REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Technical and editorial changes throughout.	91-12-27	M. A. FRYE
B	Changes in accordance with N.O.R. 5962-R022-93.	92-11-16	M. A. FRYE
C	Changes in accordance with N.O.R. 5962-R037-97.	96-11-04	R. MONNIN
D	Add case X which is a 10 lead flat pack. Make changes to 1.2.4, 1.3, and figure 1. Redrawn. - ro	98-02-20	R. MONNIN

THE ORIGINAL FIRST SHEET OF THIS DRAWING HAS BEEN REPLACED.

REV																				
SHEET																				
REV	D	D	D	D	D	D	D	D	D	D	D	D								
SHEET	15	16	17	18	19	20	21	22	23	24	25	26								

REV STATUS OF SHEETS	REV	D	D	D	D	D	D	D	D	D	D	D	D	D
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14

PMIC N/A

STANDARD MICROCIRCUIT DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

PREPARED BY
RICK OFFICER

CHECKED BY
CHARLES REUSING

APPROVED BY
MICHAEL A. FRYE

DRAWING APPROVAL DATE
91-05-14

REVISION LEVEL
D

DEFENSE SUPPLY CENTER COLUMBUS
COLUMBUS, OHIO 43216

MICROCIRCUIT, LINEAR, VOLTAGE REGULATOR, ADJUSTABLE, MICROPOWER, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	67268	5962-38705

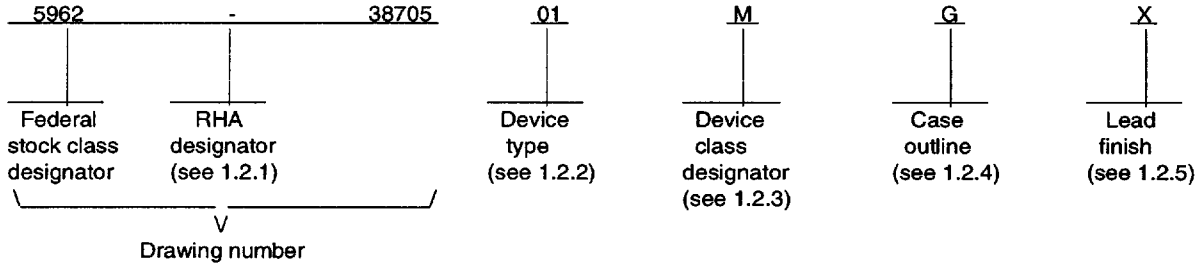
SHEET 1 OF 26

DSCC FORM 2233
APR 97

1. SCOPE

1.1 Scope. This drawing documents two product assurance class levels consisting of high reliability (device classes B, Q, and M) and space application (device classes S and V). 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 (RHA) levels are reflected in the PIN.

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



1.2.1 RHA designator. Device classes Q and V RHA marked devices meet the MIL-PRF-38535 specified RHA levels and are marked with the appropriate RHA designator. Device classes B, M, and S RHA marked devices meet the MIL-PRF-38535, appendix A specified RHA levels and are 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
01	LP2951	Adjustable micropower voltage regulator

1.2.3 Device class designator. The device class designator is a single letter identifying the product assurance level as follows:

Device class	Device requirements documentation
M	Vendor self-certification to the requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A
B or S	Certification and qualification to MIL-PRF-38535, appendix A
Q or V	Certification and qualification to MIL-PRF-38535

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

Outline letter	Descriptive designator	Terminals	Package style
G	MACY1-X8	8	Can
P	GDIP1-T8 or CDIP2-T8	8	Dual-in-line
X	See figure 1	10	Flat pack
2	CQCC1-N20	20	Square leadless chip carrier

1.2.5 Lead finish. The lead finish is as specified in MIL-PRF-38535 for device classes Q and V or MIL-PRF-38535, appendix A for device classes B, M, and S.

1.3 Absolute maximum ratings. 1/

Input voltage range	-0.3 V dc to +30 V dc
Lead temperature (soldering, 10 seconds)	+260°C
Junction temperature (T_J) 2/	+160°C
Storage temperature range	-65°C to +150°C
Feedback input voltage range 3/ 4/	-1.5 V dc to +30 V dc
Shutdown input voltage range 3/	-0.3 V dc to +30 V dc
Error comparator output voltage 3/	-0.3 V dc to +30 V dc
Maximum power dissipation (P_D):	
Case G	675 mW at +25°C
Cases P and X	1.0 W at +25°C
Case 2	1.25 W at +25°C
Thermal resistance, junction-to-ambient (Θ_{JA}): (still air)	
Case G	163°C/W
	95°C/W at 500 linear feet per minute (LFPM)
Case P	131°C/W
	75°C/W at 500 linear feet per minute (LFPM)
Case X	215°C/W
	130°C/W at 500 linear feet per minute (LFPM)
Case 2	95°C/W
	66°C/W at 500 linear feet per minute (LFPM)
Thermal resistance, junction-to-case (Θ_{JC}):	
Cases G, P, and 2	See MIL-STD-1835
Case X	24°C/W

1.4 Recommended operating conditions. 5/ 6/

Input voltage	+6 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-38535 - Integrated Circuits, Manufacturing, General Specification for.

1/ Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.
2/ The device is protected by a thermal shutdown circuit which is designed to turn off the output transistor whenever the junction temperature exceeds +160°C.
3/ May exceed input supply voltage.
4/ When used in dual supply systems where the output voltage sees loads returned to a negative supply, the output voltage should be diode-clamped to ground.
5/ A 1.0 µF capacitor is required between output and ground for stability. A 0.1 µF capacitor is recommended between the input and ground when there is more than 10 inches of wire on the input, or when the input is driven from a battery.
6/ When using external resistors to set the output voltage of the regulator, a minimum load current of 1 µA is recommended.

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 requirements for device classes Q and V shall be in accordance with MIL-PRF-38535 and as specified herein 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. The individual item requirements for device classes B and S shall be in accordance with MIL-PRF-38535, appendix A and as specified herein. The individual item requirements for device class M shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B devices and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein for device classes Q and V or MIL-PRF-38535, appendix A and herein for device classes B, M, and S.

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.

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

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table IIA. The electrical tests for each subgroup are defined in table I.

3.5 Marking. 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 MIL-HDBK-103. For packages where marking of the entire SMD PIN number is not feasible due to space limitations, the manufacturer has the option of not marking the "5962-" on the device. For RHA product using this option, the RHA designator shall still be marked. Marking for device classes Q and V shall be in accordance with MIL-PRF-38535. Marking for device classes B, M, and S shall be in accordance with MIL-PRF-38535, appendix A.

3.5.1 Certification/compliance mark. The certification mark for device classes Q and V shall be a "QML" or "Q" as required in MIL-PRF-38535. The certification mark for device classes B and S shall be a "J" or "JAN" as required in MIL-PRF-38535, appendix A. The compliance mark for device class M shall be a "C" as required in MIL-PRF-38535, appendix A.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Group A subgroups	Device class	Limits		Unit
					Min	Max	
Output voltage	V_O		1	B,M,S	4.975	5.025	V
			2, 3		4.940	5.060	
Line regulation	V_{OLINE}	$6 V \le V_{IN} \le 30 V$, $I_L = 1 mA$	1	B,M,S	-5.0	+5.0	mV
			2, 3		-25.0	+25.0	
Load regulation	V_{OLOAD}	$-100 \mu A \le I_L \le -100 mA$	1	B,M,S	-5.0	+5.0	mV
			2, 3		-25.0	+25.0	
Dropout voltage	V_{DO}	$I_L = -100 mA$	1	B,M,S		450	mV
			2, 3			600	
			1			80	
			2, 3			150	
Ripple rejection	RR	f = 120 Hz, $T_A = +25°C$, V_{IN} = 0.1 Vrms, See figure 4	4	B,S	50		dB
Ground current	I_G	$I_L = -100 mA$	1	B,M,S		12	mA
			2, 3			14	
			1			120	µA
			2, 3			140	
		$V_{IN} = 30 V$, $V_O = 15 V$	1			120	
			2, 3			140	
		$V_{IN} = 30 V$, $V_O = 15 V$, $I_L = -100 mA$	1			15	mA
			2, 3			20	
Ground current change	I_{GDIFF}	$6 V \le V_{IN} \le 30 V$	1	B,M,S	-30	+30	µA
			2, 3		-50	+50	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Group A subgroups	Device class	Limits		Unit
					Min	Max	
Ground current at current limit	I_{GSC}		1	B,S		20	mA
			2, 3			25	
Dropout ground current	I_{GDO}	V_{IN} = 4.5 V	1	B,M,S		170	µA
			2, 3			200	
Current limit	I_{SC}	2/	1	B,M,S		200	mA
			2, 3			220	
Thermal regulation	V_{RTH}	V_{IN} = 30 V, I_L = 50 mA, T_A = +25°C	1	B,M,S	-12.5	+12.5	mV
Reference voltage	V_{REF}		1	B,M,S	1.22	1.25	V
			2, 3		1.20	1.26	
Reference voltage line regulation	V_{RLINE}	2.3 V $\le V_{IN} \le$ 30 V	1	B,M,S	-1.9	+1.9	mV
			2, 3		-10.0	+10.0	
Reference voltage output regulation	V_{RLOAD}	1.2 V $\le V_O \le$ 29 V, V_{IN} = 30 V	1	B,M,S	-1.2	+1.2	mV
			2, 3		-5.0	+5.0	
Feedback pin bias current	I_{FB}		1	B,M,S		40	nA
			2, 3			60	
Error comparator output leakage current	I_{OH}	3/	1	B,M,S		1	µA
			2, 3			2	
Error comparator output low voltage 5/	V_{OL}	V_{IN} = 4.5 V, I_{OL} = 400 µA 4/ 11/	1	B,M,S		250	mV
			2, 3			400	
Error comparator upper threshold voltage 5/	V_{UT}	6/	1	B,M,S	40		mV
			2, 3		25		

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Error comparator lower threshold voltage 5/	V_{LT}	7/	1	B,M,S		95	mV
			2, 3			140	
Shutdown input logic voltage	V_{SDL}	8/	1, 2, 3	B,M,S		0.6	V
	V_{SDH}	9/			2.0		
Shutdown pin input current	I_{SD}	V_{SD} = 2.4 V, $\overline{ERROR}$ = 30 V	1	B,M,S		50	µA
			2, 3			100	
		V_{SD} = 30 V, $\overline{ERROR}$ = 30 V	1			600	
			2, 3			750	
Regulator output current in shutdown	I_{LKG}	V_{IN} = 30 V, V_{SD} = 2 V 2/	1	B,S	-10	10	µA
			2, 3		-20	20	
Output leakage current in shutdown	I_{LSD}	V_{SD} = 1.5 V, V_{IN} = 30 V	1	M	-10	10	µA
			2, 3		-20	20	
Output noise 10 Hz to 100 kHz	V_{NOISE} 1	C1 = 1 µF	7	B,S		600	µV rms
	V_{NOISE} 2	C1 = 3.3 µ 10/				250	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

1/ Unless otherwise specified, V_{IN} = 6 V, I_L = -100 µA, C_{LOAD} = 3.3 µF (see figure 3), feedback pin tied to 5 V tap pin, output pin tied to sense pin, and $V_{SD} \leq 0.6$ V , and V_{OUT} = 5 V nominal.
2/ Measured by shorting the output to ground through a 1.0Ω resistor (see figure 3).
3/ Voltage at test fixture pin 9 is 30 V. I_{OH} measured by the pin 9 source.
4/ Voltage at test fixture pin 9 is 30 V. Measure V_{OL} at the test fixture pin 4.
5/ Comparator thresholds are expressed in terms of a voltage differential at the feedback pin below the nominal reference voltage measured with V_{IN} = 6 V. To express these thresholds in terms of output voltage change, multiply by the error amplifier gain, V_{OUT}/V_{REF} = (R1+ R2)/R2. For example, at V_{OUT} = 5 V, the error pin is guaranteed to go low when V_{OUT} drops by 95 mV x 5 V/1.235 V, or 384 mV. Thresholds remain constant as a percent of V_{OUT}, with the dropout warning occuring at a maximum of 7.5 percent below the nominal V_{OUT}. If the voltage at device pin 7(V_{LT}) drops more than 95 mV below V_{REF} (table I, +25° C), the voltage at device pin 5 must be below 0.8 V (table III, +25° C). If the voltage at device pin 7(V_{UT}) then rises to less than 40 mV below V_{REF} (table I, +25° C), the voltage at device pin 5 must be above 2.0 V (table III, +25° C).
6/ Voltage at test fixture pin 9 is 30 V. Measure V_{UT} at the test fixture pin 4.
7/ Voltage at test fixture pin 9 is 30 V. Measure V_{LT} at the test fixture pin 4.
8/ V_{SDL} is guaranteed by applying 0.6 V to test circuit pin 12 (figure 3) on test number 1 (subgroup 1), test number 29 (subgroup 2), and test number 55 (subgroup 3). V_O remains with specification.
9/ V_{SDH} is guaranteed by applying 2.0 V to test circuit pin 12 (figure 4) on test number 23 (subgroup 1), test number 49 (subgroup 2), and test number 75 (subgroup 3). V_{OL} remains within specification. Must apply 30 V to test fixture pin 9.
10/ With C bypass (feedback to output) = 0.01 µF.
11/ 30 V at pin 9 across 75 kΩ resistor causes the condition of I_{OL} = 400 µA.

3.6 Certificate of compliance. For devices B and S, the manufacturer shall meet the requirements of MIL-PRF-38535 appendix A and this drawing, see 6.6.1. For device classes Q and V, a certificate of compliance shall be required from a QML-38535 listed manufacturer in order to supply to the requirements of this drawing (see 6.6.2 herein). For device class M, a certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-HDBK-103 and QML-38535 (see 6.6.3 herein). The certificate of compliance submitted to DSCC-VA prior to listing as an approved source of supply for this drawing shall affirm that the manufacturer's product meets, for device classes Q and V, the requirements of MIL-PRF-38535 and herein or for device class M, the requirements of MIL-PRF-38535, appendix A and herein.

3.7 Certificate of conformance. A certificate of conformance as required for device classes Q and V in MIL-PRF-38535 or for device classes B, M, and S in MIL-PRF-38535, appendix A shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change for device class M. For device class M, notification to DSCC-VA of change of product (see 6.2 herein) involving devices acquired to this drawing is required for any change as defined in MIL-STD-973.

3.9 Verification and review for device class M. For device class M, DSCC, DSCC'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.

3.10 Microcircuit group assignment for device classes B, M, and S. Device class B, M, and S devices covered by this drawing shall be in microcircuit group number 52 (see MIL-PRF-38535, appendix A).

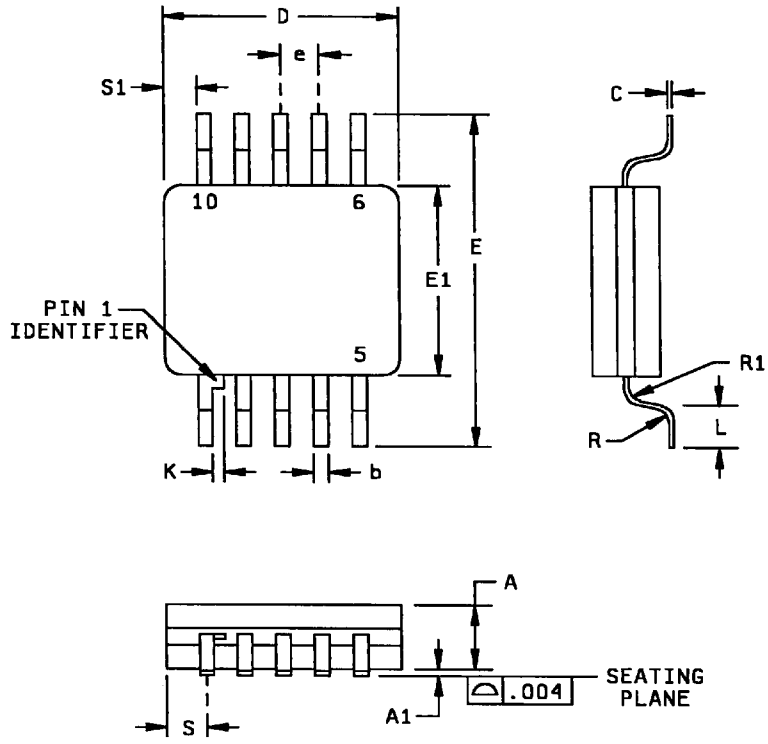


FIGURE 1. Case outline X.

STANDARD MICROCIRCUIT DRAWING DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE A		5962-38705
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Letter	Inches		Millimeters		Notes
	Min	Max	Min	Max	
A	.050	.080	1.27	2.03	
A1	.004	.012	0.10	0.30	
b	.015	.019	0.38	0.48	2
C	.004	.008	0.10	0.20	2
D		.270		6.86	
E	.400	.420	10.16	10.67	
E1	.236	.261	5.99	6.63	
e	.048	.052	1.22	1.32	
K	.008	.012	0.20	0.30	
L	.037	.043	0.94	1.09	
R	.013	.017	0.33	0.43	
R1	.013	.017	0.33	0.43	
S		.045		1.14	
S1	.005		0.13		

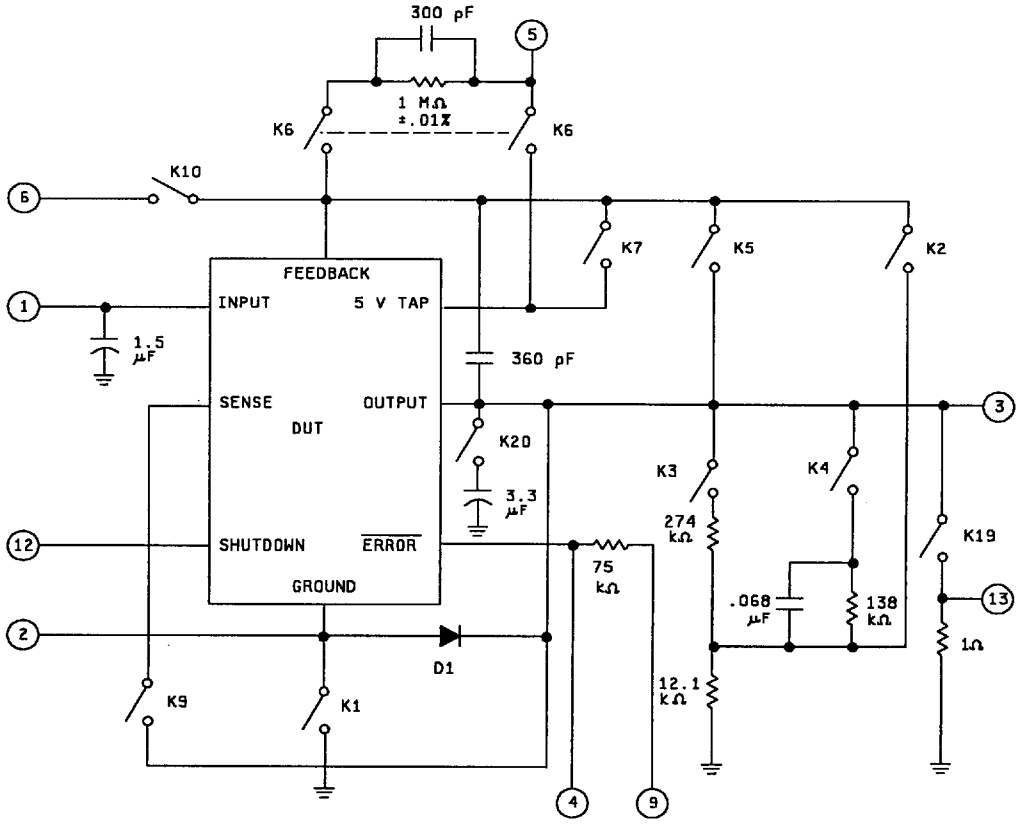
NOTES:
1. The U.S. government preferred system of measurement is the metric SI system. However, since this item was originally designed using inch pound units of measurement, in the event of conflict between the metric and inch-pound units, the inch-pound units shall take precedence.
2. Maximum limit may be increased by .003 inches after lead finish is applied.

FIGURE 1. Case outline X - Continued.

Device type	01		
Case outlines	G and P	X	2
Terminal numbers	Terminal connections		
1	OUTPUT	OUTPUT	NC
2	SENSE	SENSE	OUTPUT
3	SHUTDOWN	SHUTDOWN	NC
4	GROUND	GROUND	NC
5	$\overline{\text{ERROR}}$	NC	SENSE
6	5 V TAP	NC	NC
7	FEEDBACK	$\overline{\text{ERROR}}$	SHUTDOWN
8	INPUT	5 V TAP	NC
9	----	FEEDBACK	NC
10	----	INPUT	GROUND
11	----	---	NC
12	----	---	$\overline{\text{ERROR}}$
13	----	---	NC
14	----	---	NC
15	----	---	5 V TAP
16	----	---	NC
17	----	---	FEEDBACK
18	----	---	NC
19	----	---	NC
20	----	---	INPUT

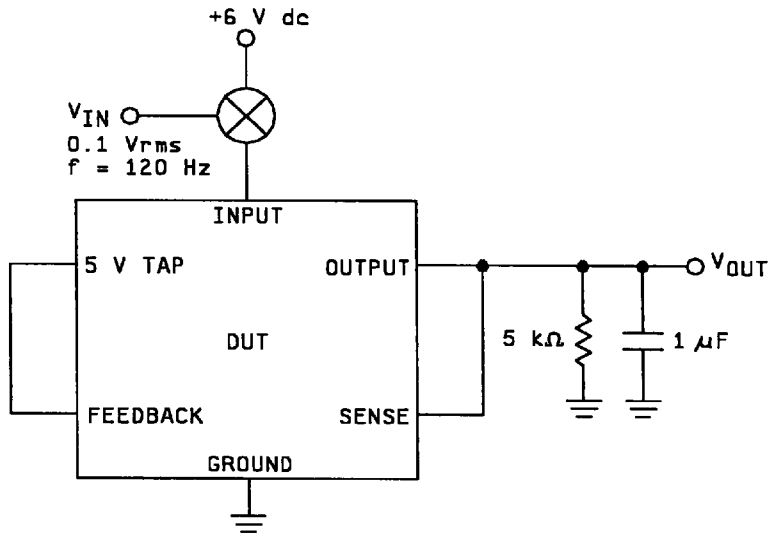
NC = No connection

FIGURE 2. Terminal connections.



NOTES:
1. Unless otherwise specified, tolerance for all resistors is ±5 percent.
2. Diode D1 is type 1N4002 or equivalent.

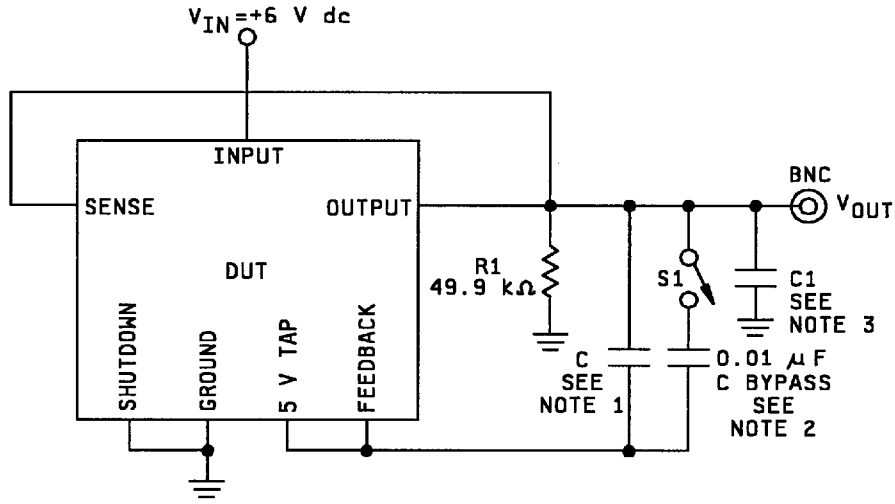
FIGURE 3. Test circuit for static and dynamic tests.



NOTES:

1. The input signal appearing at pin 8 of the device under test (DUT) is a 120 Hz, 0.1 V rms sine wave with a +6 V dc offset.
2. The instrument(s) used to measure V_{IN} and V_{OUT} shall have a minimum bandwidth of 10 Hz to 10 kHz, and shall measure true rms voltages. A 20 Hz to 200 Hz filter may be added to filter output noise to allow measurement of true ripple rejection.
3. If the output signal is too weak for the measurement instrument to detect, an amplifier with a gain of 1000 may be added to the DUT output.
4. Calculate: a. Without additional gain at output: RR = 20 log (V_{IN}/V_{OUT}).
   b. With additional gain of 1000 at DUT output: RR = 20 log (1000 V_{IN}/V_{OUT}).

FIGURE 4. Test circuit for ripple rejection (RR) test.



NOTES:

1. Not necessary for bench box. May be necessary if circuit is integrated figure 2 test circuit. Value of C dependent of correlation to bench box. Add capacitance as necessary to compensate for automatic test equipment (ATE) stray capacitance.
2. With C bypass (pin 1 to pin 7) = 0.01 µF.
3. Test 1: C1 = 1 µF, S1 is open. V_{NOISE1} = rms value of V_{OUT}.
   Test 2: C1 = 3.3 µF, S1 is open. V_{NOISE2} = rms value of V_{OUT}.

FIGURE 5. Test circuit for noise tests.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. For device classes Q and V, sampling and inspection procedures shall be in accordance with MIL-PRF-38535 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. For device classes B and S, sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A and method 5005 of MIL-STD-883, except as modified herein. For device class M, sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A.

4.2 Screening. For device classes Q and V, screening shall be in accordance with MIL-PRF-38535, and shall be conducted on all devices prior to qualification and technology conformance inspection. For device classes B and S, screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to qualification and quality conformance inspection. For device class M, screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection.

4.2.1 Additional criteria for device class M, B, and S.

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition C. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015.

(2) T_A = +125°C, minimum.

b. Interim and final electrical test parameters shall be as specified in table IIA herein.

4.2.2 Additional criteria for device classes Q and V.

a. The burn-in test duration, test condition and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document revision level control of the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. 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.

b. Interim and final electrical test parameters shall be as specified in table IIA herein.

c. Additional screening for device class V beyond the requirements of device class Q shall be as specified in MIL-PRF-38535, appendix B.

4.3 Qualification inspection.

4.3.1 Qualification inspection for device classes B and S. Qualification inspection for device classes B and S shall be in accordance with MIL-PRF-38535, appendix A. Inspections to be performed shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.5).

4.3.2 Qualification inspection for device classes Q and V. Qualification inspection for device classes Q and V shall be in accordance with MIL-PRF-38535. Inspections to be performed shall be those specified in MIL-PRF-38535 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.4).

4.4 Conformance inspection. Technology conformance inspection for classes Q and V shall be in accordance with MIL-PRF-38535 including groups A, B, C, D, and E inspections and as specified herein except where option 2 of MIL-PRF-38535 permits alternate in-line control testing. Quality conformance inspection for device classes M, B, and S shall be in accordance with MIL-PRF-38535, appendix A and as specified herein. Inspections to be performed for device classes M, B, and S shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.4).

4.4.1 Group A inspection.

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

b. Subgroups 5, 6, 8, 9, 10, and 11 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. For device class M, subgroup 7 tests shall be sufficient to verify the functionality of the device. For device classes B and S, subgroup 7 tests shall be sufficient to verify the functionality of the device as approved by the qualifying activity. For device classes Q and V, subgroup 7 shall include verifying the functionality of the device.

4.4.2 Group C inspection. The group C inspection end-point electrical parameters shall be as specified in table IIA herein.

4.4.2.1 Additional criteria for device classes M, B, and S. Steady-state life test conditions, method 1005 of MIL-STD-883:

a. Test condition C. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. 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.

b. T_A = +125°C, minimum.

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

4.4.2.2 Additional criteria for device classes Q and V. The steady-state life test duration, test condition and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The test circuit shall be maintained under document revision level control by the device manufacturer's TRB in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. 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.

4.4.3 Group D inspection. The group D inspection end-point electrical parameters shall be as specified in table IIA herein.

4.4.4 Group E inspection. Group E inspection is required only for parts intended to be marked as radiation hardness assured (see 3.5 herein).

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

b. For device classes Q and V, the devices or test vehicle shall be subjected to radiation hardness assured tests as specified in MIL-PRF-38535 for the RHA level being tested. For device classes M, B and S, the devices shall be subjected to radiation hardness assured tests as specified in MIL-PRF-38535, appendix A for the RHA level being tested. All device classes must meet the postirradiation end-point electrical parameter limits as defined in table I at T_A = +25°C ±5°C, after exposure, to the subgroups specified in table IIA herein.

c. When specified in the purchase order or contract, a copy of the RHA delta limits shall be supplied.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535 for device classes Q and V or MIL-PRF-38535, appendix A for device classes M, B and S.

TABLE IIA. Electrical test requirements.

Test requirements	Subgroups (in accordance with MIL-STD-883, method 5005, table I)			Subgroups (in accordance with MIL-PRF-38535, table III)	
	Device class M	Device class B	Device class S	Device class Q	Device class V
Interim electrical parameters (see 4.2)	1	1	1	1	1
Final electrical parameters (see 4.2)	1,2,3 1/	1,2,3 1/	1,2,3 1/	1,2,3 1/	1,2,3 1/
Group A test requirements (see 4.4)	1,2,3,4,7	1,2,3,4,7	1,2,3,4,7	1,2,3,4,7	1,2,3,4,7
Group C end-point electrical parameters (see 4.4)	1,2,3	1,2,3 2/	---	1,2,3	1,2,3 2/
Group D end-point electrical parameters (see 4.4)	1	1	1	1	1
Group E end-point electrical parameters (see 4.4)	1	1,4,7	1,4,7	1,4,7	1,4,7

1/ PDA applies to subgroup 1.
2/ Delta limits in accordance with table IIB shall be computed with reference to the previous interim electrical parameters.

TABLE IIB. Group C end-point electrical parameters. T_A = +25°C.

Device type	Test	Limit		Unit	Delta 1/		Unit
		Min	Max		Min	Max	
01	V_{REF}	1.22	1.25	V	-5.5	+5.5	mV
	I_{G2}	0	120	µA	-6.5	+6.5	µA

1/ Delta limits apply to the measured value (see MIL-PRF-38535 appendix A).

TABLE III. Group A inspection for device type 01.

Subgroup number	Symbol 1/	Test number	Adapter pin number						Relays energized
			1	2	3	6	9	12	
1	V_O	1	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9
T_A = +25° C	V_{OLINE}	2	30 V	0 V	-1 mA	open	open	0.6 V	1,7,9
	V_{OLINE}	3	6 V	0 V	-1 mA	open	open	0.6 V	1,7,9
	V_{OLOAD}	4	6 V	0 V	-100 mA	open	open	0.6 V	1,7,9
	V_{OLOAD}	5	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	VDO1	6	Z 2/	0 V	-100 mA	open	open	0.6 V	1,7,9
	V_{DO2}	7	Z 2/	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{G1}	8	6 V	0 V	-100 mA	open	open	0.6 V	1,7,9
	I_{G2}	9	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{GDIFF}	10	30 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{GDO}	11	4.5 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{G3}	12	30 V	0 V	open	open	open	0.6 V	1,2,4
	I_{G4}	13	30 V	0 V	-100 mA	open	open	0.6 V	1,2,4
	I_{SC}	14	6 V	0 V	3/	open	open	0.6 V	1,7,9,19
	I_{GSC}	15	6 V	1 mV	3/	open	open	0.6 V	7,9,19
	V_{RTH} 4/	16	30 V	0 V	-50 mA	open	open	0.6 V	1,7,9
	V_{RTH} 4/	17	30 V	0 V	-50 mA	open	open	0.6 V	1,7,9
	V_{REF}	18	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9,10
	V_{RLINE}	19	2.3 V	0 V	-100 µA	open	open	0.6 V	1,2,5,9,10
	V_{RLINE}	20	30 V	0 V	-100 µA	open	open	0.6 V	1,2,5,9,10
	V_{RLOAD}	21	30 V	0 V	-100 µA	open	open	0.6 V	1,2,3,9,10
	V_{RLOAD}	22	30 V	0 V	-100 µA	open	open	0.6 V	1,3,5,9,10
	I_{FB}	23	6 V	0 V	-100 µA	open	open	0.6 V	1,6,9,10
	I_{OH}	24	6 V	0 V	-100 µA	open	30 V	0.6 V	1,7,9

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 - Continued.

Subgroup number	Symbol 1/	Test number	Pin measured			Equation 5/	Limits		Unit
			Number	Value	Unit		Min	Max	
1	V_O	1	3	E1	V	V_{OUT} = E1	+4.975	+5.025	V
T_A = +25°C	V_{OLINE}	2	3	E2	V				
	V_{OLINE}	3	3	E2A	V	VOLINE = (E2 - E2A) x 1000	-5.0	+5.0	mV
	V_{OLOAD}	4	3	E3	V				
	V_{OLOAD}	5	3	E3A	V	V_{OLOAD} = (E3 - E3A) x 1000	-5.0	+5.0	mV
	V_{DO1}	6	3	E4	V	V_{DO1} = (Z_{FINAL} - E4) x 1000		450	mV
	V_{DO2}	7	3	E5	V	V_{DO2} = (Z_{FINAL} - E5) x 1000		80	mV
	I_{G1}	8	1	I1	mA	I_{G1} = I1 - 100		12	mA
	I_{G2}	9	1	I2	µA	I_{G2} = I2 -100		120	µA
	I_{GDIFF}	10	1	I3	µA	I_{GDIFF} = I3 - I2	-30	+30	µA
	I_{GDO}	11	1	I4	µA	I_{GDO} = I4 - 100		170	µA
	I_{G3}	12	1	I5	µA	I_{G3} = I5 - 100		120	µA
	I_{G4}	13	1	I6	mA	I_{G4} = I6 - 100		15	mA
	I_{SC}	14	13	E6	V	I_{SC} = E6 x 1000		200	mA
	I_{GSC}	15	2	I7	mA	I_{GSC} = I7		20	mA
	V_{RTH} 4/	16	3	E7	V				
	V_{RTH} 4/	17	3	E8	V	V_{RTH} = (E8-E7) x 1000	-12.5	+12.5	mV
	V_{REF}	18	6	E9	V	V_{REF} = E9	1.22	1.25	V
	V_{RLINE}	19	6	E10	V				
	V_{RLINE}	20	6	E11	V	V_{RLINE} = (E11 - E10) x 1000	-1.9	+1.9	mV
	V_{RLOAD}	21	6	E12	V				
	V_{RLOAD}	22	6	E13	V	V_{RLOAD} = (E13 - E12) x 1000	-1.2	+1.2	mV
	I_{FB}	23	5,6	E14	V	I_{FB} = E14 x 1000		40	nA
	I_{OH}	24	9	I8	µA	I_{OH} = I8		1	µA

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 - Continued.

Subgroup number	Symbol 1/	Test number	Adapter pin number						Relays energized
			1	2	3	6	9	12	
1 T_A = +25°C	V_{OL}	25	4.5 V	0 V	-100 µA	open	30 V	2 V	1,7,9
	V_{UT}	26 6/	6 V	0 V	-100 µA	6/	30 V	0.6 V	1,7,9,10
	V_{LT}	27 6/	6 V	0 V	-100 µA	6/	30 V	0.6 V	1,7,9,10
	I_{SD1}	28	6 V	0 V	-100 µA	open	30 V	2.4 V	1,7,9
	I_{SD2}	29	6 V	0 V	-100 µA	open	30 V	30 V	1,7,9
	I_{LKG}	30	30 V	0 V	0 V	open	30 V	2 V	1,7,9,20
2 T_A = +125°C	V_O	31	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	V_{OLINE}	32	30 V	0 V	-1 mA	open	open	0.6 V	1,7,9
	V_{OLINE}	33	6 V	0 V	-1 mA	open	open	0.6 V	1,7,9
	V_{OLOAD}	34	6 V	0 V	-100 mA	open	open	0.6 V	1,7,9
	V_{OLOAD}	35	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	V_{DO1}	36	Z 2/	0 V	-100 mA	open	open	0.6 V	1,7,9
	V_{DO2}	37	Z 2/	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{G1}	38	6 V	0 V	-100 mA	open	open	0.6 V	1,7,9
	I_{G2}	39	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{GDIFF}	40	30 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{GDO}	41	4.5 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{G3}	42	30 V	0 V	open	open	open	0.6 V	1,2,4
	I_{G4}	43	30 V	0 V	-100 mA	open	open	0.6 V	1,2,4
	I_{SC}	44	6 V	0 V	3/	open	open	0.6 V	1,7,9,19
	I_{GSC}	45	6 V	1 mV	3/	open	open	0.6 V	7,9,19
	V_{REF}	46	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9,10
	V_{RLINE}	47	2.3 V	0 V	-100 µA	open	open	0.6 V	1,2,5,9,10
	V_{RLINE}	48	30 V	0 V	-100 µA	open	open	0.6 V	1,2,5,9,10

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 - Continued.

Subgroup number	Symbol 1/	Test number	Pin measured			Equation 5/	Limits		Unit
			Number	Value	Unit		Min	Max	
1 T_A = +25°C	V_{OL}	25	4	E15	V	V_{OL} = E15 x 1000		250	mV
	V_{UT}	26 6/	4	E16	V	E16 6/	2.0	30	V
	V_{LT}	27 6/	4	E17	V	E17 6/	0	0.8	V
	I_{SD1}	28	12	I9	µA	I_{SD1} = I9		50	µA
	I_{SD2}	29	12	I10	µA	I_{SD2} = I10		600	µA
	I_{LKG}	30	3	I11	µA	I_{LKG} = I11	-10	+10	µA
2 T_A = +125°C	V_O	31	3	E18	V	V_{OUT} = E18	+4.940	+5.060	V
	V_{OLINE}	32	3	E19	V				
	V_{OLINE}	33	3	E19A	V	V_{OLINE} = (E19 - E19A) x 1000	-25.0	+25.0	mV
	V_{OLOAD}	34	3	E20	V				
	V_{OLOAD}	35	3	E20A	V	V_{OLOAD} = (E20 - E20A) x 1000	-15.0	+15.0	mV
	V_{DO1}	36	3	E21	V	V_{DO1} = (Z_{FINAL} - E21) x 1000		600	mV
	V_{DO2}	37	3	E22	V	V_{DO2} = (Z_{FINAL} - E22) x 1000		150	mV
	I_{G1}	38	1	I12	mA	I_{G1} = I12 - 100		14	mA
	I_{G2}	39	1	I13	µA	I_{G2} = I13 - 100		140	µA
	I_{GDIFF}	40	1	I14	µA	I_{GDIFF} = I14 - I13	-50	+50	µA
	I_{GDO}	41	1	I15	µA	I_{GDO} = I15 - 100		200	µA
	I_{G3}	42	1	I16	µA	I_{G3} = I16 - 100		140	µA
	I_{G4}	43	1	I17	mA	I_{G4} = I17 - 100		20	mA
	I_{SC}	44	13	E23	V	I_{SC} = E23 x 1000		220	mA
	I_{GSC}	45	2	I18	mA	I_{GSC} = I18		25	mA
	V_{REF}	46	6	E24	V	V_{REF} = E24	1.20	1.26	V
	V_{RLINE}	47	6	E25	V				
	V_{RLINE}	48	6	E26	V	V_{RLINE} = (E26 - E25) x 1000	-10	+10	mV

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 - Continued.

Subgroup number	Symbol 1/	Test number	Adapter pin number						Relays energized
			1	2	3	6	9	12	
2 T_A = +125°C	V_{RLOAD}	49	30 V	0 V	-100 µA	open	open	0.6 V	1,2,3,9,10
	V_{RLOAD}	50	30 V	0 V	-100 µA	open	open	0.6 V	1,3,5,9,10
	I_{FB}	51	6 V	0 V	-100 µA	open	open	0.6 V	1,6,9,10
	I_{OH}	52	6 V	0 V	-100 µA	open	30 V	0.6 V	1,7,9
	V_{OL}	53	4.5 V	0 V	-100 µA	open	30 V	2 V	1,7,9
	V_{UT}	54 6/	6 V	0 V	-100 µA	6/	30 V	0.6 V	1,7,9,10
	V_{LT}	55 6/	6 V	0 V	-100 µA	6/	30 V	0.6 V	1,7,9,10
	I_{SD1}	56	6 V	0 V	-100 µA	open	30 V	2.4 V	1,7,9
	I_{SD2}	57	6 V	0 V	-100 µA	open	30 V	30 V	1,7,9
	I_{LKG}	58	30 V	0 V	0 V	open	30 V	2 V	1,7,9,20
3 T_A = -55°C	V_O	59	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	V_{OLINE}	60	30 V	0 V	-1 mA	open	open	0.6 V	1,7,9
	V_{OLINE}	61	6 V	0 V	-1 mA	open	open	0.6 V	1,7,9
	V_{OLOAD}	62	6 V	0 V	-100 mA	open	open	0.6 V	1,7,9
	V_{OLOAD}	63	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	V_{DO1}	64	Z 2/	0 V	-100 mA	open	open	0.6 V	1,7,9
	V_{DO2}	65	Z 2/	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{G1}	66	6 V	0 V	-100 mA	open	open	0.6 V	1,7,9
	I_{G2}	67	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{GDIFF}	68	30 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{GDO}	69	4.5 V	0 V	-100 µA	open	open	0.6 V	1,7,9
	I_{G3}	70	30 V	0 V	open	open	open	0.6 V	1,2,4
	I_{G4}	71	30 V	0 V	-100 mA	open	open	0.6 V	1,2,4
	I_{SC}	72	6 V	0 V	3/	open	open	0.6 V	1,7,9,19
	I_{GSC}	73	6 V	1 mV	3/	open	open	0.6 V	7,9,19

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 - Continued.

Subgroup number	Symbol 1/	Test number	Pin measured			Equation 5/	Limits		Unit
			Number	Value	Unit		Min	Max	
2 T_A = +125°C	V_{RLOAD}	49	6	E27	V				
	V_{RLOAD}	50	6	E28	V	V_{RLOAD} = (E28 - E27) x 1000	-5	+5	mV
	I_{FB}	51	5,6	E29	V	I_{FB} = E29 x 1000		60	nA
	I_{OH}	52	9	I19	µA	I_{OH} = I19		2	µA
	V_{OL}	53	4	E30	V	V_{OL} = E30 x 1000		400	mV
	V_{UT}	54 6/	4	E31	V	E31 6/	2.0	30	V
	V_{LT}	55 6/	4	E32	V	E32 6/	0	0.8	V
	I_{SD1}	56	12	I20	µA	I_{SD1} = I20		100	µA
	I_{SD2}	57	12	I21	µA	I_{SD2} = I21		750	µA
	I_{LKG}	58	3	I22	µA	I_{LKG} = I22	-20	+20	µA
3 T_A = -55°C	V_O	59	3	E33	V	V_{OUT} = E33	+4.940	+5.060	V
	V_{OLINE}	60	3	E34	V				
	V_{OLINE}	61	3	E34A	V	VOLINE = (E34 - E34A) x 1000	-25.0	+25.0	mV
	V_{OLOAD}	62	3	E35	V				
	V_{OLOAD}	63	3	E35A	V	V_{OLOAD} = (E35 - E35A) x 1000	-15.0	+15.0	mV
	V_{DO1}	64	3	E36	V	V_{DO1} = (Z_{FINAL} - E36) x 1000		600	mV
	V_{DO2}	65	3	E37	V	V_{DO2} = (Z_{FINAL} - E37) x 1000		150	mV
	I_{G1}	66	1	I23	mA	I_{G1} = I23 - 100		14	mA
	I_{G2}	67	1	I24	µA	I_{G2} = I24 - 100		140	µA
	I_{GDIFF}	68	1	I25	µA	I_{GDIFF} = I25 - I24	-50	+50	µA
	I_{GDO}	69	1	I26	µA	I_{GDO} = I26 - 100		200	µA
	I_{G3}	70	1	I27	µA	I_{G3} = I27 - 100		140	µA
	I_{G4}	71	1	I28	mA	I_{G4} = I28 - 100		20	mA
	I_{SC}	72	13	E38	V	I_{SC} = E38 x 1000		220	mA
	I_{GSC}	73	2	I29	mA	I_{GSC} = I29		25	mA

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 - Continued.

Subgroup number	Symbol 1/	Test number	Adapter pin number						Relays energized
			1	2	3	6	9	12	
3 T_A = -55°C	V_{REF}	74	6 V	0 V	-100 µA	open	open	0.6 V	1,7,9,10
	V_{RLINE}	75	2.3 V	0 V	-100 µA	open	open	0.6 V	1,2,5,9,10
	V_{RLINE}	76	30 V	0 V	-100 µA	open	open	0.6 V	1,2,5,9,10
	V_{RLOAD}	77	30 V	0 V	-100 µA	open	open	0.6 V	1,2,3,9,10
	V_{RLOAD}	78	30 V	0 V	-100 µA	open	open	0.6 V	1,3,5,9,10
	I_{FB}	79	6 V	0 V	-100 µA	open	open	0.6 V	1,6,9,10
	I_{OH}	80	6 V	0 V	-100 µA	open	30 V	0.6 V	1,7,9
	V_{OL}	81	4.5 V	0 V	-100 µA	open	30 V	2 V	1,7,9
	V_{UT}	82 6/	6 V	0 V	-100 µA	6/	30 V	0.6 V	1,7,9,10
	V_{LT}	83 6/	6 V	0 V	-100 µA	6/	30 V	0.6 V	1,7,9,10
	I_{SD1}	84	6 V	0 V	-100 µA	open	30 V	2.4 V	1,7,9
	I_{SD2}	85	6 V	0 V	-100 µA	open	30 V	30 V	1,7,9
	I_{LKG}	86	30	0 V	0 V	open	30 V	2 V	1,7,9,20
4 T_A = +25°C	RR	87	This test shall be performed using the conditions and procedures listed in figure 4.						
7 T_A = +25°C	V_{NOISE1} V_{NOISE2}	88 89	These tests shall be performed using the conditions and procedures listed in figure 5.						

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 - Continued.

Subgroup number	Symbol 1/	Test number	Pin measured			Equation 5/	Limits		Unit
			Number	Value	Unit		Min	Max	
3 T_A = -55°C	V_{REF}	74	6	E39	V	V_{REF} = E39	1.20	1.26	V
	V_{RLINE}	75	6	E40	V				
	V_{RLINE}	76	6	E41	V	V_{RLINE} = (E41 - E40) x 1000	-10	+10	mV
	V_{RLOAD}	77	6	E42	V				
	V_{RLOAD}	78	6	E43	V	V_{RLOAD} = (E43 - E42) x 1000	-5	+5	mV
	I_{FB}	79	5,6	E44	V	I_{FB} = E44 x 1000		60	nA
	I_{OH}	80	9	I30	µA	I_{OH} = I30		2	µA
	V_{OL}	81	4	E45	V	V_{OL} = E45 x 1000		400	mV
	V_{UT}	82 6/	4	E46	V	E46 6/	2.0	30	V
	V_{LT}	83 6/	4	E47	V	E47 6/	0	0.8	V
	I_{SD1}	84	12	I31	µA	I_{SD1} = I31		100	µA
	I_{SD2}	85	12	I32	µA	I_{SD2} = I32		750	µA
	I_{LKG}	86	3	I33	µA	I_{LKG} = I33	+20	-20	µA
4 T_A = +25°C	RR	87	This test shall be performed using the conditions and procedures in figure 4.				50		dB
7 T_A = +25°C	V_{NOISE1}	88	These tests shall be performed using the conditions and procedures in figure 5.					600	µV
	V_{NOISE2}	89						250	µV

1/ Unless otherwise specified, all tests performed using the circuit of figure 3.
2/ For V_{DO1}, the value of Z is initially (E1, E18, or E33) + 0.350 V. For V_{DO2}, the value of Z is initially (E1, E18, or E33). Z is then decremented by 10 mV, and at each value of Z, a corresponding measurement of the output voltage (E4, E5, E21, E22, E36, or E37) is taken. When the measured value of the output voltage drops more than 100 mV below it's nominal value (E1, E18, or E33), the input to output differential at that value of Z is defined as the dropout voltage (V_{DO}).
3/ Measure by shorting the output to ground through a 1.0 Ω resistor (see figure 3).
4/ When the conditions for the V_{RTH} test are applied, set t = 0 ms. When t = 2 ms, take the first voltage measurement at pin 3 (E7). When t = 10 ms, take the second voltage reading at pin 3 (E8). V_{RTH} is defined as the difference between the two readings.
5/ Table III equations perform unit conversions from the measured value units to the limit value units.
6/ These tests do not measure the thresholds directly. They simply check to ensure that the threshold is in the expected region. These tests are go/no go tests; the measurement values themselves do not need to be recorded, only an indication of pass/fail. For V_{LT}, set the voltage at device pin 7 to E9 - 0.095 V for T_A = +25°C, E24 - 0.140 V for T_A = +125°C,and E39 - 0.140 for T_A = -55°C. For V_{UT}, set the voltage at device pin 7 to E9 - 0.040 V for T_A = +25°C, E24 - 0.025 V for T_A = +125°C, and E39 - 0.025 V for T_A = -55°C.

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.

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

6.1.2 Substitutability. Device class Q or B devices will replace device class M devices.

6.2 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.

6.3 Record of users. Military and industrial users should inform Defense Supply Center Columbus when a system application requires configuration control and which SMD's are applicable to that system. 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) 692-0525.

6.4 Comments. Comments on this drawing should be directed to DSCC-VA , Columbus, Ohio 43216-5000, or telephone (614) 692-0674.

6.5 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535 and MIL-HDBK-1331.

6.6 Sources of supply.

6.6.1 Sources of supply for device classes B and S. Sources of supply for device classes B and S are listed in QML-38535. The vendors listed in QML-38535 have submitted a certificate of compliance (see 3.6 herein) to DSCC-VA and have agreed to this drawing.

6.6.2 Sources of supply for device classes Q and V. Sources of supply for device classes Q and V are listed in QML-38535. The vendors listed in QML-38535 have submitted a certificate of compliance (see 3.6 herein) to DSCC-VA and have agreed to this drawing.

6.6.3 Approved sources of supply for device class M. Approved sources of supply for class M are listed in MIL-HDBK-103. The vendors listed in MIL-HDBK-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DSCC-VA.

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 98-02-20

Approved sources of supply for SMD 5962-38705 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38535 during the next revision. MIL-HDBK-103 and QML-38535 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-38535.

Standard microcircuit drawing PIN 1/	Vendor CAGE number	Vendor similar PIN 2/
5962-3870501BGA	27014	LP2951H
5962-3870501BPA	27014	LP2951J
5962-3870501B2A	3/	LP2951E
5962-3870501MGA	27014	LP2951H/883
5962-3870501MPA	27014	LP2951J/883
5962-3870501MXA	27014	LP2951WG/883
5962-3870501M2A	27014	LP2951E/883
5962-3870501SGA	27014	LP2951H
5962-3870501SPA	27014	LP2951J
5962-3870501S2A	27014	LP2951E

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	Vendor name and address
27014	National Semiconductor Corporation 2900 Semiconductor Drive P.O. Box 58090 Santa Clara, CA 95052-8090

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