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1. SCOPE

1.1 <u>Scope</u>. 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:



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 <u>https://assist.daps.dla.mil/quicksearch/</u> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 <u>Order of precedence</u>. 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 <u>Item requirements</u>. 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. This drawing has been modified to allow the manufacturer to use the alternate die/fabrication requirements of paragraph A.3.2.2 of MIL-PRF-38535 or other alternative approved by the qualifying activity.

3.2 <u>Design, construction, and physical dimensions</u>. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535, appendix A and herein.

3.2.1 <u>Terminal connections</u>. 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 <u>Case outlines</u>. The case outlines shall be in accordance with 1.2.2 herein.

3.3 <u>Electrical performance characteristics</u>. 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 <u>Electrical test requirements</u>. 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 <u>Marking</u>. 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.

3.5.1 <u>Certification/compliance mark</u>. A compliance indicator "C" shall be marked on all non-JAN devices built in compliance to MIL-PRF-38535, appendix A. The compliance indicator "C" shall be replaced with a "Q" or "QML" certification mark in accordance with MIL-PRF-38535 to identify when the QML flow option is used. For product built in accordance with A.3.2.2 of MIL-PRF-38535, or as modified in the manufacturer's QM plan, the "QD" certification mark shall be used in place of the "Q" or "QML" certification mark.

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		TABLE I. Electrical perfor	mance characte	ristics.				
Test	Symbol	Conditions	5	Device	Group A	Lin	nits	Unit
		$-55^{\circ}C \le T_{C} \le +$ +4.5 V $\le V_{CC} \le$ unless otherwise s	125°C +5.5 V specified	types	subgroups	Min	Max	
Output high voltage	V _{OH}		0 mA	All	1, 2, 3	2.4		V
Output low voltage	V _{OL}	V_{CC} = minimum, I_{OL} = 16 V_{IN} = V_{IH} or V_{IL}	mA	All	1, 2, 3		0.5	V
Input high level	V _{IH}	Guaranteed input logical voltage for all inputs	All	1, 2, 3	2		V	
Input low level	V _{IL}	Guaranteed input logical voltage for all inputs	All	1, 2, 3		0.8	V	
Input clamp voltage	VI	V_{CC} = minimum, I_{IN} = - 18	All	1, 2, 3		-1.5	V	
Input low current	IIL	V_{CC} = maximum, V_{IN} = 0.4	V_{CC} = maximum, V_{IN} = 0.5 V				-0.36	mA
Input high current	I _{IH}	V_{CC} = maximum, V_{IN} = 2.	7 V	All	1, 2, 3		20	μA
	I _I	V_{CC} = maximum, V_{IN} = 5.	5 V	All	1, 2, 3		0.1	mA
Off state (high impedance)	Ι _Ο	$V_{CC} = maximum$	V _O = 2.4 V	All	1, 2, 3		20	μΑ
		$\mathbf{v}_{\mathrm{IN}} = \mathbf{v}_{\mathrm{IH}} \text{ or } \mathbf{v}_{\mathrm{IL}}$	V _O = 0.5 V				-20	
Output short circuit current $\frac{1}{2}$	I _{OS}	V_{CC} maximum + .5 V, V_{O} = 0.5 V	V_{CC} maximum + .5 V, V_{O} = 0.5 V			-30	-85	mA
Power supply current	I _{CC}	V_{CC} = maximum T_{C} = -55°C to (Worst case I _{CC} is +125°C		All	1, 2, 3		210	mA
		temperature) <u>2</u> /	at minimum temperature) $\underline{2}$ / $T_{C} = +125^{\circ}C$				150	
Functional tests		See 4.3.1c		All	7,8A,8B			

See footnotes at end of table.

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TABLE I.	Electrical	performance characteristics	- Continu	ied.			
Test	Symbol	Conditions	Device	Group A	Lin	nits	Unit
		$-55^{\circ}C \le T_C \le +125^{\circ}C$ +4.5 V $V_{CC} \le +5.5$ V unless otherwise specified	types	subgroups	Min	Max	
Access time from: A address stable or B address stable to: YA stable or YB	t _{AA}	See figure 4 and 5 $C_1 = 50 \text{ pF}$. LE = high	01	9, 10, 11		30	ns
stable		ol oo p. ,g.:	02			35	
Turn-on time from: $\overline{OE} - \overline{A}$ or $\overline{OE} - \overline{B}$ low to: YA or YB stable	t _{on}	See figure 4 and 5 $C_L = 50 \text{ pF}$	All	9, 10, 11		20	ns
Turn-off time from: $\overline{OE} - \overline{A}$ or $\overline{OE} - \overline{B}$ high to: YA or YB off	t _{OFF}	See figure 4 and 5 $C_L = 5 \text{ pF } \underline{3}/$	All	9, 10, 11		20	ns
Reset time from: $\overline{A - LO}$ low to: YA low	t _{RES}	See figure 4 and 5 $C_L = 50 \text{ pF}$	All	9, 10, 11		20	ns
Latch enable time from: LE high	t _{EN}	See figure 4 and 5	01	9, 10, 11		22	ns
		GL = 20 b⊢	02			30	
Transparency 1 from: $\overline{\text{WE}}_1$ and $\overline{\text{WE}}_2$	t _{PD1}	See figure 4 and 5	01	9, 10, 11		35	ns
low to: YA or YB		$G_L = 50 \text{ pr}, LE = High$	02			40	
Transparency 2 from: D	t _{PD2}	See figure 4 and 5	01	9, 10, 11		35	ns
		$G_L = 50 \text{ pF}, LE = \text{nign}$	02			40	
Data setup time from: D stable to: Either $\overline{\text{WE}}$ high	t _{S1}	See figure 4 and 5 $C_L = 50 \text{ pF}$	All	9, 10, 11	15		ns
Data hold time from: Either WE high to: D changing	t _{H1}	See figure 4 and 5 $C_L = 50 \text{ pF}$	All	9, 10, 11	0		ns

See footnotes at end of table.

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TABL	E I. <u>Electri</u>	cal performa	nce characteristic	<u>s</u> - Continu	led.			
Test	Symbol	Co	onditions	Device	Group A	Lin	nits	Unit
		-55°C ≤ +4.5 V≤ unless oth	$T_C \le +125^{\circ}C$ $V_{CC} \le +5.5 V$ erwise specified	types	subgroups	Min	Max	
Address setup time from: B stable to: Both $\overline{\text{WE}}$ low	t _{S2}	See figure $C_L = 50 \text{ pF}$	4 and 5	All	9, 10, 11	8		ns
Address hold time from: Either WE high to: B changing	t _{H2}	See figure $C_L = 50 \text{ pF}$	4 and 5	All	9, 10, 11	0		ns
Latch close before write begin 1 from: LE low to: $\overline{\text{WE}}_1$ low	t _{PD3}	C _L = 50 pF See figure	, \overline{WE}_2 low 4 and 5	All	9, 10, 11	0		ns
Latch close before write begin 2 from: LE low to: $\overline{\text{WE}}_2$ low	t _{PD4}	C _L = 50 pF See figure	, WE ₁ low 4 and 5	All	9, 10, 11	0		ns
Address set up before latch closes from: A or B stable to : LE low	t _{S3}	See figure 4 C _L = 50 pF	1 and 5	All	9, 10, 11	15		ns
Write pulse width 1 Input: WE , Pulse: High-low-high	t _{PW1}	C _L = 50 pF See figure 4	, WE₂low ↓ and 5	All	9, 10, 11	15		ns
Write pulse width 2 Input: WE ₂ , Pulse: High-low-high	t _{PW2}	C _L = 50 pF See figure 4	, \overline{WE}_1 low 4 and 5	All	9, 10, 11	15		ns
A latch reset pulse Input: $\overline{A - LO}$, Pulse: High-low-high	t _{PW3}	See figure C _L = 50 pF	4 and 5	All	9, 10, 11	15		ns
Latch data capture Input: LE Pulse: Low-high-low	t _{PW4}	See figure C _L = 50 pF	4 and 5	All	9, 10, 11	18		ns
 <u>1</u>/ Not more than one output should <u>2</u>/ All inputs grounded except OE <u>3</u>/ Measured from 1.5V at the input 	d be shorte	ed at a time. $\overline{\mathbf{DE} - \mathbf{B}} = 2.4$ hange in the d	Duration of the so V butput level.	rt circuit te	est should not	exceed	I 1 seco	nd.
STANDARD MICROCIRCUIT DRA DLA LAND AND MARIT	WING IME		SIZE A	BEVISIC		SH	860 HEET	25
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Device type	All			
Case outline	X, Y, 3			
Terminal number	Terminal symbol			
number 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	$\begin{array}{c} D_1\\ D_0\\ \overline{WE}_1\\ B_0\\ B_1\\ B_2\\ B_3\\ \overline{A-LO}\\ LE\\ YB_0\\ YA_0\\ YB_1\\ YA_1\\ GND\\ YB_2\\ YA_2\\ YB_3\\ WA\end{array}$			
18 19 20	$\frac{A_3}{OE - B}$			
21 22 23	A ₃ A ₂ A			
24 25	$\frac{A_0}{WE}_2$			
26 27 28	D ₃ D ₂ V _{CC}			

FIGURE 1. Terminal connections.

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Write control

		– .:	RAM outputs at	latch inputs
WE 1	WE 2	Function	A-port	B-port
L L X H	L L T X	Write D into B Write D into B No write No write	A data (A ≠ B) (A = B) Input data A data A data	Input data Input data B data B data
H = Hig	gh	L = Lo	ow	X = Don't care

YA READ

	Inputs			Function
OE-A	A-LO	LE	YA output	Function
H L L	X L H H	X X H L	Z L A-port RAM data NC	High impedance Force YA low Latches transparent Latches retain data
H = Hig L = Lo	gh w		X = Don't care Z = High impedanc	NC = No Change

YB READ

Inputs			F our ettern
OE-B	LE	YB output	Function
H L L	X H L	Z B-port RAM data NC	High impedance Latches transparent Latches retain data

H = High L = Low X = Don't care Z = High impedance

NC = No Change

FIGURE 2. Truth tables.

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$$R_{1} = \frac{5.0 - V_{BE} - V_{OL}}{I_{OL} + V_{OL}/1K}$$

NOTES:

- C_L = 50 pF includes scope probe, wiring and stray capacitances without device in text fixture.
 S₁, S₂, and S₃ are closed during function tests and all ac tests except output enable tests.
 S₁ and S₃ are closed while S₂ is open for t_{en} high test. S₁ and S₂ are closed while S₃ is open for t_{en} low test.
 C_L = 5 pF for output disable test (see table I, t_{OFF}).

Pin label	Test circuit	R1	R2
Y _{A0} -Y _{A3} , Y _{B0} - Y _{B3}	A	230Ω	1 kΩ

FIGURE 4.	Test output load	configuration.
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Address access, reset timing





Three-state enable, disable timing



3.6 <u>Certificate of compliance</u>. 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 DLA Land and Maritime -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 <u>Certificate of conformance</u>. 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 <u>Notification of change</u>. Notification of change to DLA Land and Maritime -VA shall be required for any change that affects this drawing.

3.9 <u>Verification and review</u>. 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.

4. VERIFICATION

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

4.2 <u>Screening</u>. 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. 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) $T_A = +125^{\circ}C$, 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 <u>Quality conformance inspection</u>. 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. Subgroup 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 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.
 - (2) $T_A = +125^{\circ}C$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

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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, 10, 11
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.

5. PACKAGING

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

6. NOTES

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

6.2 <u>Replaceability</u>. Microcircuits covered by this drawing will replace the same generic device covered by a contractorprepared specification or drawing.

6.3 <u>Configuration control of SMD's</u>. 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.

6.4 <u>Record of users</u>. Military and industrial users shall inform DLA Land and Maritime when a system application requires configuration control and the applicable SMD. 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 microelectronics devices (FSC 5962) should contact DLA Land and Maritime -VA, telephone (614) 692-0544.

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

6.6 <u>Approved sources of supply</u>. 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 DLA Land and Maritime -VA.

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STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 11-03-08

Approved sources of supply for SMD 86025 are listed below for immediate acquisition 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.dscc.dla.mil/Programs/Smcr/.

Standard microcircuit drawing PIN <u>1</u> /	Vendor CAGE number	Vendor similar PIN <u>2</u> /
8602501XA	<u>3/</u> 0C7V7 3V146	AM29705A/BXA 29705/XA 29705/BXA
8602501YA	<u>3</u> / 0C7V7 3V146	AM29705A/BYA 29705/YA 29705/BYA
86025013A	<u>3</u> / 3V146	AM29705A/B3A 29705/B3A
8602502XA	0DKS7	GEM10702QXA
8602502YA	0DKS7	GEM10702QYA
86025023A	0DKS7	GEM10702Q3A
8602502XC	0DKS7	GEM10702QXC
8602502YC	0DKS7	GEM10702QYC
86025023C	0DKS7	GEM10702Q3C

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.

<u>2</u>/ <u>Caution</u>. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

 $\underline{3}$ / Not available from an approved source.

Vendor CAGE number	Vendor name and address
0DKS7	Sarnoff, David Research Center 201 Washington Road Princeton, NJ 08540-6449
0C7V7	E2V Aerospace and Defense, Inc. dba QP Semiconductor, Inc. 2945 Oakmead Village Court Santa Clara, CA 95051
3V146	Rochester Electronics Inc. 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.