



ANSI/TIA/EIA-644-1995
Approved: November 15, 1995

TIA/EIA STANDARD

Electrical Characteristics of Low Voltage Differential Signaling (LVDS) Interface Circuits

MARCH 1996

TIA/EIA-644

TELECOMMUNICATIONS INDUSTRY ASSOCIATION



Representing the telecommunications industry
in association with the Electronic Industries Association



NOTICE

TIA/EIA Engineering Standards and Publications are designed to serve the public interest through eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for his particular need. Existence of such Standards and Publications shall not in any respect preclude any member or nonmember of TIA/EIA from manufacturing or selling products not conforming to such Standards and Publications, nor shall the existence of such Standards and Publications preclude their voluntary use by those other than TIA/EIA members, whether the standard is to be used either domestically or internationally.

Standards and Publications are adopted by TIA/EIA in accordance with the American National Standards Institute (ANSI) patent policy. By such action, TIA/EIA does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the Standard or Publication.

This Standard does not purport to address all safety problems associated with its use or all applicable regulatory requirements. It is the responsibility of the user of this Standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations before its use.

(From Standards Proposal No. 3357, formulated under the cognizance of the TR-30.2 Subcommittee on DTE-DCE Interfaces.)

Published by

©TELECOMMUNICATIONS INDUSTRY ASSOCIATION 1996
Standards and Technology Department
2500 Wilson Boulevard
Arlington, VA 22201

**PRICE: Please refer to current
Catalog of EIA, JEDEC, and TIA STANDARDS and ENGINEERING PUBLICATIONS
or call Global Engineering Documents, USA and Canada (1-800-854-7179)
International (303-397-7956)**

All rights reserved
Printed in U.S.A.

**ELECTRICAL CHARACTERISTICS OF LOW VOLTAGE
DIFFERENTIAL SIGNALING (LVDS)
INTERFACE CIRCUITS**

CONTENTS		Page
1	SCOPE.....	1
2	NORMATIVE REFERENCES.....	2
3	DEFINITIONS, ABBREVIATIONS, AND SYMBOLS.....	3
3.1	Data signaling rate.....	3
3.2	DTE.....	3
3.3	DCE.....	3
3.4	LVDS.....	3
3.5	Star (*)......	3
4	APPLICABILITY.....	4
4.1	General applicability.....	4
4.2	Data signaling rate.....	5
5	ELECTRICAL CHARACTERISTICS.....	6
5.1	Generator characteristics.....	7
5.1.1	Test termination measurements.....	8
5.1.2	Short-circuit measurements.....	9
5.1.3	Output signal waveform.....	10
5.1.4	Dynamic output signal balance.....	11
5.2	Load characteristics.....	12
5.2.1	Receiver input current-voltage measurements.....	12
5.2.2	Terminating receiver input current-voltage measurements and input impedance measurements.....	13
5.2.3	Receiver input sensitivity measurements.....	15
5.2.4	Media termination.....	17

CONTENTS		Page
5.3	Interconnecting media electrical characteristics.....	18
5.3.1	Cable media.....	18
5.3.1.1	Maximum dc loop resistance.....	18
5.3.1.2	Characteristic impedance.....	18
5.3.1.3	Additional parameters.....	18
5.3.2	PC Board trace media.....	18
5.3.3	Other media.....	18
5.4	System parameters.....	19
5.4.1	Multiple receiver operation.....	19
5.4.2	Failsafe operation.....	20
5.4.3	Total load limit.....	20
6	ENVIRONMENTAL CONSTRAINTS.....	21
7	CIRCUIT PROTECTION.....	22
8	OPTIONAL GROUNDING ARRANGEMENTS.....	23
8.1	Signal common.....	23
8.1.1	Configuration "A".....	23
8.1.2	Configuration "B".....	24
8.2	Shield ground.....	24
ANNEX A (informative).....		25
A.1	Interconnecting cable.....	25
A.1.1	Length.....	25
A.1.2	Typical cable characteristics.....	26
A.1.2.1	Parallel interface cable.....	26
A.1.2.1.1	Parallel cable, physical characteristics.....	26
A.1.2.1.2	Parallel cable, electrical characteristics.....	26
A.1.2.2	Serial interface cable.....	27
A.1.2.2.1	Serial cable, physical characteristics.....	27
A.1.2.2.2	Serial cable, electrical characteristics.....	27
A.1.3	Cable termination.....	27
A.2	Cable length vs. data signaling rate guidelines.....	28
A.3	Co-directional and contra-directional timing information.....	28

CONTENTS		Page
ANNEX B (informative).....		29
B.1 Compatibility with other interface standards.....		29
B.1.1 Generator output levels.....		29
B.1.2 Compatibility with IEEE 1596.3.....		31
B.1.3 Compatibility with other interface standards.....		31
B.2 Power dissipation of generators.....		31
B.3 Related TIA/EIA standards.....		32
B.4 Other related interface standards.....		32

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.