

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Change table I parameters V_{OO} , $\Delta V_{OO}/\Delta T$, format change.	83-01-10	N. A. Hauck
B	Add 2nd vendor.	83-06-23	N. A. Hauck
C	Add vendors, FSCM 63071 and 64762. Remove vendor FSCM 27014. Page 5, figure 1, change terminal connection 9. Editorial changes throughout.	84-12-14	N. A. Hauck
D	Add vendor FSCM 27014. Page 4, table I, correct test condition for $V_{OUT(2)}$.	85-12-05	N. A. Hauck
E	Convert to military drawing format. Add vendor CAGE 23223. Page 6, Table I, delete I_{CC} minimum limit.	87-11-23	R. P. Evans
F	Add vendor CAGE 34031. Table I, change test condition R_L and I_{OUT} for R_{OUT} test. Editorial changes throughout. Change drawing CAGE to 67268.	89-01-11	M. A. Frye
G	Changed to reflect MIL-H-38534 processing. Remove vendor CAGE 63071. Editorial changes throughout.	90-01-05	W. Heckman
H	Table I, changed SR test to +SR and -SR tests. Editorial changes throughout. Remove CAGE numbers 29832 and 34031.	92-03-16	Alan Barone
J	Changes in accordance with NOR 5962-R196-93.	93-06-25	K. A. Cottongim
K	Add vendor CAGE 51651 and method 1030 to paragraph 4.2. Change figure 1, dimension A minimum. Rewrite entire document.	95-09-29	K. A. Cottongim
L	Remove CAGE codes 23223 and 64762. Change to table I.	98-07-01	K. A. Cottongim
M	Corrections to sheet 1. Update drawing boilerplate.	04-02-23	Raymond Monnin

THE ORIGINAL FIRST SHEET OF THIS DRAWING HAS BEEN REPLACED.

CURRENT CAGE CODE 67268

REV																				
SHEET																				
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REV STATUS OF SHEETS	REV	M	M	M	M	M	M	M	M	M										
	SHEET	1	2	3	4	5	6	7	8											
PMIC N/A	PREPARED BY C. R. Jackson	<p align="center">DEFENSE SUPPLY CENTER COLUMBUS POST OFFICE BOX 3990 COLUMBUS, OHIO 43216-5000 http://www.dscc.dla.mil</p> <p align="center">MICROCIRCUIT, HYBRID, LINEAR, BUFFER AMPLIFIER, THICK FILM</p>																		
STANDARD MICROCIRCUIT DRAWING	CHECKED BY William E. Shoup																			
THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE	APPROVED BY N. A. Hauck																			
AMSC N/A	DRAWING APPROVAL DATE 80-12-22																			
	REVISION LEVEL M	SIZE A	CAGE CODE 14933	80014																
		SHEET 1 OF 8																		

1. SCOPE

1.1 Scope. This drawing describes device requirements for class H hybrid microcircuits to be processed in accordance with MIL-PRF-38534 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	0033, MSK 0033H	Voltage follower/buffer amplifier with FET input

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>
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.

Supply voltage range.....	±40 V dc maximum
Input voltage range.....	±40 V dc
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P _D).....	1.5 W <u>1/</u> <u>2/</u>
Lead temperature (soldering, 10 seconds).....	+300°C
Junction temperature (T _J).....	+175°C

1.4 Recommended operating conditions.

Ambient operating temperature range (T _A).....	-55°C to +125°C
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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 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-38534 - Hybrid Microcircuits, General Specification for.

1/ No heat sink.
2/ Derate 10 mW/°C above +25°C ambient.

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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 (SMD's).
- 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 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 the applicable device class. Therefore, the tests and inspections herein may not be performed for the applicable device class (see MIL-PRF-38534). Furthermore, the manufacturers may take exceptions or use alternate methods to the tests and inspections herein and not perform them. However, the performance requirements as defined in MIL-PRF-38534 shall be met for the applicable device class. The modification in the QM plan shall not affect the form, fit, or function as described herein.

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 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 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 (DSCC-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 DSCC-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 1/ -55°C ≤ T _A ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Output offset voltage	V _{OO}	R _S = 100 kΩ	1	01		±10	mV
			2,3			±20	
Temperature coefficient of V _{OO}	%V _{OO} /ΔT	2/	1,2,3	01		250	μV/°C
Voltage gain	A _V	V _{IN} = V _{RMS} , R _L = 1 kΩ, R _L = 100 kΩ	1,2,3	01	0.97	1	V/V
Output voltage swing	V _{OUT(1)}	R _L = 1 kΩ	1,2,3	01	±12		V
Output voltage swing	V _{OUT(2)}	R _L = 100Ω	1,2,3	01	±9		V
Supply current	I _{CC}	T _A = +25°C	1	01		22	mA
Input bias current	I _{IB}		1	01		3/	nA
			2,3			10	
Output impedance	R _{OUT}	V _{IN} = 1 V _{RMS} , 2/ 100Ω ≤ R _L ≤ 1 kΩ, ±1 mA ≤ I _{OUT} ≤ ±10 mA, T _A = +25°C	4	01		10	Ω
Input impedance	R _{IN}	T _A = +25°C 2/ 4/	4	01	10 ¹⁰		Ω
Positive slew rate	+SR	V _{IN} = ±10 V, R _S = 50Ω, R _L = 1 kΩ 5/	4	01	1000		V/μs
			5,6		500		
Negative slew rate	-SR	V _{IN} = ±10 V, R _S = 50Ω, R _L = 1 kΩ 5/	4,5,6	01	500		V/μs
Power consumption		V _{IN} = 0, T _A = +25°C 4/	1	01		660	mW

1/ V_{C+} = V₊ = +15 V, V_{C-} = V₋ = -15 V, unless otherwise specified.

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

3/ Normal limit is 2.5 nA. However, under pulse test conditions, limit is 0.25 nA.

4/ Tested go/no-go only.

5/ Subgroups 5 and 6 for (+SR) and subgroups 4, 5, and 6 for (-SR) shall be tested for initial device characterization and after design or process changes that affect these parameters, therefore shall be guaranteed to the limits specified in table I.

**STANDARD
MICROCIRCUIT DRAWING**
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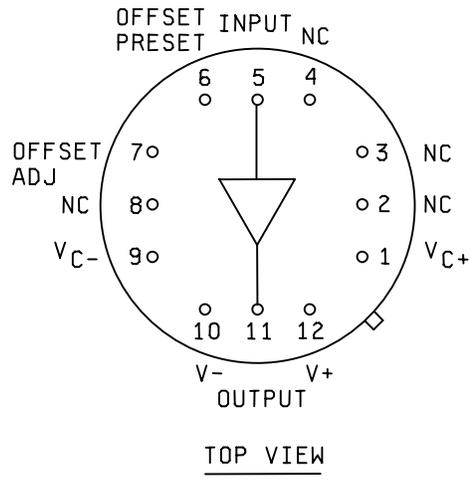
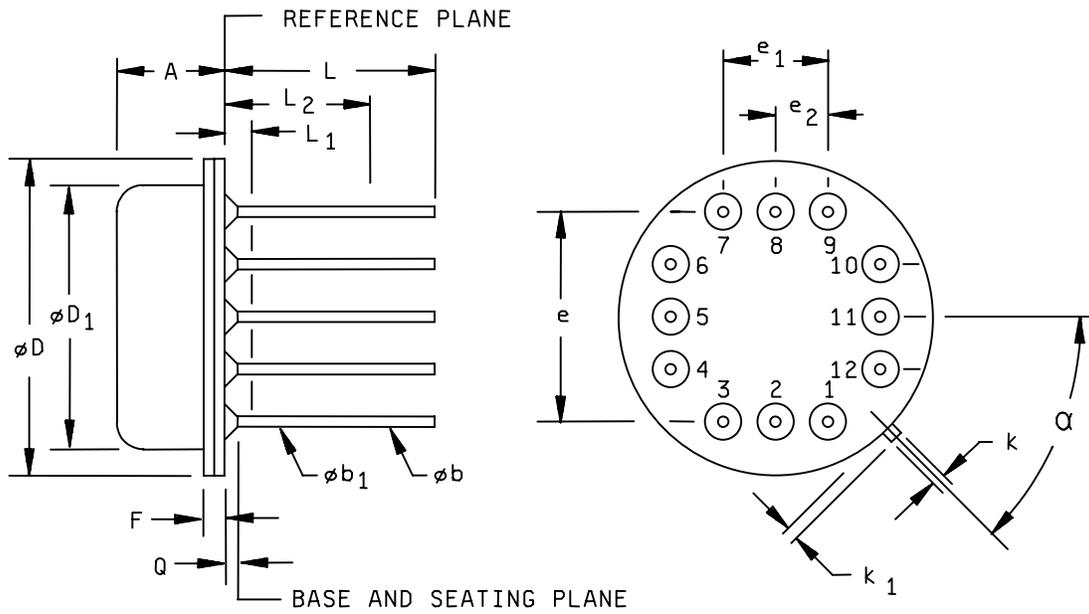


FIGURE 1. Case outline Z (12-lead can) and terminal connections.

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Dimensions					
Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
A	0.130	0.181	3.30	4.60	
∅b	0.016	0.019	0.41	0.48	3, 7
∅b ₁	0.016	0.021	0.41	0.53	3, 7
∅D	0.595	0.610	15.11	15.49	
∅D ₁	0.545	0.555	13.84	14.10	
e	0.400 BSC		10.16 BSC		5
e ₁	0.200 BSC		5.08 BSC		5
e ₂	0.100 BSC		2.54 BSC		5

Dimensions					
Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
F	0.022	0.030	0.56	0.76	
k	0.026	0.036	0.66	0.91	
k ₁	0.026	0.036	0.66	0.91	4
L	0.500	0.560	12.70	14.22	3
L ₁	---	0.050	---	1.27	3
L ₂	0.250	---	6.35	---	3
Q	---	0.045	---	1.14	
α	45° BSC		45° BSC		5

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. All leads: ∅b applies between L₁ and L₂. ∅b₁ applies between L₂ and 0.500 (12.70 mm) from the reference plane. Diameter is uncontrolled in L₁ and beyond 0.500 (12.70 mm) from the reference plane.
4. Measured from the maximum diameter of the product.
5. Leads having a maximum diameter of 0.019 (0.48 mm) measured in gauging plane 0.054 (1.37 mm) +0.001 (0.03 mm), -0.000 (0.00 mm) below the base plane of the product shall be within 0.007 (0.18 mm) of their true position relative to a maximum width tab.
6. The product may be measured by direct methods or by gauge.
7. All leads: Increase maximum limit by 0.003 (0.08 mm) when lead finish A is applied.

FIGURE 1. Case outline Z (12-lead can) and terminal connections -Continued.

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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, 5, 6
Group A test requirements	1, 2, 3, 4
Group C end-point electrical parameters	1, 2, 3, 4

* PDA applies to subgroup 1.

4. QUALITY ASSURANCE PROVISIONS

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. Pre-seal burn-in test, method 1030 of MIL-STD-883. (optional for class H)
 - (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 DSCC-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 test method 1030 of MIL-STD-883.
 - (2) T_A as specified in accordance with table I of method 1015 of MIL-STD-883.
- b. 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 DSCC-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 test method 1015 of MIL-STD-883.
 - (2) T_A as specified in accordance with table I of method 1015 of MIL-STD-883.
- c. 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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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, 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 DSCC-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 test 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.

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 in accordance with MIL-PRF-38534.

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 microelectronic devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Post Office Box 3990, Columbus, Ohio 43216-5000, 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 DSCC-VA and have agreed to this drawing.

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STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 04-02-23

Approved sources of supply for SMD 80014 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 DSCC-VA. This bulletin is superseded by the next dated revisions of MIL-HDBK-103 and QML-38534.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
8001401ZA	27851	FLH0033G/883
8001401ZA 8001401ZC	51651 51651	MSK 0033B MSK 0033B

- 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.

<u>Vendor CAGE number</u>	<u>Vendor name and address</u>
27851	Satcon Electronics 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.