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LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED

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

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

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DRAWING APPROVAL DATE
94-11-08

REVISION LEVEL

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, DIGITAL, REMOTE TERMINAL AND BUS CONTROLLER, HYBRID

SIZE	CAGE CODE	
A	67268	**5962-94775**

SHEET 1 OF 10

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

1. SCOPE

1.1 Scope. This drawing forms a part of a one part - one part number documentation system (see 6.6 herein). This drawing describes device requirements for hybrid microcircuits to be processed in accordance with MIL-H-38534. Two product assurance classes, military high reliability (device class H) and space application (device class K) 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:

5962	-	94775	01	H	X	X
Federal stock class designator	RHA designator (see 1.2.1)		Device type (see 1.2.2)	Device class designator (see 1.2.3)	Case outline (see 1.2.4)	Lead finish (see 1.2.5)
Drawing number						

1.2.1 Radiation hardness assurance (RHA) designator. Device classes H and K RHA marked devices shall meet the MIL-H-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
01	CT1990	Remote terminal and bus controller

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 requirements documentation
H or K	Certification and qualification to MIL-H-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	90	Dual-in-line

1.2.5 Lead finish. The lead finish shall be as specified in MIL-H-38534 for classes H and K. Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings. 1/

Supply voltage (V_{CC})	-0.3 V dc to +7.0 V dc
Input or output voltage at any pad	-0.3 V dc to V_{CC} + 0.3 V dc
Thermal resistance junction-to-case (θ_{JC})	2°C/W

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	+5.0 V dc ±10%
Case operating temperature range (T_C)	-55°C to +125°C

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.

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbook. Unless otherwise specified, the following specification, standards, and handbook of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

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

STANDARDS

MILITARY

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

HANDBOOK

MILITARY

MIL-HDBK-780 - Standardized Military Drawings.

(Copies of the specification, standards, and handbook required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

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 shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with MIL-H-38534 and as specified herein.

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

3.3 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. Marking shall be in accordance with MIL-H-38534. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in QML-38534.

3.6 Manufacturer eligibility. In addition to the general requirements of MIL-H-38534, the manufacturer of the part described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, produced on the certified line, for each device type listed herein. The data should also 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 (DESC-EC) upon request.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \leq T_A \leq +125°C$ unless otherwise specified		Group A subgroups	Device type	Limits		Unit
						Min	Max	
Supply voltage	V_{CC}			1,2,3	01	4.5	5.5	V
High level input voltage	V_{IH}	V_{CC} = 5.0 V		1,2,3	01	2.2		V
Low level input voltage	V_{IL}	V_{CC} = 5.0 V		1,2,3	01		0.7	V
High level output voltage	V_{OH}	V_{CC} = 4.5 V 1/		1,2,3	01	2.4		V
Low level output voltage	V_{OL}	V_{CC} = 4.5 V 1/		1,2,3	01		0.4	V
High level input current	I_{IH}	V_{CC} = 5.5 V, V_{IN} = 2.4 V	2/	1,2,3	01	-200	-700	μA
			3/	1,2,3	01	-25	-400	
Low level input current	I_{IL}	V_{CC} = 5.5 V, V_{IN} = 0.4 V	2/	1,2,3	01	-400	-900	μA
			3/	1,2,3	01	-25	-400	
Supply current	I_{CC}	V_{CC} = 5.5 V 4/			01		20	mA

1/ I_{OL} = 3 mA maximum, I_{OH} = -2 mA maximum for TX inhibit 0, 1 and TX data/$\overline{\text{data}}$, only. I_{OL} = 2 mA maximum, I_{OH} = -1 mA maximum for all remaining outputs and bidirectionals.
2/ RTAD 0, 1, 2, 3, 4 and RTADPAR only.
3/ All inputs and bidirectionals other than those in note 2.
4/ All inputs are open. All outputs and bidirectionals have no load.

Case outline X

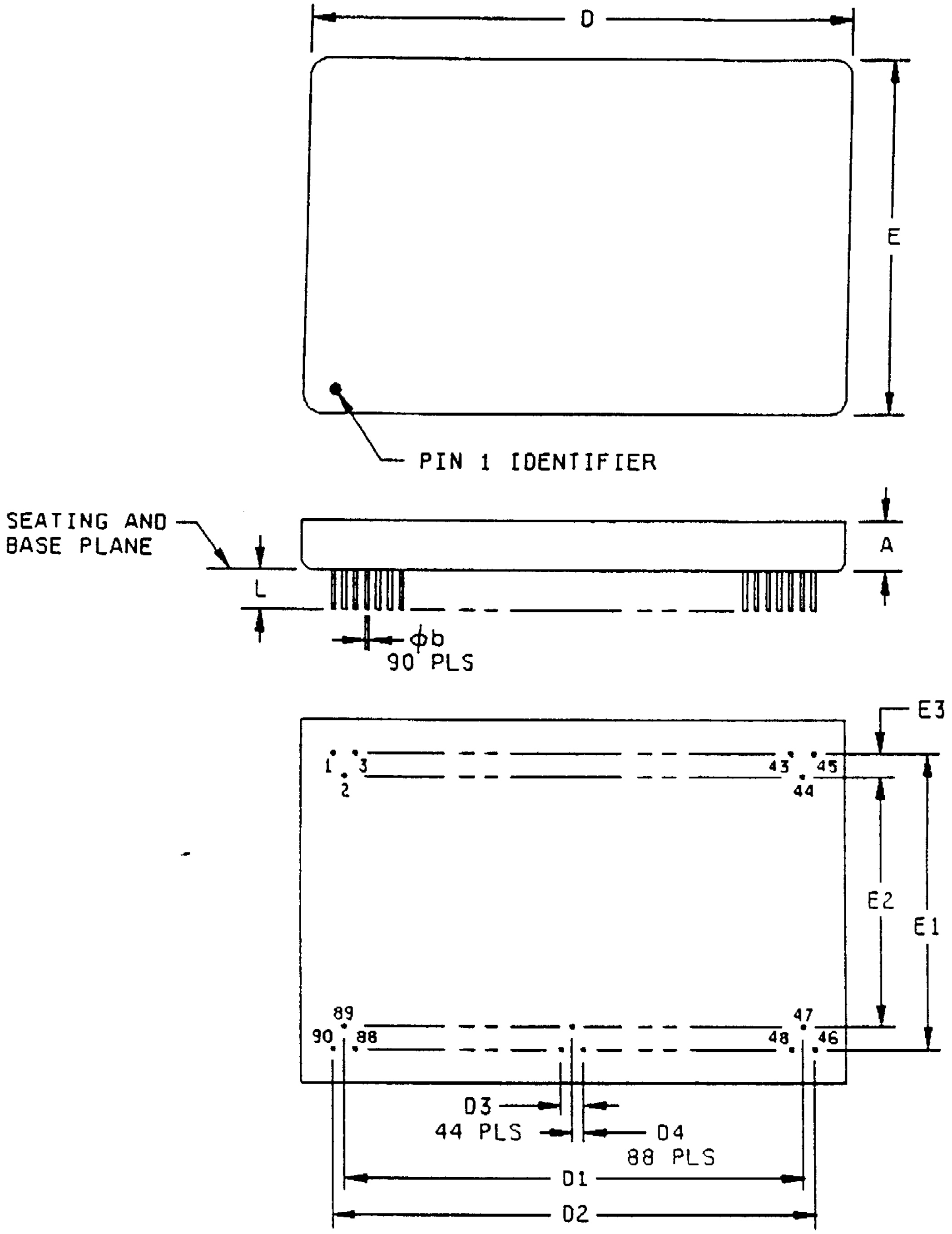

FIGURE 1. Case outline.

Case outline X - Continued.

Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A		5.72		0.225
øb	0.41	0.51	0.016	0.020
D		60.96		2.400
D1	55.75	56.01	2.195	2.205
D2	53.21	53.46	2.095	2.105
D3	2.41	2.67	0.095	0.105
D4	1.14	1.40	0.045	0.055
E		40.64		1.600
E1	32.89	33.15	1.295	1.305
E2	27.81	28.07	1.095	1.105
E3	2.41	2.67	0.095	0.105
L	4.45		0.175	

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.

FIGURE 1. Case outline - Continued.

Devices type	01	Device type	01
Case outline	X	Case outline	X
Terminal number	Terminal symbol	Terminal number	Terminal symbol
1	BIT DECODE	46	No connect (internal)
2	CWC0 (LSB)	47	RTADPAR
3	SA4 (MSB)	48	RTAD0 (LSB)
4	SA3	49	RTAD1
5	SA2	50	RTAD2
6	CWC4 (MSB)	51	RTAD3
7	CWC3	52	RTAD4 (MSB)
8	CWC2	53	CMSYNC
9	CWC1	54	DWSYNC
10	GBR	55	BCSTEN 0
11	H/L	56	RX DATA 0
12	STATEN/STATSTB	57	RX DATA 0
13	EOT	58	BCSTEN 1
14	SA1	59	RTO
15	SA0 (LSB)	60	6 MCK
16	INCMD	61	ERROR
17	TX/RX	62	LTFAIL
18	DTRQ	63	MANER
19	VECTEN/DWEN	64	PARER
20	NBGT	65	VALD
21	SYNC	66	READER
22	INCLK	67	RX DATA 1
23	IUSTB	68	RX DATA 1
24	NEXT STAT	69	+5 V_{IN}
25	DTAK	70	TX INHIBIT 1
26	BCOPA	71	TX INHIBIT 0
27	BCOPSTB	72	TX DATA
28	BCOPB	73	TX DATA
29	PASMON	74	SERVREQ
30	NDRQ	75	TXTO
31	REQBUSB	76	DBCACK
32	REQBUSA	77	RESET
33	COMMON AND CASE	78	RT/BC
34	ENABLE	79	DBCREQ
35	STAT UPDATE	80	HSFAIL
36	MEREQ	81	LSTCMD/CWEN
37	IH08 (LSB)	82	BITEN/RMDSTB
38	IH19	83	BUSY
39	IH210	84	WC4 (MSB)
40	IH311	85	WC3
41	IH412	86	WC0 (LSB)
42	IH513	87	SSERR
43	IH614	88	WC2
44	IH715 (MSB)	89	WC1
45	No connect (internal)	90	No connect (internal)

FIGURE 2. Terminal connections.

TABLE II. Electrical test requirements.

MIL-H-38534 test requirements	Subgroups (in accordance with MIL-H-38534, group A test table)
Interim electrical parameters	
Final electrical test parameters	1*, 2, 3
Group A test requirements	1, 2, 3
Group C end-point electrical parameters	1, 2, 3
MIL-STD-883, 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 standardized military drawing, the subgroups shall be defined.

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 submitted to DESC-EC shall affirm that the manufacturer's product meets the requirements of MIL-H-38534 and the requirements herein.

3.8 Certificate of conformance. A certificate of conformance as required in MIL-H-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-H-38534.

4.2 Screening. Screening shall be in accordance with MIL-H-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 DESC-EC 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 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-H-38534 and as specified herein.

4.3.1 Group A inspection. Group A inspection shall be in accordance with MIL-H-38534 and as follows:

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

b. Subgroups 4, 5, 6, 7, 8, 9, 10, and 11 shall be omitted.

4.3.2 Group B inspection. Group B inspection shall be in accordance with MIL-H-38534.

4.3.3 Group C inspection. Group C inspection shall be in accordance with MIL-H-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 DESC-EC 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. Group D inspection shall be in accordance with MIL-H-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-H-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-H-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 Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC 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 DESC-EC, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-EC, Dayton, Ohio 45444, or telephone (513) 296-5373.

6.6 One part - one part number system. The one part - one part number system described below has been developed to allow for transitions between identical generic devices covered by the three major microcircuit requirements documents (MIL-H-38534, MIL-I-38535, and 1.2.1 of MIL-STD-883) without the necessity for the generation of unique PIN's. The three military requirements documents represent different class levels, and previously when a device manufacturer upgraded military product from one class level to another, the benefits of the upgraded product were unavailable to the Original Equipment Manufacturer (OEM), that was contractually locked into the original unique PIN. By establishing a one part number system covering all three documents, the OEM can acquire to the highest class level available for a given generic device to meet system needs without modifying the original contract parts selection criteria.

Military documentation format	Example PIN under new system	Manufacturing source listing	Document listing
New MIL-H-38534 Standard Microcircuit Drawings	5962-XXXXXZZ(H or K)YY	QML-38534	MIL-BUL-103
New MIL-I-38535 Standard Microcircuit Drawings	5962-XXXXXZZ(Q or V)YY	QML-38535	MIL-BUL-103
New 1.2.1 of MIL-STD-883 Standard Microcircuit Drawings	5962-XXXXXZZ(M)YY	MIL-BUL-103	MIL-BUL-103

6.7 Sources of supply for device classes H and K. Sources of supply for device classes H and K are listed in QML-38534. The vendors listed in QML-38534 have submitted a certificate of compliance (see 3.7 herein) to DESC-EC and have agreed to this drawing.

STANDARD MICROCIRCUIT DRAWING SOURCE APPROVAL BULLETIN

DATE: 94-11-08

Approved sources of supply for SMD 5962-94775 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 DESC-EC. This bulletin is superseded by the next dated revision of QML-38534.

Standard microcircuit drawing PIN	Vendor CAGE number	Vendor similar PIN 1/
5962-9477501HXX	88379	CT1990-1-20

1/ 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
88379	Aeroflex Circuit Technology 35 South Service Road Plainview, NY 11803

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