Thermal Management

Solutions for Heat Transmission
Consult – Know-how. Built-in.
The technical competence from Rutronik Worldwide and individual consulting on the spot: by competent sales staff, application engineers and product specialists.

The product portfolio from Rutronik
Wide product range of semiconductors, passive and electromechanical components, storage, displays & boards and wireless technologies for optimum coverage of your needs.

Committed to Excellence
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Wide product range of semiconductors, passive and electromechanical components, storage, displays & boards and wireless technologies for optimum coverage of your needs.

The delivery service from Rutronik
Innovative and flexible solutions: from supply chain management to individual logistics systems.

Quality management without compromise
The integrated management system (IMS) encompasses quality control, environmental protection and occupational health and safety.

Thermal Management
Electronic module malfunctions or failures are usually down to one particular reason: overheating. This is because performance and temperature are directly related to each other. The ongoing trend towards miniaturization and to an increasing efficiency are strengthen this challenge even more. Therefore thermal management should play an essential role already from the beginning of the product development cycle. A well-considered design helps to pave the way for efficient products with longer lifetime.

It’s not easy to find out the best strategy for heat dissipation. The huge variety of products requires an individual analysis of the particular demands of our customers.

Rutronik will support you, keeping track of the latest trends and technologies in order to achieve the ideal solution for your individual needs.

This is based on the technical know-how and experience of our Product Managers and Field Application Engineers coupled with the innovative products from our comprehensive line card. The portfolio encompasses state-of-the-art fans, thermal interface materials such as thermally conductive film, phase change materials or gap fillers and heat sinks.

If you need to know which particular solution is best-suited to your application we will gladly assist you in defining the optimal components. Please don’t hesitate to contact us.
Kaimei Electronic Corp. was established in 1973, starting up with manufacturing and selling of electrolytic capacitors. Recently Jamicon has expanded their product line to a total 3 divisions, including AC/DC axis fans and LED drivers.

Kaimei Electronic Corp. has been designing, developing and manufacturing a broad line of AC and DC fans since 1990 and distributing them worldwide under the brand name Jamicon.

Kaimei Electronic Corp. has ISO 9001 and ISO14001 certificated manufacturing facilities in their home country of Taiwan as well as in China and Malaysia. In order to provide their services to various industries, recently their Shenzhen factory has obtained certification of TS16949 in 2014.

As the electronics industry matured and diversified, Jamicon always upholds its strict quality control policy. We value our customers needs and will continually develop the products that meet your expectation.

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**General Specifications**
- Operating Temperature: -25°C ~ 75°C (Ordinary humidity)
- Storage Temperature: -40°C ~ 70°C (Ordinary humidity)
- Insulation Resistance: 10M Ohm at DC 500 V
- Dielectric Strength: AC 700 V for 3 sec
  - (≤0.5 mA allowable, between lead and housing).
- Life Expectancy:
  - At ambient temperature 40°C and humidity 65%.
- Dual Ball bearing:
  - 50,000~100,000 hours depending upon models and the environmental condition
- Locked Rotor Protection:
  - designed to meet UL, CUL and TUV
- Polarity protection: Reverse connection at the rated voltage will not cause any damage
- Insulation Class: UL Class A

**Features**
- Exceptional airflow performance and high static pressure
- Low power consumption for saving the energy
- Optional functions available up on request, including RD (Rotation Detection) signal, FG (Frequency Generation) signal output, Auto-Restart, PWM control input
- IP protection version are available up on request

**Target Application**
- Telecommunication
- Industrial PC/server/storage
- Industrial power supply/inverter
- Cloud systems
- Medical equipment
- Solar energy system
- Wind-power generator

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**specification**

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<thead>
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**specification**

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</table>

**Note:** Above data is reference while fan operate at ultra high speed, other speeds requirement can be provided upon request.
**High Performance Axial DC Fans**

**Dimension: 80x80x25 mm**

Air Flow and static Pressure Characteristics

Model No.: KF0825-11

<table>
<thead>
<tr>
<th>Speed at 4500(12V) / 4000 (24V-48V)R.P.M</th>
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<tbody>
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<td>48</td>
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</tbody>
</table>

**Note:** Above data is reference while fan operate at ultra high speed, other speeds requirement can be provided upon request.

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**Dimension: 80x80x38 mm**

Air Flow and Static Pressure Characteristics

Model No.: KF0838-11

<table>
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<th>Speed at 7000R.P.M</th>
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<td>24</td>
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<td>48</td>
</tr>
</tbody>
</table>

**Note:** Above data is reference while fan operate at ultra high speed, other speeds requirement can be provided upon request.

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**Dimension: 92x92x38 mm**

Air Flow and static Pressure Characteristics

Model No.: KF0938-11

<table>
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<th>Speed at 6000 R.P.M</th>
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<tbody>
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<td>24</td>
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<td>48</td>
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</tbody>
</table>

**Note:** Above data is reference while fan operate at ultra high speed, other speeds requirement can be provided upon request.

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**Dimension: 120x120x38 mm**

Air Flow and Static Pressure Characteristics

Model No.: JF1238-14

<table>
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<th>Speed at 4000 R.P.M</th>
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<tbody>
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<td>12</td>
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<td>24</td>
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<td>48</td>
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</tbody>
</table>

**Note:** Above data is reference while fan operate at ultra high speed, other speeds requirement can be provided upon request.
As the world’s largest manufacturer of fans and fan components, Delta design and build innovative cooling systems that perform at the highest levels – even in the harshest environments. The Delta Fan and Thermal product line offers a full range of axial fans, blowers, and thermal management products. Our unique, patented blade design and innovative structure greatly increases cooling performance and reduces system noise. Moreover, the highly efficient cooling and ventilation systems can be customized to fit the needs of almost any business. This is why Delta fans and thermal products can be found worldwide in various applications, serving a wide range of organizations and industries.

Reliability Testing
In order to provide the best quality products and highest satisfactions to customers, Delta has executed several laboratory accreditation tests to examine the products’ performances, endurances under tough conditions and adopted robust construction to ensure the high reliabilities of products.

- Waterproof Test
- Package Drop / Bump Test
- Vibration and Earthquake Test
- Shock Test - Highly Accelerated Life Test
- Gas Corrosion Test
- Sand and Dust Test - Salt Spray Test
- Thermal Shock Test
- Temperature Test
- High Temperature Test
- Life Expectancy Test
- Electromagnetic Interference Test

High Performance Axial DC Fans

**Axial Blower**

**Features**
- Lower noise, lower power consumption and higher efficiency than traditional blower fans
- Flexible and easy integration
- PWM signal speed control and speed signal output

High Performance Fan

**Features**
- Provides high airflow in a high impedance system
- Low vibration
- Optimization blade designed to fit applications
- High reliability

High Efficiency Fan

**Features**
- Provides high airflow in a high impedance system
- Low vibration
- PWM signal speed control and speed signal output
- High reliability
- Energy saving

High Reliability Fan

**Features**
- Severe environmental and low power applications
- IEC 60529 and IEC68-2-32 / Bellcore compliant
- Damp/Heat: 85°C and 85% RH over 200hrs
- IP55 protection
- High reliability
New Effectual DC Blower Fan

**AB12212UB450300**

ADDA’s effectual DC blower fan has re-designed suction structure in a flat mouth shape that enhances static pressure over 30% comparing from the same series of fans. The market of traditional vacuum sweeping machines with brushed motor is around at 85%. ADDA’s customization service provides vacuum cleaning machine with brushless motor that lengthens product life expectancy over 140% and increases the efficiency of merchandise more than 30%.

Cooling Fan Solutions for Automotive Applications

**DC Fan – AG4020** e.g. for LED car headlights:

- **Features**
  - Wide Input Range: 10Vdc ~ 75Vdc or 90Vac ~ 264Vac
  - DC/DC or AC/DC converter built in for power converting
  - Widely Applicable Fan: 12V/24V/48V
  - Soft Start Function at Start Up
  - Reverse Polarity Protection
  - Hot-Swap Inrush Current Protection
  - Over Voltage & Under Voltage Lock out
  - Over Current protection
  - Thermal Detect and Fan Speed Control
  - Communication Function: I²C, RS232, RS485…etc.
  - Redundancy Function
  - Power Filter for EMI Prevention

**DC Fan for Battery Electric Vehicles**

- **Features**
  - Twins structure
  - Operating temp.: -40°C to +105°C
  - IC according AEC Q100
  - Space compression 30%
  - High air flow & high pressure design
  - Energy saving 15%
  - Speed 11,000RPM, Performance upgrade 20%

**Application:**
- **LED Car Headlights**
- **Hybrid Vehicles**
In addition to the existing CPU heat sinks, which have been successfully established over years, ASSMANN WSW has developed an optimized version to improve the features for traditional passive cooling systems.

**STAMPED CPU Heat Sinks**

STAMPED CPU heat sinks have a smaller surface than the traditional CROSS CUT version, but they bring equal or even better thermal energy flow in a passive cooling system.

For traditional CPU heat sinks inner cooling fins generate heat accumulation which results to less air flow based on heat radiation. The design of STAMPED heat sinks create an improvement of air convection to optimize the exchange of heat with the ambient air.

**Advantages**
- Geometry: Optimized heat sinks shape to improve the thermal management within passive systems
- Material: Aluminium alloy AL5052 or AL1050
- Mounting options
  - Push pins (pic.1)
  - Solder pins (pic.2)
  - Thermal tape (pic.3)
- Modification: Customized cut out can be implemented to optimized the used space on PCB; components can be located close to the heat sink (within the cut out area) to optimize the heat dissipation. Also for already existing PCB layout, a "bigger" heat sink can be used by positioning the heat sink closer to the active components which has to be cooled (pic.4)
- Customer Tailored: Special requirements such as material thickness, modifications of all dimensions, hole pattern, cut outs and perforations, surface treatments, special packing
Pyrolytic Graphite Sheet (PGS) is a new, ultra-light graphite interface film material, developed by Panasonic, which has a thermal conductivity up to five times greater than copper. It is pliable enough to be cut and folded into complex three dimensional shapes then simply stuck onto the heat source to diffuse the heat or provide a path for heat to flow to a cold wall. It is produced from polymeric film using a heat de-composition process which creates at the end a structure close to a single crystal. The hexagonal crystal structure of graphite is arranged uniformly in a horizontal 2D structure.

Features
PGS has a number of features which make it highly suitable as an easy-to-use, space-saving, thermal management solution:

- It is very thin – available in a range of thicknesses from 100µm down to 10µm – and has excellent thermal conductivity from 700 to 1950W/m.K which is two to five times higher than copper and up to seven times better than aluminum.
- The material is very stable so it is resistant to environmental effects and shows no deterioration with age.
- It is flexible and pliable so it can be easily cut and folded into a complex shape. With a bend radius of 2mm, sheets can be bent through 180 degrees more than 3000 times, and its thermal conductivity is unaffected if sharp folds are avoided.
- PGS can provide some shielding to electromagnetic noise, providing a simultaneous EMI and thermal solution.

The efficacy of PGS in reducing IC hot spot temperatures is demonstrated in the figure below. The temperatures at the ABS (Acrylnitril-Butadien-Styrol) surface, the IC and the PCB are shown for two different 70 µm thick PGS sheet sizes.

<table>
<thead>
<tr>
<th>Model</th>
<th>Type A</th>
<th>Type A-1</th>
<th>Type A-2</th>
<th>Type B</th>
<th>Type B-1</th>
<th>Type B-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicon</td>
<td>PGS</td>
<td>PGS</td>
<td>PGS</td>
<td>PGS</td>
<td>PGS</td>
<td>PGS</td>
</tr>
<tr>
<td>PGS size (mm)</td>
<td>without</td>
<td>25x40x0.07 (large)</td>
<td>25x25x0.07 (small)</td>
<td>without</td>
<td>25x40x0.07 (large)</td>
<td>25x25x0.07 (small)</td>
</tr>
<tr>
<td>Result</td>
<td>Surface: 99.85</td>
<td>83.84</td>
<td>89.08</td>
<td>93.65</td>
<td>77.17</td>
<td>80.86</td>
</tr>
<tr>
<td></td>
<td>IC: 101.9</td>
<td>88.89</td>
<td>93.26</td>
<td>98.26</td>
<td>99.76</td>
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<tr>
<td></td>
<td>PWB: 96.25</td>
<td>85.31</td>
<td>89.06</td>
<td>97.26</td>
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<td>95.31</td>
</tr>
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Heat Conducting Films and Adhesives

3M™ Thermally Conductive Adhesive Transfer Tapes

This range of high adhesion thin tapes offers efficient thermal transfer for a wide range of applications requiring a thermal management solution: bonding heat sinks, heat spreaders and other cooling devices to IC packages, power transistors, and other heat generating components. Each tape combines 3M high performance acrylic adhesive with highly conductive ceramic particles for an extremely reliable and user-friendly thermal interface. Highly conformable construction provides excellent wet-out on surfaces. Select 5, 10 and 20 mil thicknesses to meet application requirements.

3M™ Thermally Conductive Interface Pads

Through innovative 3M technology, these soft and conformable pads provide high levels of conductivity for the more demanding applications in the electronics industry. The pads provide excellent handling and can be die cut to fit most applications.

3M™ Thermally Conductive Epoxy

This range of liquid adhesives has less odor and good structural strength adhesion. Dispensing is easy for high output, in-line automated manufacturing and manual application. Adhesive flows and fills micro-spaces on surfaces. Ultra-thin bond line helps achieve low thermal impedance.
Specifications subject to change without notice. Please note, there could be some limitations for some franchised product lines in several countries. For more information, please contact our sales team.