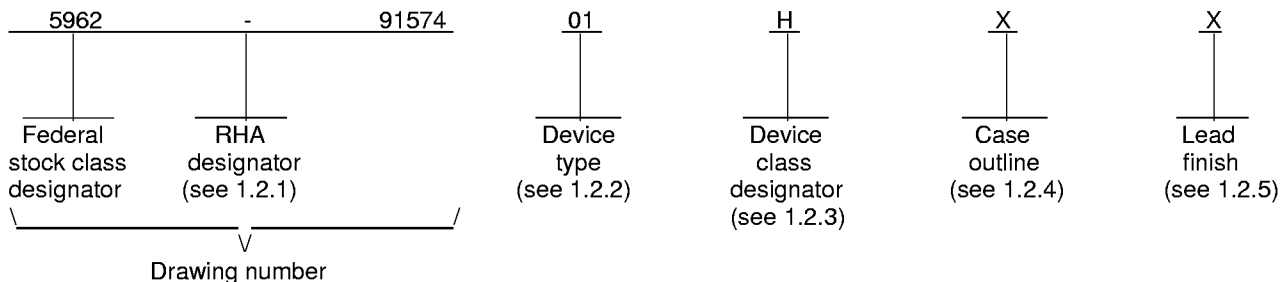


REVISIONS																				
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED																	
A	Table I, add new note 1 to table and settling time to 0.1% test.	99-11-29	Ray Monnin																	
REV																				
SHEET																				
REV																				
SHEET																				
REV STATUS OF SHEETS			REV	A	A	A	A	A	A	A	A	A	A	A	A					
			SHEET	1	2	3	4	5	6	7	8	9	10							
PMIC N/A			PREPARED BY Steve Duncan						<b>DEFENSE SUPPLY CENTER COLUMBUS POST OFFICE BOX 3990 COLUMBUS, OHIO 43216-5000</b>											
<b>STANDARD MICROCIRCUIT DRAWING</b>  THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE  AMSC N/A			CHECKED BY Michael Jones																	
			APPROVED BY Kendall A. Cottongim						<b>MICROCIRCUIT, HYBRID, LINEAR, DIFFERENTIAL OPERATIONAL AMPLIFIER, FET INPUT</b>											
			DRAWING APPROVAL DATE 93-07-09																	
			REVISION LEVEL A																	SIZE A
						SHEET 1 OF 10														

1. SCOPE

1.1 Scope. This drawing documents five product assurance classes, class D (lowest reliability), class E, (exceptions), class G (lowered high reliability), class H (high reliability), and class K, (highest reliability) and a choice of case outlines and lead finishes which are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of radiation hardness assurance levels are reflected in the PIN.

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



1.2.1 Radiation hardness assurance (RHA) designator. RHA marked devices shall meet the MIL-PRF-38534 specified RHA levels and shall be marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device. See 4.3.5.

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

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	MSK 801B	FET input, differential operational amplifier

1.2.3 Device class designator. This device class designator shall be a single letter identifying the product assurance level as follows:

<u>Device class</u>	<u>Device performance documentation</u>
D, E, G, H, or K	Certification and qualification to MIL-PRF-38534

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

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
X	See figure 1	12	TO-8 can

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

1.3 Absolute maximum ratings. 1/

Supply voltage ( $\pm V_{CC}$ ) .....	$\pm 18$ V dc
Supply voltage ( $\pm V_{SC}$ ) .....	$\pm 18$ V dc
Input voltage ( $V_{IN}$ ) .....	$\pm V_{CC}$
Peak output current ( $I_{OUT}$ ) .....	$\pm 120$ mA
Total hybrid power dissipation ( $P_D$ ) .....	1.0 W
Thermal resistance, junction-to-case ( $\theta_{JC}$ ) .....	55°C/W (Output Q's)
Storage temperature .....	-65°C to +150°C
Junction temperature .....	+175°C

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.

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1.4 Recommended operating conditions.

Supply voltage ( $\pm V_{CC}$ ) .....	$\pm 15$ V dc
Supply voltage ( $\pm V_{SC}$ ) .....	$\pm 15$ V dc
Case operating temperature range ( $T_C$ ).....	-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 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.

STANDARDS

DEPARTMENT OF DEFENSE

- MIL-STD-883 - Test Method Standard Microcircuits.
- MIL-STD-973 - Configuration Management.
- MIL-STD-1835 - Interface Standard For Microcircuit 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 classes D, E, G, H, and K 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 manufacturer 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.

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 1.2.4 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 as listed in MIL-HDBK-103 and QML-38534.

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.

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. 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.
- 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 -55°C ≤ T <sub>C</sub> ≤ +125°C ±V <sub>CC</sub> = ±15 V dc ±V <sub>SC</sub> = ±15 V dc unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Quiescent current	I <sub>Q</sub>	V <sub>IN</sub> = 0 V	1	01		±30	mA
			2, 3			±32	
Input offset voltage	V <sub>OS</sub>	V <sub>IN</sub> = 0 V, T <sub>C</sub> = +25°C	1	01		±2	mV
Input offset voltage temperature coefficient	$\frac{\Delta V_{OS}}{\Delta T}$	V <sub>IN</sub> = 0 V, T <sub>C</sub> = -55°C and +125°C	2, 3	01		±25	μV/°C
Input bias current	I <sub>IB</sub>	V <sub>CM</sub> = 0 V	1	01		±500	pA
			2, 3			±10	nA
Input offset current	I <sub>OS</sub>	V <sub>CM</sub> = 0 V	1	01		250	pA
			2, 3			5	nA
Output current	I <sub>OUT</sub>	R <sub>L</sub> = 100 Ω, V <sub>O</sub> = ±10 V	4, 5, 6	01	±100		mA
Output voltage swing	V <sub>O</sub>	R <sub>L</sub> = 100 Ω, f ≤ 10 MHz	4, 5, 6	01	±10		V
Full power bandwidth	FBW	R <sub>L</sub> = 100 Ω, V <sub>O</sub> = ±10 V	4	01	10		MHz
			5, 6		8		
Unity gain crossover	μEW	R <sub>L</sub> = 510 Ω, V <sub>IN</sub> = 0.1 V	4	01	100		MHz
			5, 6		80		
Slew rate limit	SLR	R <sub>L</sub> = 100 Ω, V <sub>O</sub> = ±10 V, f = 1 kHz	4	01	650		V/μs
			5, 6		450		
Large signal voltage gain	A <sub>VOL</sub>	R <sub>L</sub> = 1 kΩ, V <sub>O</sub> = ±10 V, f = 1 kHz	4	01	50		dB
			5, 6		40		

See footnotes at end of table.

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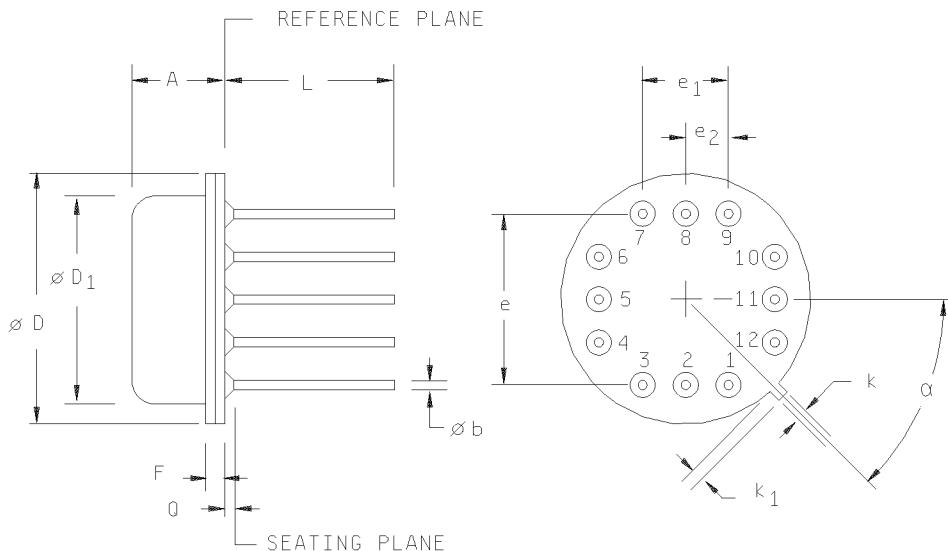
TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C ±V <sub>CC</sub> = ±15 V dc ±V <sub>SC</sub> = ±15 V dc unless otherwise specified	Group A Subgroups	Device type	Limits		Unit
					Min	Max	
Settling time to 0.1% <u>1/</u>	t <sub>s</sub>	R <sub>L</sub> = 100 Ω, V <sub>O</sub> = 10 V step	4	01		75	ns
			5, 6			100	
Settling time to 1.0%	t <sub>s1</sub>	R <sub>L</sub> = 100 Ω, V <sub>O</sub> = 10 V step	4	01		55	ns
			5, 6			75	
Power supply rejection ratio	PSRR	ΔV <sub>CC</sub> = ±5 V	1	01	60		dB
			2, 3 <u>2/</u>		40		
Common mode rejection ratio	CMRR	ΔV <sub>IN</sub> = ±10 V, f = 10 Hz	4, 5, 6 <u>3/</u>	01	70		dB

- 1/ Parameter is guaranteed to the limits specified in table I by design and is not tested.
- 2/ Subgroups 2 and 3 for power supply rejection ratio (PSRR) shall be tested as part of device initial characterization and after design and process changes. Subgroups 2 and 3 for the parameter (PSRR) 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. Subgroups 5 and 6 shall be guaranteed to the limits specified in table I for all lots not specifically tested.

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Case outline X.



Symbol	Millimeter		Inches	
	Min	Max	Min	Max
A	4.57	5.08	0.180	0.200
øb	0.41	0.51	0.016	0.020
øD	14.99	15.49	0.590	0.610
øD1	13.97 REF		0.550 REF	
e	10.16 REF		0.400 REF	
e1	5.08 REF		0.200 REF	
e2	2.54 REF		0.100 REF	
F	0.56	0.76	0.022	0.030
k	0.66	0.91	0.026	0.036
k1	0.66	0.91	0.026	0.036
L	6.10	-----	0.240	-----
Q	-----	1.14	-----	0.045
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. Pin numbers are for reference.

FIGURE 1. Case outline(s).

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Device type	01
Case outline	X
Terminal number	Terminal symbol
1	+VCC
2	Output compensation
3	Compensation balance
4	Compensation balance
5	-Input
6	+Input
7	No connection
8	Case ground
9	-VCC
10	-VSC
11	Output
12	+VSC

FIGURE 2. Terminal connections.

<b>STANDARD MICROCIRCUIT DRAWING</b>  DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE <b>A</b>		<b>5962-91574</b>
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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	1
Final electrical parameters	1*, 2, 3, 4, 5, 6
Group A test requirements	1, 2, 3, 4, 5, 6
Group C end-point electrical parameters	1, 4
End-point electrical parameters for radiation hardness assurance (RHA) devices	Not applicable

\* 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 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.

4.3.5 Radiation hardness assurance (RHA) inspection. RHA inspection is currently not applicable to this drawing.

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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-STD-973 using DD Form 1692, Engineering Change Proposal.

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, P. O. Box 3990, Columbus, Ohio 43216-5000, or telephone (614) 692-0512.

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: 99-11-29

Approved sources of supply for SMD 5962-91574 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38534 during the next revision. 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 revision of MIL-HDBK-103 and QML-38534.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962-9157401HXC	51651	MSK 801B
5962-9157401HXA	51651	MSK 801B

- 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

51651

Vendor name  
and address

M. S. Kennedy Corporation  
8170 Thompson Road  
Cicero, NY 13039-9393

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