

## **Test Report**

美麗微半導體股份有限公司 FORMOSA MICROSEMI CO., LTD. 新北市土城區中央路三段208號5樓

5F., NO. 208, SEC. 3, ZHONGYANG RD., TUCHENG DIST., NEW TAIPEI CITY 23680, TAIWAN

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以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as):

號碼(No.): CE/2016/56431 日期(Date): 2016/06/06

送樣廠商(Sample Submitted Bv) 美麗微半導體股份有限公司 (FORMOSA MICROSEMI CO., LTD.)

樣品名稱(Sample Description) BRIDGE RECTIFIERS PRODUCTS(各項橋式整流產品)/ MOLDED TYPE(成型類)

樣品型號(Style/Item No.) LMDS (TBS) / LMBS / MDB / MDS (TO-269AA) / MDS-1 / MDS-6 / MBLS / DF /

DFS / DB / DBS / MDLS (MBF) / KBP / KBL / KBU / GBP / GBL / GBJ / GBU /

4GBJ / QFNB

其他(Other Info.) 測試部位(PART NAME)No. 3:鉛含量適用ROHS排外條款(1) 7A 高熔點銲錫中的鉛(例

> 如鉛含量≥85 %合金中的鉛),使用於產品中的高溫焊錫膏及焊片 SN5 PB92.5 AG2.5;(2)7(C)-I 含鉛之玻璃或陶瓷的電器和電子元件,介電陶瓷電容器除外例

如高壓電子裝置,或玻璃或陶瓷基複合材料,使用於產品中的GLASS

PASSIVATED(GPP)晶粒。

PART NAME NO. 3: LEAD CONTENTS IS ROHS EXEMPTION (1) 7(A) LEAD IN HIGH MELTING TEMPERATURE TYPE SOLDERS (I.E. LEAD-BASED ALLOYS CONTAINING 85% BY WEIGHT OR MORE LEAD, ); (2) 7(C)-I LEAD IN GLASS OF CATHODE RAY TUBES,

ELECTRONIC COMPONENTS AND FLUORESCENT TUBES.

收件日期(Sample Receiving Date) 2016/05/31

2016/05/31 TO 2016/06/06 測試期間(Testing Period)

請見下一頁 (Please refer to next pages). 測試結果(Test Results)



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#### 測試結果(Test Results)

測試部位(PART NAME)No.1 : 銀色金屬腳鍍層(PLATING LAYER OF SILVER COLORED METAL PIN) 測試部位(PART NAME)No.2 : 銀色金屬腳底材 (BASE MATERIAL OF SILVER COLORED METAL PIN)

測試部位(PART NAME)No.3 : 整體混測 (MIXED ALL PARTS)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限值 (MDL)	結果(Result)		
				No. 1	No. 2	No. 3
鎬 / Cadmium (Cd)	mg/kg	酸洗脫鍍層,參考IEC 62321-5 (2013) ,以感應耦合電漿原子發射光譜儀檢 測. / IEC 62321-5 (2013) application of modified digestion by surface etching and performed by ICP-AES.	2	n. d.		
	mg/kg	参考IEC 62321-5 (2013),以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321-5 (2013) and performed by ICP-AES.	2		n. d.	n. d.
鉛 / Lead (Pb)	mg/kg	酸洗脫鍍層,參考IEC 62321-5 (2013) ,以感應耦合電漿原子發射光譜儀檢 測. / IEC 62321-5 (2013) application of modified digestion by surface etching and performed by ICP-AES.	2	80. 4		
	mg/kg	參考IEC 62321-5 (2013),以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321-5 (2013) and performed by ICP-AES.	2		23. 2	4740

號碼(No.): CE/2016/56431 日期(Date): 2016/06/06

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號碼(No.): CE/2016/56431 日期(Date): 2016/06/06

方法偵測 結果 (Result) 單位 測試方法 測試項目 極限值 (Test Items) (Unit) (Method) (MDL) No. 1 No. 2 No. 3 汞 / Mercury (Hg) 酸洗脫鍍層,參考IEC 62321-4 (2013) mg/kg n. d. , 以感應耦合電漿原子發射光譜儀檢 測. / IEC 62321-4 (2013) application of modified digestion by surface etching and performed by ICP-AES. 參考IEC 62321-4 (2013),以感應耦合 mg/kg n. d. n. d. 電漿原子發射光譜儀檢測. / With reference to IEC 62321-4 (2013) and performed by ICP-AES. 參考IEC 62321-7-1 (2015),以UV-VIS 六價鉻 / Hexavalent Chromium 0.10 µg/cm<sup>2</sup> n.d. n. d. Cr(VI)(#2)檢測. / With reference to IEC 62321-7-1 (2015) and performed by UV-VIS. 六價鉻 / Hexavalent Chromium Cr(VI) 參考IEC 62321 (2008),以UV-VIS檢 n.d. mg/kg 測. / With reference to IEC 62321 (2008) and performed by UV-VIS. 鎳 / Nickel (Ni) 參考US EPA 3050B (1996),以感應耦 13.4 mg/kg 合電漿原子發射光譜儀檢測. / With reference to US EPA 3050B (1996). Analysis was performed by ICP-AES. 參考US EPA 3052 (1996),以感應耦合 銻 / Antimony (Sb) mg/kg n. d. 電漿原子發射光譜儀檢測. / With reference to US EPA 3052 (1996). Analysis was performed by ICP-AES. 鉞 / Beryllium (Be) 參考US EPA 3052 (1996),以感應耦合 mg/kg n. d. 電漿原子發射光譜儀檢測. / With reference to US EPA 3052 (1996). Analysis was performed by ICP-AES.

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果 (Result)		
				No. 1	No. 2	No. 3
砷 / Arsenic (As)	mg/kg	參考US EPA 3052 (1996),以感應耦合電漿原子發射光譜儀檢測. / With reference to US EPA 3052 (1996). Analysis was performed by ICP-AES.	2		-	n. d.
全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	$\mu\mathrm{g/m^2}$	参考US EPA 3550C (2007),以液相層析/質譜儀檢測. / With reference to US EPA 3550C (2007). Analysis was performed by LC/MS.	1	n. d.		
全氟辛酸 / PFOA (CAS No.: 335-67-1)	$\mu\mathrm{g/m^2}$	参考US EPA 3550C (2007),以液相層析/質譜儀檢測. / With reference to US EPA 3550C (2007). Analysis was performed by LC/MS.	1	n. d.		
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	·參考IEC 62321-8/CD (2013),以氣相 層析儀/質譜儀檢測. / With reference to IEC 62321-8/CD (2013). Analysis was performed by GC/MS.	50			n. d.
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg		50			n. d.
鄰苯二甲酸二 (2-乙基己基)酯 / DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg		50			n. d.
鄰苯二甲酸二異丁酯 / DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg		50			n. d.
鄰苯二甲酸二異癸酯 / DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)	mg/kg		50			n. d.
鄰苯二甲酸二異壬酯 / DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0)	mg/kg		50			n. d.
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg		50			n. d.

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號碼(No.): CE/2016/56431

方法偵測 單位 結果 (Result) 測試項目 測試方法 極限值 (Test Items) (Unit) (Method) (MDL) No. 2 No. 1 No. 3 六溴環十二烷及所有主要被辨別出的異構 參考IEC 62321 (2008),以氣相層析/ mg/kg n. d. 物 / Hexabromocyclododecane (HBCDD) 質譜儀檢測. / With reference to and all major diastereoisomers IEC 62321 (2008). Analysis was identified ( $\alpha$  - HBCDD,  $\beta$  - HBCDD, performed by GC/MS.  $\gamma$  - HBCDD) (CAS No.: 25637-99-4 and 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8)) 多溴聯苯總和 / Sum of PBBs ---\_\_\_ mg/kg n. d. 一溴聯苯 / Monobromobiphenyl mg/kg 5 n. d. 二溴聯苯 / Dibromobiphenyl 5 mg/kg n. d. 三溴聯苯 / Tribromobiphenyl 5 mg/kg n. d. 四溴聯苯 / Tetrabromobiphenyl 5 n. d. mg/kg 五溴聯苯 / Pentabromobiphenyl 5 n. d. mg/kg 六溴聯苯 / Hexabromobiphenyl 5 --mg/kg n. d. 七溴聯苯 / Heptabromobiphenvl 5 n. d. mg/kg 八溴聯苯 / Octabromobiphenyl 5 \_\_\_ mg/kg n. d. 九溴聯苯 / Nonabromobiphenyl 5 n. d. mg/kg 參考IEC 62321-6 (2015),以氣相層析 十溴聯苯 / Decabromobiphenvl 5 mg/kg /質譜儀檢測. / With reference to n. d. 多溴聯苯醚總和 / Sum of PBDEs IEC 62321-6 (2015) and performed mg/kg n. d. by GC/MS. 一溴聯苯醚 / Monobromodiphenyl ether mg/kg 5 n. d. 二溴聯苯醚 / Dibromodiphenyl ether 5 \_\_\_ n. d. mg/kg 5 三溴聯苯醚 / Tribromodiphenyl ether mg/kg n. d. 四溴聯苯醚 Tetrabromodiphenyl ether 5 mg/kg n. d. 五溴聯苯醚 / Pentabromodiphenyl ether 5 mg/kg n. d. 六溴聯苯醚 5 Hexabromodiphenyl ether \_\_\_ \_\_\_ n. d. mg/kg 七溴聯苯醚 / Heptabromodiphenyl ether 5 mg/kg n. d. 5 八溴聯苯醚 / Octabromodiphenyl ether mg/kg \_\_\_ n. d. 九溴聯苯醚 / Nonabromodiphenyl ether 5 mg/kg n. d.

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5

mg/kg

十溴聯苯醚 / Decabromodiphenyl ether

n. d.



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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測 極限値 (MDL)	結果(Result)		
				No. 1	No. 2	No. 3
鹵素 / Halogen						
鹵素(氟)/ Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	参考BS EN 14582 (2007),以離子層析 儀分析. / With reference to BS EN 14582 (2007). Analysis was performed by IC.	50			n. d.
鹵素(氯)/ Halogen-Chlorine(C1) (CAS No.: 22537-15-1)	mg/kg		50			n. d.
鹵素(溴)/ Halogen-Bromine (Br) (CAS No.: 10097-32-2)	0 0		50			n. d.
鹵素(碘)/ Halogen-Iodine(I)(CAS No.: 14362-44-8)	mg/kg		50			n. d.

日期(Date): 2016/06/06

#### 備註(Note):

- 1. mg/kg = ppm ; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected (未檢出)
- 3. MDL = Method Detection Limit (方法偵測極限值)
- 4. "-" = Not Regulated (無規格值)
- 5. "---" = Not Conducted (未測項目)

a. 當六價鉻結果大於0.13 µg/cm²,表示樣品表層含有六價鉻. / The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 μg/cm². The sample coating is considered to contain Cr(VI). b. 當六價鉻結果為n.d. (濃度小於0.10 μg/cm²),表示表層不含六價鉻. / The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 μg/cm<sup>2</sup>). The coating is considered a non-Cr(VI) based coating c. 當六價鉻結果介於 0.10 及 0.13 μg/cm<sup>2</sup> 時,無法確定塗層是否含有六價鉻. / The result between 0.10 μg/cm<sup>2</sup> and 0.13 µg/cm<sup>2</sup> is considered to be inconclusive - unavoidable coating variations may influence the determination.

7. For No. 3: 樣品的測試是基於申請人要求混合測試,報告中的混合測試結果不代表其中個別單一材質的含量. (The samples was/were analyzed on behalf of the applicant as mixing sample in one testing. The above results was/were only given as the informality value.)



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#### PFOS参考資訊(Reference Information): 持久性有機污染物 POPs - (EU) 757/2010

PFOS濃度在物質或製備中不得超過0.001%(10ppm),在半成品、成品或零部件中不得超過0.1%(1000ppm),在紡織品或塗層 材料中不得超過lug/m2。

(Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above  $1\mu g/m^2$ .)

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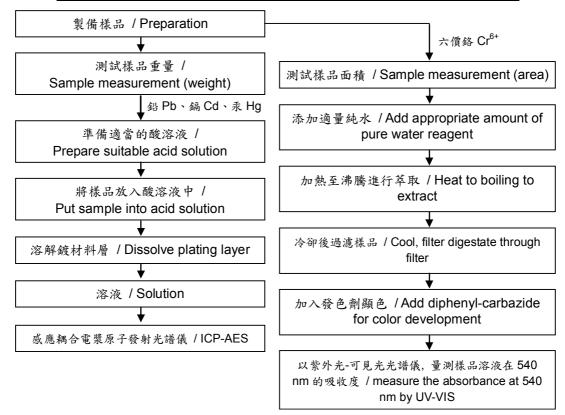
測試部位(PART NAME)No.1

根據以下的流程圖之條件,樣品之外部鍍層已完全溶解。(六價鉻測試方法除外)/The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> test method excluded)

號碼(No.): CE/2016/56431 日期(Date): 2016/06/06

- 測試人員:王志瑋 / Technician: JR Wang
- 測試負責人:張啟興 / Supervisor: Troy Chang

#### 鍍層重金屬測試流程圖 / Flow Chart of Stripping method for metal analysis





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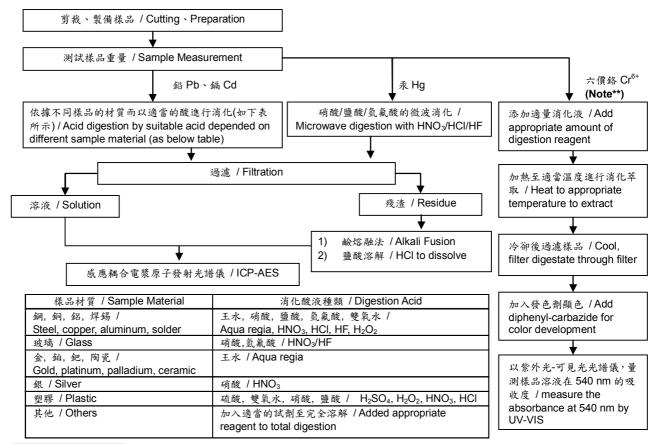
測試部位(PART NAME)No. 2,3

根據以下的流程圖之條件,樣品已完全溶解。(六價鉻測試方法除外)

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr<sup>6+</sup> test method excluded)

日期(Date): 2016/06/06

- 測試人員: 王志瑋 / Technician: JR Wang
- 測試負責人:張啟興 / Supervisor: Troy Chang



#### Note\*\* (For IEC 62321)

- (1) 針對非金屬材料加入鹼性消化液,加熱至 90~95℃ 萃取. / For non-metallic material, add alkaline digestion reagent and heat to 90~95℃
- (2) 針對金屬材料加入純水,加熱至沸騰萃取. / For metallic material, add pure water and heat to boiling.



## **Test Report**

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5F., NO. 208, SEC. 3, ZHONGYANG RD., TUCHENG DIST., NEW TAIPEI CITY 23680, TAIWAN

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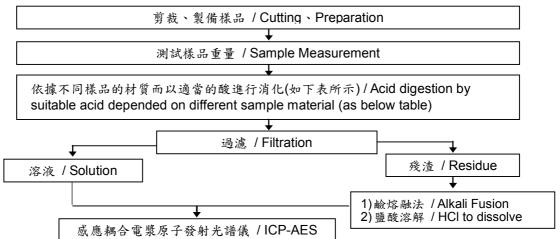
根據以下的流程圖之條件,樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.

號碼(No.): CE/2016/56431 日期(Date): 2016/06/06

測試人員:王志瑋 / Technician: JR Wang

測試負責人:張啟興 / Supervisor: Troy Chang

#### 元素以 ICP-AES 分析的消化流程圖 (Flow Chart of digestion for the elements analysis performed by ICP-AES)



鋼,銅,鋁,焊錫 / Steel, copper, aluminum, solder	王水,硝酸,鹽酸,氫氟酸,雙氧水 /
	Aqua regia, HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub>
玻璃 / Glass	硝酸,氫氟酸 / HNO <sub>3</sub> /HF
金,鉑,鈀,陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO <sub>3</sub>
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HNO <sub>3</sub> , HCI
其他 / Others	加入適當的試劑至完全溶解 / Added appropriate reagent to total digestion



## **Test Report**

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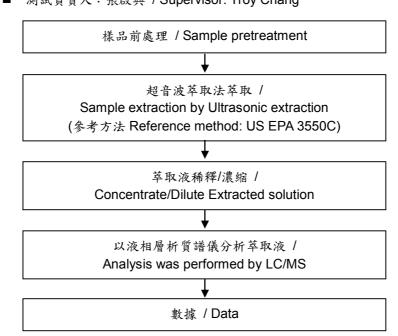


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#### 全氟辛酸/全氟辛烷磺酸分析流程圖 / Analytical flow chart - PFOA/PFOS

測試人員:涂雅苓 / Technician: Yaling Tu 測試負責人:張啟興 / Supervisor: Troy Chang

號碼(No.): CE/2016/56431 日期(Date): 2016/06/06





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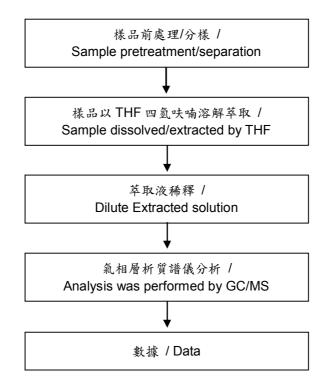
#### 可塑劑分析流程圖 / Analytical flow chart - Phthalate

測試人員:徐毓明 / Technician: Andy Shu

測試負責人:張啟興 / Supervisor nt: Troy Chang

號碼(No.): CE/2016/56431 日期(Date): 2016/06/06

【測試方法/Test method: IEC 62321-8】





## **Test Report**

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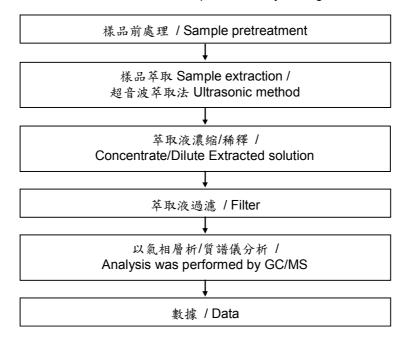


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#### 六溴環十二烷分析流程圖 / Analytical flow chart - HBCDD

- 測試人員:涂雅苓 / Technician: Yaling Tu
- 測試負責人:張啟興 / Supervisor: Troy Chang

號碼(No.): CE/2016/56431 日期(Date): 2016/06/06



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#### 多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBB/PBDE

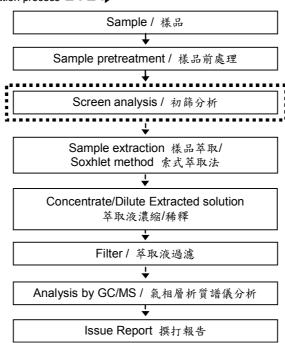
日期(Date): 2016/06/06

■ 測試人員:涂雅苓 / Technician: Yaling Tu

號碼(No.): CE/2016/56431

■ 測試負責人:張啟興 / Supervisor: Troy Chang

初次測試程序 / First testing process \_ 確認程序 / Confirmation process \_ . \_ . ▶



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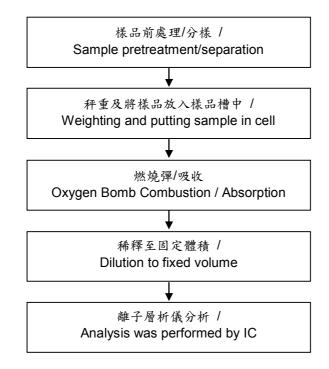
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#### 鹵素分析流程圖 / Analytical flow chart - Halogen

號碼(No.): CE/2016/56431 日期(Date): 2016/06/06

- 測試人員: 陳恩臻 / Technician: Rita Chen
- 測試負責人:張啟興 / Supervisor: Troy Chang



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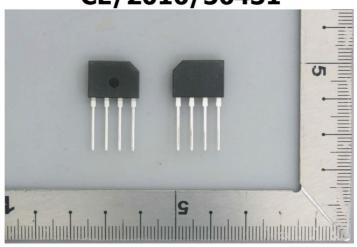
號碼(No.): CE/2016/56431

\* 照片中如有箭頭標示,則表示為實際檢測之樣品/部位. \* (The tested sample / part is marked by an arrow if it's shown on the photo.)

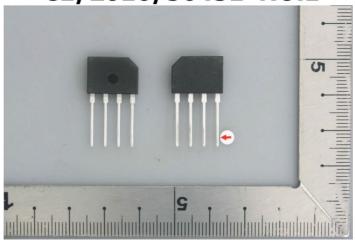
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CE/2016/56431 NO.1



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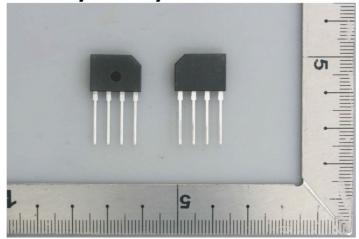
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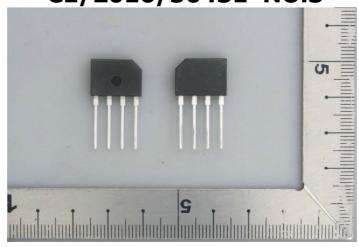
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# CE/2016/56431 NO.2

日期(Date): 2016/06/06



CE/2016/56431 NO.3



\*\* 報告結尾 (End of Report) \*\*

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