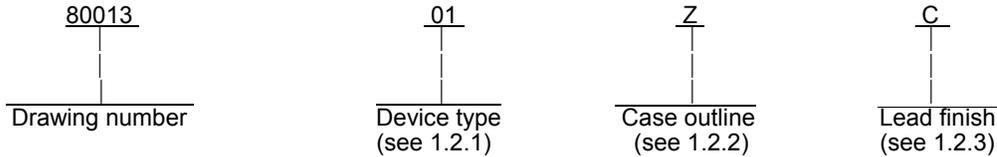


1. SCOPE

1.1 Scope. This drawing describes device requirements for class H hybrid microcircuits to processed in accordance with MIL-PRF-38534.

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



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

Device type	Generic number	Circuit function
01	FLH0032G, MSK 0032B	Operational amplifier
02	MSK 0032B	Operational amplifier

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

Outline letter	Descriptive designator	Terminals	Package style
Z	See figure 1	12	Can

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

1.3 Absolute maximum ratings. 1/

Supply voltage range	±18 V dc maximum
Input voltage range	±18 V dc
Maximum power dissipation (P _D) T _A = +25°C	1.5 W 2/ 3/
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 (V _S).....	±15 V dc
Ambient operating temperature range (T _A).....	-55°C to +125°C

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 SPECIFICATIONS

MIL-PRF-38534 - Hybrid Microcircuits, General Specification for.

1/ Stresses above the absolute maximum ratings may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

2/ No heat sink.

3/ Derate at 10 mW per °C.

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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 <https://assist.daps.dla.mil/quicksearch/> 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. The case outline 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.

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 devices. Marking of devices 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.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions <u>1/</u> -55°C ≤ T _A ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Input offset voltage	V _{IO}	R _L = 100 kΩ, V _{IN} = 0 V	1	01		5.0	mV
			2,3			10.0	
		R _L = 100 kΩ, V _{IN} = 0 V, -40°C ≤ T _C ≤ +71°C	1	02		2.0	mV
			2,3			10.0	
Input voltage range <u>2/</u>	V _{CM}		1,2,3	01,02	±10		V
Input offset current	I _{IO}	V _{IN} = 0 V	1	01,02		0.025	nA
			2,3			25	
Input bias current	I _{IB}	V _{IN} = 0 V	1	01,02		0.1	nA
			2,3			50	
Supply current	I _{CC}	I _O = 0 mA, T _A = +25°C	1	01,02		20	mA
Supply voltage rejection <u>3/</u> ratios	SVRR(±)	±5 V ≤ V _S ≤ ±20 V	1,2,3 or 4,5,6	01,02	50		dB
Large signal voltage <u>2/</u> gain	A _{VS} (±)	R _L = 1 kΩ, V _{OUT} = ±10 V	4	01,02	48		dB
			5,6		45		
Input voltage common- mode rejection ratio <u>3/</u>	CMRR	ΔV _{IN} = ±10 V	4,5,6	01,02	50		dB
Input offset voltage temperature coefficient	ΔV/ΔT		1,2,3	01,02		50	μV/°C
Output voltage swing <u>3/</u>	V _{OP}	R _L = 1 kΩ	1,2,3 or 4,5,6	01,02	±10		V
Voltage gain <u>3/</u>	A _V	R _L = 1 kΩ, V _{OUT} = ±10 V, f = 1 kHz	4,5,6	01,02	57		dB
Slew rate	SR	R _L = 1 kΩ, A _V = +1, ΔV _{IN} = 20 V, T _A = +25°C	4	01,02	350		V/μs

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions ^{1/} -55°C ≤ T _A ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Small signal rise time	t _r	A _V = +1, R _L = 1 kΩ, T _A = +25°C	9	01,02		20	ns
Small signal delay time	t _d	A _V = +1, R _L = 1 kΩ, ΔV _{IN} = 1 V, T _A = +25°C	9	01,02		25	ns
Settling time to 1 percent of final value ^{2/}	t _{SET}	A _V = -1, R _L = 1 kΩ, ΔV _{IN} = 20 V, T _A = +25°C	9	01,02		0.5	μs

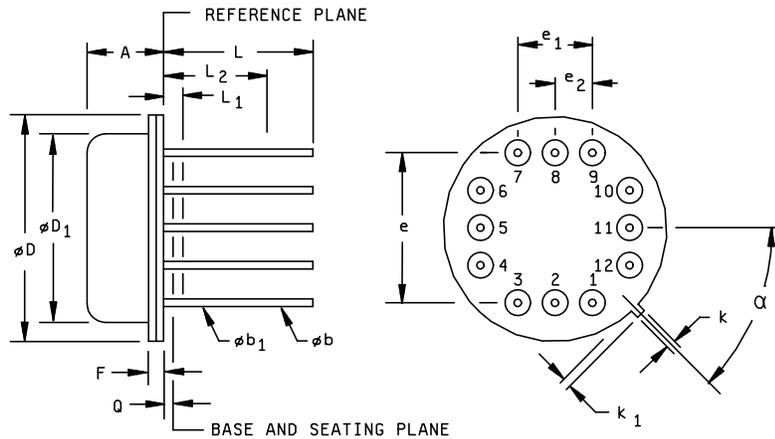
^{1/} V_S = ±15.0 V dc.

^{2/} Parameter shall be guaranteed to the limits specified in table I for all lots not specifically tested.

^{3/} Subgroups 5 and 6 shall be tested as part of device initial characterization and after design and process changes.
Parameter shall be guaranteed to the limits specified for subgroups 5 and 6 for all lots not specifically tested.

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Case outline Z.



Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
A	.130	.181	3.30	4.60	
øb	.016	.019	0.41	0.48	2, 6
øb ₁	.016	.021	0.41	0.53	2, 6
øD	.595	.610	15.11	15.49	
øD ₁	.545	.555	13.84	15.37	
e	.400 BSC		10.16 BSC		4
e ₁	.200 BSC		5.08 BSC		4
e ₂	.100 BSC		2.54 BSC		4

Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
F	.022	.030	0.56	0.76	
k	.026	.036	0.66	0.91	
k ₁	.026	.036	0.66	0.91	3
L	.500	.560	12.70	14.22	2
L ₁	----	.050	----	1.27	2
L ₂	.250	----	6.35	----	2
Q	----	.045		1.14	
α	45° BSC		45° BSC		

NOTES:

1. The U.S. government preferred system of measurement is the metric SI system. However, this item was originally designed using inch-pound units of measurement. In the event of conflict between the metric and inch-pound units, the inch-pound units shall take precedence.
2. All leads øb applies between L₁ and L₂. øb₁ applies between L₂ and .500 (12.70 mm) from the reference plane. Diameter is uncontrolled in L₁ and beyond .500 (12.70 mm) from the reference plane.
3. Measured from the maximum diameter of the product.
4. Leads having a maximum diameter .019 (0.48 mm) measured in gauging plane .054 (1.37 mm) +.001 (0.03 mm) -.000 (0.00 mm) below the base plane of the product shall be within .007 (0.18 mm) of their true position relative to a maximum tab width.
5. The product may be measured by direct methods or by gauge.
6. All leads: Increase maximum limit by .003 (0.08 mm) when lead finish A is applied.

FIGURE 1. Case outline.

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Device types	01, 02
Case outline	Z
Terminal number	Terminal symbol
1	No connection
2	Output compensation
3	Balance/compensation
4	Balance/compensation
5	Inverting input
6	Noninverting input
7	No connection
8	No connection
9	No connection
10	-V _S
11	Output
12	+V _S

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, 4, 9
Group A test requirements <u>1/</u>	1, 2, 3, 4, 5, 6, 9
Group C end-point electrical parameters	1, 2, 3
End-point electrical parameters for Radiation Hardness Assurance (RHA) devices	Not applicable

* PDA applies to subgroup 1.

1/ See table I note 3.

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.

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 7, 8, 10, and 11 shall be omitted.

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

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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.

4.3.5 Radiation Hardness Assurance (RHA) inspection. RHA inspection is not currently applicable to this drawing.

5. PACKAGING

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

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. 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) 692-0547.

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: 11-02-10

Approved sources of supply for SMD 80013 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.dscc.dla.mil/Programs/Smcr/>.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
8001301ZA	27851	FLH0032G/883
8001301ZA 8001301ZC	51651 51651	MSK 0032B MSK 0032B
8001302ZA 8001302ZC	51651 51651	MSK 0032B MSK 0032B

- 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.

Vendor CAGE number

Vendor name and address

27851

Spectrum Microwave, Incorporated
165 Cedar Hill Street
Marlborough, MA 01752

51651

M.S. Kennedy Corporation
4707 Dey Road
Liverpool, NY 13088

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