REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Add case outline Y. Update document to MIL-PRF-38534 requirements.	97-07-14	K. A. Cottongim

REV																				
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REV STATUS OF SHEETS	REV	A	A	A	A	A	A	A	A	A	A	A	A	A						
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13						

PMIC N/A

STANDARD MICROCIRCUIT DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

PREPARED BY
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DRAWING APPROVAL DATE
94-07-06

REVISION LEVEL
A

DEFENSE SUPPLY CENTER COLUMBUS
P. O. BOX 3990
COLUMBUS, OHIO 43216-5000

MICROCIRCUIT, HYBRID, LINEAR, 2-VOLT, DIRECT RESOLVER CONVERTER

SIZE	CAGE CODE	
A	**67268**	**5962-94548**

SHEET 1 OF 13

DSCC FORM 2233
APR 97

5962-E554-96

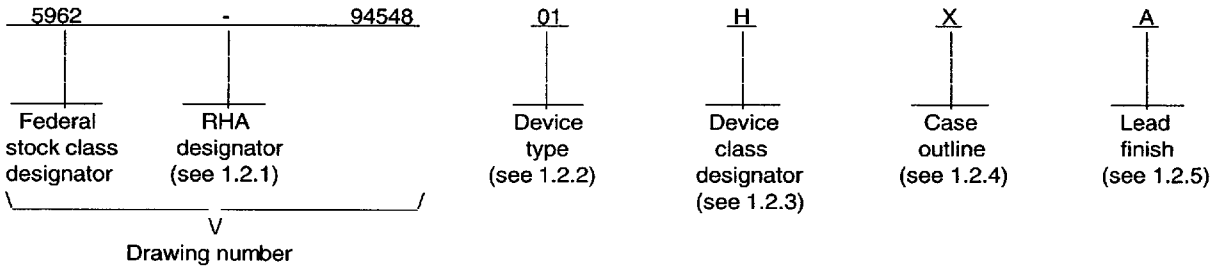
DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

9004708 0029568 8T3

1. SCOPE

1.1 Scope. This drawing documents five product assurance classes, class D (lowest reliability), class E, (exceptions), class G (lowest high reliability), class H (high reliability), and class K, (highest reliability) and a choice of case outlines and lead finishes 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. Device classes H and K 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) shall identify the circuit function as follows:

Device type	Generic number	Circuit function	Frequency	Accuracy ±1 LSB
01	SD-14623DX-112	2 V direct converter	400 Hz	4 min
01	SD-14623FX-112	2 V direct converter	400 Hz	4 min
02	SD-14623DX-114	2 V direct converter	400 Hz	2 min
02	SD-14623FX-114	2 V direct converter	400 Hz	2 min

1.2.3 Device class designator. This device class designator shall be a single letter identifying the product assurance level as follows:

Device class	Device performance documentation
D, E, G, H or K	Certification and qualification to MIL-PRF-38534

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

Outline letter	Descriptive designator	Terminals	Package style
X	See figure 1	54	Dual-in-line
Y	See figure 1	54	Flat package

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 (V_{CC})	+7.0 V dc
Reference input voltage	35 V rms
Digital input voltage range	-0.3 V dc to +7.0 V dc
Power dissipation, T_A = +125°C (P_D)	350 mW
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (θ_{JC})	8.0°C/W
Thermal resistance, junction-to-ambient (θ_{JA})	20°C/W

1.4 Recommended operating conditions.

Positive supply voltage range (V_{CC})	+4.75 V dc to +5.25 V dc
Reference input voltage range	2.0 V rms to 35 V rms
Reference input carrier frequency range	360 Hz to 5000 Hz
Signal input voltage range	1.70 V rms to 2.30 V rms
Ambient operating temperature range (T_A)	-55°C to +125°C

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbook. The following specification, standards, and handbook 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 solitation.

SPECIFICATION

DEPARTMENT OF DEFENSE

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

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-883 - Test Methods and Procedures for Microelectronics.
MIL-STD-973 - Configuration Management.
MIL-STD-1835 - Microcircuit Case Outlines.

HANDBOOK

DEPARTMENT OF DEFENSE

MIL-HDBK-780 - Standard Microcircuit Drawings.

(Unless otherwise indicated, copies of the specification, standards, and handbook 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.

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

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). Futhermore, the manufacturers 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 1.2.4 herein and figure 1.

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

3.2.3 Block diagram. The block diagram shall be as specified on figure 3.

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 described 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 as listed in QML-38534.

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.

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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ V_{CC} = +5 V dc, unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Resolution control 1/	RC	A = B = 0.8 V	7,8A,8B	All	10	10	Bits
		A = 2.0 V, B = 0.8 V			12	12	
		A = 0.8 V, B = 2.0 V			14	14	
		A = B = 2.0 V			16	16	
Accuracy repeatability	AR	2/ 3/	7,8A,8B	All	-1.0	+1.0	LSB
Accuracy differential	AR	2/ 3/	7,8A,8B	All	-1.0	+1.0	LSB
Output accuracy	AOUT	2/	7,8A,8B	01	-13	+13	LSB
				02	-7	+7	
Reference input voltage range 3/	V_{IN1}		4,5,6	All	2	35	V rms
Reference input impedance 3/	Z_{IN1}	Single ended	4,5,6	All	60		kΩ
		Differential			120		
Reference input common mode range 3/	V_{CM1}		4,5,6	All	-50	+50	Vpk
Signal input impedance 3/	Z_{IN2}	Line-to-ground	4,5,6	All	20		MΩ
Digital output low voltage	V_{OL}	I_{OL} = -1.6 mA	1,2,3	All		0.4	V
Digital output high voltage	V_{OH}	I_{OH} = 0.4 mA	1,2,3	All	2.8		V
Output leakage current	I_{OZ}		1,2,3	All	-40	+40	µA

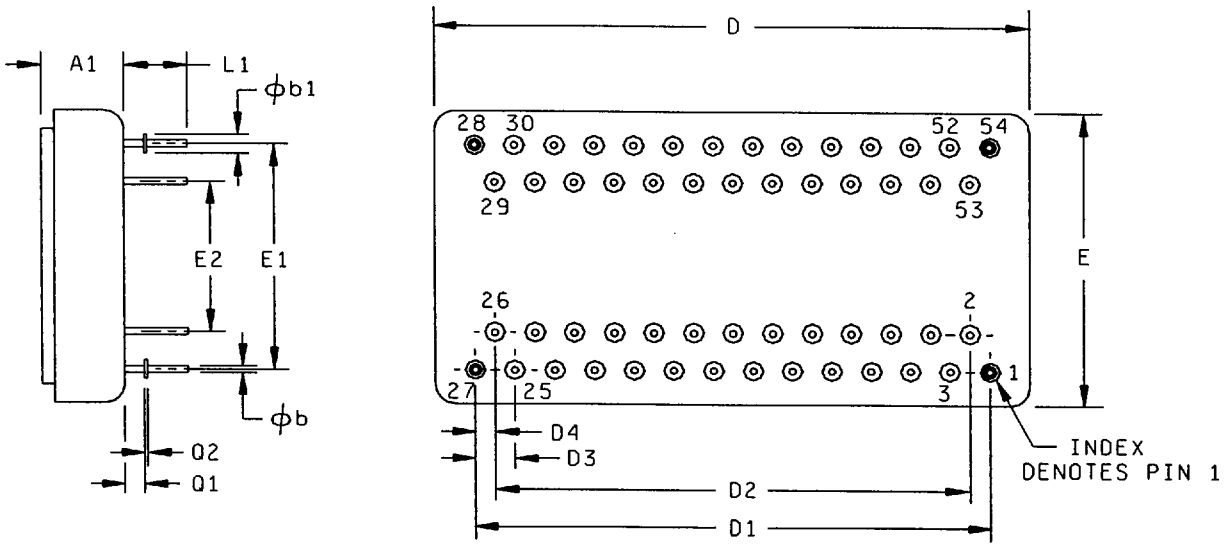
See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$, V_{CC} = +5 V dc, unless otherwise specified		Group A subgroups	Device type	Limits		Unit
						Min	Max	
Digital input high voltage 1/	V_{IH}	Digital inputs A, B, INH, EL, and EM	V_{IN} = 2.0 V	1,2,3	All	pass/ fail		
Digital input low voltage 1/	V_{IL}		V_{IN} = 0.8 V	1,2,3	All		pass/ fail	
Digital input current 1/	I_{IN}	Internal pull-up		4,5,6	All		10	µA
Inhibit voltage 1/	V_{INH}	No digital angles change while INH is logic 0 and analog input is rotating		7,8A,8B	All		0.8	V
Enable voltage 1/	V_E	$\overline{EM}$ controls output bits 1 - 8 and EL controls output bits 9 - 16		7,8A,8B	All		0.8	V
Disable voltage (high impedance) 1/	V_D			7,8A,8B	All	2.0		V
Positive supply current	I_{CC}	V_{CC} = +5.25 V		1,2,3	All		+68	mA
Analog velocity output voltage	V_{OUT}	4/		7,8A,8B	All	3.24	4.00	V
Bandwidth 1/	BW			7,8A,8B	All	39	72	Hz

1/ These parameters are tested on a go-no-go basis only or in conjunction with other measured parameters and are not directly testable.
2/ Output accuracy is measured at angles from 0° to 180°, in 15° increments, and at 225°, 270°, and 315°.
3/ Parameters shall be tested as part of device initial characterization and after design and process changes. Parameters shall be guaranteed to the limits specified in table I for all lots not specifically tested.
4/ Analog output voltage is tested at 8 revolutions per second.

Case outline X.

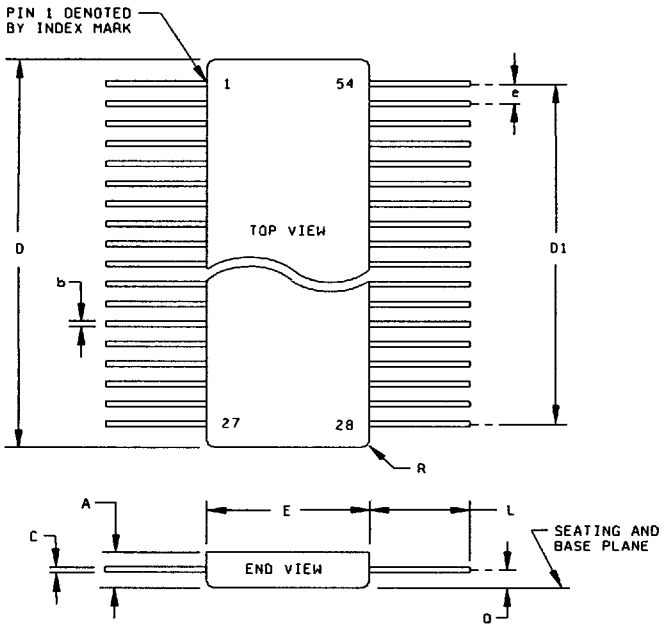


Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A1		5.33		0.210
øb	0.41	0.51	0.016	0.020
øb1	1.14	1.40	0.045	0.055
D		38.10		1.500
D1	32.89	33.15	1.295	1.305
D2	30.35	30.61	1.195	1.205
D3	2.41	2.67	0.095	0.105
D4	1.14	1.40	0.045	0.055
E		19.81		0.780
E1	15.11	15.37	0.595	0.605
E2	10.03	10.29	0.395	0.405
L1	4.06		0.160	
Q1	1.14	1.40	0.045	0.055
Q2	0.15	0.25	0.006	0.010

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.
2. Pin numbers are for reference only.
3. Lead clusters to be located within (±0.005) 1.27mm of case center line.

FIGURE 1. Case outline(s).

Case outline Y.



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A		5.33		0.210
b	0.41	0.51	0.016	0.020
C	0.20	0.31	0.008	0.012
D		38.10		1.500
D1	32.89	33.15	1.295	1.305
e	1.14	1.40	0.045	0.055
E		19.81		0.780
L	12.70		0.500	
Q	2.29	2.70	0.090	0.110
R	0.508 TYP		0.020 TYP.	

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.
2. Pin numbers are for reference only.
3. Lead clusters to be located within (±0.010) 0.25mm of case center line.

FIGURE 1. Case outline(s) - Continued.

Devices types	01 and 02	Device types	01 and 02		
Case outlines	X and Y	Case outlines	X and Y		
Terminal number	Terminal symbol	Terminal number	Terminal symbol		
1	No connection	28	S1-B(R)	S1-B(S)	No connection
2	COS-A(D)	29	S2-B(R)	S2-B(S)	+COS-B(D)
3	SIN-A(D)	30	S3-B(R)	S3-B(S)	+SIN-B(D)
4	No connection	31	No connection	S4-B(S)	No connection
5	A GND-A (analog ground channel A)	32	A GND-B (analog ground channel B)		
6	RH-A (+ reference input)	33	No connection		
7	RL-A (- reference input)	34	RH-B (+ reference input)		
8	EM (enable MSBs channel A)	35	RL-B (- reference input)		
9	BIT-A (built-in-test channel A)	36	No connection		
10	Bit 1 (MSB)	37	EM-B (enable MSBs channel B)		
11	Bit 9	38	BIT-B (built-in-test channel B)		
12	Bit 2	39	Bit 5		
13	Bit 10 (LSB, 10-bit mode)	40	Bit 13		
14	Bit 3	41	Bit 6		
15	Bit 11	42	Bit 14 (LSB, 14-bit mode)		
16	Bit 4	43	Bit 7		
17	Bit 12 (LSB, 12-bit mode)	44	Bit 15		
18	+5 V (power supply)	45	Bit 8		
19	GND (ground)	46	Bit 16 (LSB, 16-bit mode)		
20	EL-B (enable LSBs channel B)	47	No connection		
21	Resolution control A (channel B)	48	EL-A (enable LSBs channel B)		
22	Resolution control B (channel B)	49	Resolution control A (channel A)		
23	INH-B (inhibit channel B)	50	Resolution control B (channel A)		
24	Filter point - channel B	51	INH-A (inhibit channel A)		
25	E - channel B	52	Filter point - channel A		
26	VEL-B (velocity output channel B)	53	E - channel A		
27	No connection	54	VEL-A (velocity output channel B)		

FIGURE 2. Terminal connections.

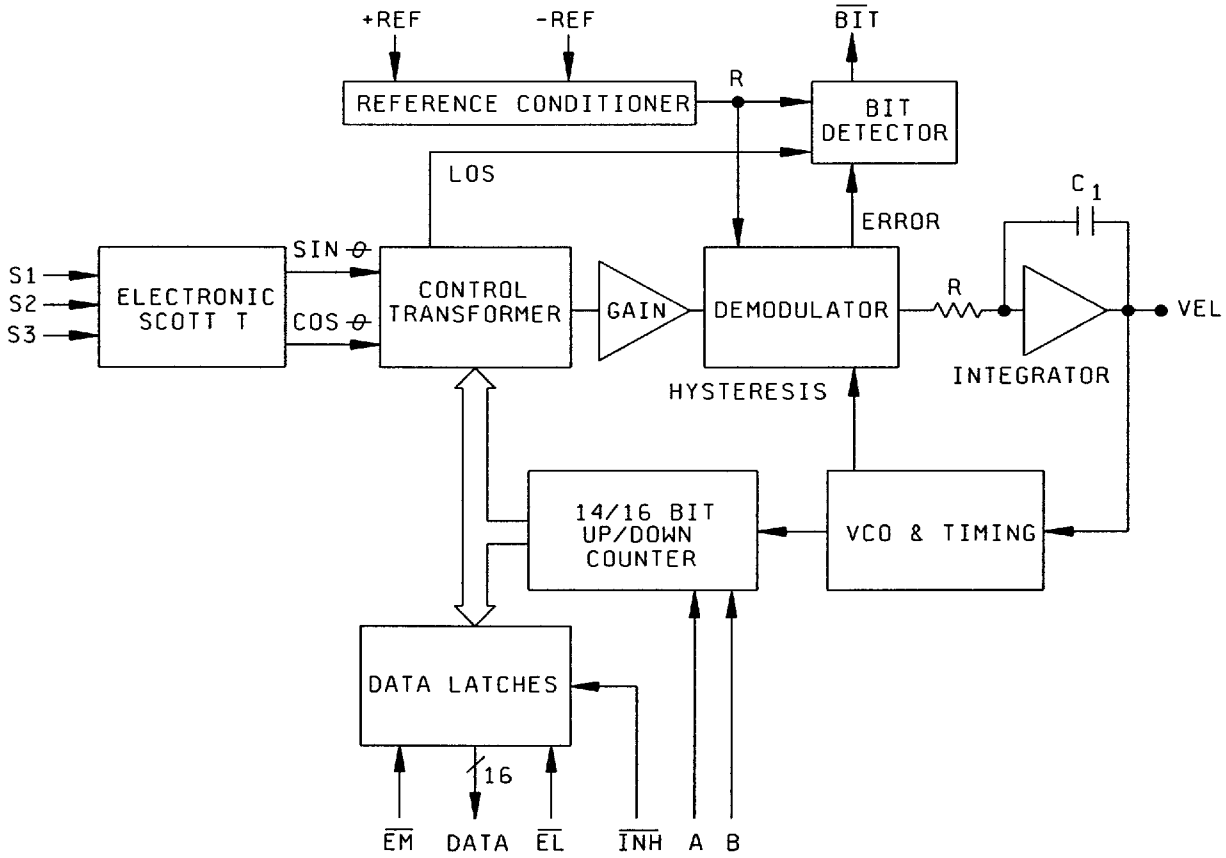


FIGURE 3. Block diagram.

TABLE II. Electrical test requirements.

MIL-PRF-38534 test requirements	Subgroups (in accordance with MIL-PRF-38534 group A test table)
Interim electrical parameters	1,4,7,9
Final electrical test parameters	1*,2,3,4,5,6,7,8A,8B
Group A test requirements	1,2,3,4,5,6,7,8A,8B
Group C end-point electrical parameters	1,2,3,4,5,6,7,8A,8B
Group E end-point electrical parameters for RHA devices	Subgroups ** (in accordance with method 5005, group A test table)

* PDA applies to subgroup 1.
** When applicable to this standard microcircuit drawing, the subgroups shall be defined.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38534 or by the device manufacturer's Quality Management (QM) Plan in accordance with appendix B of 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 9, 10, and 11 shall be omitted.

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

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 conditions, 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 Group E inspection. Group E inspection is required only for parts intended to be marked as radiation hardness assured (see 3.5 herein). RHA levels for device classes H and K shall be M, D, R, and H. RHA quality conformance inspection sample tests shall be performed at the RHA level specified in the acquisition document.

a. RHA tests for device classes H and K for levels M, D, R, and H shall be performed through each level to determine at what levels the devices meet the RHA requirements. These RHA tests shall be performed for initial qualification and after design or process changes which may affect the RHA performance of the device.

b. End-point electrical parameters shall be as specified in table II herein.

c. Prior to total dose irradiation, each selected sample shall be assembled in its qualified package. It shall pass the specified group A electrical parameters in table I for subgroups specified in table II herein.

d. For device classes H and K, the devices shall be subjected to radiation hardness assured tests as specified in MIL-PRF-38534 for RHA level being tested, and meet the postirradiation end-point electrical parameter limits as defined in table I at T_A = +25°C ±5 percent, after exposure.

e. Prior to and during total dose irradiation testing, the devices shall be biased to establish a worst case condition as specified in the radiation exposure circuit.

f. For device classes H and K, subgroups 1 and 2 in table V, method 5005 of MIL-STD-883 shall be tested as appropriate for device construction.

g. When specified in the purchase order or contract, a copy of the RHA delta limits shall be supplied.

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-STD-973 using DD Form 1692, Engineering Change Proposal.

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) 692-7603.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, P. O. Box 3990, Columbus, OH 453216-5000, or telephone (614) 692-0676.

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

STANDARD MICROCIRCUIT DRAWING SOURCE APPROVAL BULLETIN

DATE: 97-07-14

Approved sources of supply for SMD 5962-94548 are listed below for immediate acquisition only and shall be added to QML-38534 during the next revision. 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 revision of QML-38534.

Standard microcircuit drawing PIN 1/	Vendor CAGE number	Vendor similar PIN 2/
5962-9454801HXA	19645	SD-14623DX-142
5962-9454801HYA	19645	SD-14623FX-142
5962-9454801HXC	19645	SD-14623DX-112
5962-9454801HYC	19645	SD-14623FX-112
5962-9454802HXA	19645	SD-14623DX-144
5962-9454802HYA	19645	SD-14623FX-144
5962-9454802HXC	19645	SD-14623DX-114
5962-9454802HYC	19645	SD-14623FX-114

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.

Vendor CAGE number	Vendor name and address
19645	ILC Data Device Corporation 105 Wilbur Place Bohemia, NY 11716-2482

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