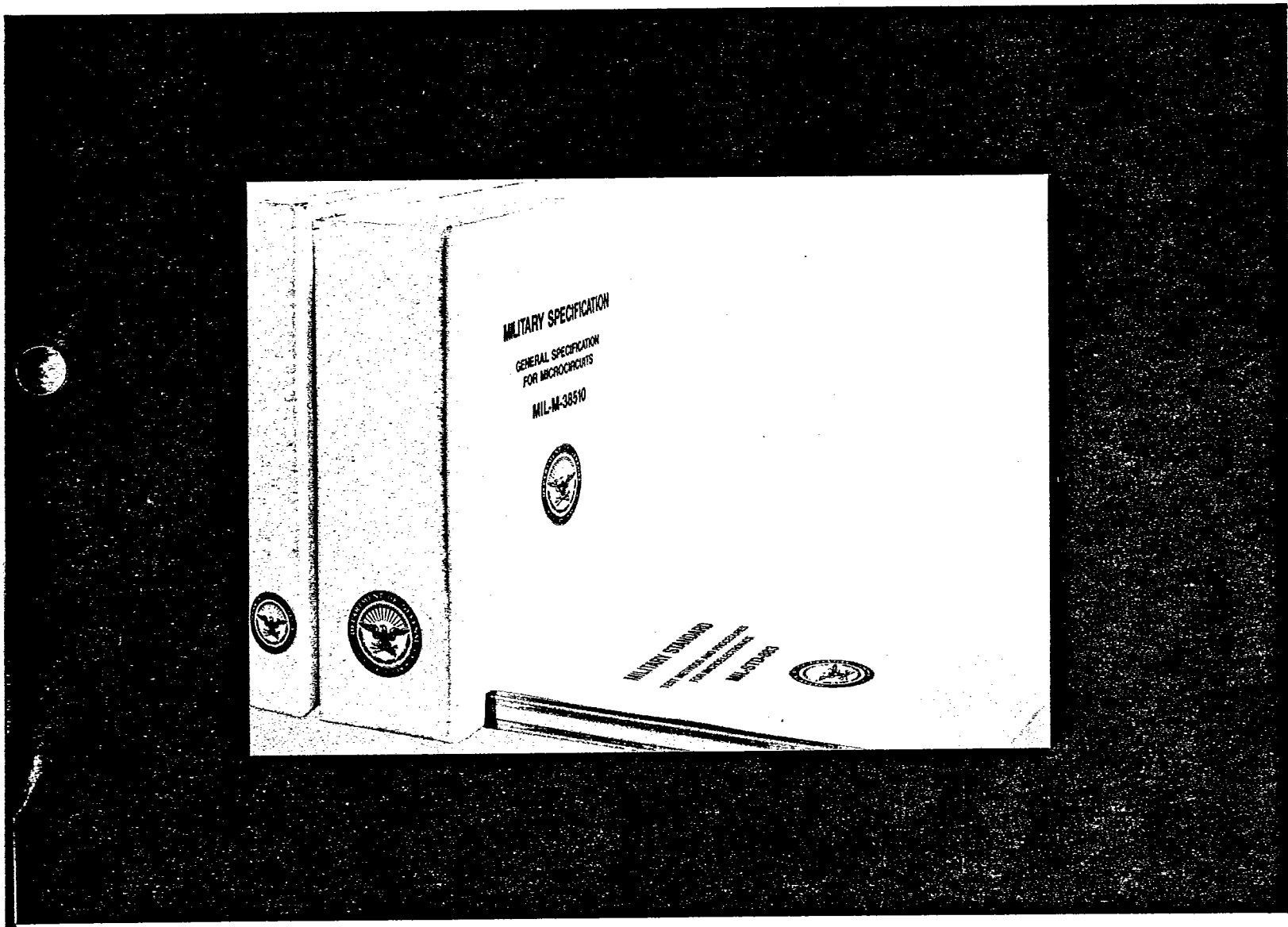
SPRAGUE®
THE MARK OF RELIABILITY

MILITARY INTEGRATED CIRCUITS

WR-219



CMOS BIPOLAR BiMOS

MILITARY ICs

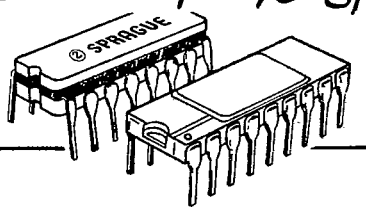
INDEX

COMPANY PROFILE

Sprague Electric Company was founded in 1926 and is recognized as a pioneer in the research, development, and manufacture of reliable, high-quality electronic components for the electrical and electronics industries. Sprague manufactures electronic components in 17 locations in the United States and in five countries in Europe and the Far East.

Headquarters for the Sprague Semiconductor Group is in Worcester, Massachusetts. This group has concentrated its activities in the areas of high-performance power and smart power, CMOS logic, sensors and discrete semiconductors. Integrated circuit manufacturing operations are conducted in Worcester in a 183,000 square foot plant and at a 223,000 square foot production facility located at Willow Grove, Pennsylvania. Other supporting operations are located in Concord, New Hampshire; Manila, Republic of Philippines; Hong Kong; and Ferney Voltaire, France.

The Sprague Semiconductor Group manufactures standard and custom ICs for specialized, military markets. Distinctive circuits, involving proprietary designs and state-of-the-art processing, have helped establish Sprague Electric Company as a leader in its field.



MILITARY PRODUCT STANDARDS

Sprague Electric Company manufactures high-reliability monolithic integrated circuits for a variety of military applications. Standard devices, qualified to MIL-M-38510 slash sheets or to DESC/SMDP drawings, and standard or custom devices, fully compliant with MIL-STD-883, provide product assurance and standardization to meet varying customer requirements.

MIL-M-38510

MIL-M-38510 is the general specification for military microcircuits. This specification is intended to support government microcircuit applications and logistic programs. It establishes the general requirements for monolithic integrated circuits and the quality assurance and reliability standards required in the acquisition of microcircuits.

Products supplied under MIL-M-38510 must be qualified and listed on the Qualified Products List, QPL-38510. Qualification and subsequent listing applies only to products manufactured in the specified plants listed in the QPL. Sprague Semiconductor Group is line-certified by the Defense Electronics Supply Center (DESC) to produce MIL-M-38510 Class-B microcircuits and offers more 4000 Series QPL devices than any other supplier.

Standardized Military Drawing Program

The Standardized Military Drawing Program (SMDP) provides standardization when a MIL-M-38510 detail drawing (slash sheet) does not exist. This program directly replaces the original DESC drawing system. Sprague Semiconductor Group offers the largest selection of 4000 Series CMOS logic to DESC/SMDP drawings, each of them fully compliant with MIL-STD-883.

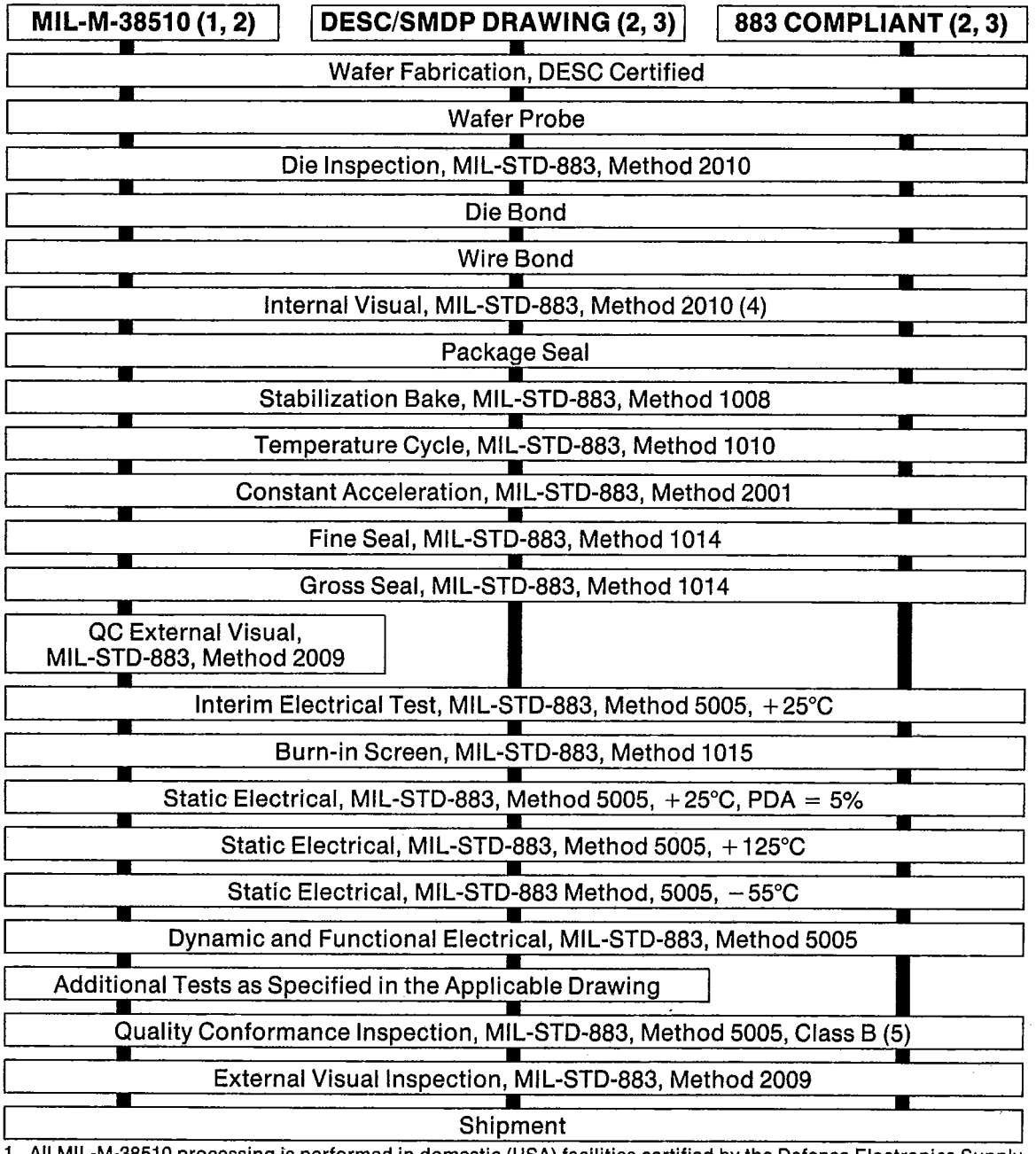
MIL-STD-883

This standard establishes uniform methods, controls, and procedures for designing, testing, identifying, and certifying microelectronic devices suitable for use within military and aerospace electronic systems. It includes basic environmental tests, physical and electrical tests, design, package and material constraints, general marking requirements, and workmanship and training procedures.

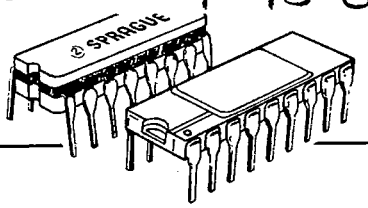
Sprague Electric Company offers a full line of integrated circuits that are fully compliant with MIL-STD-883.

MILITARY ICS

MILITARY SCREENING FLOWS



1. All MIL-M-38510 processing is performed in domestic (USA) facilities certified by the Defense Electronics Supply Center (DESC).
2. All high-reliability manufacturing processes are monitored by Sprague Electric Company Quality Control Department through gating operations at regular and periodic audits.
3. DESC/SMDP Drawing and 883 Compliant devices may include some offshore processing.
4. MIL-M-38510 pre-seal visual inspection is monitored by DCAS QAR in addition to Sprague Electric Company's Quality Control Department.
5. Quality Conformance Inspection is performed in accordance with the latest revisions of MIL-M-38510 and MIL-STD-883.



Quality Conformance

The Quality and Reliability Department of the Sprague Semiconductor Group performs all quality conformance inspection tests required by MIL-STD-883, Methods 5005 and 5010, and MIL-M-38510. The data from these tests is on file.

Group B Testing

Package-related testing is performed in accordance with the alternate Group B inspection procedure for Class B product per MIL-STD-883, Method 5005, once per date code, package type, and lead finish.

Subgroup	Test	MIL-STD-883 Method
1	Physical Dimensions	2016
2	Resistance to Solvents	2015
3	Solderability	2003
4	Internal Visual/Mechanical	2014
5	Bond Strength	2011
7	Fine and Gross Leak	1014
8*	V_{ZAP}	—

Group C Testing

Die-related tests are performed once every 13 weeks per generic group.

Subgroup	Test	MIL-STD-883 Method
1	Steady-State Life	1005
2	Temperature Cycle	1010
	Constant Acceleration	2001
	Fine and Gross Leak	1014
	External Visual	1010
	End-Point Electrical Parameters	—
3*	Dynamic Electrical at High Temperature	—
4*	Dynamic Electrical at Low Temperature	—

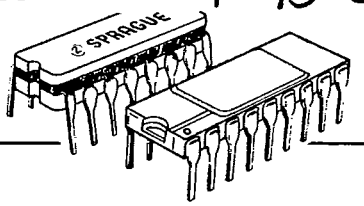
*Performed on MIL-M-38510 product as required by individual slash sheets.

MILITARY ICs

Group D Testing

Package-related tests performed once every 26 weeks per package type, pin count, and lead finish.

Subgroup	Test	MIL-STD-883 Method
1	Physical Dimensions	2016
2	Lead Integrity	2004
	Fine and Gross Leak	1014
3	Thermal Shock	1011
	Temperature Cycle	1010
	Moisture Resistance	1004
	Fine and Gross Leak	1014
	Visual	1004/1010
	End-Point Electrical Parameters	—
4	Mechanical Shock	2002
	Vibration, Variable Frequency	2007
	Constant Acceleration	2001
	Fine and Gross Leak	1014
	Visual	1004
	End-Point Electrical Parameters	—
5	Salt Atmosphere	1009
	Fine and Gross Leak	1014
	Visual	1009
6	Internal Water Vapor Content	1018
7	Adhesion of Lead Finish	2025
8	Lid Torque	2024



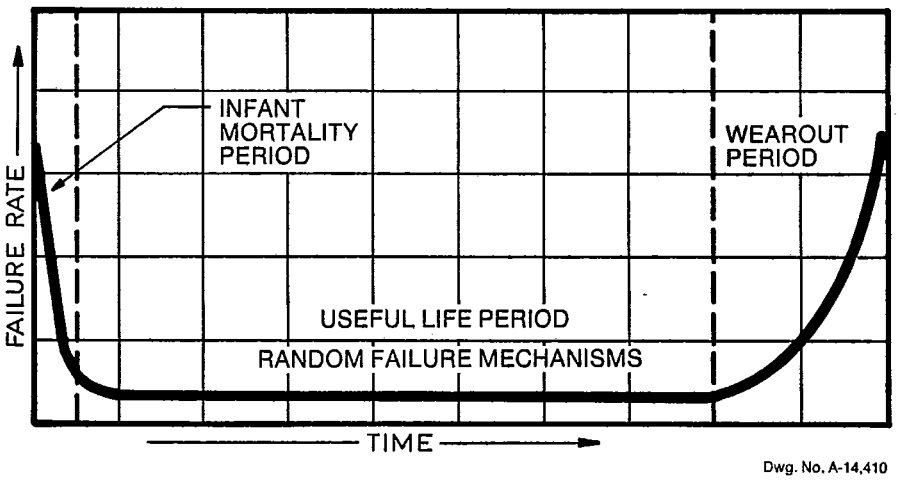
RELIABILITY

CMOS, bipolar, and BiMOS integrated circuits exhibit the same reliability characteristics as other electronic devices in that the failure rate has three distinct phases:

1) Within a relatively short time after manufacture, certain failure mechanisms appear under moderate levels of stress. The failure during this period is termed "infant mortality."
2) After the period of infant mortality, failure rate falls dramatically and, for a long period, only infrequent random failures occur.
3) Finally, device packages can actually wear out and the failure rate will increase again.

When the failure rate for electronic components is plotted as a function of time, the result is a characteristic bathtub curve. While the bathtub shape is universal throughout the industry, actual values for a single component type can vary greatly from one manufacturer to another. Sprague Electric Company, through many years of experience in the manufacture of integrated circuits, has developed design rules and processing techniques to:

1) Minimize the infant mortality failure mechanisms.
2) Detect potential failures before they reach the customer.
3) Control wear-out so that operating life far exceeds the lifetime required by the customer.
4) Comply with requirements of MIL-M-38510 (e.g., maximum current density).



Dwg. No. A-14,410

RELIABILITY LIFE CYCLE
—TYPICAL CURVE—

MILITARY ICs

SELECTION GUIDE

HIGH-VOLTAGE/HIGH-CURRENT POWER DRIVERS TO MIL-STD-883

In order of (1) Output Current Rating (2) Output Voltage Rating (3) Number of Drivers

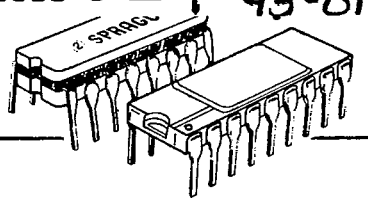
Outputs*			Features				
mA	V	Number	Serial Input	Latched Drivers	Clamp Diodes	Saturated Output	Part Number
SINK DRIVERS							
100	20	8	—	—	—	X	UDS-2595H
250	40	4	—	—	X	X	Series UHD-400
	70	4	—	—	X	X	Series UHD-400-1
	100	4	—	—	X	X	Series UHD-500**
300	80	2	—	—	—	X	Series UDS-3610H†
	80	2	—	—	—	X	Series UDS-5710H†
	80	4	—	—	X	X	Series UDS-5700H
	120	4	—	PIN DIODE DRIVER			UDS-5791EK/H
350	50	4	—	X	X	—	UCS-4801H
	50	4	—	X	X	—	UCS-5800H
	50	7	—	—	X	—	Series ULS-200EK/H/R**
	50	8	—	—	X	—	Series ULS-2800EK/H/R**
	50	8	—	X	X	—	UCS-4801H
	50	8	—	X	X	—	UCS-5801H
	50	8	X	X	—	—	UCS-4821H
	80	8	X	X	—	—	UCS-4822H
	80	8	X	X	—	—	UCS-5822H
	95	7	—	—	X	—	Series ULS-2020H/R
	95	8	—	—	X	—	Series ULS-2820H/R
	100	8	X	X	—	—	UCS-4823H
500	50	7	—	—	X	—	Series ULS-2010H/R
	50	8	—	—	X	—	Series ULS-2810H/R
1250	50	4	—	—	X	—	Series ULS-2064H
1500	80	4	—	—	X	—	Series ULS-2065H**
SOURCE DRIVERS							
−25	60	8	—	X	—	—	UCS-4815H
	60	8	—	X	—	—	UCS-5815H
	60	10	X	X	—	—	UCS-4810H
	60	10	X	X	—	—	UCS-5810H
−350	−50	8	—	—	X	—	UDS-2580/88H
	50	8	—	—	X	—	UDS-2981/82EK/H/R
	80	8	—	—	X	—	UDS-2983/84EK/H/R
SOURCE/SINK DRIVERS							
±800	30	3	HALF-BRIDGE		X	X	UDS-2933/34H

*Current is maximum tested condition; voltage is absolute maximum rating.
†NON-COMPLIANT regarding MIL-STD-883 because of package dimensions.
**UHD-508 is available to DESC Drawing 8550001CC.
ULS-2003H is available as M38510/14103BEC.
ULS-2803H is available to SMDP Drawing 5962-8605801VC.
ULS-2069H is available to SMDP Drawing 5962-8753201EC.

SMART POWER DRIVERS TO MIL-STD-883

Logic	Output Ratings*	Clamp Diodes	Part Number
PARALLEL-INPUT LATCHED DRIVERS			
4-Bit	350 mA 50 V	X	UCS-4401H
4-Bit	350 mA 50 V	X	UCS-5800H
8-Bit	−25 mA 60 V	—	UCS-4815H
8-Bit	−25 mA 60 V	—	UCS-5815H
8-Bit	350 mA 50 V	X	UCS-4801H
8-Bit	350 mA 50 V	X	UCS-5801H
SERIAL-INPUT LATCHED DRIVERS			
8-Bit	350 mA 50 V	—	UCS-4821H
8-Bit	350 mA 80 V	—	UCS-4822H
8-Bit	350 mA 80 V	—	UCS-5822H
8-Bit	350 mA 100 V	—	UCS-4823H
10-Bit	−25 mA 60 V	—	UCS-4810H
10-Bit	−25 mA 60 V	—	UCS-5810H

*Current is maximum tested condition; voltage is absolute maximum rating.



SELECTION GUIDE

4000 SERIES CMOS LOGIC

Function	Description	Part Number				Features
			MIL-M-38510†		DESC	
		MIL-STD-883	4000A	4000B	Drawing	
Gates and Inverters	NAND	883C4011BC	/05001BC	/05051BC	—	Quad 2-Input
		883C4011UBC	—	—	—	Quad 2-Input (Unbuffered)
		883C4012BC	/05002BC	/05052BC	—	Dual 4-Input
		883C4023BC	/05003BC	/05053BC	7901301CA	Triple 3-Input
		883C4068BC	—	—	—	8-Input
	AND	883C4073BC	—	/17003BC	—	Triple 3-Input
		883C4081BC	—	/17001BC	—	Quad 2-Input
		883C4082BC	—	/17002BC	—	Dual 4-Input
	NOR	883C4001BC	/05202BC	/05252BC	—	Quad 2-Input
		883C4001UBC	—	—	—	Quad 2-Input (Unbuffered)
		883C4002BC	/05203BC	—	—	Dual 4-Input
		883C4025BC	/05204BC	/05254BC	—	Triple 3-Input
		883C4078BC	—	—	7704401CA	8-Input
	OR	883C4071BC	—	/17101BC	—	Quad 2-Input
		883C4072BC	—	—	—	Dual 4-Input
		883C4075BC	—	/17103BC	—	Triple 3-Input
	Complex	883C4000BC	/05201BC	—	—	Dual 3-Input NOR and Inverter
		883C4007UBC	/05301BC	/05351BC	—	Dual Complimentary Pair and Inverter
		883C4030BC	/05303BC	/05353BC	—	Quad 2-Input Exclusive OR
		883C4070BC	—	/17203BC	—	Quad 2-Input Exclusive OR
		883C4077BC	—	/17204BC	—	Quad Input Exclusive NOR
		883C4085BC	—	/17201BC	—	Dual 2-Wide AND-OR Invert
		883C4086BC	—	/17202BC	—	4-Wide AND-OR Invert
		883C4019BC	/05302BE	/05352BE	—	Quad AND-OR Select Gate
	Inverters	883C4069UBC	—	/17401BC	—	Hex, Pin-Compatible with 74C04
		883C4449UBC	—	—	—	Hex, Pin-Compatible with 4009, 4049
	Expandable Gates	883C4402BC	—	—	—	Dual 4-Input NOR
		883C4412BC	—	—	—	Dual 4-Input NAND
Schmitt Triggers	Quad	883C4093BC	—	/17701BC	7704601CA	2-Input NAND
	Hex	883C4584BC	—	—	—	Inverter
Buffers	Level Shifting	883C4009UBC	/05501BE	—	—	Hex Inverter, Dual Supply
		883C4010BC	/05502BE	—	—	Hex Non-Inverting, Dual Supply
		883C4049UBC	/05503BE	/05553BE	7901401EA	Hex Inverter, Single Supply
		883C4050BC	/05504BE	/05554BE	—	Hex Non-Inverting, Single Supply
		883C4504BC	—	—	—	Hex Non-Inverting, Dual Supply
	High Current	883C4041UBC	††	††	—	Quad/True Complement
		883C4441UBC	—	—	—	Quad Driver
	3-State	883C4502BC	—	—	—	Hex Strobed Inverting
Shift Registers	Serial In/Serial Out	883C4006BC	††	††	—	18-Stage
	Serial In/Parallel Out	883C4015BC	/05703BE	††	—	Dual 4-Stage
	Parallel In/Serial Out	883C4014BC	—	—	—	8-Stage, Synchronous Parallel Loading
		883C4021BC	/05704BE	/05754BE	7901201EA	8-Stage, Asynchronous Parallel Loading
	Parallel In/Parallel Out	883C4035BC	—	—	8101701EA	4-Stage
	Bus Registers	883C4034BC	—	—	—	8-Stage Universal
		883C4094BC	—	—	7702501EA	8-Stage Shift and Store
		883C4517BC	—	—	—	Dual 64-Bit Static
Multiplexers and Switches	Digital Multiplexers	883C4512BC	—	—	—	8-Channel Data Selector
	Analog Multiplexers and Demultiplexers	883C4051BC	—	—	—	8-Channel Analog Multiplexer
		883C4052BC	—	—	—	Differential 4-Channel Analog Mux./Demux.
		883C4053BC	—	—	8101801EA	Triple 2-Channel Analog Mux./Demux.
	Analog Switches	883C4016BC	/05801BC	††	—	Quad SPST Switch
		883C4066BC	/05802BC	/05852BC	—	Quad SPST with Buffered Control Unit
		883C4416BC	—	—	—	4016 Configured for DPDT

†Complete part number includes the prefix "M38510" and a suffix letter to indicate lead finish. For example: M38510/05001BCA.
††Qualification is pending. Contact sales office for latest information.

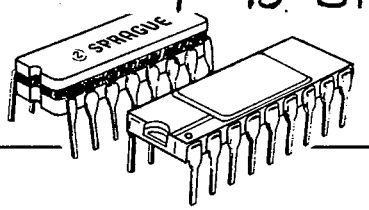
MILITARY ICS

SELECTION GUIDE

4000 SERIES CMOS LOGIC

Function	Description	Part Number				Features
			MIL-M-38510†		DESC	
		MIL-STD-883	4000A	4000B	Drawing	
Counters	Binary	883C4024BC	/05605BC	/05655BC	—	7-Stage
		883C4404BC	—	—	—	8-Stage
		883C4040BC	—	—	7705801EA	12-Stage
		883C4020BC	††	††	—	14-Stage
		883C4060BC	—	—	—	14-Stage with Oscillator
		883C4161BC	—	—	—	4-Stage with Asynchronous Clear
		883C4163BC	—	—	—	4-Stage with Synchronous Clear
		883C4193BC	—	—	—	4-Bit Up/Down
		883C4516BC	—	—	—	4-Stage Programmable Up/Down
		883C4526BC	—	—	—	4-Stage Programmable Down
	Binary/Decade	883C4029BC	—	—	8101601EA	Presettable Up/Down
	Decade	883C4520BC	—	—	7702301EA	Dual 4-Stage Up
		883C4192BC	—	—	—	Presettable Up/Down
		883C4510BC	—	—	—	Programmable Up/Down
		883C4160BC	—	—	—	Counter with Asynchronous Clear
		883C4162BC	—	—	—	Counter with Synchronous Clear
		883C4522BC	—	—	—	4-Stage Programmable Down
		883C4518BC	—	—	—	Dual Up
	Decoded Outputs	883C4017BC	/05601BE	/05651BE	—	Decade Counter with 10 Outputs
		883C4022BC	/05604BE	—	—	Octal Counter with 8 Outputs
	Johnson	883C4018BC	/05602BE	/05652BE	—	Presettable Divide-by-n
Dividers/Multipliers	Divide by 21	883C4445BC	—	—	—	On-Board Oscillator
	Rate Multiplier	883C4527BC	—	—	—	BCD
	Phase-Locked Loops	883C4046BC	—	—	—	Maximum Operating Freq. 3 MHz at 10 V
		883C4446BC	—	—	—	Maximum Operating Freq. 4 MHz at 10 V
	Multivibrators	883C4528BC	—	—	7704501EA	Dual Monostable
		883C4047BC	—	—	8102001EA	Monostable/Astable
Arithmetic Logic	4-Bit	883C4582BC	—	—	—	Look-Ahead Carry Block
		883C4585BC	—	—	7703702EA	Magnitude Comparator
		883C4008BC	/05401BE	††	—	Full Adder
		883C4581BC	—	—	—	Arithmetic Logic Unit
	12-Bit	883C4531BC	—	—	—	Parity Tree
Flip-Flops	Dual	883C4013BC	/05101BC	/05151BC	7901101CA	D Type, 16 MHz Toggle Rate
		883C4027BC	/05102BE	/05152BE	—	JK Type, 8 MHz Toggle Rate
	Quad	883C4076BC	—	—	—	D Type, 3-State Outputs
	Hex	883C4174BC	††	—	—	D Type, Functional Equivalent to TTL
Latches	R-S Type	883C4043BC	/05103BE	—	—	Quad NOR with 3-State Outputs
		883C4044BC	—	—	7702601EA	Quad NAND with 3-State Outputs
	Clocked	883C4042BC	—	—	8101901EA	Quad, Common Clock
		883C4508BC	—	—	—	Dual 4-Bit with Three-State Outputs
	Addressable	883C4099BC	—	—	—	8-Bit
Encoder	8-Bit Priority	883C4532BC	—	††	—	5 V, 10 V and 15 V Parallel Rating
Decoders	Logic Functions	883C4028BC	/05901BE	/05951BE	—	BCD-to-Decimal
		883C4428BC	—	—	—	Binary-to-Octal
		883C4514BC	—	—	—	4-to-16 Line Decoder/Latch (Active High Output)
		883C4515BC	—	—	7703201JA	4-to-16 Line Decoder/Latch (Active Low Output)
		883C4555BC	—	—	7704701EA	Dual 2-to-4 Line (Active High Output)
		883C4556BC	—	—	7704801EA	Dual 2-to-4 Line (Active Low Output)
	Display Functions	883C4026ABC	—	—	—	Decade Counter, 7 Segment Output
		883C4426ABC	—	—	—	4026 with Bipolar Drivers
		883C4033ABC	—	—	—	Decade Counter, 7 Segment Output
		883C4433ABC	—	—	—	4033 with Bipolar Drivers
		883C4511BC	—	—	—	BCD to 7-Seg. Latch/Decoder, Bipolar Outputs
		883C4543BC	—	—	—	BCD to 7-Seg. Latch/Decoder, LCD Outputs

†Complete part number includes the prefix 'M38510' and a suffix letter to indicate lead finish. For example: M38510/05001BCA.
††Qualification is pending. Contact sales office for latest information.



MILITARY CUSTOM CIRCUITS

The Sprague Semiconductor Group has broad experience in designing and manufacturing custom circuits for a wide variety of applications. Sprague high-speed CMOS, power bipolar, and smart power BiMOS technologies can provide custom silicon solutions for the toughest military system problems. Full-custom design and manufacturing capabilities, as well as foundry services for production of customer-designed circuits, are available.

Sprague IC design and manufacturing facilities have been certified as "secure" by the National Security Agency (NSA) for working with classified integrated circuits such as COMSEC devices.

Custom Design Services

An experienced design staff has developed custom silicon solutions for specific applications with a wide variety of special requirements. Design and applications engineers study a customer's special requirements and respond with a proposal of a custom solution for the specific application. Consistent high-volume production by Sprague of many custom circuits demonstrates the availability of excellent manufacturing resources.

Standard cell libraries in several process technologies can be used by the Sprague design staff as an alternative to traditional full-custom design. The custom design team can present a choice between the lower manufacturing costs of a full-custom design and the quick and lower development costs of a standard cell design. This flexibility allows the customer to choose the silicon solution that best fits both budget and schedule.

COT Foundry Services

In addition to full-custom design services, customer-owned tooling (COT) is also offered. Whether for initial production of proprietary LSI devices or for second-sourcing critical, high volume custom devices, Sprague's Foundry service is a cost-effective solution.

Sprague offers several types of engineering and development support services for foundry customers:

- Assistance in determining design and process compatibility for existing designs.
- Training of the customer design team to ensure design and process compatibility for new designs.
- In-house mask-making capability.

MILITARY ICS

Process Technologies

The three basic process technologies available from Sprague are bipolar, CMOS, and DMOS. These three technologies are used separately or in combination in the form of merged process technologies. Merged technology capabilities include:

Bipolar + CMOS ..... BiMOS
High-Current DMOS + CMOS ..... D/CMOS
CMOS + High-Voltage DMOS ..... C/DMOS
CMOS + DMOS + Bipolar

This merging gives Sprague the design flexibility to incorporate multiple system functions in a cost-effective (and often unique) manner. Functions that are currently merged in monolithic silicon chips by Sprague include:

Input Sense (Hall Effect, Photosensitive, Low Level)
Information Processing (Analog or Digital)
Output Control (High Voltage and/or High Current)

For example, smart power is a monolithic combination of information processing and output drive capability of 2 A and/or 2 W or greater. Sprague developed it and has been a leader in smart power technology since 1977.

Manufacturing Services

Custom circuits are available with a variety of manufacturing services. Circuits may be purchased as:

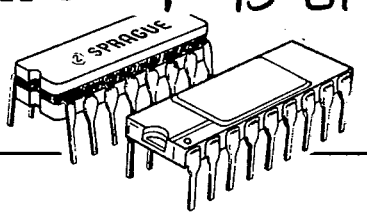
- Die in wafer form without device electrical testing, or with 100% electrical testing, or as expanded wafers
- Die in waffle packs—tested, sorted, and inspected
- Packaged units with full electrical testing in ceramic side-brazed dual in-line packages, in cerDIP packages, or in specialty packages (plastic flatpacks, small outline, leadless chip carriers).
- As completed devices with full military screening to MIL-STD-883 and domestic fabrication, assembly, testing, and qualification.

These choices give the customer the flexibility to select only the services needed, minimizing custom silicon solution costs.

CMOS Military ROMs

Sprague CMOS ROMs have been designed as replacements for NMOS ROMs and EPROMs in many applications. All devices meet or exceed NMOS speed performance (<300 ns access time) while delivering the advantages of CMOS. These include low operating power and negligible standby current (typically 10 μA), allowing battery backup. In addition, the memories are fully static, asynchronous, and do not require clocks or strobes. Due to these features, Sprague CMOS memories are suitable for applications ranging from memory systems for high-speed computers to line-powered phone systems and portable instruments.

Density	Organization	Part Number	Package	Replaces
32K	4096 x 8	883C23C32	24-Pin DIP	NMOS 2332 ROM and 2532 EPROM
	4096 x 8	883C23C33	24-Pin DIP	NMOS 2333 ROM and 2732 EPROM
64K	8192 x 8	883C23C64	24-Pin DIP	NMOS 2364 ROM and 68764 EPROM
	8192 x 8	883C23C65	28-Pin DIP	NMOS 2365 ROM and 2364/2764 EPROMs



INTEGRATED CIRCUIT PART NUMBERING SYSTEMS

UD S - 5791 H - 883

INSTRUCTIONS.
883 = MILITARY GRADE, COMPLIANT, WITH SCREENING TO MIL-STD-883
MIL = MILITARY GRADE, NON-COMPLIANT, WITH SCREENING TO MIL-STD-883

PACKAGE DESIGNATION.
C = UNPACKAGED CHIP
CW = PROBED WAFER
EK = CERAMIC/METAL HERMETIC, LEADLESS CHIP CARRIER
H = CERAMIC/METAL HERMETIC, DUAL IN-LINE
R = CERAMIC/GLASS HERMETIC, DUAL IN-LINE

DEVICE TYPE (FOUR DIGITS).

OPERATING AMBIENT TEMPERATURE RANGE.
S = FULL MILITARY (−55°C TO +125°C)

FAMILY (UC, UD, OR UL).

UH D - 400 - 1

INSTRUCTIONS.
1 = SELECTED VERSION, SEE DETAIL SPECIFICATIONS
883 = MILITARY GRADE, COMPLIANT, WITH SCREENING TO MIL-STD-883

DEVICE TYPE (THREE DIGITS).

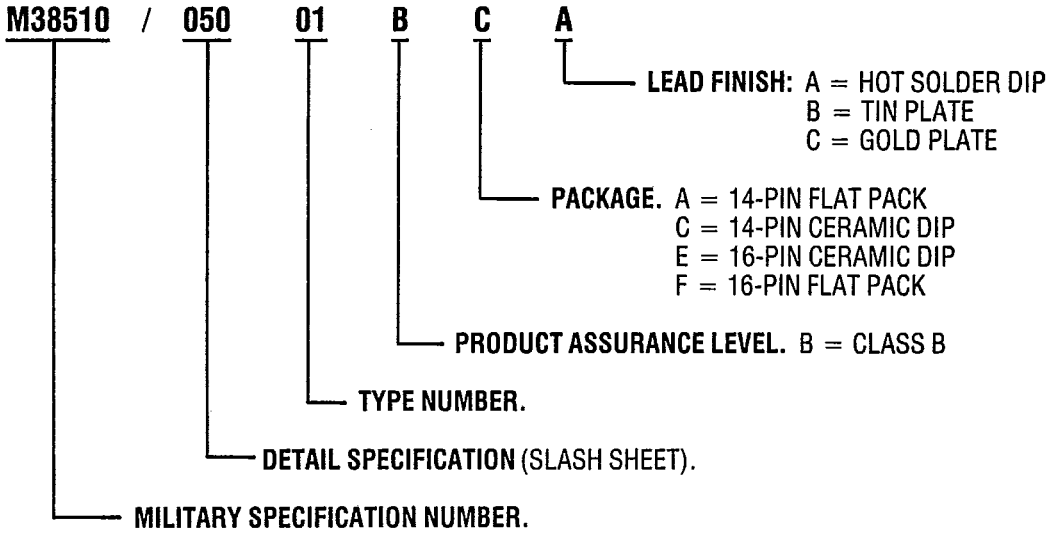
PACKAGE DESIGNATION.
C = CERAMIC/METAL HERMETIC, 14-LEAD FLAT PACK
D = CERAMIC/METAL HERMETIC, 14-PIN DUAL IN-LINE
K = UNPACKAGED CHIP OR PROBED WAFER
R = CERAMIC/GLASS HERMETIC (CERDIP), 14-PIN DUAL IN-LINE

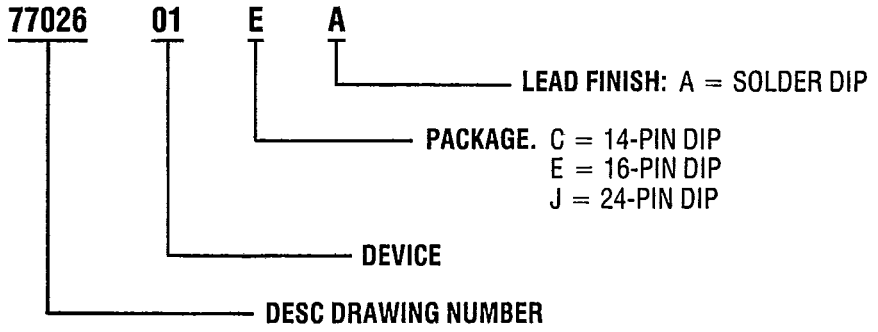
FAMILY (UH ONLY).

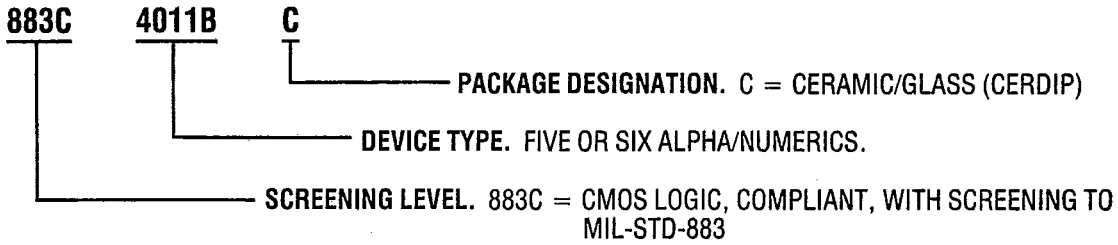
NOTE: All possible combinations of device types and package types are not necessarily available. Contact sales office for complete information.

MILITARY ICS

INTEGRATED CIRCUIT PART NUMBERING SYSTEMS
(Continued)







NOTE: All possible combinations of device types and package types are not necessarily available. Contact sales office for complete information.

INTEGRATED CIRCUIT PACKAGES
FOR SPRAGUE MILITARY PRODUCTS

Ceramic/Metal Side-Brazed Dual In-Line Packages

Number of Leads	MIL-M-38510 Case Outline	MIL Code
8	Non-Compliant*	P
14	D-1, Config. 3	C
16	D-2, Config. 3	E
18	D-6, Config. 3	V
20	D-8, Config. 3	R
22	D-7, Config. 3	W
24	D-3, Config. 3	J
28	D-10, Config. 3	—
30	none	—
36	none	—
40	D-5, Config. 3	Q
44	none	—

*Except for package length, similar to Case Outline D-4, Configuration 3.

Flatpacks

Number of Leads	MIL-M-38510 Case Outline	MIL Code
14	F-2, Config. 1 and 2	D
16	F-5, Config. 1	F
22	none	—
42	none	—
68	none	—

Ceramic/Glass (CerDIP) Dual In-Line Packages

Number of Leads	MIL-M-38510 Case Outline	MIL Code
14	D-1, Config. 1	C
16	D-2, Config. 1	E
18	D-6, Config. 1	V
22	D-7, Config. 1	W
24	D-3, Config. 1	J
28	D-10, Config. 1	—
40	D-5, Config. 1	Q

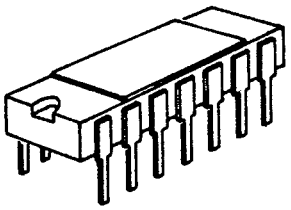
Leadless Chip Carriers

Number of Leads	MIL-M-38510 Case Outline	MIL Code
18	C-10	—
20	C-2	2
24	C-3	—
28	C-4	3
28	C-4	3
32	C-12	—
40	none	—
44	C-5	—

Leaded Chip Carriers

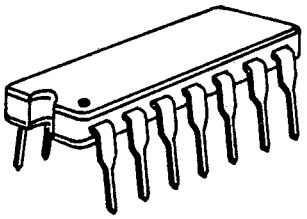
Number of Leads	MIL-M-38510 Case Outline	MIL Code
44	CJ-4	—

NOTE: All possible combinations of device types and package types are not necessarily available. Additional package types and sizes are qualified on an ongoing basis. Contact sales office for complete information.

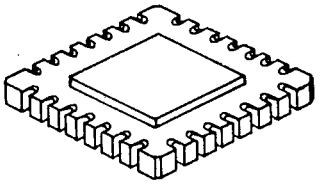


SIDE-BRAZED DIP

FLATPACK



CERAMIC DIP



LCC