

REVISIONS

REV	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Change tPLH3 max limit for subgroup 9 in table I. Editorial changes throughout – jak.	99-07-13	Monica L. Poelking

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

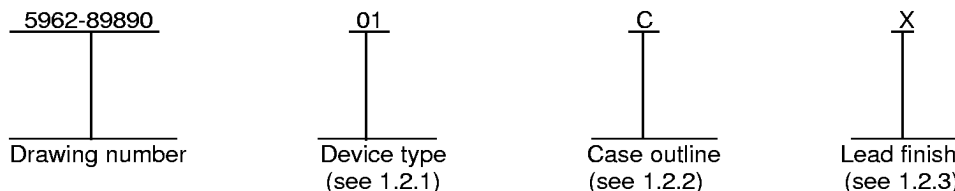
<p>STANDARD MICROCIRCUIT DRAWING</p> <p>THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE</p> <p>AMSC N/A</p>	<p>PREPARED BY Marcia B. Kelleher</p>	<p>DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216</p>		
	<p>CHECKED BY Thomas J. Ricciuti</p>			
	<p>APPROVED BY Michael A Frye</p>	<p>MICROCIRCUIT, DIGITAL, HIGH SPEED CMOS, DUAL 4-STAGE BINARY COUNTER, TTL COMPATIBLE INPUTS, MONOLITHIC SILICON</p>		
	<p>DRAWING APPROVAL DATE 90-10-11</p>			
<p>REVISION LEVEL A</p>	<p>SIZE A</p>	<p>CAGE CODE 67268</p>	<p>5962-89890</p>	
		<p>SHEET 1 OF 11</p>		

1. SCOPE

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This drawing describes device requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A.

1.2 Part or Identifying Number (PIN). The complete PIN is as shown in the following example:



1.2.1 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	54HCT393	Dual 4-stage binary counter, TTL compatible inputs

1.2.2 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>
C	GDFF1-T14	14	Dual-in-line package

1.2.3 Lead finish. The lead finish is as specified in MIL-PRF-38535 for device classes Q and V or MIL-PRF-38535, appendix A for device class M.

1.3 Absolute maximum ratings. 1/

Supply voltage range (V_{CC}).....	-0.5 V dc to +7.0 V dc
DC input voltage range (V_{IN}).....	-0.5 V dc to $V_{CC} + 0.5$ V dc
DC output voltage range (V_{OUT}).....	-0.5 V dc to $V_{CC} + 0.5$ V dc
DC input diode current (I_{IK}).....	± 20 mA
DC output diode current (I_{OK}) (per pin).....	± 20 mA
DC drain current (per pin).....	± 25 mA
DC V_{CC} or GND current.....	± 50 mA
Storage temperature range (T_{STG}).....	-65°C to +150°C
Maximum power dissipation (P_D):.....	500 mW 2/
Lead temperature (soldering, 10 seconds).....	+300°C
Thermal resistance, junction-to-case (θ_{JC}).....	See MIL-STD-1835
Junction temperature (T_J).....	+175°C

1/ Unless otherwise specified, all voltages are referenced to ground.

2/ For $T_C = +100^\circ\text{C}$ to $+125^\circ\text{C}$, derate linearly at 8 mW/°C.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-89890
		REVISION LEVEL A	SHEET 2

1.4. Recommended operating conditions.

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Supply voltage range (V _{CC}).....	+4.5 V dc to +5.5 V dc
Case operating temperature range (T _C)	-55°C to +125°C
Input rise or fall time t _r , t _f (V _{CC} = 4.5 V).....	0 to 500 ns
Maximum input clock pulse frequency (f _{MAX}):	
T _C = +25°C, V _{CC} = 4.5 V	27 MHz
T _C = -55°C to +125°C, V _{CC} = 4.5 V	18 MHz
Minimum clock pulse width (t _{w1}):	
T _C = +25°C, V _{CC} = 4.5 V	19 ns
T _C = -55°C to +125°C, V _{CC} = 4.5 V	29 ns
Minimum reset clock pulse width (t _{w2}):	
T _C = +25°C, V _{CC} = 4.5 V	16 ns
T _C = -55°C to +125°C, V _{CC} = 4.5 V	24 ns
Minimum reset recovery time (t _{rec}):	
T _C = +25°C, V _{CC} = 4.5 V	5 ns
T _C = -55°C to +125°C, V _{CC} = 4.5 V	5 ns

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-38535 - Integrated Circuits, Manufacturing, General Specification for.

STANDARDS

DEPARTMENT OF DEFENSE

- MIL-STD-883 - Test Method Standard Microcircuits.
- MIL-STD-973 - Configuration Management.
- MIL-STD-1835 - Interface Standard For Microcircuit Case Outlines.

HANDBOOKS

DEPARTMENT OF DEFENSE

- MIL-HDBK-103 - List of Standard Microcircuit Drawings (SMD's).
- 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.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-89890
		REVISION LEVEL A	SHEET 3

3. REQUIREMENTS

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3.1 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B devices and as specified herein. Product built to this drawing that is produced by a Qualified Manufacturer Listing (QML) certified and qualified manufacturer or a manufacturer who has been granted transitional certification to MIL-PRF-38535 may be processed as QML product in accordance with the manufacturers approved program plan and qualifying activity approval in accordance with MIL-PRF-38535. This QML flow as documented in the Quality Management (QM) plan may make modifications to the requirements herein. These modifications shall not affect form, fit, or function of the device. These modifications shall not affect the PIN as described herein. A "Q" or "QML" certification mark in accordance with MIL-PRF-38535 is required to identify when the QML flow option is used.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535, appendix A and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Truth table. The truth table shall be as specified on figure 2.

3.2.3 Logic diagram(s). The logic diagram(s) shall be as specified on figure 3.

3.2.4 Switching waveforms and test circuit. The switching waveforms and test circuit shall be as specified in figure 4.

3.2.5 Case outline. The case outline shall be in accordance with 1.2.2 herein.

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 (case) 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-PRF-38535, appendix A. 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 MIL-HDBK-103 (see 6.6 herein). For packages where marking of the entire SMD PIN number is not feasible due to space limitations, the manufacturer has the option of not marking the "5962-" on the device.

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-HDBK-103 (see 6.6 herein). The certificate of compliance submitted to DSCC-VA prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-PRF-38535, appendix A and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38535, appendix A shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DSCC-VA shall be required in accordance with MIL-PRF-38535, appendix A.

3.9 Verification and review. DSCC, DSCC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-89890
		REVISION LEVEL A	SHEET 4

DSCC FORM 2234
APR 97

TABLE I. Electrical performance characteristics.

Symbol	Test conditions 1/ -55°C ≤ T _C ≤ +125°C +4.5 V ≤ V _{CC} ≤ +5.5 V unless otherwise specified	Group A subgroups	Limits		Unit	
			Min	Max		
High level output voltage	V _{OH} V _{CC} = 4.5 V V _{IN} = 2.0 V or 0.8 V	I _O = 20 μA	1, 2, 3	4.4		V
				I _O = 4.0 mA	3.7	
Low level output voltage	V _{OL} V _{CC} = 4.5 V V _{IN} = 2.0 V or 0.8 V	I _O = 20 μA	1, 2, 3		0.1	V
				I _O = 4.0 mA		
High level input voltage	V _{IH} 2/ V _{CC} = 4.5 V		1, 2, 3	2.0		V
Low level input voltage	V _{IL} 2/ V _{CC} = 4.5 V		1, 2, 3		0.8	V
Input capacitance	C _{IN} T _C = +25°C See 4.3.1c		4		10.0	pF
Quiescent supply current	I _{CC} V _{IN} = V _{CC} or GND I _{OUT} = 0.0 A		1, 2, 3		160	μA
Input leakage current	I _{IN} V _{CC} = 5.5 V, V _{IN} = V _{CC} or GND		1, 2, 3		±1.0	V
Quiescent supply current delta, TTL input levels	ΔI _{CC} Any one input: V _{IN} = 2.4 V Other inputs: V _{IN} = V _{CC} or GND I _{OUT} = 0.0 A, V _{CC} = 5.5 V		1, 2, 3		3.0	mA
Functional test	See 4.3.1d		7, 8	L	H	
Propagation delay Time, CPn to Q0n	t _{PLH1} t _{PHL1} V _{CC} = 4.5 V C _L = 50 pF minimum See figure 4		9		32	ns
			10, 11		48	
Propagation delay Time, Qn to Qn + 1	t _{PLH2} t _{PHL2} 3/ V _{CC} = 4.5 V C _L = 50 pF minimum See figure 4		9		12	ns
			10, 11		18	
Propagation delay Time, CPn to Q1n	t _{PLH3} t _{PHL3} 3/ V _{CC} = 4.5 V C _L = 50 pF minimum See figure 4		9		44	ns
			10, 11		66	

See footnotes at end of table.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-89890
		REVISION LEVEL A	SHEET 5

TABLE I. Electrical performance characteristics.

Test	Symbol	Test conditions <u>1/</u> -55°C ≤ T _C ≤ +125°C +4.5 V ≤ V _{CC} ≤ +5.5 V unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Propagation delay Time, CPn to Q2n	t _{PLH4}	V _{CC} = 4.5 V C _L = 50 pF minimum See figure 4	9		50	ns
	t _{PHL4}		10, 11		75	
Propagation delay Time, CPn to Q3n	t _{PLH5}		9		62	ns
	t _{PHL5}		10, 11		93	
Propagation delay Time, CPn to Q4n	t _{PLH6}		9		32	ns
	t _{PHL6}		10, 11		48	
Output transition time	t _{TLH}	9		15	ns	
	t _{THL}	10, 11		22		



- 1/ For a power supply of 5 V ±10%, the worst case output voltages (V_{OH} and V_{OL}) occur for HCT at 4.5 V. Thus, the 4.5 V values should be used when designing with this supply. Worst cases V_{IH} and V_{IL} occur at V_{CC} = 5.5 V and 4.5 V respectively.
- 2/ The V_{IH} and V_{IL} tests are not required, and shall be applied as forcing functions for the V_{OH} or V_{OL} tests.
- 3/ Guaranteed, if not tested, to the specified limits.
- 4/ Transition time (t_{TLH}, t_{THL}), if not tested, shall be guaranteed to the specified limits.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-89890
		REVISION LEVEL A	SHEET 6

Device type	01
Case Outline	C
Terminal Number	Terminal Symbol
1	CP1
2	MR1
3	Q01
4	Q11
5	Q21
6	Q31
7	GND
8	Q32
9	Q22
10	Q12
11	Q02
12	MR2
13	CP2
14	V _{CC}

FIGURE 1. Terminal connections.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-89890
		REVISION LEVEL A	SHEET 7

Inputs		Output state
\overline{CPn}	MRn	Qn
	L	No change
	L	Count
X	H	L

\overline{CPn} Count	Outputs			
	$Q0n$	$Q1n$	$Q2n$	$Q3n$
0	L	L	L	L
1	H	L	L	L
2	L	H	L	L
3	H	H	L	L
4	L	L	H	L
5	H	L	H	L
6	L	H	H	L
7	H	H	H	L
8	L	L	L	H
9	H	L	L	H
10	L	H	L	H
11	H	H	L	H
12	L	L	H	H
13	H	L	H	H
14	L	H	H	H
15	H	H	H	H



H = High voltage level.
 L = Low voltage level.
 X = Irrelevant.
 = Low-to-high clock transition.
 = High-to-low clock transition.

FIGURE 2. Truth table.

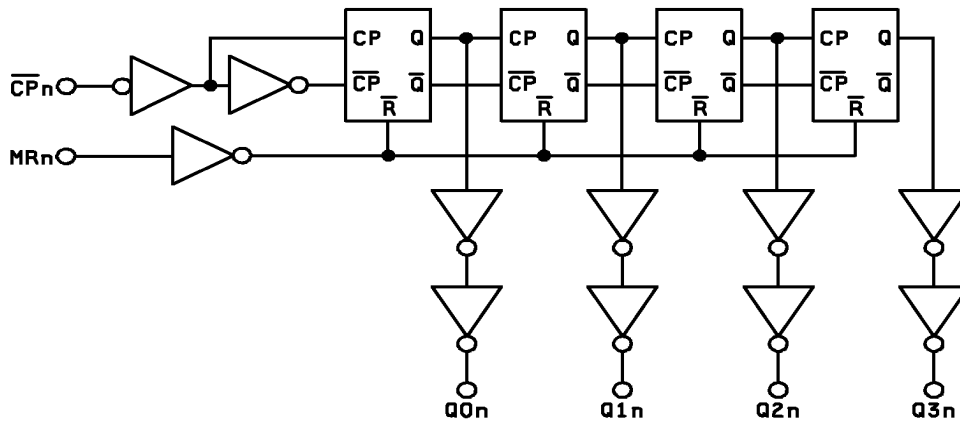
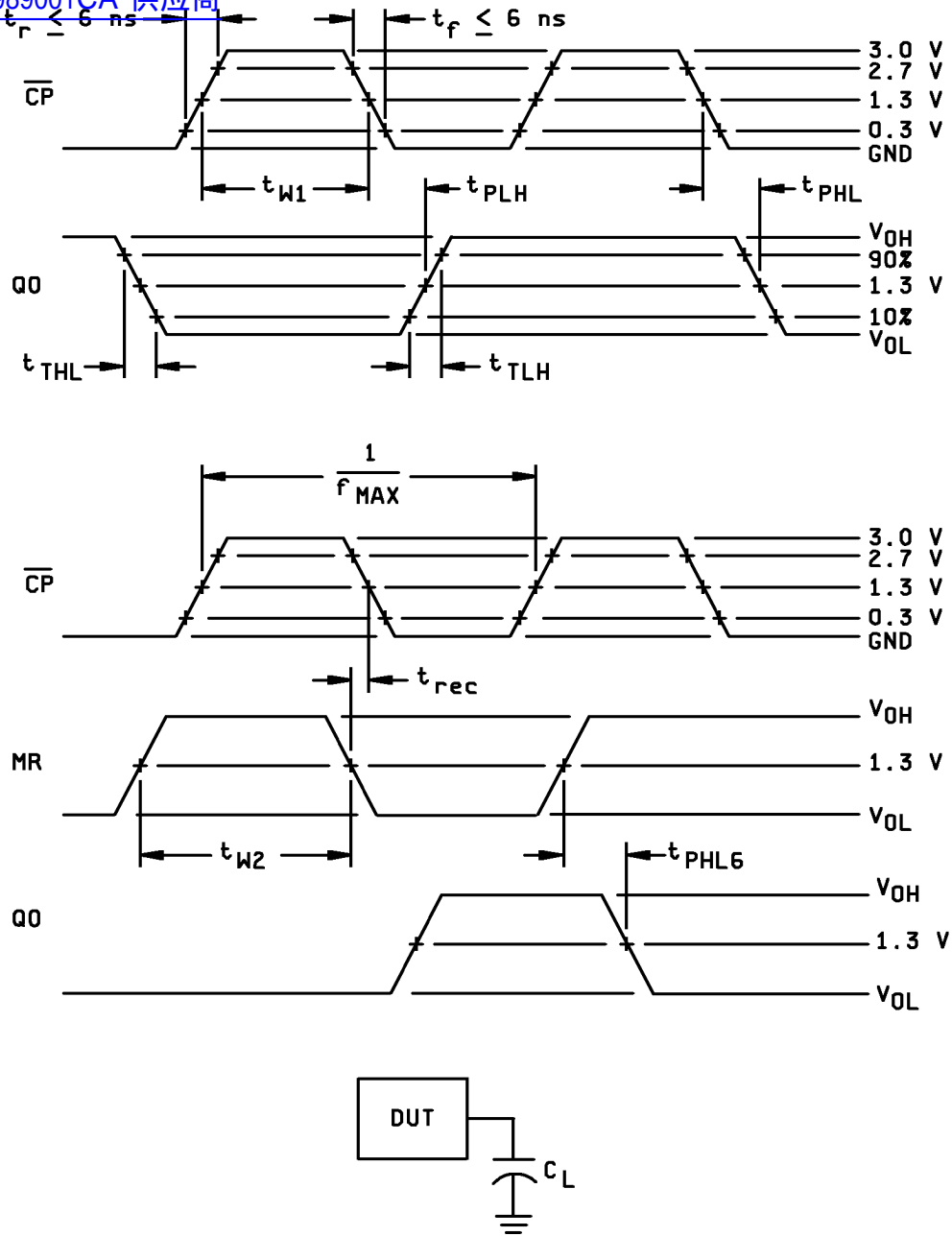


FIGURE 3. Logic diagram.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-89890
		REVISION LEVEL A	SHEET 8

查询"5962-8989001CA"供应商



NOTES:

1. $C_L = 50 \text{ pF}$ minimum or equivalent (includes jig and probe capacitance).

FIGURE 4. Switching waveforms and test circuit.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-89890
		REVISION LEVEL A	SHEET 9

DSCC FORM 2234
APR 97

4. QUALITY ASSURANCE PROVISIONS

[查询"5962-89890-1CA"供应商](#)
Sampling and Inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A.

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. 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 the preparing or acquiring activity upon request. 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) $T_A = +125^{\circ}\text{C}$, minimum.
- 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 method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

- a. Tests shall be as specified in table II herein.
- b. Subgroups 5 and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. Subgroup 4 (C_{IN} measurement) shall be measured only for the initial test and after process or design changes which may affect input capacitance. Capacitance shall be measured between the designated terminal and GND at a frequency of 1 MHz. Test all applicable pins on five devices with zero failures.
- d. Subgroups 7 and 8 tests shall include verify the truth table as specified on figure 2.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (in accordance with MIL-STD-883, method 5005, table I)
Interim electrical parameters (method 5004)	- - -
Final electrical test parameters (method 5004)	1, 2, 3, 7, 8, 9 <u>1/</u>
Group A test requirements (method 5005)	1, 2, 3, 4, 7, 8, 9, 10, 11
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

1/ PDA applies to subgroup 1.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-89890
		REVISION LEVEL A	SHEET 10

4.3.2 Groups C and D inspections.
[查询"5962-8989001CA"供应商](#)

- 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 using the circuit submitted with the certificate of compliance (see 3.6 herein).
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535, appendix A.

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 microelectronics devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0525.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43216-5000, or telephone (614) 692-0674.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-HDBK-103. The vendors listed in MIL-HDBK-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DSCC-VA.

6.6.1 Sources of supply for device classes Q and V. Sources of supply for device classes Q and V are listed in QML-38535. The vendors listed in QML-38535 have submitted a certificate of compliance (see 3.6 herein) to DSCC-VA and have agreed to this drawing.

6.6.2 Approved sources of supply for device class M. Approved sources of supply for class M are listed in MIL-HDBK-103. The vendors listed in MIL-HDBK-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DSCC-VA.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-89890
		REVISION LEVEL A	SHEET 11

DSCC FORM 2234
APR 97

查询"5962-8989001CA"快应商 STANDARD MICROCIRCUIT DRAWING SOURCE APPROVAL BULLETIN
 DATE: 99-07-13

Approved sources of supply for SMD 5962-89890 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38535 during the next revision. MIL-HDBK-103 and QML-38535 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 MIL-HDBK-103 and QML-38535.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962-8989001CA	01295	CD54HCT393F3A

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

01295

Vendor name and address

Texas Instruments Incorporated
 13500 N. Central Expressway
 P.O. Box 655303
 Dallas, TX 75265
 Point of contact: 6412 Highway 75 South
 Sherman, TX 75090-0084

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