

endrich news

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ELECTRONICA **SPECIAL** NEWS

LIVE NBIOT APPLICATION EXCLUSIVELY AT ENDRICH!



FEATURES

- Tri-mode for global market: LTE Cat-M1/Cat-NB1/GPRS
- Fit for all wireless carriers in low speed telecommunication standard
- Replacement for traditional 2G/3G modules
- Low Power Consumption
- Operating temperature range: -40 °C to +85 °C
- Global certifications

Live!
NBloT at endrich
NEW
C3.301

M910-GL – A GLOBAL CERTIFIED NB-IOT MODULE

HAVE A LOOK

Fibocom has developed the brand new LPWA module M910-GL. M910-GL is a multi-mode (LTE Cat.M1, LTE Cat.NB1 and EGPRS) IoT wireless communication module which supports half-duplex LTE and GSM. It can provide data connection in LTE-FDD, LTE-TDD, GPRS and EGPRS networks, and also supports GNSS and VOLTE (LTE Cat.M1). The module is available with LGA footprint (27.6 x 25.4 x 2.3 mm) and global certifications.

It is characterized by low power consumption and robust accessibility even inside buildings. In addition, it is very cost effective and has an enormous range, which opens up new possibilities for applications in cities or agriculture.

The module is primarily recommended for applications in which low data throughput rates have to be transmitted securely, like asset tracking, industrial monitoring and control, security systems, smart home, smart metering, etc.

APPLICATIONS

- Asset tracking
- Industrial monitoring and control
- Security systems
- Smart home
- Smart metering

FEATURES

Dimension	25.40 x 27.60 x 2.30 mm
Package	LGA, 120Pin
Operating Frequency Band	LTE FDD: B1/B2/B3/B4/B5/B8/ B12/B13/B18/B19/B20/B26/B28 LTE TDD: B39 (Cat.M1 only) GSM: GSM850/GSM900/ DCS1800/PCS1900
Power Supply	3.3V ~ 4.3V (3.8V recommended)
Operating Temperature	-40 °C ~ +85 °C
eSIM	■
eCall	Optional
Jamming Detection	■
USSD	■
STK	■
DFOTA	■
GNSS	■
LBS	■
PSM	■
eDRX	■
SMS	■
OS Driver	Linux/Win, XP/Win, 7/Win, 8/Win10/Android
VoLTE	■
Protocols	PPP/TCP/UDP/IPV4/IPV6/SSL/TLS/ FTP(S)/HTTP(S)

INTERFACES

Antenna	Main x 1, GNSS x 1
Functional Interfaces	USIM 3.0V/1.8V

DATA TRANSMISSION

Cat.M1 (DL / UL)	375 / 375 kbps
Cat.NB1 (DL / UL)	32 / 70 kbps
GPRS (DL / UL)	107 / 85.6 kbps
EDGE (DL / UL)	296 / 236.8 kbps



EC AXIAL FAN COMES WITH SEVERAL ADVANTAGES COMPARED WITH CONVENTIONAL AC AXIAL FANS

HAVE A LOOK

More than 60 % energy saving

Applicable for ErP2015

Higher efficiency with more air flow

Selectable Customized speed

IP55 / IP68 / ATEX is available for choice



APPLICATIONS

- Commercial refrigerator
- Freezer
- Icemaker
- Vending machine
- Air-conditioning

UF-T12ABPB0AM1D4A



MODEL NO.	DIMENSION	RATED VOLTAGE	OPERATING VOLTAGE	POWER	SPEED	AIR FLOW	PRESSURE	NOISE
UF-T200BMB11M1D4A	Ψ 250 x 76.1 mm	115VAC	103 to 126 VAC	8.1 W	1400 RPM	290 CFM	0.28 InchH ₂ O	44 dB
	Ψ 250 x 76.1 mm	115VAC	103 to 126 VAC	26.0 W	2200 RPM	460 CFM	0.46 InchH ₂ O	55 dB
UF-T200BMB23M1D4A	Ψ 250 x 76.1 mm	230 VAC	207 to 253 VAC	8.5 W	1400 RPM	290 CFM	0.28 InchH ₂ O	44 dB
	Ψ 250 x 76.1 mm	230 VAC	207 to 253 VAC	27.0 W	2200 RPM	460 CFM	0.46 InchH ₂ O	55 dB
UF-T15PBP23M1D4A	Ψ 172 x 150 x 51 mm	230 VAC	207 to 253 VAC	15.0 W	3000 RPM	220 CFM	0.62 InchH ₂ O	54 dB
UF-T15PBPB11M1D4A	Ψ 172 x 150 x 51 mm	115 VAC	207 to 253 VAC	15.0 W	3000 RPM	220 CFM	0.62 InchH ₂ O	54 dB
UF-T60BBPB0AM1D4A	Ψ 60 x 60 x 25 mm	115 VAC	95 to 264 VAC	2.0 W	3850 RPM	18.7 CFM	0.172 InchH ₂ O	31 dB
	Ψ 60 x 60 x 25 mm	230 VAC	95 to 264 VAC	2.3 W	3950 RPM	19.4 CFM	0.178 InchH ₂ O	31 dB
UF-T12ABPB0AM1D4A	Ψ 120 x 120 x 38 mm	115 VAC	95 to 264 VAC	4.9 W	3200 RPM	106 CFM	0.34 InchH ₂ O	43 dB
	Ψ 120 x 120 x 38 mm	230 VAC	95 to 264 VAC	5.2 W	3200 RPM	106 CFM	0.34 InchH ₂ O	43 dB

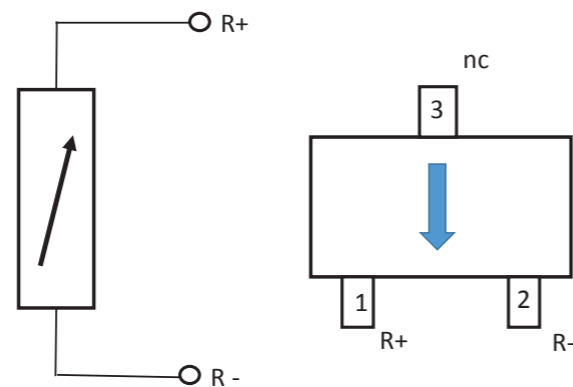
TUNNELING-MAGNETO-RESISTIVE-SENSORS

TMR-sensors from CROCUS are based on a new technology for magnetic field measurement. The main advantage of the TMR-sensors compared to Hall-sensors are low current consumption and high sensitivity.

The basic unit of TMR-sensors is the so called magnetic logic unit (MLU) which is a stack of several layers of different materials. The resistance of this stack perpendicular to the layers is dependent on the orientation of an external magnetic field compared to a fixed axis.

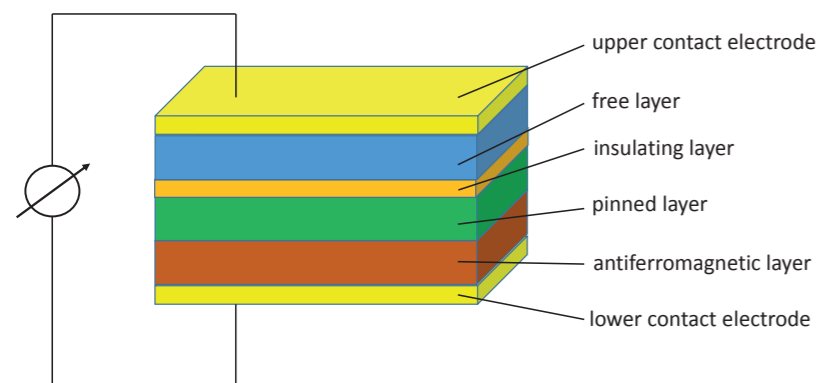
The substrate for this stack is an antiferromagnetic layer. Above this layer there is the so called pinned layer which is a ferromagnetic layer that has a fixed magnetization in a fixed direction. The direction of this magnetization defines the reference direction and it cannot be changed by an external field. Above this pinned layer there is a very thin, insulating layer with a thickness of only a few Nanometers. Above this insulating layer another magnetic layer is deposited. The orientation of the magnetization of this so called free layer can be influenced by an external field. The resistance of the whole stack of layers is dependent on angle between the magnetizations of the free and the fixed layer. It can be measured by applying a voltage at conducting electrodes at the top and bottom side of the stack. The resistance of the stack varies between 10 k Ω and 60 k Ω . This resistance range of the MLU is much higher compared to other magnetoresistive technologies like AMR (Anisotropic Magnetic Resistance) und GMR (Giant Magneto Resistance). The field necessary to rotate the magnetization of the free layer is quite small. Most of the TMR-sensors operate below 10 mT, some even below 1 mT.

Basically this technology can be used to build magnetic switches or magnetic sensors with analog output. For magnetic switches the current through the MLU is measured and a comparator drives the output stage of the sensor (either open collector or push-pull) high or low, depending on fixed internal threshold values.



TMR-Sensor : Resistance depends on the orientation of the external magnetic field relative to the internal fixed magnetization (blue arrow)

The most important switch family is the CT83xx-series. Latches, unipolar and omnipolar types with different switching fields are available. Most members of this family work internally in a pulsed mode and this leads to a current consumption down to 200 nA for some types, depending on the duty cycle.



Layer structure of the Magnetic Logic Unit

TUNNELING-MAGNETO-RESISTIVE-SENSORS

FEATURES OF CT83xx-SERIES

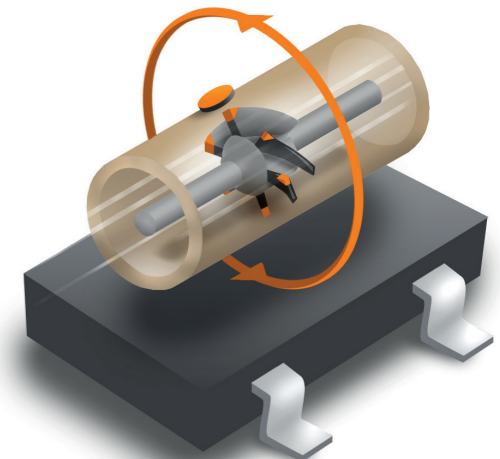
- Low power consumption of down to typ. 200nA
- High sensitivity of typ. 600 mV / mT @ 3V
- Stable performance over temperature with a linearity error of down to less than $\pm 0.25\%$
- Open drain or push pull output
- SOT23 or LGA package

APPLICATIONS OF CT83xx-SERIES

- Low power assemblies like metering or general battery driven devices
- Tamper-proofing for utility meters
- Fluid level detection
- Reed switch replacement
- Motor controllers
- Door closure detection

However, TMR-sensors can also be used as analog sensors measuring the strength of the magnetic field as well. This allows measuring the distance between a magnet and the sensor. Current sensing is also possible with this technology because electrical current always produces a magnetic field.

Since this magnetic field decreases very strongly with distance between the conducting wire and the sensor, the TMR-sensors are a good choice for simple current sensors due to their high sensitivity to small magnetic fields. The CT100 is a linear contactless current sensor in full-bridge configuration. The CT100 enables high accuracy current measurements for many consumer, enterprise and industrial applications. The CT100 is a non-intrusive current sensor that can be adapted to measure different current ranges.



FEATURES OF CT400 CURRENT SENSOR

- High Sensitivity
- Differential Outputs
- Supply Voltage: 1.0V to 5.5V
- 6-lead SOT23 package or 6-lead DFN package

APPLICATIONS OF CT400 CURRENT SENSOR

- Battery Management Systems
- Motor Control
- White Goods
- Power Utility Meters
- Over-Current Fault Protection
- Induction Cooking
- Renewable Energy

WORLDS LARGEST CAPACITIVE TOUCH MONITOR

HAVE A LOOK

Faytech's improved open frame touch monitor series is the flat yet rugged solution for easy implementation. It is designed as interactive touch display for digital signage, industrial automation, shopping malls, meeting rooms, hotels, class rooms and many more applications.

With its hardened cover lens and galvanized steel frame, these monitors enable flush surface integration for all applications. The zinc-coated metal housing is equipped with VESA-mount as well as surrounding screw domes for robust fixation.

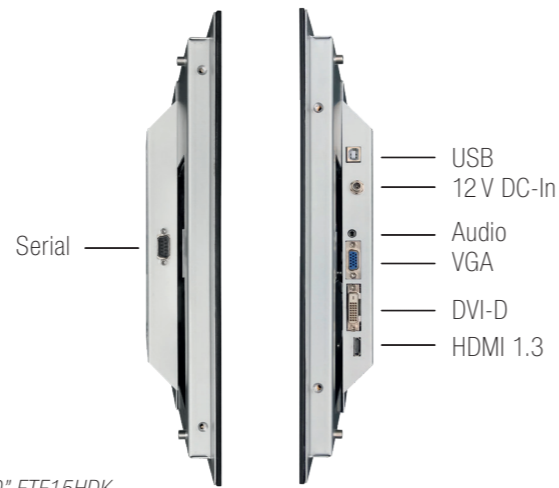
The 10-point capacitive multi-touch controlled by high performance EETI-ICs has outstanding reliability. If it rains, is foggy or dirty, if you are wearing rubber or winter gloves, the touch panel keeps its functionality and lets you control your application.

Precise optical bonding processes combined with chemically etched glasses and super high brightness backlights contribute a perfect readability in all environments. Additionally, reflections are reduced by the chemically etched cover lens with anti-glare coating. In direct sunlight, bright enlightened shopping centers or industrial workshops, the displays' quality is always crystal clear. Also, Faytech guarantees zero dead pixels at all TFT-displays! As option, an ambient light sensor can be integrated enabling automated backlight dimming, e.g. at night time.

Equipped with various interfaces these monitors can be connected to any computer system. There are touch drivers available for Windows, Linux, Mac and Android.

FEATURES

- Optical bonding of capacitive touch panel and TFT-display (increased ruggedness, reduced reflections, increased viewing angles, resistance against dirt and dust condensation)
- Capacitive multi touch panel with up to 10 touch points and anti-glare treatment (chemically etched)
- High brightness backlights with + 1,000 cd / m²
- Industrial TFT-displays with Faytechs' zero defect pixel guarantee
- Zinc-coated steel back case with VESA mount
- Various connectors: HDMI, DVI, VGA, USB-touch, Serial (remote control) and DC-in

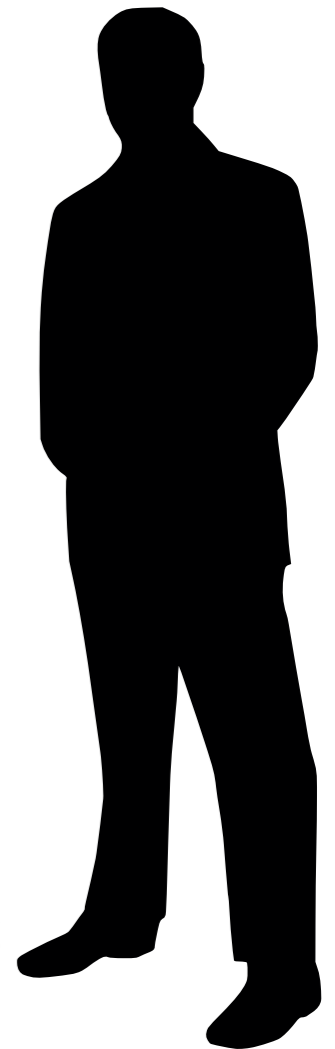
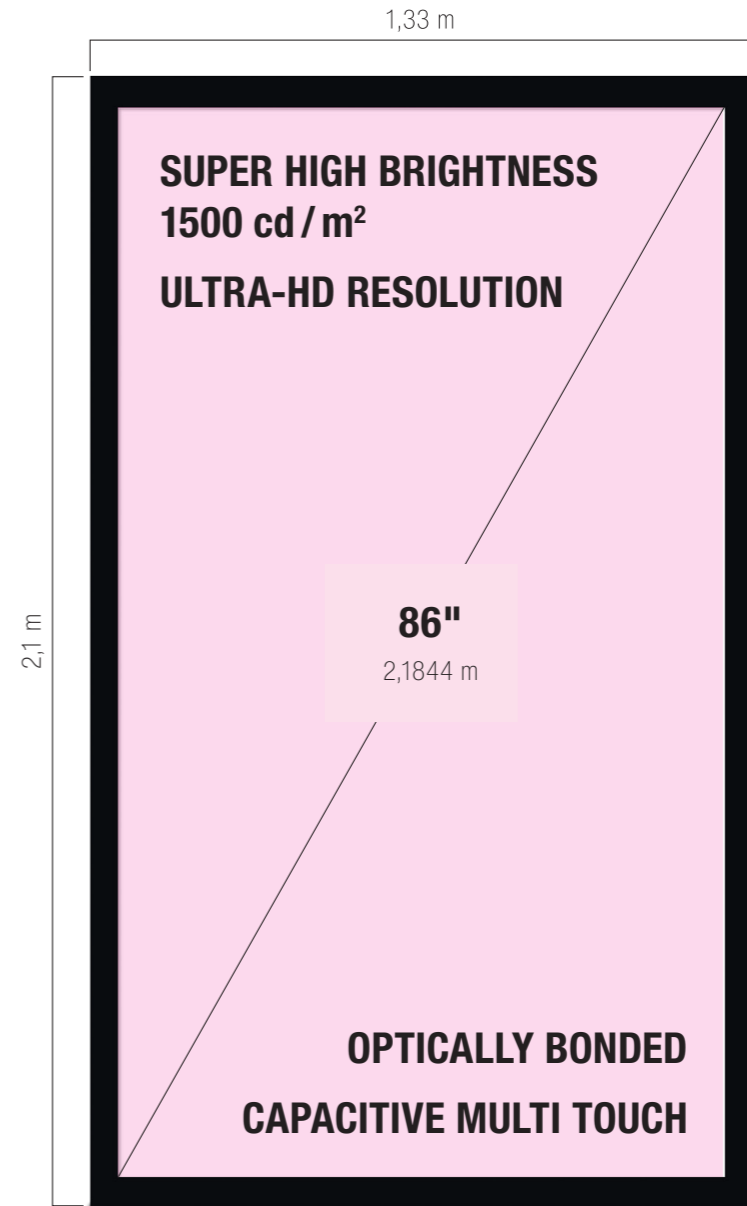


15.0" FTE15HDK

SIZE	PART-NR.	RESOLUTION	BRIGHTNESS	CONTRAST RATIO	BACKLIGHT-LIFETIME	VESA-TYPE
15.0"	FTE15HDK	1024 x 768	1000 cd / m ²	700:1	30,000 hours	100
21.5"	FTE215HDK	1920 x 1080	1000 cd / m ²	1000:1	30,000 hours	100
32"	FTE32HDK	1920 x 1080	1000 cd / m ²	3000:1	40,000 hours	200
43"	FTE43HDK	1920 x 1080	1000 cd / m ²	3000:1	60,000 hours	400
55"	FTE55HDK	1920 x 1080	1000 cd / m ²	1400:1	50,000 hours	400
86"	FTE86TMB	3840 x 2160	1500 cd / m ²	1600:1	50,000 hours	600 x 400

WORLDS LARGEST CAPACITIVE TOUCH MONITOR

Exhibited at electronica!



APPLICATIONS

- Industrial Control Interfaces
- Dash Boards
- Digital Signage
- Interactive Classrooms
- Meeting Rooms



CUSTOMIZED TEMPERATURE SENSORS

HAVE A LOOK

TEWA temperature sensors offer a wide range of standard and customized temperature sensors designed according to individual customer's requirements covering applications in temperature range between -80 °C and +800 °C. The TT-4 series group contains temperature sensors using NTC/PTC thermistors, PTRTDs and other sensing elements mounted into a wide range of metal/plastic housings.



FEATURES

- Proven stability and reliability
- Low cost
- Variety of metal and plastic housings and tubings designed for specific applications
- Potted with different kinds of resin for reliable sensor protection
- Provides good protection from the environmental conditions
- Proven high voltage and dynamic strength
- Available with special cables (2-core cables or stranded with PVC, teflon or kynar insulation, cables with screen & other), connectors and other attachments
- Wide range of resistance and temperature characteristics
- Designed for temperature measurement, temperature control and temperature compensation

APPLICATIONS

- Automotive applications
- Consumer products
- Instrumentation industrial ovens
- Electric showers
- HVAC and refrigeration
- Fire detectors
- Battery management systems
- E-mobility

SPECIFICATIONS OF TT-4:

Part No.	TT4
Measurement element	NTC, PTC, PtRTD, KTY, DS1820
Resistance tolerance	±0.2 ... ±5 %
B-Value (25 / 85)	2700 ... 5100 K
Wires / Cables	PVC, Silicone, FEP, Fiberglass insulation, etc.
Diameter	>1.25 mm
Temperature range	-80 ... 800 °C



AUTOMOTIVE TEMPERATURE SENSORS

HAVE A LOOK

BATTERY MODULE

Cell pack



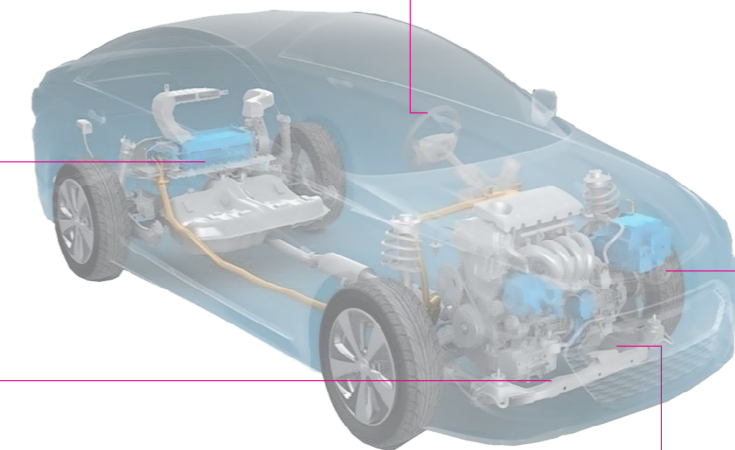
STEERING- & SEAT HEATER

Foil NTC



INVERTER / CONVERTER

Attached to PCB by crew



AIR CONDITIONING MODULE

Epoxy dipping type

High precision type



MOTOR MODULE

ATF oil submersion

High temp. range type

Screw fix type



FEATURES

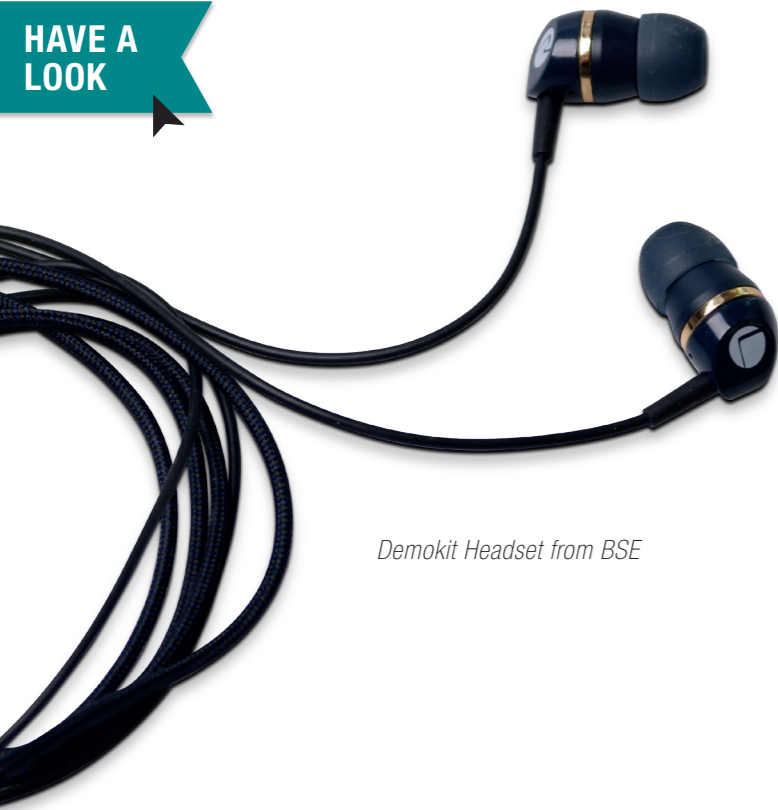
- Extensive use in all global automotive brands
- Dozens of customized assemblies for battery and EV motor applications
- Already high market share for Japanese hybrid car batteries
- Competitive pricing especially for integrated design assemblies (sensor part + resin mold)

APPLICATIONS

- EV batteries
- Electric motors
- Air conditioners
- Capacitors

NEW EARPHONE RECEIVER FROM BSE

HAVE A LOOK



Demokit Headset from BSE

Endrich is proud to introduce the new EARPHONE RECEIVER Technology "Advanced Concept & Technology speaker" (ACTS) from BSE. The ACTS are perfectly used for some new Earphone Receiver, which are found in headsets.

APPLICATIONS

- Communication devices like headsets

FEATURES

Sound Quality

- Membrane active transformation itself (direct conversion), self-moving without coil assembly
- High resolution for mid-high frequency play
- To have wide band function by ACTS/ dynamic combination

Structure

- Sequential laminated structure (similar like ECM)
- Balanced structure between permanent magnet and up and down coil

Mfg. Process

- Simplify lamination design => easy to set up automated production for huge demand
- To realize simple Mfg. process and reduce failure rate / increase productivity



PART NO	APPEARANCE	DIMENSIONS	IMPEDANCE ±15%	RATED INPUT POWER	MAX. INPUT POWER	SENSITIVITY	OPERATING TEMP.	OPERATING TEMP.
SR080670HP01N	Round	ø 8.0 x 7.8 mm	32 Ω	3.0 mW	25 mW	97 dB	-20 ~ 70 °C	20 ~ 20000 Hz
SR106560EP01N	Round	ø 10.0 x 6.0 mm	16 Ω	5.0 mW	25 mW	95 dB	-20 ~ 70 °C	20 ~ 20000 Hz

TINY NEW FRONT-END MODULE (FEM)

Front-End Modules (FEMs) are designed to fulfil the market demand on cost and space saving products. FEMs combine power amplifier (PA) or low noise amplifiers (LNA) and Filter, RF switches and matching circuits in one single package. The tiny Front-End Modules integrated various functionalities and are used for wireless applications such as GPS (GNSS) LTE, Wi-Fi, Bluetooth.

Beside cost and space saving, these products can as well the overall performance as low noise figure, low current consumption reduce number of external components, etc.

TaiSaw Technology, design and service provider for high performance communication components, announces a new Front-End Module (FEM) designed for GPS L5 band application featuring a low-noise amplifier and integrated pre – filters for GPS receiver. The **TN0126A** offers low noise figure, high linearity, and high out-band rejection characteristics brought by included high performance pre-SAW filter and low noise amplifier (LNA). The TN0126A requests only two external components, and is manufactured in a tiny 1.5 x 1.1 mm SMD package.

This new product complement the product line of FEM for GNSS (GPS) applications as:

TN0081A (compliant with AEC-Q100), a Front-End Module (FEM) designed for GPS and GLONASS applications. The TN0081A offers high gain, low noise figure, high linearity and very high out-of-band rejection characteristics brought about through the included high performance pre-SAW filter, low noise amplifier (LNA) and post-SAW filter. The TN0081A can be operated from a single 1.5V

FEATURES

- Low noise figure
- Low current consumption
- High linearity
- Input / output impedance internally matched to 50Ω
- Minimal number of external components required
- Excellent out-of-band rejection
- Evaluation board and PCB layout guide available

APPLICATIONS

- GPS / GNSS radio receivers
- Global Navigation Satellite Systems (GLONASS)
- Personal navigation devices
- Wearable / healthcare devices
- Smartphone

to 3.3V supply. The TN0081A 2.5x2.5mm package offers a very small mounting footprint and requires only two external components. TN0089A (compliant with AEC-Q100), a FEM designed for GNSS, including GPS, GLONASS, BeiDou, and Galileo applications.

The **TN0089A** offers low noise figure, high linearity, and high out-band rejection characteristics brought by included high performance pre – SAW filter and low noise amplifier (LNA). Just two external components need to be added, to the very small 1.5 x 1.1 mm SMD Package.

P/N	FREQUENCY	GAIN	NOISE FIGURE	SIZE	NOTE
TN0126A-B1397	1164 ~ 1189 MHz	16.5 dB	1.6 dB	1.5 x 1.1 x 0.5 mm	L5-Band
TN0081A (GPS+GLONASS)	1575 MHz 1597 ~ 1606 MHz	18.5 dB	1.65 dB	2.5 x 2.5 x 1.55 mm	L1-Band *AEC-Q100
TN0089A (GPS+GLONASS+GALILEO+BEIDOU)	1575 MHz 1597 ~ 1606 MHz 1559 ~ 1591 MHz	15.5 dB	1.7 dB	1.5 x 1.1 x 0.5 mm	L1-Band *AEC-Q100

PATCH ANTENNA FOR GPS L5 BAND APPLICATION

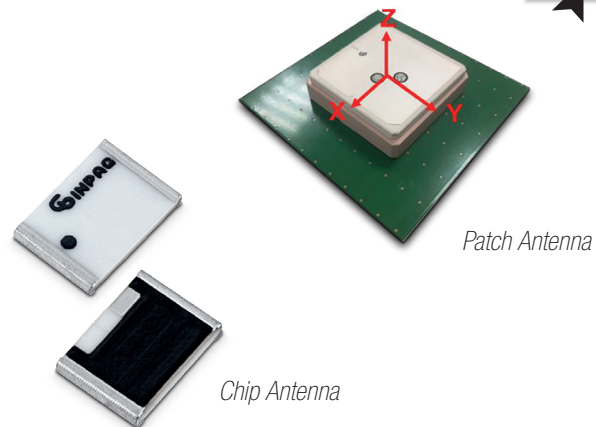
HAVE A LOOK

INPAQ Technology Co., Ltd. is the world leading patch antenna manufacturer that specializes in all kinds of GPS/GNSS antennas including GPS ceramic substrate. Ceramic patch antenna is widely used in global positioning systems, provided by INPAQ in different shapes, sizes and a high-gain, low return loss, low axial ratio characteristics of the ceramic antenna.

For navigation systems, different Stacked Patch Antenna solutions are designed. As Dual Band GPS could enhance the positioning accuracy to the next level – it will be improved from 10 meter grade to centimeter grade. INPAQ is ready for Tier 1, to customize GPS L1L2L5L6 antennas according to their need to meet the requirements of the new systems design on self-driving automotive systems. Peak Gain Radiation for above design examples is up to 4.9 dBic for L1, L2 and L5 Band.

Additional L1L2L5L6 Full Band Chip Antenna (5.0x3.6mm SMD Antenna) is already available for test, as ACLX-5036-A1-CC-S. This antenna is a coupling antenna with linear polarization. The Application PCB will be used as an antenna.

INPAQ is ready for Tier 1, GPS L1L2L5L6 stack proposal, and 5G application to connect everything, including self-driving needed L1L2L5L6 to get message of precise position; via 3D Lidar or 77 GHz



APPLICATIONS

- Self-driving
- Connected car
- Automated car
- ADAS (Advanced Driver Assistance Systems)
- Smart car

Radar is for relative position message. Connected car, automated car, smart car, self-driving car do difference by the degrees of ADAS (Advanced Driver Assistance Systems) and application method.

FREQUENCY BAND	POLARIZATION	IMPEDANCE	VSWR	*PEAK GAIN	*PEAK EFFICIENCY
1170 ~ 1270 MHz	Linear	50 Ω Typ.	Less than 2.0	4.1 dBic Typ.	79.2 % Typ.
1520 ~ 1610 MHz	Linear	50 Ω Typ.	Less than 2.0	4.9 dBic Typ.	82.2 % Typ.

*Test condition: Test board size 80x40 mm

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