REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	NOR 5962-R149-93. Revisions to paragraphs 4.2a(1) and 4.3.2b(1). --tvn	93-04-30	Monica L. Poelking
B	Update to reflect latest changes in format and requirements. Editorial changes throughout. --les	02-06-26	Raymond Monnin

Current CAGE code is 67268

The original first sheet of this drawing has been replaced.

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

PMIC N/A

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DRAWING APPROVAL DATE
86-12-19

REVISION LEVEL
B

DEFENSE SUPPLY CENTER COLUMBUS
COLUMBUS, OHIO 43216
http://www.dscc.dla.mil

STANDARD MICROCIRCUIT DRAWING

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

AMSC N/A

MICROCIRCUIT, DIGITAL, BIPOLAR, FOUR-BIT SHIFTER, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	**14933**	**5962-86718**

SHEET 1 OF 11

1. SCOPE

1.1 Scope. 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:

5962-86718	01	E	X
Drawing number	Device type (see 1.2.1)	Case outline (see 1.2.2)	Lead finish (see 1.2.3)

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

Device type	Generic number	Circuit function
01	25S10	Four-Bit shifter with three-state outputs

1.2.2 Case outlines. The case outlines are as designated in MIL-STD-1835 and as follows:

Outline letter	Descriptive designator	Terminals	Package style
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line
F	GDFP2-F16 or CDFP3-F16	16	Flat
2	CQCC1-N20	20	Square chip carrier

1.2.3 Lead finish. The lead finish is as specified in MIL-PRF-38535, appendix A.

1.3 Absolute maximum ratings.

Supply voltage	-0.5 V dc to +7.0 V dc
Input voltage range	-1.5 V dc to +7.0 V dc
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P_D) 1/	1.02 W
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (θ_{JC}):	
Case E	25°C/W
Case F	20°C/W
Case 2	20°C/W 2/
Junction temperature (T_J)	+150°C
DC output current into outputs	30 mA
DC input current	-30 mA to +5.0 mA

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	+4.5 V dc to +5.5 V dc
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.8 V dc
Ambient operating temperature (t_A)	-55°C to +125°C

1/ Must withstand the added P_D due to short circuit test (e.g. I_{OS}).
2/ When a thermal resistance for this case is specified in MIL-STD-1835, that value shall supersede the value specified herein.

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-1835 - Interface Standard Electronic Component Case Outlines.

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 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 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

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

3.2.3 Truth tables. The truth tables shall be as specified on figure 2.

3.2.4 Logic diagram. The logic 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 ambient 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.

3.5.1 Certification/compliance mark. 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 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.

4. QUALITY ASSURANCE PROVISIONS

4.1 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, 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°C, minimum.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ unless otherwise specified			Group A subgroups	Device type	Limits		Unit
							Min	Max	
High level output voltage	V_{OH}	V_{CC} = 4.5 V, I_{OH} = -1.0 mA, V_{IN} = 0.7 V or 2.0 V			1, 2, 3	All	2.4		V
Low level output voltage at Q outputs	V_{OL}	V_{CC} = 4.5 V, I_{OL} = 12 mA, V_{IN} = 2.0 V or 0.7 V			1, 2, 3	All		0.5	V
Input clamp voltage	V_{IC}	V_{CC} = 4.5 V, I_{IH} = -18 mA			1, 2, 3	All		-1.5	V
Low level input current	I_{IL}	V_{CC} = 5.5 V, V_{IN} = 0.5 V	I_3, I_{-3}, S_0, S_1, $\overline{OE}$		1, 2, 3	All		-2.0	mA
			All other inputs		1, 2, 3	All		-3.0	mA
High level input current	I_{IH1}	V_{CC} = 5.5 V, V_{IN} = 2.7 V	I_3, I_{-3}, S_0, S_1, $\overline{OE}$		1, 2, 3	All		50	µA
			All other inputs		1, 2, 3	All		75	µA
	I_{IH2}	V_{CC} = 5.5 V, V_{IN} = 5.5 V			1, 2, 3	All		1.0	mA
Short circuit output current	I_{OS}	V_{CC} = 5.5 V,			1, 2, 3	All	-40	-100	mA
Supply current	I_{CC}	V_{CC} = 5.5 V, all outputs open, all inputs = GND			1, 2, 3	All		85	mA
Off-state output current	I_{OZH}	V_{CC} = 5.5 V, V_{OUT} = 2.4 V			1, 2, 3	All		50	µA
	I_{OZL}	V_{CC} = 5.5 V, V_{OUT} = 0.5 V			1, 2, 3	All		-50	µA
Propagation delay time, data to output Y	t_{PLH1}	C_L = 15 pF ±10%, R_L = 280Ω ±5%		2/	9	All		7.5	ns
				3/	9, 10, 11	All		10	ns
	t_{PHL1}			2/	9	All		12	ns
				3/	9, 10, 11	All		16	ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ unless otherwise specified		Group A subgroups	Device type	Limits		Unit
						Min	Max	
Propagation delay time, from select to output Y	t_{PLH2}		2/	9	All		17	ns
			3/	9, 10, 11	All		22	ns
	t_{PHL2}		2/	9	All		20	ns
			3/	9, 10, 11	All		26	ns
Propagation delay time, from $\overline{OE}$ to output Y	t_{PZH}		2/	9	All		19.5	ns
			3/	9, 10, 11	All		25	ns
	t_{PZL}		2/	9	All		21	ns
			3/	9, 10, 11	All		27	ns
Propagation delay time, from $\overline{OE}$ to output Y	t_{PHZ}		2/	9	All		8	ns
			3/	9, 10, 11	All		10	ns
	t_{PLZ}		2/	9	All		15	ns
			3/	9, 10, 11	All		20	ns

1/ Not more than one output should be shorted at a time and the duration of the short circuit condition should not exceed one second.

2/ V_{CC} = 5.0 V.

3/ V_{CC} = 4.5 V to 5.5 V.

Device types	01	01
Case outlines	E, F	2
Terminal number	Terminal symbols	
1	I_{-3}	NC
2	I_{-2}	I_{-3}
3	I_{-1}	I_{-2}
4	I_0	I_{-1}
5	I_1	I_0
6	I_2	NC
7	I_3	I_1
8	GND	I_2
9	S_1	I_3
10	S_0	GND
11	Y_3	NC
12	Y_2	S_1
13	$\overline{OE}$	S_0
14	Y_1	Y_3
15	Y_0	Y_2
16	V_{CC}	NC
17	- - -	$\overline{OE}$
18	- - -	Y_1
19	- - -	Y_0
20	- - -	V_{CC}

FIGURE 1. Terminal connections.

OE	S_1	S_0	I_3	I_2	I_1	I_0	I_{-1}	I_{-2}	I_{-3}	Y_3	Y_2	Y_1	Y_0
H	X	X	X	X	X	X	X	X	X	Z	Z	Z	Z
L	L	L	D_3	D_2	D_1	D_0	X	X	X	D_3	D_2	D_1	D_0
L	L	H	X	D_2	D_1	D_0	D_{-1}	X	X	D_2	D_1	D_0	D_{-1}
L	H	L	X	X	D_1	D_0	D_{-1}	D_{-2}	X	D_1	D_0	D_{-1}	D_{-2}
L	H	H	X	X	X	D_0	D_{-1}	D_{-2}	D_{-3}	D_0	D_{-1}	D_{-2}	D_{-3}

H = High level
L = Low level
X = Don't care
Z = High impedance state

D_n at input I_n may be either high or low and output Y_m will follow the selected D_n input level

FIGURE 2. Truth tables.

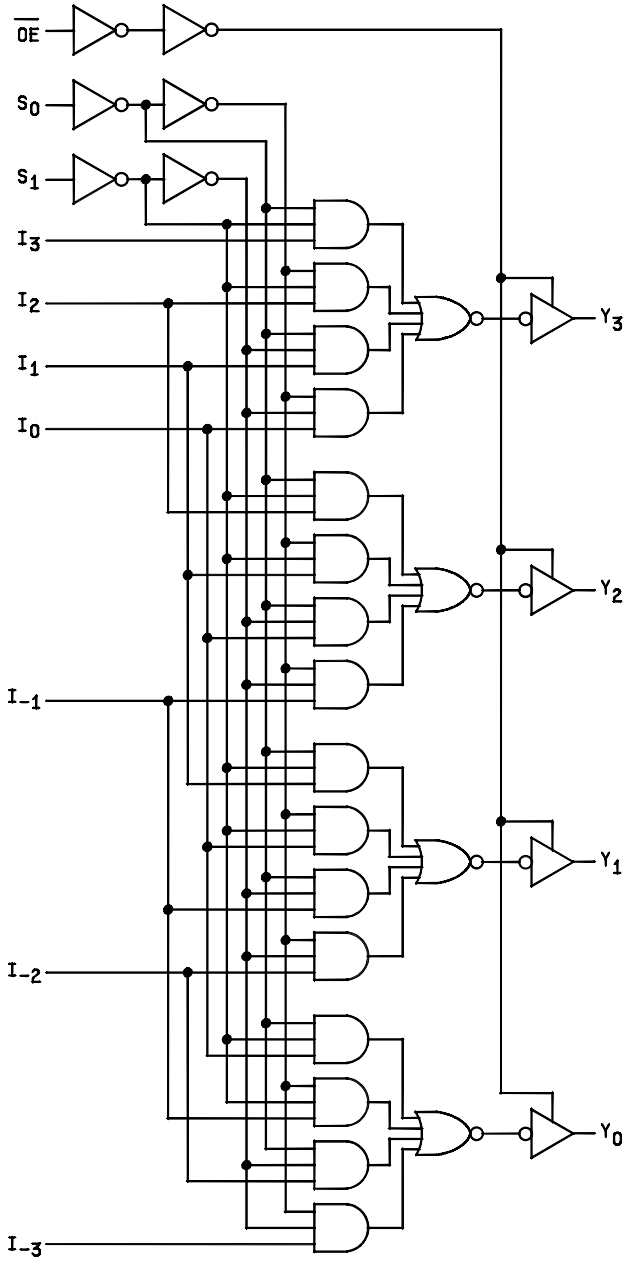

FIGURE 3. Logic diagram.

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.

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
Group A test requirements (method 5005)	1, 2, 3, 7, 8, 9, 10**, 11**
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.
** Subgroups 10 and 11, if not tested, shall be guaranteed to the specified limits in table I.

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 4, 5, and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroups 7 and 8 shall include verification of the truth table.

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, 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 1005 of MIL-STD-883.

(2) T_A = +125°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 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) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43216-5000, or telephone (614) 692-0547.

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.

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 02-06-26

Approved sources of supply for SMD 5962-86718 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 1/	Vendor CAGE number	Vendor similar PIN 2/
5962-8671801EA	0DKS7 3V146 3/	GEM08301B2A 25S10/BEA AM25S10/BEA
5962-8671801EC	0DKS7	GEM08301BEC
5962-8671801FA	0DKS7 3V146 3/	GEM08301BFA 25S10/BFA AM25S10/BFA
5962-8671801FC	0DKS7	GEM08301BFC
5962-86718012A	0DKS7 3V146 3/	GEM08301B2A 25S10/B2A AM25S10/B2A
5962-86718012C	0DKS7	GEM08301B2C

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/ No current source.

Vendor CAGE number	Vendor name and address
0DKS7	SARNOFF, DAVID RESEARCH CENTER 201 Washington Road Princeton, NJ 08540-5300
3V146	ROCHESTER ELECTRONICS 10 Malcolm Hoyt Drive Newburyport, MA 01950