REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
D	Technical changes in 1.4 and table I. Editorial changes throughout.	91-10-30	M. A. Frye
E	Update boilerplate to MIL-PRF-38535 requirements. - CFS	01-12-11	Thomas M. Hess
F	Made change to paragraph 3.5. Update boilerplate to MIL-PRF-38535 requirements. – LTG	05-03-18	Thomas M. Hess
G	Change boilerplate to add device class V criteria. – jak	06-10-26	Thomas M. Hess
H	Update test condition of high and low level voltage to table I. Update boilerplate paragraphs to the current MIL-PRF-38535 requirements. - LTG	12-03-22	Thomas M. Hess

Current CAGE Code is 67268

REV																				
SHEET																				
REV	H																			
SHEET	15																			
REV STATUS				REV			H	H	H	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	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
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DRAWING APPROVAL DATE
84-10-17

REVISION LEVEL
H

DLA LAND AND MARITIME
COLUMBUS, OHIO 43218-3990
http://www.landandmaritime.dla.mil

MICROCIRCUIT, DIGITAL, HIGH-SPEED CMOS, HEX D-TYPE FLIP-FLOP WITH CLEAR, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	**14933**	**84073**

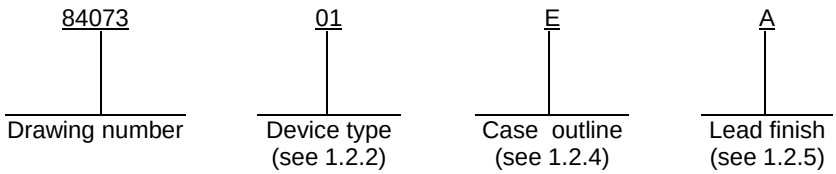
SHEET 1 OF 15

1. SCOPE

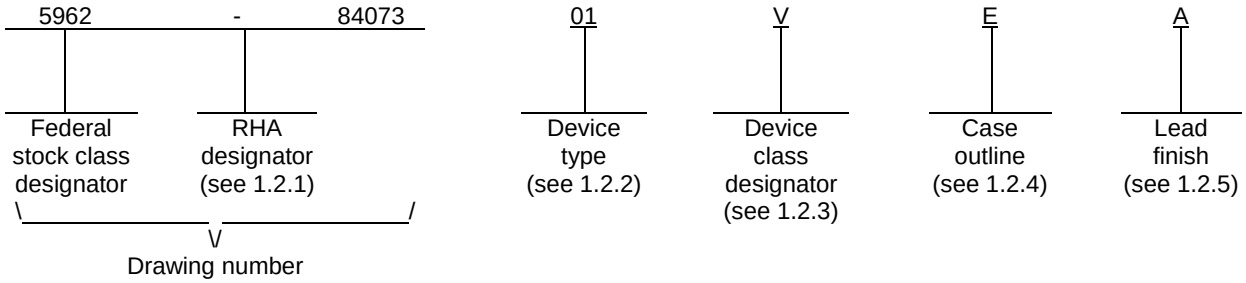
1.1 Scope. This drawing documents two product assurance class levels consisting of high reliability (device classes Q and M) and space application (device class V). A choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of Radiation Hardness Assurance (RHA) levels is reflected in the PIN.

1.2 PIN. The PIN is as shown in the following examples.

For device classes M and Q:



For device class V:



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 class M 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	54HC174	Hex D-type flip-flop with clear

1.2.3 Device class designator. The device class designator is a single letter identifying the product assurance level as listed below. Since the device class designator has been added after the original issuance of this drawing, device classes M and Q designators will not be included in the PIN and will not be marked on the device.

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
Q or V	Certification and qualification to MIL-PRF-38535

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

Outline letter	Descriptive designator	Terminals	Package style
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line
F	GDFP2-F16 or CDFP3-F16	16	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 class M.

1.3 Absolute maximum ratings. 1/ 2/ 3/

Supply voltage range (V_{CC})	-0.5 V dc to +7.0 V dc
DC input voltage range (V_{IN})	-0.5 V dc to V_{CC} + 0.5 V dc
DC output voltage range (V_{OUT})	-0.5 V dc to V_{CC} + 0.5 V dc
Clamp diode current	±20 mA
DC output current (per pin)	±25 mA
DC V_{CC} or GND current	±50 mA
Storage temperature range (T_{STG})	-65°C to +150°C
Maximum power dissipation (P_D)	500 mW 4/
Lead temperature (soldering, 10 seconds)	+260°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-STD-1835
Junction temperature (T_J)	+175°C

1.4 Recommended operating conditions. 2/ 3/

Supply voltage range (V_{CC})	+2.0 V dc to +6.0 V dc
Input voltage range (V_{IN})	0.0 V to V_{CC}
Output voltage range (V_{OUT})	0.0 V to V_{CC}
Case operating temperature range (T_C)	-55°C to +125°C

Maximum operating frequency (f_{MAX}):

T_C = +25°C	
V_{CC} = 2.0 V dc	5.4 MHz
V_{CC} = 4.5 V dc	27 MHz
V_{CC} = 6.0 V dc	32 MHz
T_C = -55°C, +125°C	
V_{CC} = 2.0 V dc	3.6 MHz
V_{CC} = 4.5 V dc	18 MHz
V_{CC} = 6.0 V dc	21 MHz

Minimum removal time, clear to clock (t_{REM}):

T_C = +25°C	
V_{CC} = 2.0 V dc	100 ns
V_{CC} = 4.5 V dc	20 ns
V_{CC} = 6.0 V dc	17 ns
T_C = -55°C, +125°C	
V_{CC} = 2.0 V dc	150 ns
V_{CC} = 4.5 V dc	30 ns
V_{CC} = 6.0 V dc	26 ns

Minimum setup time, data to clock (t_s):

T_C = +25°C	
V_{CC} = 2.0 V dc	100 ns
V_{CC} = 4.5 V dc	20 ns
V_{CC} = 6.0 V dc	17 ns
T_C = -55°C, +125°C	
V_{CC} = 2.0 V dc	150 ns
V_{CC} = 4.5 V dc	30 ns
V_{CC} = 6.0 V dc	26 ns

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/ Unless otherwise specified, all voltages are referenced to ground.
3/ The limits for the parameters specified herein shall apply over the full specified V_{CC} range and case temperature range of -55°C to +125°C.
4/ For T_C = +100°C to +125°C, derate linearly at 12 mW/°C.

1.4 Recommended operating conditions – Continued. 2/ 3/

Minimum hold time, clock to data (t_h):
- T_C = +25°C
  - V_{CC} = 2.0 V dc ..... 25 ns
  - V_{CC} = 4.5 V dc ..... 5 ns
  - V_{CC} = 6.0 V dc ..... 5 ns
- T_C = -55°C, +125°C
  - V_{CC} = 2.0 V dc ..... 40 ns
  - V_{CC} = 4.5 V dc ..... 8 ns
  - V_{CC} = 6.0 V dc ..... 7 ns

Minimum pulse width, clock (t_{w1}):
- T_C = +25°C
  - V_{CC} = 2.0 V dc ..... 90 ns
  - V_{CC} = 4.5 V dc ..... 18 ns
  - V_{CC} = 6.0 V dc ..... 15 ns
- T_C = -55°C, +125°C
  - V_{CC} = 2.0 V dc ..... 135 ns
  - V_{CC} = 4.5 V dc ..... 27 ns
  - V_{CC} = 6.0 V dc ..... 23 ns

Minimum pulse width, clear (t_{w2}):
- T_C = +25°C
  - V_{CC} = 2.0 V dc ..... 80 ns
  - V_{CC} = 4.5 V dc ..... 16 ns
  - V_{CC} = 6.0 V dc ..... 14 ns
- T_C = -55°C, +125°C
  - V_{CC} = 2.0 V dc ..... 120 ns
  - V_{CC} = 4.5 V dc ..... 24 ns
  - V_{CC} = 6.0 V dc ..... 20 ns

Maximum input rise and fall time (t_r, t_f):
- T_C = +25°C
  - V_{CC} = 2.0 V dc ..... 1000 ns
  - V_{CC} = 4.5 V dc ..... 500 ns
  - V_{CC} = 6.0 V dc ..... 400 ns
- T_C = -55°C, +125°C
  - V_{CC} = 2.0 V dc ..... 1000 ns
  - V_{CC} = 4.5 V dc ..... 500 ns
  - V_{CC} = 6.0 V dc ..... 400 ns

2/ Unless otherwise specified, all voltages are referenced to ground.
3/ The limits for the parameters specified herein shall apply over the full specified V_{CC} range and case temperature range of -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 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 https://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents cited in the solicitation or contract.

JEDEC – SOLID STATE TECHNOLOGY ASSOCIATION (JEDEC)

JEDEC Standard No. 7 - Standard for Description of 54/74HCXXXXX and 54/74HCTXXXXX Advanced High-Speed CMOS Devices.

(Copies of these documents are available online at http://www.jedec.org or from JEDEC – Solid State Technology Association, 3103 North 10th Street, Suite 240-S Arlington, VA 22201).

2.3 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.

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

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

3.2.4 Logic diagram. The logic diagram shall be as specified on figure 3.

3.2.5 Switching waveforms and test circuit. The switching waveforms and test circuit shall be as specified on figure 4.

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 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 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. 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 class M 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 compliance mark for device class M shall be a "C" as required in MIL-PRF-38535, appendix A.

3.6 Certificate of compliance. 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 6.6.1 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 (see 6.6.2 herein). The certificate of compliance submitted to DLA Land and Maritime-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 class M 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 DLA Land and Maritime-VA of change of product (see 6.2 herein) involving devices acquired to this drawing is required for any change that affects this drawing.

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

3.10 Microcircuit group assignment for device class M. Device class M devices covered by this drawing shall be in microcircuit group number 38 (see MIL-PRF-38535, appendix A).

TABLE I. Electrical performance characteristics.

Test	Symbol	Test conditions $-55°C \le T_C \le +125°C$ unless otherwise specified 1/		Group A subgroups	Limits		Unit
					Min	Max	
High level output voltage	V_{OH}	$V_{IN} = V_{IH}$ minimum or V_{IL} maximum $I_{OH} = -20\ \mu A$	$V_{CC} = 2.0$ V	1, 2, 3	1.9		V
			$V_{CC} = 4.5$ V		4.4		
			$V_{CC} = 6.0$ V		5.9		
		$V_{IN} = V_{IH}$ minimum or V_{IL} maximum $I_{OH} = -4.0$ mA	$V_{CC} = 4.5$ V		3.7		
		$V_{IN} = V_{IH}$ minimum or V_{IL} maximum $I_{OH} = -5.2$ mA	$V_{CC} = 6.0$ V		5.2		
Low level output voltage	V_{OL}	$V_{IN} = V_{IH}$ minimum or V_{IL} maximum $I_{OL} = +20\ \mu A$	$V_{CC} = 2.0$ V	1, 2, 3		0.1	V
			$V_{CC} = 4.5$ V			0.1	
			$V_{CC} = 6.0$ V			0.1	
		$V_{IN} = V_{IH}$ minimum or V_{IL} maximum $I_{OL} = +4.0$ mA	$V_{CC} = 4.5$ V			0.4	
		$V_{IN} = V_{IH}$ minimum or V_{IL} maximum $I_{OL} = +5.2$ mA	$V_{CC} = 6.0$ V			0.4	
High level input voltage	V_{IH} 2/		$V_{CC} = 2.0$ V	1, 2, 3	1.5		V
			$V_{CC} = 4.5$ V		3.15		
			$V_{CC} = 6.0$ V		4.2		
Low level input voltage	V_{IL} 2/		$V_{CC} = 2.0$ V	1, 2, 3		0.3	V
			$V_{CC} = 4.5$ V			0.9	
			$V_{CC} = 6.0$ V			1.2	
Input capacitance	C_{IN}	$V_{IN} = 0.0$ V, $T_C = +25°C$ See 4.4.1c		4		10	pF
Quiescent supply current	I_{CC}	$V_{CC} = 6.0$ V $V_{IN} = V_{CC}$ or GND		1, 2, 3		160	μA
Input leakage current	I_{IN}	$V_{CC} = 6.0$ V $V_{IN} = V_{CC}$ or GND		1, 2, 3		± 1.0	μA
Functional tests		See 4.4.1d		7, 8			

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Test conditions $-55°C \le T_C \le +125°C$ unless otherwise specified 1/		Group A subgroups	Limits		Unit
					Min	Max	
Propagation delay time, CLK or $\overline{CLR}$ input to mD output	t_{PHL}, t_{PLH} 3/	T_C = +25°C C_L = 50 pF See figure 4	V_{CC} =2.0 V	9		165	ns
			V_{CC} =4.5 V			33	
			V_{CC} =6.0 V			28	
		T_C = -55°C and +125°C C_L = 50 pF See figure 4	V_{CC} =2.0 V	10, 11		250	ns
			V_{CC} =4.5 V			50	
			V_{CC} =6.0 V			43	
Transition time high-to-low, low-to-high	t_{THL}, t_{TLH} 4/	T_C = +25°C C_L = 50 pF See figure 4	V_{CC} =2.0 V	9		75	ns
			V_{CC} =4.5 V			15	
			V_{CC} =6.0 V			13	
		T_C = -55°C and +125°C C_L = 50 pF See figure 4	V_{CC} =2.0 V	10, 11		110	ns
			V_{CC} =4.5 V			22	
			V_{CC} =6.0 V			19	

1/ For a power supply of 5 V ±10% the worst case output voltages (V_{OH} and V_{OL}) occur for HC at 4.5 V. Thus, the 4.5 V values should be used when designing with this supply. Worst case V_{IH} and V_{IL} occur at V_{CC} = 5.5 V and 4.5 V respectively. (The V_{IH} value at 5.5 V is 3.85 V.) The worst case leakage current (I_{IN}, and I_{CC}) occur for CMOS at the higher voltage, and so the 6.0 V values should be used.

2/ V_{IH} and V_{IL} tests are not required if applied as a forcing function for V_{OH} and V_{OL}.

3/ For V_{CC} = 2.0 V and 6.0 V, this parameter shall be guaranteed, if not tested, to the limits specified in table I.

4/ Transition time (t_{THL}, t_{TLH}), if not tested, shall be guaranteed to the specified parameters.

Device type	01	
Case outlines	E and F	2
Terminal number	Terminal symbol	
1	$\overline{\text{CLR}}$	NC
2	1Q	$\overline{\text{CLR}}$
3	1D	1Q
4	2D	1D
5	2Q	2D
6	3D	NC
7	3Q	2Q
8	GND	3D
9	CLK	3Q
10	4Q	GND
11	4D	NC
12	5Q	CLK
13	5D	4Q
14	6D	4D
15	6Q	5Q
16	V_{CC}	NC
17	---	5D
18	---	6D
19	---	6Q
20	---	V_{CC}

NC = No internal connection

Pin Description	
Terminal symbol	Description
mD (m = 1 to 6)	Data inputs
mQ (m = 1 to 6)	Data outputs
CLK	Clock input
$\overline{\text{CLR}}$	Clear input (active low)

FIGURE 1. Terminal connections.

Inputs			Outputs
$\overline{CLR}$	CLK	mD	mQ
L	X	X	L
H	↑	H	H
H	↑	L	L
H	L	X	Q_0

H = High voltage level
L = Low voltage level
X = Irrelevant
↑ = Low to high level transition
Q_0 = The level of Q before the indicated input conditions were established.

FIGURE 2. Truth table.

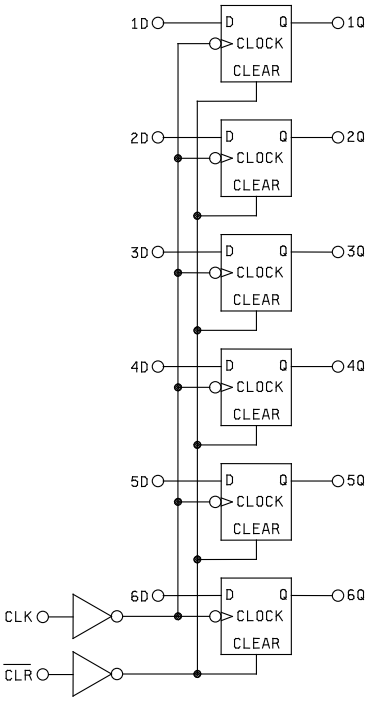


FIGURE 3. Logic diagram.

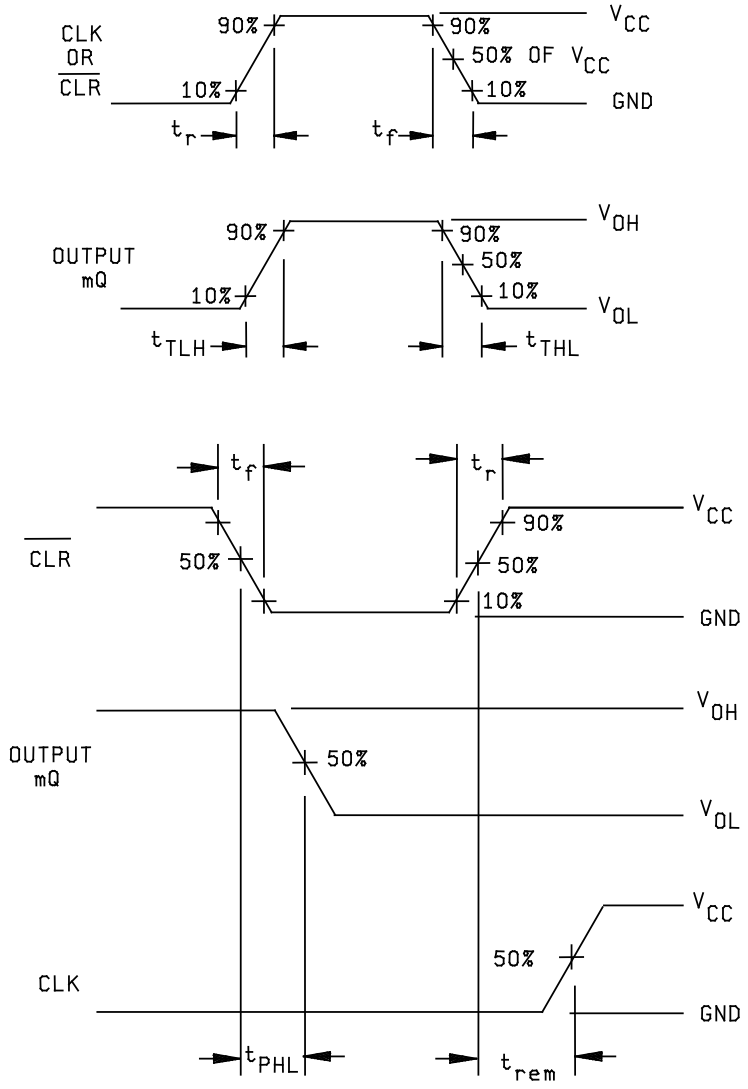
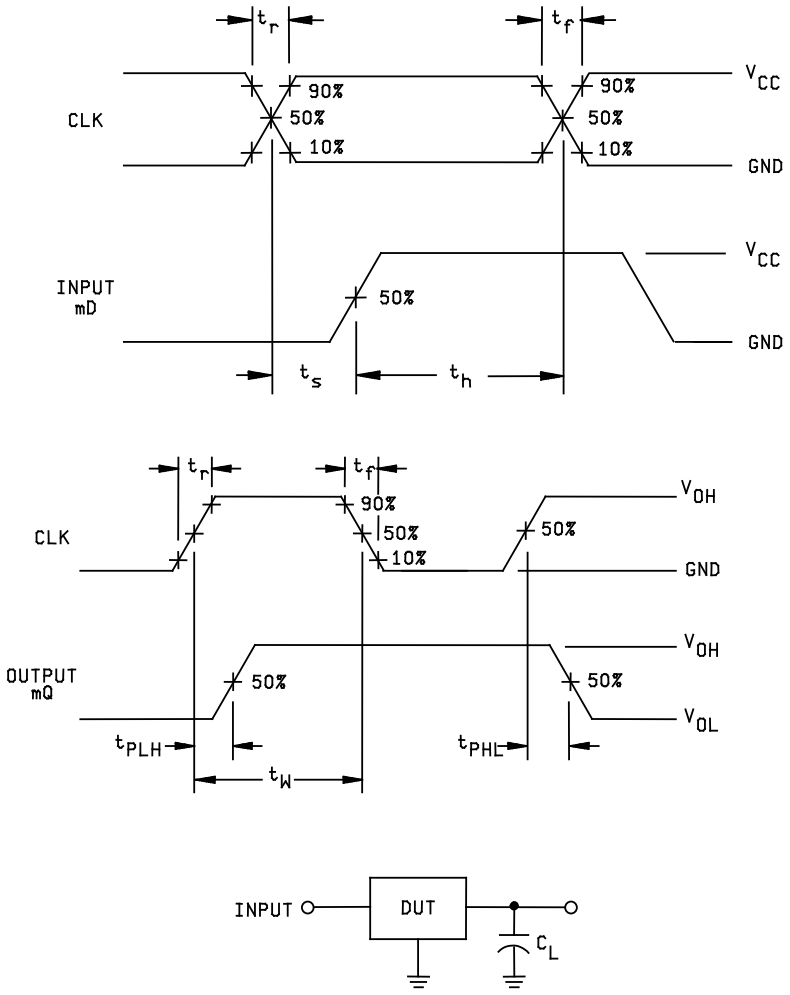


FIGURE 4. Switching waveforms and test circuit.



NOTES:

1. C_L = 50 pF minimum or equivalent (includes test jig and probe capacitance).
2. Input signal from pulse generator: V_{IN} = 0.0 V to V_{CC}; PRR ≤ 1MHz; Z_O = 50Ω; t_r = 6.0 ns; t_f = 6.0 ns; t_r and t_f shall be measured from 0.1 V_{CC} to 0.9 V_{CC} and from 0.9 V_{CC} to 0.1 V_{CC}, respectively; duty cycle = 50 percent.
3. Timing parameters shall be tested at a minimum input frequency of 1 MHz.
4. The outputs are measured one at a time with one transition per measurement.

FIGURE 4. Switching waveforms and test circuit - Continued.

4. VERIFICATION

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 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 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.

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.

(2) T_A = +125°C, minimum.

b. Interim and final electrical test parameters shall be as specified in table II 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 method 1015 of MIL-STD-883.

b. Interim and final electrical test parameters shall be as specified in table II 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 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. Quality conformance inspection for device class M shall be in accordance with MIL-PRF-38535, appendix A and as specified herein. Inspections to be performed for device class M 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 II herein.

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

c. Subgroup 4 (C_{IN} measurement) shall be measured only for the initial test and after process or design changes which may affect input capacitance.

d. For device class M, subgroups 7 and 8 tests shall be sufficient to verify the truth table. For device classes Q and V, subgroups 7 and 8 shall include verifying the functionality of the device as specified on figure 2 herein.

TABLE II. 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 Q	Device class V
Interim electrical parameters (see 4.2)	- - -	1	1
Final electrical parameters (see 4.2)	1/ 1, 2, 3, 7, 9	1/ 1, 2, 3, 7, 8, 9, 10, 11	2/ 1, 2, 3, 7, 8, 9, 10, 11
Group A test requirements (see 4.4)	1, 2, 3, 4, 7, 9, 10, 11 3/	1, 2, 3, 4, 7, 8, 9, 10, 11	1, 2, 3, 4, 7, 8, 9, 10, 11
Group C end-point electrical parameters (see 4.4)	1, 2, 3	1, 2, 3	4/ 1, 2, 3
Group D end-point electrical parameters (see 4.4)	1, 2, 3	1, 2, 3	1, 2, 3
Group E end-point electrical parameters (see 4.4)	- - -	- - -	- - -

1/ PDA applies to subgroup 1.
2/ PDA applies to subgroups 1 and 7.
3/ Subgroups 10 and 11, if not tested, shall be guaranteed to the specified limits in table I.
4/ Delta limits as specified in table III shall be required where specified and the delta limits shall be completed with reference to the zero hour electrical parameters.

TABLE III. Burn-in and operating life test delta parameters (+25°C)

Parameter	Symbol	Delta Limits
Quiescent current	I_{CC}	±120 nA
Input current low level	I_{IL}	±20 nA
Input current high level	I_{IH}	±20 nA
Output voltage low level (I_{OL} = 4 mA, V_{CC} = 4.5 V)	V_{OL}	±0.026 V
Output voltage high level (I_{OH} = -4 mA, V_{CC} = 4.5 V)	V_{OH}	±0.20 V

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

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

a. 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.

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 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 II 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 II 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 class M, 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 II herein.

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 class M.

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.

6.2 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 using DD Form 1692, Engineering Change Proposal.

6.3 Record of users. Military and industrial users should inform DLA Land and Maritime when a system application requires configuration control and which SMD's are applicable 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 microelectronic devices (FSC 5962) should contact DLA Land and Maritime-VA, telephone (614) 692-0544.

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

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 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 DLA Land and Maritime-VA and have agreed to this drawing.

6.6.2 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 DLA Land and Maritime-VA.

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 12-03-22

Approved sources of supply for SMD 84073 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/
8407301EA	01295	SNJ54HC174J
	3/	CD54HC174F3A
8407301FA	01295	SNJ54HC174W
84073012A	01295	SNJ54HC174FK
5962-8407301VFA	01295	SNV54HC174W
5962-8407301VEA	01295	SNV54HC174J

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
01295	Texas Instruments Inc. Semiconductor Group 8505 Forest Ln. P.O. Box 660199 Dallas, TX 75243 Point of contact: U.S. Highway 75 South P.O. Box 84, M/S 853 Sherman, TX 75090-9493