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FOR USE BY ALL AND AGENCI DEPARTMENT	THIS DRAWING IS AVAILABLE OR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE				DRAWING APPROVALD 23 SEPTEMBER 1988 REVISION LEVEL					SIZE A		6	72	68			-		-88	371	3				
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DISTRIBUTION STATEMENT A. Approved for public release; distribution is untimited.

1. SCOPE 1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices". 1.2 Part number. The complete part number shall be as shown in the following example: 5962-88713 Drawing number Device type Case outline Lead finish per (1.2.1)(1.2.2)MIL-M-38510 1.2.1 Device types. The device types shall identify the circuit function as follows: Generic number Device type Circuit function tpD C16L8 01,05,09 16-input 8-output AND-OR invert logic array 40,30,20 ns 16-input 8-output registered AND-OR logic array 16-input 6-output registered AND-OR logic array 40,30,20 ns 40,30,20 ns 02,06,10 C16R8 03,07,11 C16R6 04,08,12 C16R4 16-input 4-output registered AND-OR logic array 40,30,20 ns 1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows: Outline letter Case outline D-8 (20-lead, 1.060" x .310" x .200"), dual-in-line package F-9 (20-lead, .540" x .300" x .100"), flat package C-2A (20-terminal, .358" x .358" x .075"), square chip S carrier package 1.3 Absolute maximum ratings. Supply voltage range - - - - - --0.5 V dc to +7.0 V dc -0.5 V dc to +7.0 V dc DC voltage applied to outputs in High Z-----DC input voltage -----Output sink current------3.0 V dc to +7.0 V dc 24 mA Thermal resistance, junction-to-case (θ_{JC}) : See MIL-M-38510, appendix C Maximum power dissipation (P_D) 1/---- Maximum junction temperature (T_J) ----- Lead temperature (soldering, 10 seconds maximum) --1.0 W +175°C +260°C -65°C to +150°C -55°C to +125°C Storage temperature range --------Temperature under bias range - - - - - - - - - -1.4 Recommended operating conditions. 4.5 V dc to 5.5 V dc 2.0 V dc minimum 0.8 V dc maximum -55°C to +125°C

1/ Must withstand the added PD due to short circuit test, e.g., I_{OS} .

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2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510

- Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883

Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

- 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 shall take precedence.
 - 3. REQUIREMENTS
- 3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.
- 3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.
 - 3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.
 - 3.2.2 Truth table. The truth table shall be as specified on figure 2.
- 3.2.2.1 Unprogrammed devices. The truth table for unprogrammed devices for contracts involving no altered item drawing shall be as specified on figure 2. When required in groups A, B, or C (see 4.3), the devices shall be programmed by the manufacturer prior to test with a minimum of 50 percent of the total number of gates programmed or to any altered item drawing pattern which includes at least 25 percent of the total number of gates programmed.
- 3.2.2.2 Programmed devices. The truth tables for programmed devices shall be as specified by an attached altered item drawing.
 - 3.2.3 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.
- 3.3 <u>Electrical performance characteristics</u>. Unless otherwise specified, the electrical performance characteristics shall be as specified in table I and apply over the full case operating temperature range.
- 3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

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TA	BLE I. I	lectrical performance character	istics - C	ontinued.			
Test	Symbol	Conditions $\frac{1}{V_{SS}} = 0 \text{ V, } -55^{\circ}\text{C} \leq \text{T}_{\text{C}} \leq ^{+125^{\circ}\text{C}}$ $4.5 \text{ V} \leq \text{V}_{\text{CC}} \leq 5.5 \text{ V}$	Group A subgroups	 Device types	 Lir 	nits	 Unit
	<u>i</u>	unless otherwise specified	<u> </u>		ı Min	Max	
Clock to output 7/	t _{CO}	 V _{CC} = 5.5 V See figure 3 and 4 	 9, 10, 11 	02,03,04 06,07,08 10,11,12		25 20 15	ns
Input or feedback 7/ setup time	ts		9, 10, 11	02,03,04 06,07,08 10,11,12	35 25 20		ns
Hold time 7/	 t _H 	 	 9, 10, 11 	02,03,04 06,07,08 10,11,12	0		ns
Clock period <u>4</u> / <u>7</u> /	 tp 	 	 9, 10, 11 		60 45 35		ns
Clock width <u>4/ 7</u> /	t _W		 9, 10, 11 	T	25 20 12		ns
Maximum frequency	f _{MAX}		 9, 10, 11 	02,03,04 06,07,08 10,11,12	···i		MHz

- 1/ AC test are performed with input rise and fall times of 5 ns or less, timing reference levels of 1.5 V, input pulse levels of 0 to 3.0 V, and the output load on figure 3. configuration A.
- 2/ These are absolute values with respect to device ground and all overshoots due to system or tester noise are included.
- 3/ For test purposes, not more than one output at a time should be shorted. Short circuit test duration should not exceed one second.
- 4/ Tested initially and after any design or process changes that affect that parameter, and therefore shall be guaranteed to the limits specified in table I.
- To calculate I_{CC} at any given operating frequency, use 70 mA + $I_{CC}(AC)$, where $I_{CC}(AC)$ = (0.6 mA/MHz) x (operating frequency in MHz).
- $\frac{6}{}$ Transition is measured at steady state high level -500 mV or steady state low level +500 mV on the output from the 1.5 V level on the input and the output load on figure 3, configuration B.
- 7/ Test applies only to registered outputs.

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		·		
Device types	01,05,09	02,06,10	03,07,11	04,08,12
Case outlines	R,S,X	l R,S,χ	l R,S,χ	 R,S,X
Terminal number	 	Terminal	symbol	
1 2 3 4 4 5 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	IO I1 I1 I3 I14 I15 I6 I7 I8 VSS I9 00 I/01 I/02 I/03 I/04 I/04 I/06 07 VCC	CP IO II II II II II II VSS OE OO OO OO OO OO OO OO	CP	CP

FIGURE 1. Terminal connections.

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Device types 01, 05, and 09

				Inpu	ts					Outputs									
19	 I ₈ 	 I ₇ 	 I ₆	 I ₅	 I4 	 1 ₃	I I 2	 I ₁	10	 0 ₇	I /0 ₆	1/05	1/04	1/03	1/02	1/01	00		
X	i x	i X	I X	i x	i X	i x	i I X	i I X	i I X I	l Z	i I Z	Z	Z	Z	Z	Z	l Z		

Device types 02, 06, and 10

 				Inpu	ts					Outputs								
I I CP	OE	17	¹ 6	15	14	 13 	 I ₂ 		1 1 1	 0 ₇ 	06	1 10 ₅	04	03	 02 	01	00	
 X 	Н	i x	X	l X	l x	i x	X	I X	x	l Z	Z	Z	l Z	Z	Z	Z	Z	
X	L	I X	l X	l X	X	l X	l X	l X	l X	 H	 H	ј Н 	H	Н	H	 H	H	

Device types 03, 07, and 11

<u> </u>				Inpu	ts					Outputs							
I CP	IOE	 I ₇ 	1 1 6	I ₅	I I 4	 I 3 	1 1 1	 ^I 1	1 1 ₀	 I/0 ₇ 	06	1 10 ₅ 1	1 10 ₄	 0 ₃ 	102	0 ₁	 1/0 ₀
X	 H	X	l X	I X I	X	l X	l X	X	l X	l Z	Z	l I Z	l Z	l Z	l Z	l Z	i Z
X	l L	l X	X	X	i x	X	l X	i I X I	i x	l Z	H	 H	 H 	 H	 H	 H	l Z

Device types 04, 08, and 12

 				Inpu	ts					Outputs								
I CP 	0E	 1 ₇ 	I 6	15	14	1 113	12	I I 1	1 1 1	 1/07 	1/06	05	04	1 103	 0 ₂ 	I/0 ₁	 I/0 ₀ 	
X	 H	l X	l X	l X	l X	l X	l x	X	I X	 Z 	Z	Z	l Z	l z	l Z	 Z	Z	
X	L	l X	1 X 	l X	 X 	l X I	l X	i x	I X	i Z	Z	H	 H	 H	 H 	 Z 	l Z	

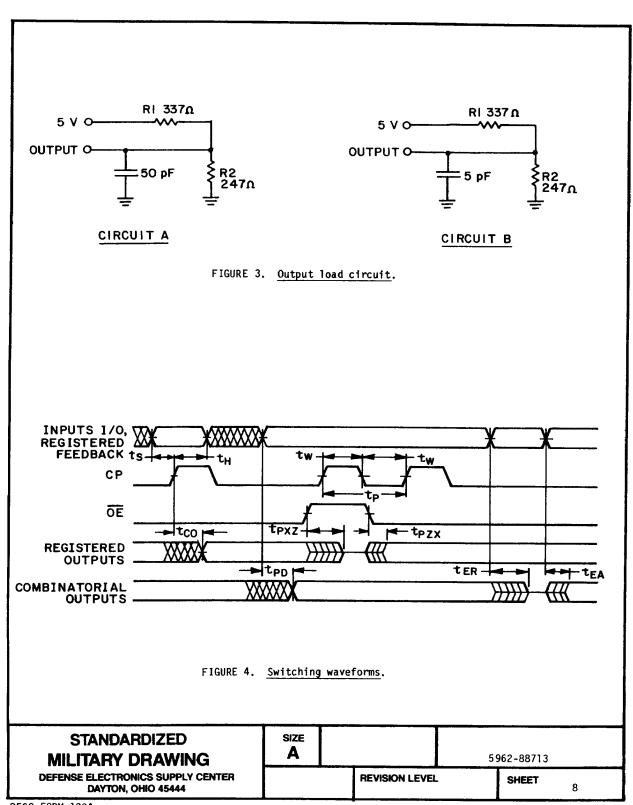
NOTES: 1. Z = Three state 2. X = Don't care

FIGURE 2. Truth table (unprogrammed).

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- 3.5 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 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.
- 3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.
- 3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).
- 3.8 Verification and review. DESC, DESC'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.
- 3.9 Processing options. Since the device is capable of being programmed by either the manufacturer or the user to result in a wide variety of configurations; two processing options are provided for selection in the contract, using an altered item drawing.
- 3.9.1 <u>Unprogrammed device delivered to the user</u>. All testing shall be verified through group A testing as defined in 3.2.2.1 and table II. It is recommended that users perform subgroups 7 and 9 after programming to verify the specific program configuration.
- 3.9.2 Manufacturer-programmed device delivered to the user. All testing requirements and quality assurance provisions herein, including the requirements of the altered item drawing, shall be satisfied by the manufacturer prior to delivery.
 - 4. QUALITY ASSURANCE PROVISIONS
- 4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).
- 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).
 - Test condition C or D using the circuit submitted with the certificate of compliance (see 3.5 herein).
 - (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.
- 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 5 and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.
 - c. Subgroup 4 (C_{IN} and C_{O} measurement) shall be measured only for the initial test and after any design or process changes which may affect capacitance.

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- d. Unprogrammed devices shall be tested for programmability and ac performance compliance to the requirements of Group A, subgroups 9, 10, and 11.
 - (1) A sample shall be selected to satisfy programmability requirements prior to performing subgroups 9, 10, and 11. Twelve devices shall be submitted to programming (see 3.2.2.1). If more than two devices fail to program, the lot shall be rejected. At the manufacturers option, the sample may be increased to 24 total devices with no more than four total device failures allowable.
 - (2) Ten devices from the programmability sample shall be submitted to the requirements of group A, subgroups 9, 10, and 11. If more than two devices fail, the lot shall be rejected. At the manufacturer's option, the sample may be increased to 20 total devices with no more than 4 total device failures allowable.
- 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.
 - Test condition C or D using the circuit submitted with the certificate of compliance (see 3.5 herein).
 - (2) $T_A = +125$ °C, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.
 - c. For quality conformance inspection, the programmability sample (see 4.3.1d) shall be included in subgroup 1 test.
- 4.4 Programming procedures. The programming procedures shall be as specified by the device manufacturer.
- 4.5 Electrostatic discharge sensitivity (ESDS). Electrostatic discharge sensitivity (ESDS) testing shall be performed in accordance with MIL-STD-883, method 3015 and MIL-M-38510 for initial testing and after any design or process changes which may affect input or output protection circuitry. The option to categorize devices as ESD sensitive without performing the test is not allowed. Only those device types that pass ESDS testing at 1000 volts or greater shall be considered as conforming to the requirements of this drawing.

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TABLE II. Electrical test requirements. 1/2/3/4/

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (pre burn-in) (method 5004)	1
Final electrical test parameters (method 5004) for unprogrammed devices	1*,2,3,7*,8
Final electrical test parameters (method 5004) for programmed devices	1*,2,3,7*,8,9
Group A test requirements (method 5005) 	1,2,3,4**,7, 8,9,10,11
Groups C and D end-point electrical parameters (method 5005)	2,3,7,8

- 1/ * indicates PDA applies to subgroups 1 and 7.
 2/ Any or all subgroups may be combined when using high-speed testers.
- 3/ ** see 4.3.1c.
- 4/ Subgroups 7 and 8 shall consist of verifying the data pattern.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

- 6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item
- 6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.
- 6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

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6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to DESC-ECS.

T	Vendor	Vendor	
Military drawing	CAGE	similar part	Replacement
part number	number	number 1/	military specification
i par o maniber	I	i number 1/	part number
5962-8871301RX	65786	PALC16L8-40DMB	
T 5962-8871301SX	65786	IPALC16L8-40KMB	
T 5962-8871301XX	65786	IPALC16L8-40LMB	
5962-8871302RX	65786	PALCIGR8-400MB	
1 5962-8871302SX	65786	PALCIGR8-40KMB	
5962-8871302XX	65786	PALC16R8-40LMB	
T 5962-8871303RX	65786	PALC16R6-40DMB	
5962-8871303SX	65786	PALC16R6-40KMB	
5962-8871303XX	65786	PALCIGRG-40LMB	1
5962-8871304RX	65786	PALCIGR4-40DMB	
5962-8871304SX		PALCI6R4-40KMB	
5962-8871304XX	65786	PALC16R4-40LMB	i i
5962-8871305RX	65786	PALCIGLE-30DMB	
5962-8871305SX	65786	PALCI6L8-30KMB	
T 5962-8871305XX	65786	PALC16L8-30LMB	`
5962-8871306RX		PALCIGR8-30DMB	
5962-8871306SX		PALC16R8-30KMB	
5962-8871306XX	65786	PALC16R8-30LMB	
5962-8871307RX	65786	PALCIGRG-30DMB	
5962-8871307SX	65786	PALCIGRG-30KMB	<u> </u>
I 5962-8871307XX		PALC16R6-30LMB	
5962-8871308RX		PALC16R4-30DMB	
5962-8871308SX		PALC16R4-30KMB	<u> </u>
5962-8871308XX		PALCIGR4-30LMB	
5962-88/1309RX		PALCI6L8-20DMB	
5962-88713095X		PALC16L8-20KMB	
5962-8871309XX		PALCI6L8-20LMB	
5962-8871310RX		PALC16R8-20DMB	
5962-8871310SX		PALCIGR8-20KMB	
5962-8871310XX		PALC16R8-20LMB	
5962-8871311RX		PALCIGRG-20DMB	
5962-8871311SX		PALC16R6-20KMB	
5962-8871311XX		PALC16R6-20LMB	
5962-8871312RX		PALCIGR4-20DMB	
5962-8871312SX	65786	PALC16R4-20KMB	
5962-8871312XX		PALC16R4-20LMB	

 $\frac{1}{}$ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE number

Vendor name and address

65786

Cypress Semiconductor Corporation 3901 North First Street San Jose, CA 95134

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