



## Test Report

Report No. A2240105760101

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**Company Name** JINAN E-TECH SEMICONDUCTOR CO.,LTD.  
**shown on Report**  
**Address** NO.6 TAIXING WEST STREET, JIBEI DEVELOPMENT ZONE, JIYANG ,  
JINAN,SHANDONG

**The following sample(s) and sample information was/were submitted and identified by/on the behalf of the applicant**

Sample Name TO Diode Halogen free  
Model No. TO-220  
Sample Received Date Mar. 5, 2024  
Testing Period Mar. 5, 2024 to Mar. 12, 2024

**Test Requested**

- As specified by client, to test Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs), Phthalates (DBP, BBP, DEHP, DIBP), Polycyclic Aromatic Hydrocarbons (PAHs), Arsenic(As), Beryllium(Be), Antimony(Sb), Perfluorooctanoic Acid(PFOA), Perfluorooctane Sulfonates(PFOS) in the submitted sample(s).
- As specified by client, to screen Antimony trioxide ( $Sb_2O_3$ ) in the submitted sample(s).

**Test Method/Test Result(s)** Please refer to the following page(s).



Approved by

*Chen Kaimin*

Date

Mar. 13, 2024

Chen kaimin  
Lab Manager

No. R475311581

Centre Testing International Pinbiao(Shanghai) Co., Ltd.

No.1351, Wanfang Road, Minhang District, Shanghai, China

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## Conclusion

<u>Tested Sample</u>	<u>According to standard/directive</u>	<u>Result</u>
Submitted Sample	RoHS Directive 2011/65/EU with amendment (EU) 2015/863	PASS

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PASS means that the results shown on the report comply with the limits set by RoHS Directive 2011/65/EU with amendment (EU) 2015/863.

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## Test Method

Tested Item(s)	Test Method	Measured Equipment(s)
Lead (Pb)	IEC 62321-5:2013	ICP-OES
Cadmium (Cd)	IEC 62321-5:2013	ICP-OES
Mercury (Hg)	IEC 62321-4:2013+AMD1:2017 CSV	ICP-OES
Hexavalent Chromium (Cr(VI))	IEC 62321-7-1:2015	UV-Vis
	IEC 62321-7-2:2017 and/or determination of Total Chromium by IEC 62321-5:2013	UV-Vis/ICP-OES
Polybrominated Biphenyls (PBBs)	IEC 62321-6:2015	GC-MS
Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS
Phthalates (DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS
Polycyclic Aromatic Hydrocarbons (PAHs)	Refer to AfPS GS 2019:01 PAK	GC-MS
Arsenic(As)	Refer to US EPA 3050B:1996 & US EPA 6010D:2018*	ICP-OES
	Refer to US EPA 3052:1996 & US EPA 6010D:2018*	
Beryllium(Be)	Refer to US EPA 3050B:1996 & US EPA 6010D:2018*	ICP-OES
	Refer to US EPA 3052:1996 & US EPA 6010D:2018*	
Antimony(Sb)	Refer to US EPA 3050B:1996 & US EPA 6010D:2018*	ICP-OES
	Refer to US EPA 3052:1996 & US EPA 6010D:2018*	
Antimony trioxide ( Sb <sub>2</sub> O <sub>3</sub> )	Refer to US EPA 3052:1996 & US EPA 6010D:2018*	ICP-OES
Perfluorooctanoic Acid(PFOA)	Refer to US EPA 3550C:2007 & US EPA 8321B:2007*	LC-MS-MS/LC-MS
Perfluorooctane Sulfonates(PFOS)	Refer to US EPA 3550C:2007 & US EPA 8321B:2007*	LC-MS-MS/LC-MS

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## Test Result(s)

Tested Item(s)	Result		MDL	Limit
	001	002		
Lead (Pb)	2677 mg/kg <sup>#</sup>	N.D.	2 mg/kg	1000 mg/kg
Cadmium (Cd)	N.D.	N.D.	2 mg/kg	100 mg/kg
Mercury (Hg)	N.D.	N.D.	2 mg/kg	1000 mg/kg
Hexavalent Chromium (Cr(VI))	N.D.	--	8 mg/kg	1000 mg/kg
	--	N.D. ▼	0.10 µg/cm <sup>2</sup> (LOQ)	1000 mg/kg

Tested Item(s)	Result		MDL	Limit
	001			
<b>Polybrominated Biphenyls (PBBs)</b>				
Monobromobiphenyl	N.D.		5 mg/kg	1000 mg/kg
Dibromobiphenyl	N.D.		5 mg/kg	
Tribromobiphenyl	N.D.		5 mg/kg	
Tetrabromobiphenyl	N.D.		5 mg/kg	
Pentabromobiphenyl	N.D.		5 mg/kg	
Hexabromobiphenyl	N.D.		5 mg/kg	
Heptabromobiphenyl	N.D.		5 mg/kg	
Octabromobiphenyl	N.D.		5 mg/kg	
Nonabromobiphenyl	N.D.		5 mg/kg	
Decabromobiphenyl	N.D.		5 mg/kg	

Tested Item(s)	Result		MDL	Limit
	001			
<b>Polybrominated Diphenyl Ethers (PBDEs)</b>				
Monobromodiphenyl ether	N.D.		5 mg/kg	1000 mg/kg
Dibromodiphenyl ether	N.D.		5 mg/kg	
Tribromodiphenyl ether	N.D.		5 mg/kg	
Tetrabromodiphenyl ether	N.D.		5 mg/kg	
Pentabromodiphenyl ether	N.D.		5 mg/kg	
Hexabromodiphenyl ether	N.D.		5 mg/kg	
Heptabromodiphenyl ether	N.D.		5 mg/kg	
Octabromodiphenyl ether	N.D.		5 mg/kg	
Nonabromodiphenyl ether	N.D.		5 mg/kg	
Decabromodiphenyl ether	N.D.		5 mg/kg	

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Tested Item(s)	Result	MDL	Limit
	001		
<b>Phthalates (DBP, BBP, DEHP, DIBP)</b>			
Dibutyl phthalate (DBP) CAS#:84-74-2	N.D.	50 mg/kg	1000 mg/kg
Butyl benzyl phthalate (BBP) CAS#:85-68-7	N.D.	50 mg/kg	1000 mg/kg
Di-(2-ethylhexyl) phthalate (DEHP) CAS#:117-81-7	N.D.	50 mg/kg	1000 mg/kg
Diisobutyl phthalate (DIBP) CAS#:84-69-5	N.D.	50 mg/kg	1000 mg/kg

Tested Item(s)	Result	MDL
	001	
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>		
Benzo(a)pyrene	N.D.	0.2 mg/kg
Benzo(e)pyrene	N.D.	0.2 mg/kg
Benzo(a)anthracene	N.D.	0.2 mg/kg
Chrysene	N.D.	0.2 mg/kg
Benzo(b)fluoranthene	N.D.	0.2 mg/kg
Benzo(j)fluoranthene	N.D.	0.2 mg/kg
Benzo(k)fluoranthene	N.D.	0.2 mg/kg
Dibenzo(a,h)anthracene	N.D.	0.2 mg/kg
Naphthalene	N.D.	0.2 mg/kg
Acenaphthylene*	N.D.	0.2 mg/kg
Acenaphthene*	N.D.	0.2 mg/kg
Fluorene*	N.D.	0.2 mg/kg
Phenanthrene	N.D.	0.2 mg/kg
Anthracene	N.D.	0.2 mg/kg
Fluoranthene	N.D.	0.2 mg/kg
Pyrene	N.D.	0.2 mg/kg
Indeno(1,2,3-cd)pyrene	N.D.	0.2 mg/kg
Benzo(g,h,i)perylene	N.D.	0.2 mg/kg
Sum 18 PAHs	N.D.	/

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Tested Item(s)	Result		MDL
	001		
Arsenic (As)	N.D.		10 mg/kg

Tested Item(s)	Result		MDL
	002		
Arsenic (As)	N.D.		10 mg/kg

Tested Item(s)	Result		MDL
	001		
Beryllium (Be)	N.D.		10 mg/kg

Tested Item(s)	Result		MDL
	002		
Beryllium (Be)	N.D.		10 mg/kg

Tested Item(s)	Result		MDL
	001		
Antimony (Sb)	N.D.		10 mg/kg

Tested Item(s)	Result		MDL
	002		
Antimony (Sb)	N.D.		10 mg/kg

Tested Item(s)	Result		MDL
	001	002	
Antimony trioxide (Sb <sub>2</sub> O <sub>3</sub> )* <sup>1</sup>	N.D.	N.D.	10 mg/kg

Tested Item(s)	Result		MDL
	001		
Perfluorooctanoic Acid (PFOA)	N.D.		0.010 mg/kg

Tested Item(s)	Result		MDL
	001		
Perfluorooctane Sulfonates (PFOS)	N.D.		0.010 mg/kg

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**Sample/Part Description**

No.	CTI Sample ID	Description
1	001	Black body(Tested as a whole)* <sup>2</sup>
2	002	Silvery metal pin

**Remark:** The sample(s) had been dissolved totally tested for Lead, Cadmium, Mercury, Arsenic, Beryllium, Antimony.

-MDL = Method Detection Limit

-N.D. = Not Detected (<MDL or LOQ)

-mg/kg = ppm = parts per million

-1000 mg/kg = 0.1%

-LOQ = Limit of Quantification, The LOQ of Hexavalent chromium is 0.10  $\mu\text{g}/\text{cm}^2$

-<sup>▼</sup>The sample is negative for Cr(VI) – The Cr(VI) concentration is below 0.10  $\mu\text{g}/\text{cm}^2$ . The coating is considered a non-Cr(VI) based coating. Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

\*<sup>1</sup> = The test result of the item is converted from the test result of certain element.

\*<sup>2</sup> = The sample(s) was tested as a whole, because it's impossible to disassemble or separate it by current equipment and technology. The result(s) shown on this report may be different from the content of any homogeneous material.

# = According to the client's statement, lead mainly comes from the high melting temperature type solders. Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead) is exempted from the restriction, with reference to EU Directive 2011/65/EU annex III Exemption Applications 7(a).

**Note:** “\*” indicates the item(s)/method(s) is (are) not in CNAS accreditation scope.

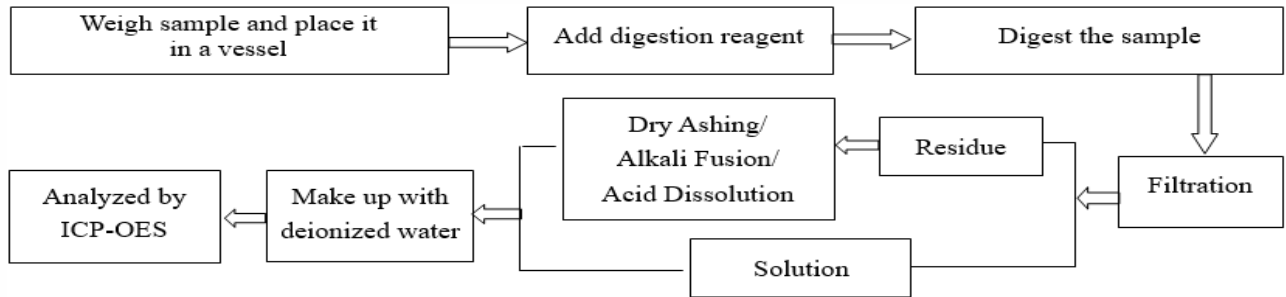
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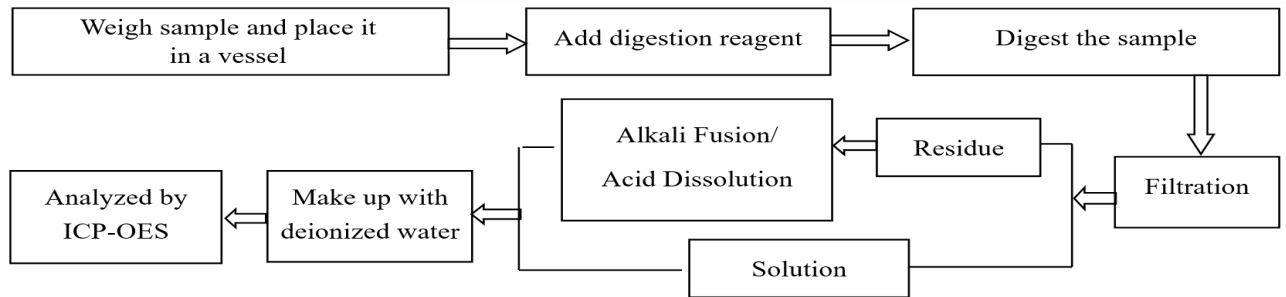
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## Test Process

### 1. Lead (Pb), Cadmium (Cd), Chromium(Cr)

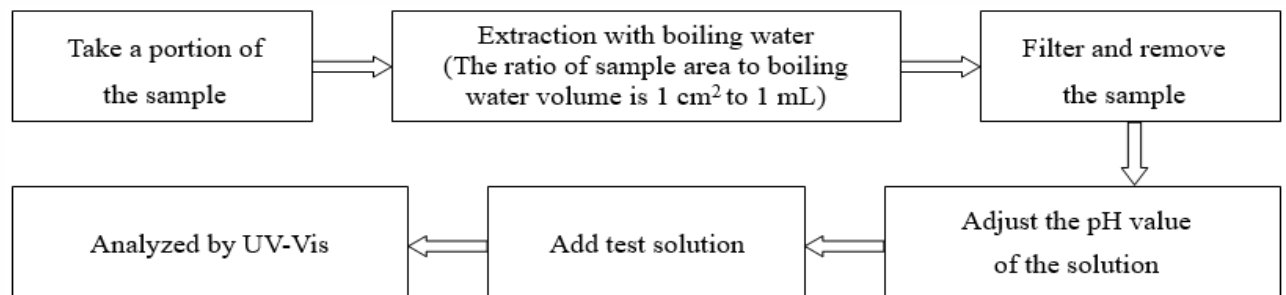


### 2. Mercury (Hg)

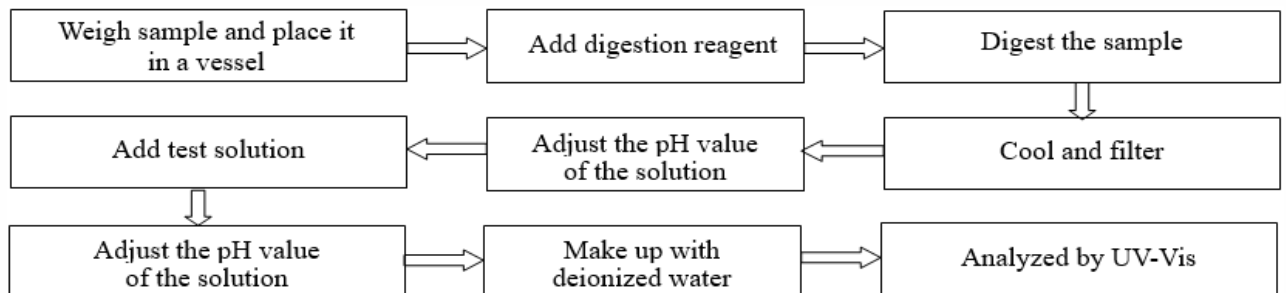


### 3. Hexavalent Chromium (Cr(VI))

#### (1) IEC 62321-7-1:2015



#### (2) IEC 62321-7-2:2017



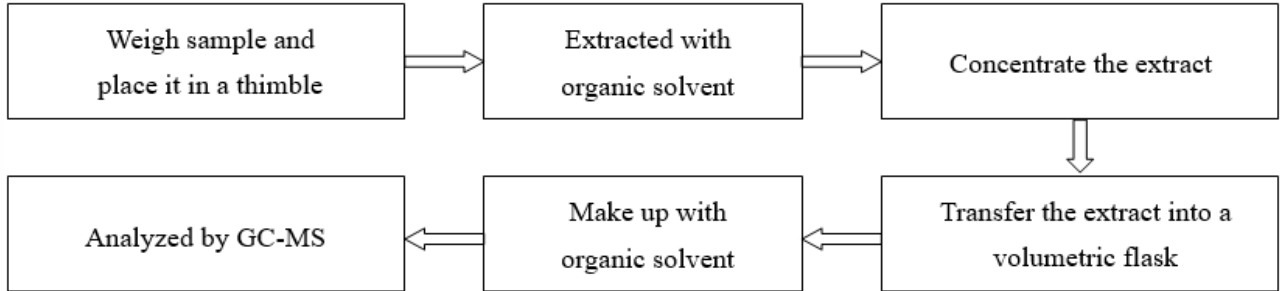


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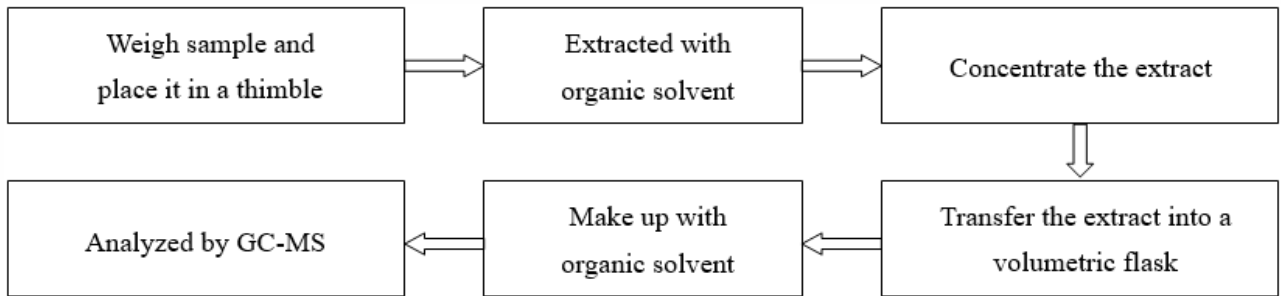
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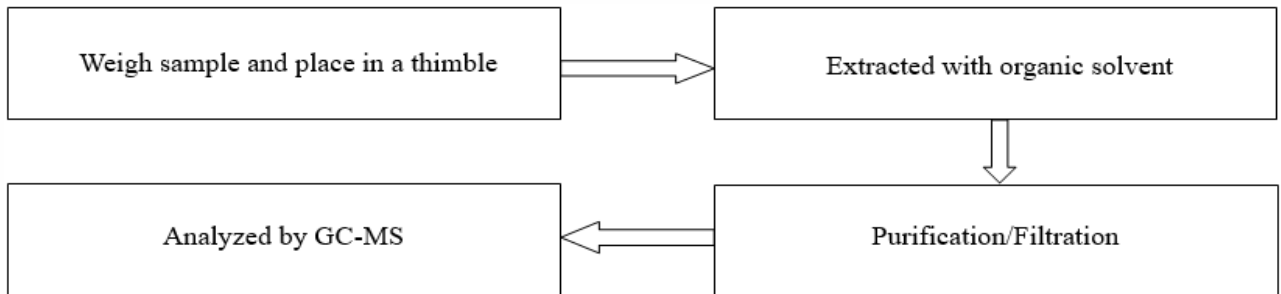
## 4. Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs)



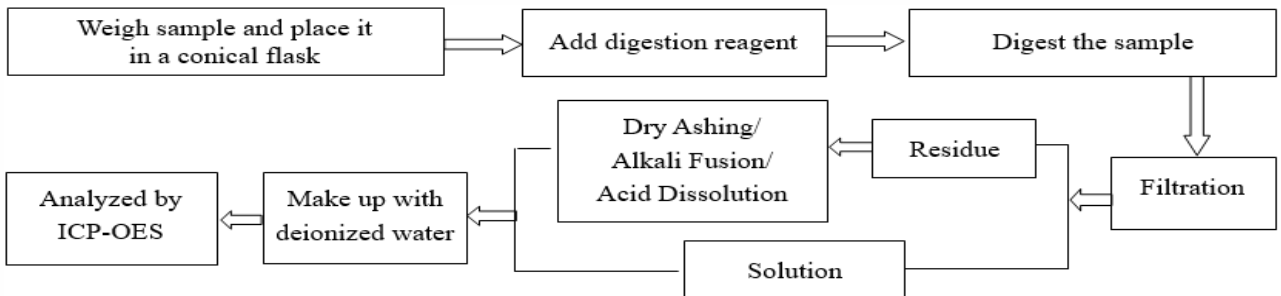
## 5. Phthalates (DBP, BBP, DEHP, DIBP)



## 6. Polycyclic Aromatic Hydrocarbons (PAHs)



## 7. Arsenic(As), Beryllium(Be), Antimony(Sb) Refer to US EPA 3050B:1996 & US EPA 6010D:2018

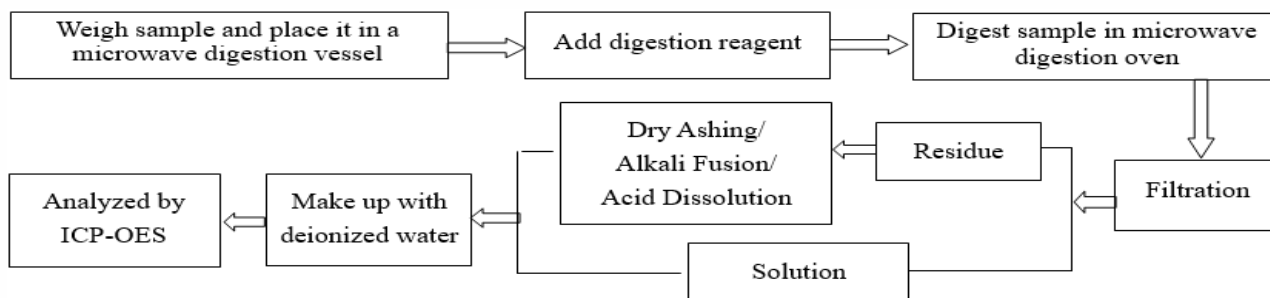


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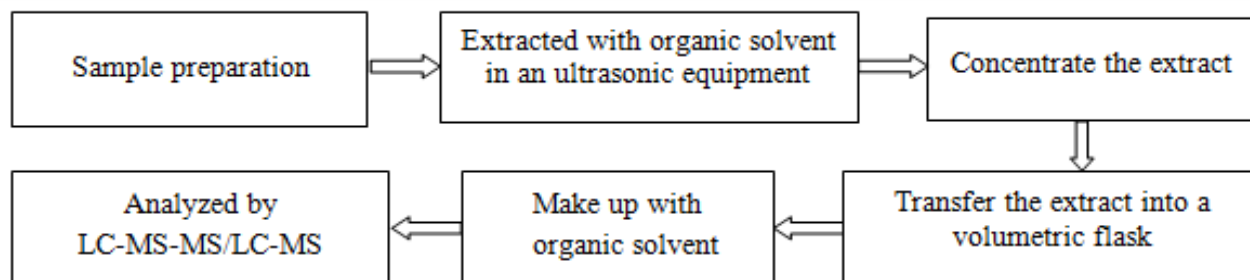
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**8. Arsenic(As), Beryllium(Be), Antimony(Sb), Antimony trioxide ( Sb<sub>2</sub>O<sub>3</sub>) Refer to US EPA 3052:1996 & US EPA 6010D:2018**



**9. Perfluorooctanoic Acid(PFOA), Perfluorooctane Sulfonates(PFOS)**

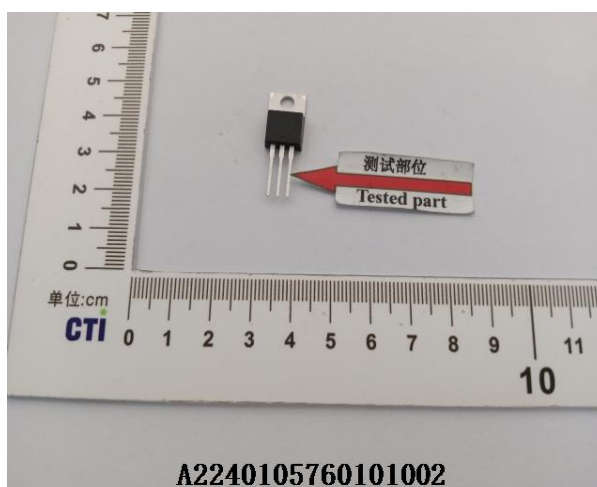
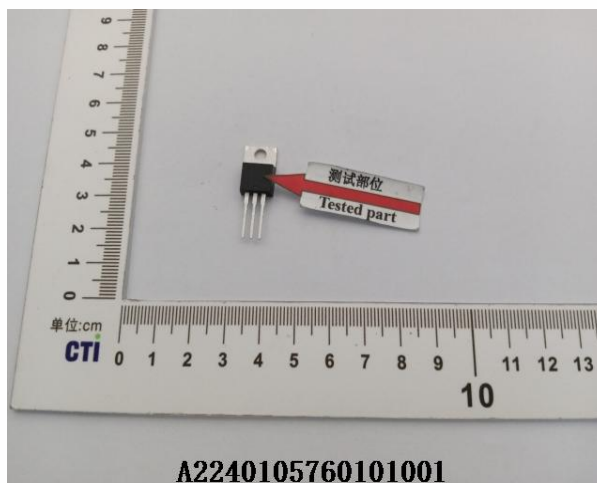


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## Photo(s) of the sample(s)



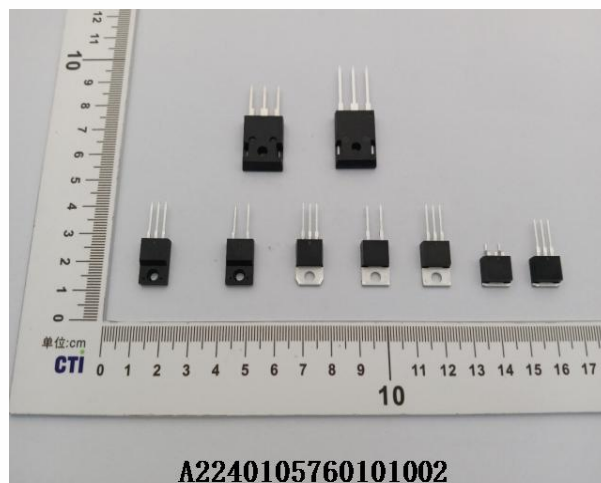
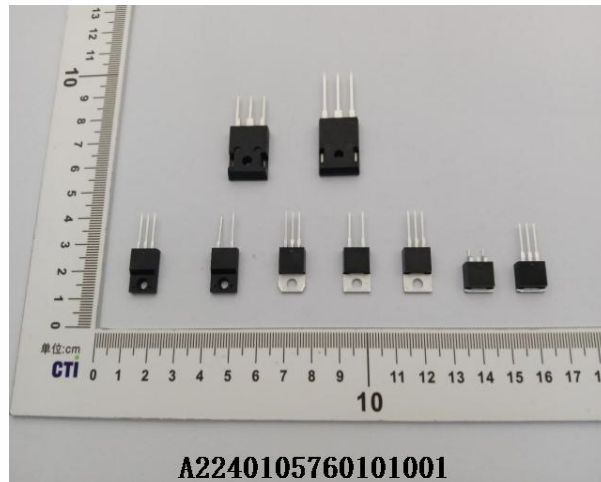
### Statement:

1. This report is considered invalid without approved signature, special seal and the seal on the perforation;
2. The Company Name shown on Report and Address, the sample(s) and sample information was/were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified;
3. The result(s) shown in this report refer(s) only to the sample(s) tested;
4. Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019 / CNAS-GL015:2022;
5. Without written approval of CTI, this report can't be reproduced except in full;
6. In case of any discrepancy between the English version and Chinese version of the testing reports (if generated), the Chinese version shall prevail.

\*\*\* End of Report \*\*\*

## Appendix

### Client Reference Photo(Non-tested sample)



#### Statement:

1. The Appendix Information was/were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.
2. The Appendix Information is/are the supplement(s) for the Report A2240105760101.