REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
B	Change V_{IL}, input voltage range, tp CLOCK, tp $\overline{\text{CLEAR}}$, $\overline{\text{CLR}}$, $\overline{\text{PR}}$ inactive setup time, I_O, I_{CCL}, I_{CCZ}, I_{IL}, and propagation delay times. Remove vendor, CAGE 01295 from device 02. Remove vendor, CAGE 04713 from drawing. Convert to military drawing format.	87-10-26	Michael A. Frye
C	Update to reflect latest changes in format and requirements. Editorial changes throughout. --les	02-08-08	Raymond Monnin
D	Update to reflect latest changes in format and requirements. Correct paragraph in 3.5. Editorial changes throughout. –les	05-05-31	Raymond Monnin
E	Update drawing to current MIL-PRF-38535 requirements. -jt	14-12-09	C. SAFFLE

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

CURRENT CAGE CODE 67268

REV																				
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REV																				
SHEET																				

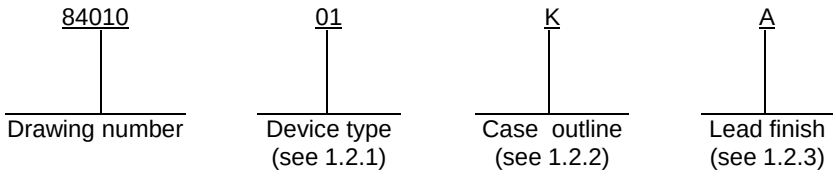
REV STATUS	REV	E	E	E	E	E	E	E	E	E	E	E	E		
OF SHEETS	SHEET	1	2	3	4	5	6	7	8	9	10	11	12		

PMIC N/A	PREPARED BY David W. Queenan	**DLA LAND AND MARITIME** **COLUMBUS, OHIO 43218-3990** **http://www.landandmaritime.dla.mil**
STANDARD MICROCIRCUIT DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE AMSC N/A	CHECKED BY D. A. DiCenzo	
	APPROVED BY Michael A. Frye	MICROCIRCUIT, DIGITAL, BIPOLAR, ADVANCED LOW-POWER SCHOTTKY TTL, FLIP-FLOPS, MONOLITHIC SILICON
	DRAWING APPROVAL DATE 84-05-11	
	REVISION LEVEL E	SIZE A CAGE CODE **14933** **84010** SHEET 1 OF 12

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. The device type identify the circuit function as follows:

Device type	Generic number	Circuit function
01	54ALS874	Dual 4-bit D-type flip-flop with clear and three state outputs
02	54ALS876	Dual 4-bit D-type flip-flop with preset and three state inverted outputs

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

Outline letter	Descriptive designator	Terminals	Package style
K	GDFP2-F24 or CDFP3-F24	24	flat
L	GDIP3-T24 or CDIP4-T24	24	dual-in-line
3	CQCC1-N28	28	square 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	-0.5 V dc to +7.0 V dc
Input voltage range	-1.2 V dc at -18 mA to +7.0 V dc
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P_D) 1/	22 mW
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-STD-1835
Junction temperature (T_J)	+175°C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	4.5 V dc minimum to +5.5 V dc maximum
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.7 V dc
Case operating temperature range (T_C)	-55°C to +125°C
Width of CLOCK pulse (t_{pCLOCK})	20 ns

1/ Maximum power dissipation is defined as V_{CC} x I_{CC}, and must withstand the added P_D due to short-circuit test; e.g., I_O.

1.4 Recommended operating conditions - Continued.

Width of CLEAR pulse (t_p $\overline{\text{CLEAR}}$) :	
Device type 01	15 ns
Width of PRESET pulse (t_p $\overline{\text{PRESET}}$) :	
Device type 02	10 ns
Data setup time	15 ns
$\overline{\text{CLR}}$ or $\overline{\text{PR}}$ inactive state setup time :	
Device type 01	15 ns
Device type 02	10 ns
Data hold time (t_p HOLD)	4 ns

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://quicksearch.dla.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 outlines. The case outlines shall be in accordance with 1.2.2 herein.

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

3.2.3 Truth tables. The truth tables shall be as specified on figure 2.

3.2.4 Logic diagrams. The logic diagrams 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 case 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. 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.

3.5.1 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 DLA Land and Maritime -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 DLA Land and Maritime -VA shall be required for any change that affects this drawing.

3.9 Verification and review. DLA Land and Maritime, DLA Land and Maritime'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 $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
High level output voltage	V_{OH}	V_{CC} = 4.5 V, V_{IN} = 0.7 V or 2.0 V, I_{OH} = -1.0 mA	1, 2, 3	All	2.4		V
Low level output voltage	V_{OL}	V_{CC} = 4.5 V, I_{OL} = 12 mA, V_{IN} = 0.7 V or 2.0 V	1, 2, 3	All		0.4	V
Input clamp voltage	V_{IC}	V_{CC} = 4.5 V, T_C = +25°C, I_{IN} = -18 mA	1, 2, 3	All		-1.5	V
Low level input current	I_{IL1}	V_{CC} = 5.5 V, V_{IN} = 0.4 V	1, 2, 3	All		-200	µA
High level input current	I_{IH1}	V_{CC} = 5.5 V, V_{IN} = 2.7 V,	1, 2, 3	All		20	µA
	I_{IH2}	V_{CC} = 5.5 V, V_{IN} = 7.0 V,				100	
Output current	I_O	V_{CC} = 5.5 V, V_{OUT} = 2.25 V 1/	1, 2, 3	All	-15	-112	mA
Output current, high level, outputs OFF	I_{OZH}	V_{CC} = 5.5 V, V_{OUT} = 2.7 V	1, 2, 3	All		20	µA
Output current, low level, outputs OFF	I_{OZL}	V_{CC} = 5.5 V, V_{OUT} = 0.4 V	1, 2, 3	All		-20	µA
Supply current, outputs high	I_{CCH}	V_{CC} = 5.5 V, V_{IN} = 0 V	1, 2, 3	01		21	mA
				02		21	
Supply current, outputs low	I_{CCL}	V_{CC} = 5.5 V, V_{IN} = 0 V	1, 2, 3	01		30	mA
		V_{CC} = 5.5 V, V_{IN} = 5.0 V		02		29	
Supply current outputs disabled	I_{CCZ}	V_{CC} = 5.5 V, V_{OC} = 5.0 V	1, 2, 3	All		32	mA
Maximum clock frequency	f_{MAX}	V_{CC} = 5.0 V, C_L = 50 pF ±10%, R_L = 500Ω	9, 10, 11	All	25		MHz
Functional tests		See 4.3.1c	7	All			
Propagation delay time, high to low, $\overline{CLR}$ or $\overline{PR}$ to output	t_{PHL1}	V_{CC} = 5.0 V, C_L = 50 pF ±10%, R_L = 500Ω ±5%	9, 10, 11	All	4	23	ns
Propagation delay time, CLK to output	t_{PLH2}		9, 10, 11	All	4	18	ns
	t_{PHL2}		9, 10, 11	All	4	16	ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Output enable time	t_{PZL}	V_{CC} = 5.0 V, C_L = 50 pF ± 10%, R_L = 500Ω ±5%	9, 10, 11	All	4	21	ns
	t_{PZH}		9, 10, 11	All	4	24	ns
Output disable time	t_{PLZ}		9, 10, 11	All	3	22	ns
	t_{PHZ}		9, 10, 11	All	2	15	ns

1/ The output conditions have been chosen to produce a current that closely approximates one half of the true short circuit output current, I_{OS}.

Device types	01	01	02	02
Case outlines	K, L	3	K, L	3
Terminal number	Terminal symbols		Terminal symbols	
1	$1\overline{CLR}$	NC	$1\overline{PR}$	NC
2	$1\overline{OC}$	$1\overline{CLR}$	$1\overline{OC}$	$1\overline{PR}$
3	1D1	$1\overline{OC}$	1D1	$1\overline{OC}$
4	1D2	1D1	1D2	1D1
5	1D3	1D2	1D3	1D2
6	1D4	1D3	1D4	1D3
7	2D1	1D4	2D1	1D4
8	2D2	NC	2D2	NC
9	2D3	2D1	2D3	2D1
10	2D4	2D2	2D4	2D2
11	$2\overline{OC}$	2D3	$2\overline{OC}$	2D3
12	GND	2D4	GND	2D4
13	$2\overline{CLR}$	$2\overline{OC}$	$2\overline{PR}$	$2\overline{OC}$
14	2CLK	GND	2CLK	GND
15	2Q4	NC	$2\overline{Q}4$	NC
16	2Q3	$2\overline{CLR}$	$2\overline{Q}3$	$2\overline{PR}$
17	2Q2	2CLK	$2\overline{Q}2$	2CLK
18	2Q1	2Q4	$2\overline{Q}1$	$2\overline{Q}4$
19	1Q4	2Q3	$1\overline{Q}4$	$2\overline{Q}3$
20	1Q3	2Q2	$1\overline{Q}3$	$2\overline{Q}2$
21	1Q2	2Q1	$1\overline{Q}2$	$2\overline{Q}1$
22	1Q1	NC	$1\overline{Q}1$	NC
23	1CLK	1Q4	1CLK	$1\overline{Q}4$
24	V_{CC}	1Q3	V_{CC}	$1\overline{Q}3$
25	- - -	1Q2	- - -	$1\overline{Q}2$
26	- - -	1Q1	- - -	$1\overline{Q}1$
27	- - -	1CLK	- - -	1CLK
28	- - -	V_{CC}	- - -	V_{CC}

FIGURE 1. Terminal connections.

Device type 01

CLEAR		CLOCK	OUTPUT CONTROL	OUTPUT
$\overline{CLR}$	D	CLK	$\overline{OC}$	Q
X	X	X	H	Z
L	X	X	L	L
H	H	↑	L	H
H	L	↑	L	L
H	X	L	L	Q_0

H = High level (steady-state)
L = Low level (steady-state)
X = Irrelevant
↑ = Transition from low to high level
Q_0 = The level of Q before the indicated steady-state input conditions were established
Z = High impedance state

Device type 02

PRESET		CLOCK	OUTPUT CONTROL	OUTPUT
$\overline{PR}$	D	CLK	$\overline{OC}$	$\overline{Q}$
X	X	X	H	Z
L	X	X	L	L
H	H	↑	L	L
H	L	↑	L	H
H	X	L	L	$\overline{Q}_0$

H = High level (steady-state)
L = Low level (steady-state)
X = Irrelevant
↑ = Transition from low to high level
$\overline{Q}_0$ = The level of $\overline{Q}$ before the indicated steady-state input conditions were established
Z = High impedance state

FIGURE 2. Truth tables.

Device type 01

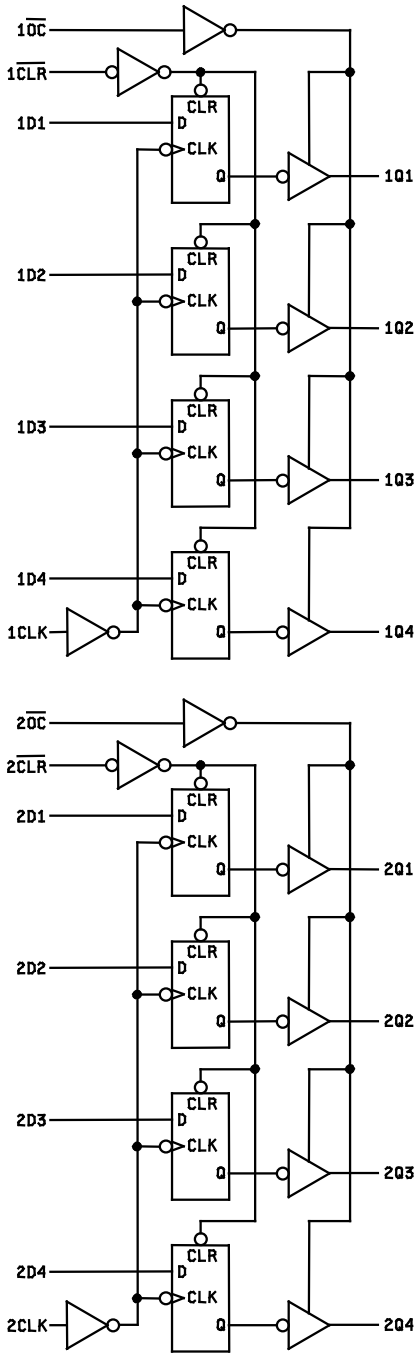


FIGURE 3. Logic diagrams.

Device type 02

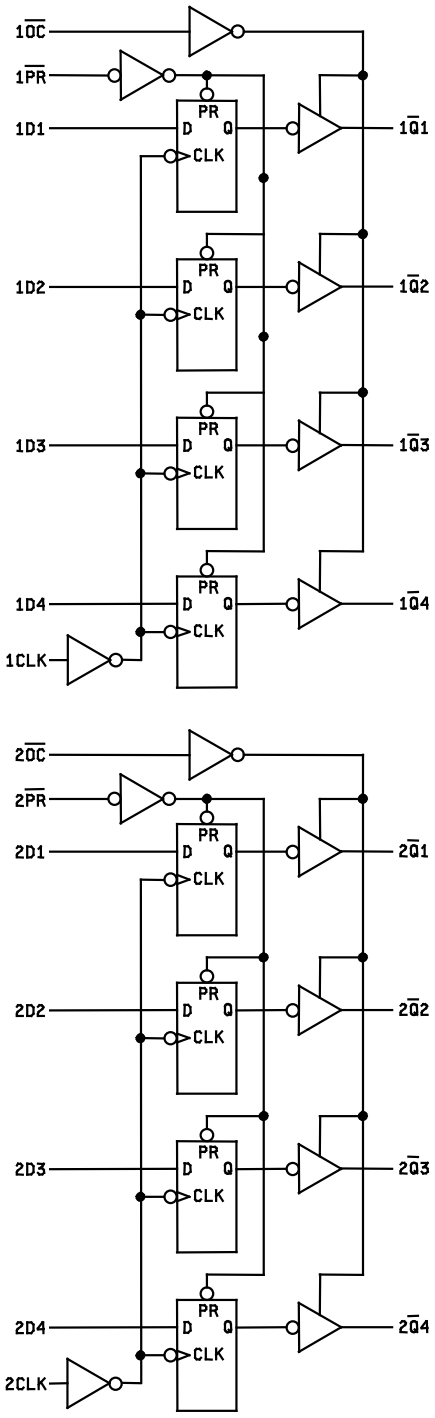


FIGURE 3. Logic diagrams - Continued.

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°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.

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, 9
Group A test requirements (method 5005)	1, 2, 3, 7, 9, 10**, 11**
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.
** Subgroups 10 and 11, if not tested, shall be guaranteed to the specified limits in table I.

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 and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroups 7 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 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°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-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 DLA Land and Maritime when a system application requires configuration control and the applicable SMD to that system. DLA Land and Maritime 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 DLA Land and Maritime -VA, telephone (614) 692-8108.

6.5 Comments. Comments on this drawing should be directed to DLA Land and Maritime -VA, Columbus, Ohio 43218-3990, or telephone (614) 692-0540.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-HDBK-103 and QML-38535. The vendors listed in MIL-HDBK-103 and QML-38535 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DLA Land and Maritime -VA.

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 14-12-09

Approved sources of supply for SMD 84010 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 DLA Land and Maritime -VA. This information bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535. DLA Land and Maritime maintains an online database of all current sources of supply at http://www.landandmaritime.dla.mil/Programs/Smcr/.

Standard microcircuit drawing PIN 1/	Vendor CAGE number	Vendor similar PIN 2/	Reference military specification PIN
8401001KA	01295	SNJ54ALS874BW	M38510/37106BKA
8401001LA	01295	SNJ54ALS874BJT	M38510/37106BLA
84010013A	01295	SNJ54ALS874BFK	M38510/37106B3A
8401002KA	3/	54ALS876/BKAJC	M38510/37107BKA
8401002LA	3/	54ALS876/BLAJC	M38510/37107BLA
84010023A	3/	54ALS876/B3AJC	M38510/37107B3A

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.

Vendor CAGE number	Vendor name and address
01295	Texas Instruments, Inc. Semiconductor Group 8505 Forest Ln. PO Box 660199 Dallas, TX 75243 POC: U.S. Highway 75 South P.O. Box 84, M/S 853 Sherman, TX 75090-9493