

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Changes to propagation delay times in Table I: delete separate specifications for Subgroup 9 at $V_{CC} = 5V$; change specification for t_{PLH2} and t_{PHZ} . Revise per current boilerplate. -ljs	99-01-29	Raymond Monnin

The original first page of this drawing has been replaced.

The current cage code for this drawing is **67268**.

REV																				
SHEET																				
REV																				
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REV STATUS	REV	A	A	A	A	A	A	A	A	A										
OF SHEETS	SHEET	1	2	3	4	5	6	7	8											
PMIC N/A	PREPARED BY David W. Queenan										<p align="center">DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OHIO 43216</p>									
<p align="center">STANDARD MICROCIRCUIT DRAWING</p> <p align="center">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 D.A. DiCenzo																			
	APPROVED BY Charles Reusing										<p align="center">MICROCIRCUITS, DIGITAL, BIPOLAR, D-TYPE REGISTER, MONOLITHIC SILICON</p>									
	DRAWING APPROVAL DATE 14 October 1986																			
	REVISION LEVEL A					SIZE A	CAGE CODE 14933	5962-86715				SHEET 1 OF 8								

1. SCOPE

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

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

<u>5962-86715</u>	<u>01</u>	<u>E</u>	<u>X</u>
*	*	*	*
*	*	*	*
*	*	*	*
*	*	*	*
-----	-----	-----	-----
Drawing number	Device type (see 1.2.1)	Case outline (see 1.2.2)	Lead finish (see 1.2.3)

1.2.1 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	2918 or 25S18	Quad D-type register with standard and three state outputs

1.2.2 Case outlines. The case outlines 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>
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

1.2.3 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
Input voltage range -----	-1.5 V dc to +7.0 V dc
Storage temperature range -----	-65°C to +150°C
Maximum power dissipation (P _D) <u>1/</u> -----	1.3 W
Lead temperature (soldering, 10 sec.) -----	+300 °C
Thermal resistance, junction to case (θ _{JC}):	
Case E -----	25°C/W
Case F -----	20°C/W
Case 2 -----	20°C/W <u>2/</u>
Junction temperature (T _J) -----	+150°C
DC output current into inputs -----	30 mA
DC input current -----	-30 mA to +5.0 mA

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

2/ When a thermal resistance value for this case is specified in MIL-PRF-38535, appendix A, that value shall supersede the value specified herein.

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1.4 Recommended operating conditions.

Supply voltage (V_{CC}) -----	+4.5 V dc minimum to +5.5 V dc maximum
Minimum high-level input voltage (V_{IH}) -----	2.0 V dc
Maximum low-level input voltage (V_{IL}) -----	0.8 V dc
Case operating temperature range (T_C) -----	-55°C to +125°C
Clock pulse width, $V_{CC} = 5.0$ V:	
high -----	7 ns minimum
low -----	9 ns minimum
Clock pulse width, $V_{CC} = 4.5$ V to 5.5 V:	
high -----	10.5 ns minimum
low -----	12.5 ns minimum
Data setup time, $V_{CC} = 5.0$ V -----	5 ns minimum
Data hold time, $V_{CC} = 5.0$ V -----	3 ns minimum
Data setup time, $V_{CC} = 4.5$ V to 5.5 V -----	6.5 ns minimum
Data hold time, $V_{CC} = 4.5$ V to 5.5 V -----	5.0 ns minimum

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 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

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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 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.

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

3.2.4 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full case operating temperature range.

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

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

3.6 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 A, B, C or D. using the circuit submitted with the certificate of compliance.
 - (2) $T_A = +125EC$, 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.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C # T _C #+125°C unless otherwise specified		Group A subgroups	Limits		Unit
					Min	Max	
High level output voltage	V _{OH}	V _{CC} = 4.5V V _{IN} = 0.8V or 2.0V	Q I _{OH} = -1mA	1, 2, 3	2.5		V
			Y I _{OH} = -2mA		2.4		
Low level output voltage	V _{OL}	V _{CC} = 4.5V, V _{IN} = 0.8V or 2.0V	I _{OL} = 20mA <u>1/</u>	1, 2, 3		0.5	V
Input clamp voltage	V _{IC}	V _{CC} = 4.5V,	I _{IN} = -18mA	1, 2, 3		-1.2	V
High level input current	I _{IH1}	V _{CC} = 5.5V,	V _{IN} = 2.7V	1, 2, 3		50	μA
	I _{IH2}	V _{CC} = 5.5V,	V _{IN} = 5.5V	1, 2, 3		1.0	mA
Low level input current	I _{IL}	V _{CC} = 5.5V,	V _{IN} = 0.5V	1, 2, 3		-2.0	mA
Off-state output current at Y output	I _{OZH}	V _{CC} = 5.5V,	V _{OUT} = 2.4V	1, 2, 3		50	μA
	I _{OZL}	V _{CC} = 5.5V,	V _{OUT} = 0.4V	1, 2, 3		-50	μA
Short circuit output current	I _{OS}	V _{CC} = 5.5V,	V _{OUT} = GND <u>2/</u>	1, 2, 3	-40	-100	mA
Supply current	I _{CC}	Measured with all inputs 4.5V and all outputs open. V _{CC} = 5.5V		1, 2, 3		130	mA
Propagation delay time, clock to Q	t _{PLH1}	R _{L1} = 1KΩ ± 5%, R _{L2} = 280Ω ± 5% C _L = 15pF ± 10% V _{CC} = 4.5V to 5.5V		9, 10, 11		11	ns
	t _{PHL1}			9, 10, 11		15	
Propagation delay time, clock to Y (QE low)	t _{PLH2}			9, 10, 11		15	ns
	t _{PHL2}			9, 10, 11		15	
Output enable time	t _{PZH}			9, 10, 11		25	ns
	t _{PZL}			9, 10, 11		23	
Output disable time	t _{PHZ}	R _{L1} = 1KΩ ± 5%, R _{L2} = 280Ω ± 5% C _L = 5pF ± 10% V _{CC} = 4.5V to 5.5V		9, 10, 11		13.5	ns
	t _{PLZ}			9, 10, 11		13.5	
Functional tests		See 4.3.1c		7, 8			

1/ Measured on Q outputs with Y outputs open. Measured on Y outputs with Q outputs open.

2/ Not more than one output should be shorted at a time and the duration of the short circuit condition should not exceed one second.

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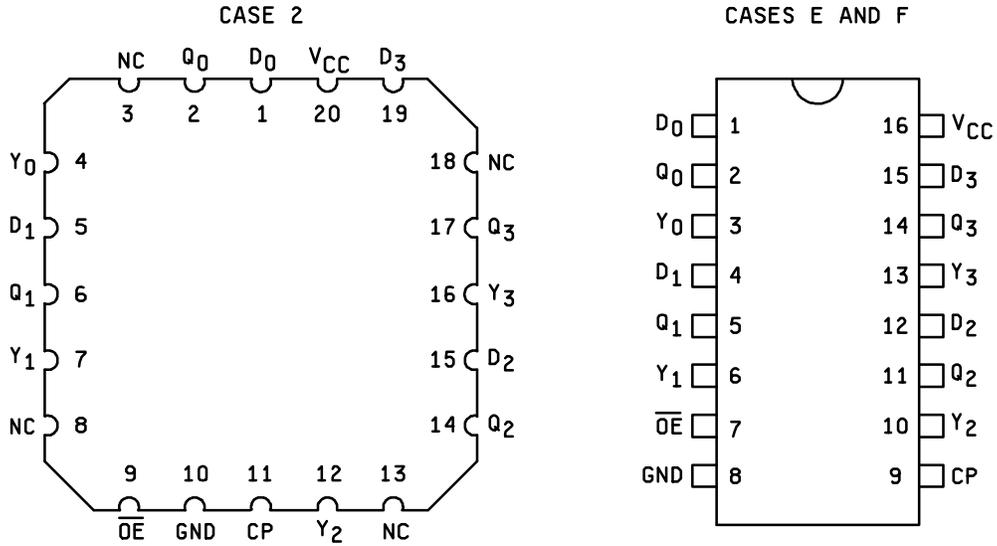


FIGURE 1. Terminal connections

Inputs		Outputs			Notes
$\overline{\text{OE}}$	Clock CP	D	Q	Y	
H	L	X	NC	Z	-
H	H	X	NC	Z	-
H	↑	L	L	Z	-
H	↑	H	H	Z	-
L	↑	L	L	L	-
L	↑	H	H	H	-
L	-	-	L	L	1
L	-	-	H	H	1

L = LOW NC = No change
H = HIGH ↑ = LOW to HIGH transition
X = Don't care Z = High impedance

NOTE: When $\overline{\text{OE}}$ is LOW the Y output will be in the same logic state as the Q output.

FIGURE 2. Truth table.

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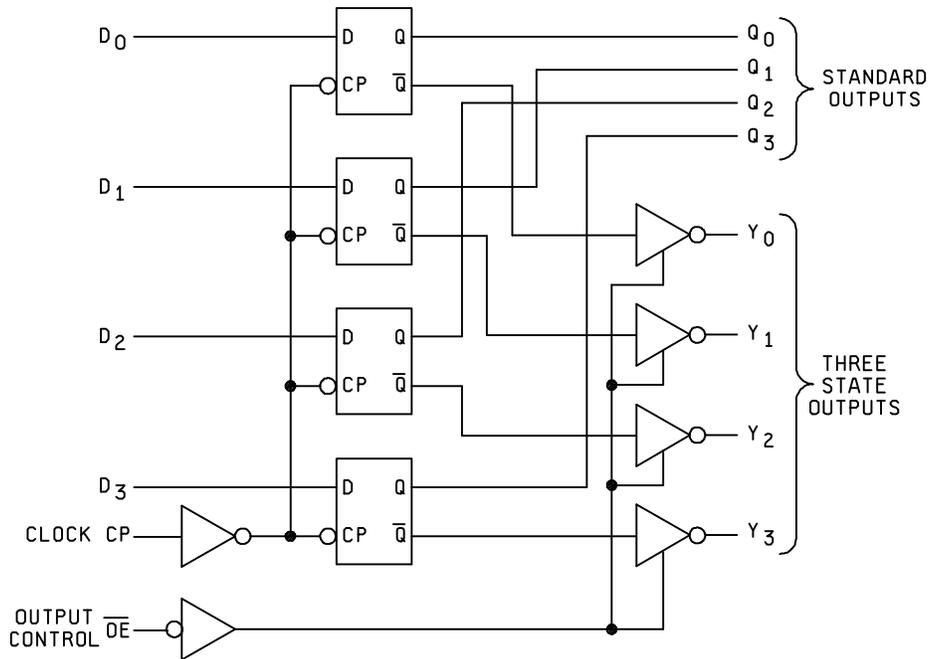


FIGURE 3. Logic diagram.

TABLE II. Electrical test requirements.

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

* PDA applies to subgroup 1.

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

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4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

- a. Tests shall be as specified in table II herein.
- b. Subgroups 4, 5, and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. Subgroups 7 and 8 shall include verification of the truth table.

4.3.2 Groups C and D inspections.

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883.
 - (1) Test condition A, B, C or D using the circuit submitted with the certificate of compliance (see 3.5 herein).
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

5. PACKAGING

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

6. NOTES

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

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

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished 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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STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 99-01-29

Approved sources of supply for SMD 5962-86715 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.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962-8671501EA	0DKS7	GEM12001BEA
5962-8671501FA	0DKS7	GEM12001BFA
5962-86715012A	0DKS7	GEM12001B2A

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.

Vendor CAGE number

0DKS7

Vendor name and address

Sarnoff, David Research Center
201 Washington Road
Princeton, NJ 08540-5300

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