

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Added case outline Y. Updated to reflect MIL-H-38534 processing. Editorial changes throughout.	91-04-16	W. Heckman
B	Updated drawing to the latest requirements. -sld	05-04-05	Raymond Monnin
C	Table I; changed the min and max limits for A_{FS} , device type 02 from -1.920 and -2.040 to 1.9602 and 2.0398. Changed the min and max limits for A_{FS} device type 02 from -2.024 and -1.944 to -2.0238 and -1.9442. Changed the min and max limits for A_{ZS} , device type 02 from +1.9652 and +2.0038 to -0.0398 and +0.0398. -sld	08-08-19	Robert M. Heber
D	Updated drawing to the latest MIL-PRF-38534 requirements. -sld	14-06-24	Charles F. Saffle
E	Updated drawing to the latest MIL-PRF-38534 requirements. -sld	19-12-12	James R. Eschmeyer
F	Updated drawing to the latest MIL-PRF-38534 requirements. -riu	24-03-18	James R. Eschmeyer



Revision Status of Sheets

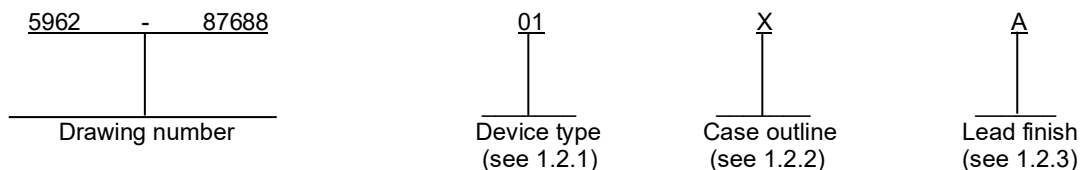
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REV	F	F	F	F	F	F	F	F	F	F										
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PMIC N/A				
STANDARD MICROCIRCUIT DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE	PREPARED BY Donald R. Osborne	DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990 https://www.dla.mil/LandandMaritime		
	CHECKED BY Robert M. Heber			
	APPROVED BY William K. Heckman			
	DRAWING APPROVAL DATE 88-10-11	MICROCIRCUIT, HYBRID, LINEAR, 8-BIT DIGITAL TO ANALOG CONVERTER		
AMSC N/A	REVISION LEVEL F	SIZE A	CAGE CODE 67268	5962-87688
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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 are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of radiation hardness assurance levels is reflected in the PIN.

1.2 PIN. The PIN is as shown in the following example:



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

Device type	Generic number	Circuit function
01	MN3008	8-bit D/A converter, 0 V to +4 V output
02	MN3009	8-bit D/A converter, -2 V to +2 V output

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

Outline letter	Descriptive designator	Terminals	Package style
X	See figure 1	16	Dual-in-line
Y	See figure 1	16	Flat package

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

1.3 Absolute maximum ratings. 1/

+15 V supply voltage (V_{CC}).....	+18 V dc
-15 V supply voltage (V_{EE}).....	-18 V dc
Digital input voltage range.....	-0.5 V dc to +15 V dc
Storage temperature range.....	-65°C to +150°C
Power dissipation (P_D).....	750 mW 2/
Lead temperature (soldering, 10 seconds).....	+300°C
Thermal resistance, junction-to-case (θ_{JC}).....	56°C/W

1.4 Recommended operating conditions.

Ambient operating temperature range (T_A).....	-55°C to +125°C
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1/ Stresses above the absolute maximum ratings may cause permanent damage to the device. Extended operation at maximum levels may degrade performance and affect reliability.

2/ Applies up to $T_A = +125^\circ\text{C}$.

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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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

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 <https://quicksearch.dla.mil>.)

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 shall be in accordance with MIL-PRF-38534.

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.

3.2.3 Truth table(s). The truth table(s) 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 described 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.

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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.

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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	
Input high voltage	V _{IH}		1, 2, 3	All	2.0		V
Input low voltage	V _{IL}		1, 2, 3	All		0.8	V
Input high current	I _{IH}	V _{IH} = 2.4 V	1, 2, 3	All		40	μA
Input low current	I _{IL}	V _{IL} = 0.4 V	1, 2, 3	All		-1.0	mA
+Full scale output accuracy (unipolar)	A+FS	Input bits = 1111 1111	4, 5, 6	01	+3.9442	+4.0238	V
+Full scale output accuracy (bipolar)		Input bits = 0000 0000		02	+1.9602	+2.0398	
-Full scale output accuracy (bipolar)	A+FS	Input bits = 1111 1111	4, 5, 6	02	-2.0238	-1.9442	V
Zero scale output accuracy (unipolar)	A _{zs}	Input bits = 0000 0000	4, 5, 6	01	-0.0398	+ 0.0398	V
Zero scale output accuracy (bipolar)		Input bits = 1000 0000		02	-0.0398	+0.0398	
Linearity error	LE		1, 2, 3	All	-0.5	+0.5	LSB
Output load current	I _o		1,2,3	All	-3.0	+3.0	mA
Power supply drain current	+I _{cc}	Input bits = all 1's and all 0's, T _A = +25°C	1	All		+25	mA
	-I _{cc}					-25	
Power supply rejection ratio	+PSRR	V _{CC} = +14.550 V dc to +15.450 V dc, T _A = +25°C, input bits = 0000 0000	1	All		<u>2</u> /	<u>2</u> /
	-PSRR	V _{EE} = -14.550 V dc to -15.450 V dc, T _A = +25°C, input bits = 0000 0000				<u>3</u> /	<u>3</u> /
Settling time	t _s	Input bits = all 1's and all 0's, T _A = +25°C	9	All		1.0	μs

1/ Unless otherwise specified, V_{CC} (pin 16) = +15 V dc and V_{EE} (pin 11) = -15 V dc.

2/ +PSRR = 0.010 V dc ±0.04 percent FSR/percent V_S maximum.

3/ -PSRR = 0.005 V dc ±0.02 percent FSR/percent V_S maximum.

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Case outline X

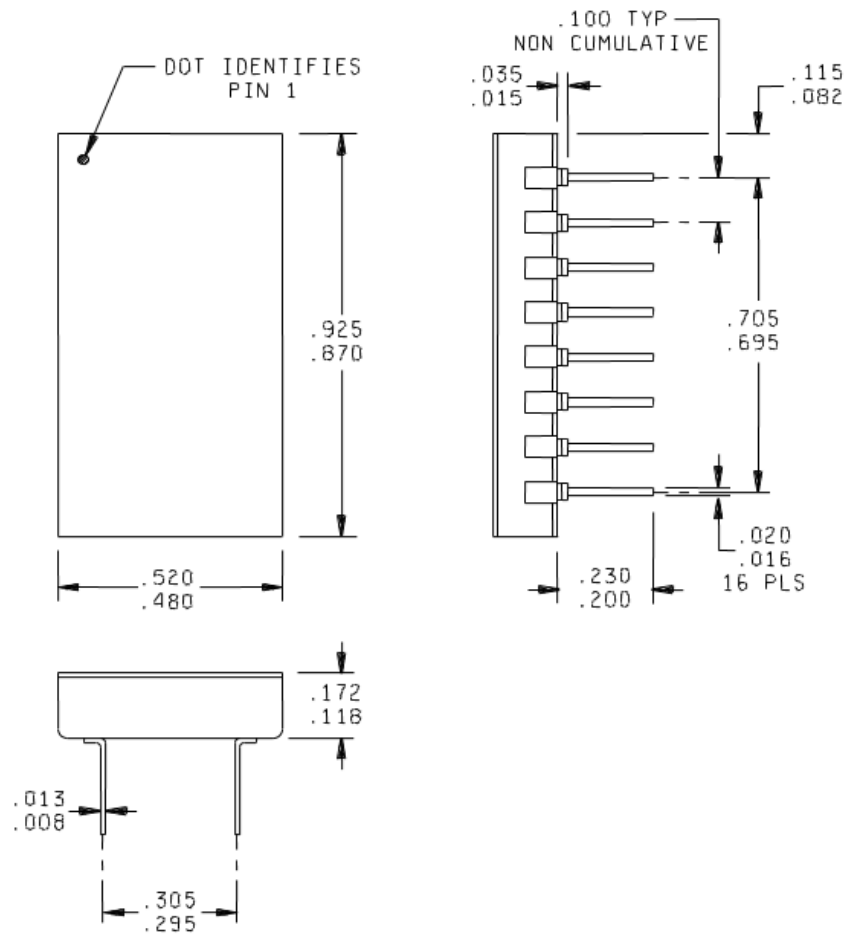


FIGURE 1. Case outline(s).

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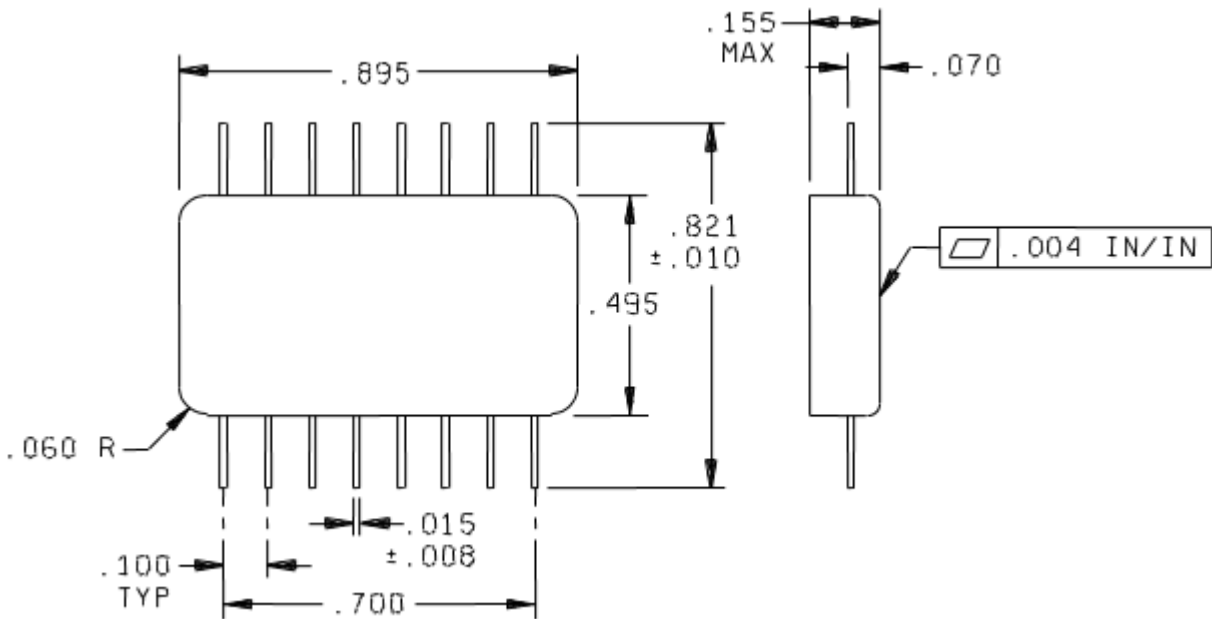
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Case outline Y



Inches	mm	Inches	mm	Inches	mm
.002	0.05	.070	1.78	.480	12.19
.004	0.10	.082	2.08	.495	12.57
.005	0.13	.100	2.54	.520	13.21
.008	0.20	.115	2.92	.695	17.65
.010	0.25	.118	3.00	.700	17.78
.013	0.33	.172	4.37	.705	17.91
.015	0.38	.200	5.08	.821	20.85
.016	0.41	.230	5.84	.870	22.10
.020	0.51	.295	7.49	.895	22.73
.035	0.89	.305	7.75	.925	23.50
.060	1.52				

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given information only.

FIGURE 1. Case outline(s) – Continued.

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Device types 01 and 02

Pin	Function	Pin	Function
1	Bit 1 MSB	9	No connection
2	Bit 2	10	Bit 8 LSB
3	Bit 3	11	V _{EE} (-15 V supply)
4	Bit 4	12	Ground
5	Bit 5	13	No connection
6	Bit 6	14	Analog output
7	Bit 7	15	No connection
8	No connection	16	V _{CC} (+ V supply)

FIGURE 2. Terminal connections.

Device input		Analog input (V dc)	
MSB	LSB	Device 01	Device 02
1111	1111	+3.984	-1.984
1111	1110	+3.969	-1.969
1000	0000	+2.000	0.00
0111	1111	+1.984	+0.016
0000	0001	+0.016	+1.984
0000	0000	0.000	+2.000

FIGURE 3. Truth table.

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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 test parameters	1*, 2, 3, 4, 5, 6, 9
Group A test requirements	1, 2, 3, 4, 5, 6, 9
Groups 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.

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) TA 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) TA 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). 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 with the users of record for the individual documents. This coordination will be accomplished using DD Form 1692, Engineering Change Proposal, or email communication.

6.4 Record of users. Military and industrial users should 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: 24-03-18

Approved sources of supply for SMD 5962-87688 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 DLA Land and Maritime-VA. This information bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38534. DLA Land and Maritime maintains an online database of all current sources of supply at <https://landandmaritimeapps.dla.mil/programs/smcr/>.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962-8768801XA	50507	MN3008MXA
5962-8768801XC	50507	MN3008MXC
5962-8768801YA	<u>3/</u>	MN3008HF/B
5962-8768802XA	50507	MN3009MXA
5962-8768802XC	50507	MN3009MXC
5962-8768802YA	<u>3/</u>	MN3009HF/B

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.

3/ Not available from an approved source of supply.

Vendor CAGE
number

50507

Vendor name
and address

Spectrum Control Inc.
dba Micro Networks Div.
400 Nickerson Rd.
Marlborough, MA 01752

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