

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

1. SCOPE

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

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:

5962-89911	01	X	X
Drawing number	Device type (See 1.2.1)	Case outline (See 1.2.2)	Lead finish per MIL-H-38534

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

Device type	Generic number	Circuit function
01	CLC220A	High speed, wideband, operational amplifier

1.2.2 Case outline(s). The case outline(s) shall be as designated in appendix C of MIL-M-38510 and as follows:

Outline letter	Case outline
X	See figure 1, (12-lead, .605" x .181"), can package

1.3 Absolute maximum ratings.

Supply voltage ($\pm V_{CC}$)	- - - - -	± 20 V dc
Output current	- - - - -	± 50 mA
Storage temperature range	- - - - -	-65°C to $+150^{\circ}\text{C}$
Lead temperature (soldering, 10 seconds)	- - - - -	$+300^{\circ}\text{C}$
Junction temperature (T_J)	- - - - -	$+175^{\circ}\text{C}$
Power dissipation (P_D)	- - - - -	1/
Thermal resistance, case-to-ambient (θ_{CA})	- - - - -	65°C/W 2/
Thermal resistance, junction-to-case:		
$\theta_{JC}(\text{circuit})$	- - - - -	37°C/W 3/
$\theta_{JC}(\text{output})$	- - - - -	200°C/W 4/

1.4 Recommended operating conditions.

Supply voltage range	- - - - -	± 5 V dc to ± 15 V dc
Gain range	- - - - -	± 1 to ± 50
Ambient operating temperature range (T_A)	- - - - -	-55°C to $+125^{\circ}\text{C}$

1/ The power dissipation can be determined based on the application and the junction temperature verified to be ($T_J < +175^{\circ}\text{C}$) and using the thermal resistance values given.

2/ Still air, no heatsink.

3/ Thermal resistance of circuit; $P_{\text{circuit}} = 2(V_{CC}) I_{CC}$.

4/ Thermal resistance of output transistors; $P_{\text{output}} = V_{CE}(I_E) \times (\% \text{ duty cycle})$.

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2. APPLICABLE DOCUMENTS

2.1 Government specifications and standard. Unless otherwise specified, the following specifications and standard of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATIONS

MILITARY

- MIL-M-38510 - Microcircuits, General Specification for.
- MIL-H-38534 - Hybrid Microcircuits, General Specification for.

STANDARD

MILITARY

- MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specifications and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

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 shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with MIL-H-38534 and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-H-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.

3.3 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. Marking shall be in accordance with MIL-H-38534. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in QML-38534 (see 6.6 herein).

3.6 Manufacturer eligibility. In addition to the general requirements of MIL-H-38534, the manufacturer of the part described herein shall submit for DECS-ECC review and approval electrical test data (variables format) on 22 devices from the initial quality conformance inspection group A lot sample, produced on a certified line, for each device type listed herein. The data should also include a summary of all parameters manually tested, and for those which, if any, are guaranteed.

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TABLE 1. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _A ≤ +125°C ^{1/} unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Small signal bandwidth (-3 dB bandwidth)	SSBW	V _{OUT} < 2 V _{p-p}	4	170		MHz
			5	150		
			6	160		
Gain flatness peaking low	GFPL	f = 100 kHz to 50 MHz	4		0.3	dB
			5		0.4	
			6		0.5	
Gain flatness peaking high	GFPH	f > 50 MHz	4		0.6	dB
			5		1.0	
			6		1.5	
Gain flatness rolloff	GFR	f = 100 MHz	4		0.6	dB
			5		0.9	
			6		0.4	
^{2/} Linear phase deviation	LPD	f < 100 MHz	4, 5, 6		2	degree
Overshoot ^{2/}	OS	5 V step	4, 5		12	%
			6		15	
Slew rate ^{2/} (overdriven input)	SR	f = 100 MHz, 2 V _{p-p}	4, 5, 6	6		V/ns
Noninverting input ^{2/} capacitance	C _{IN}		4, 5, 6		3	pF
Noninverting input ^{2/} resistance	R _{IN}		4, 5, 6	100		kΩ
Output resistance ^{2/}	R _O		4, 5, 6		0.1	Ω
2nd harmonic distortion	HD2	2 V _{p-p} , 20 MHz	7, 8A, 8B		-50	dBc ^{3/}
3rd harmonic distortion	HD3	2 V _{p-p} , 20 MHz	7, 8A, 8B		-50	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C < T _A < +125°C ^{1/} unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Noise floor	SNF	f > 5 MHz	7, 8A, 8B		-150	dBm (1 Hz)
Integrated noise	INV	f = 5 MHz to 200 MHz	7, 8A, 8B		100	μA
Input offset voltage	V _{IO}		1, 2, 3		25	mV
Input offset voltage temperature coefficient ^{2/}	$\frac{\Delta V_{IO}}{\Delta T}$		2, 3		120	μV/°C
+ Input bias current	+I _{IB}		1		30	μA
			2, 3		40	
+ Input bias current temperature coefficient ^{2/}	$\frac{\Delta +I_{IB}}{\Delta T}$		2, 3		125	nA/°C
- Input bias current	-I _{IB}		1	-50		μA
			2, 3	-70		
- Input bias current temperature coefficient ^{2/}	$\frac{\Delta -I_{IB}}{\Delta T}$		2, 3		250	nA/°C
Power supply rejection ratio	PSRR	ΔV _{CC} = ±0.5 V	1, 2, 3	45		dB
Common mode ^{2/} rejection ratio	CMRR		4, 5, 6	40		dB
Supply current	I _{CC}	No load	1		34	mA
			2, 3		36	

^{1/} Unless otherwise specified, R_L = 200.0 ohms, R_F = 1500 ohms, ±V_{CC} = ±15 V, A_v = +20.

^{2/} Parameter shall be tested as part of device initial characterization and after design and process changes, which will affect this parameter. Parameter shall be guaranteed to the limits specified in table I for all lots not specifically tested.

^{3/} dBc is the standard reference for a signal referenced to a signal level.

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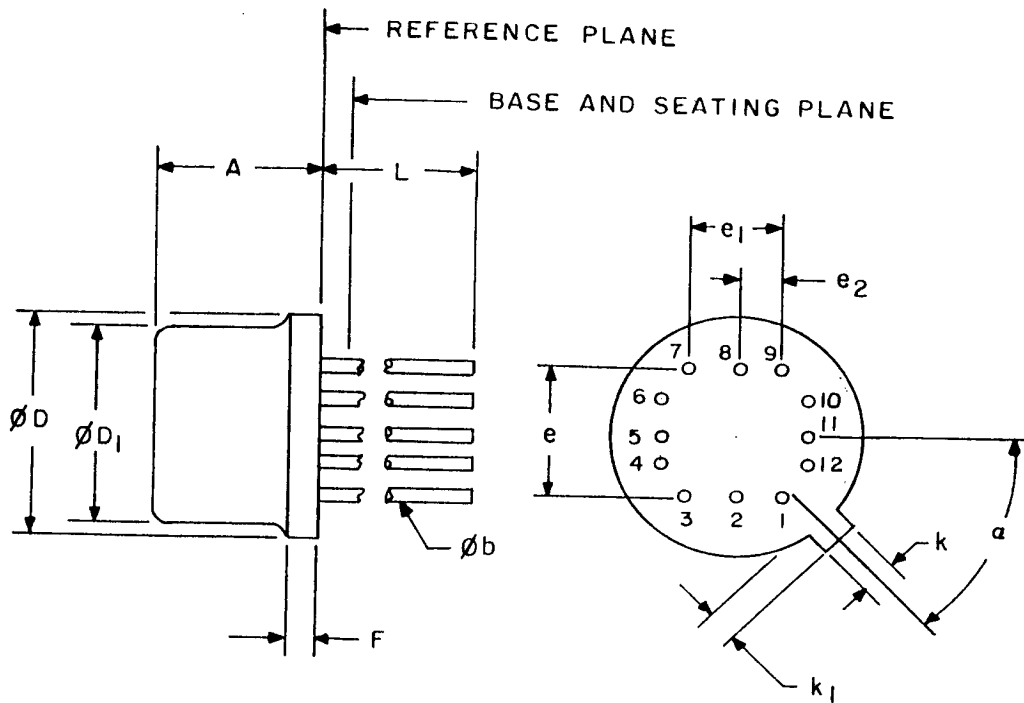


FIGURE 1. Case outline X.

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Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
A	.142	.181	3.61	4.60	
ϕb	.016	.019	0.41	0.48	
ϕD	.595	.605	15.11	15.37	
ϕD_1	.543	.555	13.79	14.10	
e	.400 BSC		10.16 BSC		5
e ₁	.200 BSC		5.08 BSC		5
e ₂	.100 BSC		2.54 BSC		5
F	.016	.030	0.41	0.76	
k	.026	.036	0.66	0.91	
k ₁	.026	.036	0.66	0.91	4
L	.310	.340	7.87	8.64	
a	45° BSC		45° BSC		5

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. The product may be measured by direct methods or by gauge.
4. Measured from the maximum diameter of the product.
5. 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 width tab.

FIGURE 1. Case outline X - Continued.

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Device type	01
Case outline	X
Terminal number	Terminal symbol
1	+V _{CC} (supply voltage)
2	Bias control
3	GND (case and bias)
4	No connection
5	-V _{IN}
6	+V _{IN}
7	GND (case and bias)
8	R _f (internal feedback)
9	-V _{CC} (supply voltage)
10	-V _C (collector supply)
11	V _{OUT}
12	+V _C (collector supply)

NOTE: Pin 8 provides access to a 1.5 k Ω feedback resistor which can be connected to the output or left open if an external feedback resistor is desired.

FIGURE 2. Terminal connections.

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3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in QML-38534 (see 6.6 herein). The certificate of compliance submitted to DESC-ECC prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-H-38534 and the requirements herein.

3.8 Certificate of conformance. A certificate of conformance as required in MIL-H-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-H-38534.

4.2 Screening. Screening shall be in accordance with MIL-H-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 using the circuit submitted with the certificate of compliance (see 3.7 herein).

(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 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-H-38534 and as specified herein.

4.3.1 Group A inspection. Group A inspection shall be in accordance with MIL-H-38534 and as follows:

a. Tests shall be as specified in table II herein.

b. Subgroups 9, 10, and 11 shall be omitted.

4.3.2 Group B inspection. Group B inspection shall be in accordance with MIL-H-38534.

4.3.3 Group C inspection. Group C inspection shall be in accordance with MIL-H-38534 and as follows:

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test conditions, method 1005 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.7 herein).

(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. Group D inspection shall be in accordance with MIL-H-38534.

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TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5008, group A test table)
Interim electrical parameters	1
Final electrical test parameters	1*,2,3,4,7
Group A test requirements	1,2,3,4,5,6, 7,8A,8B
Group C end-point electrical parameters	1

* PDA applies to subgroup 1.

5. PACKAGING

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

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for original equipment design applications and logistics support of existing equipment.

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-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC 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 microelectronics devices (FSC 5962) should contact DESC-ECC, telephone (513) 296-8527.

6.5 Comments. Comments on this drawing should be directed to DESC-ECC, Dayton, Ohio 45444, or telephone (513) 296-8525.

6.6 Approved sources of supply. An approved sources of supply is listed in QML-38534. Additional sources will be added to QML-38534 as they become available. The vendor listed in QML-38534 have agreed to this drawing and a certificate of compliance (see 3.7 herein) has been submitted to and accepted by DESC-ECC.

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