



*Products & Services  
Military/Aerospace Division*

Military, aerospace, and other high reliability systems manufacturers and their suppliers face new opportunities for creativity, innovation, and cost effectiveness. New platforms, designed for longer life cycles, must be brought to market faster and more cost effectively. Existing systems must receive greater attention as upgrades extend their field usefulness.

National Semiconductor will help you meet these challenges. We've been a major supplier of Military and Aerospace electronics for over thirty years . . . and our future commitment is equally firm. We'll work closely to help you determine the best solution to maximize your system performance. We're here to help you define new high reliability products and processes into your designs. National is committed to deliver the products you need, when you need them, and with the supporting applications expertise and other services that will ensure you meet your time and cost objectives.

## Processing Capabilities

Process Flow	Description
<b>Space-Level Systems</b>	
<b>QML V</b>	QML (DSCC Qualified Manufacturers List) product processed to MIL-PRF-38535 for space-level applications
<b>QML V "R"</b>	QML (DSCC Qualified Manufacturers List) product processed to MIL-PRF-38535 with guaranteed RHA radiation assurance to 100 krad(Si)
<b>JAN Class S</b>	QPL (DSCC Qualified Products List) products processed to MIL-PRF-38535 Appendix B for space-level applications
<b>JAN Class S "R"</b>	QPL (DSCC Qualified Products List) products processed to MIL-PRF-38535 Appendix B Level S with guaranteed RHA radiation assurance
<b>MLS</b>	Microcircuit Line for Space – Non-JAN products processed to space flow
<b>Naval/Air/Ground Systems</b>	
<b>QML Q</b>	QML (DSCC Qualified Manufacturers List) product processed to MIL-PRF-38535 for ground applications
<b>JAN Class B</b>	QPL (DSCC Qualified Products List) products processed to MIL-PRF-38535 Appendix A, Level B
<b>JAN Class B "R"</b>	QPL (DSCC Qualified Products List) products processed to MIL-PRF-38535 Appendix A Level B with guaranteed RHA radiation assurance to 100 krad(Si)
<b>SMD</b>	Standard Microcircuit Drawing tactical-level products processed to QML Level Q with electrical specifications controlled by DSCC. (National's SMD products that include an M or Q in the SMD part number are controlled by and fully compliant with MIL-PRF-38535 QML Q.)
<b>/883</b>	Products processed to MIL-STD-883 Level B for military with electrical specifications controlled by manufacturer
<b>Commercial-Grade Systems</b>	
<b>DC, HC</b>	Hermetic commercially processed product
<b>Other Services</b>	
<b>KGD</b>	Known Good Die
<b>Radiation Testing</b>	National Semiconductor has a large radiation-tested product offering. Military and Aerospace devices which are not currently offered as radiation-tolerant product may be procured with Total Dose Testing performed as an add-on option. Radiation test reports performed by National are available on many device types upon request.

## Services & Programs

	Description	For more information contact ...
<b>Customer Source Inspection</b>	Available off-shore via sub-contractors	National's CRC 800-272-9959
<b>Electrostatic Discharge (ESD)</b>	Sorted by part type; report classifies products according to ESD susceptibility as defined in MIL-STD-883, Method 3015	National's CRC 800-272-9959 Distributor
<b>Process/Product Change Notification (PCN)</b>	Advises on major process, product, or package changes	National's Mil/Aero QA (408-721-5649) Europe QA [+49 (0)8141 351483]
<b>Government Industry Data Exchange Program (GIDEP)</b>	<ul style="list-style-type: none"> <li>• Product Change Notice (PCN): Communicates vital information related to changes in National's products (i.e., form, fit &amp; function)</li> <li>• Alerts: Describes actual or potential reliability problems with supporting data</li> <li>• Problem Advisory: Preliminary information on potential problems</li> <li>• DMSMS – Refer to Product Obsolescence Notification</li> </ul>	National's Mil/Aero QA (408-721-5649) Europe QA [+49 (0)8141 351483]
<b>Product Obsolescence Notification</b>	<ul style="list-style-type: none"> <li>• Diminishing Manufacturing Sources &amp; Materials (DMSMS); sent as part of GIDEP program; includes last-time buy date and alternate sources</li> <li>• Rochester Electronics is the post-obsolescence supplier of National's products, e.g., transfer inventory and manufacturing technology</li> </ul>	National's Mil/Aero QA (408-721-5649) Europe QA [+49 (0)8141 351483] www.national.com National's CRC 800-272-9959 Distributor Rochester Electronics (508-462-9332)
<b>Military Datasheet (MDS)</b>	Detailed listing of parameters, test conditions, test limits, and applicable test temperatures which apply to electrical screening and Quality Conformance Inspection, package outlines, and pinouts	National's CRC 800-272-9959 www.national.com
<b>Returns &amp; Failure Analysis</b>	National's Mil/Aero product quality analysis (PQA) process enables product performance insight. All returned PQA devices are analyzed for root cause of the issue (i.e., correlation, device failure, etc.). If the parts were purchased through a Distributor, National will keep your Distributor informed throughout the PQA process. Return Material Authorization is issued immediately if the failure is valid.	National's Mil/Aero QA (408-721-5649) Europe QA [+49 (0)8141 351483] National's CRC 800-272-9959 Distributor
<b>National Gold</b>	Quality must be built in, not screened in. By choosing National as your certified supplier, you obtain Ship-to-Stock product at no additional cost. National Gold provides an "open door" into National's manufacturing and quality systems via quarterly reports that give visibility into National's packaging and device-level processing. In addition, every Certificate of Conformance (C of C) identifies whether the product being shipped is below 100PPM. This gives the customer the necessary information to determine whether to perform incoming inspection.	National's Mil/Aero QA (408-721-5649) Europe QA [+49 (0)8141 351483]
<b>Reliability Data</b>	Reliability data can be provided by technology and package. The source of data is Quality Conformance Inspection (defined by MIL-PRF-38535) and commercial line monitors (defined by National's specifications).	National's Mil/Aero QA (408-721-5649) Europe QA [+49 (0)8141 351483]
<b>Design</b>	<p>National has formed a partnership with Cadence Spectrum Design Services and ASPEC Technology Libraries to provide a full range of design, testing, characterization, and reliability capability. National offers full ASIC design &amp; silicon manufacturing services from design concept to silicon in both digital and mixed-signal technologies. All major workstations are supported.</p> <p>National also has design services that can augment your engineering staff and complete your time-critical design needs. Give us a call.</p>	National at 408-721-3100

	Available Process Flows					Package Options						Total I/O
	QML V/ JAN S	MLS	QML Q/ SMD	JAN B	883	CDIP	LCC	Flatpak	Metal Can	Other	KGD	10
<b>Analog</b>												
CMOS Op Amps		☑	☑	☑	☑	☑		☑ <sup>+</sup>	☑		☑	
Bipolar Op Amps												
Comlinear		☑			☑	☑		☑ <sup>+</sup>	☑		☑	
Comparators												
Data Acquisition		☑	☑		☑	☑		☑ <sup>+</sup>	☑		☑	
References												
Regulators	☑	☑	☑	☑	☑	☑		☑ <sup>+</sup>	☑		☑	
Low Dropout Voltage Regulators												
Motor Drivers		☑			☑	☑		☑ <sup>+</sup>	☑		☑	
<b>ASIC</b>												
CMOS Gate Array (.65μm)		☑	☑		☑	☑	☑	☑		☑		No data
CMOS Standard Cell (.65μm)												
CMOS Gate Array (.35μm)		☑	☑		☑	☑	☑	☑		☑		No data
CMOS Standard Cell (.35μm)												
<b>Interface</b>												
Bipolar Data Transmission												
CMOS Data Transmission	☑	☑	☑		☑	☑	☑	☑		☑	☑	
Advanced Bus												
<b>LAN</b>												
Ethernet												
FDDI			☑							☑		No data
<b>Logic</b>												
SCAN (IEEE 1149.1)		☑	☑		☑			☑			☑	No data
BiCMOS												
ABT	☑		☑			☑	☑	☑ <sup>+</sup>			☑	No data
CMOS												
FACT™ (AC/ACT)	☑ <sup>+</sup>	☑	☑	☑ <sup>+</sup>	☑	☑	☑	☑ <sup>+</sup>			☑	
FACT Quiet Series™ (ACQ/ACTQ)												
FACT FCT		☑	☑		☑	☑	☑	☑ <sup>+</sup>			☑	
CD4K/54C												
Bipolar												
FAST™												
Low Power Schottky (LS)	☑	☑	☑	☑	☑	☑	☑	☑ <sup>+</sup>				
TTL												
DTL	☑	☑	☑	☑		☑		☑ <sup>+</sup>				
ECL												
F100K 300 Series	☑	☑	☑		☑	☑		☑				
<b>Memory</b>												
SRAM												
<b>Microcontrollers</b>												
			☑				☑					No data

Radiation Data (krads, typical)				Notes
100	250	500	1Meg	
				Low power precision amplifier products for portable and battery operations
				High speed Vertically Integrated PNP (VIP™) bipolar products
				High performance Analog signal processing, signal conditioning & data conversion products
				Wide range of speeds and configurations
				Focused on integration of multiple functions on a single chip for Analog-to-Digital conversion
				Tight tolerance and temperature-stable products
				Standard high supply current regulators for typical power supplies
				Fully programmable low power regulators for distributed power systems
				Highly integrated multi-function products for motor driver requirements
				High density, high performance; up to 500K gates
				Complements the SCX065 array family with more functionality, higher density
				Available mid 1997
				Available late 1997
				Bipolar drivers, receivers and transceivers for single-ended, differential, and backplane applications
				CMOS drivers, receivers and transceivers for single-ended, differential, and backplane applications
				BTL and Pi-bus transceivers
				Available as - MPC only (plastic Quad Flatpak); tested -40°C to +85°C with burn-in
				Available as - MPC only (plastic Quad Flatpak); tested -40°C to +110°C with burn-in
				Enables faster and more cost-effective board- and system-level testability
				Qualified under QML Q & V; high performance octal and 16-bit functions
				General purpose high performance Logic; large selection of gates and octal functions; available as RHA
				General purpose high performance Logic for noise-sensitive applications; gates, octals and 16-bit functions
				High speed Logic; TTL compatible
				High voltage CMOS products
				Offers the best speed/power/broad portfolio/price/performance of all advanced Schottky TTL families
				Well known, mature family
				Well known, mature family
				Sole-source, mature family
				Easiest-to-use ECL with the lowest power and highest speed performance of any ECL
				High speed CMOS SRAMs
				Available in ROM and ROMless options; includes COP (4- and 8-bit) and HPC series (16-bit)



## Distributors

National provides its Distributors with direct access to all aspects of National's products and production. Call your Distributor representative for answers to your questions, product and sample requests, and other value-added services offered for National Semiconductor products.

### Distributors - North America

Future Electronics Corp.  
Hamilton Hallmark  
Pioneer Standard  
Zeus Electronics,  
an Arrow Company

### Die Processors - North America

Chip Supply  
Minco Technology Labs

### Die Processors - Europe

Die Technology

## Sales Information

For more information on National Semiconductor's Mil/Aero solutions, just give us a call.

### North America

National Customer Response Center 1-800-272-9959  
National Customer Service Group 1-800-272-9959  
Technical Response Group 1-800-272-9959

#### Customer Service Group

- Literature requests
- Price and delivery
- Sample requests
- Return material authorization
- Backlog maintenance
- Data requests
- Expedite issues
- Drawing review
- Waiver issues
- Purchase Order clauses

#### Technical Response Group

- Evaluate components for use in new customer applications
- Design engineering assistance
- Troubleshooting help
- Technical information for specific products/applications
- Datasheet specifications for customer evaluation
- SMD information on qualified and planned National products

### Europe

European Customer Support Centre

Deutsch	+49 (0) 180 530 8585
English	+49 (0) 180 532 7832
Fax Number	+49 (0) 180 530 8586
Email ID	europe.support@nsc.com
European Mil/Aero Marketing	
Telephone	+49 (0) 8141 351492
	+49 (0) 8141 351495
Fax Number	+49 (0) 8141 351470

### Japan

Jepico (03) 3348-0611

## Internet

### National Semiconductor Home Page

<http://www.national.com>

### Military/Aerospace Home Page

<http://www.national.com/appinfo/milaero>

## Collateral

Description	Lit. #	Description	Lit. #
<b>Databooks</b>		<b>Databooks continued</b>	
ABT Databook, 1996	400001	High-Performance Bus Interface Designers Guide	550095-002
FACT Logic Databook	400022	1994 SCAN Tutorial Handbook, Vol. 1	650223-001
F100K 300 Series Databook	400027	<b>Line Cards</b>	
Application-Specific Analog Products Databook	400034	Known Good Die Line Card	650215-003
Data Acquisition Databook	400035	Mil/Aero SRAM Line Card	650223-001
Operational Amplifiers Databook	400036	Mil/Aero Analog Line Card	650254-004
Power IC Databook	400037	Mil/Aero Logic & Interface Line Card	650255-005
Interface Databook, 1996	400045	Technologies for Space, 1996	650271-002
SCAN Databook, 1996	400103	<b>Selection Guides</b>	
Comlinear Databook, 1995	450001	Radiation Services Daytimer	650219-001
Packaging Databook, 1993	400075		

FACT, FACT Quiet Series, FACT QS, FAST, and VIP are trademarks of National Semiconductor Corporation.

National and National Semiconductor are registered trademarks of National Semiconductor Corporation.

All companies and product names are trademarks or registered trademarks of their respective holders.

©1997 National Semiconductor Corporation