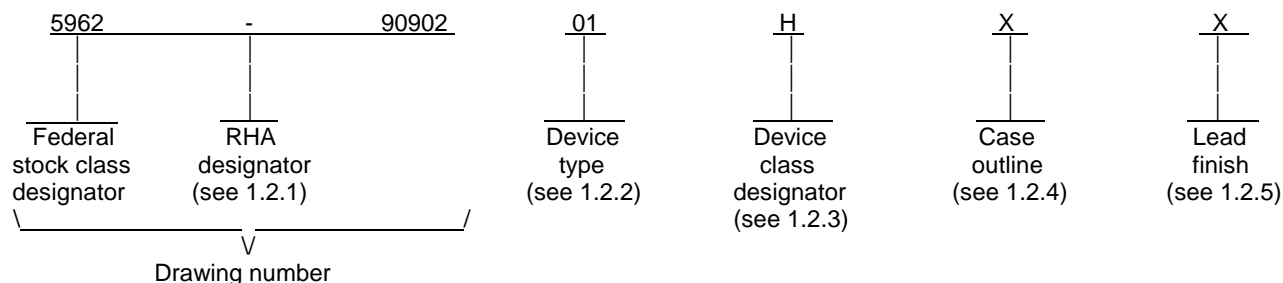


REVISIONS																			
LTR	DESCRIPTION										DATE (YR-MO-DA)				APPROVED				
A	Change figure 1 case outline dimensioning to symbols and table format. Update drawing boilerplate.										02-04-29				Raymond Monnin				
THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.																			
REV																			
SHEET																			
REV																			
SHEET																			
REV STATUS					REV		A	A	A	A	A	A	A	A	A	A	A		
OF SHEETS					SHEET		1	2	3	4	5	6	7	8	9	10	11		
PMIC N/A					PREPARED BY Steve L. Duncan					<b>DEFENSE SUPPLY CENTER COLUMBUS</b> <b>POST OFFICE BOX 3990</b> <b>COLUMBUS, OHIO 43216-5000</b> <a href="http://www.dscc.dla.mil">http://www.dscc.dla.mil</a>									
<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 C. Jones														
					APPROVED BY Gregory A. Lude					<b>MICROCIRCUIT, HYBRID, LINEAR, FET INPUT, CLOSED LOOP BUFFER AMPLIFIER</b>									
					DRAWING APPROVAL DATE 92-07-08														
										REVISION LEVEL A					SIZE A	CAGE CODE 67268	<b>5962-90902</b>		
										SHEET 1 OF 11									

## 1. SCOPE

1.1 Scope. This drawing documents five product assurance classes as defined in paragraph 1.2.3 and MIL-PRF-38534. 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.

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

Device type	Generic number	Circuit function	Supply voltage
01	MSK332B-12	FET input, closed loop buffer amplifier	±12 V
02	MSK332B-15	FET input, closed loop buffer amplifier	±15 V

1.2.3 Device class designator. This device class designator shall be a single letter identifying the product assurance level. All levels are defined by the requirements of MIL-PRF-38534 and require QML Certification as well as qualification (Class H, K, and E) or QML Listing (Class G and D). The product assurance levels are as follows:

Device class	Device performance documentation
K	Highest reliability class available. This level is intended for use in space applications.
H	Standard military quality class level. This level is intended for use in applications where non-space high reliability devices are required.
G	Reduced testing version of the standard military quality class. This level uses the Class H screening and In-Process Inspections with a possible limited temperature range, manufacturer specified incoming flow, and the manufacturer guarantees (but may not test) periodic and conformance inspections (Group A, B, C, and D).
E	Designates devices which are based upon one of the other classes (K, H, or G) with exception(s) taken to the requirements of that class. These exception(s) must be specified in the device acquisition document; therefore the acquisition document should be reviewed to ensure that the exception(s) taken will not adversely affect system performance.
D	Manufacturer specified quality class. Quality level is defined by the manufacturers internal, QML certified flow. This product may have a limited temperature range.

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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	14	Dual-in-line

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

1.3 Absolute maximum ratings. <sup>1/</sup>

Supply voltage ( $V_{CC}$ ):

Device type 01 .....	$\pm 15$ V dc
Device type 02 .....	$\pm 18$ V dc
Input voltage ( $V_{IN}$ ) .....	$\pm V_{CC}$
Peak output current ( $I_{OUT}$ ) .....	50 mA
Storage temperature .....	-65°C to +150°C
Lead temperature (soldering, 10 seconds) .....	+300°C
Total hybrid power dissipation ( $P_D$ ) .....	620 mW
Thermal resistance junction-to-case ( $\theta_{JC}$ ) .....	20°C/W
Junction temperature ( $T_J$ ) .....	+150°C

1.4 Recommended operating conditions.

Supply voltage ( $V_{CC}$ ):

Device type 01 .....	$\pm 12$ V dc
Device type 02 .....	$\pm 15$ 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 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-1835 - Interface Standard Electronic Component Case Outlines.

### HANDBOOKS

#### DEPARTMENT OF DEFENSE

MIL-HDBK-103 - List of Standard Microcircuit Drawings.  
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.

<sup>1/</sup> 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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### 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.

3.2.3 Schematic diagram. The schematic diagram shall be as specified on figure 3.

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.

### 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 and 1030 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 1/ -55°C ≤ T <sub>A</sub> ≤ +125°C 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	All		25	mA
				2,3			30	
Input offset voltage	V <sub>OS</sub>	V <sub>IN</sub> = 0 V, T <sub>A</sub> = +25°C		1	All	-2.0	+2.0	mV
Input offset voltage Temperature coefficient	$\frac{\Delta V_{OS}}{\Delta T}$	V <sub>IN</sub> = 0 V, T <sub>A</sub> = -55°C and +125°C		2,3	All	-25	+25	μV/°C
Input bias current	I <sub>IB</sub>	V <sub>CM</sub> = 0 V		1	All		300	pA
				2,3			10	nA
Output voltage swing	V <sub>O</sub>	R <sub>L</sub> = 510Ω, f ≤ 3.0 MHz		4,5,6	01	-7.0	+7.0	V
					02	-10.0	+10.0	
Full power bandwidth	FBW	R <sub>L</sub> = 510Ω	V <sub>O</sub> = ±7 V	4,5,6	01	3.0		MHz
			V <sub>O</sub> = ±10.0 V		02	3.0		
Slew rate	±SR	R <sub>L</sub> = 510Ω	V <sub>O</sub> = ±7 V	4,5,6	01	250		V/μs
			V <sub>O</sub> = ±10.0 V		02	250		
Voltage gain	A <sub>V</sub>	R <sub>L</sub> = 1 kΩ	V <sub>O</sub> = ±7 V	1,2,3	01	0.995		V/V
			V <sub>O</sub> = ±10.0 V		02	0.995		
Settling time to 0.1 percent	t <sub>s</sub>	7.0 V step 2/		4	01		100	ns
				5,6			200	
		4.0 V step 2/		4	All		50	
				5,6			100	
		10.0 V step 2/		4	02		100	
				5,6			200	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions <u>1/</u> $-55^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Power supply rejection	PSRR	$\Delta V_{CC} = \pm 5.0 \text{ V}$ <u>2/</u>	1,2,3	All	60		dB
Input noise voltage	$e_N$	$f = 10 \text{ Hz to } 1.0 \text{ MHz}$ <u>2/</u> $T_A = +25^{\circ}\text{C}$	4	All		2.0	$\mu\text{V}$
Input impedance	$Z_{IN}$	$f = \text{dc}, T_A = +25^{\circ}\text{C}$ <u>2/</u>	1	All	$10^{12}$		ohms

1/ Unless otherwise specified,  $V_{CC} = \pm 12 \text{ V}$  for device type 01, and  $V_{CC} = \pm 15 \text{ V}$  for device type 02.

2/ Parameter shall be tested as part of device initial characterization and after design and process changes. Parameter shall be guaranteed to the limits specified in table I for all lots not specifically tested.

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DEFENSE SUPPLY CENTER COLUMBUS  
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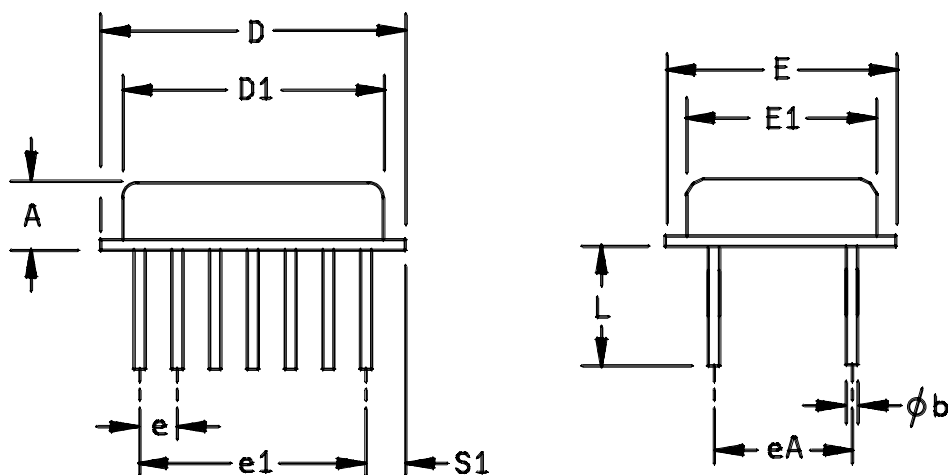
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Case outline X.



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A		6.10		0.240
$\phi b$	0.41	0.56	0.016	0.022
D	20.14	20.57	0.793	0.810
D1	18.29 REF		0.720 REF	
E	12.52	12.78	0.493	0.503
E1	10.67 REF		0.420 REF	
e	2.54 TYP		0.100 TYP	
e1	15.24 REF		0.600 REF	
eA	7.62 REF		0.300 REF	
L	6.10		0.240	
S1	2.41	2.68	0.095	0.105

NOTES:

1. Pin 1 is indicated by the square corner on the case.
2. The U.S. preferred system of measurement is the metric SI. This item was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.

FIGURE 1. Case outline(s).

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Device types	01 and 02
Case outline	X
Terminal number	Terminal symbol
1	Input
2	No connection
3	No connection
4	No connection
5	No connection
6	No connection
7	-V <sub>CC</sub>
8	Output
9	No connection
10	+V <sub>CC</sub>
11	No connection
12	No connection
13	Case ground
14	No connection

FIGURE 2. Terminal connections.

<b>STANDARD MICROCIRCUIT DRAWING</b>  DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE <b>A</b>		<b>5962-90902</b>
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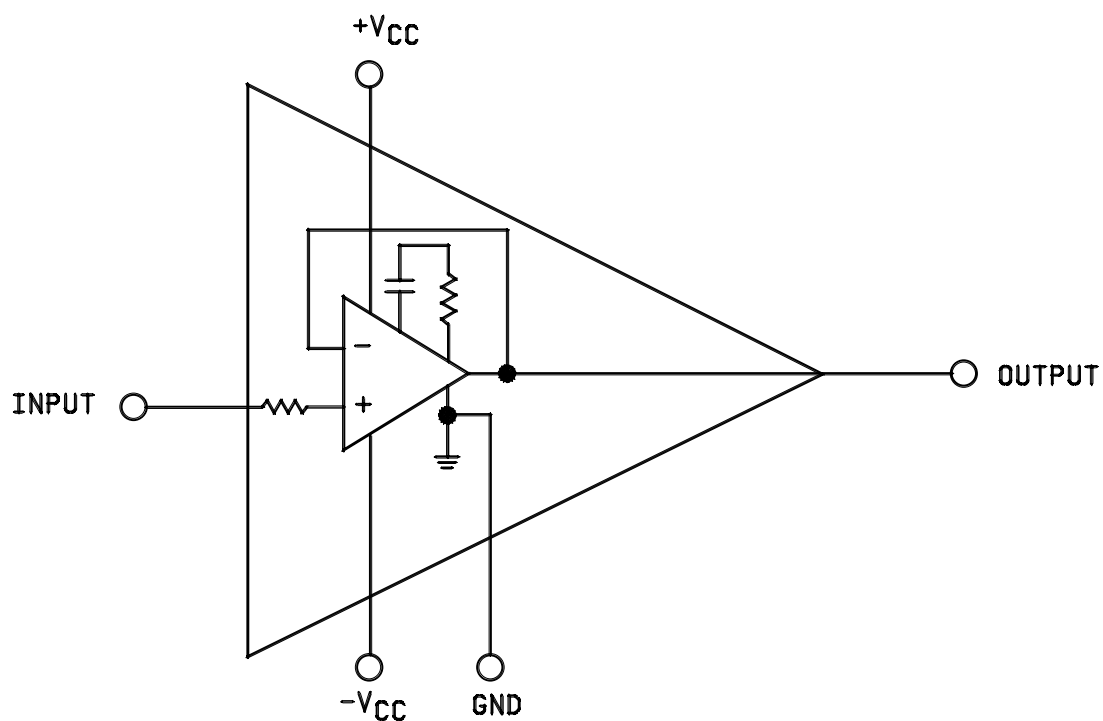


FIGURE 3. Schematic diagram.

<b>STANDARD MICROCIRCUIT DRAWING</b>  DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE <b>A</b>		<b>5962-90902</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
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 not currently 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-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) 692-0536.

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: 02-04-29

Approved sources of supply for SMD 5962-90902 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>
5962-9090201HXC	51651	MSK332B-12
5962-9090202HXC	51651	MSK332B-15

- 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  
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.