IEC 62228-3

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Integrated circuits – EMC evaluation of transceivers – Part 3: CAN transceivers

Circuits intégrés – Évaluation de la CEM des émetteurs-récepteurs – Partie 3: Émetteurs-récepteurs CAN

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INTEGRATED CIRCUITS – EMC EVALUATION OF TRANSCEIVERS –

Part 3: CAN transceivers

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 62228-3 has been prepared by subcommittee 47A: Integrated circuits, of IEC technical committee 47: Semiconductor devices.

This first edition cancels and replaces the first edition of IEC TS 62228 published in 2007 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC TS 62228:

a) introduction of CAN transceivers with partial networking functionality and CAN transceivers with flexible data rate capability and addition of operation modes and test descriptions in the respective subclauses of the document;
b) introduction of minimal communication network with two CAN transceivers;
c) update of the test requirements and targets in Annex C;
d) addition of Annex D for common mode choke characterization.

The text of this standard is based on the following documents:

CDV	Report on voting
47A/1050/CDV	47A/1069/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62228 series, published under the general *title Integrated circuits – EMC evaluation of transceivers*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTEGRATED CIRCUITS – EMC EVALUATION OF TRANSCEIVERS –

Part 3: CAN transceivers

1 Scope

This part of IEC 62228 specifies test and measurement methods for EMC evaluation of CAN transceiver ICs under network condition. It defines test configurations, test conditions, test signals, failure criteria, test procedures, test setups and test boards. It is applicable for CAN standard transceivers, CAN transceivers with partial networking functionality and CAN transceivers with flexible data rate capability and covers

- the emission of RF disturbances,
- the immunity against RF disturbances,
- the immunity against impulses, and
- the immunity against electrostatic discharges (ESD).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61967-1, *Integrated circuits – Measurement of electromagnetic emissions – Part 1: General conditions and definitions*

IEC 61967-4, *Integrated circuits – Measurement of electromagnetic emissions, 150 kHz to 1 GHz – Part 4: Measurement of conducted emissions – 1 Ω/150 Ω direct coupling method*

IEC 62132-1, *Integrated circuits – Measurement of electromagnetic immunity – Part 1: General conditions and definitions*

IEC 62132-4, *Integrated circuits – Measurement of electromagnetic immunity 150 kHz to 1 GHz – Part 4: Direct RF power injection method*

IEC 62215-3, *Integrated circuits – Measurement of impulse immunity – Part 3: Non-synchronous transient injection method*

IEC 62228-1, *Integrated circuits – EMC evaluation of transceivers – Part 1: General conditions and definitions*

ISO 7637-2, *Road vehicles – Electrical disturbances from conduction and coupling – Part 2: Electrical transient conduction along supply lines only*

ISO 10605, *Road vehicles – Test methods for electrical disturbances from electrostatic discharge*

ISO 11898-1, *Road vehicles – Controller area network (CAN) – Part 1: Data link layer and physical signalling*

ISO 11898-2*, Road vehicles – Controller area network (CAN) – Part 2: High speed medium access unit*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62228-1, IEC 61967-1, IEC 62132-1, as well as the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
global pin
pin that carries a signal or power, which enters or leaves the application board without any active component in between

3.1.2
CAN standard transceiver
transceiver with functionality according to ISO 11898-2 with data rates up to 1 MBit/s and access to RxD and TxD signal

3.1.3
CAN PN transceiver
transceiver with partial networking functionality according to ISO 11898-2 with access to RxD and TxD signal

3.1.4
CAN FD transceiver
transceiver with flexible data rate capability according to ISO 11898-2 with data rates up to 2 MBit/s or 5 Mbit/s and access to RxD and TxD signal

3.1.5
Low Power – standby
transceiver functional operation mode low power with active bus biasing

3.1.6
Low Power – sleep
transceiver functional operation mode low power with inactive bus biasing

3.1.7
Low Power – PN standby
transceiver functional operation mode low power with active bus biasing and frame detection active

3.1.8
Low Power – PN sleep
transceiver functional operation mode low power with inactive bus biasing and frame detection configured

3.1.9
mandatory components, pl
components needed for proper function of IC as specified by the IC manufacturer

3.2 Abbreviated terms

ASIC application specific integrated circuit

CMC common mode choke

DUT device under test

DPI direct RF power injection

ERR error

FD flexible data rate

INH inhibit

CAN controller area network

PCB printed circuit board

PN partial networking

RxD receive data

SBC system base chip

TxD transmit data

WUF wake-up frame

4 General

The intention of this document is to evaluate the EMC performance of CAN transceivers under application conditions in a minimal network.

The evaluation of the EMC characteristics of CAN transceivers shall be performed in functional operation modes under network condition for RF emission, RF immunity and impulse immunity tests and on a single transceiver for electrostatic discharge tests.

The aim of these tests is to determine the EMC performance on dedicated pins of the CAN transceiver which are considered as EMC relevant in the application. For a CAN transceiver IC, these pins are CAN_H, CAN_L, V_{BAT} and WAKE. Depending on the IC and its functionality, other pins as for example V_{CC} should be considered as well.

The test methods used for the EMC characterization are based on the international standards for IC EMC tests and are described in Table 1.