

**REVISIONS**

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Update boilerplate to current MIL-PRF-38535 requirements. – MAA	08-07-15	Thomas M. Hess
B	Update test condition for high level output voltage (V <sub>OH</sub> ) and low level output voltage (V <sub>OL</sub> ) in table I. Update boilerplate paragraphs to MIL-PRF-38535 requirement. - LTG	16-06-23	Thomas M. Hess

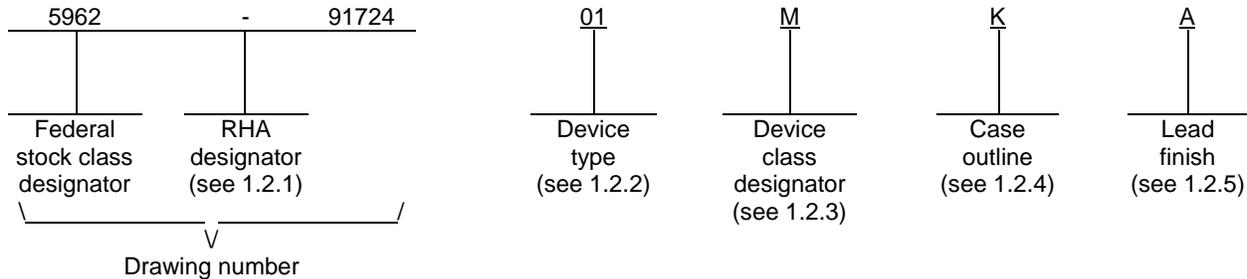


REV																				
SHEET																				
REV	B	B																		
SHEET	15	16																		
REV STATUS OF SHEETS	REV		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	SHEET		1	2	3	4	5	6	7	8	9	10	11	12	13	14				
PMIC N/A	PREPARED BY Joseph A. Kerby					<p align="center"><b>DLA LAND AND MARITIME</b>  <b>COLUMBUS, OHIO 43218-3990</b>  <a href="http://www.landandmaritime.dla.mil">http://www.landandmaritime.dla.mil</a></p>														
<p align="center"><b>STANDARD MICROCIRCUIT DRAWING</b></p> <p>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 Monica L. Poelking																			
	APPROVED BY Monica L. Poelking					<p align="center">MICROCIRCUIT, DIGITAL, BICMOS OCTAL BUS TRANSCEIVERS AND REGISTERS WITH THREE-STATE OUTPUTS, TTL COMPATIBLE, MONOLITHIC SILICON</p>														
	DRAWING APPROVAL DATE 93-11-18																			
	REVISION LEVEL B					SIZE A	CAGE CODE 67268	5962-91724												
																SHEET 1 OF 16				

1. SCOPE

1.1 Scope. This drawing documents two product assurance class levels consisting of high reliability (device class 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 example:



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:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	54BCT648	Octal bus transceivers and registers with three-state outputs, TTL compatible

1.2.3 Device class designator. The device class designator is a single letter identifying the product assurance level as follows:

<u>Device class</u>	<u>Device requirements documentation</u>
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 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>
K	GDFP2-F24 or CDFP3-F24	24	Flat pack
L	GDIP3-T24 or CDIP4-T24	24	Dual-in-line
3	CQCC1-N28	28	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.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET <b>2</b>

1.3 Absolute maximum ratings. 1/ 2/ 3/

Supply voltage range ( $V_{CC}$ ).....	-0.5 V dc to +7.0 V dc
Input voltage range (I/O ports).....	-0.5 V dc to +5.5 V dc
Input voltage range (excluding I/O ports).....	-0.5 V dc to +7.0 V dc
Voltage applied to any outputs in the disabled state.....	-0.5 V dc to +5.5 V dc
Voltage applied to any outputs in the high state.....	-0.5 V dc to $V_{CC}$
Input clamp current.....	-30 mA
Current into any output in the low state.....	+96 mA
Power dissipation ( $P_D$ ).....	+574 mW
Storage temperature range ( $T_{STG}$ ).....	-65°C to +150°C
Lead temperature (soldering, 10 seconds).....	+300°C
Thermal resistance, junction-to-case ( $\theta_{JC}$ ).....	See MIL-STD-1835
Junction temperature ( $T_J$ ).....	+175°C

1.4 Recommended operating conditions. 2/ 3/

Supply voltage range ( $V_{CC}$ ).....	+4.5 V dc to +5.5 V dc
Minimum high level input voltage ( $V_{IH}$ ).....	+2.0 V dc
Maximum low level input voltage ( $V_{IL}$ ).....	+0.8 V dc
Maximum input clamp current ( $I_{IC}$ ).....	-18 mA
Maximum high level output current ( $I_{OH}$ ).....	-12 mA
Maximum low level output current ( $I_{OL}$ ).....	+48 mA
Minimum setup time ( $t_s$ ) A or B before CAB or CBA going high.....	6.0 ns
Minimum hold time ( $t_h$ ) A or B after CAB or CBA going high.....	1.0 ns
Minimum pulse duration ( $t_w$ ):	
CBA or CAB high.....	4.3 ns
CBA or CAB low.....	7.5 ns
Maximum clock frequency ( $f_{clock}$ ).....	67 MHz
Case operating temperature range ( $T_C$ ).....	-55°C to +125°C

- 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 noted, all voltages are referenced to GND.
- 3/ The limits of the parameters specified herein shall apply over the full specified  $V_{CC}$  range and case temperature range of -55°C to +125°C.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET <b>3</b>

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 for device classes Q and V shall be in accordance with MIL-PRF-38535 as specified herein, 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. The individual item requirements for device class M shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B devices and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein for device classes Q and V or MIL-PRF-38535, appendix A and herein for device class M.

3.2.1 Case outlines. The case outlines shall be in accordance with 1.2.4 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 Block or Logic diagram. The block or 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.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET <b>4</b>

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 129 (see MIL-PRF-38535, appendix A).

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET <b>5</b>

TABLE I. Electrical performance characteristics.

Test and MIL-STD-883 test method <u>1/</u>	Symbol	Test conditions <u>2/</u> -55°C ≤ T <sub>C</sub> ≤ +125°C +4.5 V ≤ V <sub>CC</sub> ≤ +5.5 V unless otherwise specified		V <sub>CC</sub>	Group A subgroups	Limits <u>3/</u>		Unit
						Min	Max	
High level output voltage 3006	V <sub>OH1</sub>	For all inputs affecting output under test, V <sub>IN</sub> = V <sub>IH</sub> = 2.0 V or V <sub>IL</sub> = 0.8 V	I <sub>OH</sub> = -3 mA	4.5 V	1, 2, 3	2.4		V
	V <sub>OH2</sub>	For all inputs affecting output under test, V <sub>IN</sub> = V <sub>IH</sub> = 2.0 V or V <sub>IL</sub> = 0.8 V	I <sub>OH</sub> = -12 mA	4.5 V	1, 2, 3	2.0		
Low level output voltage 3007	V <sub>OL</sub>	For all inputs affecting output under test, V <sub>IN</sub> = V <sub>IH</sub> = 2.0 V or V <sub>IL</sub> = 0.8 V	I <sub>OL</sub> = +48 mA	4.5 V	1, 2, 3		0.55	V
Negative input clamp voltage 3022	V <sub>IC-</sub>	For input under test, I <sub>IN</sub> = -18 mA		4.5 V	1, 2, 3		-1.2	V
Input current high 3010	I <sub>IH</sub> <u>4/</u>	For input under test, V <sub>IN</sub> = 5.5 V		5.5 V	1, 2, 3		+1.0	mA
		Control inputs For input under test, V <sub>IN</sub> = 2.7 V			1, 2, 3		+20	μA
		A or B ports For input under test, V <sub>IN</sub> = 2.7 V			1, 2, 3		+70	μA
Input current low 3009	I <sub>IL</sub> <u>4/</u>	Control inputs For input under test, V <sub>IN</sub> = 0.5 V		5.5 V	1, 2, 3		-0.7	mA
		A or B ports For input under test, V <sub>IN</sub> = 0.5 V			1, 2, 3		-0.7	
Output short circuit current 3011	I <sub>OS</sub> <u>5/</u>	V <sub>OUT</sub> = 0.0 V		5.5 V	1, 2, 3	-100	-225	mA
Quiescent supply current outputs high 3005	I <sub>CCH</sub>	V <sub>IN</sub> = 4.5 V I <sub>OUT</sub> = 0.0 A		5.5 V	1, 2, 3		13	mA
Quiescent supply current outputs low 3005	I <sub>CCL</sub>	V <sub>IN</sub> = GND I <sub>OUT</sub> = 0.0 A		5.5 V	1, 2, 3		66	mA
Quiescent supply current outputs disabled 3005	I <sub>CCZ</sub>	V <sub>IN</sub> = GND I <sub>OUT</sub> = 0.0 A		5.5 V	1, 2, 3		16	mA

See footnotes at end of table.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET <b>6</b>

TABLE I. Electrical performance characteristics - Continued.

Test and MIL-STD-883 test method <u>1/</u>	Symbol	Test conditions <u>2/</u> -55°C ≤ T <sub>C</sub> ≤ +125°C +4.5 V ≤ V <sub>CC</sub> ≤ +5.5 V unless otherwise specified	V <sub>CC</sub>	Group A subgroups	Limits <u>3/</u>		Unit
					Min	Max	
Functional test	<u>6/</u>	Verify output, V <sub>OUT</sub> See 4.4.1b	4.5 V and 5.5 V	7, 8	L	H	
Propagation delay time, CBA or CAB to A or B 3003	t <sub>PLH1</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	3.7	10.3	ns
			4.5 V and 5.5 V	10, 11	3.7	13.4	
Propagation delay time, CBA or CAB to A or B 3003	t <sub>PHL1</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	4.3	10.6	ns
			4.5 V and 5.5 V	10, 11	4.3	13.2	
Propagation delay time, A or B to B or A 3003	t <sub>PLH2</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	3.8	9.9	ns
			4.5 V and 5.5 V	10, 11	3.8	12.8	
Propagation delay time, A or B to B or A 3003	t <sub>PHL2</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	3.3	8.9	ns
			4.5 V and 5.5 V	10, 11	3.3	11.2	
Propagation delay time, SAB or SBA (with A or B high) to A or B 3003	t <sub>PLH3</sub> <u>8/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	3.3	8.4	ns
			4.5 V and 5.5 V	10, 11	3.3	10.7	
Propagation delay time, SAB or SBA (with A or B high) to A or B 3003	t <sub>PHL3</sub> <u>8/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	5.3	12.6	ns
			4.5 V and 5.5 V	10, 11	5.3	16.5	
Propagation delay time, SAB or SBA (with A or B low) to A or B 3003	t <sub>PLH4</sub> <u>8/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	4.6	11.7	ns
			4.5 V and 5.5 V	10, 11	4.6	15.5	
Propagation delay time, SAB or SBA (with A or B low) to A or B 3003	t <sub>PHL4</sub> <u>8/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	4.9	11.1	ns
			4.5 V and 5.5 V	10, 11	4.9	13.8	

See footnotes at end of table.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET <b>7</b>

TABLE I. Electrical performance characteristics - Continued.

Test and MIL-STD-883 test method <u>1/</u>	Symbol	Test conditions <u>2/</u> -55°C ≤ T <sub>C</sub> ≤ +125°C +4.5 V ≤ V <sub>CC</sub> ≤ +5.5 V unless otherwise specified	V <sub>CC</sub>	Group A subgroups	Limits <u>3/</u>		Unit
					Min	Max	
Propagation delay time, output enable, $\bar{G}$ to A or B 3003	t <sub>PZH1</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	4.5	11.0	ns
			4.5 V and 5.5 V	10, 11	4.5	14.4	
Propagation delay time, output enable, $\bar{G}$ to A or B 3003	t <sub>PZL1</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	4.9	12.2	ns
			4.5 V and 5.5 V	10, 11	4.9	16.0	
Propagation delay time, output disable $\bar{G}$ to A or B 3003	t <sub>PHZ1</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	4.0	9.7	ns
			4.5 V and 5.5 V	10, 11	4.0	12.0	
Propagation delay time, output disable $\bar{G}$ to A or B 3003	t <sub>PLZ1</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	3.5	9.3	ns
			4.5 V and 5.5 V	10, 11	3.5	11.6	
Propagation delay time, output enable DIR to A or B 3003	t <sub>PZH2</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	3.1	11.0	ns
			4.5 V and 5.5 V	10, 11	3.1	14.1	
Propagation delay time, output enable DIR to A or B 3003	t <sub>PZL2</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	3.8	12.2	ns
			4.5 V and 5.5 V	10, 11	3.8	15.5	
Propagation delay time, output disable DIR to A or B 3003	t <sub>PHZ2</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	4.3	11.6	ns
			4.5 V and 5.5 V	10, 11	3.5	14.3	
Propagation delay time, output disable DIR to A or B 3003	t <sub>PLZ2</sub> <u>7/</u>	C <sub>L</sub> = 50 pF minimum R <sub>L</sub> = 500Ω See figure 4	5.0 V	9	2.7	9.9	ns
			4.5 V and 5.5 V	10, 11	2.7	12.8	

1/ For tests not listed in the referenced MIL-STD-883 (e.g. ΔI<sub>CC</sub>), utilize the general test procedure of 883 under the conditions listed herein.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET <b>8</b>

TABLE I. Electrical performance characteristics - Continued.

- 2/ Each input/output, as applicable, shall be tested at the specified temperature, for the specified limits, to the tests in table I herein. Output terminals not designated shall be high level logic, low level logic, or open, except for all  $I_{CC}$  and  $\Delta I_{CC}$  tests, where the output terminals shall be open. When performing these tests, the current meter shall be placed in the circuit such that all current flows through the meter. For input terminals not designated,  $V_{IN} = GND$  or  $V_{IN} \geq 3.0 V$ .
- 3/ For negative and positive voltage and current values, the sign designates the potential difference in reference to GND and the direction of current flow, respectively; and the absolute value of the magnitude, not the sign, is relative to the minimum and maximum limits, as applicable, listed herein. All devices shall meet or exceed the limits specified in table I at  $4.5 V \leq V_{CC} \leq 5.5 V$ .
- 4/ For I/O ports, the parameters  $I_{IH}$  and  $I_{IL}$  include the off-state output current.
- 5/ Not more than one output shall be shorted at one time and the duration of the test condition shall not exceed 1 second.
- 6/ Functional tests shall be conducted at input test conditions of  $0.4 V \leq V_{IL} \leq 0.8 V$  and  $2.0 V \leq V_{IH} \leq 2.4 V$  for  $V_{CC} = 4.5 V$  and repeated at  $V_{CC} = 5.5 V$ .
- 7/ For propagation delay tests, all paths must be tested.
- 8/ These parameters are measured with the internal output state of the storage register opposite to that of the bus input.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET 9

Device type	01	
Case outlines	K and L	3
Terminal number	Terminal symbol	
1	CAB	NC
2	SAB	CAB
3	DIR	SAB
4	A1	DIR
5	A2	A1
6	A3	A2
7	A4	A3
8	A5	NC
9	A6	A4
10	A7	A5
11	A8	A6
12	GND	A7
13	B8	A8
14	B7	GND
15	B6	NC
16	B5	B8
17	B4	B7
18	B3	B6
19	B2	B5
20	B1	B4
21	$\bar{G}$	B3
22	SBA	NC
23	CBA	B2
24	V <sub>CC</sub>	B1
25	---	$\bar{G}$
26	---	SBA
27	---	CBA
28	---	V <sub>CC</sub>

NC = No internal connection

FIGURE 1. Terminal connections.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET 10

Inputs						Data I/O		Operation or Function
$\bar{G}$	DIR	CAB	CBA	SAB	SBA	A1 THRU A8	B1 THRU B8	
X	X	↑	X	X	X	Input	unspecified <u>1/</u>	Store A, B unspecified <u>1/</u>
X	X	X	↑	X	X	unspecified <u>1/</u>	Inputs	Store B, A unspecified <u>1/</u>
H	X	↑	↑	X	X	Input	Input	Store A and B data
H	X	H or L	H or L	X	X	Input	Input	Isolation, hold storage
L	L	X	X	X	L	Output	Input	Real-time $\bar{B}$ data to A bus
L	L	X	H or L	X	H	Output	Input	Stored $\bar{B}$ data to A bus
L	H	X	X	L	X	Input	Output	Real-time $\bar{A}$ data to B bus
L	H	H or L	X	H	X	Input	Output	Stored $\bar{A}$ data to B bus

H = High voltage level  
L = Low voltage level  
X = Don't care or Irrelevant  
↑ = Upward transition of clock

1/ The data output functions may be enabled or disabled by various signals at the  $\bar{G}$  and DIR inputs. Data input functions are always enabled; i.e., data at the bus pins will be stored on every low-to-high transition of the clock inputs.

FIGURE 2. Truth table.

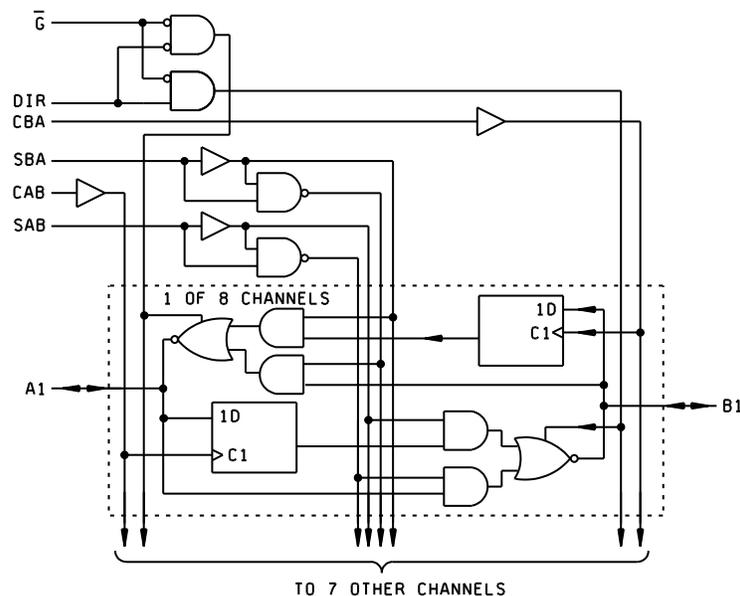


FIGURE 3. Logic diagram.

<b>STANDARD  MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET 11

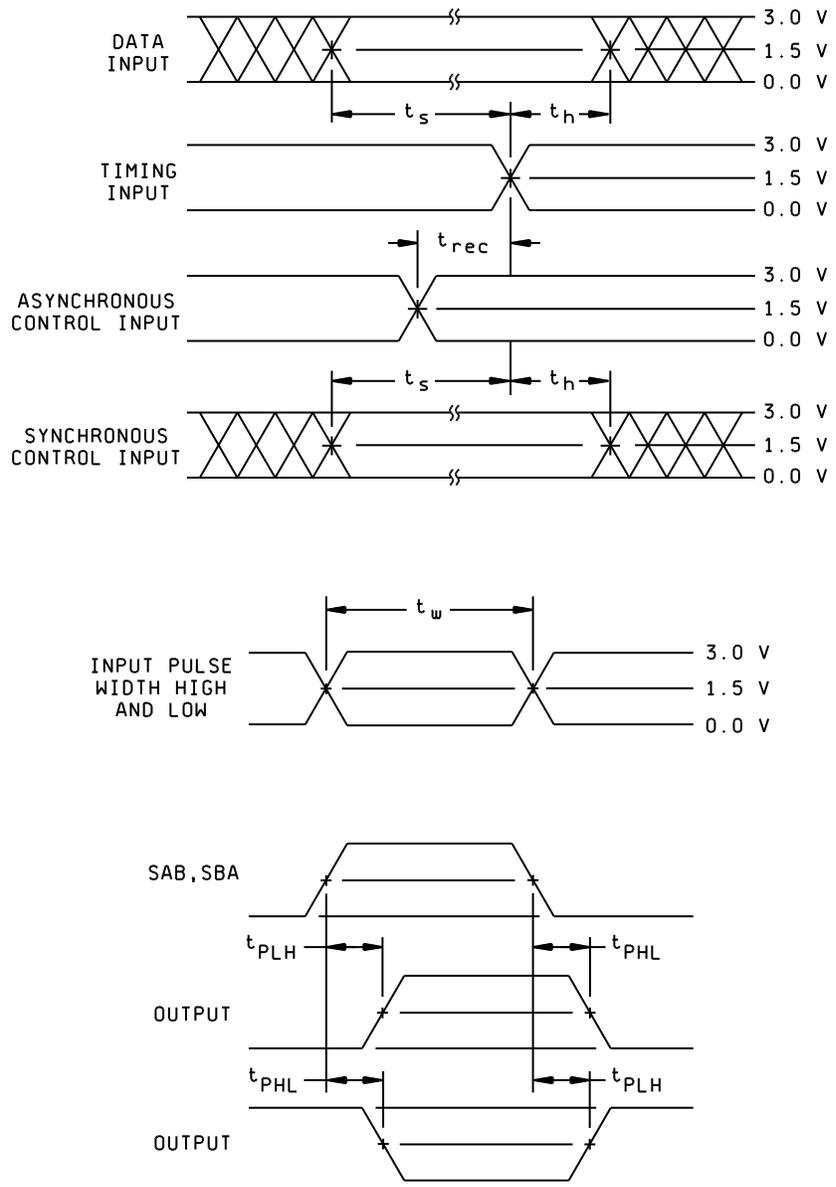
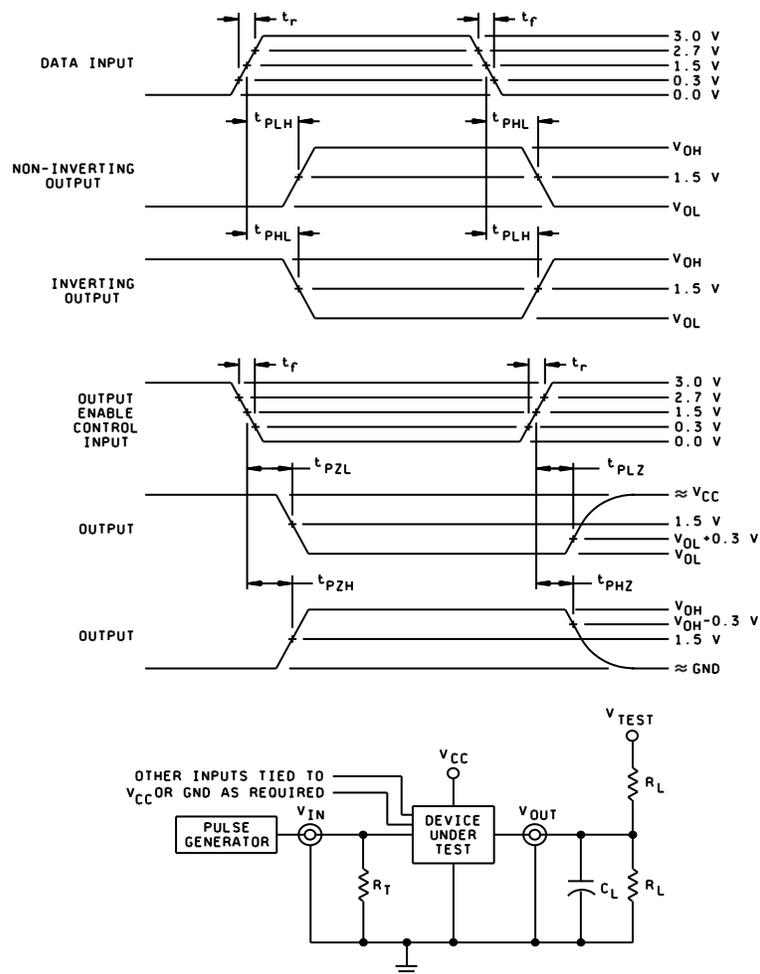


FIGURE 4. Switching waveforms and test circuit.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET 12



NOTES:

1. When measuring  $t_{PLZ}$  and  $t_{PZL}$ :  $V_{TEST} = 7.0 \text{ V}$
2. When measuring  $t_{PHZ}$ ,  $t_{PZH}$ ,  $t_{PLH}$  and  $t_{PHL}$ :  $V_{TEST} = \text{Open}$
3. The  $t_{PZL}$  and  $t_{PLZ}$  reference waveform is for the output under test with internal conditions such that the output is low at  $V_{OL}$  except when disabled by the output enable control. The  $t_{PZH}$  and  $t_{PHZ}$  reference waveform is for the output under test with internal conditions such that the output is high at  $V_{OH}$  except when disabled by the output enable control.
4.  $C_L = 50 \text{ pF}$  minimum or equivalent (includes test jig and probe capacitance).
5.  $R_L = 500\Omega$  or equivalent.
6.  $R_T = 50\Omega$  or equivalent.
7. Input signal from pulse generator:  $V_{IN} = 0.0 \text{ V}$  to  $3.0 \text{ V}$ ;  $\text{PRR} \leq 10 \text{ MHz}$ ;  $t_r \leq 2.5 \text{ ns}$ ;  $t_f \leq 2.5 \text{ ns}$ ;  $t_r$  and  $t_f$  shall be measured from  $0.3 \text{ V}$  to  $2.7 \text{ V}$  and from  $2.7 \text{ V}$  to  $0.3 \text{ V}$  respectively; duty cycle = 50 percent.
8. Timing parameters shall be tested at a minimum input frequency of 1 MHz.
9. The outputs are measured one at a time with one transition per measurement.

FIGURE 4. Switching waveforms and test circuit - Continued.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET 13

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 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.

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

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

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET 14

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)	<u>1/</u> 1, 2, 3, 7, 8, 9, 10, 11	<u>1/</u> 1, 2, 3, 7, 8, 9, 10, 11	<u>2/</u> 1, 2, 3, 7, 8, 9, 10, 11
Group A test requirements (see 4.4)	1, 2, 3, 7, 8, 9, 10, 11	1, 2, 3, 7, 8, 9, 10, 11	1, 2, 3, 7, 8, 9, 10, 11
Group C end-point electrical parameters (see 4.4)	1, 2, 3	1, 2, 3	
Group D end-point electrical parameters (see 4.4)	1, 2, 3	1, 2, 3	1, 2, 3

1/ PDA applies to subgroup 1.

2/ PDA applies to subgroups 1 and 7.

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 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.  $T_A = +125^\circ\text{C}$ , 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  $T_A = +25^\circ\text{C} \pm 5^\circ\text{C}$ , after exposure, to the subgroups specified in table II herein.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET 15

4.5 Methods of inspection. Methods of inspection shall be specified as follows:

4.5.1 Voltage and current. Unless otherwise specified, all voltages given are referenced to the microcircuit GND terminal. Currents given are conventional current and positive when flowing into the referenced terminal.

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.

6.1.2 Substitutability. Device class Q devices will replace device class M devices.

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) 692-8108.

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 MIL-HDBK-103 and 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.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-91724</b>
		REVISION LEVEL <b>B</b>	SHEET 16

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 16-06-23

Approved sources of supply for SMD 5962-91724 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 <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962-9172401M3A	3V146	54BCT648/B3A
	<u>3/</u>	SNJ54BCT648FK
5962-9172401MKA	3V146	54BCT648/BKA
	<u>3/</u>	SNJ54BCT648W
5962-9172401MLA	3V146	54BCT648/BLA
	<u>3/</u>	SNJ54BCT648JT

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

3V146

Vendor name  
and address

Rochester Electronics  
16 Malcolm Hoyt Drive  
Newburyport, MA 01950

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