

What is a System in a Package (SIP)?

A System in a Package product is a multi-chip module that uses a variety of technologies in its construction in order to improve performance and/or reliability while reducing size. Most SMT devices as well as its surrounding circuitry can be produced in a SIP design

Die Attach

Components are attached with either silver or glass filled epoxies, resulting in tremendous bond strength while achieving outstanding conductive or insulating properties.

Wirebond

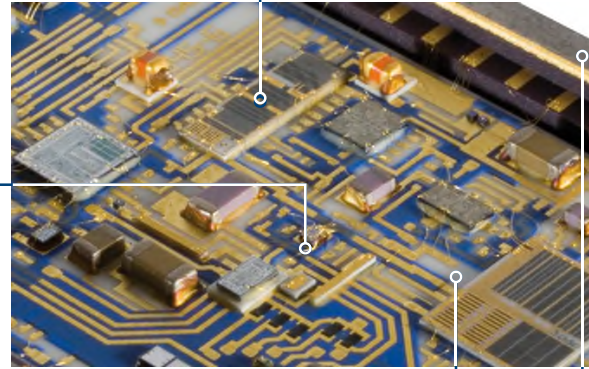
The components are wire-bonded using traditional ball and wedge processes. This results in a high-reliability bond, while achieving very low connection resistances.

Single or Multi Layer Screen Printing

Conductive and dielectric pastes are screened onto a ceramic plate to create a single or multi-layer high-reliability thick-film substrate.

Seam Seal

While the device is under a nitrogen vacuum, a Kovar lid is welded onto the seal ring of the ceramic package. The internal components are now sealed in a moisture free, hermetic environment.



Process Capabilities

Manufacturing Capabilities

- Die attach (epoxy, eutectic)
- Wirebond (gold, aluminum)
- Packaging:
 - Ceramic DIP/gull-wing/LCC
 - metal glass seal, TO
 - seam seal, projection weld
- Laser trimming
- ATE testing 100% @ 25°C and over specified temperature
- Complete environmental testing
- Solder dipping available
- Manufacturing at our MIL-PRF-38534 certified Class 8 facility located in Mansfield, MA

Military 883 Screening

Our Manufacturing line is audited and certified by DLA as conforming to the MIL-PRF-38534 and MIL-STD-883 military standards. Several screening levels can be provided (commercial, industrial, medical, military, QL and full MIL-883). All assembly and screening is performed on our MIL-883 production lines in our state of the art clean room facility.

Benefits of DATEL® SIP Products:

- 1 SIPs employ components in die form**
 - Smaller footprint - You can use this space/weight savings to reduce the size of your board or to add other space saving features to your system.
 - Improved reliability - Components are closer in proximity reducing the length of connections thereby affording better speed/performance and a more reliable circuit that increases the MTBF of the entire system.

- 2 Housed in a hermetically sealed package.**
 - A hermetic package protects the internal circuitry from the effects of moisture, making the precision characteristics of the SIP more stable in environments where humidity is a concern.
 - The ceramic package improves DC characteristics by isolating precision components from stresses that may occur on the printed circuit board.

- 3 DATEL uses proven Hi-Rel processes**
 - All SIPs are built on our MIL-PRF-38534 certified production line.
 - Die-attach, wire-bond, and thick-film ceramic substrate processes are developed to withstand harsh environmental/mechanical stresses
 - Our 29-step production MIL-certified testing process ensures quality, performance and reliability.

- 4 SIPs are fully screened and tested**
 - We supply a functionally complete SIP that has been actively laser trimmed and 100% tested over the operating temperature range to assure its specified performance.
 - The SIP solution provides a single component to purchase eliminating any lot to lot component variations found in discrete designs.

- 5 Solves your obsolescence problems**
 - Component obsolescence is addressed by DATEL. Let us manage your obsolescence concerns.
 - The flexibility of SIPs allows our engineering team to develop designs that are Form-Fit-Function solutions to your sole sourced or obsolete components.
- 6 Off the shelf and custom designs available**
 - In addition to our standard product portfolio, our experienced team of engineers will customize a product to meet your specific needs.
 - Our DATEL engineering team can also design custom products to meet your system demands.
- 7 Defense Logistics Agency (DLA) certified for MIL-PRF-38534 Class H and Class E devices.**



DATEL, Inc.
11 Cabot Boulevard, Suite 200
Mansfield, MA 02048 USA
Tel: 508.964.5131 • www.datel.com • sales@datel.com

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CAPABILITIES



DATEL®

System in a Package Technology

DATEL has a broad range of processing capabilities that are coupled with a depth of technical knowledge and design experience gained through our 45-plus years as a market leader.

If our standard products do not meet your application's requirements, we will work with you to create a custom solution manufactured with the high quality standards used in our MIL-PRF-38534 certified facility.

DATEL also offers a thick-film ceramic substrate service where we can design and manufacture your circuit layout with gold or silver conductors on a ceramic substrate.

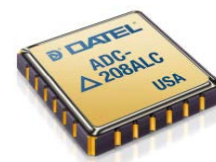
This brochure gives an overview of our services and capabilities. Please contact us to discuss your application and allow us to work with your team to create the optimum solution for your application.

Call us at **508 964-5131** or visit **www.datel.com**

The DATEL Advantage

DATEL has 45-plus years of design and manufacturing expertise in digital and analog products for the Commercial, Industrial, Medical and Military Markets:

- Standard, special or custom products
- Form-Fit-Function for obsolete products
- Dedication/commitment to customer requirements and satisfaction
- No obsolescence - DATEL products are guaranteed to be available for long-term programs
- Low-volume & high-volume applications
- RoHS and Non-RoHS versions available
- Commercial, industrial, medical and military grades are produced in our Mansfield based MIL-PRF-38534 certified facility
- Hermetically sealed packaging



Standard Products

We have many standard product designs with field-proven reliability and performance. These include:

Sampling A/D Converters

- 7 to 24-Bit up to 500MHz sampling rate

Digital-to-Analog Converters

- 12,14,16-Bit up to 250MHz conversion rate

Multi-Channel Converters

- Single-package, multi-channel A/D, D/A and Hybrid Data Acquisition Systems (HDAS)

CCD Signal Processor/Imaging Converters (ADCDS)

- 12, 14, 16, 18-Bit ADC and a Correlated Double Sampler for easy interface with CCDs

Precision Voltage References

Sample/Hold Amplifiers

Linear Voltage Regulators

Clock Drivers

Standard Microcircuit Drawings (SMD) 5962xxx DLA-certified available

Further Information

For more data on our standard products go to www.datel.com or request a copy of our product data book.



29-Step Production Testing

Depending on the screening level required, our hybrid devices are subjected to as many as 29 QA controlled production processes. Including:

- 4 in-process audits
- 4 inspection points

Multiple in-process tests include:

- First electrical test
- Power stress test
- Second electrical test
- Visual inspection (internal)
- Stabilization bake
- Temperature cycle
- Constant acceleration
- Pre-burn-in electrical test
- Burn-in
- 25°C electrical test
- Temperature test
- Leak tests
- Room temperature final electrical tests
- External visual inspections

Dedicated Solutions

With our broad process capabilities and design knowledge we can create a custom product that meets your new design or obsolescence needs, allowing you to focus on other aspects of your design and shorten your time to market.

Typical modifications include:

- Modified analog input range
- Special pinout or footprint
- Special packages
- Improved Dynamic or Static DC specifications
- Custom screening, testing or temperature ranges
- Multi-channel solutions
- Special packaging, Hermetic sealing

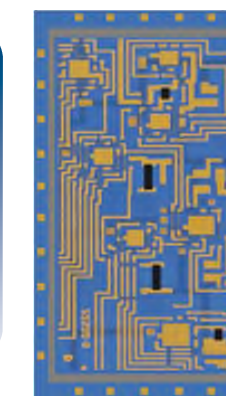
- Incorporating some of your on-board circuitry into one of our existing modules allows you to source a single, fully screened building block tailored to meet your exact requirements.
- Improve temperature coefficient (TC) tracking
- Converting a standard/custom product into a lower cost SMT solution.
- Non-RoHS equivalent device, solder dipped terminations
- Rad-Hard testing (SEL, TID)



High-Density Multi-Layer Circuit on Ceramic

Thick Film Substrate Services (MIL-PRF-38534 compliant)

- Multi-layer (8 conductors)
- Built on Al₂O₃ or BeO ceramic
- Thick Film RuO₂ resistors
- Class 8 clean room
- DLA lab suitability
- RoHS and Non-RoHS available



DATEL Power Modules

We are also able to leverage the capabilities of our power design group to incorporate DC/DC converters into your sub-system or as a fully screened stand-alone module.



Medical Imaging



Typical Application

CAT Scan

Our Imaging Converters have an integrated Correlated Double Sampler that is directly fed from the CCD detector's output. We provide solutions that achieve optimum signal to noise ratio resulting in the sharpest images and the most accurate digital representations possible. If image accuracy and resolution is critical, DATEL's products will deliver state-of-the-art performance.

Scientific Research



Typical Application

High Power Telescopes

Whether you're exploring the vast solar system, or the interaction of atoms within a molecule there is data that needs to be acquired, transferred, stored and analyzed. Our products are designed to acquire an analog event and convert it into a digital format in real time for subsequent scientific analyzing. We offer true high resolution, high speed acquisition solutions that achieve outstanding system performance in a small footprint.

Defense Systems



Typical Application

Radar & Missile Tracker/Seeker

Performance, quality and high-reliability are the three key attributes of all Defense Systems. Our data acquisition components meet all three and are used in many state-of-the-art radar and tracking system applications. Whether you are using one of our commercial off the shelf (COTS) components or our full MIL screened (883) components, rest assured that both have been processed on the same manufacturing line and are fully tested and ready to meet the requirements of your system.

High Temperature / Down-Hole

Typical Application



Geothermal Exploration

DATEL's extensive experience in producing high reliability SIP Hybrid products has allowed us to broaden our product line to introduce a High Temperature/ Harsh Environment family of standard and custom products. This series of Harsh Environment components are developed and manufactured using processes that originate with DATEL's MIL-PRF-38534 standards. These products are offered in the operating temperature ranges of -55°C up to +220°C. Devices are housed in a variety of hermetically-sealed SMT or through-hole ceramic packages and are 100% tested over their specified temperature range. Qualification plans as well as test results by serial numbers are available. If you require a custom high temperature System-in-a-Package solution, DATEL engineers will work with your team to provide a solution that is right for your application.

To find out how DATEL can provide a solution for your application call our development team at 508 964-5131

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DATEL®
INNOVATION and EXCELLENCE