

REVISIONS													
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED										
REV													
SHEET													
REV													
SHEET													
REV STATUS OF SHEETS	REV												
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12
PMIC N/A	PREPARED BY <i>Larry T. Bauder</i> CHECKED BY <i>Tim H. Nish</i> APPROVED BY <i>William K. Beckman</i> DRAWING APPROVAL DATE 7 AUGUST 1990 REVISION LEVEL	DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444 MICROCIRCUIT, DIGITAL, ECL, DUAL 4-5 INPUT OR/NOR GATE, MONOLITHIC SILICON		SIZE A	CAGE CODE 67268	5962-89856	SHEET <div style="text-align: right; font-size: 2em;">1</div>						
STANDARDIZED MILITARY DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE AMSC N/A													

DESC FORM 193
SEP 87

U.S. GOVERNMENT PRINTING OFFICE: 1987 - 748-129/60911

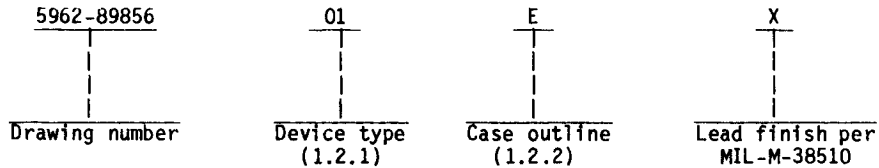
DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

5962-E1488

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:



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

Device type	Generic number	Circuit function
01	10H509	Dual 4-5 Input OR/NOR Gate

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
E	D-2 (16-lead, .840" x .310" x .200"), dual-in-line package
F	F-5 (16-lead, .440" x .285" x .085"), flat package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage range (V_{EE}) - - - - -	-8.0 V dc minimum to 0.0 V dc maximum
Input voltage range - - - - -	0.0 V dc to -5.2 V dc
Storage temperature range - - - - -	-65°C to +165°C
Lead temperature (soldering 10 seconds) - - - - -	+300°C
Junction temperature (T_J) - - - - -	+165°C
Maximum power dissipation (P_D) - - - - -	150 mW
Thermal resistance, junction-to-case (θ_{JC}) - - - - -	See MIL-M-38510, appendix C

1.4 Recommended operating conditions.

Supply voltage range (V_{EE}) - - - - -	-5.46 V dc minimum to -4.94 V dc maximum
Supply voltage range (V_{CC}) - - - - -	-0.2 V dc to +0.2 V dc or +1.98 V dc to +2.02 V dc
Ambient operating temperature range (T_A) - - - - -	-55°C to +125°C
Minimum high level input voltage (V_{IH}):	
$T_A = +25^\circ\text{C}$ - - - - -	-0.780 V
$T_A = +125^\circ\text{C}$ - - - - -	-0.650 V
$T_A = -55^\circ\text{C}$ - - - - -	-0.840 V
Maximum low-level input voltage (V_{IL}) - - - - -	-1.950 V

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-89856
	REVISION LEVEL	SHEET 2

DESC FORM 193A
SEP 87

U.S. GOVERNMENT PRINTING OFFICE: 1989-749-153

2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin 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.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standard Military Drawings (SMD's).

(Copies of the specification, standard, and bulletin 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 tables. The truth tables shall be as specified on figure 2.

3.2.3 Test circuit and switching waveforms. The test circuit and switching waveforms 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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89856
		REVISION LEVEL	SHEET 3

DESC FORM 193A
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1989-748-033

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C < T _A < +125°C unless otherwise specified	Group A subgroups	Limits		Unit		
				Min	Max			
Cases E, F, and 2 1/		Quiescent test conditions						
High level output voltage	V _{OH}	Outputs terminated through 100Ω to -2.0 V V _{CC} = 0.0 V V _{EE} = -5.2 V	V _{IH}	V _{IL}				
			1	-0.780	-1.950	-1.010	-0.780	V
			2	-0.650	-1.950	-0.860	-0.650	
Low level output voltage	V _{OL}	2/ V _{CC} = 0.0 V V _{EE} = -5.2 V	1	-0.780	-1.950	-1.950	-1.580	V
			2	-0.650	-1.950	-1.950	-1.363	
			3	-0.840	-1.950	-1.950	-1.610	
High level threshold output voltage	V _{OHA}		1	-1.110	-1.480	-1.010	-0.780	V
			2	-0.960	-1.465	-0.860	-0.650	
			3	-1.160	-1.510	-1.060	-0.840	
Low level threshold output voltage	V _{OLA}		1	-1.110	-1.480	-1.950	-1.580	V
			2	-0.960	-1.465	-1.950	-1.565	
			3	-1.160	-1.510	-1.950	-1.610	
Power supply drain current	I _{EE}	V _{EE} = -5.46 V V _{CC} = 0.0 V	1 2, 3		-14 -15		mA	
High level input current	I _{IH}	V _{IH} = -0.780 at +25°C = -0.650 at +125°C = -0.840 at -55°C	1 2, 3			265 425	μA	
Low level input current	I _{IL}	V _{EE} = -4.94 V V _{IL} = -1.950 V V _{CC} = 0.0 V	1, 3 2		0.5 0.3		μA μA	
Functional tests		See 4.3.1c	7, 8					

See footnotes at end of table.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89856
		REVISION LEVEL	SHEET 4

DESC FORM 193A
SEP 87

G. D. GOVERNMENT PRINTING OFFICE: 1989-149-043

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C < T _A < +125°C unless otherwise specified	Group A subgroups	Limits		Unit		
				Min	Max			
Cases E and F		DC rapid test 4/						
High level output voltage	V _{OH}	Outputs terminated through 100Ω to -2.0 V V _{CC} = 0.0 V V _{EE} = -5.2 V 2/	V _{IH}	V _{IL}				
			-0.785	-1.950	1	-1.015	-0.785	V
			-0.655	-1.950	2	-0.865	-0.655	
Low level output voltage	V _{OL}	2/	-0.845	-1.950	3	-1.065	-0.845	
			-0.785	-1.950	1	-1.950	-1.582	V
			-0.655	-1.950	2	-1.950	-1.567	
High level threshold output voltage	V _{OHA}	2/	-0.845	-1.950	3	-1.950	-1.612	
			-1.115	-1.482	1	-1.015	-0.785	V
			-0.965	-1.467	2	-0.865	-0.655	
Low level threshold output voltage	V _{OLA}	2/	-1.165	-1.512	3	-1.065	-0.845	
			-1.115	-1.482	1	-1.950	-1.582	V
			-0.965	-1.467	2	-1.950	-1.567	
Power supply drain current	I _{EE}	V _{EE} = -5.46 V V _{CC} = 0.0 V V _{IH} = -0.786 at +25°C = -0.657 at +125°C = -0.847 at -55°C			1	-13		mA
					2, 3	-14		
High level input current	I _{IH}				1		250	μA
					2, 3		410	
Low level input current	I _{IL}	V _{EE} = -4.94 V V _{IL} = -1.950 V V _{CC} = 0.0 V			1, 3	0.5		μA
					2	0.3		μA
Functional tests		See 4.3.1c			7, 8			

See footnotes at end of table.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89856
		REVISION LEVEL	SHEET 5

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C < T _A < +125°C unless otherwise specified	Group A subgroups	Limits		Unit		
				Min	Max			
Case 2		DC rapid test 4/						
High level output voltage	V _{OH}	Outputs terminated through 100Ω to -2.0 V	V _{IH}	V _{IL}				
			-0.789	-1.950	1	-1.018	-0.789	V
			-0.659	-1.950	2	-0.868	-0.659	
Low level output voltage	V _{OL}	V _{CC} = 0.0 V V _{EE} = -5.2 V 2/	-0.789	-1.950	1	-1.950	-1.583	V
			-0.659	-1.950	2	-1.950	-1.568	
			-0.849	-1.950	3	-1.950	-1.613	
High level threshold output voltage	V _{OHA}		-1.118	-1.483	1	-1.018	-0.789	V
			-0.968	-1.468	2	-0.868	-0.659	
			-1.168	-1.513	3	-1.068	-0.849	
Low level threshold output voltage	V _{OLA}		-1.118	-1.483	1	-1.950	-1.583	V
			-0.968	-1.468	2	-1.950	-1.568	
			-1.168	-1.513	3	-1.950	-1.613	
Power supply drain current	I _{EE}	V _{EE} = -5.46 V V _{CC} = 0.0 V	1 2, 3	-13 -14		mA		
High level input current	I _{IH}	V _{IH} = -0.789 at +25°C = -0.660 at +125°C = -0.850 at -55°C	1 2, 3		250 410	μA		
Low level input current	I _{IL}	V _{EE} = -4.94 V V _{IL} = -1.950 V V _{CC} = 0.0 V	1, 3 2	0.5 0.3		μA μA		
Functional tests		See 4.3.1c	7, 8					
Cases E, F, and 2		AC test						
Transition time	t _{TLH} t _{THL} t ₊ , t ₋	V _{EE} = -2.94 V _{CC} = 2.0 V C _L < 5 pF	9	0.4	2.1	ns		
			10	0.4	2.3			
			11	0.35	2.0			
Propagation delay time	t _{PHH} t _{PLL} t _{PHL} t _{PLH}	Load all outputs through 100Ω to GND	9	0.3	1.3	ns		
			10	0.45	1.6			
			11	0.25	2.0			

See footnotes on next page.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89856
		REVISION LEVEL	SHEET 6

DESC FORM 193A
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1989 - 749-003

- 1/ The quiescent limits are determined after a device has reached thermal equilibrium. This is defined as the reading taken with the device in a socket with > 500 LPM of +25°C air blowing on the unit and with power applied at least 4 minutes before the reading is taken.
- 2/ The high and low level output current varies with temperature, and can be calculated using the following formulas;

$$I_{OH} = (-2.0 \text{ V} - V_{OH})/100\Omega$$

$$I_{OL} = (-2.0 \text{ V} - V_{OL})/100\Omega$$
- 3/ The I_{EE} and I_{IC} limits, although specified in the minimum column, shall not be exceeded, in magnitude, as a minimum value.
- 4/ The dc rapid test forcing functions and limits are used for all dc testing. These limits are determined for each device type based on the power dissipation and package type. The rapid test (ΔV) limits and forcing functions are skewed allowing rapid testing to be performed at standard temperatures without the addition of ΔT 's.

3.5 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 MIL-BUL-103 (see 6.6 herein).

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-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECC prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 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.

3.8 Notification of change. Notification of change to DESC-ECC shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.9 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 3.6 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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-89856
	REVISION LEVEL	SHEET 7

DESC FORM 193A
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1984-771-003

Device type	01		
Case outlines	E	F	2
Terminal number	Terminal symbol		
1	VCC1	A2	NC
2	Y1	Y2	VCC1
3	Y1	Y2	Y1
4	A1	VCC2	Y1
5	B1	VCC1	A1
6	C1	Y1	NC
7	D1	Y1	B1
8	VEE	A1	C1
9	F2	B1	D1
10	D2	C1	VEE
11	C2	D1	NC
12	B2	VEE	F2
13	A2	F2	D2
14	Y2	D2	C2
15	Y2	C2	B2
16	VCC2	B2	NC
17	---	---	A2
18	---	---	Y2
19	---	---	Y2
20	---	---	VCC2

FIGURE 1. Terminal connections.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89856
		REVISION LEVEL	SHEET 8

DESC FORM 193A
SEP 87

* U. S. GOVERNMENT PRINTING OFFICE: 1988-749-033

4 INPUT OR/NOR GATE

A ₁	B ₁	C ₁	D ₁	Y ₁	$\overline{Y_1}$
L	L	L	L	L	H
H	X	X	X	H	L
X	H	X	X	H	L
X	X	H	X	H	L
X	X	X	H	H	L

5 INPUT OR/NOR GATE

A ₂	B ₂	C ₂	D ₂	E ₂	Y ₂	$\overline{Y_2}$
L	L	L	L	L	L	H
H	X	X	X	X	H	L
X	H	X	X	X	H	L
X	X	H	X	X	H	L
X	X	X	H	X	H	L
X	X	X	X	H	H	L

H = High level voltage
 L = Low level voltage
 X = Irrelevant

FIGURE 2. Truth tables.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89856
		REVISION LEVEL	SHEET 9

DESC FORM 193A
 SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1959-749-033

For AC characteristics

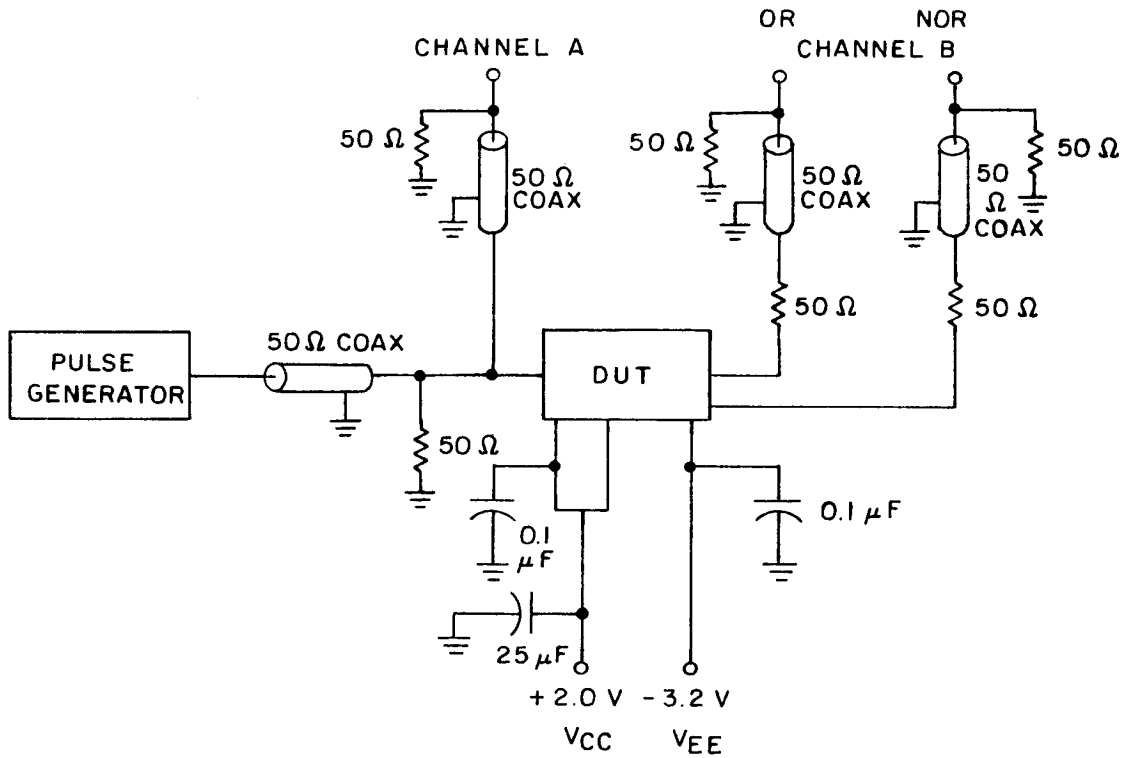
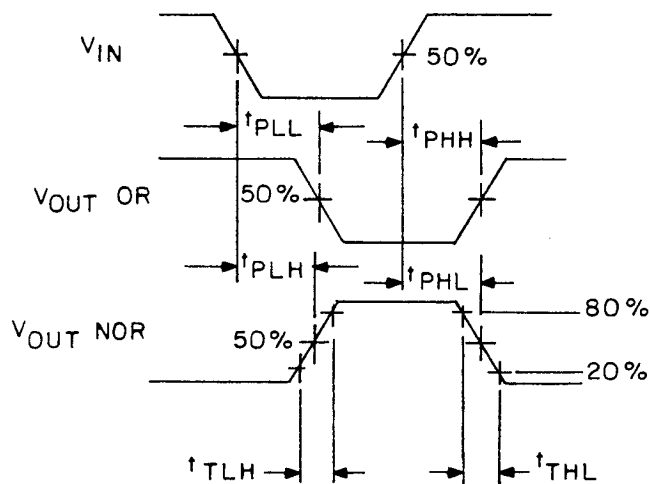


FIGURE 3. Test circuit and switching waveforms.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89856
		REVISION LEVEL	SHEET 10

DESC FORM 193A
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1969-749-033



NOTES:

1. Pulse generator characteristics:
 PRR = 1 MHz, $t_{THL} = 1.0 \pm 0.2$ ns (20% to 80%), duty cycle = 50%.
2. All other outputs are loaded through 100Ω to GND.
3. The 50Ω resistor in series with the 50Ω coaxial constitutes the 100Ω load.

FIGURE 3. Test circuit and switching waveform - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89856
		REVISION LEVEL	SHEET 11

DESC FORM 193A
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1989-749-033

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1
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 subgroups 1 and 7.

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 tests shall verify the truth tables as specified on figure 2.

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 3.6 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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-89856
	REVISION LEVEL	SHEET 12

DESC FORM 193A
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1989-749-032

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. 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-481 using DD Form 1693, Engineering Change Proposal (short form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system requires configuration control and the applicable SMD. DESC 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 DESC-ECC, telephone (513 296-6022).

6.5 Comments. Comments on this drawing should be directed to DESC-ECC, Dayton, Ohio 45444, or telephone 513-296-8525.

6.6 Approved source of supply. An approved source of supply is listed in MIL-BUL 103. Additional sources will be added to MIL-BUL-103 as they become available. The vendor listed in MIL-BUL-103 has agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to DESC-ECC. The approved source of supply listed below is for information purposes only and is current only to the date of the last action of this document.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/
5962-8985601EX	04713	10H509/BEAJC
5962-8985601FX	04713	10H509/BFAJC
5962-89856012X	04713	10H509/B2AJC

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

Vendor CAGE number

04713

Vendor name and address

Motorola, Incorporated
 5005 E McDowell Road
 Phoenix AZ 85008
 Point of contact: 7402 S Price Rd
 Tempe AZ 85283

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-89856	
		REVISION LEVEL	SHEET 13

DESC FORM 193A
 SEP 87

U.S. GOVERNMENT PRINTING OFFICE: 1989-749-033