

0REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Changes in accordance with NOR 5962-R005-91	91 - 09 - 24	Michael A. Frye
B	Changed the minimum clock period for device 02 from 45 to 40 ns. Boilerplate update. ksr	99 - 07 - 28	Raymond Monnin



REV																				
SHEET																				
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REV STATUS OF SHEETS	REV	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							

<p>PMIC N/A</p> <p>STANDARD MICROCIRCUIT DRAWING</p> <p>THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE</p> <p>AMSC N/A</p>	<p>PREPARED BY Rick Officer</p>	<p>DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216 http://www.dsccl.dla.mil</p>		
	<p>CHECKED BY Ray Monnin</p>	<p>MICROCIRCUITS, DIGITAL, CMOS, GENERIC PROGRAMMABLE LOGIC DEVICE</p>		
	<p>APPROVED BY D. A. DiCenzo</p>			
	<p>DRAWING APPROVAL DATE 28 JULY 1988</p>	<p>SIZE A</p>	<p>CAGE CODE 67268</p>	<p>5962-88637</p>
	<p>REVISION LEVEL B</p>	<p>SHEET 1 OF 12</p>		

DSCC FORM 2233
APR 97

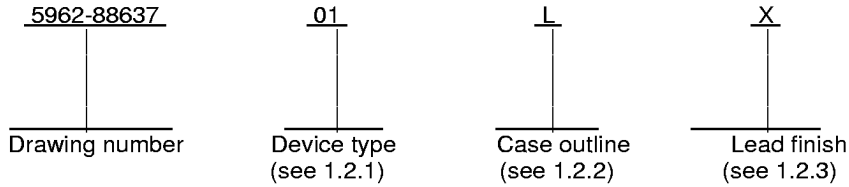
5962-E381-99

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

1. SCOPE

1.1 Scope. This drawing describes device requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A.

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:



1.2.1 Device type(s). The device type(s) shall identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>	<u>t_{PD}</u>
01	20G10	24 Pin Generic CMOS PLD	40 ns
02	20G10	24 Pin Generic CMOS PLD	30 ns

1.2.2 Case outline(s). The case outline(s) shall be 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 package
L	CDIP4-T24 or GDIP3-T24	24	dual-line package
3	CQCC1-N28	28	leadless chip carrier

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

1.3 Absolute maximum ratings.

Supply voltage range -----	-0.5 V dc to +7.0 V dc
DC voltage applied to Outputs in High Z state range -----	-0.5 V dc to +7.0 V dc
DC Input voltage -----	-3.0 V dc to +7.0 V dc
DC program voltage -----	+14.0 V dc
Maximum power dissipation <u>1/</u> -----	1.0 W
Lead temperature (soldering, 10 seconds) ----	+260° C
Thermal resistance, junction-to-case (Θ_{JC}): ---	See MIL-STD-1835
Junction temperature (T_J) <u>2/</u> -----	+150° C
Storage temperature range -----	-65° C to +150° C
Temperature under bias range -----	-55° C to +125° C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC}) -----	+4.5 V dc to +5.5 V dc
Ground voltage (GND) -----	0 V dc
High level input voltage range (V_{IH}) -----	2.0 V dc to V_{CC}
Low level input voltage range (V_{IL}) -----	-0.5 V dc to +0.8 V dc
Case operating temperature range (T_C) -----	-55° C to +125° C

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

2/ Maximum junction temperature may be increased to 175° C during burn-in and steady state life.

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2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-PRF-38535 - Integrated Circuits, Manufacturing, General Specification for.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-883 - Test Method Standard Microcircuits.
 MIL-STD-973 - Configuration Management.
 MIL-STD-1835 - Interface Standard For Microcircuit Case Outlines.

HANDBOOKS

DEPARTMENT OF DEFENSE

MIL-HDBK-103 - List of Standard Microcircuit Drawings (SMD's).
 MIL-HDBK-780 - Standard Microcircuit Drawings.

(Unless otherwise indicated, copies of the specification, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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. 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 (unprogrammed devices). The truth table for unprogrammed devices shall be as specified on figure 2.

3.2.4 Programmed devices. The requirements for supplying programmed devices are not a part of this drawing.

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.

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3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-PRF-38535, appendix A. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-HDBK-103 (see 6.6 herein). For packages where marking of the entire SMD PIN is not feasible due to space limitations, the manufacturer has the option of not marking the "5962-" on the device.

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-HDBK-103 (see 6.6 herein). The certificate of compliance submitted to DSCC-VA prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-PRF-38535, appendix A and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38535, appendix A shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DSCC-VA shall be required in accordance with MIL-PRF-38535, appendix A.

3.9 Verification and review. DSCC, DSCC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A.

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

- a. Burn-in test, method 1015 of MIL-STD-883.
 - (1) Test condition C or D using the circuit submitted with the certificate of compliance (see 3.5 herein).
 - (2) $T_A = +125^\circ\text{C}$, 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_{OUT} measurement) shall be measured only for the initial test and after process or design changes which may affect capacitance.
- d. For unprogrammed devices, 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 4.4). If more than two devices fail to program, the lot shall be rejected. At the manufacturer's option, the sample may be increased to 24 total devices with no more than 4 total device failures allowed.
- e. For unprogrammed devices, 10 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.
- f. Subgroups 7 and 8 shall consist of verifying the pattern specified.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C 4.5 V ≤ V _{CC} ≤ 5.5 V unless otherwise specified	Device type	Group A sub-groups	Limits		Unit	
					Min	Max		
Output high voltage	V _{OH}	V _{CC} = 4.5 V, I _{OH} = -2.0 mA, V _{IN} = V _{IH} or V _{IL}	All	1,2,3	2.4		V	
Output low voltage	V _{OL}	V _{CC} = 4.5 V, I _{OL} = 12 mA, V _{IN} = V _{IH} or V _{IL}	All	1,2,3		0.5	V	
Input high voltage <u>1/</u>	V _{IH}		All	1,2,3	2.0		V	
Input low voltage <u>1/</u>	V _{IL}		All	1,2,3		0.8	V	
Input current	I _{Ix}	V _{IN} = 5.5 V to GND	All	1,2,3	-10	10	μA	
Output leakage current	I _{OZ}	V _{CC} = 5.5 V V _{OUT} = 5.5 V and GND	All	1,2,3	-100	+ 100	μA	
Output short circuit current <u>2/ 3/</u>	I _{OS}	V _{CC} = 5.5 V, V _{OUT} = 0.5 V	All	1,2,3		-90	mA	
Power supply current	I _{CC}	V _{CC} = 5.5 V, I _{OUT} = 0 mA V _{IN} = 2.0 V	All	1,2,3		80	mA	
Input capacitance	C _{IN}	f = 1.0 Mhz T _A = +25°C V _{CC} = 5.0V	All	4	V _{IN} = 0.0 V		10	pF
Output capacitance	C _{OUT}	(see 4.3.1c)			V _{OUT} = 0.0 V			10
Input or feedback to non-registered output <u>4/</u>	t _{PD}		01	9,10,11		40	ns	
			02			30		
Input to output enable <u>3/ 4/</u>	t _{EA}		01	9,10,11		40	ns	
			02			30		
Input to output disable <u>3/ 5/</u>	t _{ER}		01	9,10,11		40	ns	
			02			30		

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C 4.5 V ≤ V _{CC} ≤ 5.5 V unless otherwise specified	Device type	Group A sub- groups	Limits		Unit
					Min	Max	
$\overline{\text{OE}}$ to output enabled <u>5/</u>	t _{PZX}		All	9,10,11		25	ns
$\overline{\text{OE}}$ to output disabled <u>3/ 5/</u>	t _{PXZ}		All	9,10,11		25	ns
Clock to output <u>4/</u>	t _{CO}		01	9,10,11		25	ns
			02			20	
Input or feedback setup time <u>4/</u>	t _S		01	9,10,11	35		ns
			02		20		
Hold time <u>4/</u>	t _H		All	9,10,11	0		ns
Clock period <u>3/ 4/</u>	t _P		01	9,10,11	60		ns
			02		40		
Clock width <u>3/ 4/</u>	t _W		01	9,10,11	25		ns
			02		20		
Maximum frequency <u>3/ 4/</u>	f _{MAX}		01	9,10,11		16.5	MHz
			02			25	

1/ These are absolute values with respect to device ground and all overshoots due to system or tester noise are included.

2/ For test purposes, not more than one output at a time should be shorted. Short circuit test duration should not exceed one second.

3/ If not tested, shall be guaranteed to the values specified in table I.

4/ AC tests 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, output loading of the specified I_{OL}/I_{OH} and 50 pF load capacitance. (See figures 3a and 4).

5/ 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 5 pF load capacitance. (See figures 3b and 4).

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Device	Terminal	
	01, 02	
Case	K, L	3
Terminal number		
1	CP/I	CP/I
2		
3		
4		NC
5		
6		
7		
8		
9		
10		
11		NC
12	GND	
13	I/OE	
14	I/O	GND
15	I/O	I/OE
16	I/O	I/O
17	I/O	I/O
18	I/O	NC
19	I/O	I/O
20	I/O	I/O
21	I/O	I/O
22	I/O	I/O
23	I/O	I/O
24	V _{CC}	I/O
25	---	NC
26	---	I/O
27	---	I/O
28	---	V _{CC}

FIGURE 1. Terminal connections.

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Truth table																				
Input pins												Output pins								
CP/I	I/CE	I	I	I	I	I	I	I	I	I	I	I/O	I/O	I/O	I/O	I/O	I/O	I/O	I/O	I/O
X	X	X	X	X	X	X	X	X	X	X	X	Z	Z	Z	Z	Z	Z	Z	Z	Z

- NOTES:
 1. Z = 3-state
 2. X = Don't care

FIGURE 2. Truth table (unprogrammed).

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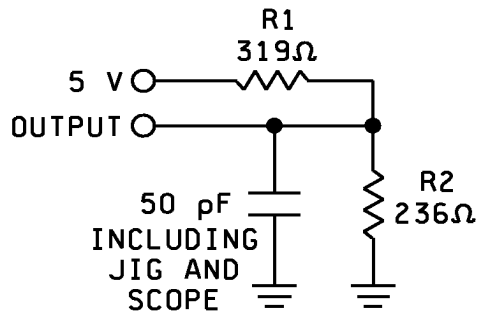


FIGURE 3a. Output load circuit (CL = 50 pF)

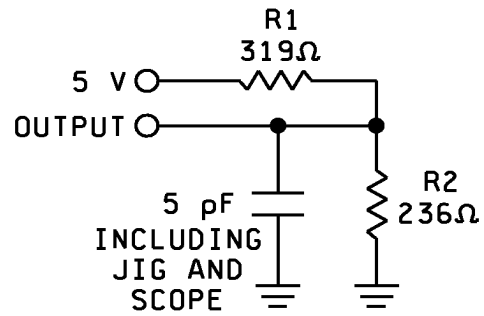


FIGURE 3b. Output load circuit (CL = 5 pF)

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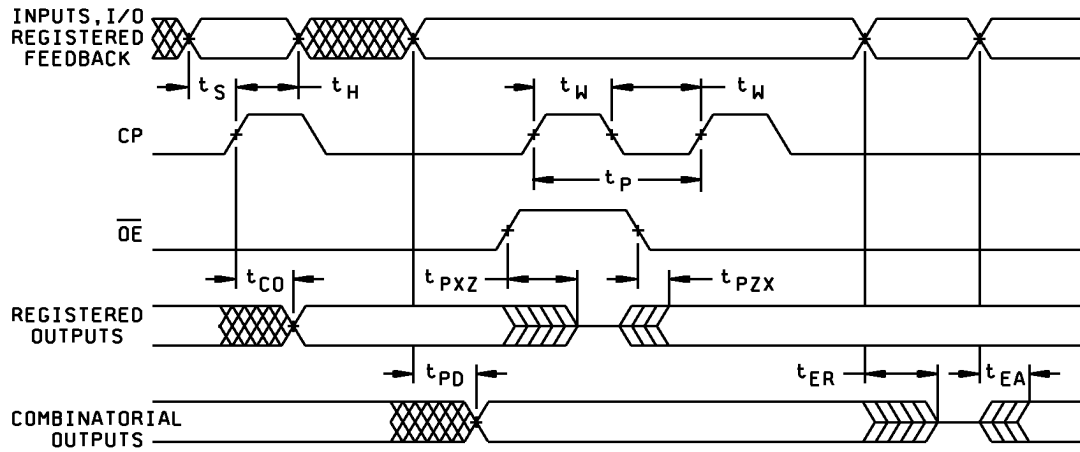


FIGURE 4. Switching waveforms.

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TABLE II. Electrical test requirements.

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

- 1/ Any or all subgroups may be combined when using high speed testers.
 * PDA applies to subgroups 1 and 7.
 ** For subgroup 4, see 4.3.1c
 *** See 4.3.1f.

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 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 test method 1005 of MIL-STD-883.
 - (2) $T_A = +125^\circ\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.
 - (4) All devices shall be programmed with a pattern that assures all inputs and I/O's are dynamically switched.
- c. For quality conformance inspections, the programmability sample (see 4.3.1e) shall be included in the subgroup 1 test.

4.4 Programming procedures. The programming procedures shall be as specified by the device manufacturer and shall be made available to the user on request.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535, appendix A.

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6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-973 using DD Form 1692, Engineering Change Proposal.

6.4 Record of users. Military and industrial users shall inform Defense Supply Center Columbus when a system application requires configuration control and the applicable SMD. DSCC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0525.

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

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

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STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE: 99-07-28

Approved sources of supply for SMD 5962-88637 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38535 during the next revision. MIL-HDBK-103 and QML-38535 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DSCC-VA. This bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535.

Standardized military drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>3/</u>
5962-8863701KA 5962-8863701LA 5962-88637013A	<u>2/</u> <u>2/</u> <u>2/</u>	PLDC20G10-40KMB PLDC20G10-40DMB PLDC20G10-40LMB
5962-8863702KA 5962-8863702LA 5962-88637023A	<u>2/</u> 65786 65786	PLDC20G10-30KMB PLDC20G10-30DMB PLDC20G10-30LMB

- 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/ No longer available from an approved source.
- 3/ **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
65786

Vendor name
and address
Cypress Semiconductor
3901 North First Street
San Jose, CA 95134-1599

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