

Title (en)  
LASER MACHINING METHOD

Title (de)  
LASERBEARBEITUNGSVERFAHREN

Title (fr)  
PROCEDE DE TRAITEMENT LASER

Publication  
**EP 1480780 A1 20041201 (DE)**

Application  
**EP 03709643 A 20030224**

Priority  
• DE 0300579 W 20030224  
• DE 10209617 A 20020305

Abstract (en)  
[origin: WO03074224A1] The invention relates to a laser machining method for rapidly drilling holes in dielectric substrates (6). A Q-switched CO<sub>2</sub> laser is used as a laser light source whereby generating a pulsed laser beam (4) with a pulse repetition frequency greater 50 kHz, with pulse durations shorter than 200 ns and with an energy per laser pulse of at least 10<sup>-4</sup> joules. The laser beam (4) is directed onto substrate (6) to be machined by means of a diverting unit. The cited parameters that characterize the laser beam (4) ensure both a high production rate of drilled holes (5) as well as a high hole quality. For example, 500 holes per second can be drilled in a 0.4 mm-thick LCP substrate, whereby the shape of the drilled holes is approximately cylindrical or conical. The high production rate and the simultaneously high hole quality are a consequence of the selected wavelength, the short pulse duration, the high repetition rate, and of the pulse energy which is high compared to that of conventional laser machining devices used for manufacturing electronics.

IPC 1-7  
**B23K 26/38**

IPC 8 full level  
**B23K 26/0622** (2014.01); **B23K 26/386** (2014.01); **H05K 3/00** (2006.01); **B23K 101/36** (2006.01)

CPC (source: EP KR US)  
**B23K 26/0624** (2015.10 - EP US); **B23K 26/38** (2013.01 - KR); **B23K 26/389** (2015.10 - EP US); **B23K 2101/42** (2018.07 - EP US); **H05K 3/0032** (2013.01 - EP US)

Citation (search report)  
See references of WO 03074224A1

Cited by  
CN101829850A

Designated contracting state (EPC)  
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT SE SI SK TR

DOCDB simple family (publication)  
**WO 03074224 A1 20030912**; CN 1328001 C 20070725; CN 1638913 A 20050713; DE 10209617 C1 20030807; EP 1480780 A1 20041201; JP 2005518945 A 20050630; KR 20040083546 A 20041002; US 2003168435 A1 20030911; US 6833528 B2 20041221

DOCDB simple family (application)  
**DE 0300579 W 20030224**; CN 03805224 A 20030224; DE 10209617 A 20020305; EP 03709643 A 20030224; JP 2003572720 A 20030224; KR 20047013897 A 20030224; US 37888403 A 20030305