NOTICE OF REVISION (NOR)

(See MIL-STD-480 for instructions)
This revision described below has been authorized for the document listed.

DATE (YYMMDD)	Form Approved OMB No. 0704-0188
93-04-07	

Public reporting burden for this collection is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

1. ORIGINATOR NAME AND ADDRESS Defense Electronics Supply Center Dayton, Ohio 45444-5277	**2. CAGE CODE** 67268	**3. NOR NO.** 5962-R054-93
	4. CAGE CODE 67268	**5. DOCUMENT NO.** **86008**
6. TITLE OF DOCUMENT MICROCIRCUITS, LINEAR, HIGH-SPEED VOLTAGE COMPARATOR, MONOLITHIC SILICON	**7. REVISION LETTER** (Current) B	(New) C
	8. ECP NO. 86008ECP-1	

9. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES

10. DESCRIPTION OF REVISION

Sheet 1: Revisions ltr column; add "C"
Revisions description column; add "Changes in accordance with NOR 5962-R054-93".
Revisions date column; add "93-04-07".
Revision level block; add "C".
Revision status of sheets; For sheets 1, 7, 8, 9, 11, and 12, add "C".

Sheet 7: TABLE I.
Propagation delay time test, device type 01, group A subgroups 9 and 11, min limit column, delete 4.5 ns and substitute 3.5 ns.
Propagation delay time and latch enable to output test, add footnote 5/.
Revision level block; add "C".

Sheet 8: TABLE I. Footnote 7/.
Delete sentence "b" and substitute the following; "b. t_{PD+} on either output Q or $\bar{Q}$ is performed."
Delete sentence "c" and substitute the following; "c. t_{PD-} on either output $\bar{Q}$ or Q is performed."
Revision level block; add "C".

Sheet 9: FIGURE 1. Terminal connections. For case outline I, pin 6, delete "NC" and substitute "NC/HYSTERESIS".
For case outline E, pin 9, delete "NC" and substitute "NC/HYSTERESIS".
Revision level block; add "C".

CONTINUED ON NEXT SHEET

11. THIS SECTION FOR GOVERNMENT USE ONLY

a. CHECK ONE

[X] EXISTING DOCUMENT SUPPLEMENTED BY THIS NOR MAY BE USED IN MANUFACTURE.

[ ] REVISED DOCUMENT MUST BE RECEIVED BEFORE MANUFACTURER MAY INCORPORATE THIS CHANGE.

[ ] CUSTODIAN OF MASTER DOCUMENT SHALL MAKE ABOVE REVISION AND FURNISH REVISED DOCUMENT TO:

b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT DESC-ECS	SIGNATURE AND TITLE MICHAEL A. FRYE BRANCH CHIEF	DATE (YYMMDD) 93-04-07
12. ACTIVITY ACCOMPLISHING REVISION DESC-ECS	REVISION COMPLETED (Signature) RICK C. OFFICER	DATE (YYMMDD) 93-04-07

Sheet 11: TABLE II. Delete the second sentence at the bottom of table and substitute the following; "** Subgroups 9, 10, and 11, if not tested, shall be guaranteed to the limits in table I herein." Revision level block; add "C".

Sheet 12: 6.4. Approved sources of supply. Under military drawing part numbers 8600803EX and 8600803IX, delete vendor CAGE number 34335 and substitute footnote "2/". Footnote 2/ states, "Not available from an approved source of supply".

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Change to military drawing format. Page 2, add device type 02. Page 6, table I, add device type 02 characteristic. Page 8, 6.4 add vendor. Editorial change throughout.	1987 MAY 11	M. A. Frye
B	Add device types 03 and 04. Add case outline 2. Add vendors CAGE 34031 and 64155. For 1.3 change footnotes 1/ and 2/ and delete footnotes 3/ and 4/. Change vendor similar part number for CAGE 07263 and change vendor CAGE 07263 to 27014. Add footnotes 7/, 8/, and 9/ to table I and change footnote 1/. Delete latch setup test and subgroup 12. Change drawing CAGE to 67268. Editorial changes throughout. Add latch enable voltage to the recommended operating conditions, Add latch enable propagation delay to table I to be tested. Delete vendor CAGE 27014.	89 MAY 09	M. A. Frye

CURRENT CAGE CODE 67268

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

PMIC N/A

STANDARDIZED MILITARY DRAWING

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

AMSC N/A

PREPARED BY Douglas A. Kirby

CHECKED BY Ray Monnin

APPROVED BY M. A. Frye

DRAWING APPROVAL DATE 14 NOVEMBER 1985

REVISION LEVEL B

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUITS, LINEAR HIGH-SPEED VOLTAGE COMPARATOR, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	14933	86008

SHEET 1 OF 13

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5962-E724

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

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:

86008	01	E	X
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

1.2.1 Device types. The device types shall identify the circuit function as follows:

Device type	Generic number	Circuit	t_{PD}±(at T_A = +25°C) Min	Max
01	685	Open-emitter output	4.5	6.5 ns
02	685	Open-emitter output	0.5	6.5 ns
03	6685	Open-emitter output	2.0	4.0 ns
04	96685	Open-emitter output	1.5	3.5 ns

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
E	D-2 (16-lead, .840" X .310" X .200"), dual-in-line package
I	A-2 (10-lead, .370" X .185") can package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

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1.3 Absolute maximum ratings.

Positive supply voltage (V+):	
Device types 01, 02, 03	+7 V dc
Device type 04	+6.5 V dc
Negative supply voltage (V-):	
Device types 01, 02, 03	-7 V dc
Device type 04	-6.5 V dc
Input voltage range (V_I):	
Device types 01, 02, 03	±4 V dc
Device type 04	±5 V dc
Differential input voltage (V_{ID}):	
Device types 01, 02, 03	±6 V dc
Device type 04	±5.5 V dc
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P_D):	
Device types 01, 02	500 mW
Device types 03, 04	300 mW
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (θ_{JC}):	
Cases E, I, 2	See MIL-M-38510, appendix C
Junction temperature (T_J)	+175°C
Thermal resistance, junction-to-ambient (θ_{JA}):	
Case E	120°C/W
Case I	140°C/W
Case 2	92.3°C/W
Output current	30 mA

1.4 Recommended operating conditions.

Positive supply voltage (V+):	
Device types 01, 02, 03	+6.0 V dc
Device type 04	+5.0 V dc 1/
Negative supply voltage (V-):	
Device types 01, 02, 03	-5.2 V dc
Device type 04	-5.2 V dc 1/
Ambient operating temperature range (T_A)	-55°C to +125°C 2/
Minimum operating voltage (V+ to V-)	9.7 V dc
Latch enable voltage:	
V_{IH}	-.85 V
V_{IL}	-1.65 V

1/ $V_{IN} \leq$ positive supply and negative supply voltage.

2/ Devices require a thermal equilibrium to be established with a transverse airflow of $\geq$500 LFPM.

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2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, 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-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard 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 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

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

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

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I and apply over the full ambient operating temperature range.

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

3.5 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 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55^\circ C \le T_A \le +125^\circ C$ unless otherwise specified 1/ 2/ 3/ 4/	Device types	Group A subgroups	Limits Min	Limits Max	Unit
Input offset voltage	V_{IO}	$R_S = 100\Omega$, $V_{CM} = 0$ V dc	All	1		±2.0	mV
				2, 3		±3.0	
Input offset voltage temperature coefficient 5/	$\frac{\Delta V_{IO}}{\Delta T}$	$R_S = 100\Omega$ $V_{CM} = 0$ V	01, 02	1, 2, 3		±10	µV/°C
			03			±15.0	
			04			±20	
Input offset current	I_{IO}	$V_{CM} = 3.3$ V $T_A = +25^\circ C$	01, 02	1		±1.0	µA
			03			±1.5	
		$V_{CM} = +.5$ V $T_A = +25^\circ C$	04			±1.0	
		$-V_{CM} = -3.3$ V $T_A = +125^\circ C, -55^\circ C$	01, 02	2, 3		±1.6	
			03			±3.0	
		$-V_{CM} = -.5$ V $T_A = +125^\circ C, -55^\circ C$	04			±1.6	
Input bias current	I_{IB}	$V_{CM} = 3.3$ V $T_A = +25^\circ C$	01, 02	1		10	µA
			03			15	
		$V_{CM} = +.5$ V $T_A = +25^\circ C$	04			10	
		$-V_{CM} = -3.3$ V $T_A = +125^\circ C, -55^\circ C$	01, 02	2, 3		16	
			03			30	
		$-V_{CM} = -.5$ V $T_A = +125^\circ C, -55^\circ C$	04			16	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^\circ C \le T_A \le +125^\circ C$ unless otherwise specified 1/ 2/ 3/ 4/	Device types	Group A subgroups	Limits Min	Limits Max	Unit
Input voltage range	V_{CM}		01,02,03	1, 2, 3	-3.3	3.3	V
			04		-2.5	+5.0	
Input voltage common mode rejection ratio	CMRR	$R_S = 100\Omega$, $-3.3\ V \le V_{CM} \le +3.3\ V$	01,02,03	4, 5, 6	80		dB
		$-2.5 \le V_{CM} \le +5.0\ V$	04				
Power supply rejection ratio	PSRR	$R_S = 100\Omega$, $\Delta V_S = \pm 5\%$	All	4, 5, 6	60		dB
High level output voltage	V_{OH}	$T_A = +25^\circ C$	01,02,03	1	-.960	-.810	V
		$T_A = +125^\circ C$		2	-.850	-.620	
		$T_A = -55^\circ C$		3	-1.10	-.920	
			04	1, 2, 3	-1.10		
Low level output voltage	V_{OL}	$T_A = +25^\circ C$	01,02,03	1	-1.85	-1.65	V
		$T_A = +125^\circ C$		2	-1.81	-1.57	
		$T_A = -55^\circ C$		3	-1.91	-1.69	
			04	1, 2, 3		-1.50	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}C \leq T_A \leq +125^{\circ}C$ unless otherwise specified 1/ 2/ 3/ 4/	Device types	Group A subgroups	Limits Min	Limits Max	Unit
Positive supply current	I+		01,02,03	1, 2, 3		22	mA
			04			9	
Negative supply current	I-		01, 02	1, 2, 3		-26	mA
			03, 04			-18	
Propagation delay time	t_{PD}±	$T_A = -55^{\circ}C, +25^{\circ}C$ 6/ 7/	01	9, 11	4.5	6.5	ns
		$T_A = +125^{\circ}C$ 6/ 7/		10	5.5	12	
		$T_A = +25^{\circ}C, -55^{\circ}C$ 6/ 7/	02	9, 11	0.5	6.5	
		$T_A = +125^{\circ}C$ 6/ 7/		10	0.5	12	
		$T_A = +25^{\circ}C, -55^{\circ}C$ 7/ 8/	03	9, 11	2.0	4.0	
		$T_A = +125^{\circ}C$ 7/ 8/		10	1.5	6.0	
		$T_A = +25^{\circ}C, -55^{\circ}C$ 9/	04	9, 11	1.5	3.5	
		$T_A = +125^{\circ}C$ 9/		10	1.5	6.0	
Propagation delay time Latch enable to output	t_{PD}± (E)	$T_A = +25^{\circ}C, -55^{\circ}C$	01, 03	9, 11		8	ns
		$T_A = +125^{\circ}C$		10		12.5	
		$T_A = +25^{\circ}C, -55^{\circ}C$	02	9, 11		8	
		$T_A = +125^{\circ}C$		10		12.5	
		$T_A = +25^{\circ}C,$	04	9		3.5	
		$T_A = +125^{\circ}C, -55^{\circ}C$		10, 11		7	

See footnotes on top of next page.

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1/ For device types 01, 02, and 03 unless otherwise specified: $V^+ = +6.0$ V dc; $V^- = -5.2$ V dc; $V_T = -2.0$ V dc, and $R_L = 50\Omega$.

2/ Devices require a thermal equilibrium to be established with a transverse airflow of >500 LFPM.

3/ Production pulse test devices at correlated temperatures of -35°C and +145°C to compensate for high power steady-state operation.

4/ For device type 04 unless otherwise specified: $V^+ = +5.0$ V dc; $V^- = -5.2$ V dc; $V_T = -2.0$ V dc, and $R_L = 50\Omega$.

5/ Guaranteed if not tested to the limits specified.

6/ 100 mV step input with 5 mV overdrive.

7/ a. This parameter tested with $V_{CM} = 0$ V and supplies $V^+ = 6.0$ V, $V^- = -5.2$ V.
b. Only t_{PD}^+ on output Q.
c. Only t_{PD}^- on output $\overline{Q}$.

8/ 100 mV step input with 10 mV overdrive $V^+ = +5.0$ V; $V^- = -5.2$ V for 03.

9/ This parameter measured with 100 mV pulse (10 mV overdrive), to 50 percent of the transition output point.

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Device types	01, 02, 03, and 04		04
Case outlines	I	E	2
Terminal number	Terminal symbol		
1	V+	GROUND 1	NC
2	NONINVERTING INPUT	V+	GROUND 1
3	INVERTING INPUT	NONINVERTING INPUT	V+
4	LATCH ENABLE	INVERTING INPUT	NONINVERTING INPUT
5	V-	NC	INVERTING INPUT
6	NC	LATCH ENABLE	NC
7	Q OUTPUT	NC	NC
8	$\overline{Q}$ OUTPUT	V-	LATCH ENABLE
9	GROUND 2	NC	NC
10	GROUND 1	NC	V-
11		Q OUTPUT	NC
12		$\overline{Q}$ OUTPUT	NC
13		NC	NC
14		NC	Q OUTPUT
15		NC	$\overline{Q}$ OUTPUT
16		GROUND 2	NC
17			NC
18			NC
19			NC
20			GROUND 2

NC = no connection

FIGURE 1. Terminal connections.

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3.8 Verification and review. DESC, DESC'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 section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

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 using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) T_A = +125°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 7 and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

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, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) T_A = +125°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.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*, 2, 3, 4
Group A test requirements (method 5005)	1, 2, 3, 4, 5, 6, 9, 10, 11**
Groups C and D end-point electrical parameters (method 5005)	1

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

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

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

6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

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6.4 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have agreed to this drawing and a certificate of compliance (see 3.5 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/
8600801EX	34335 64155	AM685/BEA LT685J/883
8600801IX	34335 64155	AM685/BIC LT685H/883
8600802EX	64155	LT685J/883
8600802IX	64155	LT685H/883
8600803EX	34335	AM6685/BEA
8600803IX	34335	AM6685/BIC
8600804EX	34031	AD96685TQ/883B
8600804IX	34031	AD96685TH/883B
86008042X	34031	AD96685TE/883B

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

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Vendor CAGE number	Vendor name and address
34031	Analog Devices, Incorporated Computer Labs Division 7910 Triad Center Drive Greensboro, NC 27409
34335	Advanced Micro Devices, Incorporated 901 Thompson Place P.O. Box 3453 Sunnyvale, CA 94088
64155	Linear Technology Corp. 1630 McCarthy Blvd. Milpitas, CA 95035-7487

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