1	Software development	7.7.2	PCB design tools
7.3.1	Simulation programs	7.6.1.2	PCB design technology consulting	7.7.3	Design and development systems, miscellaneous
7.3.2	Diagnostic programs	7.6.1.3	Circuit optimization services		
7.3.3	Verification programs	7.6.1.4	Fault analysis		
7.3.4	EMI/EMC test software	7.6.1.5	Release testing		
7.3.5	Application software, miscellaneous				

- 8.1 Inductors and accessories**
  - 8.1.1 DC inductors, filter reactors
  - 8.1.2 Laminated core inductors
  - 8.1.3 Coils with powder cores/ferrite cores
  - 8.1.4 Aircore coils
  - 8.1.5 Planar transformers
  - 8.1.6 SMD inductors
  - 8.1.7 Magnetic tape heads
  - 8.1.8 Inrush current limiters
  - 8.1.9 Deflection coils
  - 8.1.10 Scanning Line transformers
  - 8.1.11 Ignition spark transformers
  - 8.1.12 Low frequency transformers
  - 8.1.13 Isolation transformers
  - 8.1.14 Power transformers
  - 8.1.15 L/C networks (PFC)
  - 8.1.16 Pressed cores
  - 8.1.17 Inductor cores
  - 8.1.18 Metal powder inductor cores
  - 8.1.19 Inductors, miscellaneous
  - 8.1.20 Accessories, miscellaneous
- 8.2 Capacitors**
  - 8.2.1 Capacitors, fixed**
    - 8.2.1.1 Aluminum electrolytic capacitors
    - 8.2.1.2 Capacitor networks
    - 8.2.1.3 Film capacitors
    - 8.2.1.4 High-voltage capacitors
    - 8.2.1.5 Ceramic capacitors
    - 8.2.1.6 Capacitors with non-standard dielectrics
    - 8.2.1.7 Capacitors, special design
    - 8.2.1.8 Plastic capacitors
    - 8.2.1.9 Power capacitors
    - 8.2.1.10 SMD capacitors
    - 8.2.1.11 Tantalum electrolytic capacitors
    - 8.2.1.12 Ultra capacitors
    - 8.2.1.13 Capacitors, miscellaneous
  - 8.2.2 Capacitors, variable**
    - 8.2.2.1 Rotary capacitors
    - 8.2.2.2 Trimmer capacitors with solid dielectrics
    - 8.2.2.3 Air dielectric variable capacitors
- 8.3 Resistors (including R networks)**
  - 8.3.1 Fixed resistors**
    - 8.3.1.1 Individual fixed resistors, standard
    - 8.3.1.2 SMD resistors
    - 8.3.1.3 SMD resistor networks
    - 8.3.1.4 High-voltage resistors
    - 8.3.1.5 Power resistors, air-cooled
    - 8.3.1.6 Power resistors, water-cooled
    - 8.3.1.7 Measurement resistors
    - 8.3.1.8 Calibration resistors
    - 8.3.1.9 Resistor combinations/networks
    - 8.3.1.10 Varistors
    - 8.3.1.11 NTC thermistors
    - 8.3.1.12 PTC thermistors
    - 8.3.1.13 Fixed resistors, miscellaneous
  - 8.3.2 Variable resistors**
    - 8.3.2.1 Wire-wound potentiometers
    - 8.3.2.2 Conductive plastic potentiometers
    - 8.3.2.3 Layered potentiometers
    - 8.3.2.4 Precision potentiometers
    - 8.3.2.5 Rotary potentiometers
    - 8.3.2.6 Linear potentiometers
    - 8.3.2.7 Sliding resistors
    - 8.3.2.8 Trimmer resistors
  - 8.3.2.9 Adjustable resistors, miscellaneous
  - 8.3.2.10 Nonlinear resistors
  - 8.3.2.11 Controllable resistors
  - 8.3.2.12 Motor potentiometers
  - 8.3.2.13 Variable resistors, miscellaneous
- 8.4 Radiofrequency and microwave components**
  - 8.4.1 Antennas and antenna accessories**
    - 8.4.1.1 Antennas
    - 8.4.1.2 Antenna components
    - 8.4.1.3 Absorbers
    - 8.4.1.4 Tuner units
    - 8.4.1.5 Antenna accessories, miscellaneous
  - 8.4.2 Signal transmission, RF**
    - 8.4.2.1 Waveguides
    - 8.4.2.2 Waveguide components
    - 8.4.2.3 Waveguide systems, miscellaneous
    - 8.4.2.4 Directional couplers, coaxial
    - 8.4.2.5 Directional couplers, waveguide
    - 8.4.2.6 Circulators
    - 8.4.2.7 Isolators
    - 8.4.2.8 Signal transmission, RF, miscellaneous
    - 8.4.2.9 RF transformers
  - 8.4.3 RF switches**
    - 8.4.3.1 Waveguide switches
    - 8.4.3.2 Waveguide switching systems
    - 8.4.3.3 Matrix switches
    - 8.4.3.4 Coaxial relays
    - 8.4.3.5 Coaxial switches
    - 8.4.3.6 PIN diode switches
    - 8.4.3.7 Multiplexers
    - 8.4.3.8 RF switches, miscellaneous
  - 8.4.4 Signal influencing**
    - 8.4.4.1 Power splitters
    - 8.4.4.2 Combiners
    - 8.4.4.3 Step attenuators
    - 8.4.4.4 Attenuators
    - 8.4.4.5 Phase shifters
    - 8.4.4.6 Delay lines
    - 8.4.4.7 Mixers
    - 8.4.4.8 Components for signal modification, miscellaneous
  - 8.4.5 LTCC (Low-Temperature Co-fired Ceramics)**
    - 8.4.5.1 Accessories
    - 8.4.5.2 Loads, chip
    - 8.4.5.3 Loads, coax
    - 8.4.5.4 Loads, waveguide
    - 8.4.5.5 Rotary couplings
    - 8.4.5.6 Seals
    - 8.4.5.7 DC blocks
    - 8.4.5.8 Adapters, coax-waveguide
    - 8.4.5.9 Adapters, coax-coax
    - 8.4.5.10 Circulators, coax
    - 8.4.5.11 Circulators, waveguide
    - 8.4.5.12 Accessories, miscellaneous
  - 8.4.6 Passive microwave components, miscellaneous**
    - 8.4.6.1 Mixers
    - 8.4.6.2 Amplifiers
    - 8.4.6.3 Frequency multipliers
    - 8.4.6.4 YIG components
    - 8.4.6.5 Microwave components, active, miscellaneous
  - 8.4.7 Filters, resonators and oscillators**
    - 8.4.7.1 Filters
    - 8.4.7.2 R/C filter arrays
    - 8.4.7.3 YIG filters
    - 8.4.7.4 Surface acoustic wave filters (SAW filters)
    - 8.4.7.5 Crystal filters
    - 8.4.7.6 Ceramic filters
    - 8.4.7.7 Coupling filters
    - 8.4.7.8 Customized filters
    - 8.4.7.9 Filters, miscellaneous
    - 8.4.7.10 Resonators
    - 8.4.7.11 Microwave ceramics
    - 8.4.7.12 Surface acoustic wave resonators (SAW resonators)
    - 8.4.7.13 Cavity resonators
    - 8.4.7.14 Resonators, miscellaneous
    - 8.4.7.15 Oscillators
    - 8.4.7.16 Crystal oscillators
    - 8.4.7.17 VCXO modules
    - 8.4.7.18 TCXO modules
    - 8.4.7.19 OCXO modules
    - 8.4.7.20 Programmable oscillators
    - 8.4.7.21 Crystal oscillators, miscellaneous
    - 8.4.7.22 Oscillators for SMT
    - 8.4.7.23 Tuning-fork oscillators
    - 8.4.7.24 Synthesizer modules
    - 8.4.7.25 Oscillator modules, miscellaneous
  - 8.4.8 Tubes**
    - 8.4.8.1 X-ray tubes
    - 8.4.8.2 Transmitter tubes
    - 8.4.8.3 Generator tubes
    - 8.4.8.4 Microwave tubes
    - 8.4.8.5 Specialized tubes
    - 8.4.8.6 Vacuum switching elements
    - 8.4.8.7 Traveling wave tubes
    - 8.4.8.8 Tubes, miscellaneous
- 8.5 Polymer components**
- 8.6 Nonlinear high-voltage components**
  - 8.6.1 2-electrode arresters
  - 8.6.2 3-electrode arresters
  - 8.6.3 Switching spark gaps
  - 8.6.4 Starters for gas discharge tubes
- 8.7 Passive components, miscellaneous**
- 8.8 Piezoelectric components**
  - 8.8.1 Piezoelectric signal generators
  - 8.8.2 Piezoceramic wares
  - 8.8.3 Piezo foils
  - 8.8.4 Piezo actuators
- 8.9 Magnetic and electronic ceramic products**
  - 8.9.1 AlNiCo magnets
  - 8.9.2 Hard-ferrite magnets
  - 8.9.3 Plastic-bonded hard-ferrite magnets
  - 8.9.4 Plastic-bonded neodymium iron boron magnets
  - 8.9.5 Magnetic systems
  - 8.9.6 Soft-ferrite products
  - 8.9.7 Neodymium iron boron magnets
  - 8.9.8 Samarium cobalt magnets
  - 8.9.9 Ferroelectric ceramic tubes
  - 8.9.10 Ferroelectric ceramic perls
  - 8.9.11 Ceramic molded parts
  - 8.9.12 Ceramic insulation inserts
  - 8.9.13 Magnetic and electronic ceramic products, miscellaneous

<b>9.1</b>	<b>Switches and keybords</b>	9.1.7.3	Silicone keypads for keyboards	9.2.3.1	Fine-pitch connectors
<b>9.1.1</b>	<b>Switches for continuous connection</b>	9.1.7.4	Silicone rubber key pads	9.2.3.2	Card plug-in connectors
9.1.1.1	Encoder switches	9.1.7.5	Piezo keys	9.2.3.3	PCB connection systems
9.1.1.2	DIL switches	9.1.7.6	LCD single keys	9.2.3.4	PCB connectors
9.1.1.3	Dial/rotary switches	9.1.7.7	Key modules	9.2.3.5	DIP plug-in connectors
9.1.1.4	Push-button switches	<b>9.1.8</b>	<b>Initiation devices, manually activated</b>	9.2.3.6	SM-capable connectors
9.1.1.5	Remote-control switches, miscellaneous	9.1.8.1	Console components	9.2.3.7	Ball-grid array adapters
9.1.1.6	Manually activated switches, miscellaneous	9.1.8.2	User consoles for night usage	9.2.3.8	SM test points
9.1.1.7	Toggle switches	9.1.8.3	Input systems	<b>9.2.4</b>	<b>Sockets</b>
9.1.1.8	Multiplexers	9.1.8.4	Remote controls	9.2.4.1	Plug bodies, modular
9.1.1.9	Matrix switches	9.1.8.5	Initiation devices, miscellaneous	9.2.4.2	IC sockets
9.1.1.10	PCB switches	9.1.8.6	Trackball input devices	9.2.4.3	IC footprint converters
9.1.1.11	Illuminated key switches/keypads	9.1.8.7	Mouse	9.2.4.4	IC test clips
9.1.1.12	Miniature switches	9.1.8.8	Joysticks	9.2.4.5	PGA sockets
9.1.1.13	Subminiature switches	9.1.8.9	Miniature joysticks	9.2.4.6	Ball-grid array sockets
9.1.1.14	Reed switches	<b>9.1.9</b>	<b>Relays</b>	9.2.4.7	Lead frames
9.1.1.15	Opto switches	9.1.9.1	DIL relays	9.2.4.8	Sockets, miscellaneous
9.1.1.16	Piezo switches	9.1.9.2	Poled relays	<b>9.2.5</b>	<b>Connectors, application-oriented</b>
9.1.1.17	Sliding switches	9.1.9.3	Telecommunications relays	9.2.5.1	Railway plug-in connectors
9.1.1.18	Safety switches	9.1.9.4	Card relays	9.2.5.2	Mining plug-in connectors
9.1.1.19	SM-capable switches	9.1.9.5	Hermetically sealed relays	9.2.5.3	Audio, video plug-in connectors
9.1.1.20	Incremental switch/resistor combinations	9.1.9.6	Automotive relays	9.2.5.4	Automotive plug-in connectors
9.1.1.21	Switches, miscellaneous	9.1.9.7	Miniature relays	9.2.5.5	Battery plug-in connectors
<b>9.1.2</b>	<b>Switches with additional functions</b>	9.1.9.8	Microrelays	9.2.5.6	High current plug-in connectors
9.1.2.1	Selection switches	9.1.9.9	Mains power-isolating relays	9.2.5.7	Medical plug-in connectors
9.1.2.2	Circuit breaker	9.1.9.10	Phase monitor relays	9.2.5.8	Equipment plug-in connectors
9.1.2.3	Time switches	9.1.9.11	Reed relays	9.2.5.9	MIL connectors
9.1.2.4	Tilt switches	9.1.9.12	Relays with forcibly guided (linked) contacts	9.2.5.10	Audio connectors
9.1.2.5	Thermo switches	9.1.9.13	Incremental switch relays	<b>9.2.6</b>	<b>Connectors for telecommunications</b>
9.1.2.6	Sensor switches	9.1.9.14	Fuses/relays, miscellaneous	9.2.6.1	Coaxial plug-in connectors
9.1.2.7	ASI switches	9.1.9.15	Sensor relays	9.2.6.1.1	BNC 50 W/ 75 W connectors
<b>9.1.3</b>	<b>Electrical keys</b>	9.1.9.16	Relays as SMDs	9.2.6.1.2	C/UHF connectors
9.1.3.1	Limit keys	9.1.9.17	Current relays	9.2.6.1.3	MCX/MMCX connectors
9.1.3.2	Input keys	9.1.9.18	Thermorelays	9.2.6.1.4	F connectors
9.1.3.3	Miniature keys	9.1.9.19	Overload-monitor relays	9.2.6.1.5	N connectors
9.1.3.4	Sensor switches	9.1.9.20	Secured relays	9.2.6.1.6	SMA connectors
9.1.3.5	ASi keys	9.1.9.21	Vacuum relays	9.2.6.1.7	SMB/SMC/SMS connectors
9.1.3.6	Electrical keys, miscellaneous	9.1.9.22	Time relays	9.2.6.1.8	PC 7 mm connectors
<b>9.1.4</b>	<b>Detector components</b>	9.1.9.23	Measurement relays	9.2.6.1.9	PC 3.5 mm connectors
9.1.4.1	Event detectors/counters	9.1.9.24	High-frequency relays	9.2.6.1.10	PC 2.4 mm connectors
9.1.4.2	Light barriers	9.1.9.25	Magnets, electric	9.2.6.1.11	PC 2.0 mm connectors and smaller
9.1.4.3	Reflectors for light barriers	9.1.9.26	Timers, electromechanical	9.2.6.1.12	Adapters
9.1.4.4	Signal generators, acoustic	9.1.9.27	Counter mechanisms, electromechanical	9.2.6.1.13	Twinaxial components
9.1.4.5	Proximity switches	9.1.9.28	Relays, miscellaneous	9.2.6.1.14	Coaxial connectors, miscellaneous
9.1.4.6	Limit switches	<b>9.2</b>	<b>Interconnection components/systems</b>	9.2.6.2	Fiber-optic plug-in connectors
9.1.4.7	Ring generators for telephones	<b>9.2.1</b>	<b>Standardized connectors</b>	9.2.6.3	Data connectors (e.g. RJ 45)
9.1.4.8	Detector components, miscellaneous	9.2.1.1	DIN 41 612 plug-in connectors	<b>9.2.7</b>	<b>Cables with connectors</b>
<b>9.1.5</b>	<b>Detector and signaling devices</b>	9.2.1.2	Metric connectors	9.2.7.1	Configured cable/connector combinations for data technology
9.1.5.1	Optical signaling devices	9.2.1.3	D subminiature connectors	9.2.7.2	Configured cable/connector combinations for household equipment
9.1.5.2	Optical/acoustical signaling devices	9.2.1.4	D subminiature connectors with filters	9.2.7.3	Configured cable/connector combinations for industrial electronics
9.1.5.3	Acoustical signaling devices	9.2.1.5	D plug-in connectors	9.2.7.4	Configured cable/connector combinations for consumer electronics
9.1.5.4	Ex-signaling devices	9.2.1.6	Extended standards plug-in connectors	9.2.7.5	Configured cable/connector combinations for automotive applications
9.1.5.5	Loudspeakers	9.2.1.7	Subminiature plug-in connectors	9.2.7.6	Configured cable/connector combinations for laboratory/testing technology
9.1.5.6	Tone generators, electronic	9.2.1.8	SMD print connectors 0.635 mm pitch	9.2.7.7	Configured cable/connector combinations for the aerospace industry
9.1.5.7	Microphones	9.2.1.9	Standardized connectors, miscellaneous	9.2.7.8	Configured cable/connector combinations for miscellaneous applications
9.1.5.8	Sound generators, electromechanical	9.2.1.10	RCA plugs/ jacks	9.2.7.9	Configured cable/connector combinations for telecommunications
<b>9.1.6</b>	<b>Keyboards</b>	9.2.1.11	Mains power appliance inlets	9.2.7.10	Ribbon cable connection systems
9.1.6.1	Keyboards	9.2.1.12	Mains power appliance outlets	9.2.7.11	Powercords
9.1.6.2	PC keyboards	<b>9.2.2</b>	<b>Connectors for specific handling</b>	<b>9.2.8</b>	<b>Connectors with additional functions</b>
9.1.6.3	Flat keyboards	9.2.2.1	Crimp connectors, open frame	9.2.8.1	Inverted plug-in connectors
9.1.6.4	Membrane keyboards	9.2.2.2	Crimp connectors, rectangular	9.2.8.2	Encoder plug-in connectors
9.1.6.5	Short-stroke keyboards	9.2.2.3	Crimp connectors, round	<b>9.2.9</b>	<b>Connectors, specific forms</b>
9.1.6.6	MF keyboards (multifunctional)	9.2.2.4	Crimp connectors, miscellaneous	9.2.9.1	Miniature plug-in connectors
9.1.6.7	Miniature keyboards	9.2.2.5	Plug-in connectors for press-fit applications	9.2.9.2	Right-angle plug-in connectors
9.1.6.8	Piezo keypads	9.2.2.6	Plug-in connectors for soldered connections	9.2.9.3	Round plug-in connectors
9.1.6.9	Sensor keys/keyboards	9.2.2.7	Plug-in connectors with solder tags	9.2.9.4	Zero-force plug-in connectors (ZIF)
9.1.6.10	Silicone keyboards	9.2.2.8	Plug-in connectors with crimp connectors	9.2.9.5	Cut/crimp connectors (IP)
9.1.6.11	Specialized keyboards	9.2.2.9	Plug-in connectors for wire-wrap connectors		
9.1.6.12	Keyboard systems	9.2.2.10	Plug-in connectors for insulation displacement assembly		
9.1.6.13	Touch-glass keyboards	<b>9.2.3</b>	<b>Connectors, PCB-mountable</b>		
9.1.6.14	LCD single-key keyboards				
9.1.6.15	Touch panels				
<b>9.1.7</b>	<b>Components and accessories for keyboards</b>				
9.1.7.1	Panel membranes for keyboards				
9.1.7.2	Separation membranes for keyboards				

9.2.9.6	Flat plug-in connectors	9.2.13.10	Light-conducting cables	9.3.6.2.6	Heat exchanger systems
9.2.9.7	SMD connectors, 0.635 mm pitch	9.2.13.11	Instrument cables	9.3.6.2.7	Heat pipes
9.2.9.8	Foil-type plug-in connectors	9.2.13.12	Safety cables/leads	9.3.6.2.8	Air-conditioning units
9.2.9.9	Ribbon cable connectors	9.2.13.13	Data transmission cables	9.3.6.2.9	Radiators and coolants
<b>9.2.10</b>	<b>Miscellaneous connectors</b>	9.2.13.14	Computer cables, configured	9.3.6.2.10	Cooling equipment
9.2.10.1	Transfer plug-in connectors (I/O)	9.2.13.15	Round-conductor ribbon cables for IDC	9.3.6.2.11	CPU cooling equipment
9.2.10.2	Coupling plug-in connectors	9.2.13.16	Flexible ribbon cables	9.3.6.2.12	Filter fans
9.2.10.3	Customized plug-in connectors	9.2.13.17	Shielded cables	9.3.6.2.13	Thermostats
9.2.10.4	Specialized plug-in connectors	9.2.13.18	Halogen-free cables	9.3.6.2.14	Thermal management aids, miscellaneous
9.2.10.5	Multiple connection systems	9.2.13.19	Enamelled wire	9.3.6.2.15	Thermofoil heaters
9.2.10.6	Plug sockets, miscellaneous	9.2.13.20	Wire/cables/leads, miscellaneous	9.3.6.2.16	Heating elements with/without regulators
9.2.10.7	Chip card connectors	9.2.13.21	Cables, miscellaneous	9.3.6.2.17	Active components, miscellaneous
9.2.10.8	Hermetically sealed connectors	<b>9.3</b>	<b>Specialized connection/ connecting components</b>	<b>9.3.7</b>	<b>Electronic protection devices (EMI/ ESD)</b>
9.2.10.9	Waterproof connectors	<b>9.3.1</b>	<b>System racks</b>	9.3.7.1	EMC-conducted
9.2.10.10	Shielded connectors	9.3.1.1	„19“ racks and cabinets“	9.3.7.1.1	EMC-type plug-in connectors
9.2.10.11	Jumpers	9.3.1.2	RF-shielded housings	9.3.7.1.2	EMC leads
9.2.10.12	MID connectors	9.3.1.3	Circuit boxes	9.3.7.1.3	EMC filters
9.2.10.13	Connectors, miscellaneous	9.3.1.4	Modular systems, metric	9.3.7.1.4	SM EMI suppression filters
<b>9.2.11</b>	<b>Accessories for connectors</b>	9.3.1.5	Sheet-metal structures	9.3.7.1.5	Chip bead EMI suppressors
9.2.11.1	Plastic housings for connectors	9.3.1.6	System racks for telecommunications	9.3.7.1.6	Filter-equipped power-connection leads
9.2.11.2	Metal housings for connectors	<b>9.3.2</b>	<b>Build-in and desktop housings</b>	9.3.7.1.7	Mains filter modules
9.2.11.3	EMI / RFI shielding metal hoods	9.3.2.1	„19“ inserts and housings“	9.3.7.1.8	RF chokes
9.2.11.4	Rubber and plastic parts for connectors	9.3.2.2	„19“ frames“	9.3.7.1.9	Mains power-surge protectors
9.2.11.5	Tapper sleeves	9.3.2.3	„19“ accessories“	9.3.7.1.10	Filter-equipped plug-in connectors
9.2.11.6	Special tools for connectors	9.3.2.4	Console housings	9.3.7.1.11	Threaded EMC cable glands
9.2.11.7	Press-fit tools for connectors	9.3.2.5	Consoles	9.3.7.1.12	EMC feedthrough components
<b>9.2.12</b>	<b>Specialized connection/connecting components</b>	9.3.2.6	Computer housings	9.3.7.1.13	X/Y capacitors
9.2.12.1	Terminals	9.3.2.7	Stand-alone housings	9.3.7.1.14	Electronic protection devices, miscellaneous
9.2.12.1.1	Terminals/terminal strips	9.3.2.8	Table-top housings	9.3.7.2	EMC-radiated
9.2.12.1.2	Connectors (silicon rubber)	9.3.2.9	Wall-mountable housings	9.3.7.2.1	Shieldings (EMC)
9.2.12.1.3	Connection strips	9.3.2.10	Specialized housings for assemblies/ devices	9.3.7.2.2	Housings with EMC protection
9.2.12.1.4	Test terminals	9.3.2.11	Housings, RF-resistant	9.3.7.2.3	RF seals
9.2.12.1.5	Terminal strips	9.3.2.12	Wall-mountable and desktop housings, miscellaneous	9.3.7.2.4	Metal sealings for housings
9.2.12.1.6	Terminals with diodes	<b>9.3.3</b>	<b>Small-scale housings</b>	9.3.7.2.5	Polymere seals for housings
9.2.12.1.7	PCB terminals	9.3.3.1	Sheet-metal housings	9.3.7.2.6	Conductive tapes/cloth
9.2.12.1.8	Feed-through terminals	9.3.3.2	Plastic housings, application-specific	9.3.7.2.7	Window glass, RF-sealed
9.2.12.1.9	Measurement terminals	9.3.3.3	Hand-held housings	9.3.7.3	EMP protection
9.2.12.1.10	Disconnect terminals	9.3.3.4	Milling housings	9.3.7.3.1	EMP protection elements/modules
9.2.12.1.11	Terminals, miscellaneous	9.3.3.5	Mini housings, miscellaneous	9.3.7.3.2	NEMP protective equipment
9.2.12.2	Connection elements, miscellaneous	<b>9.3.4</b>	<b>Special housings</b>	9.3.7.4	ESD protection
9.2.12.2.1	Contact elements/modules	9.3.4.1	Specialized component enclosures	9.3.7.4.1	ESD protection
9.2.12.2.2	Screen-connection elements	9.3.4.2	Portable cases	9.3.7.4.2	Voltage suppressors
9.2.12.2.3	Slip-ring transformers	9.3.4.3	Individual housings	9.3.7.4.3	Limiter diodes
9.2.12.2.4	Contactless electrical rotary joints	<b>9.3.5</b>	<b>Accessories for housings</b>	9.3.7.4.4	Lightning protection equipment
9.2.12.2.5	Contactless optical rotary joints	9.3.5.1	Card slots	9.3.7.4.5	Surge protection equipment
9.2.12.2.6	Soldered connection elements	9.3.5.2	Covers	9.3.7.5	Packaging materials
9.2.12.2.7	Wire-wrap elements	9.3.5.3	Front panels for assemblies/devices	9.3.7.5.1	Packaging materials
9.2.12.2.8	Removable connection elements, miscellaneous	9.3.5.4	Front panels, customized	9.3.7.5.2	Blister belting strips
9.2.12.2.9	Power distribution components (power strips)	9.3.5.5	Front handles	9.3.7.5.3	Blister belt cover strips
9.2.12.2.10	Microconnectors	9.3.5.6	Housing seals	9.3.7.5.4	Belt spools for component belting
9.2.12.2.11	Press-fit connectors	9.3.5.7	Knobs	9.3.7.6	Protection components, miscellaneous
9.2.12.2.12	Individual contacts	9.3.5.8	Rubber and plastic parts for housings	9.3.7.6.1	Suppressor chokes
9.2.12.2.13	Chip-card connection frames	9.3.5.9	Distance assembly fittings	9.3.7.6.2	Suppressor capacitors
9.2.12.2.14	Permanent contacting elements, miscellaneous	9.3.5.10	Housing cover accessories	9.3.7.6.3	Shielded chokes/converters
9.2.12.2.15	Connection elements, miscellaneous	9.3.5.11	Conduits	9.3.7.6.4	Power semiconductor protection
9.2.12.3	Accessories	9.3.5.12	Filters, air	9.3.7.6.5	Low-voltage protection equipment
9.2.12.3.1	Continuity accessories	9.3.5.13	Bearings	9.3.7.6.6	EMC ferrite cores
9.2.12.3.2	Elastomers, electrical/thermal conducting	9.3.5.14	Power distribution components	9.3.7.6.7	Circuit breaker for equipment protection
9.2.12.3.3	Shrink-wrap hoses	9.3.5.15	Accessories for housings, miscellaneous	9.3.7.6.8	Equipment-protection fuses
9.2.12.3.4	Strain-relief elements	<b>9.3.6</b>	<b>Thermal management</b>	9.3.7.6.9	Fuse holders/sockets
9.2.12.3.5	Threaded cable glands	9.3.6.1	Passive components	9.3.7.6.10	Protection components accessories
9.2.12.3.6	Accessories, miscellaneous	9.3.6.1.1	Shieldings, thermal		
<b>9.2.13</b>	<b>Cables</b>	9.3.6.1.2	Insulating elements, special		
9.2.13.1	Coaxial high-frequency cables	9.3.6.1.3	Heat sinks		
9.2.13.2	RF cords	9.3.6.1.4	Specialized heat sinks		
9.2.13.3	Semi-rigid cables	9.3.6.1.5	Heat-conducting plates/washers		
9.2.13.4	Ready-made coaxial cables	9.3.6.1.6	Circuit carriers, thermally conductive		
9.2.13.5	Coaxial conductor components and systems	9.3.6.1.7	Passive components, miscellaneous		
9.2.13.6	Twinaxial components	9.3.6.1.8	Thermal interface materials		
9.2.13.7	Wire harnesses	9.3.6.2	Active components		
9.2.13.8	Spiral cords	9.3.6.2.1	Fans		
9.2.13.9	Customized cables	9.3.6.2.2	Fan inserts		
		9.3.6.2.3	Heat exchangers with built-in radiators		
		9.3.6.2.4	Heat pumps, thermoelectric		
		9.3.6.2.5	Peltier elements		

## 10 Power supplies

<b>10.1</b>	<b>Transformers</b>	10.3.5	Accessories, miscellaneous	10.8.4	Intelligent power modules, customized
10.1.1	Power-supply transformers	10.3.6	Amorphous Cut Cores	10.8.5	Power supplies, high-voltage
10.1.2	PCB transformers	<b>10.4</b>	<b>Power supplies, DC output</b>	10.8.6	Mains power devices, application-specific
10.1.3	Planar transformers	10.4.1	AC/DC power supplies, single/multiple phase	10.8.7	LED power supplies
10.1.4	Miniature transformers	10.4.2	AC/DC eurocard power supplies	<b>10.9</b>	<b>Batteries</b>
10.1.5	Toroidal core transformers	10.4.3	AC/DC power supplies, DIN rail	10.9.1	Accumulators, up to 50 Ah
10.1.6	Security transformers	10.4.4	AC/DC power supplies, open frame	10.9.2	Primary elements and batteries
10.1.7	Isolating transformers (including shielded)	10.4.5	VME bus power supplies	10.9.3	Smart batteries
10.1.8	Regulating transformers	10.4.6	DC/DC converter modules	10.9.4	Chargers, battery
10.1.9	High-voltage transformers	10.4.7	DC converters with 42 V input for automotive applications	<b>10.10</b>	<b>Static current supplies, miscellaneous</b>
10.1.10	Pulse transformers	10.4.8	Protected power supplies	<b>10.11</b>	<b>Power management systems</b>
10.1.11	Stray-field transformers	10.4.9	Plug-in mains power devices (AC/DC)	<b>10.12</b>	<b>Accessories</b>
10.1.12	Diode splitter transformers	<b>10.5</b>	<b>Power supplies, AC output</b>	10.12.1	Power factor compensation equipment
10.1.13	Autotransformers	10.5.1	Mains power devices, insert housing	10.12.2	Voltage stabilizers
10.1.14	Transformers, miscellaneous	10.5.2	Mains power devices, portable	10.12.3	Charge rectifiers
<b>10.2</b>	<b>Coilware for specific applications</b>	10.5.3	Plug-in mains power devices (AC/AC)	10.12.4	Charge indicators
10.2.1	Filter coils	10.5.4	Inverters (DC/AC)	10.12.5	SMPS capacitors for high-frequency suppression
10.2.2	Commutation chokes	<b>10.6</b>	<b>Frequency converters</b>	10.12.6	Battery testers
10.2.3	Chokes, miscellaneous	<b>10.7</b>	<b>UPS systems</b>	10.12.7	Accessories, miscellaneous
10.2.4	Coilware, application-specific	10.7.1	Uninterruptable power supplies (UPS)		
10.2.5	Coilware, shielded	10.7.2	Backup power supplies		
10.2.6	Coilware, miscellaneous	10.7.3	Mains power stabilizers		
<b>10.3</b>	<b>Accessories for coilware</b>	<b>10.8</b>	<b>Special power supplies</b>		
10.3.1	Core-molded parts	10.8.1	Programmable power supplies		
10.3.2	Cores	10.8.2	System power supplies		
10.3.3	Coil former	10.8.3	Lab power supplies		
10.3.4	Metal powder coil cores				

## 11 PCBs, other circuit carriers and EMS

<b>11.1</b>	<b>Non-PTH single- and double-sided PCBs</b>	<b>11.5</b>	<b>Ceramic PCBs</b>	11.7.2	<b>EMS for component construction and equipment manufacturing</b>
<b>11.2</b>	<b>Double-sided PCBs, PTH</b>	11.5.1	LTCC	11.7.2.1	Solder mask services
11.2.1	Copper through-hole PCBs	11.5.2	Al2O3	11.7.2.2	Hybrid solutions
11.2.2	Silver through-hole PCBs	11.5.3	AlN	11.7.2.3	Component insertion
<b>11.3</b>	<b>Multilayer PCBs (ML)</b>	11.5.4	Ceramic PCBs, miscellaneous	11.7.2.4	Bonding of dies on PCBs
11.3.1	Ultrathin ML (100µm/layer)	<b>11.6</b>	<b>PCBs for backplanes/bus systems</b>	11.7.2.5	Flip chip insertion
11.3.2	Plated through-hole PCBs	11.6.1	PCI bus	11.7.2.6	Component insertion under cleanroom conditions
11.3.3	PCBs with blind vias	11.6.2	Compact PCI bus	11.7.2.7	Metal machining
11.3.4	HDI PCBs	11.6.3	VME 64	11.7.2.8	Manufacturing precision drilling and milling parts
11.3.5	PCBs with thick copper	11.6.4	Backplane PCBs, unconfigured	11.7.2.9	Housings, customer-specific
11.3.6	Multilayer PCBs, miscellaneous	11.6.5	Backplanes/bus systems, miscellaneous	11.7.2.10	Assembly production
<b>11.4</b>	<b>Special PCBs</b>	<b>11.7</b>	<b>EMS Electronic manufacturing services</b>	11.7.2.11	EMD shielding
11.4.1	Bondable PCBs	<b>11.7.1</b>	<b>EMS for component/chip carrier manufacturing</b>	11.7.2.12	Cabling
11.4.2	Metal core PCBs	11.7.1.1	Layout services	11.7.2.13	Labeling
11.4.3	PCBs with embedded resistors	11.7.1.2	Artwork production services	11.7.2.14	Production services for component construction and equipment manufacturing, miscellaneous
11.4.4	Flexible circuits	11.7.1.3	Screen production services	<b>11.8</b>	<b>Prototyping</b>
11.4.5	Flex-rigid circuits	11.7.1.4	Coating services	11.8.1	PCBs
11.4.6	Micro via PCBs	11.7.1.5	Laser engraving	11.8.2	Housings, prototypes
11.4.7	PCBs on aluminum substrates	11.7.1.6	Wire erosion	11.8.3	Equipment
11.4.8	HF PCBs	11.7.1.7	Laser welding/cutting	11.8.4	Prototyping, miscellaneous
11.4.9	Impedance-controlled PCBs	11.7.1.8	Plating services	<b>11.9</b>	<b>Accessories for PCBs</b>
11.4.10	Press-fit component PCBs	11.7.1.9	Reflow services	11.9.1	Multilayer bus bars for PCBs
11.4.11	Large-format PCBs (more than 600 mm)	11.7.1.10	Surface treatment	11.9.2	Conductor strips
11.4.12	Ultrafine-line circuitry (< 50µm)	11.7.1.11	Production services for component/chip carrier manufacturing, miscellaneous	11.9.3	Accessories for PCBs, miscellaneous
11.4.13	PCBs, other				
11.4.14	3D PCBs (MID)				
11.4.15	Optical PCBs				

## 12 Assemblies and subsystems

- 12.1 Assemblies for control applications**
  - 12.1.1 Regulator assemblies
  - 12.1.2 Motor protection modules
  - 12.1.3 Switching-device assemblies
  - 12.1.4 MPC assemblies
  - 12.1.5 Compact PCI bus modules
  - 12.1.6 VME 64 modules
  - 12.1.7 Profi bus modules
  - 12.1.8 Field bus modules
  - 12.1.9 LON bus modules
  - 12.1.10 Mezzanine modules
  - 12.1.11 Modules for other bus systems
  - 12.1.12 Controllers, programmable
  - 12.1.13 Electromotor controllers/regulators
- 12.2 Printer assemblies**
  - 12.2.1 Thermal printers
  - 12.2.2 Thermal transfer printers
  - 12.2.3 Printer assemblies, mechanical
  - 12.2.4 Laser printer assemblies
  - 12.2.5 Ink-jet printer assemblies
  - 12.2.6 Printer assemblies, miscellaneous
- 12.3 Assemblies, miscellaneous**
  - 12.3.1 Converter assemblies
  - 12.3.2 Backplane PCBs, configured
  - 12.3.3 IR transmitters/receivers
  - 12.3.4 Matrix cameras, CCD
  - 12.3.5 Bar-code reader assemblies
  - 12.3.6 Image-conversion assemblies, miscellaneous
- 12.4 Hybrid modules (including multi-chip modules)**
  - 12.4.1 Thick-film hybrids
  - 12.4.2 Thin-film hybrids
  - 12.4.3 RF hybrids
  - 12.4.4 Hybrid filters
  - 12.4.5 Hybrid modules, mixed-signal
  - 12.4.6 Hybrid modules, alternating-signal, miscellaneous
  - 12.4.7 Hybrid modules, static-signal, miscellaneous
  - 12.4.8 Hybrid circuits on glass substrates
  - 12.4.9 Hybrid modules on ceramic substrates
  - 12.4.10 LSI hybrids (MCM)
  - 12.4.11 Multi-chip module hybrids, miscellaneous
  - 12.4.12 Application-specific hybrid circuits
  - 12.4.13 Networks, miscellaneous
  - 12.4.14 Opto hybrids
  - 12.4.15 Miscellaneous hybrid circuits/modules
  - 12.4.16 Strip-conductor components for microwave technology
  - 12.4.17 Clock modules
  - 12.4.18 Hybrid modules, miscellaneous
- 12.5 Servo-technology/Drive elements**
  - 12.5.1 Motors
    - 12.5.1.1 AC motors (standard, up to 300 W)
    - 12.5.1.2 Brushless motors
    - 12.5.1.3 DC motors (standard, up to 300 W)
    - 12.5.1.4 Torque motors
  - 12.5.1.5 Miniature motors, universal current
  - 12.5.1.6 Stepper motors
  - 12.5.1.7 Micromotors
  - 12.5.2 Gears
    - 12.5.2.1 Geared motors
    - 12.5.2.2 Linear drives
    - 12.5.2.3 Micropositioning
    - 12.5.2.4 Actuators, miscellaneous
    - 12.5.2.5 Micro gears
  - 12.5.3 Magnetic actuators
    - 12.5.3.1 Magnetic motors (translational direct drives)
    - 12.5.3.2 Electromagnets for moving processes
  - 12.5.4 Actuators, miscellaneous
    - 12.5.4.1 Piezo actuator motors
    - 12.5.4.2 Translational direct drives
    - 12.5.4.3 Positioning drives, miscellaneous
    - 12.5.4.4 Resolvers
  - 12.5.5 Accessories for actuators
    - 12.5.5.1 Electromotor device parts, miscellaneous
    - 12.5.5.2 Slide bearings, ceramic
    - 12.5.5.3 Soft starters for electric motors

## 13 Automotive

- 13.1 Drive (engine and gears)**
  - 13.1.1 Engine Control**
    - 13.1.1.1 Ignition
    - 13.1.1.2 Fuel injection
    - 13.1.1.3 Direct fuel injection
    - 13.1.1.4 Multi-point fuel injection
    - 13.1.1.5 Valve controllers
    - 13.1.1.6 Common rail
    - 13.1.1.7 Camshaft controllers
    - 13.1.1.8 Emission recirculation
    - 13.1.1.9 Catalytic converter
    - 13.1.1.10 Drive by wire
    - 13.1.1.11 Cruise control
    - 13.1.1.12 On-board diagnostic system
  - 13.1.2 Gearbox controllers**
    - 13.1.2.1 Gearbox electronic
  - 13.1.3 Alternative drives**
    - 13.1.3.1 Starter generators
    - 13.1.3.2 Hybrid batteries (Li-Ion, NiMH)
    - 13.1.3.3 Electromotor
    - 13.1.3.4 Automatic start-stop system
- 13.2 Chassis/Steering**
  - 13.2.1 Steering**
    - 13.2.1.1 Steer by wire
    - 13.2.1.2 Power steering
    - 13.2.1.3 Parameter steering
  - 13.2.2 Chassis**
    - 13.2.2.1 Electronic shock absorption control
    - 13.2.2.2 Roll stabilizer
- 13.3 Brake**
  - 13.3.1 Brake by wire
  - 13.3.2 ABS/ESP
  - 13.3.3 Anti-slip control
  - 13.3.4 Brake assistant
  - 13.3.5 Power handbrake
  - 13.3.6 Auto emergency stop
- 13.4 Interior/Comfort**
  - 13.4.1 Comfort functions**
    - 13.4.1.1 Power window control
    - 13.4.1.2 Anti-trap protection
    - 13.4.1.3 Electrical seat adjustment
    - 13.4.1.4 Seat memory
    - 13.4.1.5 Seat heater
    - 13.4.1.6 Interior lights
    - 13.4.1.7 Ambient lights
  - 13.4.1.8 Wind screen heating
  - 13.4.1.9 Electrical air conditioning
  - 13.4.1.10 Automatic 2-/-4-zone air-conditioning system
- 13.4.2 Driver information**
  - 13.4.2.1 Multi-purpose instrument
  - 13.4.2.2 Head-up display
  - 13.4.2.3 Displays (see displays)
  - 13.4.2.4 Pointer instrument
  - 13.4.2.5 Warning lights, displays
  - 13.4.2.6 Secondary display
- 13.4.3 Communication/Telematics**
  - 13.4.3.1 Car radio/Loudspeaker
  - 13.4.3.2 CD/DVD player
  - 13.4.3.3 Sound system
  - 13.4.3.4 Mobile radio
  - 13.4.3.5 Infotainment
  - 13.4.3.6 Voice command?
  - 13.4.3.7 Multimedia
  - 13.4.3.8 Navigation
  - 13.4.3.9 GSP receiver
  - 13.4.3.10 Car antenna
  - 13.4.3.11 Video
  - 13.4.3.12 Car television receiver
  - 13.4.3.13 Rear seat entertainment
  - 13.4.3.14 USB port
  - 13.4.3.15 Bluetooth
- 13.5 Body/Safety**
  - 13.5.1 Theft protection**
    - 13.5.1.1 Engine immobilizer
    - 13.5.1.2 Interior surveillance
    - 13.5.1.3 Access authorization
    - 13.5.1.4 Keyless Go/Keyless Entry
  - 13.5.2 Passive safety**
    - 13.5.2.1 Airbag controllers
    - 13.5.2.2 Passenger detection
    - 13.5.2.3 Precrash
    - 13.5.2.4 Seat-belt tightener
    - 13.5.2.5 Active headrest
    - 13.5.2.6 Pedestrian protection
  - 13.5.3 Car lighting/exterior**
    - 13.5.3.1 Headlights
    - 13.5.3.2 Bending light
    - 13.5.3.3 Headlight levelling
    - 13.5.3.4 Light-emitting-diodes (see Semiconductors)
- 13.5.3.5 Taillights
- 13.5.3.6 Adaptive headlight assistant
- 13.6 Active safety**
  - 13.6.1 Driver assistance systems**
    - 13.6.1.1 Adaptive cruise control (ACC)
    - 13.6.1.2 Stop and go cruise control
    - 13.6.1.3 Lane change assistant
    - 13.6.1.4 Lane departure warning
    - 13.6.1.5 Pre-crash detection (activation) system
    - 13.6.1.6 Tire pressure sensor
    - 13.6.1.7 Night vision
    - 13.6.1.8 Parking aid
    - 13.6.1.9 Parking assistant
    - 13.6.1.10 Radar
    - 13.6.1.11 Lidar
    - 13.6.1.12 Infrared
    - 13.6.1.13 Car to car communication
    - 13.6.1.14 Ultrasonic
    - 13.6.1.15 Video/camera
    - 13.6.1.16 Doze alarm
    - 13.6.1.17 Traffic sign detection system
  - 13.7 Electrical on-board power supply**
    - 13.7.1 Energy supply**
      - 13.7.1.1 Generators
      - 13.7.1.2 Energy storage (Batteries, ultracaps)
      - 13.7.1.3 Energy recovery systems
      - 13.7.1.4 DC/DC converter, DC/AC converter
      - 13.7.1.5 Battery sensor
      - 13.7.1.6 Power supply sensor
      - 13.7.1.7 Central electrics
      - 13.7.1.8 On-board power supply management
    - 13.7.2 Components/Mechatronics**
      - 13.7.2.1 Electric motor
      - 13.7.2.2 Solenoid valves
      - 13.7.2.3 Piezo valves
      - 13.7.2.4 Relays (see Electromechanics/System peripherals)
      - 13.7.2.5 Switches (see Electromechanics/System peripherals)
      - 13.7.2.6 Fuses
      - 13.7.2.7 Smart Power
      - 13.7.2.8 Connectors (see Electromechanics/System peripherals)
      - 13.7.2.9 Cable assemblies
      - 13.7.2.10 Optical conductors

## 13 Automotive

13.7.2.11 Sensors (see Sensor technology)  
13.7.3 Bus systems  
13.7.3.1 Gateway  
13.7.3.2 Lin bus  
13.7.3.3 Can-B bus  
13.7.3.4 Can-C bus  
13.7.3.5 FlexRay  
13.7.3.6 MOST

**13.8 Construction and test Services**  
13.8.1  
13.8.1.1 Diagnosis  
13.8.1.2 Controller development  
13.8.1.3 Software development  
13.8.1.4 Hardware development  
**13.8.2 Test equipment**  
13.8.2.1 Hardware in the Loop

13.8.2.2 Tester  
**13.8.3 Standards**  
13.8.3.1 DIN/ISO norming  
13.8.3.2 Test regulations  
13.8.3.3 Autosar  
13.8.3.4 OSEK

## 14 Wireless

**14.1 Cellular systems**  
14.1.1 UMTS  
14.1.2 GSM  
14.1.3 GSM-R  
14.1.4 GPRS  
14.1.5 EDGE  
14.1.6 HSCSD  
14.1.7 Tetra  
14.1.8 Tetrapol  
14.1.9 Other standards  
**14.2 Non-cellular systems**  
14.2.1 WLAN  
14.2.2 DECT  
14.2.3 Bluetooth

14.2.4 Home RF  
14.2.5 Infrared  
14.2.6 Spread-spectrum transmitters/receivers  
14.2.7 Other standards  
14.2.8 Modems  
14.2.9 RF assemblies, miscellaneous  
14.2.10 Filter assemblies  
14.2.11 Up converters  
14.2.12 Down converters  
14.2.13 Low-noise converters, LNC, LNB  
14.2.14 IRD  
14.2.15 Batteryless radio technology  
14.2.16 ISM modules

**14.3 Wireless applications**  
14.3.1 Music  
14.3.2 Games  
14.3.3 TV receiver subsystems  
14.3.4 TV tuners  
14.3.5 SAT tuners  
14.3.6 GPS chip sets  
14.3.7 GPS receivers  
14.3.8 Other applications  
14.3.9 RFID  
**14.4 Business partners**  
14.4.1 Content providers  
14.4.2 Service providers

## 15 Information gathering and services

**15.1 Information**  
15.1.1 Parts databases, also with online access  
15.1.2 Product information systems  
15.1.3 Technical books  
15.1.4 Technical publications  
15.1.5 Publications, miscellaneous  
15.1.6 Associations  
15.1.7 Standards, national/European  
15.1.8 Generation of documentation, technical  
15.1.9 Economic development agencies  
15.1.10 Kitting  
15.1.11 Training  
**15.2 Approval testing and other services**  
15.2.1 ASIC development services  
15.2.2 Hardware design

15.2.3 Software design  
15.2.4 Test software design  
15.2.5 System design  
15.2.6 Project assistance  
15.2.7 Consulting/training  
15.2.8 Consulting services for measurement applications  
15.2.9 Systems integration  
15.2.10 Firmware and drivers  
15.2.11 User groups  
15.2.12 Providing embedded system services  
15.2.13 EMC testing/characterization  
15.2.14 ESD testing/characterization  
15.2.15 Certification, product  
15.2.16 Quality management services  
15.2.17 Environmental simulation testing  
15.2.18 Testing services, electronic components

15.2.19 Distribution  
15.2.20 Second-hand equipment  
15.2.21 Equipment rental, leasing  
15.2.22 Calibration/test equipment services  
15.2.23 Consulting services for measurement applications  
15.2.24 Other services  
15.2.25 Programming services  
15.2.26 Test-program creation  
15.2.27 Production services  
15.2.28 Consulting services for electro-mechanical solutions  
**15.3 Start-up Forum**  
15.3.1 Technology transfer  
15.3.2 Consulting  
15.3.3 Financial services/risk capital  
15.3.4 Joint ventures