

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
C	Redrawn with changes. Table I changes. Delete vendor CAGE 15818. Add vendor CAGE 1ES66 for device types 01, 02, and 03. Add vendor CAGE 60496 for device types 01 through 09.	92-10-22	<i>M.O. Yee</i>

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

REV																				
SHEET																				
REV																				
SHEET																				
REV STATUS OF SHEETS		REV	C	C	C	C	C	C	C	C	C	C	C	C						
		SHEET	1	2	3	4	5	6	7	8	9	10	11							
PMIC N/A		PREPARED BY Marcia B. Kelleher				DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444														
STANDARDIZED MILITARY DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE AMSC N/A		CHECKED BY Ray Monnin				MICROCIRCUIT, LINEAR, DUAL MOSFET DRIVERS, MONOLITHIC SILICON														
		APPROVED BY D. A. DiCenzo																		
		DRAWING APPROVAL DATE 88-07-25				SIZE A	CAGE CODE 67268	5962-88503												
		REVISION LEVEL C				SHEET	1	OF	11	1										

DESC FORM 193
JUL 91

5962-E625-92

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

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 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:

Device type	Generic number	Circuit function	Output current
01	TSC426, MIC426	Dual power MOSFET driver	1.5 A dc
02	TSC427, MIC427	Dual power MOSFET driver	1.5 A dc
03	TSC428, MIC428	Dual power MOSFET driver	1.5 A dc
04	MIC4423	Dual high power MOSFET driver	3.0 A dc
05	MIC4424	Dual high power MOSFET driver	3.0 A dc
06	MIC4425	Dual high power MOSFET driver	3.0 A dc
07	MIC4426	Dual power MOSFET driver with latch proof output for inductive loads	1.5 A dc
08	MIC4427	Dual power MOSFET driver with latch proof outputs for inductive loads	1.5 A dc
09	MIC4428	Dual power MOSFET driver with latch proof outputs for inductive loads	1.5 A dc

1.2.2 Case outline(s). The case outline(s) shall be as designated in MIL-STD-1835 and as follows:

Outline letter	Descriptive designator	Terminals	Package style
P	GDIP1-T8 or CDIP2-T8	8	dual-in-line
2	CQCC1-N20	20	square leadless chip carrier

1.2.3 Lead finish. The lead finish shall be as specified in MIL-M-38510. Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings.

Supply voltage (V_S):	
Device types 01 through 03	20 V dc
Device types 04 through 09	22 V dc
Input voltage (V_{IN}):	
Device types 01 through 03	$V_S + 0.3$ V dc to GND - 0.3 V dc
Device types 04 through 09	$V_S + 0.5$ V dc to GND - 5.0 V dc
Output current (per pin, capacitance load):	
Device types 01, 02, 03, 07, 08, and 09	1.5 A dc
Device types 04, 05, and 06	3.0 A dc
Peak supply current or GND current (per pin)	3.0 A dc
Storage temperature range	-55°C to +125°C
Maximum power dissipation (P_D):	
Case P	800 mW ^{1/}
Case 2	1.8 W ^{2/}
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature (T_J)	+150°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-STD-1835

^{1/} Derate linearly at 6.4 mW/°C above $T_A = +25^\circ\text{C}$.
^{2/} Derate linearly at 14.4 mW/°C above $T_A = +25^\circ\text{C}$.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-88503
	REVISION LEVEL C	SHEET 2

1.4 Recommended operating conditions.

Supply voltage range - - - - - 4.5 V dc $\leq V_G \leq$ 18 V dc
 Ambient operating temperature range (T_A)- - - - - -55°C to $+125^\circ\text{C}$

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and bulletin. Unless otherwise specified, the following specification, standards, 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.
 MIL-STD-1835 - Microcircuit Case Outlines.

BULLETIN

MILITARY

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

(Copies of the specification, standards, 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 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.

3.3 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I and shall apply over the full ambient 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-STD-883 (see 3.1 herein). 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-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-EC 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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-88503
		REVISION LEVEL C	SHEET 3

DESC FORM 193A
 JUL 91

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$ $4.5\text{ V} \leq V_S \leq 18\text{ V}$ unless otherwise specified		Device type	Group A subgroups	Limits		Unit
						Min	Max	
Logic "1" input voltage	V_{IH}			ALL	1,2,3	2.4		V
Logic "0" input voltage	V_{IL}			ALL	1,2,3		0.8	
Input voltage range	$V_{IN(max)}$			01,02,03	1,2,3	0	V_S	
				04,05,06,07,08,09	1,2,3	-5	$V_S + 0.5$	
Input current	I_{IN}	$0\text{ V} \leq V_{IN} \leq V_S$		01,02,03	1		± 1	μA
					2, 3		± 10	
		$0\text{ V} \leq V_{IN} \leq V_S$		04,05,06,07,08,09	1		± 1	μA
					2, 3		± 10	
$-5\text{ V} \leq V_{IN} \leq 0$		04,05,06,07,08,09	1		± 1	mA		
			2, 3		± 10			
High output voltage	V_{OH}	$R_L = \infty$		ALL	1,2,3	$V_S - 25\text{ mV}$		V
Low output voltage	V_{OL}	$R_L = \infty$			1,2,3		25	mV
Output resistance	R_{O1}	Apply V_{IN} to force V_{OUT} high $I_{OUT} = 10\text{ mA}$	$V_S = 18\text{ V}$	01,02,03	1,2,3		20	Ω
				04,05,06	1,2,3		8	
				07,08,09	1,2,3		15	
	R_{O2}	Apply V_{IN} to force V_{OUT} low $I_{OUT} = 10\text{ mA}$	$V_S = 18\text{ V}$	01,02,03,07,08,09	1,2,3		15	Ω
				04,05,06	1,2,3		8	

See footnotes at end of table.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-88503
		REVISION LEVEL C	SHEET 4

DESC FORM 193A
JUL 91

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _A ≤ +125°C 4.5 V ≤ V _S ≤ 18 V unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Latch-up protection	I	1/	04,05 06,07 08,09		-500	500	mA
Power supply current	I _{S1}	V _{IN} = 3.0 V (both inputs)	01,02, 03,07, 08,09,	1		8.0	mA
				2,3		12	
			04,05, 06	1		1.5	
		2,3		4.0			
	I _{S2}	V _{IN} = 0.0 V, (both inputs)	01,02, 03,07, 08,09	1		0.4	
				2,3		0.6	
04,05, 06			1		0.15		
			2,3		0.40		
Rise time	t _R	2/ 3/ V _S = 18 V	01,02, 03	9,10,11		60	ns
			04,05, 06	9		35	
				10,11		60	
			07,08, 09	9		30	
				10,11		40	
Fall time	t _F		01,02, 03,07, 08,09	9,10,11		40	
			04,05, 06	9		35	
				10,11		60	

See footnotes at end of table.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-88503
		REVISION LEVEL C	SHEET 5

DESC FORM 193A
JUL 91

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _A ≤ +125°C 4.5 V ≤ V _S ≤ 18 V unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Delay time	t _{D1}	2/ 3/ V _S = 18 V	01,02,03	9,10,11		60	ns
			04,05,06	9	75		
				10,11	100		
			07,08,09	9	30		
				10,11	40		
			t _{D2}	01,02,03	9,10,11		
	04,05,06			9	75		
				10,11	100		
	07,08,09			9	50		
				10,11	60		

- 1/ Tested initially and after any design changes which may affect the performance of the device.
- 2/ Subgroups 10 and 11 are guaranteed if not tested to the limits as specified in table I herein.
- 3/ For device types 01, 04, and 07, see figure 2.
 For device types 02, 05, and 08, see figure 3.
 For device types 03, 06, and 09 inverting drivers, see figure 2.
 For device types 03, 06, and 09 noninverting drivers, see figure 3.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-88503
		REVISION LEVEL C	SHEET 6

DESC FORM 193A
JUL 91

Device types	01, 04, and 07		02, 05, and 08		03, 06, and 09	
Case outlines	P	2	P	2	P	2
Terminal number	Terminal symbol		Terminal symbol		Terminal symbol	
1	NC	NC	NC	NC	NC	NC
2	IN A	NC	IN A	NC	IN A	NC
3	GND	NC	GND	NC	GND	NC
4	IN B	IN A	IN B	IN A	IN B	IN A
5	OUT B	NC	OUT B	NC	OUT B	NC
6	V _S	GND	V _S	GND	V _S	GND
7	OUT A	NC	OUT A	NC	OUT A	NC
8	NC	IN B	NC	IN B	NC	IN B
9	---	NC	---	NC	---	NC
10	---	NC	---	NC	---	NC
11	---	NC	---	NC	---	NC
12	---	NC	---	NC	---	NC
13	---	NC	---	NC	---	NC
14	---	OUT B	---	OUT B	---	OUT B
15	---	NC	---	NC	---	NC
16	---	V _S	---	V _S	---	V _S
17	---	NC	---	NC	---	NC
18	---	OUT A	---	OUT A	---	OUT A
19	---	NC	---	NC	---	NC
20	---	NC	---	NC	---	NC

NC = No connection

FIGURE 1. Terminal connections.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-88503
		REVISION LEVEL C	SHEET 7

DESC FORM 193A
JUL 91

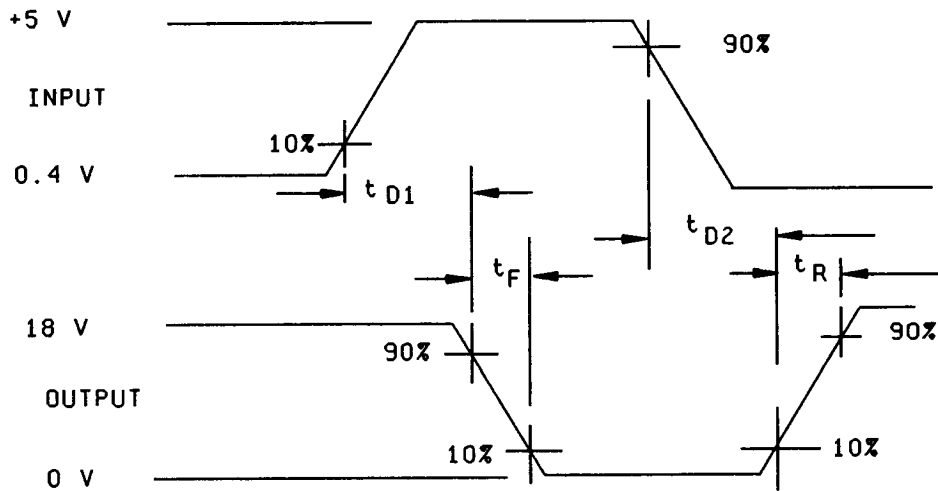
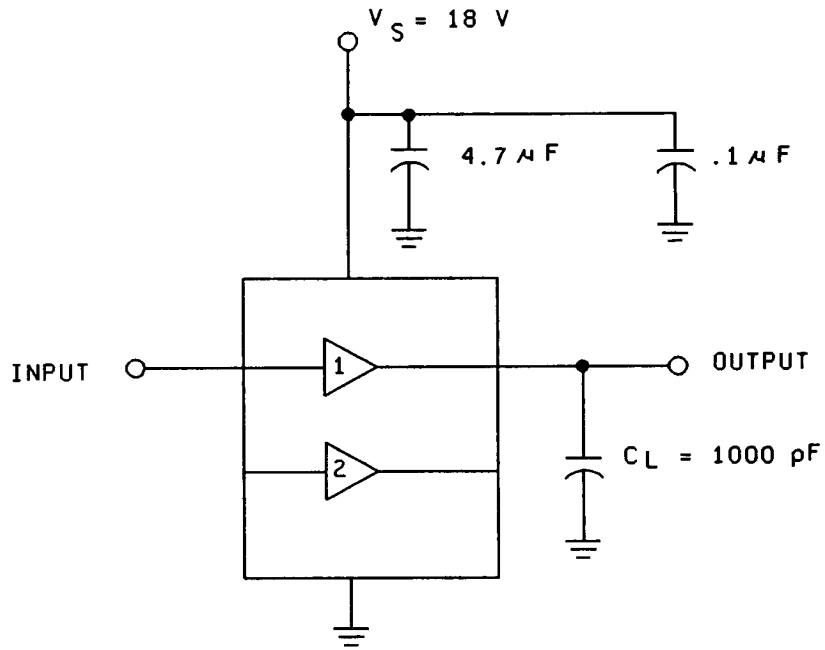


FIGURE 2. Inverting driver switching time.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-88503
		REVISION LEVEL C	SHEET 8

DESC FORM 193A
JUL 91

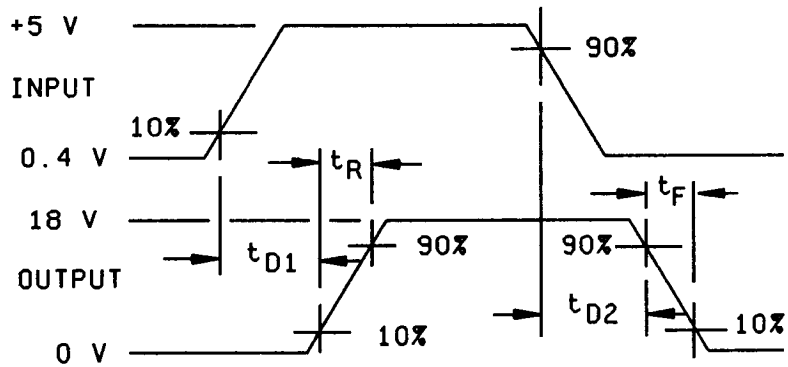
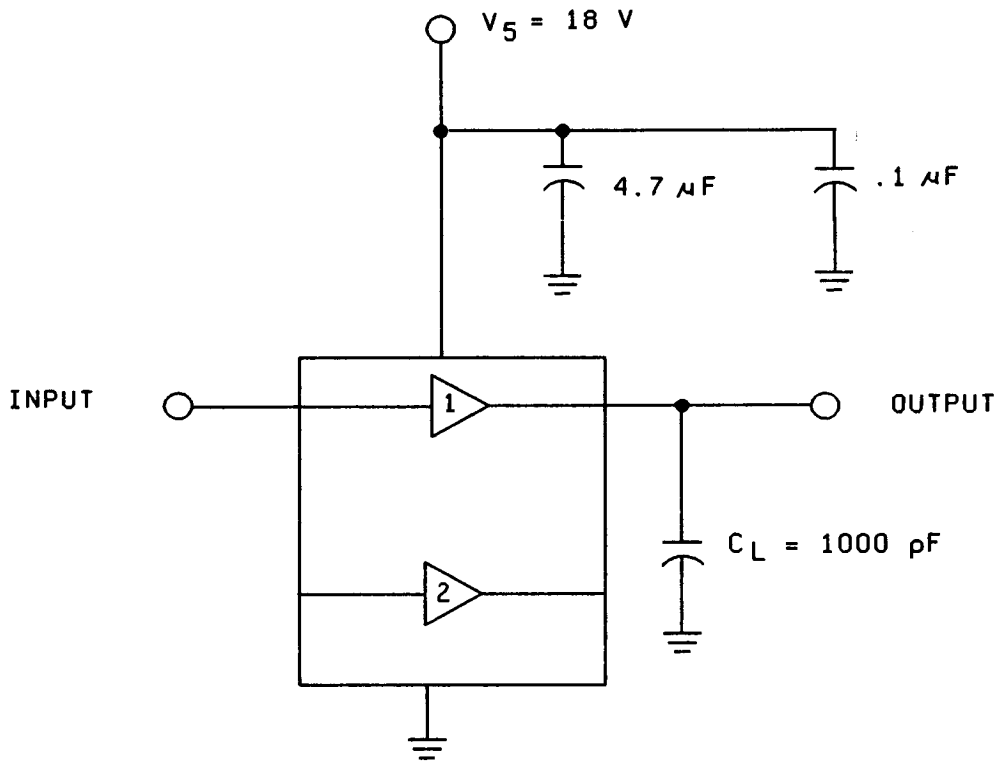


FIGURE 3. Noninverting driver switching time.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

5962-88503

REVISION LEVEL
C

SHEET
9

DESC FORM 193A
JUL 91

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
Group A test requirements (method 5005)	1, 2, 3, 9, 10**, 11**
Groups C and D end-point electrical parameters (method 5005)	1

- * PDA applies to subgroup 1.
- ** Subgroups 10 and 11, if not tested, shall be guaranteed to the specified limits in table I.

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-EC 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 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. 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 1015 of MIL-STD-883.
- (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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-88503
		REVISION LEVEL C	SHEET 10

DESC FORM 193A
JUL 91

4.3.1 Group A inspection.

- a. Tests shall be as specified in table II herein.
- b. Subgroups 4, 5, 6, 7, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. O/V (latch-up) tests shall be measured only for initial qualification and after process or design changes which may affect the performance of the device. Latch-up tests shall be considered destructive. Test all applicable pins on three devices with zero failures.

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. 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.

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. 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 application 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-EC, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-EC, Dayton, Ohio 45444, or telephone 513-296-5377.

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

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-88503
		REVISION LEVEL C	SHEET 11

DESC FORM 193A
JUL 91