

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Change input to output voltage differential in 1.3, 1.4, V_{REE} , V_{RLINE} , I_{ADJ} , and delta I_{ADJ} conditions. Change I_{LIM} test limits for conditions $(V_{IN} - V_{OUT}) = 2.5$ V from 0.05 A to 0.075 A. Add case outline Y (T0-39).	92-08-19	M. A. Frye
B	Changes in accordance with NOR 5962-R034-94.	92-12-23	M. A. Frye
C	Add case outline Z. Technical and editorial changes throughout.	94-08-09	M. A. Frye

THE FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

REV																				
SHEET																				
REV																				
SHEET																				
REV STATUS OF SHEETS		REV	C	C	C	C	C	C	C	C	C	C	C	C	C					
		SHEET	1	2	3	4	5	6	7	8	9	10	11	12						
PMIC N/A		PREPARED BY Joseph A Kerby				DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444														
STANDARDIZED MILITARY DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE AMSC N/A		CHECKED BY Charles E Besore				MICROCIRCUIT, LINEAR, POSITIVE REGULATOR, ADJUSTABLE, MONOLITHIC SILICON														
		APPROVED BY Michael A. Frye																		
		DRAWING APPROVAL DATE 90-07-24				SIZE A	CAGE CODE 67268	5962-89981												
		REVISION LEVEL C				SHEET 1		OF 12												

DESC FORM 193

JUL 91

5962-E080-94

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

9004708 0003890 742

1. SCOPE

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 non-JAN devices".

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

5962-89981	01	X	X
Drawing number	Device type (see 1.2.1)	Case outline (see 1.2.2)	Lead finish (see 1.2.3)

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

Device type	Generic number	Circuit function
01	LT1086/OM186	Positive regulator, adjustable

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

Outline letter	Descriptive designator	Terminals	Package style
X	See figure 1	2	T0-3 Can
U	See figure 1	3	T0-257 Flange mounted, with isolated tab
Y	See figure 1	3	T0-39 Can
Z	See figure 1	3	Z-tab

1.2.3 Lead finish. The lead finish shall be as specified in MIL-STD-883 (see 3.1 herein). Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings.

Input to output voltage differential	25 V dc
Output current (I_{MAX}):	
Cases X, U, and Z	1.0 A
Cases Y	0.5 A
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Power dissipation (P_D)	Internally limited
Thermal resistance, junction-to-case (Θ_{JC}):	
Case X	3.0°C/W
Cases U and Z	4.2°C/W
Case Y	40°C/W
Thermal resistance, junction-to-ambient (Θ_{JA}):	
Case X	35°C/W
Cases U and Z	42°C/W
Case Y	140°C/W
Junction temperature (T_J)	+150°C

1.4 Recommended operating conditions.

Input to output voltage differential	15 V dc
Ambient operating temperature range (T_A)	-55°C to +125°C

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89981
		REVISION LEVEL C	SHEET 2

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and bulletin. Unless otherwise specified, the following specification, standards, and bulletin 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-I-38535 - Integrated Circuits (Microcircuits) Manufacturing, General Specification for.

STANDARDS

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.
MIL-STD-1835 - Microcircuit Case Outlines.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawings (SMD's).

(Copies of the specification, standards, and bulletin 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. Product built to this drawing that is produced by a Qualified Manufacturer Listing (QML) certified and qualified manufacturer or a manufacturer who has been granted transitional certification to MIL-I-38535 may be processed as QML product in accordance with the manufacturers approved program plan and qualifying activity approval in accordance with MIL-I-38535. This QML flow as documented in the Quality Management (QM) plan may make modifications to the requirements herein. These modifications shall not affect form, fit, or function of the device. These modifications shall not affect the PIN as described herein. A "Q" or "QML" certification mark in accordance with MIL-I-38535 is required to identify when the QML flow option is used.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-STD-883 (see 3.1 herein) and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein.

3.2.2 Case outline dimensions. The case outline dimensions shall be as specified on figure 1.

3.2.3 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 ambient 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-STD-883 (see 3.1 herein). 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-BUL-103 (see 6.6 herein).

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89981
		REVISION LEVEL C	SHEET 3

DESC FORM 193A
JUL 91

9004708 0003892 515

TABLE 1. Electrical performance characteristics.

Test	Symbol	Conditions <u>1/</u> -55°C ≤ T _A ≤ +125°C unless otherwise specified		Group A subgroups	Limits		Unit
					Min	Max	
Reference voltage	V _{REF}	I _{OUT} = 10 mA, (V _{IN} - V _{OUT}) = 3.0 V		1	1.238	1.262	V
		1.5 V ≤ (V _{IN} - V _{OUT}) ≤ 15 V, 10 mA ≤ I _{OUT} ≤ I _{MAX}	Cases X and Y	1,2,3	1.225	1.270	V
			Cases U and Z	1,2,3	1.220	1.270	
Line regulation <u>2/</u>	V _{RLINE}	1.5 V ≤ (V _{IN} - V _{OUT}) ≤ 15 V, I _{OUT} = 10 mA		1,2,3		0.2	%
Load regulation <u>2/</u>	V _{RLOAD}	(V _{IN} - V _{OUT}) = 3.0 V, 10 mA ≤ I _{OUT} ≤ I _{MAX}	Cases X and Y	1		0.3	%
			Cases U and Z	1		0.8	
			Cases X and Y	2,3		0.4	
			Cases U and Z	2,3		1.0	
Dropout voltage	V _{DO}	I _{OUT} = I _{MAX} , delta V _{REF} = 1.0%		1,2,3		1.5	V
Thermal regulation	---	30 ms pulse, T _A = +25°C		1		0.04	%/W
Ripple rejection	ΔV _{IN} / ΔV _{OUT}	C _{ADJ} = 25 μF, f = 120 Hz, C _{OUT} = 25 μF (tantalum), I _{OUT} = I _{MAX} , (V _{IN} - V _{OUT}) = 3.0 V		4,5,6	60		dB
Adjust pin current	I _{ADJ}	1.5 V ≤ (V _{IN} - V _{OUT}) ≤ 15 V, 10 mA ≤ I _{OUT} ≤ I _{MAX}		1,2,3		120	μA

See footnotes at end of table.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

5962-89981

REVISION LEVEL
C

SHEET

4

DESC FORM 193A
JUL 91

9004708 0003893 451

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _A ≤ +125°C unless otherwise specified		Group A subgroups	Limits		Unit
					Min	Max	
Adjust pin current change	ΔI _{ADJ}	10 mA ≤ I _{OUT} ≤ I _{MAX} 1.5 V ≤ (V _{IN} - V _{OUT}) ≤ 15 V		1,2,3		5.0	μA
Minimum load current	I _{MIN}	(V _{IN} - V _{OUT}) = 25 V		1,2,3		10	mA
Current limit	I _{LIM}	(V _{IN} - V _{OUT}) = 5.0 V	Case X	1,2,3	1.5	2.8	A
			Cases U and Z		1.5	2.5	
			Case Y		0.5	1.2	
		(V _{IN} - V _{OUT}) = 25 V	Case X	1,2,3	0.05		A
			Cases U and Z		0.075		
Case Y	0.02						
Temperature stability <u>3</u> /	ΔV _{OUT} /ΔT	-55°C ≤ T _J ≤ +125°C		1,2,3		1.5	%
Long term stability <u>3</u> /	ΔV _{OUT} /Δt	T _A = +125°C, t = 1000 hrs		2		1.0	%

1/ For case outlines X, U, and Z, $I_{\text{MAX}} = 1.0 \text{ A}$.
For case outline Y, $I_{\text{MAX}} = 0.5 \text{ A}$.

2/ Line and load regulation are measured at a constant junction temperature using a low duty cycle pulse technique. Although power dissipation is internally limited, regulation is guaranteed up to the maximum power dissipation of 15 W. Power dissipation is determined by the input/output differential voltage and the output current. Guaranteed maximum power dissipation will not be available over the full input/output voltage range.

3/ If not tested, shall be guaranteed to the limits specified in table I.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

5962-89981

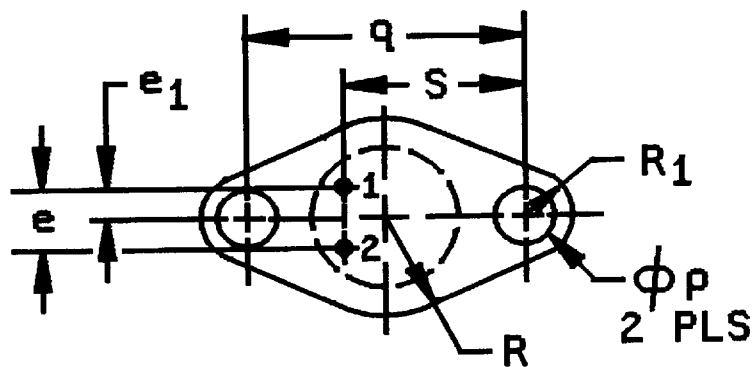
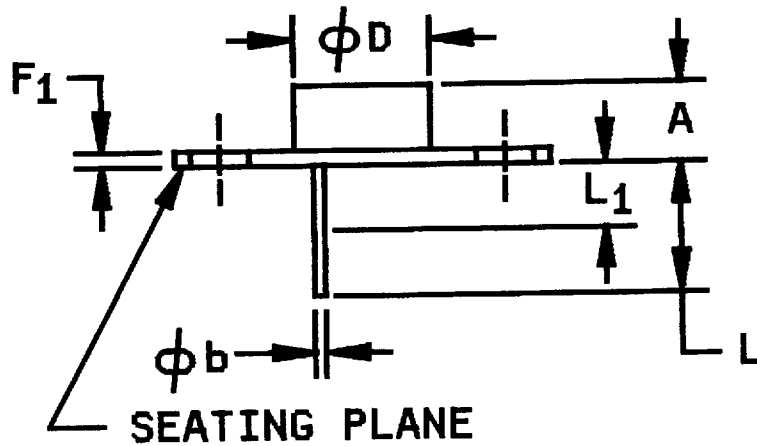
REVISION LEVEL
C

SHEET
5

DESC FORM 193A
JUL 91

9004708 0003894 398

Case outline X



Symbol	Inches		Millimeters	
	Min	Max	Min	Max
A	.250	.450	6.35	11.43
ϕb	.038	.043	.97	1.09
ϕD		.875		22.23
e	.420	.440	10.67	11.18
e_1	.205	.225	5.21	5.72
F_1	.060	.135	1.52	2.43
L	.312	.500	7.92	12.70
L_1		.050		1.27
ϕp	.151	.161	3.84	4.09
q	1.177	1.197	29.90	30.40
R	.495	.525	12.57	13.34
R_1	.131	.188	3.33	4.78
S	.655	.675	16.64	17.15

NOTE: The US 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.

FIGURE 1. Case outline.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

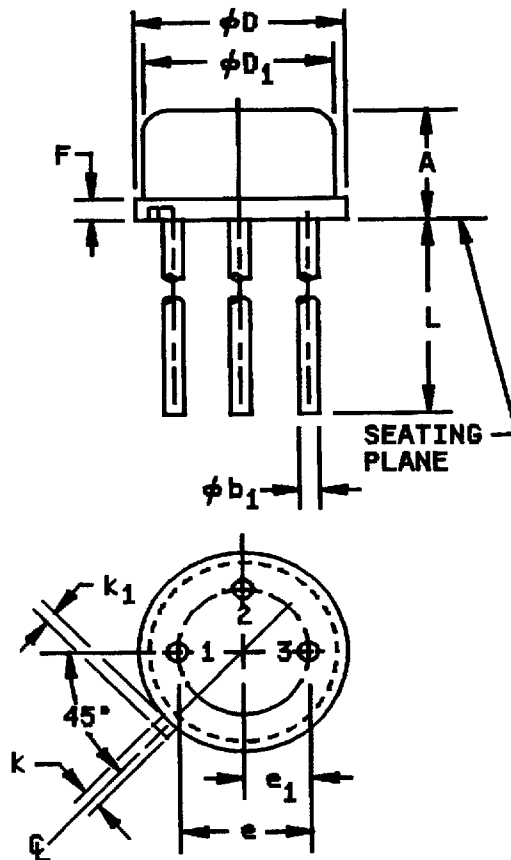
SIZE
A

5962-89981

REVISION LEVEL
C

SHEET
6

Case outline Y



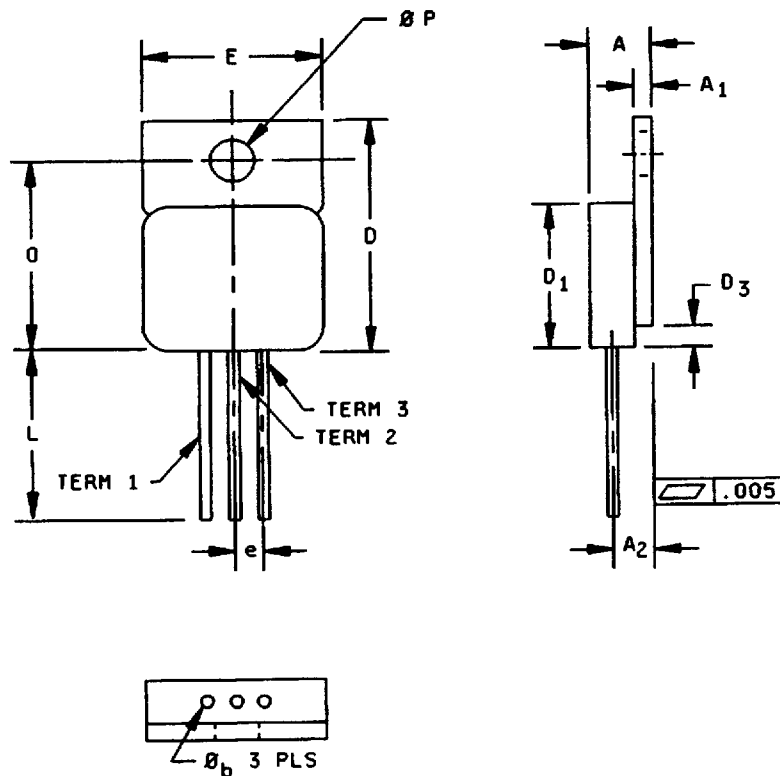
Symbol NOTE 1	Inches		Millimeters	
	Min	Max	Min	Max
A	.165	.185	6.35	11.43
ϕb_1	.016	.019	.97	1.09
ϕD	.340	.370		22.23
ϕD_1	.305	.335	4.10	1.09
e	.200 typ	NOTE 2	5.08 typ	NOTE 2
e_1	.100 typ	NOTE 2	2.54 typ	NOTE 2
k	.028	.038	7.92	12.70
k_1	.026	.045		1.27
L	.500		7.92	

- NOTES: 1. The US 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. Leads having a maximum diameter of .019 (0.48 mm) measured in gauging plane .054 \pm .001 (1.37 \pm 0.03 mm) below the base plane of the product shall be within .007 (0.18 mm) of their true position relative to the maximum width tab.

FIGURE 1. Case outline - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89981
		REVISION LEVEL C	SHEET 7

Case outline U



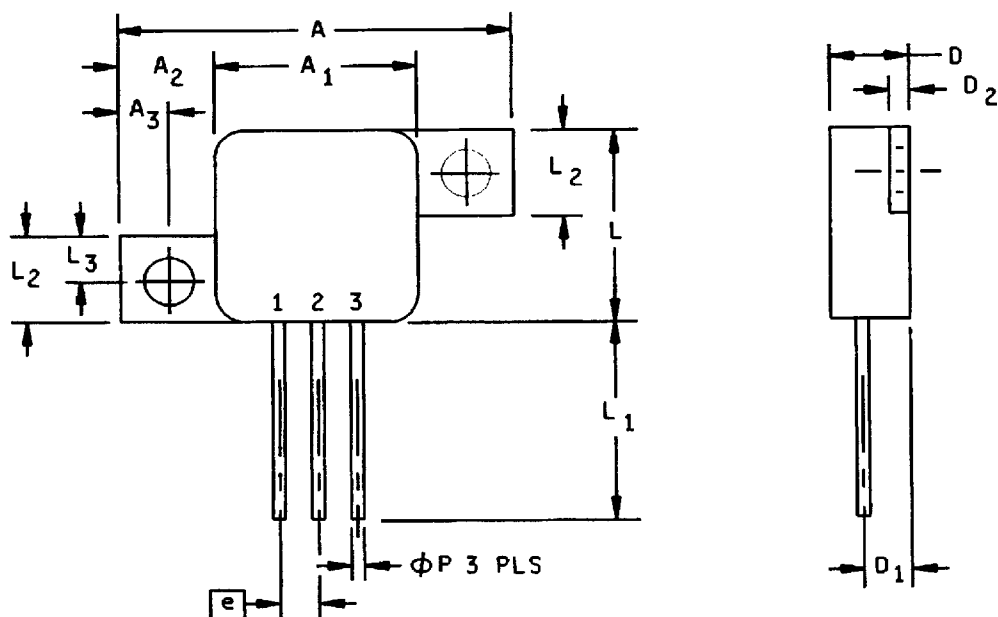
Symbol	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.200	4.83	5.08
A_1	.035	.045	.89	1.14
A_2	.120 bsc		3.05 bsc	
ϕ_b	.025	.035	.64	.89
D	.645	.665	16.38	16.89
D_1	.410	.430	10.41	10.92
D_3		.065		1.65
e	.100 bsc		2.54 bsc	
E	.410	.422	10.41	10.72
L	.500	.750	12.70	19.05
O	.527	.537	13.39	13.64
ϕP	.140	.150	3.56	3.81

NOTE: The US 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.

FIGURE 1. Case outline - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89981
		REVISION LEVEL C	SHEET 8

Case outline Z



Symbol	Inches		Millimeters	
	Min	Max	Min	Max
A	.910	.920	23.11	23.37
A ₁	.410	.420	10.41	10.67
A ₂	.245	.255	6.22	6.48
A ₃	.120	.130	3.05	3.30
φb	.120	.130	3.05	3.30
D	.135	.220	4.70	5.59
D ₁	.115	.125	2.92	3.18
D ₂	.035	.045	0.89	1.14
e	.100 bsc		2.54 bsc	
L	.410	.420	10.41	10.67
L ₁	.500	.750	12.70	19.05
L ₂	.245	.255	6.22	6.48
L ₃	.120	.130	3.05	3.30
φp	.028	.032	0.71	0.81

NOTE: The US 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.

FIGURE 1. Case outline - Continued.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

5962-89981

REVISION LEVEL
C

SHEET
9

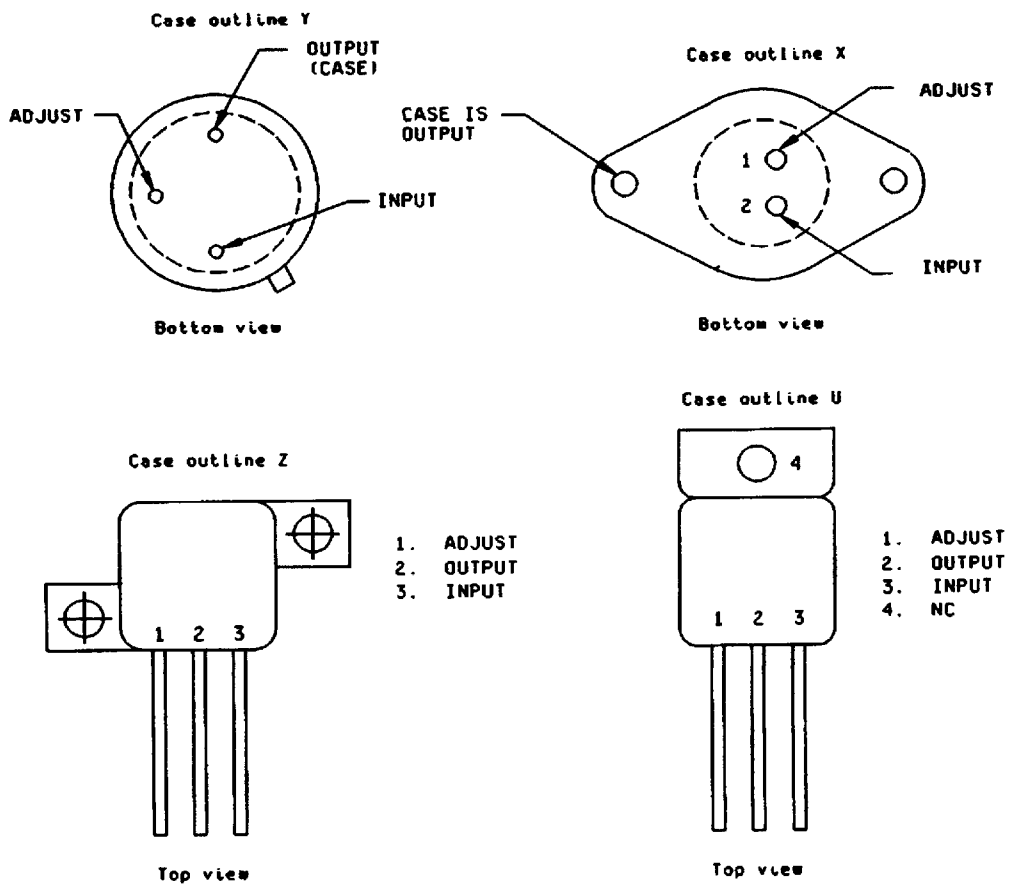


FIGURE 2. Terminal connections.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

5962-89981

REVISION LEVEL
C

SHEET
10

DESC FORM 193A
JUL 91

9004708 0003899 97T

TABLE II. Electrical test requirements.

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

*PDA applies to subgroup 1.

3.6 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 MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-EC prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 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.

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

3.9 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 MIL-STD-883 (see 3.1 herein).

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. 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 of MIL-STD-883.

(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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89981
		REVISION LEVEL C	SHEET 11

DESC FORM 193A
JUL 91

9004708 0003900 411

4.3.1 Group A inspection.

- a. Tests shall be as specified in table II herein.
- b. Subgroups 7, 8A, 8B, 9, 10, and 11 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. 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.
 - (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-STD-883 (see 3.1 herein).

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-STD-973 using DD Form 1692, Engineering Change Proposal.

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-EC, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-EC, Dayton, Ohio 45444-5270, or telephone (513) 296-5377.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-EC.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89981
		REVISION LEVEL C	SHEET 12

DESC FORM 193A
JUL 91

45723

9004708 0003901 358