

## Test Report

No. SZXEC2001296001

Date: 19 Jun 2020

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WINSEMI MICROELECTRONICS COMPANY LIMITED

ROOM 1002,EAST,2,HIGH TECH PLAZA,TIANAN CYBER PARK,CHEGONGMIAO,SHENZHEN,P.R.CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : TO-220F

SGS Job No. : RP20-012572 - SZ  
Model No. : TO-220F  
Client Ref. Info. : TO-220F/TO-220C/TO-251/TO-252/IPAK/DPAK/TO-126/TO-247/TO-3PN/  
TO-3PB/TO-3PH/TO-92/TO-220HW/TO-220AB/TO-220-2L/TO-89/TO-220HF/  
TO-220HF-2L/TO-262/SOT-23/SOT23-3L/TO-277B/TO-252-4L/IPAK/DPAK/  
TO-247/TO-263/TO-262/TO-3P/TO-2PN/PDFN3.3\*3.3-8L/DFN3\*3-8L/  
PDFN5\*6-8L/DFN5\*6-8L/DFN2\*2-6L/DFN2\*5-6L/DFN1006/SOT-23/  
SOT23-3L/SOT23-6L/SOT-523/SOT-232/SOP/TSSOP8/SOT89-3L

Date of Sample Received : 15 Jun 2020

Testing Period : 15 Jun 2020 - 18 Jun 2020

Test Requested : Selected test(s) as requested by client.

Test Method : Please refer to next page(s).

Test Results : Please refer to next page(s).

Conclusion : Based on the performed tests on selected part of submitted sample(s), the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP) , Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) , and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of  
SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch



Kitty Xu  
Approved Signatory



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Test Results :

Test Part Description :

| Specimen No. | SGS Sample ID    | Description          |
|--------------|------------------|----------------------|
| SN1          | SZX20-012960.001 | Black plastic        |
| SN2          | SZX20-012960.002 | Copper-colored metal |
| SN3          | SZX20-012960.003 | Silver-gray metal    |

Remarks :

- (1) 1 mg/kg = 1 ppm = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected ( < MDL )
- (4) "-" = Not Regulated

**RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU**

Test Method : With reference to IEC 62321-4:2013+AMD1:2017, IEC62321-5:2013, IEC62321-7-2:2017, IEC 62321-6:2015 and IEC62321-8:2017, analyzed by ICP-OES, UV-Vis and GC-MS.

| <u>Test Item(s)</u>          | <u>Limit</u> | <u>Unit</u> | <u>MDL</u> | <u>001</u> |
|------------------------------|--------------|-------------|------------|------------|
| Cadmium (Cd)                 | 100          | mg/kg       | 2          | ND         |
| Lead (Pb)                    | 1,000        | mg/kg       | 2          | ND         |
| Mercury (Hg)                 | 1,000        | mg/kg       | 2          | ND         |
| Hexavalent Chromium (Cr(VI)) | 1,000        | mg/kg       | 8          | ND         |
| Sum of PBBs                  | 1,000        | mg/kg       | -          | ND         |
| Monobromobiphenyl            | -            | mg/kg       | 5          | ND         |
| Dibromobiphenyl              | -            | mg/kg       | 5          | ND         |
| Tribromobiphenyl             | -            | mg/kg       | 5          | ND         |
| Tetrabromobiphenyl           | -            | mg/kg       | 5          | ND         |
| Pentabromobiphenyl           | -            | mg/kg       | 5          | ND         |
| Hexabromobiphenyl            | -            | mg/kg       | 5          | ND         |
| Heptabromobiphenyl           | -            | mg/kg       | 5          | ND         |
| Octabromobiphenyl            | -            | mg/kg       | 5          | ND         |
| Nonabromobiphenyl            | -            | mg/kg       | 5          | ND         |
| Decabromobiphenyl            | -            | mg/kg       | 5          | ND         |
| Sum of PBDEs                 | 1,000        | mg/kg       | -          | ND         |
| Monobromodiphenyl ether      | -            | mg/kg       | 5          | ND         |
| Dibromodiphenyl ether        | -            | mg/kg       | 5          | ND         |
| Tribromodiphenyl ether       | -            | mg/kg       | 5          | ND         |



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| Test Item(s)                       | Limit | Unit  | MDL | 001 |
|------------------------------------|-------|-------|-----|-----|
| Tetrabromodiphenyl ether           | -     | mg/kg | 5   | ND  |
| Pentabromodiphenyl ether           | -     | mg/kg | 5   | ND  |
| Hexabromodiphenyl ether            | -     | mg/kg | 5   | ND  |
| Heptabromodiphenyl ether           | -     | mg/kg | 5   | ND  |
| Octabromodiphenyl ether            | -     | mg/kg | 5   | ND  |
| Nonabromodiphenyl ether            | -     | mg/kg | 5   | ND  |
| Decabromodiphenyl ether            | -     | mg/kg | 5   | ND  |
| Dibutyl Phthalate (DBP)            | 1000  | mg/kg | 50  | ND  |
| Butyl benzyl Phthalate (BBP)       | 1000  | mg/kg | 50  | ND  |
| Bis(2-ethylhexyl) Phthalate (DEHP) | 1000  | mg/kg | 50  | ND  |
| Diisobutyl Phthalate (DIBP)        | 1000  | mg/kg | 50  | ND  |

Notes :

- (1)The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863. IEC 62321 series is equivalent to EN 62321 series  
[https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)
- (2) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.
- (3) The restriction of DEHP, BBP, DBP and DIBP shall not apply to toys which are already subject to the restriction of DEHP, BBP, DBP and DIBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.

**RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU**

Test Method : With reference to IEC 62321-4:2013+AMD1:2017, IEC62321-5:2013, IEC 62321-7-1:2015, analyzed by ICP-OES and UV-Vis.

| Test Item(s)                  | Limit | Unit               | MDL  | 002 | 003 |
|-------------------------------|-------|--------------------|------|-----|-----|
| Cadmium (Cd)                  | 100   | mg/kg              | 2    | ND  | ND  |
| Lead (Pb)                     | 1,000 | mg/kg              | 2    | 7   | 7   |
| Mercury (Hg)                  | 1,000 | mg/kg              | 2    | ND  | ND  |
| Hexavalent Chromium (Cr(VI))▼ | -     | µg/cm <sup>2</sup> | 0.10 | ND  | ND  |

Notes :

- (1)The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863. IEC 62321 series is equivalent to EN 62321 series  
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- (2) ▽= a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm<sup>2</sup>. The sample coating is considered to contain CrVI
- b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm<sup>2</sup>). The coating is considered a non-CrVI based coating
- c. 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.

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.



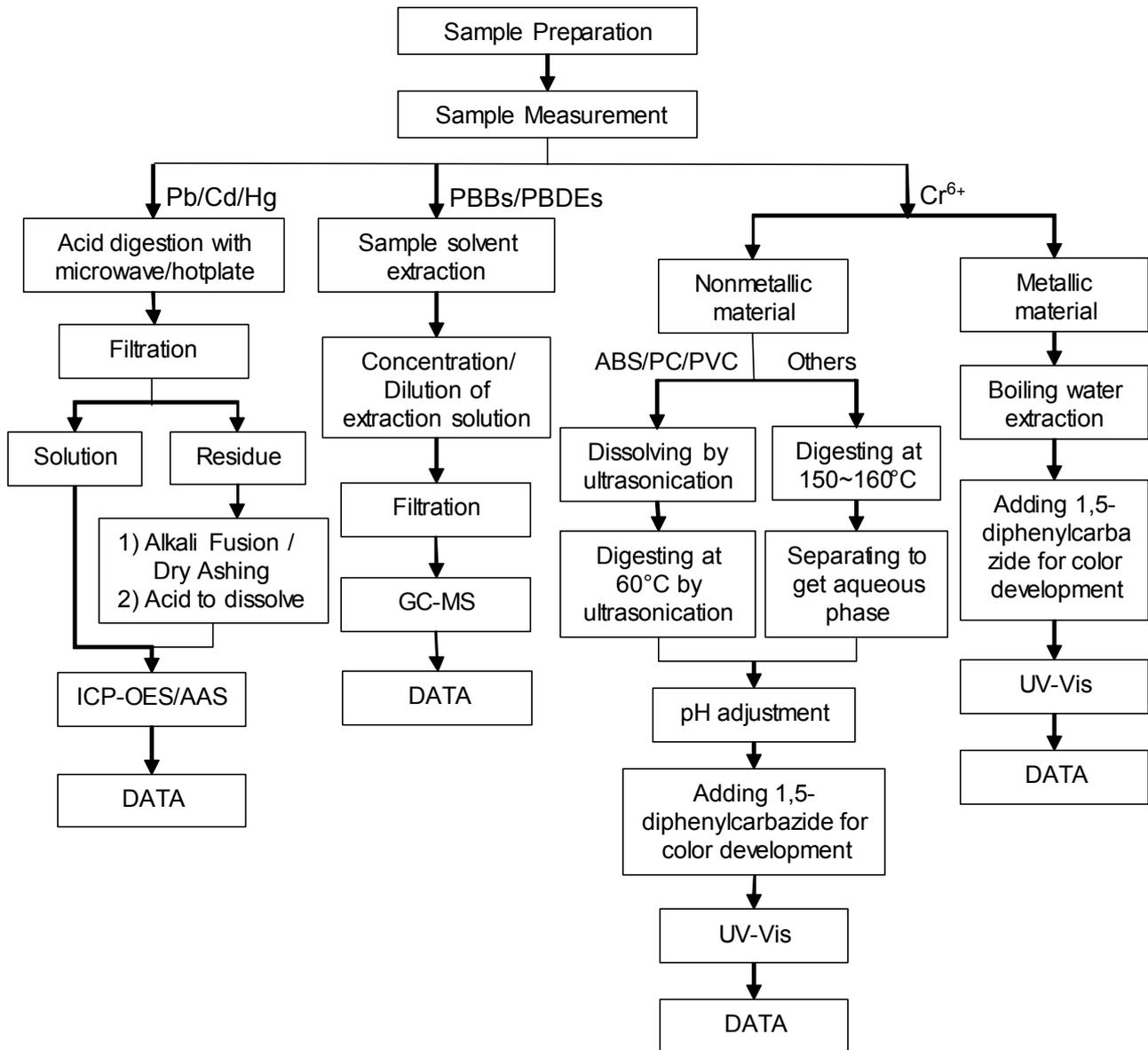
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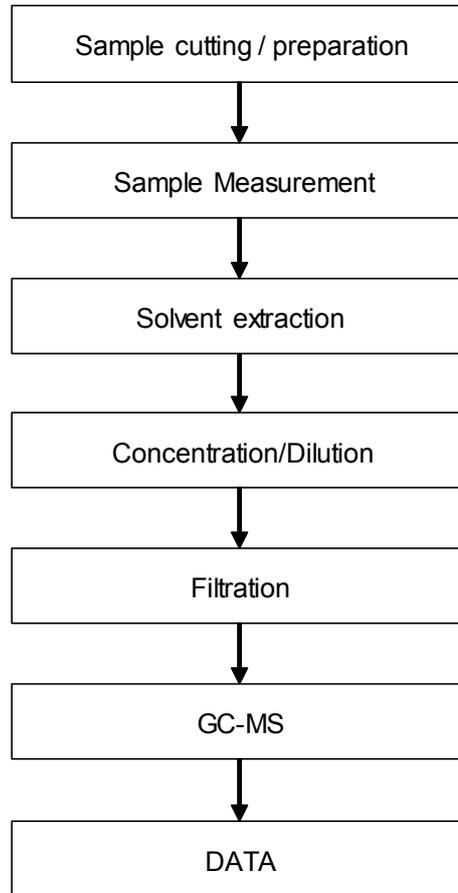
Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs Testing Flow Chart

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



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Phthalates Testing Flow Chart

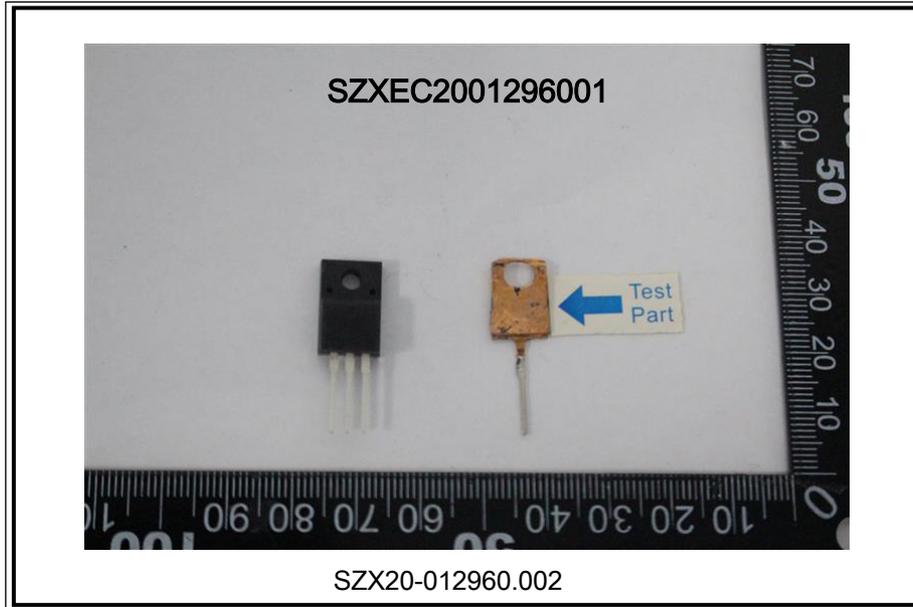
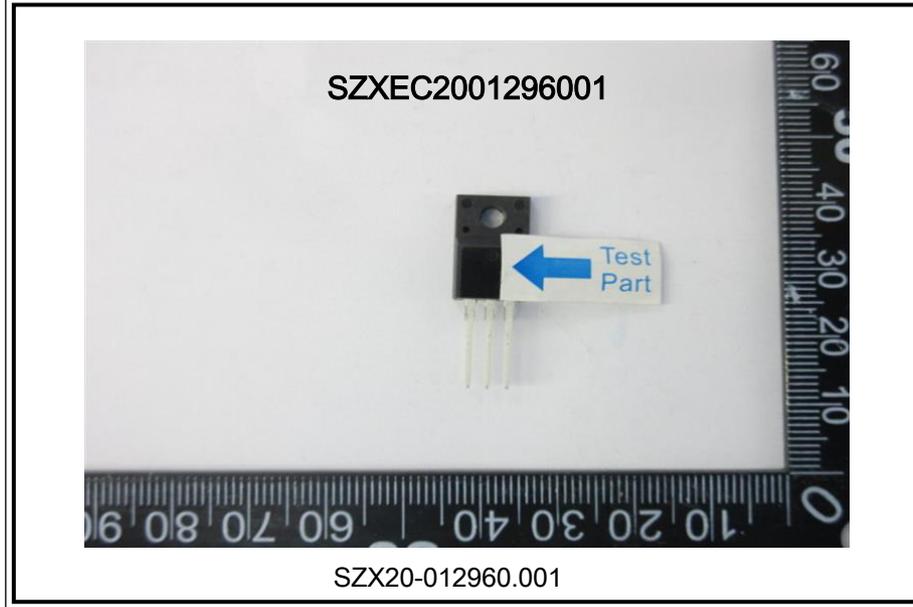


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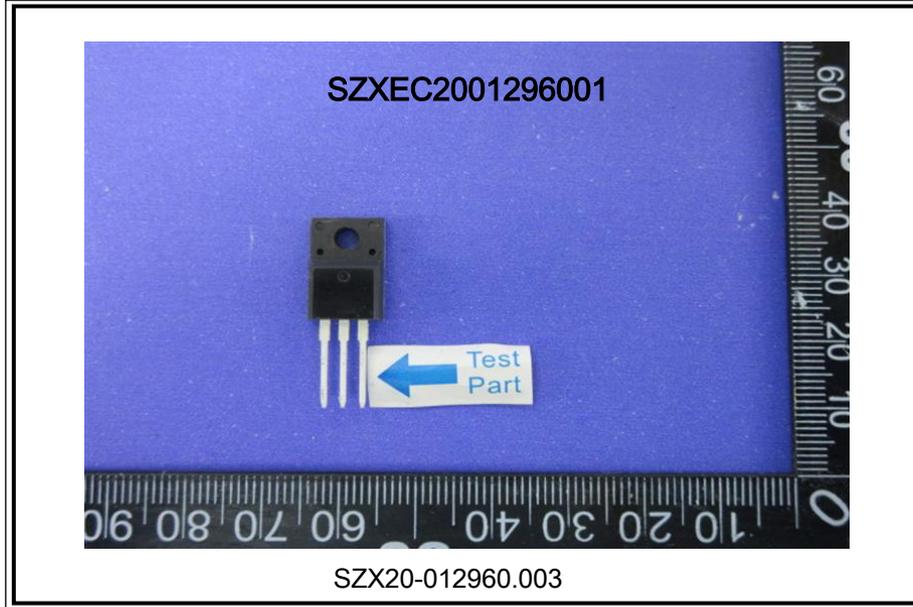
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