REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED

REV																
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REV STATUS OF SHEETS	REV															
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	

PMIC N/A	PREPARED BY Joseph A. Kirby	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	CHECKED BY Charles E. Besore	MICROCIRCUITS, LINEAR, TRAPEZOIDAL-WAVEFORM INTERFACE BUS TRANSCEIVERS, MONOLITHIC SILICON
	APPROVED BY	
	DRAWING APPROVAL DATE 91-02-14	SIZE A
		CAGE CODE 67268
		5962-90629
AMSC N/A	REVISION LEVEL	SHEET 1 OF 14

DESC FORM 193
SEP 87

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:

5962-90629	01	R	X
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

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

Device type	Generic number	Circuit function
01	55ALS057	Trapezoidal-waveform interface bus transceivers

1.2.2 Case outline(s). The case outline(s) shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
R	D-8 (20-lead, 1.060" x .310" x .200"), dual-in-line package
S	F-9 (20-lead, .540" x .300" x .100"), flat package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage (V_{CC})	6.0 V dc
Control input voltage	5.5 V dc
Driver input voltage	5.5 V dc
Driver output voltage	2.5 V dc
Receiver input voltage	2.5 V dc
Receiver output voltage	5.5 V dc
Continuous power dissipation (P_D) 1/:	
Cases R and 2	1,375 mW
Case S	1,000 mW
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	300°C
Junction temperature (T_J)	150°C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	4.5 V dc minimum to 5.5 V dc maximum
Minimum high-level input voltage (V_{IH})	2.0 V dc
Maximum low-level input voltage (V_{IL})	0.8 V dc
Bus termination voltage	1.9 V dc to 2.1 V dc
Ambient operating temperature range (T_A)	-55°C to +125°C

1/ For operation above 25°C free-air temperature, derate case outlines R and 2 at the rate of 11 mW/°C and case S at 8 mW/°C.

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 Standardized 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 and truth table. The terminal connections and truth table shall be as specified on figure 1 .

3.2.2 Driver delay waveforms. The driver delay waveforms shall be as specified on figure 2.

3.2.3 Driver plus receiver delay waveforms. The driver plus receiver delay waveforms shall be as specified on figure 3.

3.2.4 Receiver delay waveforms. The receiver delay waveforms shall be as specified on figure 4.

3.2.5 Receiver delay waveforms from $\overline{RE}$ to Rn. The receiver delay waveforms from $\overline{RE}$ to Rn shall be as specified on figure 5.

3.2.6 Receiver noise immunity waveforms. The receiver noise immunity waveforms shall be as specified on figure 6.

3.2.7 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein.

TABLE I. Electrical performance characteristics.

Test		Symbol	Conditions $-55^\circ C \le T_A \le +125^\circ C$ unless otherwise specified	Group A subgroups	Limits		Unit
					Min	Max	
High level output voltage at Rn		V_{OH}	V_{CC} = 4.5 V dc Bn at 1.2 V dc I_{OH} = -400 μA $\overline{RE}$ at 0.8 V dc	1,2,3	2.4		V
Low level output voltage	Rn	V_{OL}	V_{CC} = 4.5 V dc, I_{OL} = 16 mA Bn at 2 V dc $\overline{RE}$ at 0.8 V dc	1,2,3		0.5	
	Bn		V_{CC} = 4.5 V dc, Dn = 2 V dc En at 2 V dc, R_L = 18Ω $\overline{TE}$ at 0.8 V dc		0.75	1.2	
Input clamp voltage at Dn, En, TE and RE		V_{IC}	V_{CC} = 4.5 V dc, I_I = -18 mA	1,2,3		-1.5	
Receiver input threshold at Bn		V_T	V_{CC} = 5.0 V dc	1	1.45	1.65	
				2,3	1.4	1.7	
Short circuit output current at Rn		I_{OS}	V_{CC} = 5.5 V dc Bn at 1.2 V dc Rn at 0.0 V dc, $\overline{RE}$ at 0.8 V dc	1,2,3	-35	-125	μA
High level input current	Dn, En, TE, and $\overline{RE}$	I_{IH}	V_{CC} = 5.5 V dc, V_I = V_{CC}	1,2,3		40	
	Bn		V_{CC} = 5.5 V dc V_I = 2.0 V dc En at 0.8 V dc Dn at 0.8 V dc, $\overline{TE}$ at 0.8 V dc			100	
Low level input current at Dn, En, $\overline{TE}$ and $\overline{RE}$		I_{IL}	V_{CC} = 5.5 V dc V_I = 0.4 V dc	1,2,3		-400	
Supply current		I_{CC}	V_{CC} = 5.5 V dc	1,2,3		45	mA
Functional test 1/			See 4.3.1c.	7,8			

See footnote at the end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^\circ C \le T_A \le +125^\circ C$ unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Driver						
Propagation delay time, from Dn or En to Bn	t_{PLH1}	$\overline{\text{TE}}$ at 0.8 V dc, $\overline{\text{RE}}$ at 2.0 V dc V_L = 2.0 V dc V_{CC} = 4.5 V dc to 5.5 V dc See figure 2	9		10	ns
			10,11		27	
	t_{PHL1}		9		12	
			10,11		15	
Propagation delay time, from $\overline{\text{TE}}$ to Bn	t_{PLH2}	Dn, En, $\overline{\text{RE}}$ at 2.0 V dc V_L = 2.0 V dc V_{CC} = 4.5 V dc to 5.5 V dc See figure 2	9		10	
			10,11		27	
	t_{PHL2}		9		17	
			10,11		19	
Transition time, from Dn or En to Bn	t_{TLH}	$\overline{\text{RE}}$ at 2.0 V dc V_L = 2.0 V dc V_{CC} = 4.5 V dc to 5.5 V dc See figure 2	9		8	
			10,11		33	
	t_{THL}		9		10	
			10,11		13	
Driver plus receiver						
Propagation delay time, from Dn to Rn	t_{PLH3}	$\overline{\text{RE}}$ at 0.8 V dc, $\overline{\text{TE}}$ at 0.8 V dc V_{CC} = 4.5 V dc to 5.5 V dc V_L = 2.0 V dc (both loads are used), S1 closed, see figure 3	9		25	ns
			10,11		35	
	t_{PHL3}		9		25	
			10,11		35	
Receiver						
Propagation delay time, from Bn to Rn	t_{PLH4}	$\overline{\text{RE}}$ at 0.8 V dc, $\overline{\text{TE}}$ at 2.0 V dc V_{CC} = 4.5 V dc to 5.5 V dc V_L = 5.0 V dc, S1 closed See figure 4	9		20	ns
			10,11		22	
	t_{PHL4}		9		18	
			10,11		20	

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^\circ C \leq T_A \leq +125^\circ C$ unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Receiver						
Output disable time, from RE to Rn	t_{PLZ}	Bn at 2.0 V dc V_L = 5.0 V dc	9		15	ns
			10,11		17	
Output enable time, from $\overline{RE}$ to Rn	t_{PZL}	$\overline{TE}$ at 2.0 V dc V_{CC} = 4.5 V dc to 5.5 V dc See figure 5, S1 closed	9		13	
			10,11		14	
Output disable time, from $\overline{RE}$ to Rn	t_{PHZ}	Bn at 0.8 V dc V_L = 0.0 V dc $\overline{TE}$ at 2.0 V dc V_{CC} = 4.5 V dc to 5.5 V dc See figure 5, S1 closed	9		12	
			10,11		13	
Output enable time, from $\overline{RE}$ to Rn	t_{PZH}	Bn at 0.8 V dc $\overline{TE}$ at 2.0 V dc V_{CC} = 4.5 V dc to 5.5 V dc See figure 5, S1 open	9		14	
			10,11		15	
Receiver noise rejection pulse duration from Bn to Rn	$t_{w(NR)}$	V_{CC} = 4.5 V dc to 5.5 V dc V_L = 5.0 V dc, S1 closed See figure 6	9	4		
			10,11	2		

[1] Functional test shall be conducted at input test conditions of GND $\leq V_{IL} \leq V_{OL}$ and $V_{OH} \leq V_{IH} \leq V_{CC}$.

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 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-ECS 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-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. 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 or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

    (2) T_A = +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 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 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 A or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

    (2) T_A = +125°C, minimum.

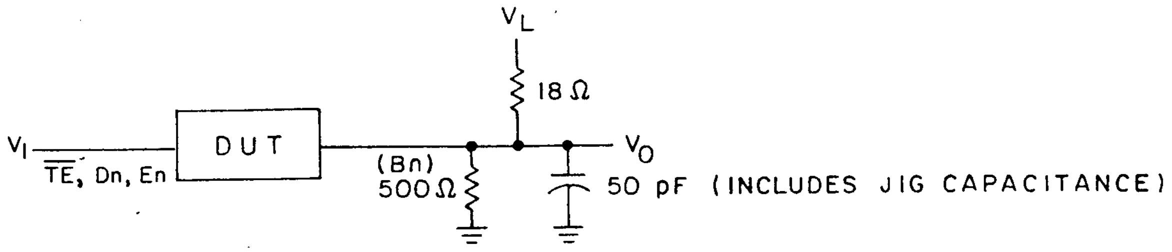
    (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

Device type	01
Case outlines	R, S and 2
Terminal number	Terminal symbol
1	D1
2	R1
3	D2
4	R2
5	V_{CC}
6	D3
7	R3
8	D4
9	R4
10	$\overline{TE}$
11	$\overline{RE}$
12	E4
13	B4
14	E3
15	B3
16	GND
17	E2
18	B2
19	E1
20	B1

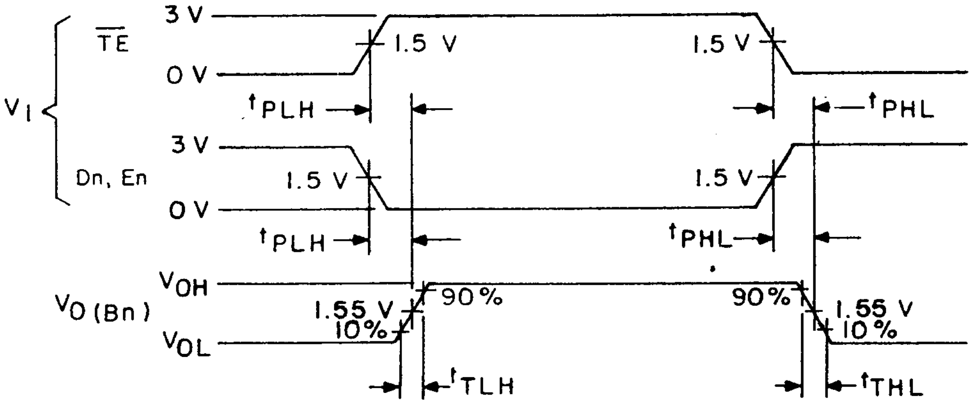
Controls			Channels	
$\overline{TE}$	$\overline{RE}$	En	D→B	B→R
L	L	L	D	R
L	L	H	T	R
L	H	L	D	D
L	H	H	T	D
H	L	X	D	R
H	H	X	D	D

NOTES:
H = High level
L = Low level
R = Receive
T = Transmit
D = Disable
X = Irrelevant

FIGURE 1. Terminal connections and truth table.



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTE: For V_I, $t_r = t_f \leq 5$ ns from 10% to 90%.

FIGURE 2. Driver delay waveforms.

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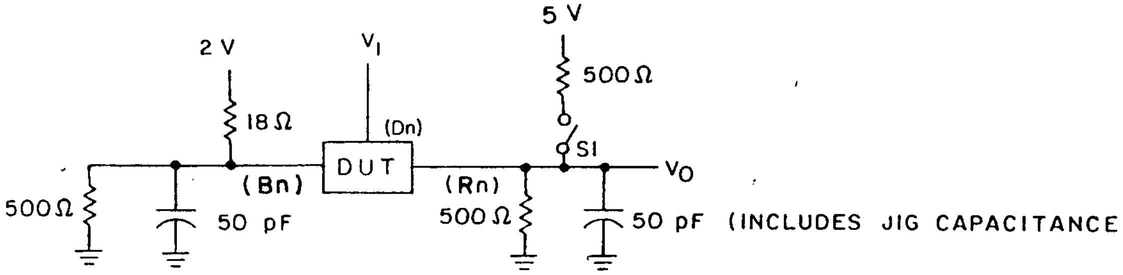
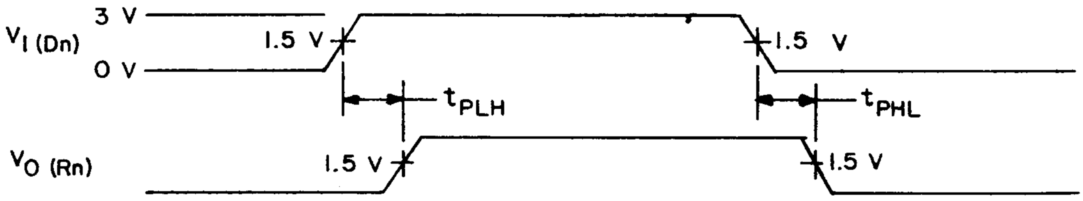


TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTE: For V_I(Dn), $t_r = t_f \leq 5$ ns from 10% to 90%.

FIGURE 3. Driver plus receiver delay waveforms.

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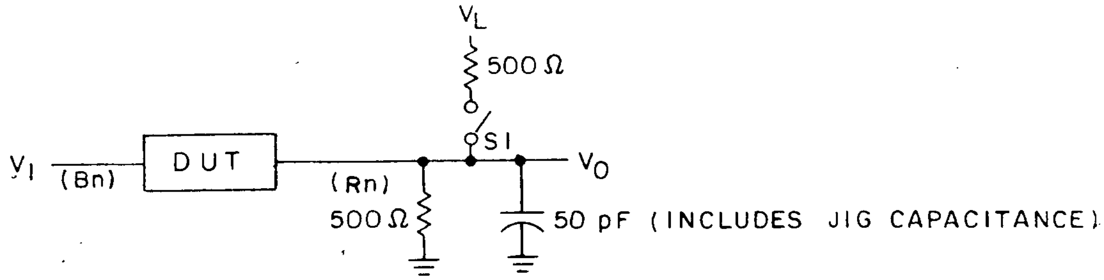
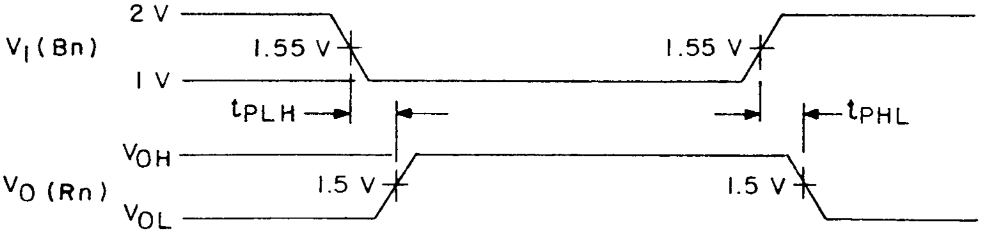


TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTE: For V_I(Bn), $t_r = t_f \leq 5$ ns from 10% to 90%.

FIGURE 4. Receiver delay waveforms.

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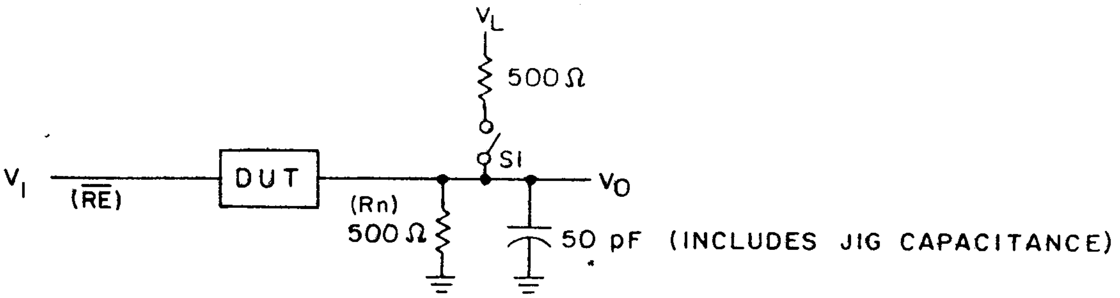
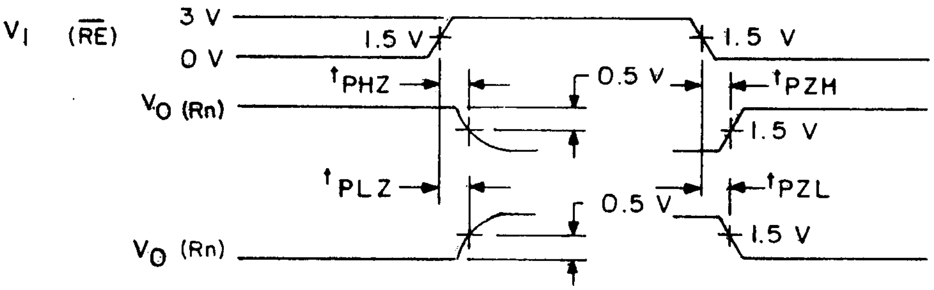


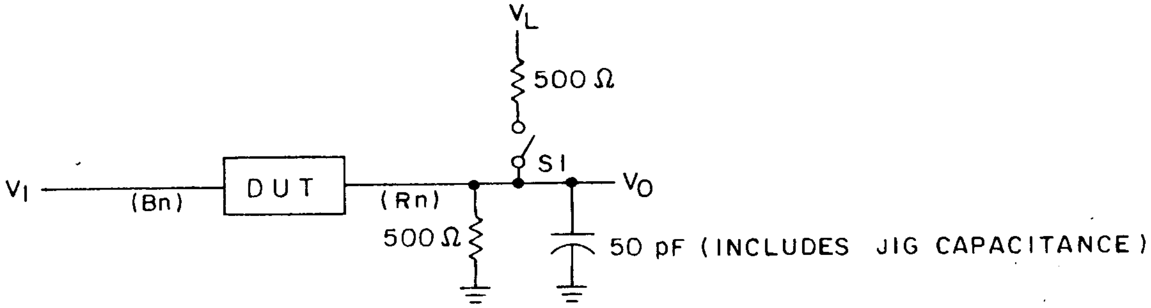
TEST CIRCUIT



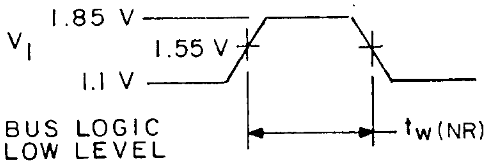
VOLTAGE WAVEFORMS

NOTE: For $V_I(\overline{RE})$, $t_r = t_f \leq 5$ ns from 10% to 90%.

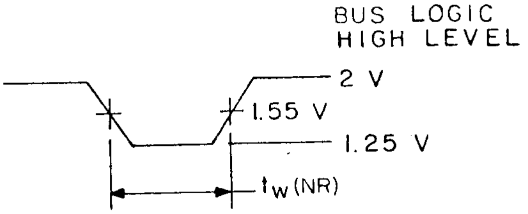
FIGURE 5. Delay waveforms from $\overline{RE}$ to Rn.



TEST CIRCUIT



t_W IS INCREASED UNTIL THE OUTPUT VOLTAGE FALL JUST REACHES 2.0 V.



t_W IS INCREASED UNTIL THE OUTPUT VOLTAGE RISE JUST REACHES 0.8 V.

VOLTAGE WAVEFORMS

NOTE: For V_I, $t_r = t_f \leq 2$ ns from 10% to 90%.

FIGURE 6. Receiver noise immunity waveforms.

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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, 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-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-ECS, telephone (513) 296-6022.

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

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The 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-ECS.