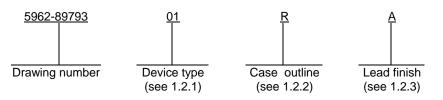
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1. SCOPE

1.1 <u>Scope</u>. 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 <u>Device type(s)</u>. The device type(s) identify the circuit function as follows:

Device type	Generic number	Circuit function
01	54ACT520	8-bit identity comparator, TTL compatible inputs
02	54ACT521	8-bit identity comparator, TTL compatible inputs
03	54ACT11520	8-bit identity comparator, TTL compatible inputs
04	54ACT11521	8-bit identity comparator, TTL compatible inputs

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

Outline letter	Descriptive designator	<u>Terminals</u>	Package style
R	GDIP1-T20 or CDIP2-T20	20	Dual-in-line
S	GDFP2-F20 or CDFP3-F20	20	Flat pack
2	CQCC1-N20	20	Square leadless chip carrier

1.3 Absolute maximum ratings. 1/

Supply voltage range (V_{CC}) DC input voltage range (V_{IN}) DC output voltage range (V_{OUT}) DC input diode current (I_{IK}) DC output diode current (I_{CC} , I_{GND}) DC V_{CC} or GND current (I_{CC} , I_{GND}) Storage temperature range (T_{STG}) Maximum power dissipation (P_D) Lead temperature (soldering 10 seconds) Thermal resistance, junction-to-case (θ_{JC})	0.5 V dc to V _{CC} + 0.5 V dc 0.5 V dc to V _{CC} + 0.5 V dc ±20 mA ±50 mA ±100 mA 65°C to +150°C 500 mW +300°C See MIL-STD-1835
Junction temperature (T _J)	+175°C <u>2</u> /

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

2/ Maximum junction temperature shall not be exceeded except for allowable short duration burn-in screening conditions per method 5004 of MIL-STD-883.

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1.4 Recommended operating conditions.

Supply voltage range (V _{CC})	
Input voltage range (V _{IN})	
Output voltage range (V _{OUT})	
Case operating temperature range (T _c)	
Input rise or fall times (t _r , t _f):	
$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	0 to 8 ns/V

2. APPLICABLE DOCUMENTS

2.1 <u>Government specification, standards, and handbooks</u>. 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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

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

DEPARTMENT OF DEFENSE STANDARDS

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

DEPARTMENT OF DEFENSE HANDBOOKS

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

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or http://assist.daps.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 <u>Order of precedence</u>. 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 <u>Item requirements</u>. The individual item requirements for device classes Q and V shall be in accordance with MIL-PRF-38535 and as specified herein 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. The individual item requirements for device class M shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B devices and as specified herein.

3.2 <u>Design, construction, and physical dimensions</u>. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein for device classes Q and V or MIL-PRF-38535, appendix A and herein for device class M.

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

3.2.2 <u>Terminal connections</u>. The terminal connections shall be as specified on figure 1.

3.2.3 <u>Truth table</u>. The truth table shall be as specified on figure 2.

3.2.4 Logic diagram. The logic diagram shall be as specified on figure 3.

3.2.5 Switching waveforms and test circuit. The switching waveforms and test circuit shall be as specified on figure 4.

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3.3 <u>Electrical performance characteristics</u>. 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 <u>Electrical test requirements</u>. 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 <u>Marking</u>. 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. 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.

3.5.1 <u>Certification/compliance mark</u>. A compliance indicator "C" shall be marked on all non-JAN devices built in compliance to MIL-PRF-38535, appendix A. The compliance indicator "C" shall be replaced with a "Q" or "QML" certification mark in accordance with MIL-PRF-38535 to identify when the QML flow option is used.

3.6 <u>Certificate of compliance</u>. 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 <u>Certificate of conformance</u>. 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 for any change that affects this drawing.

3.9 <u>Verification and review</u>. 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.

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Test	Symbol	-55°C ≤ T _C +4.5 V ≤ V _C	ditions $_{C} \leq +125^{\circ}C$ $_{CC} \leq +5.5 \text{ V}$ wise specified	Group A subgroups	Device type	Lin	Unit	
						Min	Max	l
High level output voltage <u>1</u> /	V _{OH}	V _{IN} = V _{IH} min or V _{IL} max	V _{CC} = 4.5 V	1, 2, 3	All	4.4		V
Voltago <u>i</u> ,		I _{OH} = -50 μA	V _{CC} = 5.5 V			5.4]
		$V_{IN} = V_{IH} \min$	$V_{CC} = 4.5 V$			3.7		
		or V _{IL} max I _{OH} = -24 mA	$V_{CC} = 5.5 V$]		4.7		
		$V_{IN} = V_{IH} min$ or $V_{IL} max$ $I_{OH} = -50 mA$	V _{CC} = 5.5 V			3.85		
Low level output	V _{OL}	$V_{IN} = V_{IH} \min$	$V_{CC} = 4.5 V$	1, 2, 3	All		0.1	V
voltage <u>1</u> /		or V _{IL} max I _{OL} = 50 μA	$V_{\rm CC} = 5.5 \text{ V}$	1 1			0.1	1
		$V_{IN} = V_{IH} min$ or $V_{IL} max$	V _{CC} = 4.5 V	-			0.5	
		I _{OL} = 24 mA	V _{CC} = 5.5 V	1			0.5	1
		$V_{IN} = V_{IH} min$ or $V_{IL} max$ $I_{OL} = 50 mA$	$V_{\rm CC} = 5.5 \rm V$				1.65	
High level input	V _{IH}		$V_{CC} = 4.5 V$	1, 2, 3	All	2.0		V
voltage <u>2</u> /			V _{CC} = 5.5 V			2.0		
Low level input	V _{IL}		V _{CC} = 4.5 V	1, 2, 3	All		0.8	V
voltage <u>2</u> /			$V_{CC} = 5.5 V$				0.8	ļ
Input leakage current, B inputs, low	I _{IL1}	$V_{IN} = 0.0 V$	V _{CC} = 5.5 V	1, 2, 3	01, 03		-1.0	mA
-			-		02, 04		-1.0	μA
Input leakage current, B inputs, high	I _{IH1}	$V_{IN} = 5.5 V$			01, 03		10.0	μA
			<u> </u>		02, 04		1.0	μA
Input leakage current, other inputs, low	I _{IL2}	$V_{IN} = 0.0 V$	V _{CC} = 5.5 V	1, 2, 3	01, 03		-1.0	μA
-			- 0.0 1		02, 04		-1.0	μA
Input leakage current, other inputs, high	I _{IH2}	$V_{IN} = 5.5 V$			01, 03		1.0	μA
					02, 04		1.0	μA
Quiescent supply current	I _{CC}	$V_{IN} = V_{CC}$ or GND,	$V_{CC} = 5.5 V$	1, 2, 3	01, 02, 04		160	μA
Quiescent supply	I _{CC}	B inputs at GND	Other inputs	1, 2, 3	03	ĺ	8.0	mA
current		B inputs open	$= V_{CC} \text{ or GND}$ $V_{CC} = 5.5 \text{ V}$		03	ĺ	160	μA
Maximum I _{CC} /TTL inputs high, supply current	Δl _{CC}	One input at 3.4 V Other inputs = V_{CC}	/, V _{CC} = 5.5 V	1, 2, 3	All		1.6	mA

See footnotes at end of table.

STANDARD				
MICROCIRCUIT DRAWING				
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COLUMBUS, OHIO 43218-3990				

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	T/	ABLE I. Electrical performance charact	eristics - Contin	ued.			
Test	Symbol	$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	Group A subgroups	Device type	Lir Min	nits Max	Unit
Input capacitance	C _{IN}	See 4.3.1c	4	All		10	pF
Power dissipation capacitance <u>3</u> /	C _{PD}	See 4.3.1c	4	All		60	pF
Functional tests		Tested at V_{CC} = 4.5 V and repeated at V_{CC} = 5.5 V See 4.3.1d	7, 8	All			
Propagation delay	t _{PHL1}	$V_{CC} = 4.5 V$	9	01, 02	1.5	11.0	ns
time, An or Bn		C _L = 50 pF	10, 11		1.5	12.5	
to $\overline{O}_{A=B}$ <u>4</u> /		$R_{L} = 500\Omega$	9	03, 04	1.5	12.4	
		See figure 4	10, 11		1.5	14.8	
	t _{PLH1}		9	01, 02	1.5	12.0	
			10, 11		1.5	12.0	
			9	03, 04	1.5	13.0	
			10, 11		1.5	15.9	
Propagation delay	t _{PHL2}		9	01, 02	1.5	8.5	ns
time, $I_{A=B}$ to			10, 11		1.5	9.0	
O _{A=B} <u>4</u> /			9	03, 04	1.5	9.0	
			10, 11		1.5	10.4	-
	t _{PLH2}		9	01, 02	1.5	8.5	-
			10, 11		1.5	8.5	-
			9	03, 04	1.5	9.3	-
			10, 11		1.5	11.2	

<u>1</u>/ V_{OH} and V_{OL} will be tested at V_{CC} = 4.5 V. V_{OH} and V_{OL} are guaranteed, if not tested, for V_{CC} = 5.5 V. Limits shown apply to operation at V_{CC} = 5.0 V ±0.5 V. Transmission driving tests are performed at V_{CC} = 5.5 V with a 2 ms duration maximum.

- 2/ The V_{IH} and V_{IL} tests are not required, and shall be applied as forcing functions for the V_{OH} and V_{OL} tests.
- 3/ Power dissipation capacitance (C_{PD}) determines both the dynamic power consumption (P_D) and the dynamic current consumption (I_S). Where:

 $P_{D} = (C_{PD} + C_{L}) (V_{CC} \times V_{CC})f + (I_{CC} \times V_{CC}) + (n \times d \times \Delta I_{CC} \times V_{CC})$

$$_{\rm S} = (C_{\rm PD} + C_{\rm L}) V_{\rm CC}f + I_{\rm CC} + (n \ x \ d \ x \ \Delta I_{\rm CC})$$

For both P_D and I_S , n is number of device inputs at TTL levels; f is the frequency of the input signal; d is duty cycle of the input signal; and C_L is the external output load capacitance.

<u>4</u>/ AC limits at $V_{CC} = 5.5$ V are equal to the limits at $V_{CC} = 4.5$ V and guaranteed by testing at $V_{CC} = 4.5$ V. Minimum ac limits for $V_{CC} = 5.5$ V are 1.0 ns and guaranteed by guardbanding the $V_{CC} = 4.5$ V minimum limits to 1.5 ns.

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Device types	01 and 02	03 and	
Case outlines	R, S, and 2	R	2
Terminal number	Terminal symbol	Terminal symbol	Terminal symbo
1	I _{A=B}	B1	B3
2	A0	A1	A3
3	B0	B0	B2
4	A1	AO	A2
5	B1	GND	I _{A=B}
6	A2	O _{A=B}	B1
7	B2	B7	A1
8	A3	A7	B0
9	B3	B6	AO
10	GND	A6	GND
11	A4	B5	O _{A=B}
12	B4	A5	B7
13	A5	B4	A7
14	B5	A4	B6
15	A6	V _{CC}	A6
16	B6	B3	B5
17	A7	A3	A5
18	B7 O _{A=B} V _{CC}	B2	B4
19	O _{A=B}	<u>_A</u> 2	A4
20	V _{CC}	I _{A=B}	V _{cc}

 $\begin{array}{l} A0-A7 = Word \ A \ inputs \\ \underline{B0}-B7 = Word \ B \ inputs \\ \hline I_{A=B} = Expansion \ or \ enable \ inputs \\ \hline O_{A=B} = I dentity \ output \end{array}$

FIGURE 1. Terminal connections.

Device types 01, 02, 03, and 04

Inp	Inputs	
I _{A=B}	А, В	O _{A=B}
L	A = B*	L
L	A ≠ B	Н
Н	A = B*	Н
Н	A ≠ B	Н

H = High voltage level

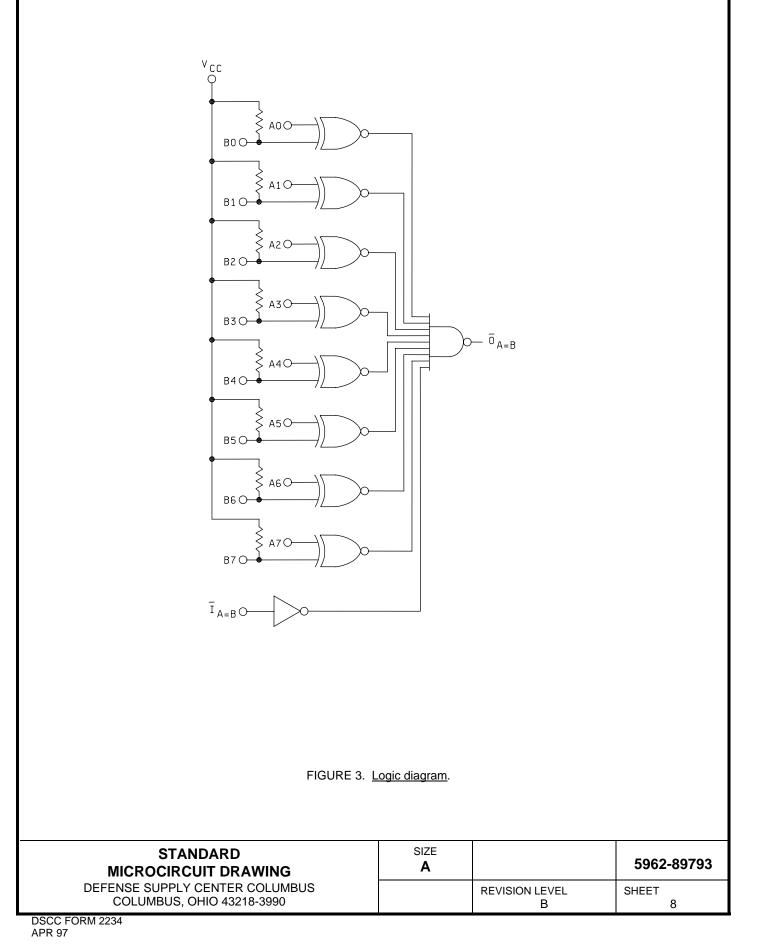
L = Low voltage level * = A0 = B0, A1 = B1, A2 = B2, ..., A7 = B7

FIGURE 2. Truth table.

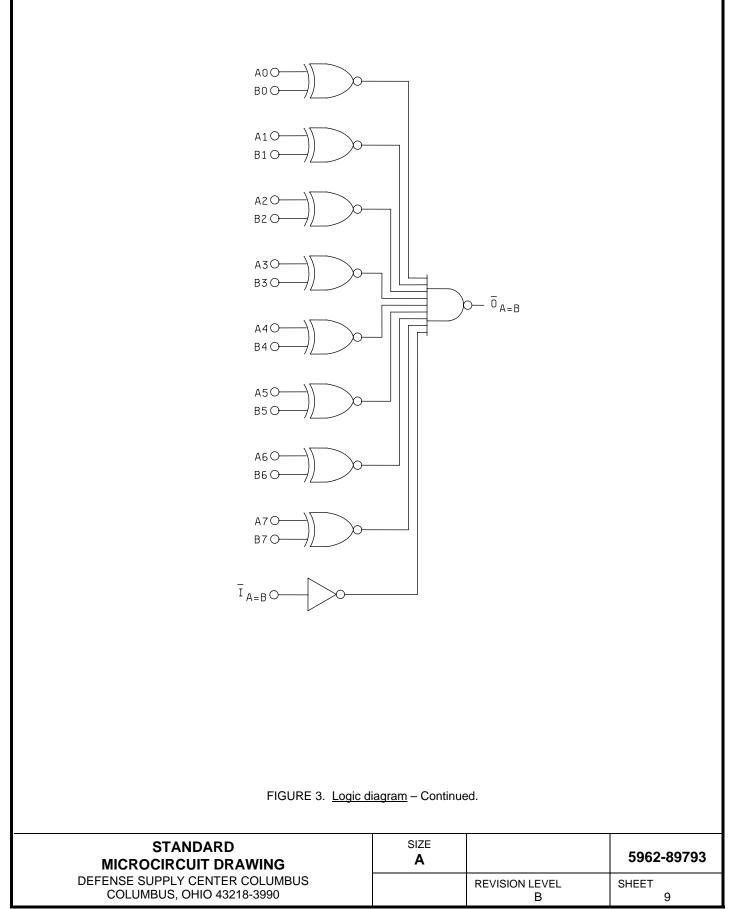
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Device types 01 and 03

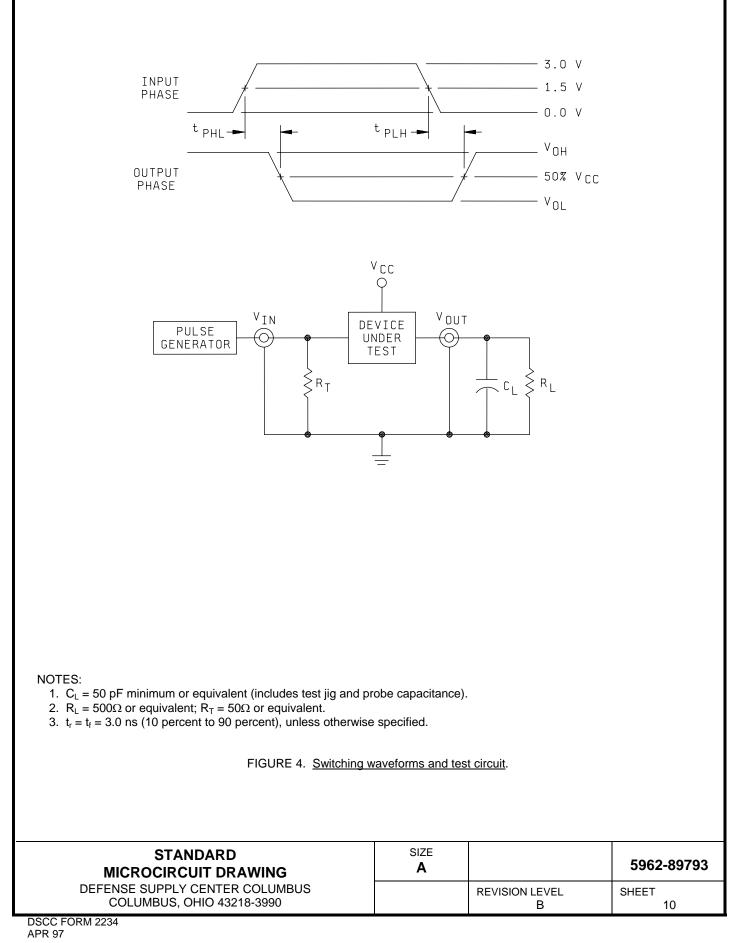


Device types 02 and 04



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4. VERIFICATION

4.1 <u>Sampling and inspection</u>. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A.

4.2 <u>Screening</u>. 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) $T_A = +125^{\circ}C$, 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 <u>Quality conformance inspection</u>. 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} and C_{PD} measurements) 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 V_{SS} or GND at a frequency of 1 MHz. Test all applicable pins on 5 devices with zero failures.
 - d. Subgroups 7 and 8 shall include verification of the truth table as specified on figure 2 herein.
- 4.3.2 Groups C and D inspections.
 - 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, and 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 1005 of MIL-STD-883.
 - (2) $T_A = +125^{\circ}C$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

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TABLE II. Electrical test requirements.

Subgroups
(in accordance with
MIL-STD-883, method 5005,
table I)
1*, 2, 3, 7, 8, 9
1, 2, 3, 4, 7, 8, 9, 10, 11
1, 2, 3

* PDA applies to subgroup 1.

5. PACKAGING

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

6. NOTES

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

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

6.3 <u>Configuration control of SMD's</u>. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished using DD Form 1692, Engineering Change Proposal.

6.4 <u>Record of users</u>. Military and industrial users shall inform Defense Supply Center Columbus (DSCC) 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) 692-0544.

6.5 <u>Comments</u>. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43218-3990 or telephone (614) 692-0547.

6.6 <u>Approved sources of supply</u>. Approved sources of supply are listed in MIL-HDBK-103 and QML-38535. The vendors listed in MIL-HDBK-103 and QML-38535 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DSCC-VA.

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STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 06-12-20

Approved sources of supply for SMD 5962-89793 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 information bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535. DSCC maintains an online database of all current sources of supply at http://www.dscc.dla.mil/Programs/Smcr/.

Vendor	Vendor
CAGE	similar
number	PIN <u>2</u> /
0C7V7	54ACT520DMQB
0C7V7	54ACT520FMQB
0C7V7	54ACT520LMQB
0C7V7	54ACT521DMQB
0C7V7	54ACT521FMQB
0C7V7	54ACT521LMQB
<u>3</u> /	54ACT11520
<u>3</u> /	54ACT11520
3V146	54ACT11521/BRA
3V146	54ACT11521/B2A
	CAGE number 0C7V7 0C7V7 0C7V7 0C7V7 0C7V7 0C7V7 0C7V7 <u>3/</u> <u>3/</u> 3/146

- 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.
- <u>2</u>/ <u>Caution</u>. 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 an approved source of supply.

Vendor CAGE	Vendor name
number	and address
0C7V7	QP Semiconductor 2945 Oakmead Village Court Santa Clara, CA 95051

3V146

Rochester Electronics 16 Malcolm Hoyt Drive Newburyport, MA 01950

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