

Title (en)  
THREE DIMENSIONAL INTEGRATED CIRCUIT

Title (de)  
DREIDIMENSIONALE INTEGRIERTE SCHALTUNG

Title (fr)  
CIRCUIT INTÉGRÉ TRIDIMENSIONNEL

Publication  
**EP 3718134 A1 20201007 (EN)**

Application  
**EP 18883845 A 20181130**

Priority  
• US 201715829442 A 20171201  
• US 201815899622 A 20180220  
• US 201816057747 A 20180807  
• US 2018063328 W 20181130

Abstract (en)  
[origin: WO2019108945A1] Implanting ions to form a cleave layer in a semiconductor device causes damage to sensitive materials such as high-K dielectrics. In a process for forming a cleave layer and repairing damage caused by ion implantation, ions are implanted through a circuit layer of a substrate to form a cleave plane. The substrate is exposed to a hydrogen gas mixture for a first time at a first temperature to repair damage caused by the implanted ions. A cleaving process may then be performed, and the cleaved substrate may be stacked in a 3DIC structure. A stacked device is formed by bonding a die to a first substrate, the die having a smaller width than a width of the first substrate, depositing a planarization material over the die, planarizing the planarization material to form a planarized upper surface, and stacking a third substrate on the planarized upper surface.

IPC 8 full level  
**H01L 21/822** (2006.01)

CPC (source: EP KR)  
**H01L 21/187** (2013.01 - KR); **H01L 21/2007** (2013.01 - EP); **H01L 21/6835** (2013.01 - EP KR); **H01L 21/8221** (2013.01 - KR); **H01L 23/473** (2013.01 - EP KR); **H01L 23/481** (2013.01 - EP KR); **H01L 23/50** (2013.01 - KR); **H01L 24/18** (2013.01 - KR); **H01L 24/80** (2013.01 - EP KR); **H01L 24/83** (2013.01 - EP KR); **H01L 24/94** (2013.01 - EP KR); **H01L 25/0657** (2013.01 - EP KR); **H01L 25/074** (2013.01 - EP KR); **H01L 25/18** (2013.01 - EP KR); **H01L 25/50** (2013.01 - EP); **H01L 21/7806** (2013.01 - EP); **H01L 21/8221** (2013.01 - EP); **H01L 24/05** (2013.01 - EP); **H01L 24/08** (2013.01 - EP); **H01L 24/29** (2013.01 - EP); **H01L 24/32** (2013.01 - EP); **H01L 2221/68304** (2013.01 - EP); **H01L 2221/68368** (2013.01 - EP); **H01L 2224/0557** (2013.01 - EP); **H01L 2224/08145** (2013.01 - EP); **H01L 2224/13101** (2013.01 - EP); **H01L 2224/29186** (2013.01 - EP); **H01L 2224/32145** (2013.01 - EP); **H01L 2224/80006** (2013.01 - EP); **H01L 2224/80895** (2013.01 - EP); **H01L 2224/80896** (2013.01 - EP); **H01L 2224/83005** (2013.01 - EP); **H01L 2224/83896** (2013.01 - EP); **H01L 2924/14** (2013.01 - EP)

Designated contracting state (EPC)  
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)  
BA ME

DOCDB simple family (publication)  
**WO 2019108945 A1 20190606**; CN 111684581 A 20200918; EP 3718134 A1 20201007; EP 3718134 A4 20210901; JP 2021506106 A 20210218; JP 7328221 B2 20230816; KR 102578576 B1 20230915; KR 20200099156 A 20200821; TW 201933585 A 20190816; TW I716864 B 20210121; TW M588362 U 20191221

DOCDB simple family (application)  
**US 2018063328 W 20181130**; CN 201880088450 A 20181130; EP 18883845 A 20181130; JP 2020529407 A 20181130; KR 20207019044 A 20181130; TW 107216360 U 20181130; TW 108115449 A 20181130