Rochester Electronics

Datasheet

78007

Microcircuit, Linear, General Purpose, Operational Amplifier, Monolithic Silicon

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All re-creations are done with the approval of the Original Component Manufacturer (OCM).

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
    - Class Q Military
    - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
    - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

FOR REFERENCE ONLY

© 2018 Rochester Electronics, LLC. All Rights Reserved 10112018

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Correct errors Table I. Insert paragraph 6.2.	83-11-03	N. A. HAUCK
B	Table I, page 4, delete Input offset voltage / current temp sensitivity $\Delta V_{IO} / \Delta T$ and $\Delta I_{IO} / \Delta T$. Page 5, Guarantee transit response overshoot $TR_{(OS)}$.	84-12-10	N. A. HAUCK
C	Make changes to table I, table II, figure 1, and paragraph 1.2.2. Change to military drawing format. Delete vendors CAGE 04713, 18324, 01295, and 07263.	88-12-19	M. A. FRYE
D	Make correction to the Open loop voltage gain test units column as specified under Table I. - ro	04-06-10	R. MONNIN
E	Update boilerplate to current MIL-PRF-38535 requirements. -rrp	12-02-06	C. SAFFLE
F	Update drawing to current MIL-PRF-38535 requirements. -rrp	17-04-10	C. SAFFLE

CURRENT CAGE CODE 67268
THE ORIGINAL FIRST SHEET OF THIS DRAWING HAS BEEN REPLACED.

REV																				
SHEET																				
REV																				
SHEET																				
REV STATUS				REV			F	F	F	F	F	F	F							
OF SHEETS				SHEET			1	2	3	4	5	6	7							

PMIC N/A

PREPARED BY
JOAN M. FISHER

CHECKED BY
WILLIAM E. SHOUP

APPROVED BY
NELSON. A. HAUCK

DRAWING APPROVAL DATE
78-07-05

REVISION LEVEL
F

STANDARD MICROCIRCUIT DRAWING

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

AMSC N/A

DLA LAND AND MARITIME
COLUMBUS, OHIO 43218-3990
http://www.landandmaritime.dla.mil

MICROCIRCUIT, LINEAR, GENERAL PURPOSE, OPERATIONAL AMPLIFIER, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	**14933**	**78007**

SHEET 1 OF 7

DSCC FORM 2233
APR 97

5962-E264-17

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.

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:

78007	01	C	A
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	709	General purpose operational amplifier

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

Outline letter	Descriptive designator	Terminals	Package style
C	GDIP1-T14 or CDIP2-T14	14	Dual-in-line
G	MACY1-X8	8	Can
H	GDFP1-F10 or CDFP2-F10	10	Flat pack
P	GDIP1-T8 or CDIP2-T8	8	Dual-in-line

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

1.3 Absolute maximum ratings.

Supply voltage (V_{CC})	±18 V dc
Input voltage (V_{IN})	±10 V dc
Differential input voltage	±5 V dc
Maximum power dissipation (P_D)	300 mW
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature (T_J)	+150°C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	±9 V dc to ±15 V dc
Ambient operating temperature range (T_A)	-55°C to +125°C

1.5 Power and thermal characteristics.

Package	Case outline	Maximum allowable power dissipation	Maximum θ_{JC}	Maximum θ_{JA}
Dual in line	C, P	400 mW at T_A = +125°C	35°C/W	120°C/W
8-lead can	G	330 mW at T_A = +125°C	40°C/W	150°C/W
10 lead FP	H	330 mW at T_A = +125°C	60°C/W	150°C/W

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 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://quicksearch.dla.mil/ or 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 outline(s). The case outline(s) shall be in accordance with 1.2.2 herein.

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

3.3 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. 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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ $V_{CC} = \pm 15$ V, $V_{CM} = 0$, $R_S = 10$ kΩ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Input offset voltage	V_{IO}	$V_{CC} = \pm 15$ V, $R_S = 0$ Ω and	1	01		5.0	mV
		$V_{CC} = \pm 9$ V, $R_S = 10$ kΩ	2,3			6.0	
Input offset current	I_{IO}	$V_{CC} = \pm 9$ V and $V_{CC} = \pm 15$ V	1,2	01	-200	200	nA
			3		-500	500	
Input bias current	$\pm I_{IB}$	$V_{CC} = \pm 9$ V and $V_{CC} = \pm 15$ V	1,2	01		0.5	µA
			3			1.5	
Power supply rejection ration	±PSRR	± 9 V $\le V_{CC} \le \pm 15$ V	1,2,3	01	-150	150	µV/V
Input voltage common mode rejection	CMR	$\pm V_{CC} = 15$ V, -8 V $\le V_{CM} \le 8$ V	1,2,3	01	70		dB
Supply current	I_{CC}	$V_{CC} = \pm 15$ V, $R_S = 0$ Ω	1	01		5.5	mA
			2			4.5	
			3			6.3	
Output voltage swing (maximum)	V_{OP}	$V_{CC} = \pm 15$ V, $R_L = 10$ kΩ, $R_S = 0$ Ω	4,5,6	01	±12		V
		$V_{CC} = \pm 15$ V, $R_L = 2$ kΩ, $R_S = 0$ Ω			±10		
Open loop voltage gain (single ended)	$A_{VS(\pm)}$	$V_{CC} = \pm 15$ V, $R_L \ge 2$ kΩ, $V_{OUT} = \pm 10$ V, $R_S = 0$ Ω	4,5,6	01	25	70	V/mV
Gain bandwidth	GBW	$V_{CC} = \pm 15$ V, $V_{IN} = 50$ mV, $R_L = 2$ kΩ, TMS = 20 kHz, $T_A = +25°C$	4	01	250		kHz

Device type	01			
Case outlines	C	G	H	P
Terminal number	Terminal number			
1	NC	INPUT FREQ COMP B	NC	INPUT FREQ COMP B
2	NC	INV INPUT	INPUT FREQ COMP B	INV INPUT
3	INPUT FREQ COMP B	NON-INV INPUT	INV INPUT	NON-INV INPUT
4	INV INPUT	V_{CC-}	NON-INV INPUT	V_{CC-}
5	NON-INV INPUT	OUTPUT FREQ COMP	V_{CC-}	OUTPUT FREQ COMP
6	V_{CC-}	OUTPUT	OUTPUT FREQ COMP	OUTPUT
7	NC	V_{CC+}	OUTPUT	V_{CC+}
8	NC	INPUT FREQ COMP A	V_{CC+}	INPUT FREQ COMP A
9	OUTPUT FREQ COMP	---	INPUT FREQ COMP A	---
10	OUTPUT	---	NC	---
11	V_{CC+}	---	---	---
12	INPUT FREQ COMP A	---	---	---
13	NC	---	---	---
14	NC	---	---	---

NC = No connection

FIGURE 1. Terminal connections.

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 DLA Land and Maritime -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 DLA Land and Maritime -VA shall be required for any change that affects this drawing.

3.9 Verification and review. DLA Land and Maritime, DLA Land and Maritime'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. VERIFICATION

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, 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 method 1015 of MIL-STD-883.

(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, 8, 9, 10, and 11 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. 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 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.

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)	1
Final electrical test parameters (method 5004)	1*, 2, 3, 4
Group A test requirements (method 5005)	1, 2, 3, 4, 5, 6
Groups C and D end-point electrical parameters (method 5005)	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 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 DLA Land and Maritime when a system application requires configuration control and the applicable SMD to that system. DLA Land and Maritime 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 DLA Land and Maritime-VA, telephone (614) 692-8108.

6.5 Comments. Comments on this drawing should be directed to DLA Land and Maritime-VA, Columbus, Ohio 43218-3990, or telephone (614) 692-0540.

6.6 Approved sources of supply. 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 DLA Land and Maritime-VA.

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 17-04-10

Approved sources of supply for SMD 78007 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 DLA Land and Maritime-VA. This information bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535. DLA Land and Maritime maintains an online database of all current sources of supply at https://landandmaritimeapps.dla.mil/programs/smcr/.

Standard microcircuit drawing PIN 1/	Vendor CAGE number	Vendor similar PIN 2/
7800701CA	3V146	LM7709AJ/883
	3/	LM709J/883B
7800701GA	3V146	LM7709AH/883
	3/	LM709H/883B
7800701HA	3V146	LM7709AW/883
	3/	μA709FM
	3/	MC1709F
	3/	SNCμA709FA
7800701PA	3V146	LM7709AJ8/883
	3/	LM709N/883B

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/ Not available from an approved source of supply.

Vendor CAGE number	Vendor name and address
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.