

DESC FORM 193
SEP 87

U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911
5962-E654

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

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant on-JAN devices".

<u>5962-87742</u>	<u>01</u>	<u>E</u>	<u>X</u>
Drawing number	Device type (1 2 1)	Case outline (1 2 2)	Lead finish per MIL-M-38510

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	1834	High efficiency linear regulator

<u>Outline letter</u>	<u>Case outline</u>
E	D-2 (16-lead, 840" x .310" x .200"), dual-in-line package

Input supply voltage (V_{IN+})	- - - - -	40 V dc
Driver current	- - - - -	400 mA
Driver source to sink voltage	- - - - -	40 V dc
Crowbar current	- - - - -	-200 mA
+1.5 V reference output current	- - - - -	-10 mA
Fault alert voltage	- - - - -	40 V dc
Fault alert current	- - - - -	15 mA
Error amplifier inputs	- - - - -	-0.5 V dc to +35 V dc
Current sense inputs	- - - - -	-0.5 V dc to +40 V dc
0 V latch output voltage	- - - - -	-0.5 V dc to +40 V dc
0 V latch output current	- - - - -	15 mA
Power dissipation (P_D):		
$T_A = +50^\circ\text{C}$	- - - - -	1000 mW 2/
$T_C = +25^\circ\text{C}$	- - - - -	2000 mW 3/
Storage temperature range	- - - - -	-65°C to $+150^\circ\text{C}$
Lead temperature (soldering, 10 seconds)	- - - - -	$+300^\circ\text{C}$
Thermal resistance, junction-to-ambient (θ_{JA}):		
Case E	- - - - -	100°C/W
Thermal resistance, junction-to-case (θ_{JC}):		
Case E	- - - - -	See MIL-M-38510, appendix C
Junction temperature (T_J)	- - - - -	$+150^\circ\text{C}$

2/ Derate above $T_A = +50^\circ\text{C}$ at $10\text{ mW}/^\circ\text{C}$.
3/ Derate above $T_C = +25^\circ\text{C}$ at $16\text{ mW}/^\circ\text{C}$.

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1.4 Recommended operating conditions.

Ambient operating temperature range (T_A) - - - - - -55°C to $+125^{\circ}\text{C}$

2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification 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.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

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

(Copies of the specification 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 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Block diagram. The block diagram shall be as specified on figure 2.

3.2.3 Case outline. The case outline shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I and apply over the full ambient operating temperature range.

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

3.5 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 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements 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	Limits		Unit
				Min	Max	
Standby supply current	I _{SBY}		1, 2, 3		7.0	mA
+1.5 V Reference section						
Output voltage	V _{OUT1}	-55°C ≤ T _J ≤ +125°C	1	1.485	1.515	V
			2, 3	1.47	1.53	
Line regulation	V _{RLINE1}	V _{IN+} = 5.0 V to 35 V	1, 2, 3		10	mV
Load regulation	V _{RLOAD1}	I _{OUT} = 0 mA to 2.0 mA	1, 2, 3		10	
-2.0 V Reference section 2/						
Output voltage (referenced to V _{IN+})	V _{OUT2}	-55°C ≤ T _J ≤ +125°C	1	2.04	1.96	V
			2, 3	2.06	1.94	
Line regulation	V _{RLINE2}	V _{IN+} = 5.0 V to 35 V	1, 2, 3		15	mV
Error amplifier section						
Input offset voltage	V _{OS}	V _{CM} = 1.5 V	1, 2, 3		6.0	mV
Input bias current	I _{IB1}	V _{CM} = 1.5 V	1, 2, 3		-4.0	μA
Input offset current	I _{OS}	V _{CM} = 1.5 V	1, 2, 3		1.0	
Small signal open loop gain	A _{VOL}	Output at pin 14, pin 12 = V _{IN+} , pin 13 connected through 20Ω resistor to V _{IN-}	4, 5, 6	50		dB
See footnotes at end of table.						
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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55°C < T _A < +125°C unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Error amplifier section - Continued						
Common mode rejection ratio	CMRR	V _{CM} = 0.5 V to 33 V, V _{IN+} = 35 V	4, 5, 6	60		dB
Power supply rejection ratio	PSRR	V _{IN+} = 5.0 V to 35 V, V _{CM} = 1.5 V	4, 5, 6	70		
Driver section 3/						
Maximum output current	I _{OUT(max)}		1, 2, 3	200		mA
Saturation voltage	V _{SAT}	I _{OUT} = 100 mA	1, 2, 3		1.2	V
Output leakage current	I _{LO}	Pin 12 = 35 V, pin 13 = V _{IN-} , pin 14 = V _{IN-}	1, 2, 3		50	μA
Shutdown input voltage at pin 14	V _{IN} (SHTDN)	I _{OUT} ≤ 100 μA, pin 13 = V _{IN-} , pin 12 = V _{IN+}	1, 2, 3	0.4		V
Shutdown input current at pin 14	I _{IN} (SHTDN)	Pin 14 = V _{IN-} , pin 12 = V _{IN+} , I _{OUT} ≤ 100 μA, pin 13 = V _{IN-}	1, 2, 3		-150	μA
Fault amplifier section						
Under-and over-voltage fault threshold	V _{TH1}	V _{CM} = 1.5 V, at E/A inputs	1, 2, 3	120	180	mV
Common-mode sensitivity	VCMS	V _{IN+} = 35 V, V _{CM} = 1.5 V to 33 V	1, 2, 3		-0.8	%/V
Supply sensitivity	V _{SS}	V _{CM} = 1.5 V, V _{IN+} = 5.0 V to 35 V	1, 2, 3		-1.0	
See footnotes at end of table.						
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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55°C < T _A < +125°C unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Fault amplifier section - Continued						
Fault delay	t _{FD}		9, 10, 11	30	60	ms/μF
Fault alert output current	I _{OUT} (pin 10)		1, 2, 3	2.0		mA
Fault alert saturation voltage	V _{SAT} (pin 10)	I _{OUT} = 1.0 mA	1, 2, 3		0.5	V
0 V latch output current	I _{OUT} (pin 15)		1, 2, 3	2.0		mA
0 V latch saturation voltage	V _{SAT} (pin 15)	I _{OUT} = 1.0 mA	1, 2, 3		1.3	V
0 V latch output reset voltage	V _{RESET}		1, 2, 3	0.3	0.6	
Crowbar gate current	I _{OUT} (pin 16)		1, 2, 3	-100		mA
Crowbar gate leakage current	I _{LO} (pin 16)	V _{IN+} = 35 V, pin 16 = V _{IN-}	1, 2, 3		-50	μA
Current sense amplifier section						
Threshold voltage	V _{TH2}	Pin 4 open, V _{CM} = V _{IN+} or V _{IN-}	1, 2, 3	130	170	mV
		Pin 4 = 0.5 V, V _{CM} = V _{IN+} or V _{IN-}	1, 2, 3	40	60	
See footnotes at end of table.						
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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55°C < T _A < +125°C unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Current sense amplifier section - Continued						
Threshold supply sensitivity	$\frac{\Delta V_{TH2}}{\Delta V_{IN+}}$	V _{IN+} = 5.0 V to 35 V, Pin 4 open, V _{CM} = V _{IN-}	1, 2, 3		-0.3	%/V
Adjustment input current	I _{IN}	Pin 4 = 0.5 V	1, 2, 3		-10	μA
Sense input bias current	I _{IB2}	V _{CM} = V _{IN+}	1, 2, 3		200	
		V _{CM} = V _{IN-}	1, 2, 3		-200	

- 1/ Unless otherwise specified, V_{IN+} = 15 V, V_{IN-} = 0 V and T_A = -55°C to +125°C.
 2/ When using both the 1.5 V and -2.0 V references, the current out of pin 3 should be balanced by an equivalent current into pin 2. The -2.0 V output will change -2.3 mV per μA imbalance.
 3/ The driver section contains a thermal shutdown which turns the driver off at approximately +165°C. If pin 15 (0 V latch output) is tied to pin 14 (compensation/shutdown), the 0 V latch will be reset.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.8 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

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Device type 01

Case E

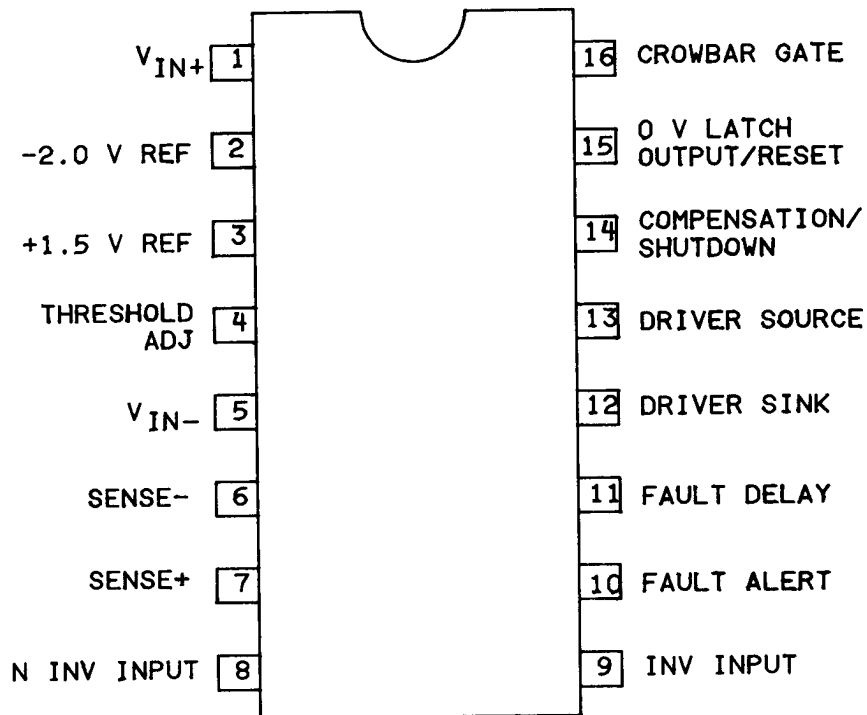


FIGURE 1. Terminal connections.

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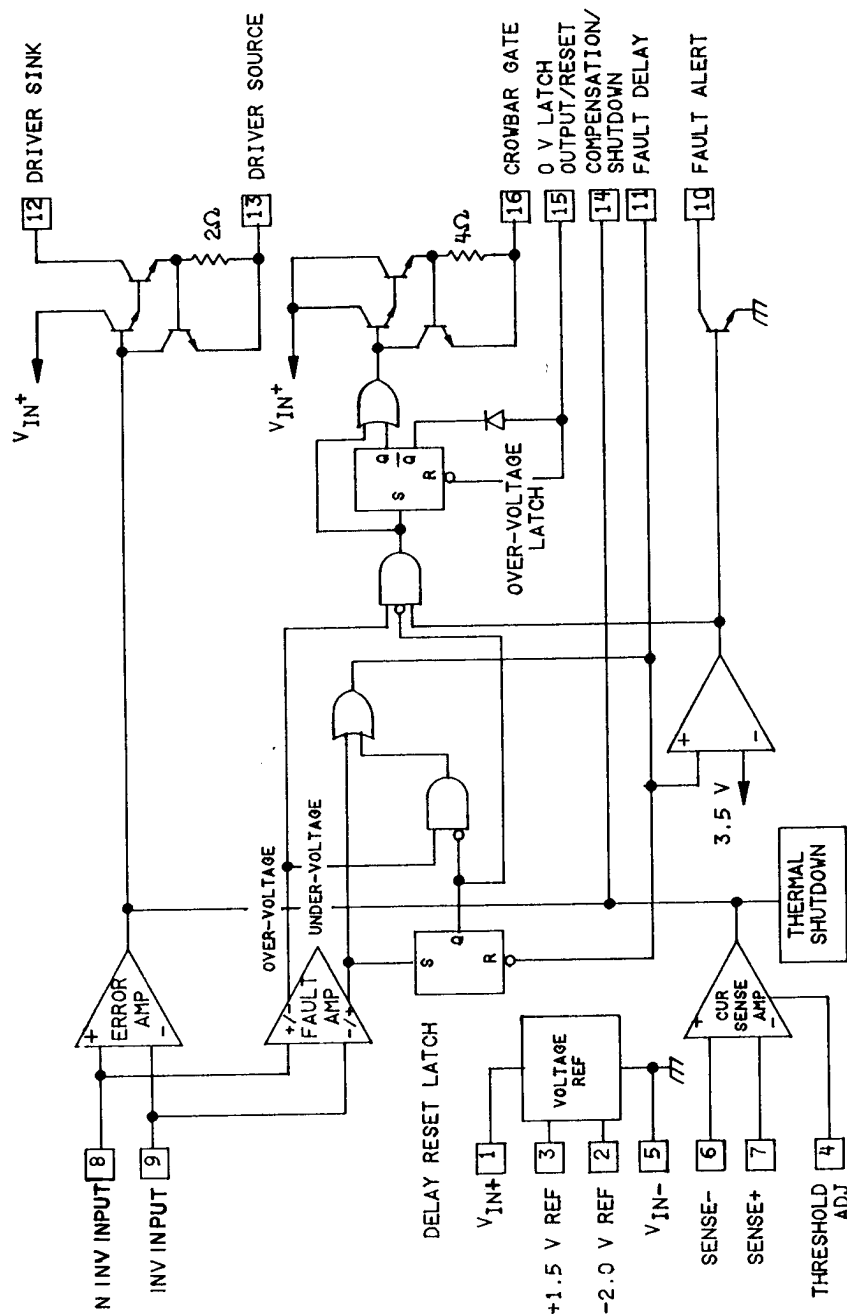


FIGURE 2. Block diagram.

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TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004)	1*,2,3,4,9
Group A test requirements (method 5005)	1,2,3,4,5,6, 9,10,11
Groups C and D end-point electrical parameters (method 5005)	1,2,3

* PDA applies to subgroup 1.

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. 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 3.5 herein).
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
- 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 method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

- a. Tests shall be as specified in table II herein.
- b. Subgroups 7 and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

4.3.2 Groups C and D inspections.

- 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 3.5 herein).

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(2) $T_A = +125^{\circ}\text{C}$, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.5 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number ^{1/}
5962-8774201EX	48726	UC1834J/883B

^{1/} Caution. Do not use this number for item acquisition. Items acquired by this number may not satisfy the performance requirements of this drawing.

Vendor CAGE
number

48726

Vendor name
and address

Unitrode Integrated Circuits Corporation
7 Continental Boulevard
Merrimack, NH 03054

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