where TIS is, where heat goes away

薄绝铝®

Thinsulation®

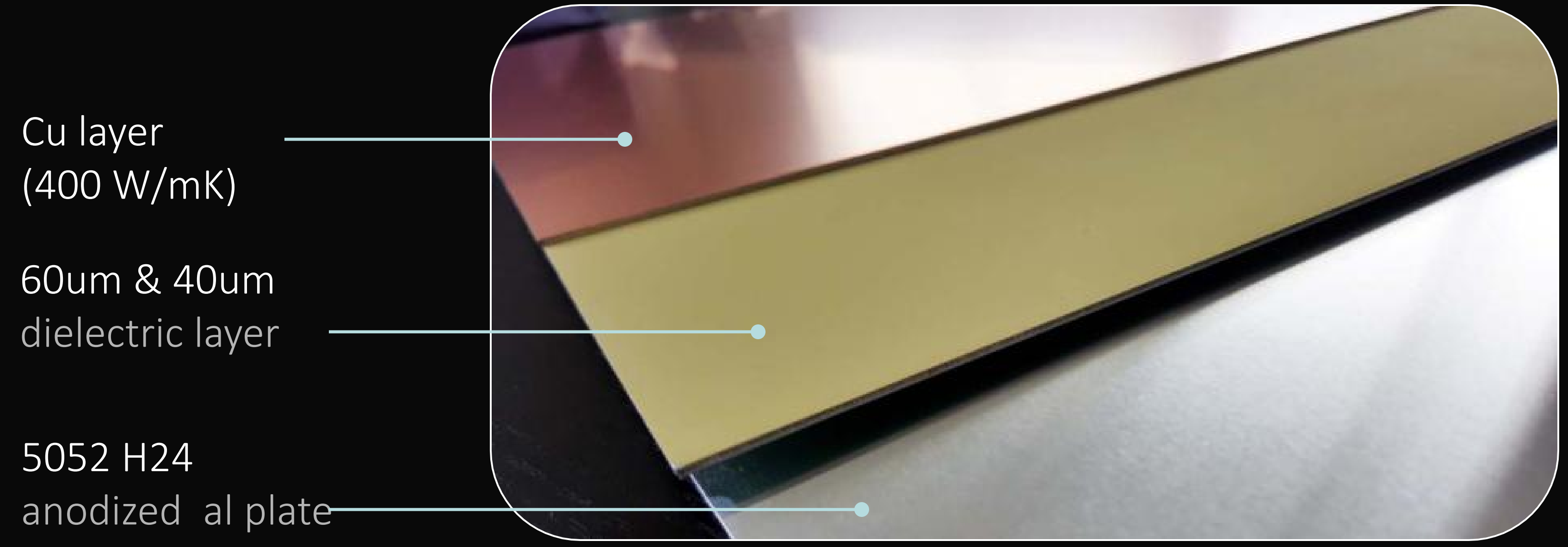
thinner、*faster*

releasing heat struggle of high power lighting device

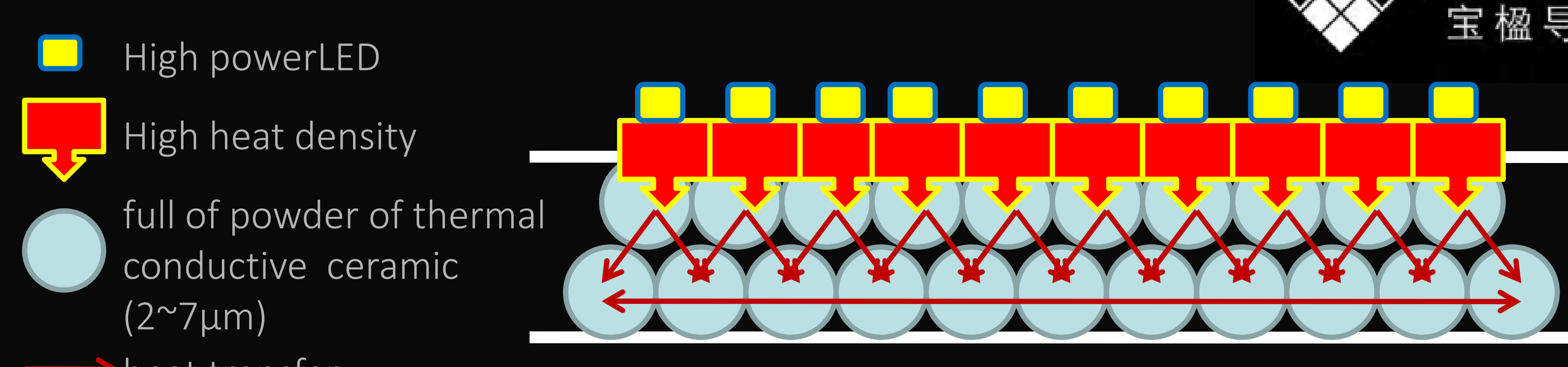
The key to LEDs delivering on their promise of longer life and more efficient electrical performance is in controlling the heat inside the LED chip package. The most effective way to do that is with substrate materials that dissipate heat conductively through the package while providing lower thermal impedance, such as Powerin's advanced thermal substrate- Thinsolution ® (TIS), that will transform solid-state lighting designs and the lighting industry itself.

The essence of less than 60 um

Thin technology with Thick engineering accumulation

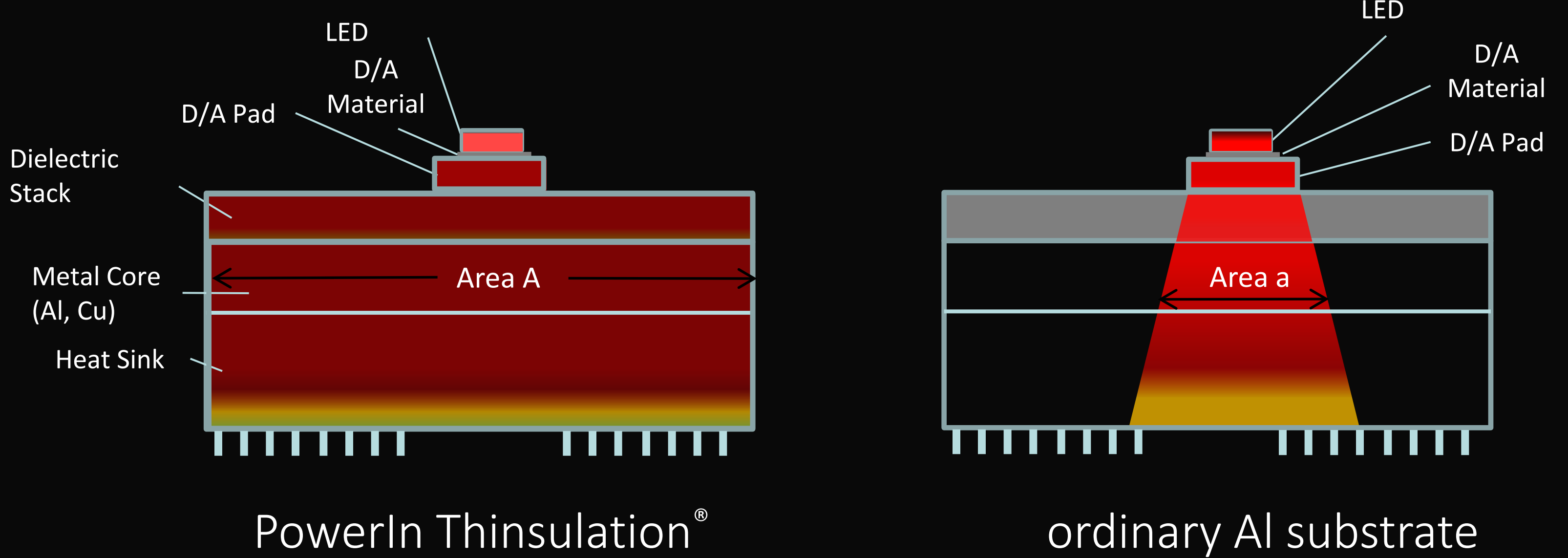


TIS is a revolutionary interconnect technology based on PowerIn's proprietary thin insulation layer that also possesses extra-low thermal impedance. TIS lower the thickness of dielectric layer(35um~60um), compared to conventional MCPCB's(75~120um), without sacrificing reliability. This thin dielectric layer allows for heat to pass readily while accommodating smaller packages. The dielectric is placed between the copper layer that fabricators convert to pads to mount the LED chip and the aluminum heat sink.



very thin, very much

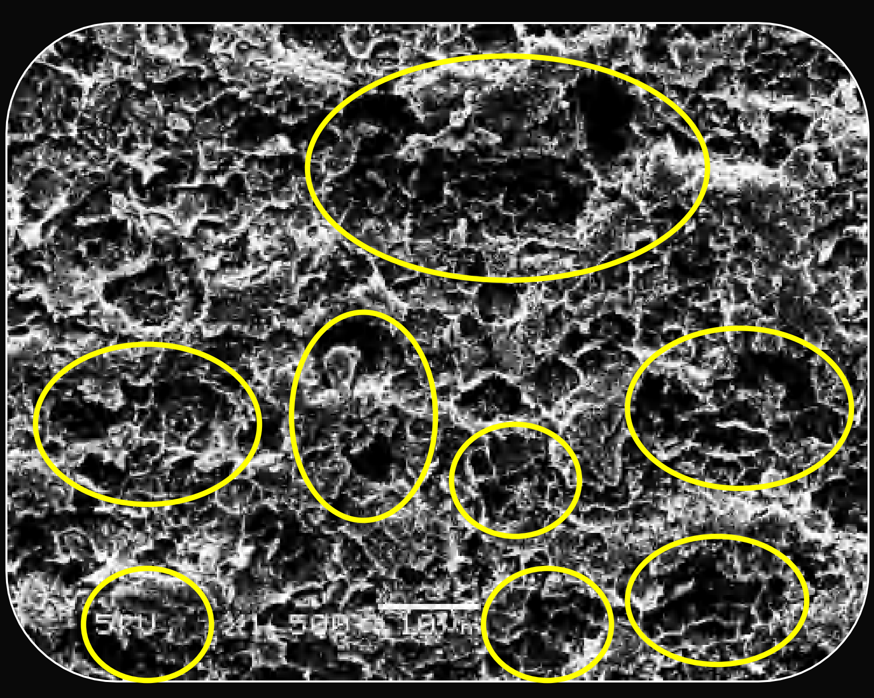
heat transfer could be very easy



PowerIn Thinsulation®

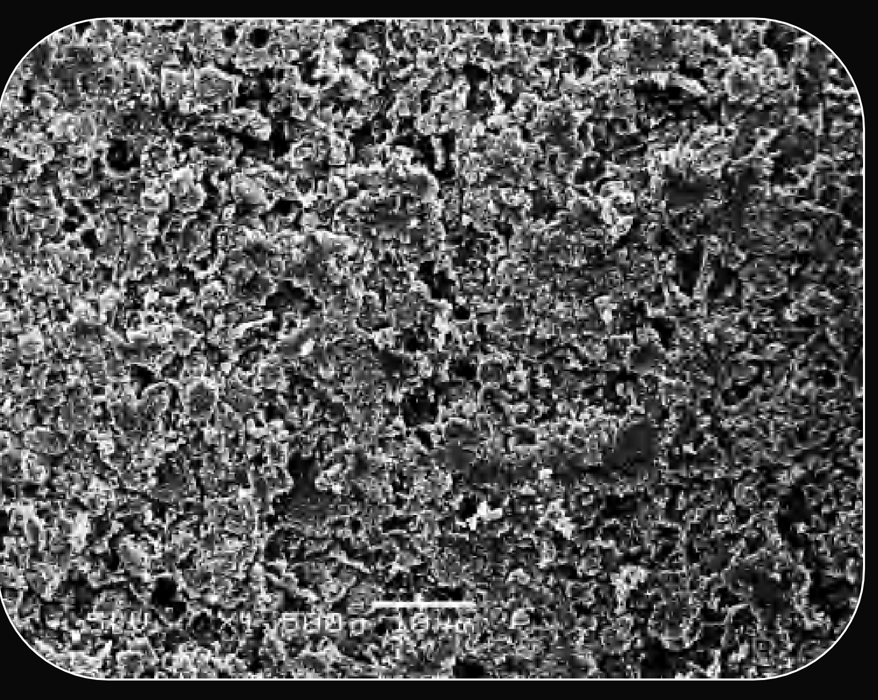
ordinary Al substrate

magnify 1,500 X （SEM）



ordinary MCPCB dielectric layer

1. shows mostly epoxy within the layer → high impedance
2. less thermal conductive powder

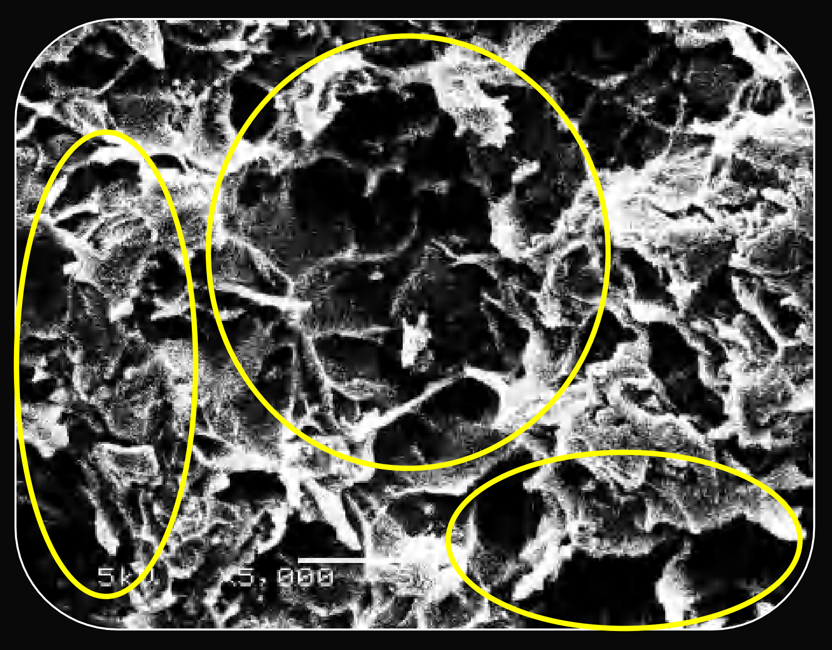


TIS dielectric layer

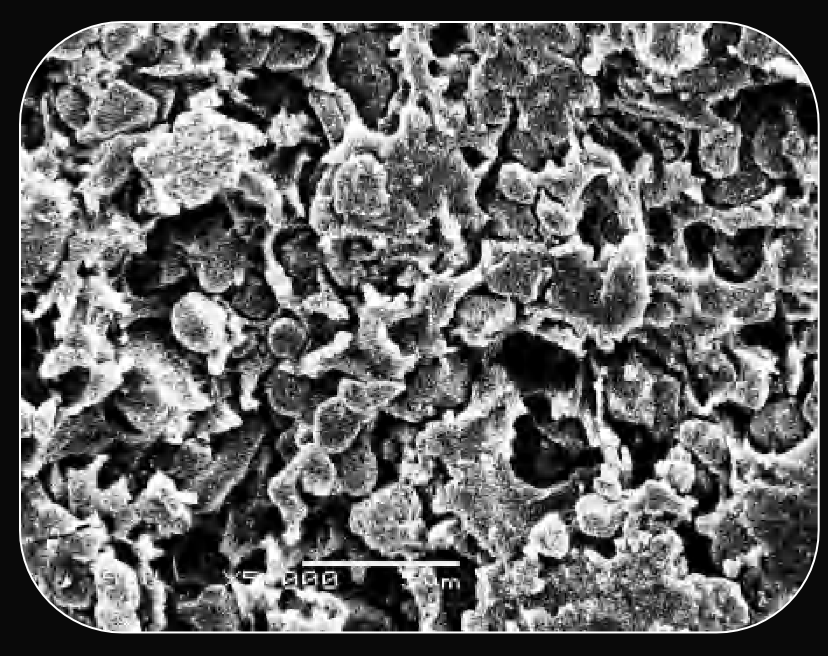
- fill in much of thermal conductive powder(white powder) with uniform dispersion

5,000 x （SEM）

BIG difference between dielectric technology



ordinary MCPCB dielectric layer



TIS dielectric layer

- 80um ~ 120 um VS. 40 ~ 60um
  (TIS, much lower thermal impedance)
- TIS thermal diffusion is faster since uniform dispersion of thermal conductive powder

Product No. & Advantage

lighting lives longer

TIS 40： extra-low rth

rth： 0.35℃cm²/W； BDV： AC 2KV

TIS 50： low rth& low cost

rth： 0.42℃cm²/W； BDV： AC 2KV

TIS 60： high reliability with low rth

rth： 0.46℃cm²/W； BDV： AC 3KV

Thinsulation® Spec

Substrate rth
0.42 (TIS 50)
0.35 (TIS 40)
℃ cm^2/ W

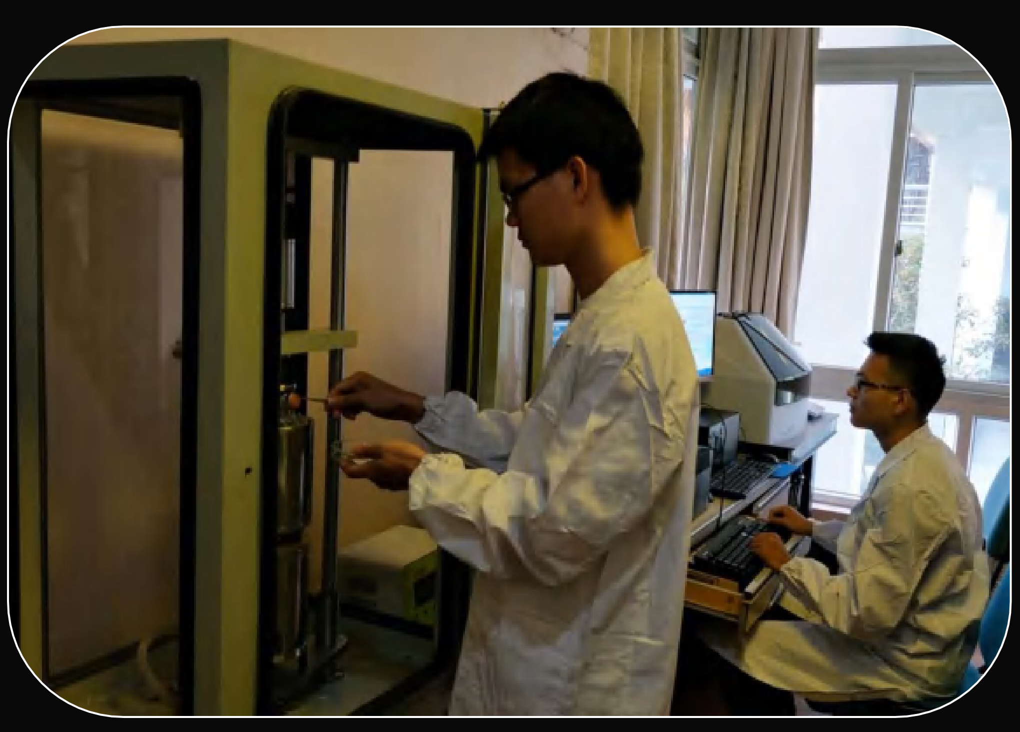
peeling
1.5 up
kgf/cm

BDV
AC 2 KV
(TIS 40&50)
AC 3 KV
(TIS 60)

Tg
135
℃

soldering
3次
288℃/10秒

UL 94-v0
RoHS



rth tester ： DRL-III （ ASTM D5470)

for details of spec, pls contact with powerIn

No.	TIS 40	TIS 50	TIS 60
Advantage	Extra-low rth/high C/p 0.35 ℃cm2/W	low rth/low cost 0.42 ℃cm2/W	high BDV/low rth 0.46 ℃cm2/W AC 3000V
application	High power flip chip CoB	mid to high power flip chip CoB	mid to high power DoB
application	High power CSP	mid to high power CSP	High voltage linear constant current COB
application	high current density lighting emitter	high powder lighting emitter	outdoor lighting

Thinsulation®

LED TV backlight

- TIS 50 for mid to high current density lighting emitters

- low rth required

MP with customized capacity

PowerIn
宝楹导热基板

Cu thickness (mm, Oz)	Aluminum alloy	Al thickness (mm)	Substrate dimension (mm)
0.035mm (1 oz.) (customized for other thickness)	3003 5052 (anodized Al)	1.0, 1.5, 2.0 (other thickness is customized)	1200*1000 (customized is allowed)

rth testing report

报告编号：12950

导热系数、热阻

试验样品

尺寸为 25.4mm×25.4mm 的铝基覆铜板每种型号各 1 块。

参考文件

ASTM D 5470 热导性电绝缘材料的热传输特性的标准试验方法

试验方法

使用导热系数量测仪测定试样的导热系数和热阻。
其中整板 R 热阻=整板热阻/样品面积。

试验结果

样品经以上试验方法检验，具体检验结果见所附试验数据表。

导热系数、热阻

样品名称		铝基覆铜板			工作号		12950		
试验日期		2016-05-24			试验环境		23℃，50%RH		
样品编号	样品型号	整板厚度 (mm)	整板热阻 (K·cm²/W)	整板导热系数 (W/m·K)	整板R热阻 (℃/W)	绝缘层厚度 (mm)	绝缘层热阻 (K·cm²/W)	绝缘层导热系数 (W/m·K)	铜厚 (μm)
12950-1-1	1.6mm/(60+13)μm/35μm	1.490	0.40	37.47	0.06	0.063	0.33	1.92	28.5
12950-1-2	1.6mm/(50+13)μm/35μm	1.380	0.39	35.29	0.06	0.051	0.32	1.57	28.7

检测报告

报告编号：SCL01I043857001C　　　　第 3 页 共 3 页

测试项目：导热系数

（1）测试设备：

设备名称	型　号	设备编号	校准有效期
界面材料热阻及热传导系数量测装置	LW-9389	TTF20110218	------

（2）环境条件：

温度：23.5℃；　　湿度：54%RH

（3）参考标准： ASTM D5470-12 用于薄导热固态电绝缘材料热传导性质测试的方法

CPCA 4105-2010 印制电路用金属基覆铜箔层压板

（4）测试条件：

测试样品	热极温度/℃	冷极温度/℃	绝缘层厚度/mm	热量/W	压力/Psi
A43857001	80.01	72.21	0.060	86.65	80.11

备注： 1）绝缘层厚度客户提供；
2）绝缘层厚度=阳极氧化膜+环氧树脂。

（5）测试结果：

测试样品	热阻（m²K/W）	导热系数（W/m·K）
A43857001	0.00004	1.496

*** 报告结束 ***

Testing company： MICROTEK

Testing company ： CTI

worldwide patent

中國	
●	高導熱效率電路板（一）, Pub. No.: CN1941346A; China: 高導熱效率電路板（二）, Pub. No.: CN1941347A
台灣	
● ● ● ● ● ● ● ●	高導熱性印刷電路板, Patent No.: I255161 具高導熱性印刷電路板, Patent No.: I263475 用於承載電子元件之載板結構及其製作方法；Application No: 097112351 印刷電路板之散熱方法及其裝置（一）；Application No: 095129328 印刷電路板之散熱方法及其裝置（二）；Application No: 096147421 具高散熱性的發光二極體裝置；Application No: 096108157 高導熱性電路載板及其製作方法；Application No: 097114999 高散熱封裝載板; Application No: 096136526
美國	
● ● ● ● ●	Methods and Devices for Cooling Printed Circuit Boards； Application No: US 11/610,313 Methods and Devices For Cooling Electronic Circuitry； Application No: US 11/706,876 Support substrate structure for supporting electronic component thereon and method for fabricating the same: Application No: US 12/219,708 Circuit Board with high thermal conductivity and method for manufacturing the same: Application No: US 12/222,199 Methods and devices for cooling printed circuit boards ； Pub. No: US 2007/0035930 A1
日本	
●	高導熱效率電路板（一）, Pub. No.: 2007-180439; Japan: 高導熱效率電路板（二）, Pub. No.: 2007-180441
韓國	
● ●	Support substrate structure for supporting electronic component thereon and method for fabricating the same ; Application No: 10-2009-0003721

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