

Semiconductor devices — Mechanical and climatic test methods —

Part 35: Acoustic microscopy for plastic encapsulated electronic components

The European Standard EN 60749-35:2006 has the status of a
British Standard

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National foreword

This British Standard was published by BSI. It is the UK implementation of EN 60749-35:2006. It is identical with IEC 60749-35:2006.

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A list of organizations represented on EPL/47 can be obtained on request to its secretary.

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**Semiconductor devices -
Mechanical and climatic test methods
Part 35: Acoustic microscopy for plastic encapsulated
electronic components
(IEC 60749-35:2006)**

Dispositifs à semiconducteurs -
Méthodes d'essais mécaniques
et climatiques
Partie 35: Microscopie acoustique
pour composants électroniques
à boîtier plastique
(CEI 60749-35:2006)

Halbleiterbauelemente -
Mechanische und klimatische
Prüfverfahren
Teil 35: Ultraschallmikroskopie
für kunststoffverkappte Bauelemente
der Elektronik
(IEC 60749-35:2006)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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CENELEC

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

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Foreword

The text of document 47/1863/FDIS, future edition 1 of IEC 60749-35, prepared by IEC TC 47, Semiconductor devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60749-35 on 2006-09-01.

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- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2009-09-01

Endorsement notice

The text of the International Standard IEC 60749-35:2006 was approved by CENELEC as a European Standard without any modification.

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SEMICONDUCTOR DEVICES – MECHANICAL AND CLIMATIC TEST METHODS –

Part 35: Acoustic microscopy for plastic encapsulated electronic components

1 Scope

This part of IEC 60749 defines the procedures for performing acoustic microscopy on plastic encapsulated electronic components. This standard provides a guide to the use of acoustic microscopy for detecting anomalies (delamination, cracks, mould-compound voids, etc.) reproducibly and non-destructively in plastic packages.

2 Terms and definitions

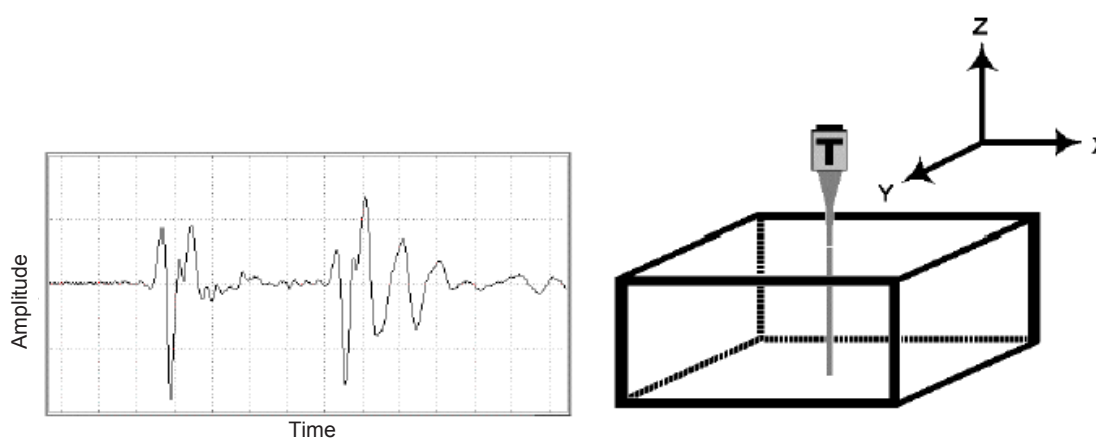
For the purposes of this document, the following terms and definitions apply.

2.1

A-mode

acoustic data collected at the smallest X-Y-Z region defined by the limitations of the given acoustic microscope

NOTE An A-mode display contains amplitude and phase/polarity information as a function of time of flight at a single point in the X-Y plane. In this test method, A-mode is primarily used for focussing the acoustic microscope. See Figure 1.



IEC 1333/06

Figure 1 – Example of A-mode display

2.2

B-mode

acoustic data collected along an X-Z or Y-Z plane versus depth using a reflective acoustic microscope. A B-mode scan contains amplitude and phase/polarity information as a function of time of flight at each point along the scan line

NOTE A B-mode scan furnishes a two-dimensional (cross-sectional) description along a scan line (X or Y). In this test method B-mode is used to provide cross-sectional acoustic information. When scanned, B-mode can be used to track the depth of a defect. See Figure 2.

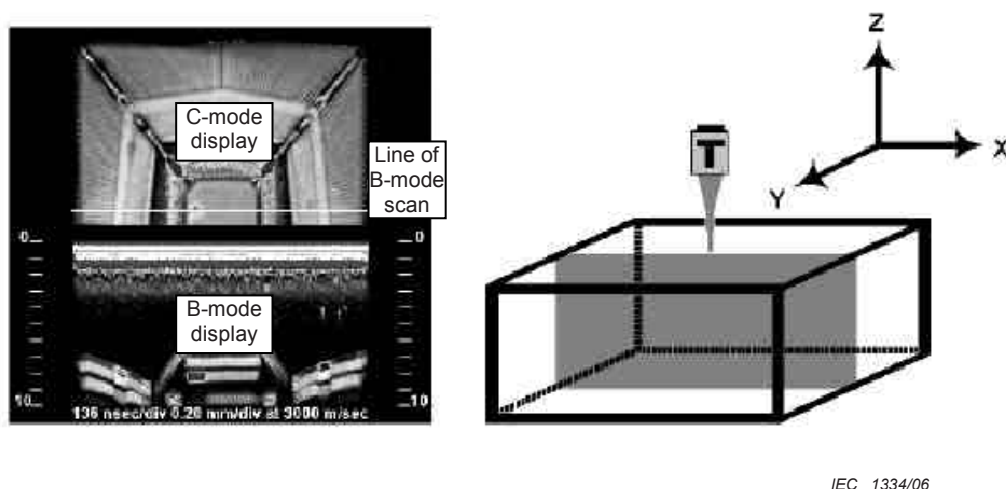


Figure 2 – Example of B-mode display (bottom half of picture on left)

2.3

back-side substrate view area

interface between the encapsulant and the back of the substrate within the outer edges of the substrate surface (refer to Annex A, type IV)

2.4

C-mode

acoustic data collected in an X-Y plane at depth (Z) using a reflective acoustic microscope

NOTE 1 A C-mode scan contains amplitude and phase/polarity information at each point in the scan plane. A C-mode scan furnishes a two-dimensional (area) image of echoes arising from reflections at a particular depth (Z). See Figure 3.

NOTE 2 C-mode is the preferred mode for scanning devices to determine compliance to the criteria of IEC 60749-20.

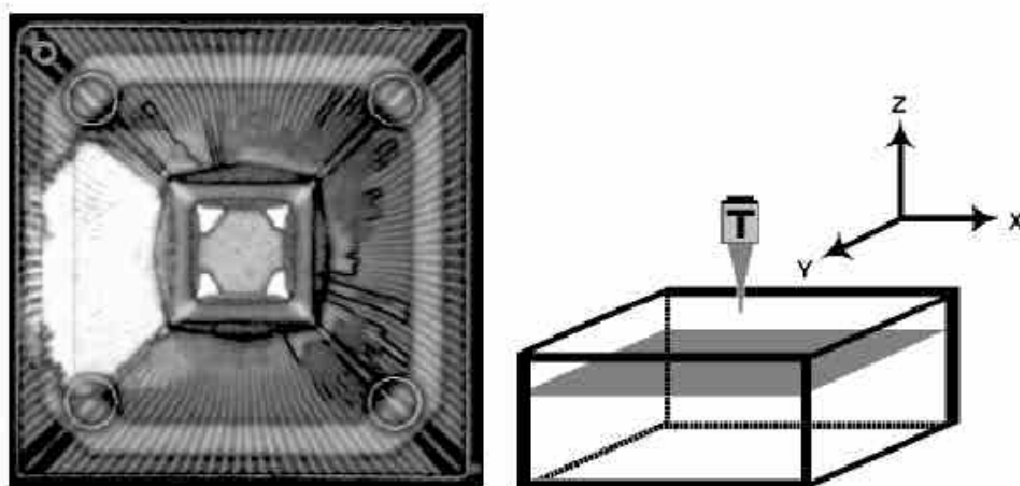
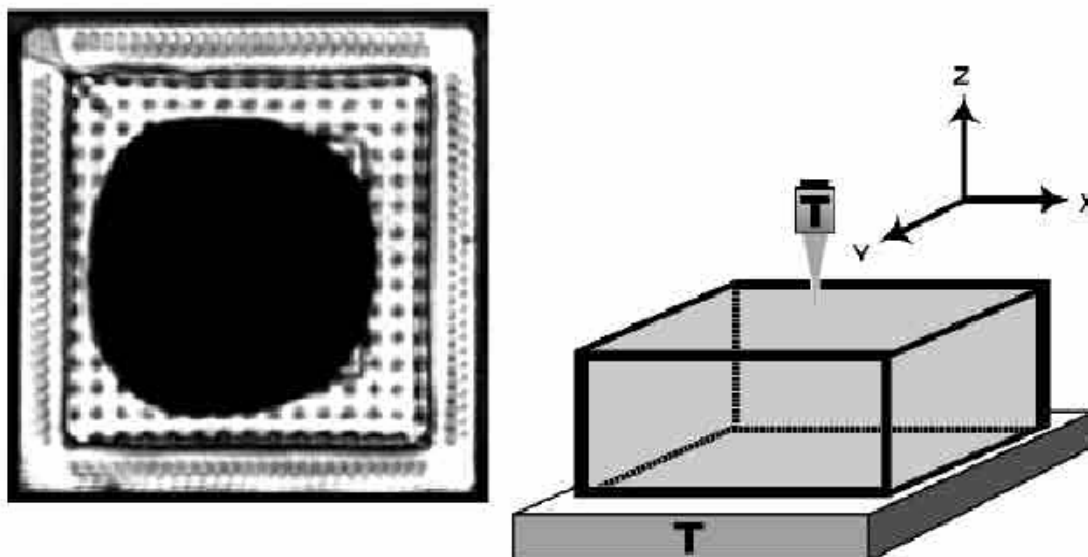


Figure 3 – Example of C-mode display

2.5**through transmission mode**

acoustic data collected in an X-Y plane throughout the depth (Z) using a through transmission acoustic microscope

NOTE A through transmission mode scan contains only amplitude information at each point in the scan plane. A through transmission scan furnishes a two-dimensional (area) image of transmitted ultrasound through the complete thickness/depth (Z) of the sample/component (see Annex C). Through transmission mode is used as a quick scan method to determine large defects in devices prior to investigation using C-mode. See Figure 4.



IEC 1336/06

Figure 4 – Example of through transmission display

2.6**die attach view area**

interface between the die and the die attach adhesive and/or the die attach adhesive and the die attach substrate (refer to Annex A, type II)

2.7**die surface view area**

interface between the encapsulant and the active side of the die (refer to Annex A, type I)

2.8**focal length****FL**

distance in water at which a transducer's spot size is at a minimum

2.9**focus plane**

X-Y plane at a depth (Z), at which the amplitude of the acoustic signal is maximized

2.10**leadframe view area****L/F**

imaged area which extends from the outer L/F edges of the package to the L/F "tips" (wedge bond/stitch bond region of the innermost portion of the L/F) (refer to Annex A, type V)