

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 specification 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 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" 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.

3.2.3 Block diagram. The block 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.

3.2.5 Die overcoat. Polyimide and silicone coatings are allowable as an overcoat on the die for alpha particle protection provided that each coated microcircuit inspection lot as specified in MIL-M-38510, shall be subjected to and pass the internal moisture content test, (method 1018 of MIL-STD-883), the frequency of the internal water vapor testing may not be decreased unless approved by the preparing activity.

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are 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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		84132
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* U. S. GOVERNMENT PRINTING OFFICE: 1988-549-904

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ -55°C < T _C < +125°C V _{SS} = 0 V 4.5 V < V _{CC} < 5.5 V unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Supply current (operating)	I _{CC1}	Address cycling, f = 1/t _{AVAV} (minimum) CE = V _{IL} , I _O = 0 A	1,2,3	01,03 02,05, 07,08, 09 04,06		50 100 70	mA
Supply current TTL standby	I _{CC2}	Address stable, I _O = 0 A CE = WE = V _{IH}	1,2,3	01,03 02,08 04,05, 06 09		15 15 20 25 20	mA
Supply current CMOS standby	I _{CC3}	CE = V _{CC} - 0.2 V, I _O = 0 A V _{IN} ≥ V _{CC} - 0.2 V OR ≤ 0.2 V	1,2,3	01,03 04,06 07		100 900 10	μA
Supply current (data retention)	I _{CC4}	V _{CC} = 2.0 V, I _O = 0 A CE = WE = V _{CC}	1,2,3	01,03 09,04, 06		40 200	μA
Low level output voltage	V _{OL}	V _{CC} = 4.5 V; I _{OL} = 8 mA	1,2,3	A11		0.4	V
High level output voltage	V _{OH}	V _{CC} = 4.5 V; I _{OH} = -4 mA	1,2,3	A11	2.4		V
Input leakage current	I _{IL} I _{IH}	V _{IN} = GND V _{IN} = 5.5 V	1,2,3	01,03 02,05 07,09 04,06 08	-1.0 -10	1.0 10	μA
High impedance output leakage current	I _{OHZ}	V _{OUT} = 5.5 V CE = V _{CC}	1,2,3	01,03	-1.0	1.0	μA
	I _{OLZ}	V _{OUT} = GND CE = V _{IH}	1,2,3	07 02,05 08,09 04,06	-10 -20 -5	10 20 5	
Low level input voltage	V _{IL}		1,2,3	A11		0.8	V
High level input voltage	V _{IH}		1,2,3	A11	2.2		V
Input capacitance	C _{IN} ^{2/}	T _C = +25°C, V _{CC} = GND V _{IN} = GND, f = 1 MHz See 4.3.1c	4	A11		8	pF
Output capacitance	C _{OUT} ^{2/}	T _C = +25°C, V _{CC} = GND V _{OUT} = GND, f = 1 MHz See 4.3.1c	4	A11		10	pF

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 3/ 4/ -55°C < T _C < +125°C V _{SS} = 0 V 4.5 V < V _{CC} < 5.5 V unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Read or write cycle time	t _{AVAV}	See figure 5	9,10,11	01	85	ns	
				02,09	45		
				03	70		
				08	55		
				04,05	35		
				06,07	25		
Address access time	t _{AVQV}		9,10,11	01	85	ns	
				02,09	45		
				03	70		
				08	55		
				04,05	35		
				06,07	25		
Chip enable access time	t _{ELQV}		9,10,11	01	85	ns	
				02,09	45		
				03	70		
				08	55		
				04,05	35		
				06,07	25		
Chip enable to output in high Z	t _{EHQZ} 2/		9,10,11	01,03	40	ns	
				02,08,	25		
				05,09			
				04	15		
				06,07	10		
Output hold after address change	t _{AVQX} 2/		9,10,11	01,03, 04,06, 07	5	ns	
				02,05, 08,09	3		
Chip enable to output active	t _{ELQX} 2/		9,10,11	01,03, 07	5	ns	
				02,08, 09	3		
Write enable pulse width during write	t _{WLWH}		9,10,11	01	45	ns	
				03,08	40		
				02,04, 05,09	30		
				06,07	20		
Chip enable to end of write	t _{ELWH}		9,10,11	01	65	ns	
				02,09	35		
				03	55		
				04,05	30		
				08	45		
				06,07	20		

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 3/ 4/ -55°C < T _C < +125°C V _{SS} = 0 V 4.5 V < V _{CC} < 5.5 V unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Data setup to end of write	t _{DVWH}	See figure 5	9,10,11	01	35		ns
				02,08,09	25		
				03	30		
				04,05	25		
				06,07	15		
Data hold after end of write	t _{MHDX}		9,10,11	A11	5		ns
Address setup to end of write	t _{AVWH}		9,10,11	01	65		ns
				02,09	35		
				03	55		
				04,05	30		
				06,07	20		
Write recovery time	t _{MHAV} 2/		9,10,11	02,05,08,09	5		ns
				01,03,04,06,07	0		
Write-enable low to output in high Z	t _{WLQZ} 2/		9,10,11	01,03		40	ns
				02,09		30	
				08		25	
				05		20	
				04		15	
Write-enable high to output invalid	t _{MHQX} 2/		9,10,11	A11	0		ns
Address setup before write low	t _{AVNL}			01,03,04,06,07	0		ns
				02,05,08,09	5		

1/ All voltages referenced to V_{SS}.

2/ Tested initially and after any design and or process changes which may affect this parameter.

3/ AC measurements assume transition time < 5 ns and input level are from V_{SS} to 3.0 V. See figure 5. Timing transitions are at 1.5 V.

4/ For timing waveforms, see figure 4.

**STANDARDIZED
MILITARY DRAWING**

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

84132

REVISION LEVEL

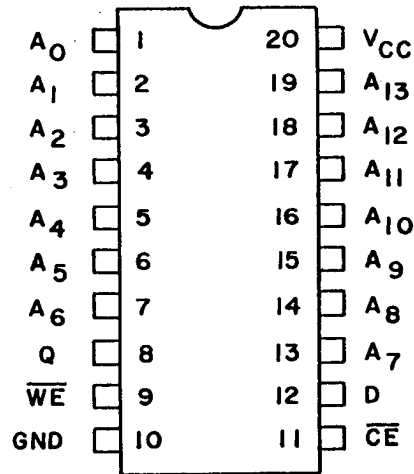
B

SHEET

6

Device types 01 through 09

Cases R and S



Case Y

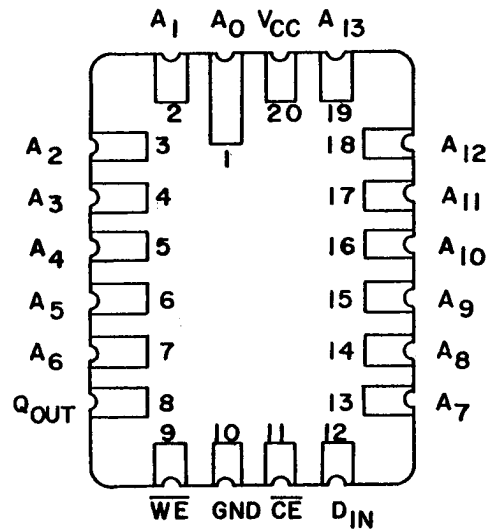


FIGURE 1. Terminal connections.

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Device types 01 through 09

Mode	\overline{CE}	\overline{WE}	Output	Power
Standby	H	X	High Z	Standby
Read	L	H	DOUT	Active
Write	L	L	High Z	Active

FIGURE 2. Truth table.

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Device types 01, 03, 07, and 09

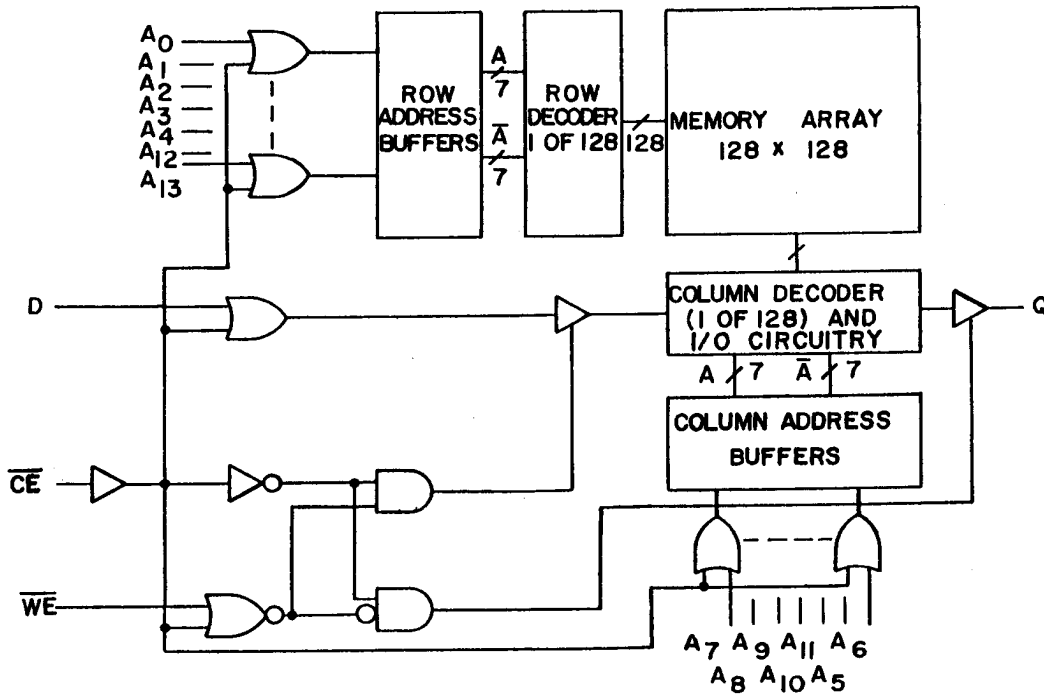


FIGURE 3. Block diagram.

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Device type 02, 04 through 06, and 08

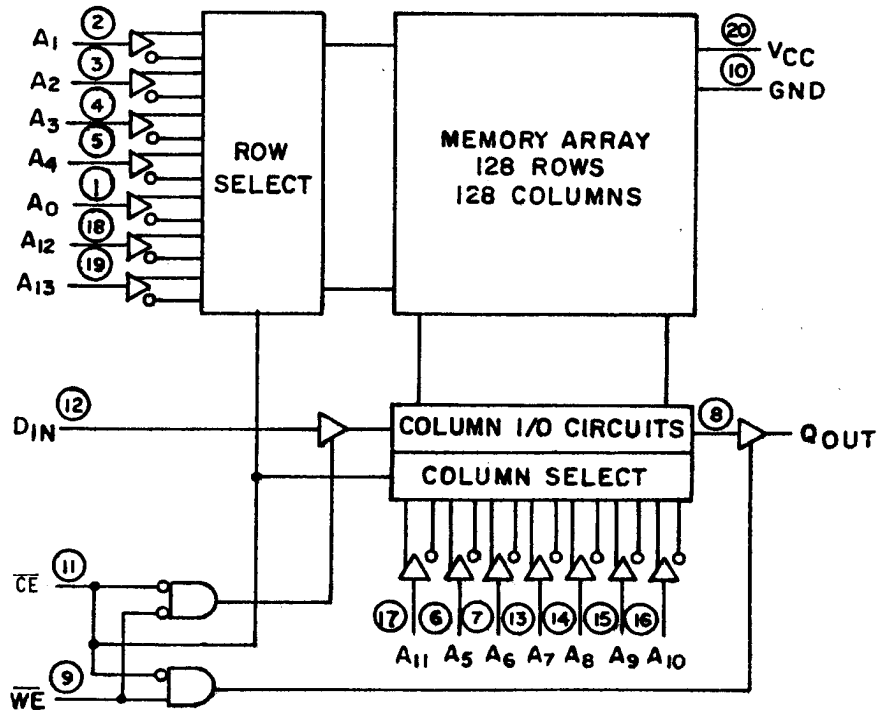


FIGURE 3. Block diagram - Continued.

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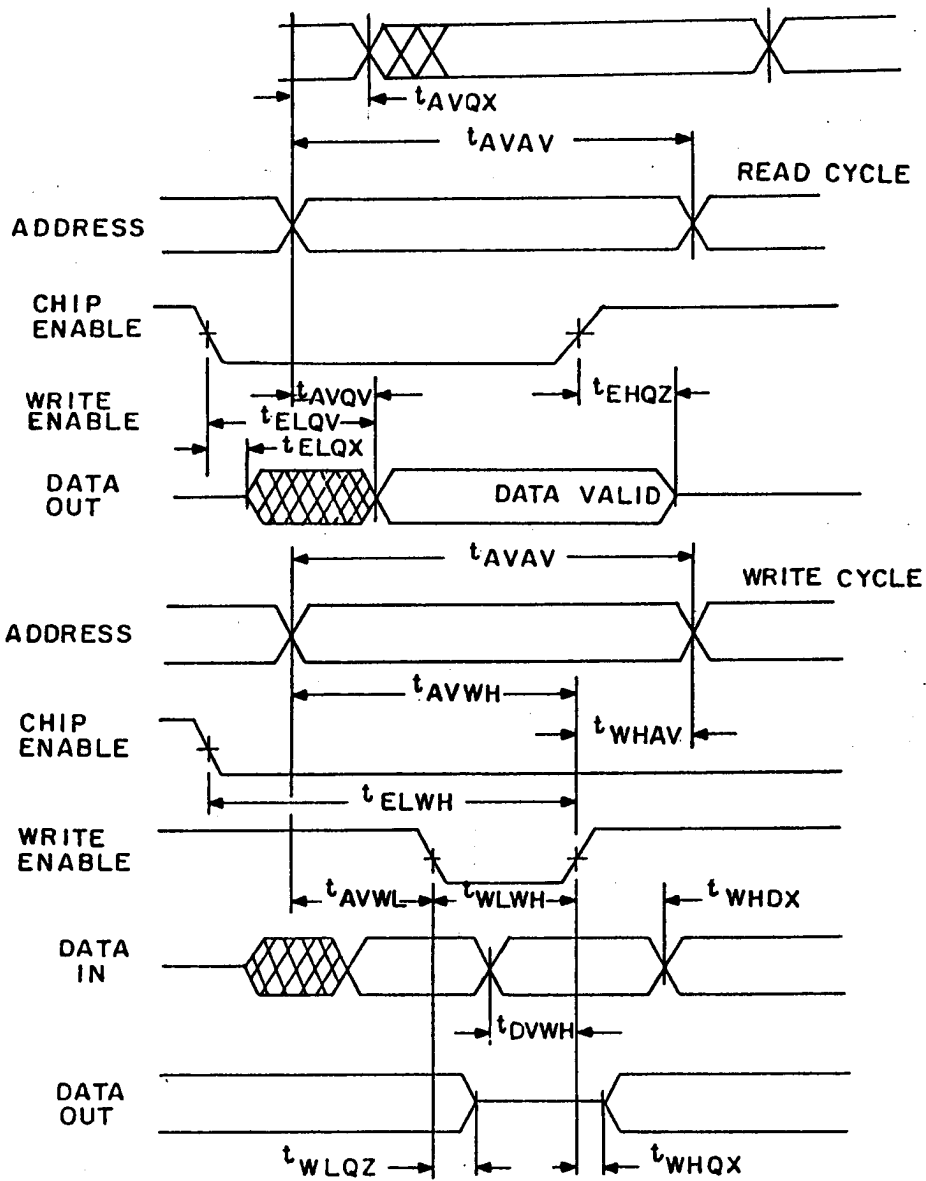
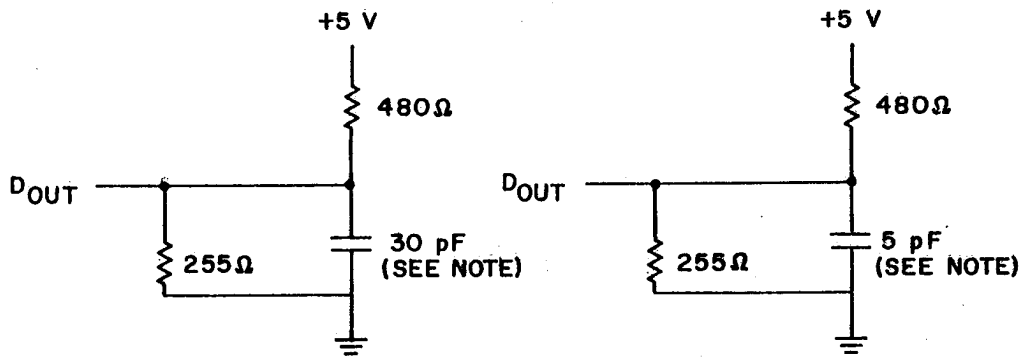


FIGURE 4. Timing waveform diagram.

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Circuit A or equivalent
for all other switching
parameters.

Circuit B or equivalent
for t_{EHQZ} , t_{ELQX}
 t_{WLQZ} , t_{WHQX}

NOTE: Including scope and jig.

FIGURE 5. Output loading.

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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.

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.
 - (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.
- 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. Subgroups 7 and 8 shall test sufficient to verify the truth table.

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TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*,2,3,9
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)	2,8(125°C),10 or 1,7,9

* PDA applies to subgroup 1.

** See 4.3.1c.

*** See 4.3.1d.

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-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 for all applications.

6.2 Replaceability. Replaceability is determined as follows:

- a. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.
- b. When a QPL source is established, the part numbered device specified in this drawing will be replaced by the microcircuit identified as part number M38510/2910XBXX.

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6.3 **Comments.** Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

6.4 **Approved sources of supply.** Approved sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have agreed to this drawing and a certificate of compliance (see 3.5 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number <u>1/</u>	Replacement military specification part number
8413201RX	34371	HM1-65262/883	M38510/29103BRX
8413201YX	34371	HM4-65262/883	M38510/29103BYX
8413202RX	<u>2/</u>	MD51C67-45/B CY7C167-45DMB IMS1403S-45M IDT6167LA45LB	M38510/29106BRX
8413202SX	65786 61772	CY7C167-45KMB IDT6167LA45FB	
8413202YX	65786 60911 61772	CY7C167-45LMB IMS1403N-45 IDT6167LA45LB	M38510/29106BYX
8413203RX	34371	HM1-65262B/883	
8413203YX	34371	HM4-65262B/883	
8413204RX	61772	IDT6167LA35DB	
8413204SX	61772	IDT6167LA35FB	
8413204YX	61772	IDT6167LA35LB	
8413205RX	34649 65786 61772 60911	MD51C67-35/B CY7C167-35DMB IDT6167SA35DB IMS1403S-35M	
8413205SX	65786 61772	CY7C167-35KMB IDT6167SA35FB	
8413205YX	65786 61772 60911	CY7C167-35LMB IDT6167SA35LB IMS1403N-35M	
8413206RX	61772	IDT6167SA25DB	
8413206SX	61772	IDT6167SA25FB	
8413206YX	61772	IDT6167SA25LB	

See footnotes at end of table.

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Military drawing part number	Vendor CAGE number	Vendor similar part number <u>1/</u>	Replacement military specification part number
8413207RX	61772	IDT6167LA25DB	
8413207SX	61772	IDT6167LA25FB	
8413207YX	61772	IDT6167LA25LB	
8413208RX	60911 34649	IMS1403S-55M MD51C67-55/B	
8413208YX	60911	IMS1403N-55M	
8413209RX	61772	IDT6167LA45LB	
8413209SX	61772	IDT6167LA45LB	
8413209YX	61772	IDT6167LA45LB	

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

2/ Inactive for new design. Use MIL-M-38510/29106BRX.

<u>Vendor CAGE number</u>	<u>Vendor name and address</u>
34371	Harris Semiconductor P.O. Box 883 Melbourne, FL 32901
34649	Intel 5000 W. Williams Field Road Chandler, AZ 85224
60911	INMOS Corporation 1110 Bayfield Drive Colorado Springs, CO 80935-6000
61772	Integrated Device Technology Static Ram Division 1566 Moffett Street Salinas, CA 93905
65786	Cypress Semiconductor Corporation 3901 North First Street San Jose, CA 95134

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