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	13	14	15									

PMIC N/A

STANDARDIZED MILITARY DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

PREPARED BY: Donald R. Osborne

CHECKED BY: Ray Monnin

APPROVED BY:

DRAWING APPROVAL DATE: 20 JUNE 1989

REVISION LEVEL:

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, DIGITAL, LOW POWER, SINGLE CHANNEL, DRIVER-RECEIVER, HYBRID

SIZE	CAGE CODE	
A	67268	5962-89592

SHEET

DESC FORM 193
SEP 87

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

5962-E1273

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:

5962-89592	01	X	X
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

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

Device types	Generic number	Circuit function
01 and 03	3231	Single channel, driver-receiver (MIL-STD-1553 A and B, low power)
02 and 04	3232	Single channel, driver-receiver (universal transceiver, low power)

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
X	See figure 1 (24-lead, 1.27" x 1.27" x .175"), hybrid package
Y	See figure 1 (24-lead, 1.27" x 1.27" x .200"), flat package

1.3 Absolute maximum ratings.

Supply voltage:	
V_{CC}	-0.3 V dc to +18 V dc
V_{EE}	+0.3 V dc to -18 V dc
+5 V supply	-0.3 V dc to +7 V dc
Logic input voltage range	-0.3 V to +5.5 V
Receiver differential input voltage	40 Vp-p
Receiver common mode input voltage range	-10 V to +10 V
Driver peak output current	±300 mA
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature (T_J)	+160°C
Power dissipation (P_D) total hybrid:	
100% duty cycle (T_C = +25°C):	
Device types 01 and 03	3.0 W
Device types 02 and 04	3.24 W
Standby mode, all devices	1.06 W

Power dissipation (P_D) hottest die:	
100% duty cycle:	
Device types 01 and 03	484 mW 1/ 3/
Device types 02 and 04	545 mW 2/ 3/
Standby mode, all devices	Derates to zero
Thermal resistance:	
Junction to case (θ_{JC}) hottest die:	
Device types 01 and 02	88°C/W
Device types 03 and 04	58°C/W
Case to ambient, all devices	21°C/W
Maximum junction to case temperature rise for the hottest die at 100% duty cycle:	
Device type 01	42.6°C
Device type 02	47.9°C
Device type 03	28°C
Device type 04	31.6°C

1.4 Recommended operating conditions.

Supply voltage range:	
V_{CC}	+11.4 V dc to +15.75 V dc
V_{EE}	-11.4 V dc to -15.75 V dc
5 V supply	+4.5 V dc to +5.5 V dc
Logic input voltage range	0 V to +5.0 V
Receiver differential voltage	40 Vp-p
Receiver common mode voltage range	-10.0 V to +10.0 V
Driver peak output current:	
Device types 01 and 02	±180 mA
Device types 03 and 04	±120 mA
Maximum serial data rate	1.0 MHz
Case operating temperature range (T_C)	-55°C to +125°C

1/ Duty cycle at 1.0 MHz for device type 01, derate to 82 percent maximum at T_C = +125°C for a maximum junction temperature of 160°C in the hottest die.
2/ Duty cycle at 1.0 MHz for device type 02, derate to 73 percent maximum at T_C = +125°C for a maximum junction temperature of 160°C in the hottest die.
3/ Duty cycle for device types 03 and 04 needs no derating over the full operating temperature range.

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 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.

(Copies of the 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" 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 2.

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

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-M-38510. 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 6.3 herein.

3.5 Manufacturer eligibility. In addition to the general requirements of MIL-M-38510, appendix G, the manufacturer of the part described herein shall submit for DESC-ECS review electrical test data (variables format) on one QCI group A lot sample, produced on the certified line, for each device type listed herein. The data should also include a summary of all parameters manually tested, and for those which, if any, are guaranteed.

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 6.3. 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.

TABLE I. Electrical performance characteristics.

Test		Symbol	Conditions 1/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Limits		Unit
					Min	Max	
Receiver	Output low voltage	V_{OL}	I_{OL} = 10 mA	1,2,3		0.5	V
	Output high voltage	V_{OH}	I_{OH} = -0.4 mA	1,2,3	2.5		V
	Differential input voltage level	V_I		4,5,6		40	Vp-p
	Differential input impedance	Z_{IN}	1 MHz sine wave	4,5,6	10		kΩ
	Input capacitance	C_{IN}	1 MHz sine wave 2/	4		5	pF
	Threshold voltage	V_{TH}	3/ 4/	4,5,6	0.6	1.05	Vp-p
	Receiver delay	t_{DR}	Input zero crossing 2/ to DATA or $\overline{DATA}$, see figure 3	9,10,11		450	ns
Receiver strobe	Input low voltage	V_{SIL}		1,2,3		0.7	V
	Input high voltage	V_{SIH}		1,2,3	2.0		V
	Input low current	I_{SIL}	V_{SIL} = 0.4 V	1,2,3	-0.4		mA
	Input high current	I_{SIH}	V_{SIH} = 2.7 V	1,2,3		40	μA
	Strobe delay	t_{DS}	Turn-on or turn-off 2/ see figure 3	9,10,11		200	ns
Transmitter	Input low voltage	V_{IL}		1,2,3		0.7	V
	Input high voltage	V_{IH}		1,2,3	2.0		V
	Input low current	I_{IL}	V_{IL} = 0.4 V	1,2,3	-0.4		mA
	Input high current	I_{IH}	V_{IH} = 2.7 V	1,2,3		40	μA

See footnotes at end of table.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1988—549-904

TABLE I. Electrical performance characteristics - Continued.

Test		Symbol	Conditions 1/ $-55°C < T_C < +125°C$ unless otherwise specified	Group A subgroups	Limits		Unit
					Min	Max	
Transmitter (continued)	Differential output voltage	V_O	35Ω load 4/	1,2,3	6.5	8.5	Vp-p
			140Ω load 5/		26	34	
	Differential output noise	V_{ON}	Inhibited 35Ω load 4/	4,5,6		10	mVp-p
			140Ω load 5/			40	
	Differential output impedance	Z_{OUT}	1 MHz sine wave (transmitter off)	4,5,6	10		kΩ
	Output capacitance	C_{OUT}	1 MHz sine wave 2/	4		5	pF
	Differential output offset voltage	V_{OS}	35Ω load 4/	4,5,6	-90	+90	mV pk
			140Ω load 5/ 6/		-360	+360	
	Receiver filter response	FILTER	f = 2 MHz	4,5,6	-4.0		dB
			f = 4 MHz		-13		
	Rise time	t_R	35Ω load, see figure 3; devices 01, 03	9,10,11	100	300	ns
			devices 02, 04		220	300	
	Fall time	t_F	35Ω load, see figure 3; devices 01, 03		100	300	
			devices 02, 04		220	300	
	Transmitter delay	t_{DT}	Transmitter-in to transmitter-out, see figure 3 2/			550	
Transmitter inhibit	Input low voltage	V_{IIL}		1,2,3		0.7	V
	Input high voltage	V_{IIH}		1,2,3	2.0		V
	Input low current	I_{IIL}	V_{SIL} = 0.4 V	1,2,3	-0.4		mA
	Input high current	I_{IIH}	V_{SIH} = 2.7 V	1,2,3		40	µA
	Transmitter inhibit delay (high)	t_{DI-H}	0-1 inhibited output see figure 3 2/	9,10,11		450	ns
	Transmitter inhibit delay (low)	t_{DI-L}	1-0 active output see figure 3 2/	9,10,11		450	ns

See footnotes at end of table.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1988—549-904

TABLE I. Electrical performance characteristics - Continued.

Test		Symbol	Conditions 1/ $-55°C \le T_C \le +125°C$ unless otherwise specified		Group A subgroups	Limits		Unit
						Min	Max	
Power supply	+Supply (V_{CC}) -Supply (V_{EE}) +5 V supply	I_{CC}-SB I_{EE}-SB I_{CC1}-SB	Standby mode		1,2,3		20 35 35	mA
	+Supply (V_{CC}) -Supply (V_{EE})	I_{CC}-50 I_{EE}-50	50% duty cycle		4,5,6		75 92.5	
	+Supply (V_{CC})	I_{CC}-100	100% duty cycle $-55°C \le T_C \le +25°C$	devices 01, 02	4,6		130	
				devices 03, 04	4,5,6		130	
	-Supply (V_{EE})	I_{EE}-100	$-55°C \le T_C \le +25°C$	devices 01, 02	4,6		150	
				devices 03, 04	4,5,6		150	

1/ $(+14.9 \le V_{CC} \le +15.1$ V dc), $(-14.9 \le V_{EE} \le -15.1$ V dc), $(+4.9 \le +5$ V supply $\le +5.1$ V dc).

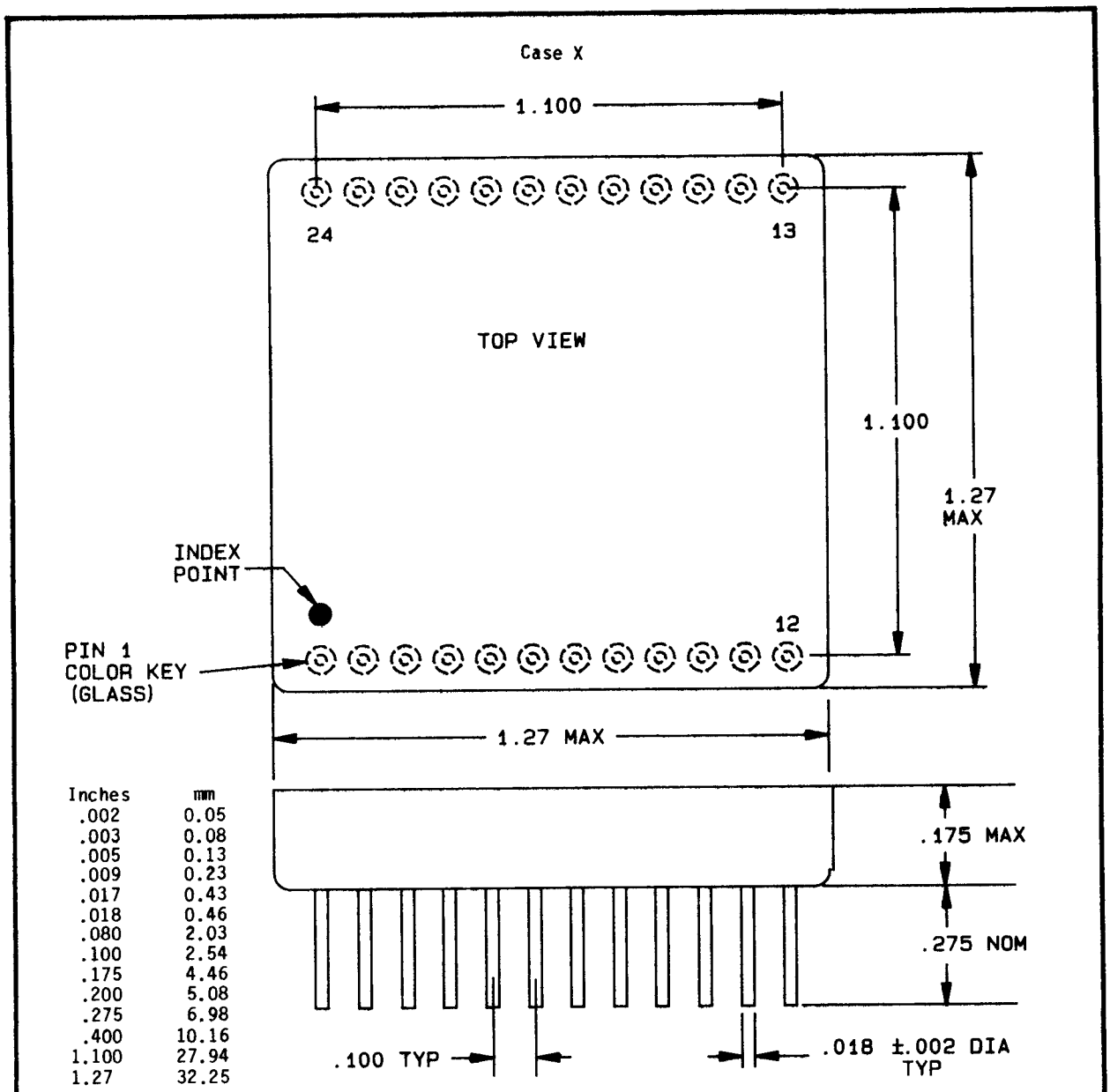
2/ Parameter shall be tested as part of initial characterization and after design and process changes. Parameters shall be guaranteed to limits specified in table I for all lots not specifically tested.

3/ Threshold determined by absence of output on receiver (i.e. full rejection).

4/ Measured at point AA' of figure 4.

5/ Measured at point BB' of figure 4.

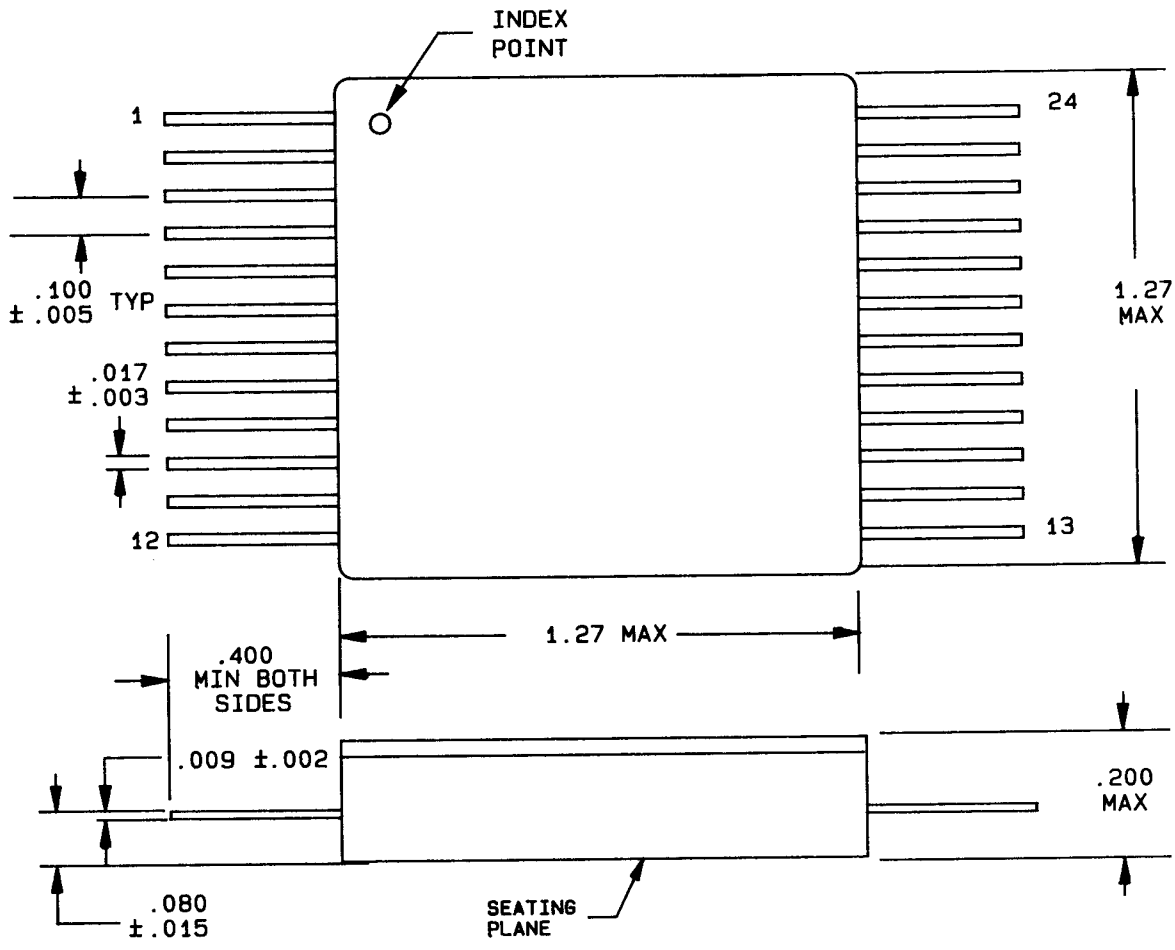
6/ Offset is measured 2.5 µs after the mid-bit zero crossing of the last parity bit of a 660 µs transmission cycle of contiguous words (no dead time in between words).



Inches	mm
.002	0.05
.003	0.08
.005	0.13
.009	0.23
.017	0.43
.018	0.46
.080	2.03
.100	2.54
.175	4.46
.200	5.08
.275	6.98
.400	10.16
1.100	27.94
1.27	32.25

FIGURE 1. Case outlines.

Case Y



NOTES (for case X and case Y):
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance for three place decimals shall be .005 (0.13 mm).

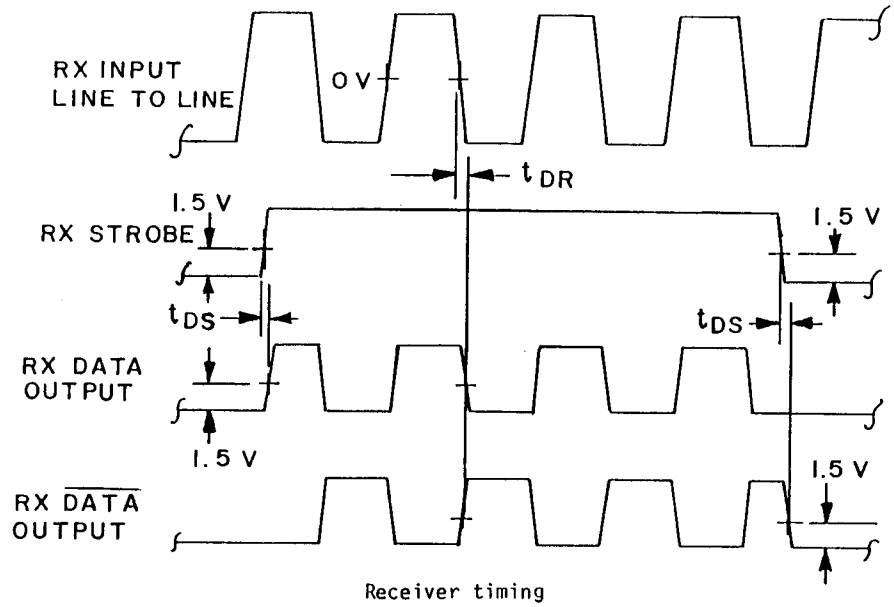
FIGURE 1. Case outlines - Continued.

☆U.S. GOVERNMENT PRINTING OFFICE: 1987 - 748-129-60913

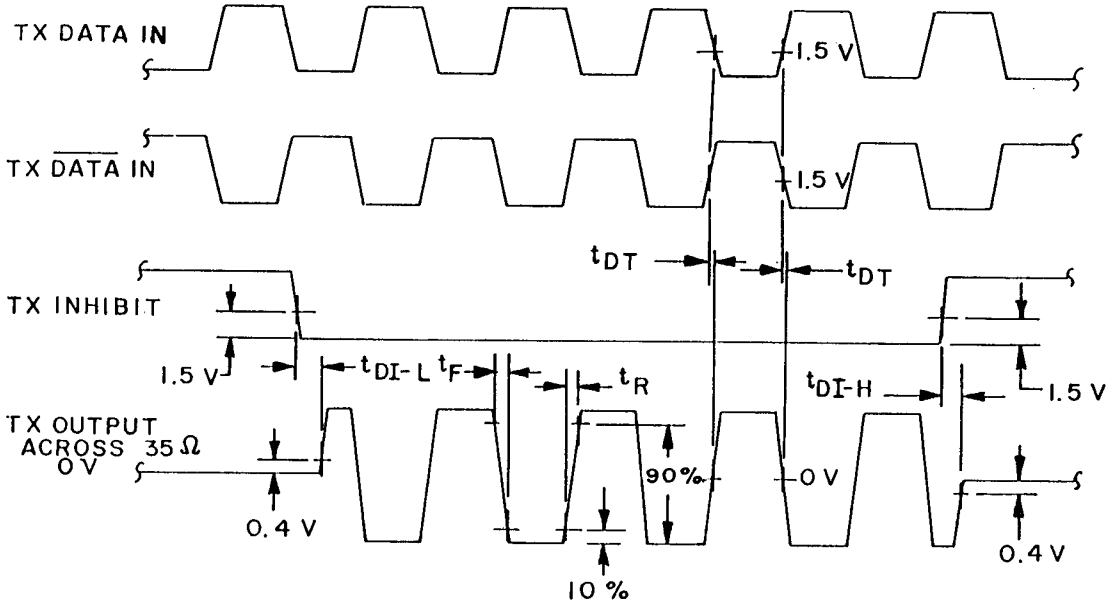
Device types 01, 02, 03, and 04

Pin	Function	Pin	Function
1	TX DATA OUT	13	+15 V
2	TX $\overline{\text{DATA}}$ OUT	14	NC
3	TX GND	15	RX DATA IN
4	+15 V	16	RX $\overline{\text{DATA}}$ IN
5	NC	17	GND
6	NC	18	CASE GND
7	RX DATA OUT	19	-15 V
8	RX STROBE	20	+5 V
9	RX GND	21	TX INHIBIT
10	RX $\overline{\text{DATA}}$ OUT	22	TX DATA IN
11	NC	23	TX $\overline{\text{DATA}}$ IN
12	NC	24	-15 V

FIGURE 2. Terminal connections.



Receiver timing



Transmitter timing

FIGURE 3. Waveforms.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89592
		REVISION LEVEL	SHEET 11

☆U.S. GOVERNMENT PRINTING OFFICE: 1987 - 748-129-60913

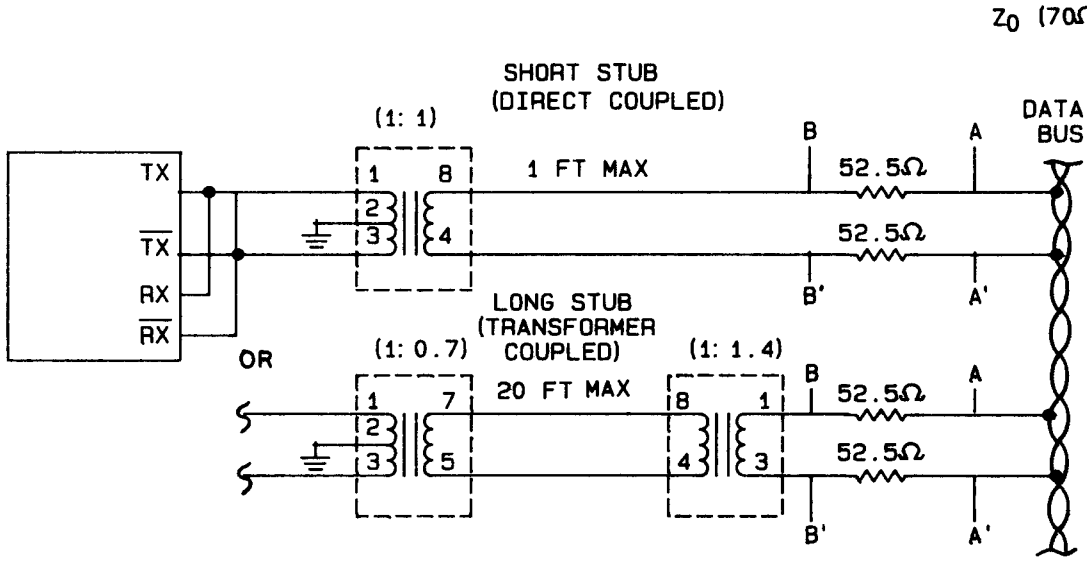


FIGURE 4. Coupling diagram.

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-ECS 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.

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 5008 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_C = +125°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 5008 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 7 and 8 in group A electrical test table of method 5008 of MIL-STD-883 shall be omitted.

4.3.2 Group C inspection.

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_C = +125°C, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

TABLE II. Electrical test requirements.

MIL-STD-883, method 5008 test requirements	Subgroups (per method 5008, group A test table)
Interim electrical parameters (pre burn-in)	1
Final electrical test parameters	1*,2,3,4,5,6, 9,10,11
Group A test requirements	1,2,3,4,5,6, 9,10,11
Group C end-point electrical parameters	1,2,3

* PDA applies to subgroup 1.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

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

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

6.3 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/
5962-8959201XX	88379	ARX3407
5962-8959201YX	88379	ARX3407FP
5962-8959202XX	88379	ARX3404
5962-8959202YX	88379	ARX3404FP
5962-8959203XX	88379	ARX3407-001
5962-8959203YX	88379	ARX3407-001FP
5962-8959204XX	88379	ARX3404-001
5962-8959204YX	88379	ARX3404-001FP

1/ 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	Vendor name and address
88379	Aeroflex Laboratories Inc. 35 South Service Road Plainview, NY 11803

☆ U. S. GOVERNMENT PRINTING OFFICE: 1988—549-904