

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Add device type 03. Rewrite entire document	96-01-10	K. A. Cottongim
B	Update drawing boilerplate.	02-07-31	Raymond Monnin

REV																				
SHEET																				
REV																				
SHEET																				

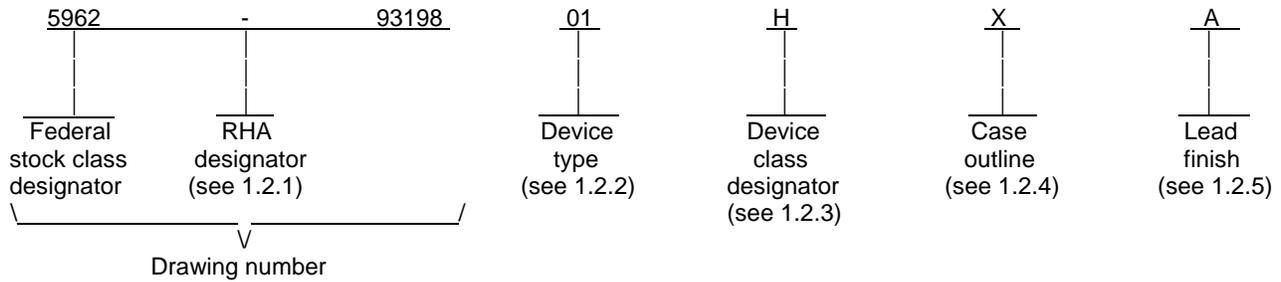
REV STATUS OF SHEETS	REV	B	B	B	B	B	B	B	B	B	B	B	B	B						
	SHEET	1	2	3	4	5	6	7	8	9	10	11								

PMIC N/A	PREPARED BY Gary Zahn	<p align="center">DEFENSE SUPPLY CENTER COLUMBUS POST OFFICE BOX 3990 COLUMBUS, OHIO 43216-5000 http://www.dscc.dla.mil</p>																		
<p align="center">STANDARD MICROCIRCUIT DRAWING</p> <p align="center">THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE</p> <p align="center">AMSC N/A</p>	CHECKED BY Michael C. Jones																			
	APPROVED BY Kendall A Cottongim	<p align="center">MICROCIRCUIT, HYBRID, DIGITAL-LINEAR, 14-BIT, SAMPLING ANALOG TO DIGITAL CONVERTER</p>																		
	DRAWING APPROVAL DATE 95-06-06																			
	REVISION LEVEL B		SIZE A	CAGE CODE 67268	<p align="center">5962-93198</p>															
SHEET			1 OF 11																	

1. SCOPE

1.1 Scope. This drawing documents five product assurance classes as defined in paragraph 1.2.3 and MIL-PRF-38534. A choice of case outlines and lead finishes which are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of radiation hardness assurance levels are reflected in the PIN.

1.2 PIN. The PIN shall be as shown in the following example:



1.2.1 Radiation hardness assurance (RHA) designator. RHA marked devices shall meet the MIL-PRF-38534 specified RHA levels and shall be marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device.

1.2.2 Device type(s). The device type(s) identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	ADS-944	14-bit, 5 MHz sampling, A/D converter
02	ADS-30189	14-bit, 5 MHz sampling, A/D converter
03	ADS-30214	14-bit, 5 MHz sampling, A/D converter

1.2.3 Device class designator. This device class designator shall be a single letter identifying the product assurance level. All levels are defined by the requirements of MIL-PRF-38534 and require QML Certification as well as qualification (Class H, K, and E) or QML Listing (Class G and D). The product assurance levels are as follows:

<u>Device class</u>	<u>Device performance documentation</u>
K	Highest reliability class available. This level is intended for use in space applications.
H	Standard military quality class level. This level is intended for use in applications where non-space high reliability devices are required.
G	Reduced testing version of the standard military quality class. This level uses the Class H screening and In-Process Inspections with a possible limited temperature range, manufacturer specified incoming flow, and the manufacturer guarantees (but may not test) periodic and conformance inspections (Group A, B, C, and D).
E	Designates devices which are based upon one of the other classes (K, H, or G) with exception(s) taken to the requirements of that class. These exception(s) must be specified in the device acquisition document; therefore the acquisition document should be reviewed to ensure that the exception(s) taken will not adversely affect system performance.
D	Manufacturer specified quality class. Quality level is defined by the manufacturers internal, QML certified flow. This product may have a limited temperature range.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-93198
		REVISION LEVEL B	SHEET 2

1.2.4 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
X	See figure 1	32	Dual-in-line

1.2.5 Lead finish. The lead finish shall be as specified in MIL-PRF-38534.

1.3 Absolute maximum ratings. ^{1/}

Positive supply voltage range (+V _{CC})	0 V to +16 V dc
Negative supply voltage range (-V _{EE})	0 V to -16 V dc
Positive analog and digital supply voltage (+V _{DD})	0 V to +6 V dc
Negative analog and digital supply voltage (-V _{DD})	0 V to -6 V dc
Digital inputs	-0.3 V dc to +V _{DD} + 0.3 V dc
Analog input	-5 V dc to +5 V dc
Lead temperature (soldering, 10 seconds)	+300°C
Power dissipation (P _D)	3.3 W
Junction temperature (T _J)	+175°C
Thermal resistance:	
Junction-to-case (θ _{JC})	7°C/W
Junction-to-ambient (θ _{JA})	28°C/W
Storage temperature	-65°C to +150°C

1.4 Recommended operating conditions.

Positive supply voltage range (+V _{CC})	+14.25 V dc to +15.25 V dc
Negative supply voltage range (-V _{EE})	-14.25 V dc to -15.25 V dc
Positive analog and digital supply voltage (+V _{DD})	+4.75 V dc to +5.25 V dc ^{2/}
Negative analog and digital supply voltage (-V _{DD})	-4.95 V dc to -5.45 V dc ^{3/}
Ambient operating temperature range (T _A)	-55°C to +125°C

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-PRF-38534 - Hybrid Microcircuits, General Specification for.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-883 - Test Method Standard Microcircuits.
MIL-STD-1835 - Interface Standard Electronic Component Case Outlines.

^{1/} Stresses above the absolute maximum ratings may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

^{2/} +4.9 V dc minimum at T_A = -55°C.

^{3/} -5.1 V dc minimum at T_A = -55°C.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-93198
		REVISION LEVEL B	SHEET 3

HANDBOOKS

DEPARTMENT OF DEFENSE

- MIL-HDBK-103 - List of Standard Microcircuit Drawings.
- MIL-HDBK-780 - Standard Microcircuit Drawings.

(Unless otherwise indicated, copies of the specification, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Item requirements. The individual item performance requirements for device classes D, E, G, H, and K shall be in accordance with MIL-PRF-38534. Compliance with MIL-PRF-38534 may include the performance of all tests herein or as designated in the device manufacturer's Quality Management (QM) plan or as designated for the applicable device class. Therefore, the tests and inspections herein may not be performed for the applicable device class (see MIL-PRF-38534). Furthermore, the manufacturer may take exceptions or use alternate methods to the tests and inspections herein and not perform them. However, the performance requirements as defined in MIL-PRF-38534 shall be met for the applicable device class.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38534 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.2.3 Output coding table. The output coding table shall be as specified on figure 3.

3.2.4 Timing diagram. The timing diagram shall be as specified on figure 4.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full specified operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are defined in table I.

3.5 Marking of device(s). Marking of device(s) shall be in accordance with MIL-PRF-38534. The device shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's vendor similar PIN may also be marked.

3.6 Data. In addition to the general performance requirements of MIL-PRF-38534, the manufacturer of the device described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, for each device type listed herein. Also, the data should include a summary of all parameters manually tested, and for those which, if any, are guaranteed. This data shall be maintained under document revision level control by the manufacturer and be made available to the preparing activity (DSCC-VA) upon request.

3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to supply to this drawing. The certificate of compliance (original copy) submitted to DSCC-VA shall affirm that the manufacturer's product meets the performance requirements of MIL-PRF-38534 and herein.

3.8 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38534 shall be provided with each lot of microcircuits delivered to this drawing.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-93198
		REVISION LEVEL B	SHEET 4

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions <u>1/</u> -55°C ≤ T _C ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Power supply currents	+I _{CC}	+V _{CC} = +15.0 V dc	1, 2, 3	All		+45	mA
	-I _{EE}	-V _{EE} = -15.0 V dc				-65	
	+I _{DD}	+V _{DD} = +5.0 V dc				+168	
	-I _{DD}	-V _{DD} = -5.2 V dc				-175	
Power supply rejection ratios	±PSRR	For each +V _{CC} , -V _{EE} , and ±V _{DD}	4, 5, 6	All		±0.05	%FSR/ %V
ANALOG INPUT							
Input voltage range	V _{IN}		1, 2, 3	All		±1.25	V
Input resistance <u>2/</u>	R _{IN}		4	All	500		Ω
DIGITAL INPUTS <u>2/</u>							
Logic "0"	V _{IH}		1, 2, 3	All	+2.0		V
Logic "1"	V _{IL}		1, 2, 3	All		+0.8	V
Logic loading "1"	I _{IL}		1, 2, 3	All		+20	μA
Logic loading "0" <u>3/</u>	I _{IH}		1, 2, 3	All		-20	μA
DIGITAL OUTPUTS <u>2/</u>							
Logic "0"	V _{OH}		1, 2, 3	All	+2.4		V
Logic "1"	V _{OL}		1, 2, 3	All		+0.4	V
Logic loading "1"	I _{OL}		1, 2, 3	All		+4	mA
Logic loading "0" <u>3/</u>	I _{OH}		1, 2, 3	All		-4	mA
STATIC PERFORMANCE							
Resolution	RES		4, 5, 6	All	14		Bits
Differential nonlinearity	DNL	f = 10 kHz	4	All	-0.95	+1.20	LSB
			5, 6		-0.95	+1.50	
		f = 10 kHz, T _C = -55°C, <u>4/</u> ±V _{DD} = -4.95 V dc and +4.80 V dc	6	03	-0.99	+1.50	
See footnotes at end of table.							
STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000				SIZE A			5962-93198
					REVISION LEVEL B	SHEET 5	

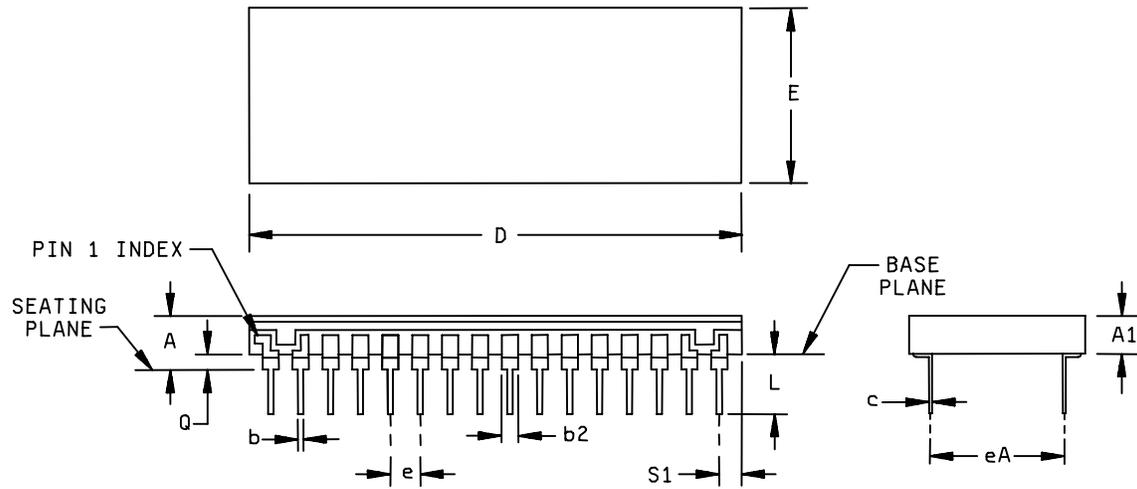
TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions ^{1/} -55°C ≤ T _C ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
STATIC PERFORMANCE - Continued.							
Full scale absolute accuracy			4	All		±0.4	%FSR
			5, 6			±0.8	
Bipolar offset error	B _{POE}		4	All		±0.4	%FSR
			5, 6			±0.9	
Gain error	A _E		4	All		±0.4	%FSR
			5, 6			±1.5	
DYNAMIC PERFORMANCE							
Peak harmonics (-0.5 dB)		1 MHz to 2.5 MHz	4	All		-70	dB
			5, 6			-61	
Total harmonic distortion (-0.5 dB)		1 MHz to 2.5 MHz	4	All		-68	dB
			5, 6			-60	
Signal to noise ratio (-0.5 dB, without distortion)		1 MHz to 2.5 MHz	4	01, 03	73		dB
			5, 6		71		
Signal to noise ratio (-0.5 dB, with distortion)		1 MHz to 2.5 MHz	4	All	68		dB
			5, 6		62		
Signal to noise ratio (DC to 100 kHz)	SNR	98 kHz	4, 5, 6	02	75		dB

- ^{1/} +V_{CC} = +14.25 V dc to +15.75 V dc, -V_{EE} = -14.25 V dc to -15.75 V dc, +V_{DD} = +4.9 V dc to +5.25 V dc, -V_{DD} = -5.1 V dc to -5.45 V dc.
- ^{2/} Parameter shall be tested as part of device initial characterization and after design and process changes. Parameter shall be guaranteed to the limits specified in table I for all lots not specifically tested.
- ^{3/} When Comp. bits (8 pin) is low, logic loading "0" will be -350 μA for this pin.
- ^{4/} These test conditions are additional for device type 03 only.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-93198
		REVISION LEVEL B	SHEET 6

Case outline X.



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		5.97		0.235
A1		4.32		0.225
b	0.41	0.56	0.016	0.021
b2	0.89	1.14	0.035	0.045
c	0.23	0.38	0.009	0.015
D	42.93	43.69	1.69	1.72
e	2.54 BSC		0.100 BSC	
E	27.43	28.19	1.08	1.11
eA	22.61	23.37	0.89	0.92
L	4.45	5.08	0.175	0.200
Q	0.38	0.89	0.015	0.035
S1	2.29	2.79	0.09	0.11

NOTES:

1. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.

FIGURE 1. Case outline(s).

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-93198
		REVISION LEVEL B	SHEET 7

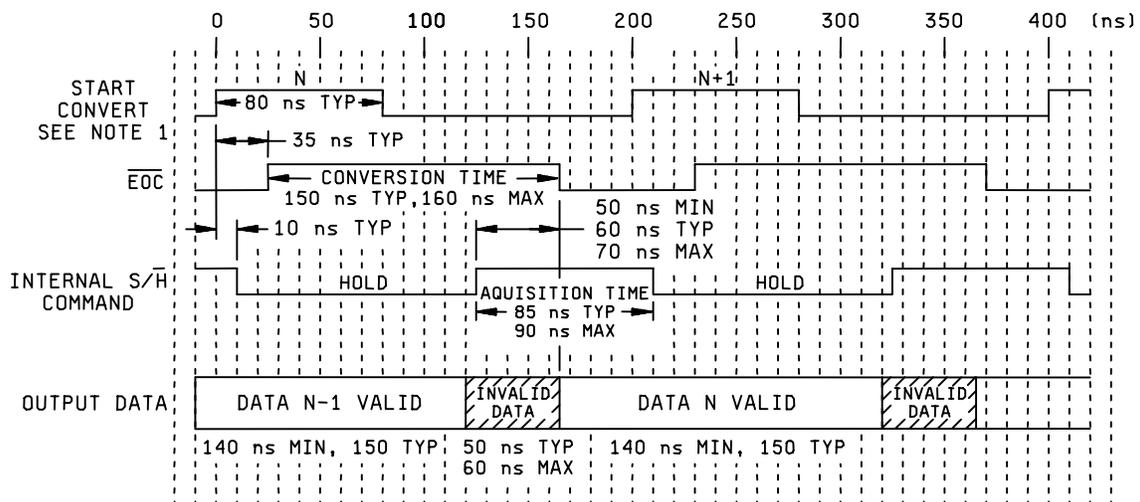
Device types	All
Case outline	X
Terminal number	Terminal symbol
1	+5 V analog supply
2	-5.2 V digital supply
3	Analog input
4	Analog ground
5	Offset adjust
6	Analog ground
7	Gain adjust
8	<u>Comp. bits</u>
9	Output enable
10	+5 V digital supply
11	Analog ground
12	+15 V supply
13	-15 V supply
14	-5.2 V analog supply
15	<u>Digital ground</u>
16	EOC
17	Bit 14 (LSB)
18	Bit 13
19	Bit 12
20	Bit 11
21	Bit 10
22	Bit 9
23	Bit 8
24	Bit 7
25	Bit 6
26	Bit 5
27	Bit 4
28	Bit 3
29	Bit 2
30	<u>Bit 1 (MSB)</u>
31	Bit 1 (MSB)
32	Start convert

FIGURE 2. Terminal connections.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-93198
		REVISION LEVEL B	SHEET 8

Output coding						Input range ± 1.25 V	Bipolar scale
MSB	LSB	MSB	LSB	$\overline{\text{MSB}}$	LSB		
11 1111 1111 1111		00 0000 0000 0000		01 1111 1111 1111		+1.249847 V	+FS -1 LSB
11 1000 0000 0000		00 0111 1111 1111		01 1000 0000 0000		-0.937500 V	+3/4 FS
11 0000 0000 0000		00 1111 1111 1111		01 0000 0000 0000		+0.625000 V	+1/2 FS
10 0000 0000 0000		01 1111 1111 1111		00 0000 0000 0000		+0.000000 V	0
01 0000 0000 0000		10 1111 1111 1111		11 0000 0000 0000		-0.625000 V	-1/2 FS
00 1000 0000 0000		11 0111 1111 1111		10 1000 0000 0000		-0.937500 V	-3/4 FS
00 0000 0000 0001		11 1111 1111 1110		10 0000 0000 0001		-1.249847 V	-FS +1 LSB
00 0000 0000 0000		11 1111 1111 1111		10 0000 0000 0000		-1.250000 V	-FS
Offset binary		Comp. offset binary		Two's comp.			

FIGURE 3. Output coding.



NOTES:

- 1/ START CONVERT pulse width: 40 to 80 ns or 130 to 160ns.
- 2/ Scale division is 10 ns/division.

FIGURE 4. Timing diagram.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-93198
		REVISION LEVEL B	SHEET 9

TABLE II. Electrical test requirements.

MIL-PRF-38534 test requirements	Subgroups (in accordance with MIL-PRF-38534, group A test table)
Interim electrical parameters	
Final electrical parameters	1*,2,3,4,5,6
Group A test requirements	1,2,3,4,5,6
Group C end-point electrical parameters	1,4
End-point electrical parameters for radiation hardness assurance (RHA) devices	Not applicable

* PDA applies to subgroup 1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38534 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38534. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.

(2) T_A as specified in accordance with table I of method 1015 of MIL-STD-883.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Conformance and periodic inspections. Conformance inspection (CI) and periodic inspection (PI) shall be in accordance with MIL-PRF-38534 and as specified herein.

4.3.1 Group A inspection (CI). Group A inspection shall be in accordance with MIL-PRF-38534 and as follows:

a. Tests shall be as specified in table II herein.

b. Subgroups 7, 8, 10, and 11 shall be omitted.

4.3.2 Group B inspection (PI). Group B inspection shall be in accordance with MIL-PRF-38534.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-93198
		REVISION LEVEL B	SHEET 10

4.3.3 Group C inspection (PI). Group C inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test, method 1005 of MIL-STD-883.
 - (1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to either DSCC-VA or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.
 - (2) T_A as specified in accordance with table I of method 1005 of MIL-STD-883.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.3.4 Group D inspection (PI). Group D inspection shall be in accordance with MIL-PRF-38534.

4.3.5 Radiation Hardness Assurance (RHA) inspection. RHA inspection is not currently applicable to this drawing.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38534.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-PRF-38534.

6.4 Record of users. Military and industrial users shall inform Defense Supply Center Columbus when a system application requires configuration control and the applicable SMD. DSCC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronic devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Post Office Box 3990, Columbus, Ohio 43216-5000, or telephone (614) 692-0536.

6.6 Sources of supply. Sources of supply are listed in MIL-HDBK-103 and QML-38534. The vendors listed in MIL-HDBK-103 and QML-38534 have submitted a certificate of compliance (see 3.7 herein) to DSCC-VA and have agreed to this drawing.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-93198
		REVISION LEVEL B	SHEET 11

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 02-07-31

Approved sources of supply for SMD 5962-93198 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38534 during the next revisions. MIL-HDBK-103 and QML-38534 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DSCC-VA. This bulletin is superseded by the next dated revisions of MIL-HDBK-103 and QML-38534.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962-9319801HXA 5962-9319801HXC	50721 50721	ADS-944/883 ADS-944/883
5962-9319802HXA 5962-9319802HXC	<u>3/</u> <u>3/</u>	ADS-30189 ADS-30189
5962-9319803HXA 5962-9319803HXC	50721 50721	ADS-30214 ADS-30214

- 1/ The lead finish shown for each PIN representing a hermetic package is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the Vendor to determine its availability.
- 2/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.
- 3/ Not available from a QML source.

Vendor CAGE
number

50721

Vendor name
and address

Datel, Incorporated
11 Cabot Boulevard
Mansfield, MA 02048-1151

The information contained herein is disseminated for convenience only and the Government assumes no liability whatsoever for any inaccuracies in the information bulletin.