REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Add device type 02 and generic part number 7702A. Make changes to 1.3, 1.4, table I and figure 3. Make changes to figure 1.	89-06-05	M. A. Frye
B	Add device types 03, 04, and 05. Add case outline F-4. Changes to table I, figure 1, and figure 2. Editorial changes throughout.	91-09-05	M. A. Frye
C	Changes in accordance with NOR 5962-R265-92.	92-09-29	M. A. Frye
D	Changes in accordance with NOR 5962-R016-95.	94-10-27	M. A. Frye
E	Add V_{CC} = 3.6 V as a test condition to sheet 6, table 1, supply current, subgroups 1, 2, 3, device type 03, 04, 05 max value = 3 mA. Add V_{CC} = 18 V as a test condition to sheet 8, table 1, supply current, subgroups 1, 2, 3, device type 03, 04, 05 max value = 4 mA. -lgt	98-06-16	Ray Monnin
F	Change test conditions for supply current (I_{CC}) in table I for device type 01 to read : $\overline{RESIN} \geq 2$ V, $V_{SENSE} \geq 10$ V. -lgt	98-09-25	Ray Monnin
G	Change test conditions for supply current (I_{CC}) in table I for device type 01 to read : All inputs and outputs open. Change value for V_{REF} for device type 01 and 02, to 2.75 V max and change value for V_{T-} for device type 01 to 4.79 V max on sheet 5, table 1. Change value to 70 µA Typical on sheet 9, Figure 3, logic diagram. -lgt	99-04-21	Ray Monnin
H	Make temperature range changes for device type 01 in 1.4, 4.2, and 4.3.2. Change Table I test conditions for device type 01. -lgt	99-07-15	Ray Monnin

THE ORIGINAL FIRST SHEET OF THIS DRAWING HAS BEEN REPLACED.

REV																				
SHEET																				
REV																				
SHEET																				
REV STATUS				REV			H	H	H	H	H	H	H	H	H	H	H			
OF SHEETS				SHEET			1	2	3	4	5	6	7	8	9	10	11			

PMIC N/A	PREPARED BY Joseph A. Kirby	**DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216**
STANDARD MICROCIRCUIT DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE AMSC N/A	CHECKED BY Ray Monnin	
	APPROVED BY M. A. Frye	MICROCIRCUITS, LINEAR, SUPPLY VOLTAGE SUPERVISORS, MONOLITHIC SILICON
	DRAWING APPROVAL DATE 88-08-17	
	REVISION LEVEL H	SIZE A CAGE CODE **67268** **5962-88685** SHEET 1 OF 11

DSCC FORM 2233
APR 97

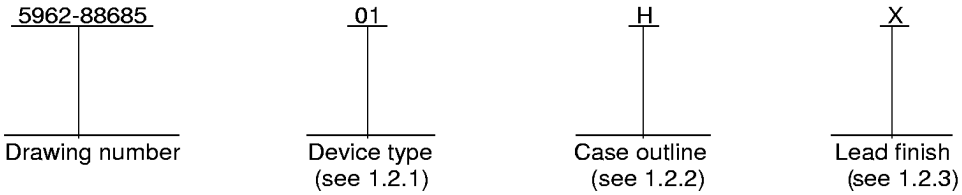
5962-E372-99

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

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:

Device type	Generic number	Circuit function
01	TL7705A	Supply voltage supervisors
02	TL7702A	Supply voltage supervisors
03	TL7705B	Supply voltage supervisors
04	TL7702B	Supply voltage supervisors
05	TL7705B	Supply voltage supervisors (see table I, V_{T-})

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

Outline letter	Descriptive designator	Terminals	Package style
H	GDFP1-F10 or CDFP2-F10	10	Flat pack
P	GDIP1-T8 or CDIP2-T8	8	Dual-in-line
2	CQCC1-N20	20	Square leadless chip carrier

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

1.3 Absolute maximum ratings.

Supply voltage (V_{CC}) 1/	20 V dc
Input voltage range at $\overline{\text{RESIN}}$	-0.3 V dc to 20 V dc
Input voltage range at SENSE (V_I):	
Device type 01	-0.3 V dc to 10 V dc
Device type 02	-0.3 V dc to 6 V dc 2/
Device types 03, 04, 05	-0.3 V dc to 20 V dc
Power dissipation (P_D): (T_A > +25°C) 3/	
Case H	675 mW
Case P	1050 mW
Case 2	1375 mW
High level output current at $\overline{\text{RESET}}$ (I_{OH})	-30 mA
Low level output current at $\overline{\text{RESET}}$ (I_{OL})	30 mA
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature (T_J)	+150°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-STD-1835

1/ All voltage values are with respect to the network ground terminal.
2/ For device type 02, the voltage applied to the SENSE terminal must never exceed V_{CC}.
3/ Derate factor at T_A > +25°C for case H is 5.5 mW/°C, for case P is 8.4 mW/°C, and case 2 is 11.0 mW/°C.

1.4 Recommended operating conditions.

Supply voltage range (V_{CC}):	
Device types 01 and 02	+3.6 V dc minimum to +10.0 V dc maximum
Device types 03, 04, and 05	+3.6 V dc minimum to +18.0 V dc maximum
Ambient operating temperature range (T_A):	
Device type 01	-55°C to +110°C
Device types 02, 03, 04, and 05	-55°C to +125°C
High level input voltage at $\overline{RESIN}$ (V_{IH})	2.0 V dc
Low level input voltage at $\overline{RESIN}$ (V_{IL})	0.6 V dc
Input voltage range at SENSE (V_I):	
Device type 01	0.0 V dc to 10.0 V dc
Device type 02	0.0 V dc to 6 V dc 4/
Device types 03, 04, and 05	0.0 V dc to 18 V dc
High level output current at RESET (I_{OH})	-16 mA
Low level output current at $\overline{RESET}$ (I_{OL})	16 mA
Hysteresis at SENSE input (V_{hys}): 5/	
Device type 01	15 mV typical
Device types 02 and 04	10 mV typical
Device types 03 and 05	30 mV typical

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.

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.)

4/ For proper operation of device type 02, the voltage applied to the SENSE terminal should not exceed V_{CC} - 1 V or 6 V whichever is less.
5/ Hysteresis is the difference between the positive-going input threshold, V_{T+} , and the negative-going input threshold, V_{T-} .

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

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

3.2. Truth table(s). The truth table(s) shall be as specified on figure 2.

3.2. Logic diagram(s). The logic diagram(s) shall be as specified on figure 3.

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-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 as listed in MIL-HDBK-103 (see 6.6 herein). 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.

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 in accordance with MIL-PRF-38535, appendix A.

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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +110°C$ 2/ $-55°C \le T_A \le +125°C$ 3/ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Supply voltage to define the outputs	V_{CCO}	I_{OL} = 2 mA at $\overline{\text{RESET}}$, T_A = +25°C	1	03, 04, 05	1		V
High level output voltage at RESET	V_{OH}	I_{OH} = -16 mA	1, 2, 3	ALL	V_{CC} -1.5		V
Low level output voltage at $\overline{\text{RESET}}$	V_{OL}	I_{OL} = 16 mA	1, 2, 3	ALL		0.4	V
Reference voltage	V_{REF}	I_{REF} = 0 µA	1, 2, 3	01, 02	2.38	2.75	V
		I_{REF} = 500 µA		03, 04 05	2.48	2.58	V
Negative-going threshold voltage at SENSE input	V_{T-}		1, 2, 3	01	4.25	4.79	V
				02	2.38	2.63	
			1	03	4.5	4.6	
			2, 3		4.45	4.65	
			1	04	2.505	2.555	
			2, 3		2.48	2.58	
			1, 2, 3	05	4.5	4.59	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +110°C$ 2/ $-55°C \le T_A \le +125°C$ 3/ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Input current at $\overline{\text{RESIN}}$ input	I_I	V_I = 2.4 V to V_{CC}	1, 2, 3	01, 02		20	µA
		V_I = 0.4 V		01, 02	-100		
		V_I = 0.4 V to V_{CC}		03, 04 05	-10		
Input current at SENSE input	I_I	$V_I = V_{REF}$ to V_{CC} -1.5 V	1, 2, 3	04	-2		µA
High level output current at $\overline{\text{RESET}}$	I_{OH}	V_O = 10.0 V	1, 2, 3	01, 02		50	µA
		V_O = 18.0 V		03, 04 05		50	
Low level output current at RESET	I_{OL}	V_O = 0.0 V	1, 2, 3	ALL	-50		µA
Supply current	I_{CC}	All inputs and outputs open	1, 2, 3	01, 02		3	mA
		$\overline{\text{RESIN}} \ge 2$ V, $V_{SENSE} > V_{T+}$ 4/ V_{CC} = 3.6 V		03, 04 05		3	
		$\overline{\text{RESIN}} \ge 2$ V, $V_{SENSE} > V_{T+}$ 4/ V_{CC} = 18 V				4	
Functional test 5/		See 4.3.1c	7, 8	All			

1/ For device types 01 and 02, all characteristics are measured with C_1 = 0.02 µF from REF to GND, and with C_1 = 0.1 µF from C_T to GND. Unless otherwise specified, V_{CC} = 3.6 V to 10.0 V. For device types 03, 04, and 05, a 0.1 µF capacitor is connected at REF, C_T, and V_{CC} . When V_{CC} and SENSE are connected to the same point, it is recommended that series resistance (R_T) be added between the time delay programming capacitor (C_T) and the voltage supervisor device pin (C_T). The suggested R_T value is given by : $R_T > (V_I - V_T-) / 1 \times 10^{-3}$, where V_I = (the lesser of 7.1 V or V_S). Unless otherwise specified, V_{CC} = 3.6 V to 18.0 V.
2/ For device type 01 only.
3/ For device types 02, 03, 04, and 05.
4/ $V_{T+} = V_{T-} + V_{hys}$.
5/ If not tested, subgroup 8 is guaranteed to the limits specified in table I herein.

Device types	03, 04, and 05	01, 02, 03, 04, and 05	
Case outlines	H	P	2
Terminal number	Terminal symbol		
1	NC	REF	NC
2	REF	$\overline{\text{RESIN}}$	REF
3	$\overline{\text{RESIN}}$	GND	NC
4	C_T	$\overline{\text{RESET}}$	NC
5	GND	RESET	$\overline{\text{RESIN}}$
6	$\overline{\text{RESET}}$	SENSE	NC
7	RESET	VCC	C_T
8	SENSE	-----	NC
9	V_{CC}	-----	NC
10	NC	-----	GND
11	-----	-----	NC
12	-----	-----	$\overline{\text{RESET}}$
13	-----	-----	NC
14	-----	-----	NC
15	-----	-----	RESET
16	-----	-----	NC
17	-----	-----	SENSE
18	-----	-----	NC
19	-----	-----	NC
20	-----		V_{CC}

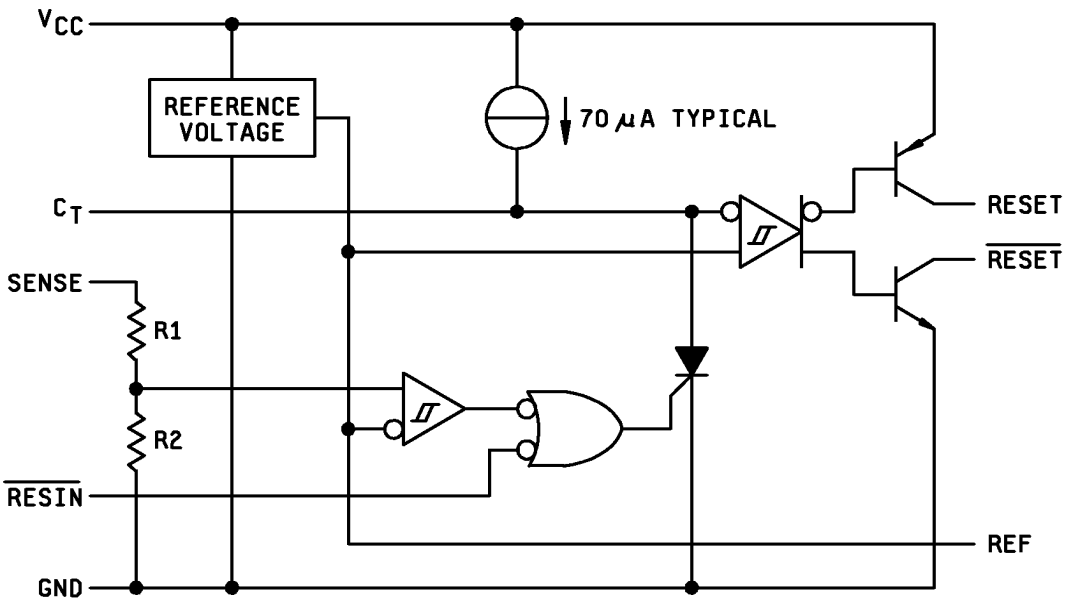
NC = No Connections

FIGURE 1. Terminal connections.

Input		Output	
V_T	$\overline{\text{RESIN}}$	RESET	$\overline{\text{RESET}}$
X	L	H	L
< V_T minimum	H	H	L
> V_T maximum	H	L	H

X = Don't care
H = High
L = Low

FIGURE 2. Truth table.



NOTE : For device 01, R1 = 7.8 kΩ, R2 = 10 kΩ
For device 02 and 04, R1 = 0 kΩ, R2 = Open
For devices 03 and 05, R1 = 24 kΩ, R2 = 10 kΩ

FIGURE 3. Logic diagram.

4. QUALITY ASSURANCE PROVISIONS

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 B 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 = +110°C, minimum for device type 01 only.
T_A = +125°C, minimum for device types 02, 03, 04, and 05.

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 4, 5, 6, 10, and 11in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroups 7 and 8 shall include verification of the truth table.

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 B 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 = +110°C, minimum for device type 01 only.
T_A = +125°C, minimum for device types 02, 03, 04, and 05.

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

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, 7
Group A test requirements (method 5005)	1, 2, 3, 7, 8**, 9**
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.
** If not tested, subgroups 8 and 9 shall be guaranteed to the limits specified in table I herein.

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 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 Supply Center Columbus 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) 692-0525.

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

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.

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 99-07-15

Approved sources of supply for SMD 5962-88685 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/
5962-8868501PA	3/	TL7705AMJGB
5962-88685012A	3/	TL7705AMFKB
5962-8868502PA	3/	TL7702AMJGB
5962-88685022A	3/	TL7702AMFKB
5962-8868503HA	01295	TL7705BMUB
5962-8868503PA	01295	TL7705BMJGB
5962-88685032A	01295	TL7705BMFKB
5962-8868504HA	3/	TL7702BMUB
5962-8868504PA	3/	TL7702BMJGB
5962-88685042A	3/	TL7702BMFKB
5962-8868505HA	01295	TL7705BMUB
5962-8868505PA	01295	TL7705BMJGB
5962-88685052A	01295	TL7705BMFKB

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.

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Vendor CAGE number	Vendor name and address
01295	Texas Instruments, Incorporated 13500 North Central Expressway P.O. Box 655303 Dallas, TX 75265 Point of Contact: 6412 Highway 75 South Sherman, TX 75090-0084

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