

# endrich news

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## OUR PRODUCT OF THE MONTH: SWITCHING REGULATORS K78T-SERIES



### FEATURES OF K78T-500R3/1000R3

- Compatible with traditional LM78xx linear regulators
- SMD package
- High efficiency up to 95 %
- No-load input current as low as 0.2 mA
- Operating temperature range: -40 °C to +85 °C

## PAN1760A – THE LOWEST POWER CONSUMPTION ON THE MARKET



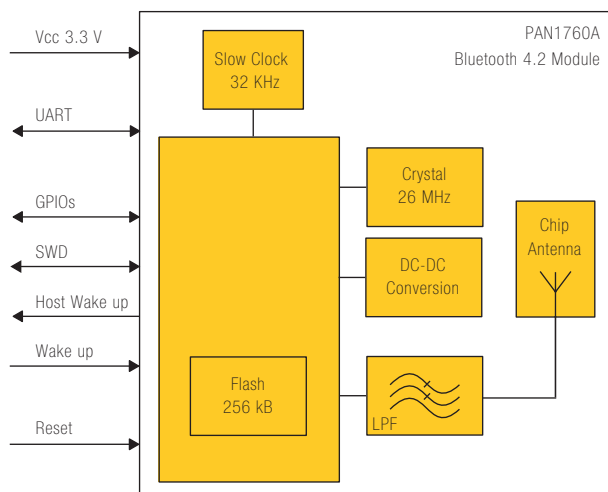
Bluetooth Low Energy Module  
PAN1760A

PAN1760A is Panasonic's next generation Bluetooth module which is based on industry's lowest power Bluetooth Low Energy SoC from Toshiba.

The peak power consumption in Tx and Rx mode is only 3.3 mA, in Deep Sleep mode even only 50 nA. Therefore the module is recommended for applications where low power consumption is essential, like diagnostics and maintenance systems, medical healthcare and sensor applications, or automotive aftermarket products.

The module embeds a 256 kB flash memory and a 192 kB RAM. 83 kB RAM are free configurable for user application. In Stand-Alone mode, the PAN1760A can be used for many applications without the need for an external processor, saving cost, complexity, and space.

As a small SMD module (15.6 x 8.7 mm) with integrated Bluetooth antenna, PAN1760A supports all features of Bluetooth v.4.2, and even the mandatory features of Bluetooth v.5.0. Solutions for mesh networks and extended security features are given.



### FEATURES

- Small 15.6 x 8.7 x 1.9 mm SMD module
- Same form factor and pinout as PAN1026, PAN1760, and PAN1761
- Bluetooth Low Energy 4.2 compliant
- Embedded 256 kB flash memory and 192 kB internal RAM
- 83 kB RAM available for user application
- AT Command mode, Host mode, Stand-Alone mode
- Standard SIG BLE profiles as well as SPPoverBLE profile
- UART (2x), SPI & I2C interface, PWM output (4x), ADC (5 ext, 1 int), 17 programmable I/O
- ARM Cortex-M0 processor with Single Wire Debug (SWD) interface

### BLUETOOTH

- GAP central and peripheral support for LE
- GATT, SMP, and SDB support for LE
- Over-the-Air firmware update
- Support for Scatternet/Mesh network
- BT 4.2 secure connections support through Elliptic-Curve-DH Cryptography
- AES-128 hardware encryption (FIPS-approved)
- Frequent changing of device address (improved privacy, reduced tracking ability)
- Larger packet sizes (more efficient application and network layer security)

### CHARACTERISTICS

- Receiver sensitivity -93 dBm typ
- Output power 0 dBm maximum setting
- Power supply 1.8 V to 3.6 V single operation voltage
- Transmit and receive 3.3 mA Tx/Rx peak power consumption
- Low Power 50 nA Deep Sleep mode
- Operating temperature range -40 °C to +85 °C

## SMD NON-ISOLATED SWITCHING REGULATORS K78T SERIES

MORNSUN K78 series are non-isolated regulators known for compact size, high efficiency and compatible with traditional LM78xx linear regulators. New SMD packaged K78T-500R3/ K78T-1000R3 series are introduced to meet the reflow soldering production requirements.

The peak temperature of reflow soldering is  $T_c \leq 245^\circ\text{C}$  and keeps 60s (Max.) above  $217^\circ\text{C}$ , which meets the IPC/ JEDEC J-STD-020D.1 standard. Dimension is  $15.24 \times 11.40 \times 8.25$  mm (about  $0.6 \times 0.45 \times 0.32$  inch). Efficiency is up to 95 % and operating temperature ranges from  $-40$  to  $+85^\circ\text{C}$ , without additional heat sink.

Besides, these K78T-R3 series also provide a wide input voltage range ( $4.75\text{-}36\text{V}$ ), continuous short-circuit protection, adjustable output voltage ( $\pm 10\%$ ) and remote voltage control and so on, which can be widely used in industrial control, grid power, instrumentation, mining and other related industries.

### FEATURES

- SMD package
- High efficiency up to 95 %
- No-load input current as low as 0.2 mA
- Operating temperature range:  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$
- Output short circuit protection
- Meet UL62368, EN62368, IEC62368 (pending)



K78T-500R3



K78T-1000R3

#### K78T-500R3

|                      |                                       |
|----------------------|---------------------------------------|
| Input Voltage (VDC)  | 4.75 - 36                             |
| Output Voltage (VDC) | 1.5, 1.8, 2.5, 3.3, 5, 6.5, 9, 12, 15 |
| Output Current (mA)  | 500                                   |
| No of Output         | 1                                     |
| Package              | SMD                                   |
| Dimension (mm)       | $15.24 \times 11.40 \times 8.25$      |
| Certification        | UL / CE / CB (pending)                |

#### K78T-1000R3

|                      |                                   |
|----------------------|-----------------------------------|
| Input Voltage (VDC)  | 4.75 - 36                         |
| Output Voltage (VDC) | 1.5, 1.8, 2.5, 3.3, 5, 6.5, 9, 12 |
| Output Current (mA)  | 1000                              |
| No of Output         | 1                                 |
| Package              | SMD                               |
| Dimension (mm)       | $15.24 \times 11.40 \times 8.25$  |
| Certification        | UL / CE / CB (pending)            |

## 5-65 W HIGH-EFFICIENCY DOE LEVEL VI AC ADAPTERS

MORNSUN newest 5-65 W AC adapters are designed for a universal input (85 Vac to 265 Vac) exceeding DOE Level VI requirements for external power supplies which are cost-effective in compact size .

### 1. Multiple AC input plugs meet various socket interfaces.

The adapters feature universal input voltage of 90 - 264 VAC, and have multiple AC input plugs to select except optional interchangeable AC plugs which meet various regulations of Europe, the US, Britain, Australia and China. They are applicable to different socket interfaces in different countries.

### 2. High quality makes the world safer.

The adapters are certificated by UL60950, EN60950, BS EN60950, AS/NZS60950 and GB4943 standards. Other certifications are K60950, J60950 and relevant standards for AV-audio/video, home appliances, lighting, etc. Surge is

optional to 1 - 6 KV, and ESD immunity is  $\pm 8$  KV / Air  $\pm 15$  KV. These adapters meet various industrial safety requirements in different countries, safe and reliable.

### 3. Low power consumption promotes sustainable development.

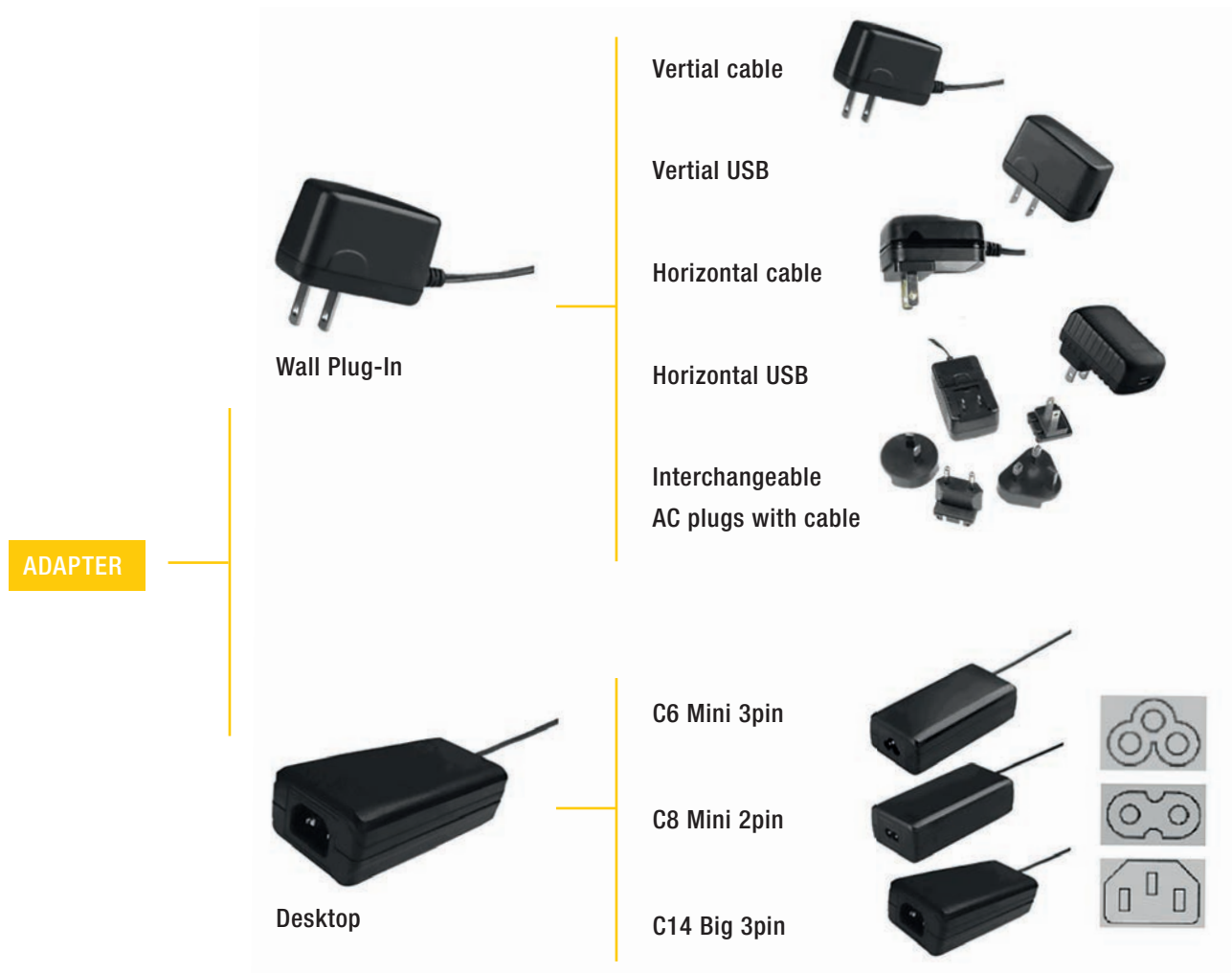
The adapters meet DoE VI and CoC standards to promote energy ecology design.

### 4. No pollution creates a green environment.

The adapters have approvals of ROHS certification and meet PAHS, REACH, Pro65 standards.

### 5. High-quality service makes win-win cooperation.

A strong marketing team is ready to provide customers with high-quality products and best service, develop customers' potential demands and create the maximum value for them.



## 5-65 W HIGH-EFFICIENCY DOE LEVEL VI AC ADAPTERS



Wall-mounted type and desktop type



Interchangeable type

### FEATURES

- Wide input voltage: 90 - 264 VAC
- AC input plugs with optional interchangeable AC plugs meet various socket interfaces
- Meets various regulations of CB, UL, CE, GS, BS, SAA and CCC
- Surge up to  $\pm 6$  KV
- ESD immunity:  $\pm 8$  KV / Air  $\pm 15$  KV
- Meets DoE VI and CoC standards
- Meets ROHS, PAHS, REACH and Pro65 standards

### APPLICATIONS

- IT-information technology equipment: Router, phone exchange, fax machine, printer, laptop, monitor, copier, etc.
- AV-Audio / Video: Speaker, TV, visual telephone, set-top box, VCR, radio, recorder, etc.
- Household appliances: Humidifier, vacuum cleaner, smart home, game player, etc.

| POWER                           | INPUT VOLTAGE | OUTPUT VOLTAGE / CURRENT                                   | ENERGY EFFICIENCY | SURGE (MAX.) |
|---------------------------------|---------------|--|-------------------|--------------|
| <b>ELECTRICAL SPECIFICATION</b> |               |  |                   |              |
| 5W                              | 90 - 264 VAC  | 3V/1A, 5V/1A, 9V/0.5A, 12V/0.5A, 15V/0.4A                  | Level VI          | $\pm 2$ KV   |
| 12W                             | 90 - 264 VAC  | 3V/2.5A, 5V/2.5A, 9V/1.5A, 12V/1.25A, 15V/1A, 24V/0.65A    | Level VI          | $\pm 2$ KV   |
| 18W                             | 90 - 264 VAC  | 3V/3A, 5V/3A, 9V/2A, 12V/1.5A, 15V/1.2A, 18V/1A, 24V/0.75A | Level VI          | $\pm 6$ KV   |
| 24W                             | 90 - 264 VAC  | 5V/4A, 9V/2.5A, 12V/2A, 15V/1.6A, 18V/1.33A, 24V/1A        | Level VI          | $\pm 6$ KV   |
| 36W                             | 90 - 264 VAC  | 5V/5A, 9V/3A, 12V/3A, 15V/2.4A, 18V/2A, 24V/1.5A           | Level VI          | $\pm 4$ KV   |
| 65W                             | 90 - 264 VAC  | 9V/5A, 12V/5A, 15V/4.5A, 18V/4A, 24V/3A, 36V/1.9A          | Level VI          | $\pm 6$ KV   |



## PRODUCTS LINEUP – PART 1

Crystal Resonator, Oscillator, Radio frequency (RF) filters are key components in any wireless system and as these systems continue to be miniaturized, the pressure on filter technology to shrink as well without compromising performance continues.

Handheld systems and their associated volumes have generated strong interest in filter technologies that show promise for lower cost and smaller size.

Today's wireless devices must not only reject signals from other services but from themselves, too, as the number of bands packed inside each device increases.

A high-end smartphone must filter the transmit and receive paths for 2G, 3G, and 4G wireless access methods in up to 15 bands, as well as Wi-Fi, Bluetooth and the receive path of GPS receivers. Signals in the receive paths must be isolated from one another. They also must reject other extraneous signals whose causes are too diverse to list.

To do so, a multi-band smartphone will require eight or nine filters and eight duplexers. Without acoustic filter, Crystal and Oscillator technology, it would be impossible.

Dedicated for different application we introduce in the news paper "PRODUCTS LINEUP – PART 1 PRODUCTS" suitable components for GNSS (GPS) Applications



|                                      | P/N | FREQUENCY     | INSERTION LOSS | BAND WIDTH | SIZE         | NOTE     |
|--------------------------------------|-----|---------------|----------------|------------|--------------|----------|
| <b>GPS SAW</b>                       |     |               |                |            |              |          |
| TA1804A                              |     | 1.582.469 MHz | 1.1 dB         | 46.834 MHz | 1.1 x 0.9 mm |          |
| TA1954A (GPS+GLONASS+COMPASS)        |     | 1582.47 MHz   | 1.2 dB         | 46.84 MHz  | 1.1 x 0.9 mm |          |
| TA1425A (GPS band)                   |     | 1574.42 MHz   | 0.8 dB         | 2 MHz      | 1.4 x 1.1 mm |          |
| TA0757B (GPS band)                   |     | 1575.42 MHz   | 0.9 dB         | 2 MHz      | 1.4 x 1.1 mm |          |
| TA1343A (GPS+GLONASS+GALILEO+BEIDOU) |     | 1583 MHz      | 1.2 dB         | 46.79 MHz  | 1.4 x 1.1 mm |          |
| TA1343B (GPS+GLONASS+GALILEO+BEIDOU) |     | 1583 MHz      | 1.2 dB         | 46.79 MHz  | 1.4 x 1.1 mm | AEC-Q200 |
| TA1661A (GPS+GLONASS+GALILEO+BEIDOU) |     | 1583 MHz      | 1.8 dB         | 46.79 MHz  | 1.4 x 1.1 mm | AEC-Q200 |
| TA1267A (GPS+GLONASS)                |     | 1.588.655 MHz | 1.25 dB        | 34.47 MHz  | 1.4 x 1.1 mm |          |
| TA1267E (GPS+GLONASS)                |     | 1.588.655 MHz | 1.25 dB        | 34.47 MHz  | 1.4 x 1.1 mm | AEC-Q200 |
| TA1901A                              |     | 1587.5 MHz    | 2 dB           | 57 MHz     | 2.0 x 1.6 mm | AEC-Q200 |
| TA1745A                              |     | 1583 MHz      | 1.8 dB         | 46.79 MHz  | 2.0 x 1.6 mm | AEC-Q200 |
| TA1658A (GNSS)                       |     | 1582.4 MHz    | 1.7 dB         | 46.61 MHz  | 3.0 x 3.0 mm | AEC-Q200 |
| TA1925A (GPS+GLONASS L2)             |     | 1234.4 MHz    | 3.3 dB         | 45 MHz     | 3.0 x 3.0 mm | AEC-Q200 |
| TA0440A (Car Antenna)                |     | 1575.42 MHz   | 2.9 dB         | 2 MHz      | 3.0 x 3.0 mm | AEC-Q200 |
| TA1785A                              |     | 1583 MHz      | 1.8 dB         | 46.79 MHz  | 3.0 x 3.0 mm | AEC-Q200 |
| TA0676A                              |     | 1592.5 MHz    | 2.6 dB         | 43 MHz     | 3.0 x 3.0 mm | AEC-Q200 |
| TA1442A (BEIDOU)                     |     | 2492 MHz      | 1.55 dB        | 5 MHz      | 3.0 x 3.0 mm | AEC-Q200 |
| TA1924A (GPS L5+GLONASS E5)          |     | 1191.8 MHz    | 3.5 dB         | 55 MHz     | 3.8 x 3.8 mm | AEC-Q200 |

## PRODUCTS LINEUP – PART 1

| P/N                                  | FREQUENCY                                  | INSERTION LOSS | BAND WIDTH | SIZE                  | NOTE     |
|--------------------------------------|--|----------------|------------|-----------------------|----------|
| <b>GPS FRONT END MODULE</b>          |  |                |            |                       |          |
| TN0081A (GPS+GLONASS)                | 1575~1606 MHz                              | 1.65 dB        | 18.5 MHz   | 2.5 x 2.5H : 0.535 mm | AEC-Q100 |
| TN0089A (GPS+GLONASS+GALILEO+BEIDOU) | 1575 MHz<br>1597-1606 MHz<br>1559-1591 MHz | 1.5 dB         | 15.5 MHz   | 1.5 x 1.1H : 0.39 mm  | AEC-Q100 |

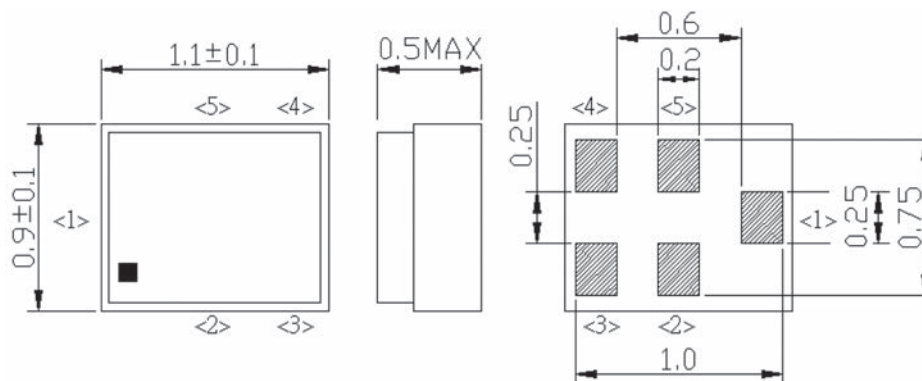
| P/N             | FREQUENCY  | LOAD CAPACITANCE | TOLERANCE | SIZE         | NOTE     |
|-----------------|------------|------------------|-----------|--------------|----------|
| <b>GPS Xtal</b> |            |                  |           |              |          |
| TZ3120A         | 32.768 KHz | 9 pF             | ±20 ppm   | 1.6 x 1.0 mm |          |
| TZ3108A         | 32.768 KHz | 12.5 pF          | ±20 ppm   | 1.6 x 1.0 mm |          |
| TZ2528A         | 32.768 KHz | 12.5 pF          | ±20 ppm   | 2.0 x 1.2 mm |          |
| TZ1510C         | 32.768 KHz | 9 pF             | ±20 ppm   | 3.2 x 1.5 mm | AEC-Q200 |
| TZ1006A         | 32.768 KHz | 12.5 pF          | ±20 ppm   | 3.2 x 1.5 mm |          |
| TZ2754C         | 32.768 KHz | 12.5 pF          | ±20 ppm   | 3.2 x 1.5 mm | AEC-Q200 |
| TZ1628A         | 26 MHz     | 19 pF            | ±7 ppm    | 3.2 x 2.5 mm |          |
| TZ1628C         | 26 MHz     | 19 pF            | ±7 ppm    | 3.2 x 2.5 mm | AEC-Q200 |

| P/N                | FREQUENCY     | VOLTAGE    | TOLERANCE       | SIZE         | NOTE                       |
|--------------------|---------------|------------|-----------------|--------------|----------------------------|
| <b>GPS TCXO/XO</b> |               |            |                 |              |                            |
| TX0628C            | 19.2 MHz      | 3.3V       | ±0.5 ~ ±7.5 ppm | 2.0 x 1.6 mm | wide temp range to +105 °C |
| TX0408C            | 26 MHz        | 2.85V      | ±0.5 ppm        | 2.0 x 1.6 mm |                            |
| TX0544B            | 38.4 MHz      | 1.8V       | ±0.5 ppm        | 2.0 x 1.6 mm |                            |
| TX0678B            | 48 MHz        | 1.8 ~ 3.3V | ±0.5 ~ ±7.5 ppm | 2.0 x 1.6 mm | wide temp range to +105 °C |
| TX0360A            | 16.367667 MHz | 2.85V      | ±0.5 ppm        | 2.5 x 2.0 mm |                            |
| TX0358A            | 16.368 MHz    | 1.8V       | ±0.5 ppm        | 2.5 x 2.0 mm |                            |
| TX0590B            | 16.369 MHz    | 1.7 ~ 3.3V | ±2 ppm          | 2.5 x 2.0 mm |                            |
| TX0578C            | 26 MHz        | 1.8V       | ±0.5 ppm        | 2.5 x 2.0 mm |                            |
| TX0395B            | 26 MHz        | 2.8V       | ±0.5 ppm        | 2.5 x 2.0 mm |                            |
| TX0486A            | 26 MHz        | 2.8V       | ±0.5 ppm        | 2.5 x 2.0 mm |                            |
| TX0617B            | 26 MHz        | 2.8V       | ±0.5 ppm        | 2.5 x 2.0 mm |                            |
| TX0275A            | 16.368 MHz    | 2.85V      | ±0.5 ppm        | 3.2 x 2.5 mm |                            |
| TX0203A            | 26 MHz        | 2.775V     | ±0.5 ppm        | 3.2 x 2.5 mm |                            |

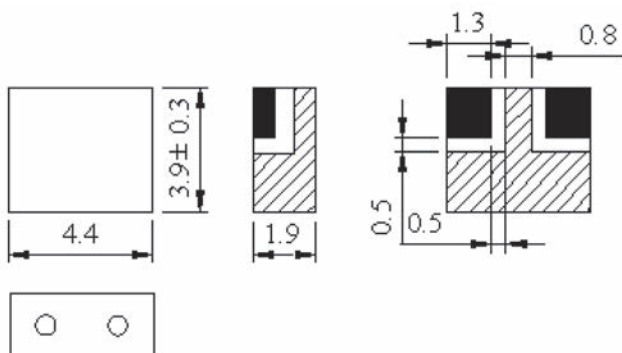
## NEW FILTER FOR WIFI AND V2V APPLICATION ENABLE HIGH POWER SIGNAL TRANSMISSION

Founded in 1997, Tai Saw Technology, leading manufacturer for high performance communication components, announces two new filters for IoT (2.4 GHz) and automotive V2V applications. Former Motorola employees founded TST, applied their extensive experiences in related device design, manufacturing and processing development to realize these SAW (surface acoustic wave) BAW (Bulk Acoustic Wave) devices and modules (Xtal, XO, VCO, VCTCXO etc).

Dimension BAW Filter  
TA2105D-B1397, 2437 MHz  
(BW = 69 MHz)



The new TA2105D-B1397 is a BAW (Bulk Acoustic Wave) filter 2437 MHz (BW = 69 MHz), in a tiny SMD 1.1 x 0.9 mm package and wide operating temperature range: -40 °C to +105 °C. The BAW technology enables an input power of 28 dBm (Ta = +50 °C, 10 kh, CW). Take advantage of the low loss in the WiFi band, while simultaneously high rejection in the band-edge and adjacent LTE/TD-LTE bands. Even if Wifi and LTE devices are close one to another, it guarantees coexistence of the signals.



Dimension Microwave Dielectric Filter  
TR0002A-B1397, 5825MHz (BW=100MHz)

Vehicle-to-vehicle (V2V) is also known as VANET (vehicular ad hoc network) or more common in Europe Car-to-Car communication (Car2Car or C2C) allow automobiles to "talk" to each other. The wireless communication use the 5.9 GHz band. (5 875-5 905 MHz frequency band). In order to allow a proper filtering of the signals, low insertion loss and high power level, TST has developed a small dielectric filter dedicated to this application. This filter will be used as front end filter after the antenna.

The Microwave Dielectric Filter at centre frequency of 5825 MHz and bandwidth of 100 MHz, has a base area of just 4.4 x 3.9 mm<sup>2</sup> with 1.9 mm of height. The filter is specified for the temperature range of -40 °C to 105 °C.

Contact for information: Mr. Gensler · Tel.: +49(0)7452-6007-31 · e-mail: a.gensler@endrich.com

### HEADQUARTERS

ENDRICH Bauelemente Vertriebs GmbH · P.O.Box 1251 · D-72192 Nagold  
T +49 (0) 7452 6007-0 · F +49 (0) 7452 6007-70 · endrich@endrich.com · www.endrich.com



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### SALES OFFICES IN EUROPE

#### France:

Paris: T +33/186653215 · france@endrich.com  
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#### Bulgaria:

Sofia: bulgaria@endrich.com

#### Romania:

Timisoara: romania@endrich.com

#### Switzerland – Novitronic:

Zurich: T +41/44 306 91 91 · info@novitronic.ch

#### Spain:

Barcelona: T +34/93 217 31 44 · spain@endrich.com