

**REVISIONS**

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Updated drawing to reflect MIL-H-38534 processing. Editorial changes throughout.	91-12-10	Alan Barone
B	Correct paragraphs 1.3 and 4.3.1.b. Correct table II. Update drawing boilerplate.	02-02-13	Raymond Monnin
C	Update drawing. -gz	07-01-09	Joseph Rodenbeck
D	Updated drawing to the latest MIL-PRF-38534 requirements. -sld	14-08-12	Charles F. Saffle

THE ORIGINAL FIRST SHEET OF THIS DRAWING HAS BEEN REPLACED.

**CURRENT CAGE CODE 67268**

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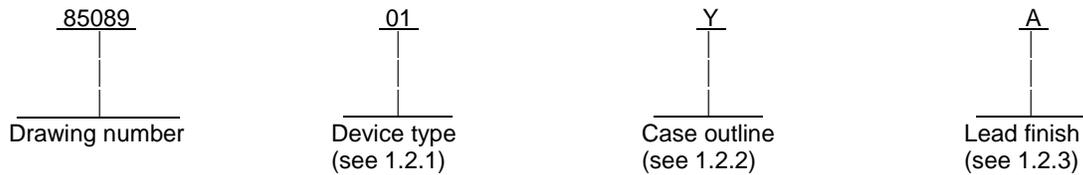
REV STATUS OF SHEETS	REV	D	D	D	D	D	D	D	D	D	D	D				
	SHEET	1	2	3	4	5	6	7	8	9	10					

PMIC N/A	PREPARED BY Donald R. Osborne	<p align="center"><b>DLA LAND AND MARITIME</b>  <b>COLUMBUS, OHIO 43218-3990</b>  <a href="http://www.landandmaritime.dla.mil/">http://www.landandmaritime.dla.mil/</a></p>													
<p align="center"><b>STANDARD MICROCIRCUIT DRAWING</b></p> <p align="center">THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE</p> <p align="center">AMSC N/A</p>	CHECKED BY Dan DiCenzo														
	APPROVED BY Nelson A. Hauck	<p align="center">MICROCIRCUIT, HYBRID, LINEAR,                  WIDE BAND POWER OPERATIONAL                  AMPLIFIER, THICK FILM</p>													
	DRAWING APPROVAL DATE 85-10-21														
	REVISION LEVEL D		<table border="1"> <tr> <td>SIZE A</td> <td>CAGE CODE 14933</td> <td align="center"><b>85089</b></td> </tr> </table>	SIZE A	CAGE CODE 14933	<b>85089</b>									
SIZE A	CAGE CODE 14933	<b>85089</b>													
		SHEET	1 OF 10												

1. SCOPE

1.1 Scope. This drawing documents one product assurance class, class H (high reliability) and a choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN).

1.2 PIN. The PIN shall be as shown in the following example:



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

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	LH0101A, FLH0101AK	Power operational amplifier
02	LH0101, FLH01010K	Power operational amplifier

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

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
Y	See figure 1	8	Metal base flange mount (TO-3)

1.2.3 Lead finish. The lead finish shall be as specified in MIL-PRF-38534.

1.3 Absolute maximum ratings.

Supply voltage ( $\pm V_S$ ) .....	±22 V dc
Input voltage range .....	±20 V dc but $\leq \pm V_S$
Power dissipation ( $P_D$ ) <u>1/</u> .....	5 W
Power dissipation ( $P_D$ ) <u>2/</u> .....	62 W
Differential input voltage .....	±40 V dc but $\leq \pm V_S$
Peak output current (50 ms pulse) .....	5 A
Output short circuit duration <u>3/</u> .....	Continuous
Storage temperature range .....	-65°C to +150°C
Lead temperature (soldering, 10 seconds) .....	+300°C
Thermal resistance:	
Junction-to-case ( $\theta_{JC}$ ) .....	2°C/W
Junction-to-ambient ( $\theta_{JA}$ ) .....	25°C/W
Junction temperature ( $T_J$ ) .....	+150°C

1.4 Recommended operating conditions.

Ambient operating temperature range ( $T_A$ ) .....	-55°C to +125°C
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1/  $T_A = +25^\circ\text{C}$ . Derate linearly at 25°C/W to zero at 150°C.

2/  $T_C = +25^\circ\text{C}$ . Derate linearly at 2°C/W to zero at 150°C.

3/  $T_A = +25^\circ\text{C}$ ,  $R_{SC} = 0.35\Omega$ . Rating applies as long as package power dissipation is not exceeded.

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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-38534 - Hybrid Microcircuits, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard Microcircuits.  
MIL-STD-1835 - Interface Standard for 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 performance requirements for device class H shall be in accordance with MIL-PRF-38534. Compliance with MIL-PRF-38534 may include the performance of all tests herein or as designated in the device manufacturer's Quality Management (QM) plan or as designated for applicable device class. The manufacturer may eliminate, modify or optimize the tests and inspections herein, however the performance requirements as defined in MIL-PRF-38534 shall be met for the applicable device class. In addition, the modification in the QM plan shall not affect the form, fit, or function of the device for the applicable device class.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38534 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

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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 specified 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 defined in table I.

3.5 Marking of device(s). Marking of device(s) shall be in accordance with MIL-PRF-38534. The device shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's vendor similar PIN may also be marked.

3.6 Data. In addition to the general performance requirements of MIL-PRF-38534, the manufacturer of the device described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, for each device type listed herein. Also, the data should include a summary of all parameters manually tested, and for those which, if any, are guaranteed. This data shall be maintained under document revision level control by the manufacturer and be made available to the preparing activity (DLA Land and Maritime -VA) upon request.

3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to supply to this drawing. The certificate of compliance (original copy) submitted to DLA Land and Maritime -VA shall affirm that the manufacturer's product meets the performance requirements of MIL-PRF-38534 and herein.

3.8 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38534 shall be provided with each lot of microcircuits delivered to this drawing.

#### 4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38534 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.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38534. 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 either DLA Land and Maritime -VA or the acquiring activity upon request. Also, 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)  $T_A$  as specified in accordance with table I of method 1015 of MIL-STD-883.
- 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.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ -55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Input offset voltage	V <sub>IO</sub>		1	01		3	mV
				02		10	
			2,3	01		7	
				02		15	
Input bias current	I <sub>IB</sub>		1	01		300	pA
				02		1000	
			2,3	01		300	nA
				02		1000	
Input offset current	I <sub>IO</sub>		1	01		75	pA
				02		250	
			2,3	01		75	nA
				02		250	
Large signal voltage gain	A <sub>VOL</sub>	V <sub>O</sub> = ±10 V, R <sub>L</sub> = 10Ω, T <sub>A</sub> = +25°C	1	All	50		V/mV
Output voltage swing	V <sub>O</sub>	R <sub>SC</sub> = 0Ω, A <sub>V</sub> = 1, R <sub>L</sub> = 100Ω, T <sub>A</sub> = +25°C	1	All	±11.7		V
		R <sub>SC</sub> = 0Ω, A <sub>V</sub> = 1, R <sub>L</sub> = 10Ω, T <sub>A</sub> = +25°C	1	All	±11		
Common mode rejection ratio	CMRR	V <sub>IN</sub> = ±10 V, T <sub>A</sub> = +25°C	1	All	85		dB

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions <sup>1/</sup> -55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Power supply rejection ratio	PSRR	±5 V ≤ ±V <sub>S</sub> ≤ ±15 V, T <sub>A</sub> = +25°C	1	All	85		dB
		+5 V ≤ +V <sub>S</sub> ≤ +15 V, -V <sub>S</sub> = -15 V, T <sub>A</sub> = +25°C	1	All	80		
		-5 V ≤ -V <sub>S</sub> ≤ -15 V, +V <sub>S</sub> = +15 V, T <sub>A</sub> = +25°C	1	All	80		
Supply current	I <sub>S</sub>	T <sub>A</sub> = +25°C	1	All		35	mA
Slew rate	SR	R <sub>L</sub> = 10Ω, A <sub>V</sub> = 1, T <sub>A</sub> = +25°C	1	All	7.5		V/μs
Gain-bandwidth product	SR	R <sub>L</sub> = ∞, A <sub>V</sub> = 1, T <sub>A</sub> = +25°C	1	All	4		MHz

<sup>1/</sup> Unless otherwise specified, ±V<sub>S</sub> = ±15 V and V<sub>CM</sub> = 0 V.

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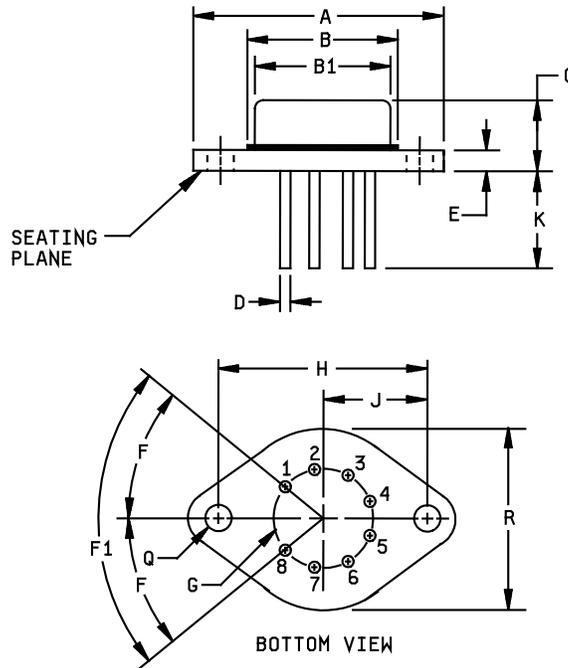
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Case outline X.



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	38.33	39.35	1.509	1.549
B	22.35	23.50	.880	.925
B1	19.30	19.69	.760	.775
C	8.76	10.03	.345	.395
D	0.92	1.12	.036	.044
E	2.16	2.66	.085	.105
F	40° BSC		40° BSC	
F1	80° BSC		80° BSC	
G	12.57	12.83	.495	.505
H	29.90	30.40	1.177	1.197
J	14.96	15.22	.589	.599
K	5.59	7.11	.220	.280
Q	3.89	4.04	.153	.159
R	24.89	25.91	.980	1.020

NOTES:

1. Leads in true position within 0.010 inch (0.25 mm) R at MMC at seating plane.
2. The U. S. preferred system of measurement is the metric SI. This case outline was originally designed using inch-pound units of measurement, in the event of conflict between the metric and inch-pound units, the inch-pound shall take precedence.
3. Pin numbers are for reference and may not be marked on package.

FIGURE 1. Case outline(s).

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Device type	01
Case outline	X
Terminal number	Terminal symbol
1	+Current limit ( $I_{SC+}$ )
2	+ $V_S$
3	Feedback
4	(See note)
5	- $V_{IN}$
6	+ $V_{IN}$
7	- $V_S$
8	-Current limit ( $I_{SC-}$ )
Case	Output

NOTE:

1. Pin 4 is electrically connected internally. No connection should be made to pin.

FIGURE 2. Terminal connections.

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TABLE II. Electrical test requirements.

MIL-PRF-38534 test requirements	Subgroups (in accordance with MIL-PRF-38534, group A test table)
Interim electrical parameters	---
Final electrical parameters	1*, 2, 3
Group A test requirements	1, 2, 3
Group C end-point electrical parameters	1, 2, 3

\* PDA applies to subgroup 1.

4.3 Conformance and periodic inspections. Conformance inspection (CI) and periodic inspection (PI) shall be in accordance with MIL-PRF-38534 and as specified herein.

4.3.1 Group A inspection (CI). Group A inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. Tests shall be as specified in table II herein.
- b. Subgroups 4, 5, 6, 7, 8, 9, 10, and 11 shall be omitted.

4.3.2 Group B inspection (PI). Group B inspection shall be in accordance with MIL-PRF-38534.

4.3.3 Group C inspection (PI). Group C inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test, 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 either DLA Land and Maritime -VA or the acquiring activity upon request. Also, 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)  $T_A$  as specified in accordance with table I of method 1005 of MIL-STD-883.
  - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

4.3.4 Group D inspection (PI). Group D inspection shall be in accordance with MIL-PRF-38534.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38534.

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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 as specified in MIL-PRF-38534.

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 microelectronic 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) 692-1081.

6.6 Sources of supply. Sources of supply are listed in MIL-HDBK-103 and QML-38534. The vendors, listed in MIL-HDBK-103 and QML-38534, have submitted a certificate of compliance (see 3.7 herein) to DLA Land and Maritime-VA and have agreed to this drawing.

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STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 14-08-12

Approved sources of supply for SMD 85089 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38534 during the next revisions. MIL-HDBK-103 and QML-38534 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 revisions of MIL-HDBK-103 and QML-38534. DLA Land and Maritime maintains an online database of all current sources of supply at <http://www.landandmaritime.dla.mil/Programs/Smcr/>.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
8508901YA	27851	FLH0101AK/883
8508902YA	27851	FLH0101K/883

- 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 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

27851

Vendor name  
and address

Spectrum Microwave Incorporated  
400 Nickerson Road  
Marlborough, MA 01752

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