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Incorporating corrigendum April 2011



BSI Standards Publication

Semiconductor devices

Part 1: Time-dependent dielectric breakdown
(TDDB) test for inter-metal layers

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee EPL/47, Semiconductors.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Date	Text affected
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English version

**Semiconductor devices -
Part 1: Time-dependent dielectric breakdown (TDDB) test for inter-metal
layers
(IEC 62374-1:2010)**

Dispositifs à semiconducteurs -
Partie 1: Essai de rupture diélectrique en
fonction du temps (TDDB) pour les
couches intermétalliques
(CEI 62374-1:2010)

Halbleiterbauelemente -
Teil 1: Prüfung auf zeitabhängigen
dielektrischen Durchbruch (TDDB) bei
Isolationsschichten zwischen metallischen
Leiterbahnen
(IEC 62374-1:2010)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 47/2063/FDIS, future edition 1 of IEC 62374-1, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62374-1 on 2010-11-01.

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- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2011-08-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2013-11-01

Endorsement notice

The text of the International Standard IEC 62374-1:2010 was approved by CENELEC as a European Standard without any modification.

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SEMICONDUCTOR DEVICES –

Part 1: Time-dependent dielectric breakdown (TDDB) test for inter-metal layers

1 Scope

This part of IEC 62374 describes a test method, test structure and lifetime estimation method of the time-dependent dielectric breakdown (TDDB) test for inter-metal layers applied in semiconductor devices.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1 leakage current of inter-metal layer

I_{leak}
current through the dielectric layer when a use voltage is applied

2.2 initial leakage current of inter-metal layer

$I_{\text{leak-0}}$
leakage current of inter-metal layer before a stress voltage is applied

2.3 compliance current

I_{comp}
maximum current of the voltage-forcing equipment

NOTE A compliance limit can be specified for a particular test.

2.4 measured leakage current of inter-metal layer

I_{meas}
measured current in constant voltage stress (CVS) test

2.5 breakdown time

t_{bd}
summation of time during which stress voltage is applied to inter-metal layer until failure

NOTE In CVS test, applied stress voltage is interrupted by measuring and assessing repeatedly (see Figure 5).

2.6 dielectric layer thickness

t_{d}
physical thickness of dielectric layer which is pitched between metal lines

2.7 stress voltage

V_{stress}
voltage applied during CVS test