

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Pg. 6, 7: Added static cond. A,B,C to burn-IN and Life test paragraphs.	81-09-30	N.A. Hauck
B	Change to approved source format, update document.	84-03-12	N.A. Hauck
C	Page 4, table I, change output short circuit current and output noise voltage. Guarantee TC for output voltage and ripple rejection	85-11-29	N.A. Hauck
D	Page 2: Absolute maximum rating; change power dissipation rating. Page 4: Table I, change test condition for line and load regulation, stand-by- current, ripple rejection, and output noise voltage. Add I <sub>L</sub> value to footnote 1. Page 9: R - package not available from approved source.	86-07-03	R.P. Evans
E	Changes in accordance with N.O.R. 5962-R173-96.	96-07-10	M. A. Frye
F	Replaced reference to MIL-STD-973 with reference to MIL-PRF-38535. Drawing updated to reflect current requirements. Redrawn. - gt	04-05-19	R. Monnin

**CURRENT CAGE CODE 67268**

THE ORIGINAL FIRST SHEET OF THIS DRAWING HAS BEEN REPLACED.

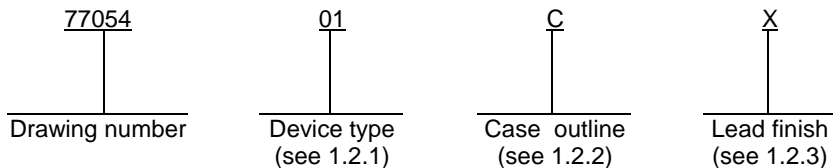
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REV STATUS	REV	F	F	F	F	F	F	F	F	F	F	F	F							
OF SHEETS	SHEET	1	2	3	4	5	6	7	8	9	10									

PMIC N/A	PREPARED BY William Sharp	<p align="center"><b>DEFENSE SUPPLY CENTER COLUMBUS</b>  <b>COLUMBUS, OHIO 43216</b>  <a href="http://www.dscc.dla.mil">http://www.dscc.dla.mil</a></p> <p align="center"><b>MICROCIRCUIT, LINEAR, DUAL TRACKING  VOLTAGE REGULATOR, MONOLITHIC SILICON</b></p>		
<p align="center"><b>STANDARD  MICROCIRCUIT  DRAWING</b></p> <p align="center">THIS DRAWING IS AVAILABLE  FOR USE BY ALL  DEPARTMENTS  AND AGENCIES OF THE  DEPARTMENT OF DEFENSE</p> <p align="center">AMSC N/A</p>	CHECKED BY C.R. Jackson			
	APPROVED BY N.A. Hauck			
	DRAWING APPROVAL DATE 77-12-05			
REVISION LEVEL F	SIZE A	CAGE CODE <b>14933</b>	<b>77054</b>	
SHEET		1 OF 10		

1. SCOPE

1.1 Scope. This drawing describes device requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A.

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



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

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	4194	Dual tracking voltage regulator

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

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
C	GDIP1-T14 or CDIP2-T14	14	Dual-in-line
R	See figure 1	9	TO-66

1.2.3 Lead finish. The lead finish is as specified in MIL-PRF-38535, appendix A.

1.3 Absolute maximum ratings.

Input voltage $\pm V$ to ground .....	±45 V
Input-output voltage differential .....	±45 V
Power dissipation at 25°C:	
DIP .....	900 mW
TO-66 .....	3.0 W
Load current:	
DIP .....	150 mA
TO-66 .....	250 mA
Operation junction temperature range .....	-55°C to +125°C
Storage temperature range .....	-65°C to +150°C
Lead temperature (soldering, 10 seconds) .....	+300°C
Power dissipation, ( $T_C = +25^\circ C$ ):	
DIP .....	1.8 W
TO-66 .....	13.9 W
Thermal resistance junction-to-ambient:	
DIP ( $\theta_{JA}$ ) .....	128 °C/W
TO-66 ( $\theta_{JA}$ ) .....	41.6 °C/W
Thermal resistance junction-to-case:	
DIP ( $\theta_{JC}$ ) .....	55 °C/W
TO-66 ( $\theta_{JC}$ ) .....	7.15 °C/W

<b>STANDARD MICROCIRCUIT DRAWING</b> DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE <b>A</b>		<b>77054</b>
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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 SPECIFICATION

MIL-PRF-38535 - Integrated Circuits, Manufacturing, General Specification for.

### DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard Microcircuits.  
MIL-STD-1835 - Interface Standard 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 <http://assist.daps.dia.mil/quicksearch/> or [www.dodssp.daps.mil](http://www.dodssp.daps.mil) or 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 shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B 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-PRF-38535 may be processed as QML product in accordance with the manufacturers approved program plan and qualifying activity approval in accordance with MIL-PRF-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-PRF-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-PRF-38535, appendix A 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 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.

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TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Line regulation		$\Delta V_{IN} = 0.1 V_{IN}$ $V_{IN} = V_{MAX}$	4, 5, 6	01		0.1	% $V_{OUT}$
Load regulation		DIP: $I_L = 1$ to 100 mA	4, 5, 6	01		0.004	% $V_O$ /mA
		TO-66: $I_L = 1$ to 200 mA $\pm V_S = \pm(V_O + 5)$ $V_S = \pm 10$ V				0.004	
TC of output voltage 2/			4, 5, 6	01		0.015	%/ $^{\circ}C$
Stand by current drain 3/		$V_{IN} = V_{MAX}$ , $V_O = 0$ V, $I_L = 0$	1, 2, 3	01		+2.5	mA
		$I_L = 0$				-4.0	
Input voltage range			1, 2, 3	01	$\pm 9.5$	$\pm 45$	V
Output voltage scale factor		$R_{SET} = 71.5$ k $\Omega$ , $T_J = 25^{\circ}C$	4	01	2.38	2.62	k $\Omega$ /V
Output voltage range		$R_{SET} = 71.5$ k $\Omega$	1, 2, 3	01	0.05	$\pm 42$	V
Output voltage tracking			4, 5, 6	01		2.0	%
Input-output voltage differential		$I_L = 50$ mA	1, 2, 3	01	3.0		V
Ripple rejection 2/		$f = 120$ Hz, $T_J = 25^{\circ}C$ , $V_O = \pm 15$ V, $V_{IN} = \pm 19$ V	4	01	40		dB
Output short circuit current		$V_{IN} = \pm 30$ V max, $T_J = 25^{\circ}C$	1	01		600	mA
Output noise voltage		$C_L = 4.7$ $\mu$ F, $V_O = \pm 5$ V, $f = 10$ Hz to 100 kHz, $T_J = 25^{\circ}C$ , $V_{IN} = \pm 30$ V	4	01		350	$\mu$ V rms
Internal thermal shutdown					4/		

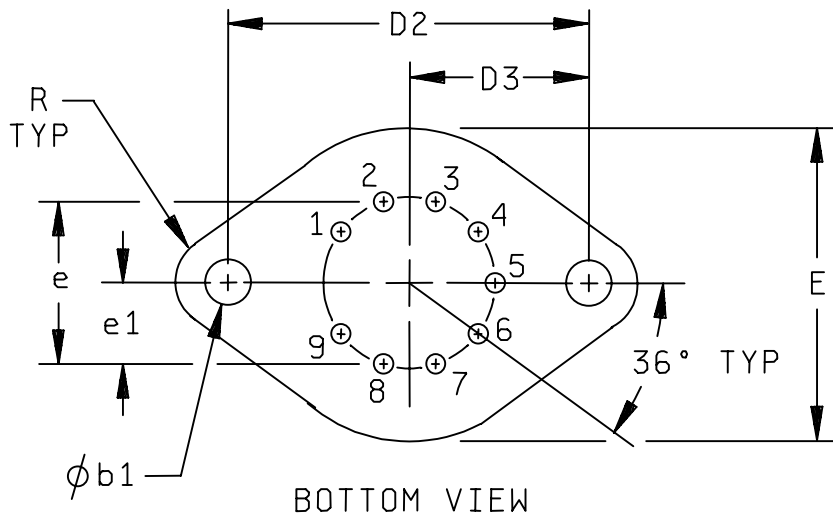
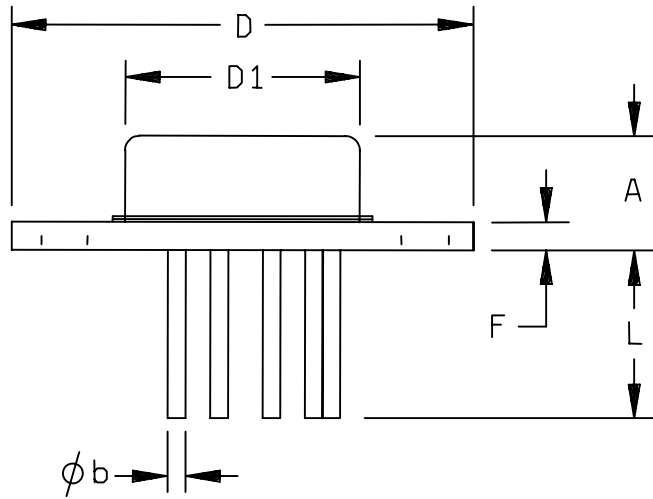
1/  $\pm 5 \leq V_{OUT} \leq V_{MAX}$ ;  $-55^{\circ}C \leq T_J \leq +125^{\circ}C$ ;  $I_L = \pm 1$  mA, unless otherwise specified.

2/ If not tested, shall be guaranteed to the specified limits.

3/ Plus or minus quiescent current will increase by 50  $\mu$ A/ $V_{OUT}$  on positive side and 100  $\mu$ A/ $V_{OUT}$  on negative side.

4/ Internal thermal shutdown occurs typically at 175 $^{\circ}C$ .

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BOTTOM VIEW

FIGURE 1. Case outline.

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Letter	Inches		Millimeters	
	Min	Max	Min	Max
A	0.250	0.340	6.35	8.64
D		1.252		31.80
D1	0.470	0.500	11.94	12.70
D2	0.958	0.962	24.30	24.43
D3	0.477	0.483	12.12	12.27
E		0.700		17.78
e	0.325		8.26	
e1	0.163		4.14	
F	0.050	0.075	1.27	1.90
L	0.360		9.14	
φb	0.028	0.032	0.71	0.81
φb1	0.142	0.152	3.61	3.86
R		0.145		3.68

NOTES:

1. Dimensions are in inches.
2. Metric equivalent are given for general information only.

FIGURE 1. Case outline - continued.

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Device types	01	
Case outline	R	C
Terminal number	Terminal symbol	
1	V <sub>O-</sub>	V <sub>O+</sub>
2	R <sub>O</sub>	NC
3	R <sub>SET</sub>	COMP+
4	GND	BAL
5	V+	COMP-
6	V <sub>O+</sub>	NC
7	COMP+	V-
8	BAL	V <sub>O-</sub>
9	COMP-	NC
10	-----	R <sub>O</sub>
11	-----	R <sub>SET</sub>
12	-----	GND
13	-----	NC
14	-----	V+

NC = No connection

FIGURE 2. Terminal connections.

<b>STANDARD MICROCIRCUIT DRAWING</b> DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216-5000	SIZE <b>A</b>		<b>77054</b>
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3.5 Marking. Marking shall be in accordance with MIL-PRF-38535, appendix A. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked.

3.5.1 Certification/compliance mark. A compliance indicator "C" shall be marked on all non-JAN devices built in compliance to MIL-PRF-38535, appendix A. The compliance indicator "C" shall be replaced with a "Q" or "QML" certification mark in accordance with MIL-PRF-38535 to identify when the QML flow option is used.

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-HDBK-103 (see 6.6 herein). The certificate of compliance submitted to DSCC-VA prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-PRF-38535, appendix A and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38535, appendix A shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DSCC-VA shall be required for any change that affects this drawing.

3.9 Verification and review. 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.

#### 4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A.

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 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.

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TABLE II. Electrical test requirements.

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

\* PDA applies to subgroup 1.

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, 8, 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 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.

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5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535, appendix A.

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.

6.4 Record of users. Military and industrial users shall inform Defense Supply Center Columbus (DSCC) when a system application requires configuration control and the applicable SMD. 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 microelectronics devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43216-5000, or telephone (614) 692-0547.

6.6 Approved sources of supply. Approved sources of supply 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.

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STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 04-05-19

Approved sources of supply for SMD 77054 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 information bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
7705401CA	0C7V7	RM4194DC
	0EU86	RM4194DC
7705401RA	0C7V7	RM4194TK

- 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

0C7V7

QP Semiconductor  
2945 Oakmead Village Court  
Santa Clara, Ca 95051

0EU86

Austin Semiconductor Inc.  
8701 Cross Park Dr.  
Austin, Tx 78754-4566

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