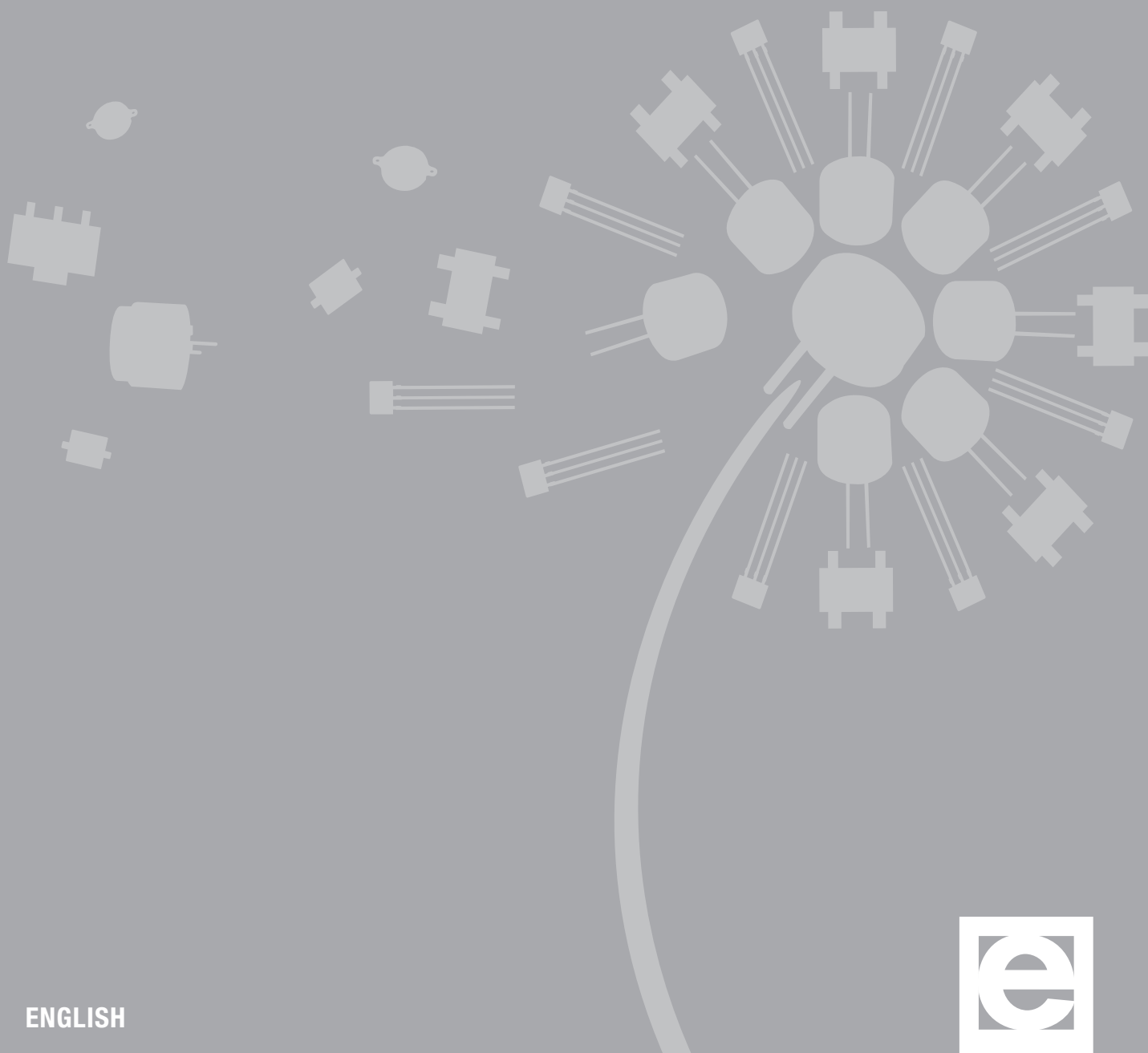


LINECARD





“Where the future of electrical engineering is at home“



Quality and technical support Quality is not a question of being demanding, but a key for success. Who recommends quality, shows that he is an expert himself. Every good engineer is perfectly aware that he needs excellent instruments to be successful. Business relationships which last over 30 years have become rare in the struggle for orders and yield. And it is exactly for this reason why we focus on continuity and close cooperation, not only for what concerns the relationships towards our suppliers, but also with regard to our colleagues. Thus on one hand we can guarantee competitive advantages and a maximum of product availability, on the other hand a positive social environment generates a major efficiency and a higher motivation in the daily business. Through the acquisition of Novitronic AG we have gained an excellent access to the market for electromechanical components, which we will further extend in the future.

Our colleague in Asia, who directly knows the problems on-site and the appropriate solutions and thus affords a smooth workflow, proves that closeness has nothing to do with distance. The marketing teams of Endrich and their colleagues are sophisticated but not detached, because they possess excellent technical skills, which are completed by many years of professional experience in design. Surely at this point we can be a little bit proud of our uniqueness: all the product ranges are taken care of for you by **endrich** teams of experts and by professionals operating for our producers. In short, we are capable of exactly providing the technical support you desire. The figures but first and foremost the high level of customer satisfaction show that this strategy works.



Mrs. Dr. Endrich



One fourth of the yearly turnover of **endrich** is generated by its activities in the automotive supply industry, considered particularly delicate. This result is only feasible thanks to the permanent contact and the growing relationships with our partners. In this way we manage to operate successfully for our customers and to be profitable for ourselves. Medium-sized manufacturers as well as big enterprises in Asia, Europe and the USA form the basis for our design-in in the technically oriented distribution business.

“A family with more than 10,000 children“

Facts: From our central stock in Nagold we deliver to 50 countries worldwide with standards like “just in time”, buffer stocks or consignment stock, 100 % bar code labelled and therefore traceable. Our customised logistic strategies enable us to supply our products quickly wherever you need them. We remain in constant contact on-site with the supplier and are at the same time always close to you. We always act locally and think globally in the truest sense of the word.



Philosophy: In the procurement of true innovations from Asia we do not only see a challenge – it really is a central driving force for our company. Top service and highest quality are our gauge, in a sector known for its worldwide quality competition. When costs and product development spin like turbines we remain composed and keep thinking goal-oriented. We do not abandon our clients, but provide advice about the right products and their potentialities already in the forefront. The advantages of familiar thinking are possible only in a family enterprise. **endrich** stands for the dialogue from person to person drawn from long relationships with our customers and manufacturers and inspired by our claim “**endrich – components of life**“.

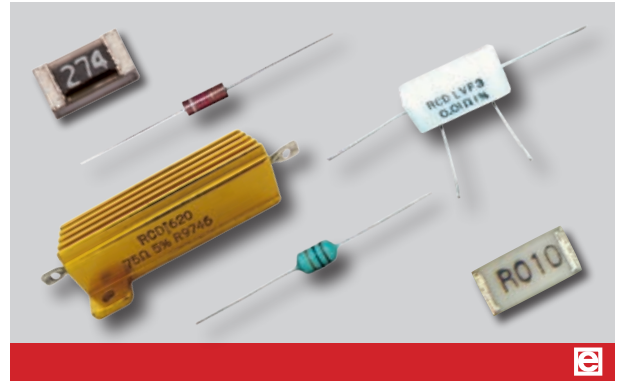


CAPACITORS

SMD	Electrolytic	■		
	Hybrid	■		
	Polymer		■	
THT	Electrolytic	■		
	Hybrid	■		
	Polymer		■	
LARGE CAN	Axial			■
	Snap-in/screw/lug			■
	Film			■

FEATURES

Certificates	TS 16949 AEC-Q200	TS 16949 partly AEC-Q200 partly	TS 16949 in process ISO 9001
General information	<p>Large portfolio of SMD and polymer hybrid capacitors</p> <p>Hybrid technology: Aluminium electrolyte capacitor combined with polymer hybrid material</p> <p>Extremely high ampacity in comparison with identical SMD capacitors</p> <p>High voltage, up to 125V in a temperature range from 105°C ... 150°C</p> <p>Radial type HEH up to 100 V / 10.000 h</p>	<p>Inventor as well as leading manufacturer of polymer technology</p> <p>Life time up to 5.000 h / 105°C > 100.000 h / 85°C</p> <p>Low ESR, up to 5 mOhm</p> <p>High ripple load (@ Oscon SVPE 10 mm x 13 mm)</p> <p>Poscap / Oscon / SP-cap</p> <p>Voltage range 2 ... 35 V</p> <p>Capacity range up to 1500 uF</p>	<p>Manufacturer of AL- electrolyte and foil capacitors</p> <p>Specialized for smaller and medium size quantities</p> <p>Customer-specific products on request</p> <p>Electrolyte/Film: Temperature range - 55 ... + 125 °C Voltage range 16 ... 1900 V Capacity range 2.5 µF ... 3.3 F Long life time e. g. 100.000 h/80 °C</p>
Applications	<p>Automotive</p> <p>Telecommunication</p> <p>Computer & IT</p> <p>Measurement</p> <p>Sensors</p> <p>Consumer</p> <p>Power supplies</p> <p>Industrial</p> <p>Medical</p>	<p>Automotive</p> <p>Telecommunication</p> <p>Computer & IT</p> <p>Measurement</p> <p>Sensors</p> <p>Consumer</p> <p>Power supplies</p> <p>Industrial</p> <p>Medical</p>	<p>Automotive</p> <p>UPS</p> <p>Power supplies</p> <p>Industrial</p> <p>Medical</p>
News	For 2017 new SMD series with higher capacity in same case size, available for 105°C and 125°C	<p>Voltage range up to 50V for Poscap</p> <p>Ultra low SP-cap with 3 mOhm</p>	<p>Individual customer-specific capacitor solutions possible:</p> <ul style="list-style-type: none"> - Wind energy systems - Hybrid cars

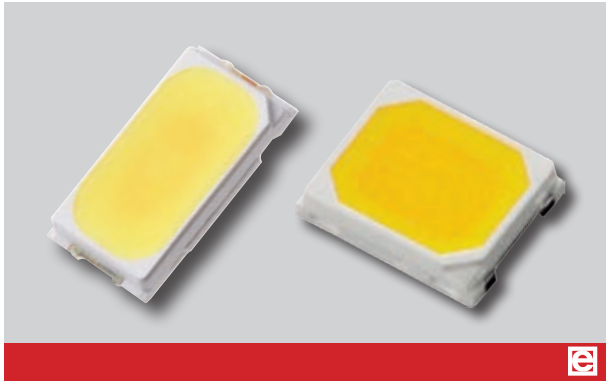


INDUCTIVE COMPONENTS / RESISTORS

Inductive components	RF chokes	■				
	Power chokes	■				
	EMI/EMC chokes	■				
Chip-resistors	Precision		■	■		■
	Low ohm		■	■		■
	High ohm			■	■	■
	Special/Others		■	■	■	■
Leaded resistors	Metal film-foil		■		■	■
	Carbon film composition					■
	Metal oxide					■
	Wire wound					■
	Ceramic					■
	Special/Others				■	■

FEATURES

Certificates	TS 16949 partly AEC-Q200 partly	TS 16949 AEC-Q200	TS 16949 ISO 14001	ISO 9001 ISO 14001	ISO 9001 MIL-STD-790
General information	Wide range of SMD power inductors for various applications High quality with best price/performance ratio	Thinfilm precision resistors and networks from 0201 ... 2512, down to 0,01 % tolerance and 1 ppm TCR with short or long side electrodes. Innovative products in the area of low ohm (shunt) resistors. High quality and superior long term stability	Manufacturer of chip resistors that are customized for special applications like pulse proof (EN61000-4-5), high ohm (100 MΩ), low ohm (1 mΩ), and high voltage (2 kV) operations	Manufacturer of precision, high ohm and high voltage resistors up to several TΩ, 300 kV or 250 W, EN61000-4-5 capable	Wide variety of SMD & leaded resistors in all market-common technologies and suitable for most applications
Applications	Telecommunication Computer & IT Measurement Sensors Consumer Power supply Industrial Medical	Telecommunication Measurement Sensors Industrial Medical Automotive Sensors	Telecommunication Computer & IT Measurement Sensors Consumer Power supply Industrial Medical	Measurement Sensors Power supply Industrial Medical High Voltage (applications)	Telecommunication Computer & IT Measurement Power supply Industrial Medical Sensors
News	DP Series: smallest SMD power inductor with iron powder core, flat copper wire and amorphous core material for best efficiency	LRG Series: ultra precision thin film resistor with radial lead wires as extension to the URG series (SMD)	FVS – safety resistor with UL certificate	HC series: smallest size high ohm chip resistor in the market Case 0402 is available with up to 150 GΩ	The unique swift® program enables RCD to produce items much faster than usual by adding only a small surcharge



CITIZEN

EVERLIGHT

DOMINANT™
Semiconductors
Innovating Illumination

LED

Low power LEDs	SMD	■	■	■
	THT		■	■
	7-Segment displays		■	

FEATURES

Certificates	ISO 9001 ISO 14001	ISO 9001 ISO 14001	ISO 9001 ISO 14001 TS 16949
General information	Wide range of low power LEDs in several colors and packages	Wide range of low power LEDs in several colors and packages Superb cost-efficiency Standard packages and colors on stock All colors available: 2700 ... 6500 K	Wide range of automotive certified LEDs in several colors and packages All automotive certificates are available
Applications	Industrial lighting	Industrial lighting General lighting LED displays	Interior and exterior lighting for automotive applications
News	Amber White COBs Blue COBs Horticulture COBs	Agricultural SMD LEDs from 365 ... 730 nm and 0,2 ... 1 W sizes 2835, 3030 and 3535	SpicePlus2520: 150 lm ultra low height profile 0,7 mm low thermal resistance RthJS 10 K/W



Lumotech®

INVENTRONICS

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POWER SUPPLIES

Power supplies	Indoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FEATURES

Certificates	ISO 9001	ISO 9001	ISO 9001 ISO 14001
General information	6 ... 100 Watt DIP-switch current selection DALI drivers Compact housing 5 years warranty Made in EU	IP67 drivers More than 1000 standard drivers DALI and programmable versions up to 500 W constant voltage 5 years warranty	1 ... 150 Watt DALI drivers IP65 versions 5 years warranty Made in EU
Applications	Interior lighting	Interior and exterior lighting Tunnel and stadium lighting	Interior and exterior lighting
News		Constant current driver with 600 W Programmable drivers up to 320 W, also available in DALI versions	Bluetooth driver Programmable via app Luminaire control and dimming with mobile phone

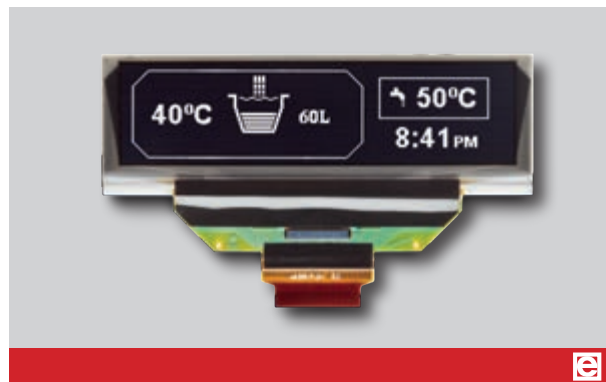


DISPLAYS / EMBEDDED SYSTEMS

TFT-Displays	■	■	■	
Embedded Systems				■
Monochrome LCD		■		

FEATURES

Certificates	TS 16949, ISO 9001, ISO 14001, OHSAS 18001	TS 16949 partial ISO 9001, ISO 14001	TS 16949 partial ISO 9001, ISO 14001	ISO 9001
General information	Own TFT glass, color filter and backlight-manufacturing TFT-Modules from 5.0 ... 27.6" Extend operating temperature range -30° ... +85°C Extended viewing angle by HFFS technology Automotive TFT production line Special sizes available	Industrial TFT-modules from 3.5 ... 12.1" Sunlight readable TFT-modules Modules available in high bright and super high bright versions Minimum backlight lifetime of up to 50,000 hours Extended operating temperature range -30° ... +85°C 5-year operational guarantee on workmanship and interface	TFT-Modules from 1.45 ... 10.4" TFT-Modules from 2.8 ... 10.1" with resistive and projective-capacitive Touch	armStone (Single Board Computer) - ARM CortexTM-A5 & -M4 - ARM CortexTM-A9/A9r2 - Single-/Dual-/Quad-Core CPU - min. longterm availability up to 2023 efus (Computer on Module) - Freescale i.MX6 ARM Cortex-A9 - UltraLite/Solo/Dual-Lite/Quad-Core CPU - min. longterm availability up to 2025 Operating systems Windows & Linux Modules with WLAN/Bluetooth & camera available Starter kits available Extensive soft-/hardware-support
Applications	Medical Automotive Consumer	Industrial Medical Building Automation Telecommunication	Industrial Medical Building Automation Telecommunication	Industrial Medical Building Automation Telecommunication
News		Optical Bonding Outdoor Touch Panel 10.4" TFT-modules with a brightness of 1.500 cd/m ² 12.1" TFT-modules with a brightness of 1.300 cd/m ²	Customized solutions (cover lens, brightness, backlight, interface) iSi50 3.5"/4.3"/5.0"/5.7"/7.0" TFT-module without touch, resistive and capacitive touch. All sizes are available as industrial displays for indoor-application (brightness up to 500cd/m ²) and sunlight readable high-end displays (brightness up to 1.000 cd/m ²).	armStoneA9r2 (Single Board Computer) efusA7UL (Computer on Module)

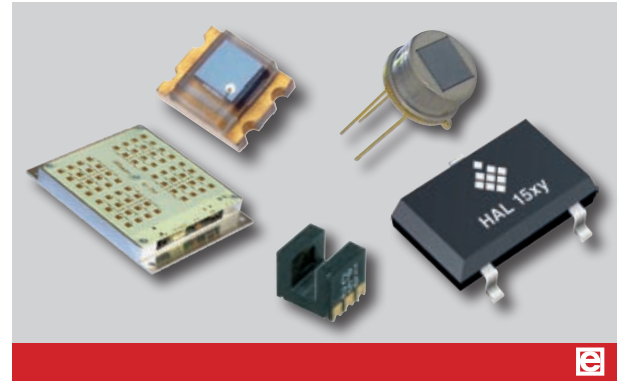
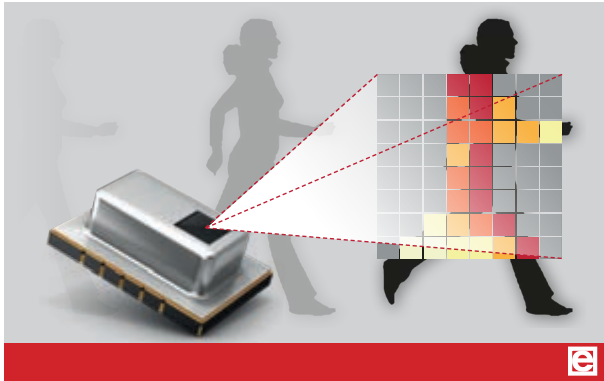


DISPLAYS / EMBEDDED SYSTEMS

TFT-Displays			
Embedded Systems			
OLED-Displays			
Monochrome LCD			

FEATURES

Certificates	TS 16949, ISO 9000, QS 9000, ISO 14001, QS 080000, ISO 13485	TS 16949 partly ISO 9001, ISO 14001	TS 16949 ISO 9001, ISO 14001
General information	<p>Closed embedded computer-solutions (Panel-PC) from 4.3" ... 15.0" with resistive and projective-capacitive touch</p> <p>IPS-modules (All-View)</p> <p>Cover lens 4 mm (optical bonding)</p> <p>Different performance classes (Freescale CPU)</p> <p>Longterm availability of 7 years</p> <p>Eval-kits available</p>	<p>Own OLED glass manufacturing</p> <p>Q-Series: TFT-modules from 3.5 ... 10.2" Resistive and projective-capacitive Touch available Unified 36-pin standard MCU interface</p> <p>M-Series: TFT-modules from 3.5 ... 5.7" Resistive and projective-capacitive touch available</p> <p>Integrated Display Controller PIC24 (clever system)</p> <p>Monochrom alphanumeric OLED from 8 x 2 up to 20 x 4 signs</p> <p>Monochrom graphic OLED from 0.95 .. 3.2", 50 x 16 up to 256 x 64 pixels</p> <p>Alphanumeric LC-displays (COB) from 8 x 2 ... 40 x 4 signs</p> <p>Graphic LC-displays (COB) from 122 x 32 ... 240 x 128 pixels</p> <p>Graphic LC-displays (COB/COG) from 16 x 2 ... 320 x 240 pixels</p>	<p>Biggest OLED glass manufacturing worldwide</p> <p>Monochrom alphanumeric OLED from 16 x 2 ... 20 x 2 signs</p> <p>Monochrom graphic OLED from 0.5 ... 3.2", 72 x 32 or 96 x 16 ... 256 x 64 pixels</p> <p>Full-color-OLED from 1.1 ... 1.8", 96 x 3 x 96 ... 160 x 3 x 128 pixels</p>
Applications	Industrial Medical Telecommunication	Industrial Medical Building Automation Telecommunication	Industrial Medical Building Automation Telecommunication
News		Q-series and M-series USB-Demo available	Monochrom alphanumeric OLEDs from 16 x 2 ... 20 x 2 signs



EVERLIGHT

MICRONAS

NICERA

JRC

Panasonic

RFbeam

SENSOLITE

SENSORS

Grid Eye – Thermopile Array					■		
Hall		■	■				
Infrarot	■		■				
Solar cells					■		
Radar				■		■	
Vibration							■

FEATURES

Certificates	ISO 9001 TS 16949 partly	ISO 9001 TS 16949	ISO 9001 TS 16949 partly	ISO 14001 TS 16949	ISO 9001	ISO 9001	ISO 9001
General information	Famous Taiwanese manufacturer with a high production capability Large product range of IR sensors	Development and production with own waferfab in Germany High innovation power Large portfolio of switches, linear and angle sensors Leading manufacturer of linear sensors in the automotive sector	Long-standing partner for electronic components on ceramic basis	Japanese manufacturer for analog and microwave components	Global player with a wide product range Manufacturer of e.g. solar cells and thermopile sensors	Swiss company Specialist for consumer and special applications in the radar sector Development of HF applications	Development and production in Germany Specialist in micromechanics
Applications	Industrial White goods Measurement equipment Light barriers	Automotive Industrial White goods Medical equipment	Home automation Measurement equipment White goods Security (e.g. burglar alarm)	Movement detector Door opener People counting	Grid-Eye: Object & person recognition Non-contact temp. measurement Solar cells: Watches Shutters & lighting control Home automation	Traffic control Door opener Movement detector Lighting control Speed measurement	System-wake-up for portable devices Bicycle lamps Shaver Burglar alarm
News	Ambient light sensors with digital output Ambient light sensors with proximity sensors	HAL15xy – ASIL-A ready HAC – hallsensor with integrated capacitors HAR – hallsensor as dual-die version (redundancy)	Digital pyrosensor Lens for pyrosensor	Detection of heart and breathing rate Low power module	Grid-Eye Generation 2 with better accuracy and detection distance Foil cell with thickness 0.18 mm Energy harvesting applications	Digital 3D radar	Vibration sensor with reduced sensitivity

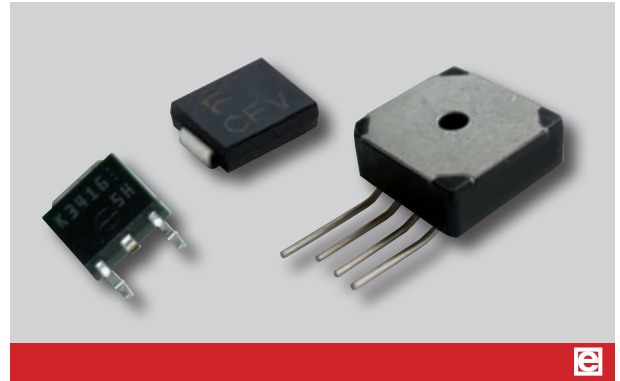
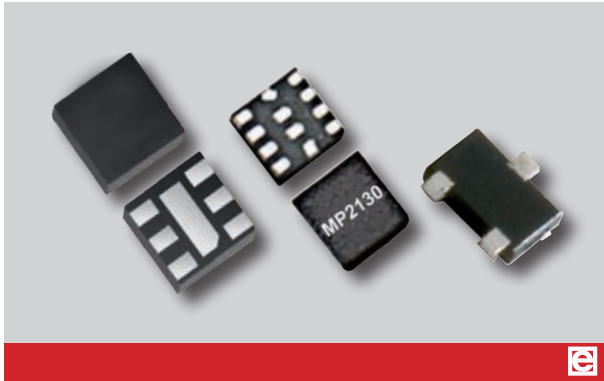


THERMISTORS

NTC SMD	■	■	■
NTC leaded		■	■
PTC leaded	■		
NTC film type		■	■
NTC thermistor probes	■	■	■
PTC thermistor probes			■
Assembled sensors	■	■	■

FEATURES

Certificates	ISO 9001 TS 16949 / AEC-Q200	ISO 9001 TS 16949 partly	ISO 9001 ATEX partly
General information	Thick film thermistors based on Al_2O_3 substrate Tateyama patented core material technology Wide variety and customization of R/T curves Guaranteed long-term stability of minimum 10 years High quality with best price/performance ratio	Semiconducting ceramic resistors Guaranteed long term stability of minimum 10 years High precision thermistors featuring extremely small B-value tolerance and resistance High quality with best price/performance ratio	Semiconductor based ceramic resistors Most responsive and flexible thermistor supplier in Europe Wide range of assembled NTC/PTC temperature probes Custom sensors on demand High quality with best price/performance ratio
Applications	Automotive Battery management HVAC Electro domestics Industrial Metering Medical	Automotive Battery management HVAC Electro domestics Industrial Metering Medical	Automotive Battery management HVAC Electro domestics Industrial Metering Medical
News	HTS/Pt200 for temperatures of + 1000 °C especially for exhaust temperature measurements	Temperature sensors for e-mobility applications (HV/EV) μ -chip thermistor for medical applications	Temperature sensors for HVAC applications with IP68 (heart catheters) protection

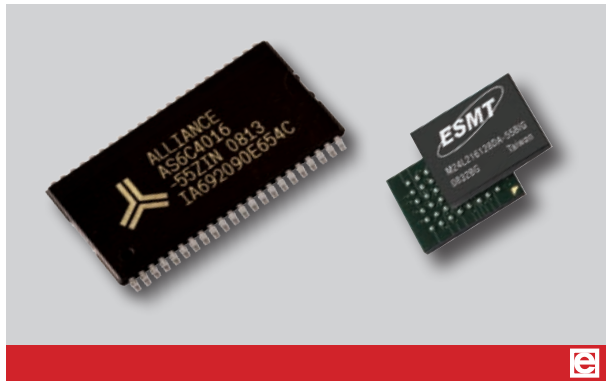


ANALOG

Analog switches		■	■		
Audio ICs	■	■	■		
Communication ICs	■	■			
Discrete				■	■
Display drivers	■	■			
GaAs MMICs		■			
LED drivers	■	■	■		
Microcontroller	■				
Motor ICs	■	■	■		
Operational amplifiers	■	■	■		
Power supply ICs	■	■	■		
Video ICs	■	■			
HV rectifiers					■

FEATURES

Certificates	ISO 9001 ISO 14001	TS 16949 ISO 14001	TS 16949 ISO 14001	TS 16949 ISO 14001	ISO 9001
General information	Taiwanese company with product development focus in the area of microcontrollers and their peripheral products. The microcontroller range includes fully integrated digital and analog functions such as A/D converters, LCD drivers, PWM generators, high current LED drivers, touch switches, SPI/I2C interfaces, USB drivers, voice functions, RF functions, Telecom functions etc. Microcontroller devices meet with full industry specifications, and are as OTP and Flash type available	NJRC (New Japan Radio Ltd.) is a Japanese company with its development focus in analog ICs Leading company for operational amplifiers (OPA) and LDO Beside this JRC offers a large diversity of ICs for communication, automotive, industrial and RF- applications For the automotive applications special parts can be provided with AEC-Q qualification	Monolithic Power Systems (MPS) is a USA based high performance analog semiconductor company DC/DC converter ICs, LED driver ICs, Class D audio amplifier ICs that are well-suited for small form factors Linear ICs including operational and current sense amplifiers Battery chargers and protection devices Power over Ethernet (PoE) Motor ICs	Eris Technology Corporation, is a Taiwanese ODM providing a variety of support services to design, manufacturing, and after-marketing services for diode products Eris business scope comprises Schottky diodes, TVS diodes, Zener diodes, bridge diodes, wafers, LEDs	The rectifier specialist since 1951 EDI offers an extensive selection of bridges, low and high voltage rectifiers, high voltage fast recovery diodes and high voltage assemblies Available in a wide range of voltage and current ratings, recovery times, case configurations and terminations
Applications	Industrial and communication market White goods Entertainment	Sensors, head sets, automotive, entertainment equipment, TV, white goods, PLC, navigation systems, mobile phones, RF-applications	Sensors, TV, white goods, router, navigation systems, mobile applications, automotive, general lighting, industrial applications	Sensors, head sets, automotive, entertainment equipment, TV, white goods, PLC, navigation systems, mobile phones	Avionics, engines, night vision, lasers, X-ray machines, power supplies
News	32 - Bit MCU Finger print sensor MCU PIR Sensor	Special high- and low- side switches for sensors, high power OPA, GPS Front-End-Module	Mini module	World thinnest bridge rectifiers	Night vision multipliers, diodes and arrays



ANVO-SYSTEMS

ALLIANCE
MEMORY

FIDELIX

ESMT

GigaDevice

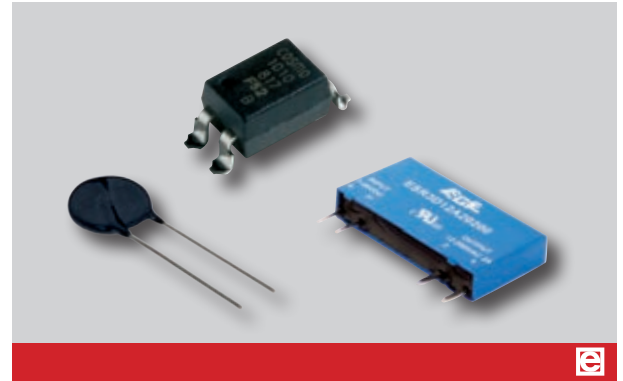
JSC JEJU
Semiconductor

MEMORY

SRAM/pSRAM/nvSRAM	■	■	■	■		■
SDRAM/DDR/DDR2/DDR3		■	■	■		■
Flash			■	■	■	■
MCP			■	■		
SSD						
eMMC			■		■	■
Audio IC				■		
Microcontroller					■	
Power Supply IC				■		

FEATURES

Certificates	ISO 9001 ISO 14001	ISO 9001 ISO 14001	ISO 9001 ISO 14001	ISO 9001 ISO 14001	ISO 9001 ISO 14001	ISO 9001 ISO 14001
General information	<p>ANVO Systems is a German company specialized in serial and parallel non volatile SRAMs</p> <p>The combination of the typical SRAM feature with the extreme robust Sonos Flash technology allows unlimited write cycles and guarantees the data retention also in case of voltage drop</p>	<p>American fabless semiconductor company</p> <p>The company strategy focuses on the „legacy“ memories to support the industrial and communications market space</p> <p>Additionally they offer a wide range of SDRAMs and DDR1-2-3</p>	<p>Fidelix Co. Ltd., a Korean fabless company, focusing on developing higher performance yet more cost competitive memory solutions</p> <p>Their focus is on pSRAMs, low power SDRAMs and DDR SDRAMs as well as MCPs and mobile application memories</p> <p>A number of SPI Flash completes their product range</p>	<p>Taiwan based memory IC design company</p> <p>ESMT offers a full range density (from 1 Mb ... 4 Gb) and a wide variety of specialty DRAM products (SDRAM, DDR, mobile SD/DDR1 up to DDR3)</p> <p>MCPs, NOR and NAND Flash with parallel and/or serial interface completes the product range</p>	<p>GigaDevice, is a leader fabless manufacturer for progressive Memory technology and Microcontroller in China</p> <p>Large product spectrum for NOR Flash, as well as also Nand Flash and e-MMC</p> <p>The ARM Cortex MCU upgrade the GigaDevice product portfolio</p>	<p>JSC (former EMLSI) is a Korean company</p> <p>The focus is on Low Power SRAMs from 1 ... 16 Mb and pSRAMs from 8 ... 32 Mb</p> <p>Mobile SDRAM /DDR1 (128 ... 512 Mb), SPI Flash: 4 ... 64 Mb, as well as 1 ... 4 Gb SPI Nand Flash and also the 4 ... 64 Gb e-MMC complete the product range of JSC.</p>
Applications	<p>Measurement equipment</p> <p>Medical equipment</p> <p>Automotive- and industrial equipment</p>	<p>Industrial and communications market</p>	<p>Low power and fast speed</p> <p>Memory solutions for mobile communication and point-to-point applications</p>	<p>PCs, servers and workstations</p> <p>PC peripherals, industrial products, consumer products, communication devices</p>	<p>Industrial</p> <p>Medical and consumer area</p>	<p>Consumer storage</p> <p>Industrial</p> <p>Embedded</p> <p>Customized</p>
News	<p>1 Mb SPI nvSRAM</p> <p>Development of customer made ASICs</p>	<p>512 Mb mobile SDRAM</p> <p>1 Gb DDR SDRAM</p> <p>1 ... 8 Gb DDR2 SDRAM</p> <p>16 Gb DDR3 SDRAM</p>	<p>1 ... 2 Gb DDR2 SDRAM</p> <p>1 Gb DDR3 SDRAM</p> <p>1 ... 2 Gb SPI Nand Flash</p> <p>4 ... 32 GB (MLC) E-MMC</p>	<p>1 ... 4 Gb DDR3 SDRAM</p> <p>1Gb SPI Nand Flash</p> <p>1 ... 4 Gb Parallel Nand Flash</p>	<p>256 ... 512 Mb Parallel Flash</p> <p>512 kb ... 512 Mb SPI Flash</p> <p>1 ... 8 Gb SPI Nand Flash</p> <p>e-MMC: 4 ... 8 Gb</p> <p>Mikrocontroller Cortex M0+, M3, M4</p>	<p>512 Mb mobile SDRAM</p> <p>1 Gb mobile DDR</p> <p>1 ... 4 Gb SPI Nand Flash</p> <p>4 ... 64 Gb e-MMC (MLC+TLC)</p>

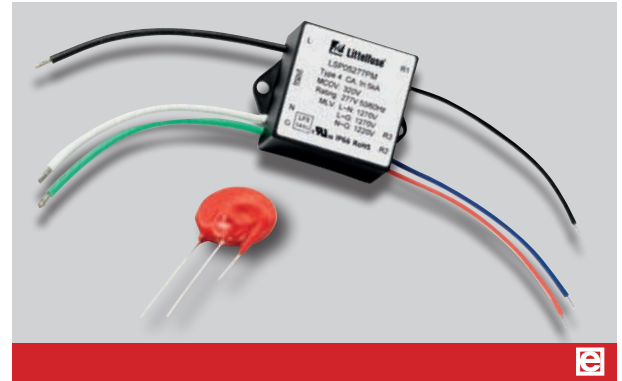
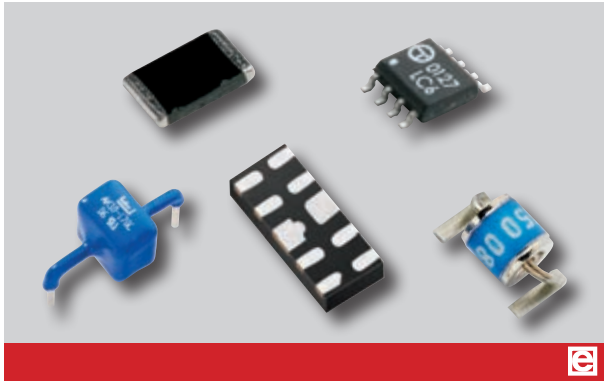


PROTECTION DEVICES

Overcurrent protection	PolySwitch PPTC	■				
	Fuse	■				
	Power thermistor		■			
	CRD		■			
Coupler/SSR	Opto coupler			■	■	
	MOS relay				■	■
	Solid State Relay				■	■

FEATURES

Certificates	ISO 9001 / 14001 TS 16949 AEC-Q200	ISO 9001 / 14001	ISO 9001 / 14001 TS 16949	ISO 9001 ISO 14001	ISO 9001 ISO 14001
General information	Resettable & non resettable solutions Size: SMD and through-hole options Voltage: up to 25800 V Current: 0.04 ... 6000 A UL, VDE and TUV approved	Unique current regulative characteristic Pinch off currents from 0.1 ... 22 mA Voltages up to 100 V High dynamic impedance Low temperature drift	DIL, SMD, mini-flat (SOP), LSOP, SSOP and wide body-housing Single- and multi-channel CTR 50 ... 15000% High-speed coupler up to 10 MBit Isolating voltage up to 5.000 V UL, VDE and TUV approved	DIL, SMD, Mini-flat (SOP), LSOP and SSOP-housing Single- and multi-channel CTR 50 ... 2000 % High-speed coupler up to 10 MBit Isolating voltage up to 5.000 V UL, VDE and TUV approved	DIL, SMD and mini-flat (SOP) housing Load current: 130 mA ... 40 A Load voltage: 60 ... 800 V On-resistance: 0.83 ... 28 Ohm Isolation voltage: up to 5.000 V Trigger current: 10 ... 25 mA UL and TÜV approved
Applications	Appliances Automotive Batteries Communication Home entertainment Industrial Lighting Mobile devices	PLC (programmable logic controller) Sensor applications LED control circuits	Power supply Home appliances Industrial Telecommunication Network Point of sales Testing instruments	Power supply Home appliances Industrial Telecommunication Network Point of sales Testing instruments	Power supply Home appliances Industrial Telecommunication Network Point of sales Testing instruments
News	TVSS are varistor protection fuses, designed to survive the 8x20 µs lightning surges without opening	CRD S-223T ... 22 mA and 500 mW rated current regulative Diode in compact SOD-123FL package	CTP17 – smallest and flattest opto coupler worldwide CT816L low input current phototransistor optocoupler with higher operating temperature of 110°C		high current MOS relays including the EPR311A038005 with a continuous peak load current of 6A

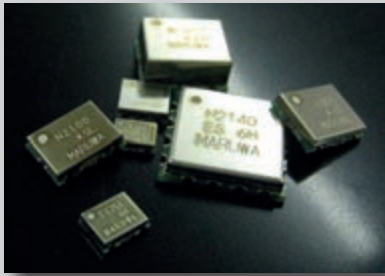


PROTECTION DEVICES

Over-voltage protection	TVS-Diode/array	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	Varistors	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	
	CSPD		<input type="checkbox"/>			
	ESD suppressor	<input type="checkbox"/>			<input type="checkbox"/>	
	GDT	<input type="checkbox"/>	<input type="checkbox"/>			
	Protection thyristor	<input type="checkbox"/>		<input type="checkbox"/>		
	Protection module	<input type="checkbox"/>		<input type="checkbox"/>		
	PLED	<input type="checkbox"/>				
Hybrid protection	PolyZen	<input type="checkbox"/>				
	2Pro	<input type="checkbox"/>				
	TMOV	<input type="checkbox"/>				

FEATURES

Certificates	ISO 9001 / 14001 TS 16949 AEC-Q200	ISO 9001 / 14001 TS 16949 AEC-Q200 partly	ISO 9001 TS 16949 AEC-Q101	ISO 9001 / 14001 TS 16949 AEC-Q200	ISO 9001 / 14001 TS 16949 AEC-Q101 partly
General information	Size: SMD 0201, modules and through-hole options Voltage: 5 ... 6500 V Impulse current > 25 kA Integrated overcurrent / overvoltage protection devices Thermally protected varistors	Sizes: 0201 to 6420 Voltage: 3.3 to 385 VDC Up to 5.5 kA (8/20 µs) Special parts with 0.05 pF for RF-applications High ESD handling ability (ESD types >30 kV) CSPDs with superior high surge and high voltage protection capability	Size: SMD 0201, modules and through-hole options Uni- and bi-directional Voltage: 1 ... 440 V High surge capability up to 2.2 MW High ESD handling ability (>30kV Contact/Air) Ultra low capacitances down to 0.15pF	Sizes: 0201 ... 1206 Voltage: 4 ... 42 VAC Extremely quick response time (< 1 ns) Extremely low capacitance (0.2 pF) Extremely low leakage current Zero signal distortion	Size: SMD from SOD-123F Uni- and bi-directional Glass passivated chip junction Peak pulse power: 200 ... 5000 W Stand-off voltage: 5 ... 570 V Excellent clamping capability Very fast response time (ns)
Applications	Appliances Automotive Batteries Communications Home entertainment Industrial Lighting Mobile devices	Telecom + Networking: Ethernet Access Points IP cameras Base stations Security systems Power line modems	Automotive Industrial Telecommunication Networking Medical Test + Measurement Security Point of sales	RF modules Antenna circuits HDMI + USB Handheld devices Set-top boxes	Automotive Telecommunication Consumer Computer + IT Industrial electronics
News	LSP05 & LSP10 series – thermally protected CE compliant IP66 approved UL1449 Type 4 recognized LED lighting surge protection modules	SHV series, high voltage protection up to 385 V DC, from 1210 up to 3220 SHA serie, load dump protection up to 80 Joule, from 1210 up to 3220	SM3/5/10KW series - super flat DFN 2 package, high power surge protection AEC-Q101 qualified PAM8S series, pulse 5A/5B load dump suppression	ESD Guard™ in miniature size 0201 AEC-Q200 specified MLVS AM & EGA AM series for automotive applications	



CITIZEN



SMI

Electronic Ceramics
MARUWA

QUARTZ / OSCILLATOR / FILTER

Quartz crystals	MHz			
	kHz			
Ceramic resonators				
Oscillators				
MCF filters				
SAW filters				
Dielectric filters				
Ceramic filters				

FEATURES

Certificates	ISO 9001	ISO 9001	ISO 9001
General information	<p>Through-hole and SMD</p> <p>Tuning fork crystals</p> <p>Smallest size: 2.0 × 1.2 mm</p> <p>Tight tolerances: up to ± 5 ppm</p> <p>Extended temperature range: - 40 ... + 85 °C</p>	<p>Crystals, clock OSC, TCXO, VCXO, MCF</p> <p>Frequencies: 16 kHz ... 300 MHz</p> <p>Wide range SMD and through-hole packages</p> <p>World smallest package</p> <p>LVP, LVD oscillators</p> <p>Tight tolerances and excellent temperature stability</p> <p>Package down to 1.6 x 1.0 mm</p>	<p>Compact, high performance sub miniature VCOs and LTCC</p> <p>Operating frequency: 1 MHz ... 5 GHz</p> <p>Through-hole and SMD</p> <p>Small size: up to 3.2 × 4.5 mm</p> <p>Excellent tolerance over temperature range</p> <p>Custom made products</p>
Applications	<p>Smart metering</p> <p>GPS</p> <p>Home automation</p> <p>Solar</p> <p>Wrist watch</p> <p>Industrial control</p>	<p>Industry electronics</p> <p>Medical equipment</p> <p>Computer gaming</p> <p>Reference clock</p> <p>TV / Audio</p> <p>RFID</p>	<p>RF Audio</p> <p>Wireless microphone</p> <p>Industrial RF control</p> <p>Base station</p> <p>Wi-Fi</p>
News	<p>Low ESR SMD tuning fork 3.2 x 1.5 mm</p> <p>SMD 2.0 x 1.2 mm tuning fork</p> <p>SMD Tuning Fork 3.2 x 1.5 mm with parallel contacts (better EMI performance)</p>	<p>SMD oscillator 32.768 kHz with extreme low current consumption</p> <p>High stability VC-TCXO, meets STRATUM3</p> <p>AEC-Q200 tuning fork</p> <p>HF-CMOS oscillator 55 ... 160 MHz with excellent temperature stability</p>	<p>Smallest size VCO</p> <p>Base station: Wireless microphone transceiver</p>



SiTime



Chequers Electronic (China) Limited

TST

QUARTZ / OSCILLATOR / FILTER

Quartz crystals	MHz			
	kHz			
Ceramic resonators				
Oscillators				
MCF filters				
SAW filters				
Dielectric filters				
Ceramic filters				

FEATURES

Certificates	TS 16949 AEC-Q100	TS 16949 partly	TS 16949 AEC-Q200
General information	<p>MEMS-based silicon timing solutions from 1 Hz ... 600 MHz</p> <p>1 kHz ... 32 kHz solutions replacing traditional quartz crystals</p> <p>Low power, ultra-performance oscillators</p> <p>Differential and high-temp. oscillators</p> <p>Automotive</p> <p>Clock generators, VCXO, DCXO & VCTCXO</p> <p>Stratum 3</p> <p>Spread spectrum and field prog. oscillators</p> <p>Extended temperature: - 55 ... 125 °C</p> <p>Size down to 1.5 x 0.8 CSP or SOT23</p>	<p>Ceramic resonators: 1 ... 60 MHz, 2.5 x 2.0 mm or smaller Temp.: - 40 °C ... + 85 °C</p> <p>Ceramic filters: e.g. 455 kHz / 10.7 MHz / 27 / 45 MHz</p> <p>Dielectric filters: 433 MHz ... 5 GHz Temp.: - 40 ... + 85 °C</p> <p>Quartz: up to 200 MHz, 1.6 x 1.2 mm, Temp.: - 40 ... + 125 °C</p> <p>Oscillators: up to 200 MHz, 2.5 x 2.0 mm, Temp.: - 40 ... + 125 °C</p>	<p>SAW Filters: 200 MHz ... 3 GHz</p> <p>Through-hole and SMD</p> <p>Size: 2.0 x 1.6 mm or smaller</p> <p>Extended temperature: - 40 ... + 125 °C</p> <p>Standard and customized</p>
Applications	<p>Ethernet</p> <p>DDR and PCI applications</p> <p>Reference clock</p> <p>RF modules</p> <p>Automotive</p> <p>Electric vehicles</p>	<p>Industry electronics</p> <p>Consumers</p> <p>RF modules</p> <p>Lighting</p> <p>White goods</p>	<p>Digital radio</p> <p>Cellular</p> <p>GNSS</p> <p>RF modules</p> <p>TV + radio</p> <p>Wi-Fi & Bluetooth®</p> <p>Electric vehicles</p>
News	<p>32.768 KHZ SUPER TCXO 1.5 x 0.8 mm CSP package. Frequency tolerance just +-5ppm in temp range</p> <p>Extreme temperature range up to - 55 ... 125 °C for industry and automotive SOT23 package</p> <p>Ultra-stable MEMS VCTCXO</p> <p>Ultra-low jitter differential MEMS XO</p> <p>In-system programmable MEMS XO/VCXO/DCXO</p>	<p>Smallest 2.0 mm x 1.6 mm ceramic resonator for 20 ... 60 MHz</p>	<p>Miniature VC-TCXO and TCXO</p> <p>Narrow band SAW filters and wide operating temperature range for mobile phones, 3G, GPS and other mobile communication applications</p>



RF MODULES (ISM BAND / BLUETOOTH / WIFI)

RF-modules (315 MHz ... 2.4 GHz)	■		
Bluetooth®		■	
WiFi™ / WLAN		■	
ZigBee® ready	■		
GSM			■
UMTS			■
LTE			■
LoRa™ Transceiver	■		

FEATURES

Certificates	ISO 9001	TS 16949	ISO 9001, ISO 14001, OHSAS 18001, TS 16949
General information	<p>Low power RF modules for 315, 433.92, 868, 915 MHz and 2.4 GHz</p> <p>Products fully compliant with ETS 300 200 standard</p> <p>Complete AM & FM transmitter modules</p> <p>Keyfob transmitter, transceiver and antennas</p> <p>Extreme low current consumption for extended battery use</p> <p>Customized products for automotive, industrial, heating & controls and home automation applications</p>	<p>Bluetooth® modules class 2 and class 1.5</p> <p>Classic Bluetooth® V2.1 + EDR V3.0+EDR</p> <p>Bluetooth®Smart Ready V4.0 + V2.1</p> <p>Bluetooth® Smart V4.0 and V4.1</p> <p>WiFi-module 802.11 b/g/n</p>	<p>Chinese company</p> <p>Strategic Intel partner</p> <p>GSM modules, UMTS & LTE modules in SMD solderable or mini PCIe and M.2 form factor</p>
Applications	<p>Gate openers / access control</p> <p>Home/car alarm systems</p> <p>Home automation</p> <p>General metering systems</p> <p>Telemetry and remote controls</p> <p>Personal security</p> <p>Social alarms</p>	<p>Home automation</p> <p>General metering systems</p> <p>Telemetry and remote controls</p> <p>Industrial, automation, medical and fitness products</p>	<p>Smart Home</p> <p>Communication for mobile devices</p> <p>Remote controls</p> <p>M2M applications</p> <p>Emergency calls</p> <p>Tracking devices</p> <p>Measurements systems</p>
News	<p>RF-TIDE mesh network, easy installation @868 MHz</p> <p>Category 1 receiver for social alarm</p> <p>SMD FSK & OOK transceiver with wide power supply range @868 MHz</p> <p>Long range transceiver (more than 2 km distance LOS)</p> <p>Transceiver module with Semtech LoRa™ technology enable radio link up to 12 km LOS</p>	<p>PAN9320-WiFi Module</p> <p>Small form factor</p> <p>WiFi stack, TCP/IP, AdHoc and Flash for customer application on board</p> <p>Parallel master and client</p>	<p>M.2 form factor in development</p> <p>LTE module L811-EA with Cat4</p> <p>LTE modules fallback to UMTS and GSM</p> <p>Extended temperature range</p>



LOCOSYS

GNSS MODULES / ANTENNAS

GPS/GNSS receiver modules		■
GPS/GNSS smart antennas (complete module)	■	■
Antennas f. ISM Band, WiFi™, Bluetooth®	■	
Antennas f. navigation / satellite	■	
Antennas f. note book/PND/DVB	■	
NFC antennas	■	
Wireless charging	■	

FEATURES

Certificates	TS 16949, AEC-Q200	TS 16949
General information	<p>Custom made, high gain patch antennas for GPS GLONASS, Galileo, Compass, SDARS, DAB, etc.</p> <p>Small sizes (to 6 x 6 mm) and low profiles (to 2 mm)</p> <p>GSM, W-CDMA antennas as flat or custom designed helix or integrated antennas</p> <p>NFC and power charging solutions</p> <p>ISM band, Bluetooth® and WiFi antennas (2.4 & 5 GHz)</p> <p>Active GPS antenna modules</p>	<p>GPS/GNSS (Global Navigation Satellite System) modules</p> <p>TMC (Traffic Message Channel) devices and G-mouse</p> <p>LOCOSYS is an official value-added partner or strategic partner of world leading GNSS chipset makers such as Mediatek, CSR / SiRF and STM</p>
Applications	<p>Asset tracking / tracing</p> <p>Telematics</p> <p>Navigation</p> <p>Smart metering</p> <p>Cellular phones</p> <p>PC and notebooks</p> <p>Car / vehicle infotainment</p>	<p>Telematics</p> <p>Navigation</p> <p>Asset tracking / tracing</p> <p>Car / vehicle infotainment</p>
News	<p>DUAL PIN GNS antenna with improved axial ratio</p> <p>Smallest GPS antenna in the market (6 x 6 mm)</p> <p>MultiStandard GLONASS/GPS antennas</p> <p>MultiBand active antennas</p> <p>Antennas for NFC and wireless charging</p>	<p>GPS / GLONASS / Beidou / Galileo LNA modules</p> <p>GNSS receiver based on SIRF Star V chipset</p> <p>MEMS sensor integrated GNSS module</p> <p>HED multi-GNSS module solutions</p>

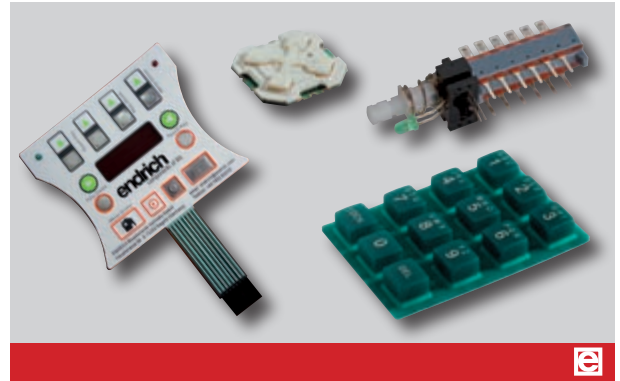


ELECTROMECHANICS

Airmover	Axial fans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Radial blowers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	AC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	EC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FEATURES

Certificates	ISO 9001, ISO 14001 OHSAS 18001, TS 16949 IECQ QC080000, ISO 14064-1	ISO 9001 ISO 14001	ISO 9001	ISO 9001, ISO 14001 OHSAS 18001, SIX-SIGMA
General information	Large range of AC and DC axial fans and radial blowers AC 115 V 50/60 Hz AC 230 V 50/60 Hz DC 5 V / 12 V / 24 V / 48 V Custom made fan trays and modules	Large range of AC and DC axial fans and radial blowers AC 115 V 50/60 Hz AC 230 V 50/60 Hz DC 5 V / 12 V / 24 V / 48 V Custom made fan trays and modules	Large range of custom made AC, DC and EC air movers AC 115 V 50/60 Hz AC 230 V 50/60 Hz DC 5 V / 12 V / 24 V / 48 V EC 230 V 50/60 Hz	Large range of AC and DC axial fans and radial blowers EC air movers AC 115 V 50/60 Hz AC 230 V 50/60 Hz DC 5 V / 12 V / 24 V / 48 V Custom made fan trays and modules
Applications	Telecommunication Network Power supplies PC / IPC Notebook Home appliances Industry Automotive Medical devices	Telecommunication Network Power supplies PC / IPC Notebook Home appliances Industry	Telecommunication Network Power supplies PC / IPC Notebook Home appliances Industry Aerospace Railway	Telecommunication Network Power supplies PC / IPC Notebook Home appliances Industry
News	Smart AC-fan with speed control High performance DC-fans with speed control All DC-fans up to IP55 Special DC-fans up to IP68 3 phase DC-fans Energy saving fans	High end DC fans and blowers for IT and industry IP68 fans on demand	ErP 2015 on all EC products and on most of AC products New generation of fans for railway applications	



win
Total Manufacturing Solution

ECE[®]

CITIZEN

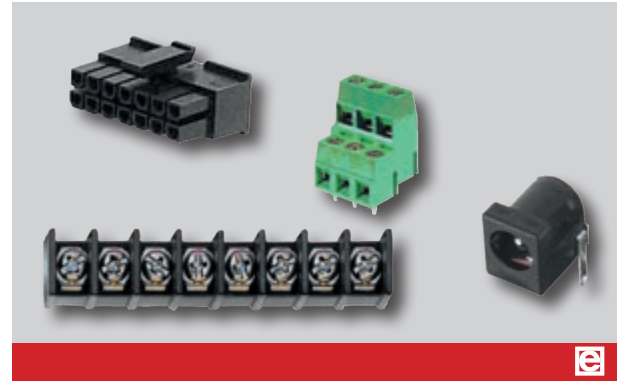
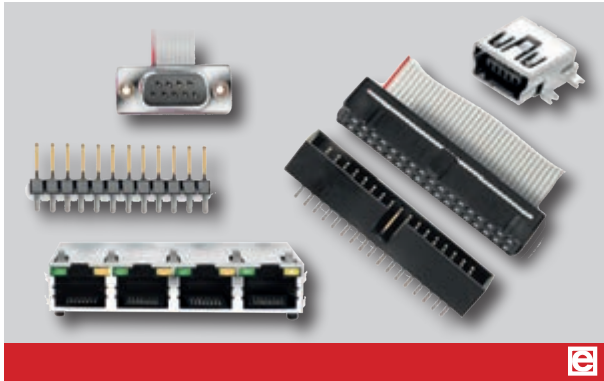
knitter-switch

ELECTROMECHANICS

Tactile switches			■	■
Push-button switches				■
Micro switches				■
Silicone keypads & membrane keyboards	■			■
Relays		■		
Tilt switches		■		
DIP-/ Piano Switch		■		
Rotary Dip Switch		■		
Slide Switch		■		
Industrial Control Switch		■		
Relays		■		

FEATURES

Certificates	ISO 9001 / 14001 TS 16949	ISO 9001 / 14001 TS 16949	ISO 14001 TS 16949	ISO 9001 / 14001
General information	Design and manufacturing of silicon keypads and membrane keyboards Injection moulding Silk screen printing Spray coating PCB-designing	Well-known manufacturer of switches and relays	Manufacturer of high-grade tactile and multifunction switches	Diversified product range of: Push-button switches Tactile switches DIP (rotary) switches Silicone keypads and membrane keyboards
Applications	Home appliances Automotive IT Measurement devices Medical devices	Industry Home appliances Automation Data technology Measurement devices Automotive	Home appliances IT Measurement devices Medical devices Industry	Home appliances Smartphone Industry Medical devices Entertainment Air and space industry
News	Dual color and double layer injection moulding	Industrial switches / buttons IP65 Ø 22 mm, Ø 25 mm, Ø 30 mm mounting diameter Illuminated	Reduction of product range in order to optimize production process Durable Small size IP57	Illuminated and waterproof switches Membrane keyboards in stainless steel up to IP69K



CONNECTORS

Data	USB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	RJ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	D-Sub	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	HDMI / SATA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	FFC / FPC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	IDC / flat cable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power	Terminal blocks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Header / housing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FEATURES

Certificates	ISO 9001 TS 16949 ISO 14001 VG and TÜV New: IRIS certification	ISO 9001 TS 16949 ISO 14001 OHSAS 18001 TÜV (Solar)	ISO 9001 and diverse product certifications	TS 16949 ISO 9000 ISO 14001 ISO 9001
General information	Wide variety of quality connectors for high end performance applications	TE-Connectivity is a unique component manufacturer for automotive industry as well as further branches	Producer of connectors for data- and power connections Best price/performance ratio	High value PCB connectors
Applications	Telecommunication Automotive Computer & IT power units Industry Military Marine Railway Audio LED cabling Solar connectors AC/DC	Telecommunication Automotive Computer & IT Measurement systems Sensors Retail industry Power units Industry Solar	Telecommunication Computer & IT Sensors Retail industry Power units	Telecommunication Automotive Computer & IT Sensors Retail industry Power units
News	USB 3.1C	Dynamic Series Micro-Match	USB 3.1C	

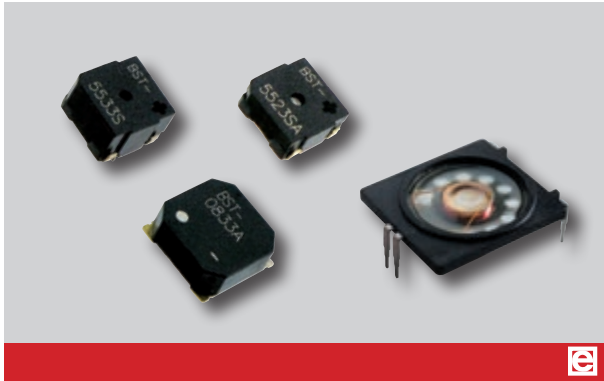


BATTERIES

Lithium primary	Li-SOCl ₂	■
	Li-MnO ₂	■
	Li-FeS ₂	■
	Super pulse caps	■
	High temperature	■
Lithium Ion / Polymer	Li-Ion	■
	Li-Po	■

FEATURES

Certificates	ISO 9001 / 14001 TS 16949 ATEX
General information	One of the biggest manufacturers for lithium primary cells Own engineering and production facility Li-SOCl ₂ and Li-MnO ₂ High temperature cells Temp.: - 40 ... + 180 °C SPC - super pulse capacitors Customized battery packs with PCB Very thin Li-Po cells
Applications	AMR utility metering Alarms and security wireless devices Industrial Home Entertainment RFID transponder Energy storage systems Smoke detectors Emergency transmitter Automotive Mobile devices E-mobility
News	ICR18650 with 2200 mAh ICR18650 with 2600 mAh



ACOUSTICS

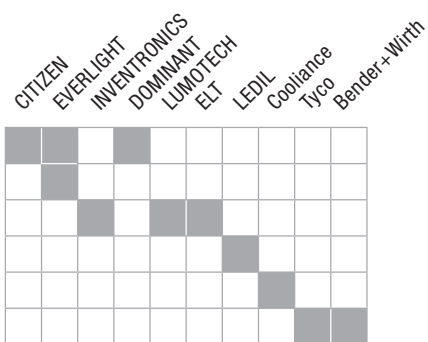
Sound generators	Piezoel. transducer		■			
	Piezoel. buzzer		■			
	Piezoel. speaker		■			
	Piezoel. element		■			
	E-magn. transducer	■				
Dyn. speakers	Impedances 4 ... 50 Ω		■	■		■
Electret cond. microphones	Reflow solderable SMD			■		
	Standard			■		
Vibration motors	Coin type				■	
	Cylinder type				■	
	SMD type				■	

FEATURES

Certificates	ISO 9001	TS 16949	TS 16949	ISO 9001	TS 16949
General information	<p>Bosan Hitech is located in S. Korea</p> <p>Competence in design & production</p> <p>Output capability: 5 mio. pcs per month</p> <p>Magnetic soundparts in SMD, standard models, produced on automatic lines</p>	<p>Chinasound is producing in Changzhou (China)</p> <p>Main focus are piezo parts and buzzers, also alarm buzzers and mylar speakers, own R&D facilities</p>	<p>Main subject are speakers of all kind, also microphones (ECM technology, conventional & reflowable)</p> <p>Strong commitment to R&D, state-of-the-art laboratories, meets customer requirements with regard to size, sound and/or power consumption</p>	<p>KOTL has its location in Wenzhou</p> <p>Focus: micro vibration motors; well experienced in mechanical engineering, stable construction motors with excellent performance, light weight, low power consumption</p>	<p>LS was established in 2007 in Shuyang (2014 in Changzhou) with 5000 m² production area and 4000 employees. Focused on notebook, ear phones, audio equipment, home appliance and automotive applications. Mainly dynamic loudspeakers.</p>
Applications	<p>Acoustical warning & confirmation sound</p> <p>Industrial automation</p> <p>Household appliances</p> <p>Laboratory and medical equipment</p> <p>Customized solutions</p>	<p>Piezo alarms for fire and security industry</p> <p>Home appliances</p> <p>POS</p>	<p>Computer industry</p> <p>Telecommunication</p> <p>Automotive</p> <p>Consumer</p> <p>Home appliances</p> <p>Customized automotive</p>	<p>Vibration alarm</p> <p>Silent alarm</p> <p>Tactile feedback</p> <p>Cylindrical and coin-type solutions</p>	<p>Computer industry</p> <p>Telecommunication</p> <p>Automotive</p> <p>Home appliances</p>
News	Only SMD components from fully automated production	<p>Customer specific piezo alarms</p> <p>SMD-loudspeaker</p>	<p>Waterproof speakers, microphones and receivers (up to IP67)</p> <p>Speakers in small boxes</p> <p>SMD-loudspeaker</p>	<p>Reflow solderable SMD types</p> <p>Linear vibration motors</p>	Automotive loudspeaker

LED

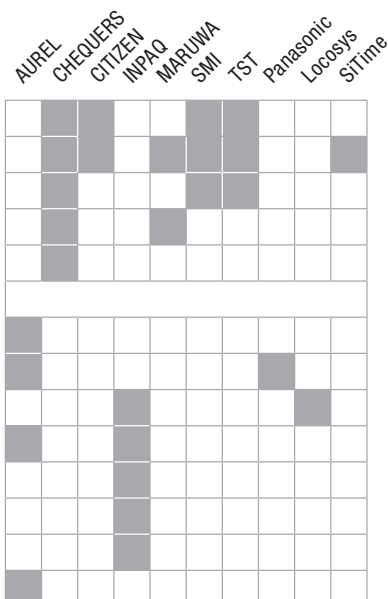
Low power LED, SMD / THT
7-segment displays
Power supplies
Optics
Heat-sinks
LED holders



HF PRODUCTS

QUARTZ / OSCILLATOR / FILTER

Quartz crystals (MHz) / (kHz)
Oscillators
MCF / SAW filters
Dielectric filters
Ceramic filters / resonators
RF MODULES / GNSS MODULES / ANTENNAS
RF-modules (315 MHz ... 2.4 GHz)
WiFi-, Bluetooth®, Zig Bee®-modules
GPS/GNSS modules
Antennas f. ISM Band, WiFi™, Bluetooth®
Antennas f. navigation / satellite
Antennas f. note book/PND/DVB
NFC / Wireless charging
LoRa™ Transceiver



ELEKTROMECHANICS

AIR MOVER

Axial and radial fans
AC
EC
DC

SWITCHES / KEYPADS

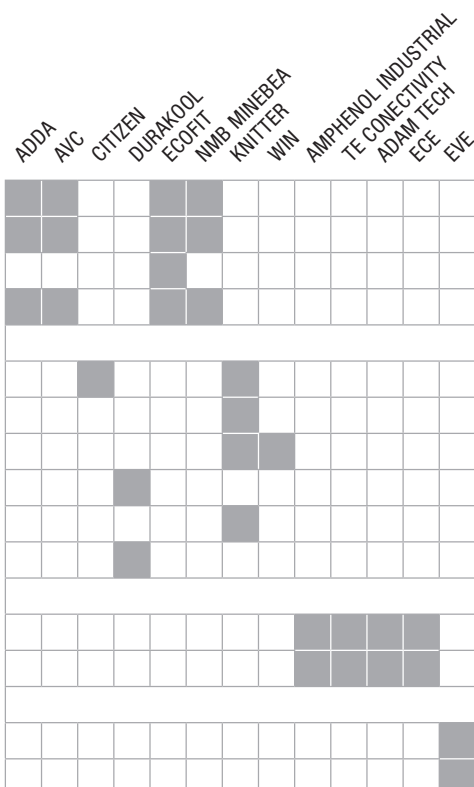
Tactile switches
Push-button switches
Silicone keypads & membrane keyboards
Relays
Micro switches
Tilt switches

CONNECTORS

Data
Power

BATTERIES

Lithium primary
Lithium Ion / Polymer



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