



Chuangxin Online Test Center Laboratory

Add: F/r 401 Building A, Ying Da Feng industrial No,393,Jihua Rd.LongGang
Dis. Shenzhen China
Tel: 0755-83765367 Email: engineer@iclab-cn.com



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Project Inspection Report

Company : NA
Address : NA
Sample Name : TPS62160DSGR
Manufacture : TI
Date Code : 2105
Package Type : WSON8
Sample Number : 2000 PCS
Check Number : 3 PCS
Date of Received : 09/01/2021
Date of Tested : 14:00/09/02/2021 ~ 18:00/09/06/2021

WE HEREBY CERTIFY THAT:

The test(s) shown in the attachment were conducted according to the indicating procedures. We assume full responsibility for the accuracy and completeness of these tests and vouch for the qualifications of all personnel performing them.

Inspected by Engineer
Cherry

Reviewed by Project Manager
Felix

Note:

1. This report will be invalid if reproduced in whole or in part.
2. This report refers only to the specimen(s) submitted to test, and is invalid if used separately.
3. This report is only valid with the examination seal and signature of this institute.
4. The tested specimen(s) will only be preserved for thirty days from the date issued, if not collected by the applicant.
5. This report is only responsible for the samples tested.



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Items test

- External visual inspection
- Pin Correlation Test
- Programming test
- Solder ability Analysis
- Radiography (X-ray)
- ROHS test
- Key Functional Testing (KFT)
- Baking
- Tape and Reel
- Internal visual inspection
- Top permanency test
- Ultrasonic scanning microscope (SAT)

Methods & Equipment

1.1 Applicable Standard

- MIL-STD-883L-2019 2009.14
- GB/T 4377-2018
- MIL-STD-883L-2019 2012.11
- GB/T 26125-2011.9
- MIL-STD-883L-2019 2010.14
- MIL-STD-883L-2019 2030.2

1.2 Optical Microscope

- Equipment Spec:
Top view: FINIAL Hi-scope System SEZ-260: X7 ~ X45
FJ-3A: X50 ~ X500

1.3 Digital Caliper

- Equipment Spec:
MASTERPROOF : Standard Digital Caliper 0-150mm

1.4 Radiography (X-ray)

- Equipment Spec:
Hardware: XiDAT Dage XD6500
Software: 11.56-DD6058
Magnification in excess of 2800x
Resolution below 2um
Energy: 60KV/40uA



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1.5 ROHS test

- Equipment Spec:
ICP-OES

1.6 Functional testing Equipment

- MIXED SIGNAL IC TESTER TR6850:
64 to 256 pin logic I/O pin with 64 pin increments.
High-precision measurement unit.
40MSPS/16bit arbitrary waveform generator, 10MSPS/14 bit digitizer.

Easy programming & debugging

1.7 Ultrasonic scanning microscope (SAT)

- Equipment Spec:
Hardware: Sonoscan
Maximum resolution: 16384X16384
Select sound wave width: 0.25 nanosecond to 1 microsecond
Z-axis resolution: 5 nm

1.8 Testing Environment

- Ambient Temperature: 25±5°C
- Relative Humidity: 45%-65% RH

1.9 Testing Base

- [TI TPS62160DSGR]

<https://www.ti.com/lit/ds/symlink/tps62160.pdf?HQS=dis-dk-null-digikeymode-dsf-pf-null-ww&ts=1630565313246>



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Analysis Summary

External Visual Inspection:

Applicable Standard: MIL-STD-883L 2019 2009.14

External Visual Inspection on 3 PCS(#1-#3) samples marked with D/C2105. No secondary coating, sanding marks, crack or chips were observed on all inspected. Leads were in acceptable condition. Devices package and dimension matched to manufacturer's specification. All devices passed the external visual inspection. Device passed top permanency tested.

Specification dimension:

A: 1.90-2.10 MM

B: 1.90-2.10 MM

C: 0.70-0.80 MM

Measurement dimension:

A: 2.00 MM

B: 2.01 MM

C: 0.77 MM

Key Functional Testing (KFT):

Key Functional Testing (KFT)	Result:
Total quantity tested:	3 PCS
Total quantity passed:	3 PCS
Total quantity failed:	0 PCS
Note:	All test samples passed the functional parameter test.



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External Visual Inspection Result:

External Visual Criteria	Yes/No	Result
Mix-up	No	Pass
Top Scratches	No	Pass
Bottom Scratches	No	Pass
Residues	No	Pass
Indentation	No	Pass
Contamination	No	Pass
Cracks	No	Pass
Copper defect	No	Pass
Oxidization	No	Pass
Coplanarity	Yes	Pass
Sanding Marks	No	Pass
Secondary Coating	No	Pass
Top permanency Test	Yes	Pass

Key Functional Testing (KFT) Results:

Tested Parameters	Result
Supply Voltage VIN	3 PCS PASS
Output voltage VOUT	3 PCS PASS
Enable input VEN	3 PCS PASS
Internal reference voltage VREF	3 PCS PASS



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X-ray Analysis:

Applicable Standard: MIL-STD-883L 2019 2012.11

X-ray Inspection on 3 PCS (#1-#3) samples marked with D/C2105 . No structure or bonding wire abnormal was found.

ROHS Testing:

Applicable Standard: GB/T 26125-2011.9

ROHS testing on 3 PCS samples. Cr (ppm), Cd (PPM), Hg(ppm) and Pb (ppm) tests comply with ROHS standards.All samples pass the test.

Ultrasonic scanning microscope Analysis:

Applicable Standard: MIL-STD-883L-2019 2030.2

Ultrasonic scanning microscope Inspection on 3 PCS(#1-#3) samples marked with D/C2105. The Lead of #1-#3 is layered with the bonding surface of plastic sealing material, the Paddle of #1-#3 is layered with the bonding surface of plastic sealing material.

Internal Visual Inspection:

Applicable Standard: MIL-STD-883L-2019 2010.14

Internal Visual Inspection was verified on 1PCS sample. Manufacturer TI marking was found on the die surface. Die TPS62160D1 was also found on the die surface. Device confirmed to be a TI device.

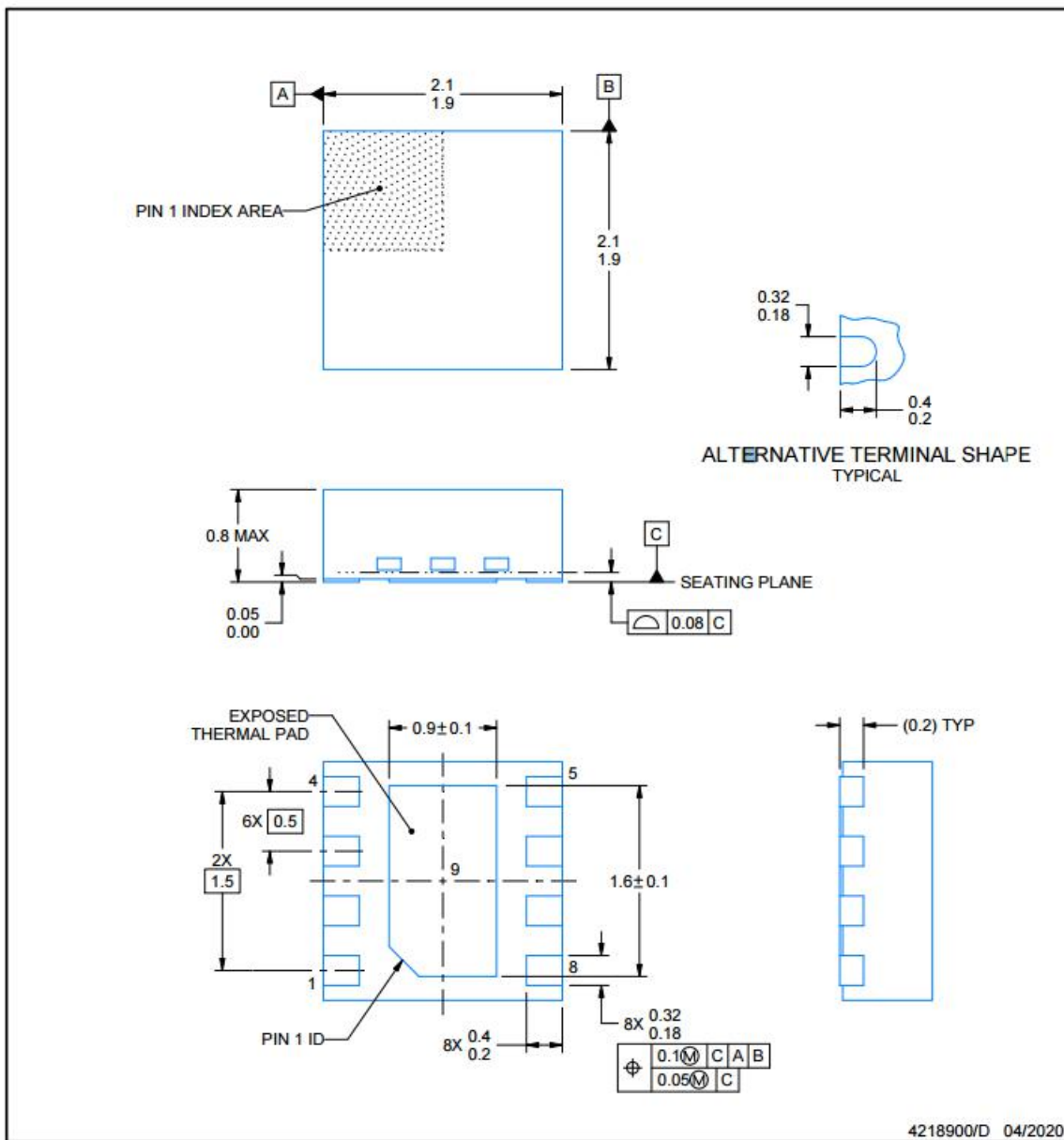


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1. Device Description:

The TPS6216x device family are easy to use synchronous step-down DC/DC converters optimized for applications with high power density. A high switching frequency of typically 2.25 MHz allows the use of small inductors and provides fast transient response as well as high output voltage accuracy by utilization of the DCS-Control™ topology.

2. Package Dimensions:





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3. Receiving Inspection:

Gross Weight	87 g	Parts Total	2000 PCS
Number Of Boxes	1	Full Label	Exist
Package type	Reel	Moisture protection	Non Present
MSL	1	ESD protection	Non Present

Note: All devices contain 2000PCS samples.
 The first reel were tested 2pcs devices each: (#1-#2).
 The second reel were tested 1pcs devices : (#3).





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4. External Visual Inspection:

Applicable Standard: MIL-STD-883L 2019 2009.14

External Visual Inspection on 3 PCS(#1-#3) samples marked with D/C2105. No secondary coating, sanding marks, crack or chips were observed on all inspected. Leads were in acceptable condition. Devices package and dimension matched to manufacturer's specification. All devices passed the external visual inspection. Device passed top permanency tested.

Specification dimension:

A: 1.90-2.10 MM

B: 1.90-2.10 MM

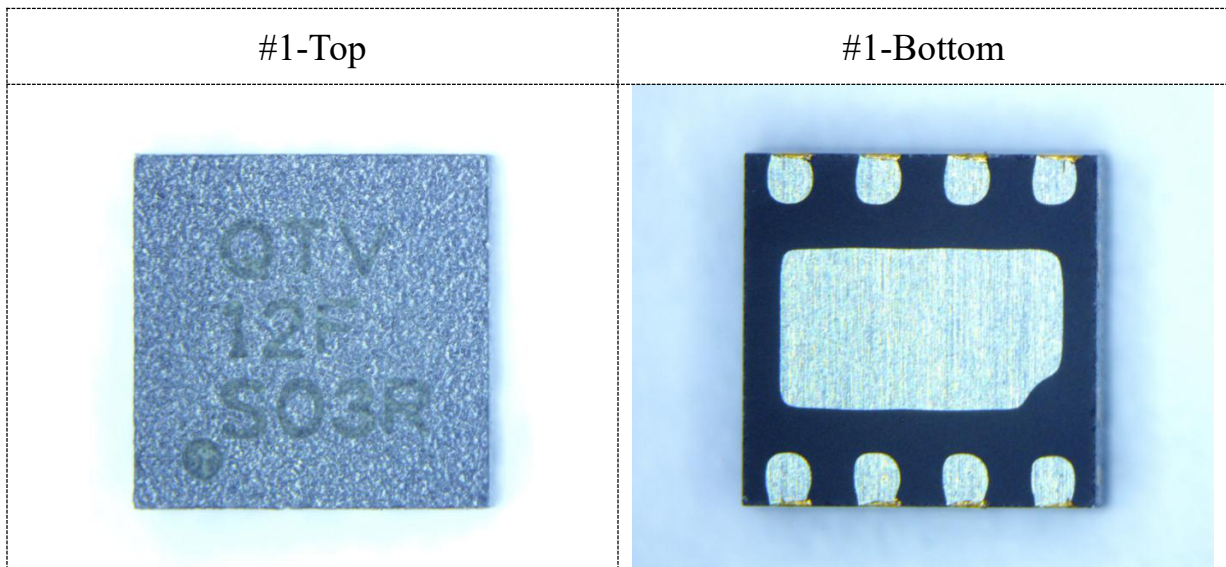
C: 0.70-0.80 MM

Measurement dimension:

A: 2.00 MM

B: 2.01 MM

C: 0.77 MM





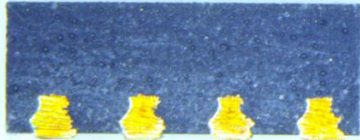
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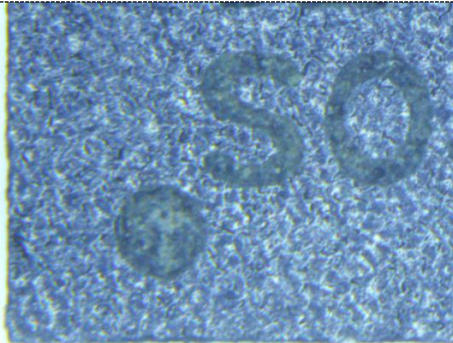
#1-Side



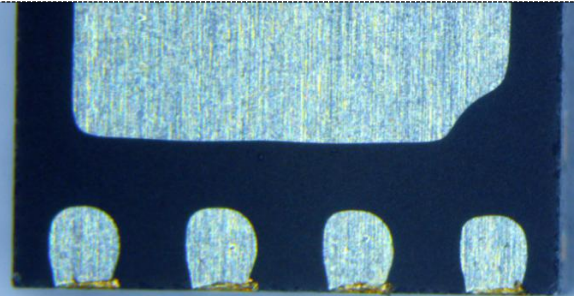
#1-Laser Marking



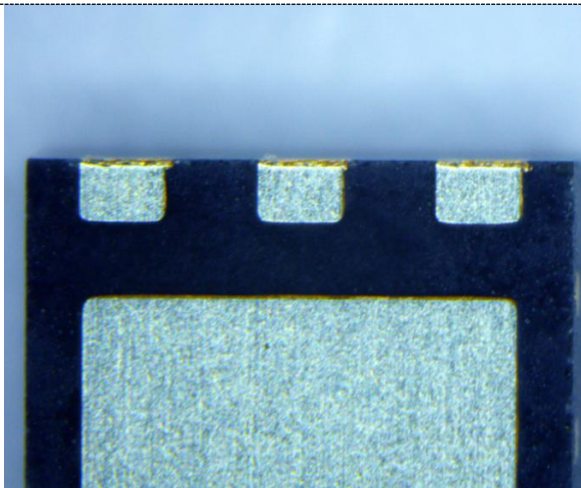
#1-Top Pin



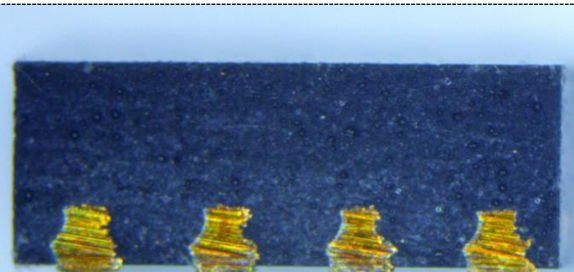
#1-Bottom Leads-1



#1-Bottom Leads-2



#1-Leads End



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#1-A = 2.00 MM



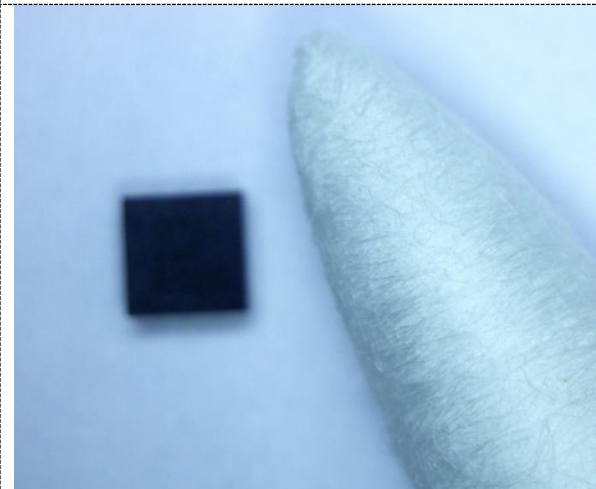
#1-B = 2.01 MM



#1-C = 0.77 MM



#1- Top permanency test



#1-Top Side
(Before Top permanency test)



#1-Top Side
(After Top permanency test)





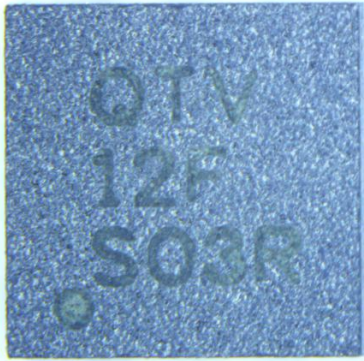
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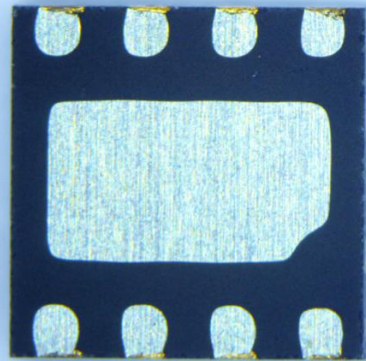


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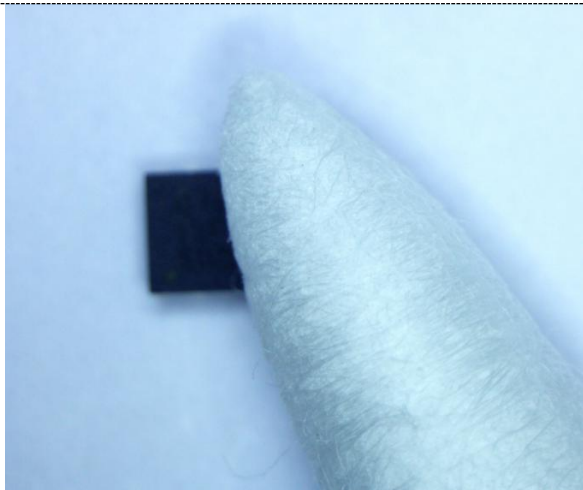
#2-Top



#2-Bottom



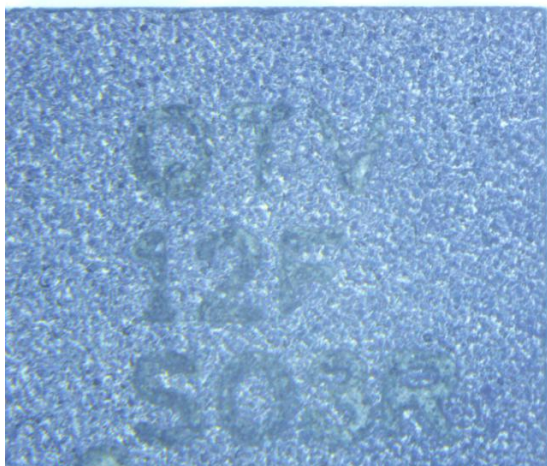
#2-Top permanency test



#2-Top Side
(Before Top permanency test)



#2-Top Side(After Top permanency test)



#3-Top





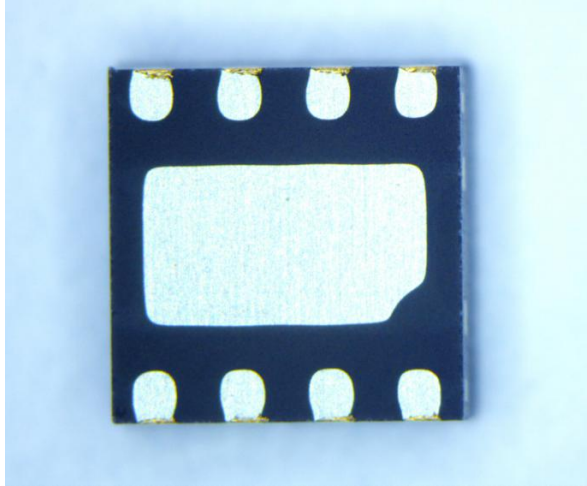
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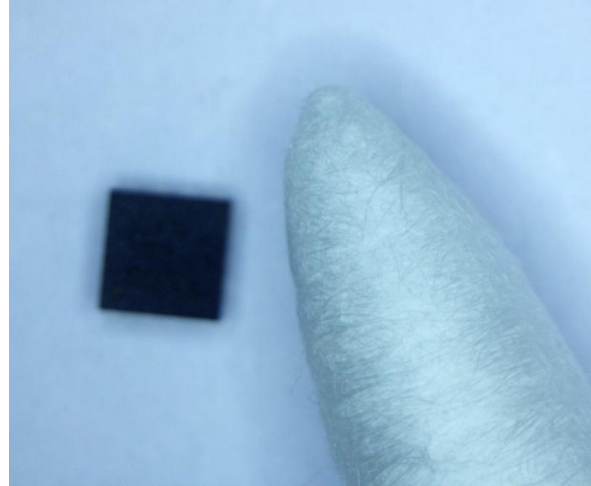


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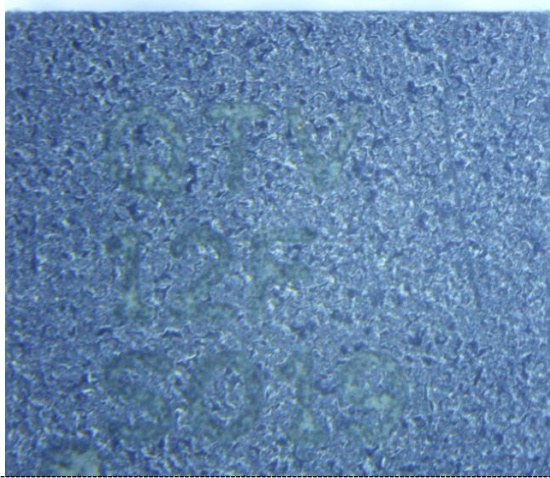
#3-Bottom



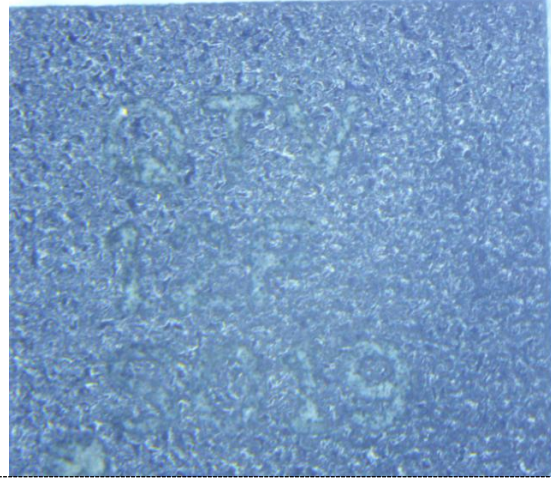
#3-Top permanency test



#3-Top Side(Before Top permanency test)



#3-Top Side(After Top permanency test)





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5.Key Functional Testing (KFT):

Applicable Standard: GB/T 4377-2018

Using DC power supply and multimeter the following parameters were verified at 25°C :

- Input voltage VIN: $3V \cong VIN \cong 17V$;
- Output voltage VOUT: $VOUT=2.5V$;
- Internal reference voltage VREF : $VREF = 0.8V$ TYP;
- Enable input VEN : $VEN = 0.9V$ MIN;

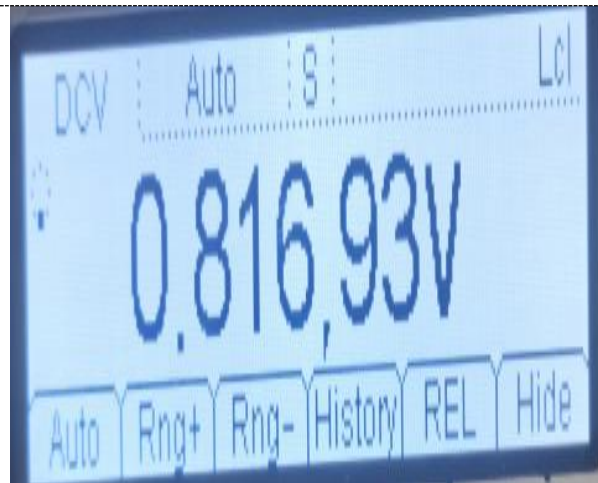
VIN = 3.66V



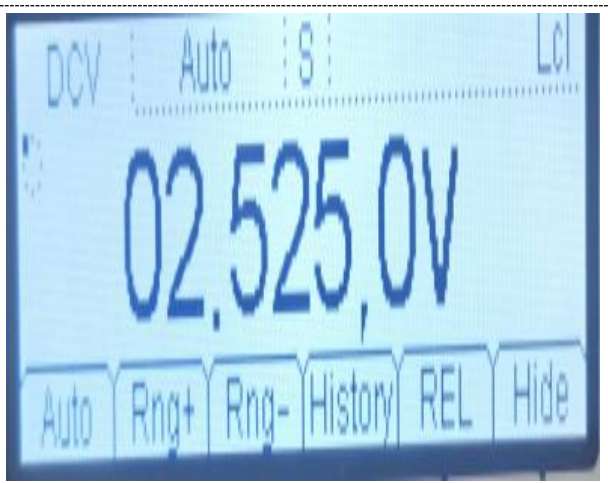
VEN = 3.66V



VREF =0.816V



VOUT = 2.5V





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Key Functional Testing (KFT) Results:

Key Functional Testing (KFT)	Result:
Total quantity tested:	3 PCS
Total quantity passed:	3 PCS
Total quantity failed:	0 PCS
Note:	All test samples passed the functional parameter test.



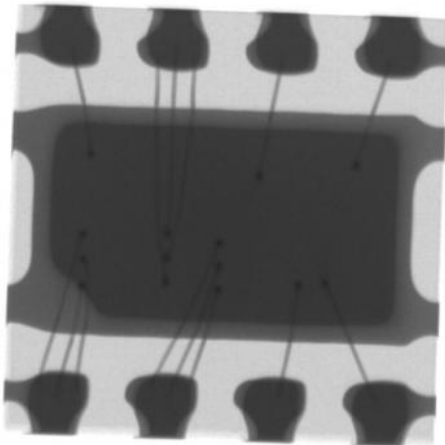
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6.X-ray Analysis:

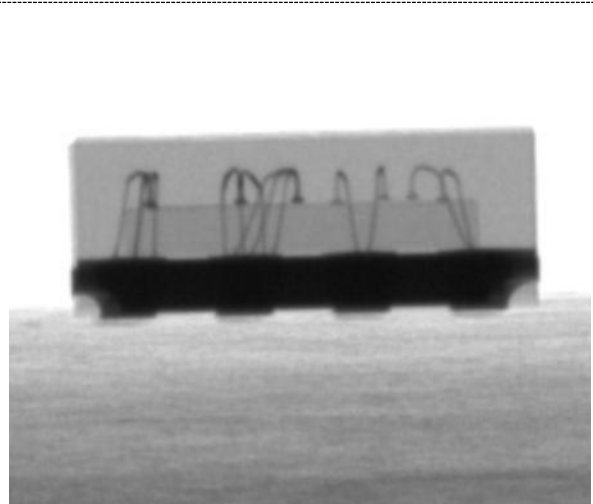
Applicable Standard: MIL-STD-883L 2019 2012.11

X-ray Inspection on 3 PCS (#1-#3) samples marked with D/C2105 . No structure or bonding wire abnormal was found.

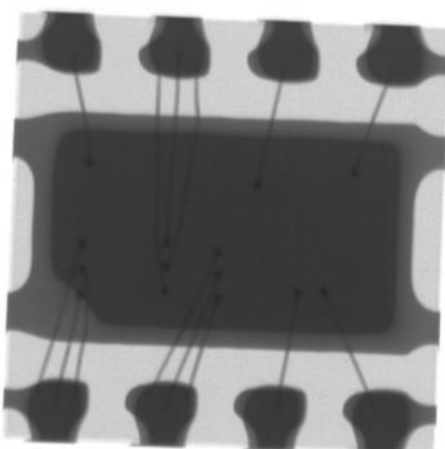
#1-Top View-All



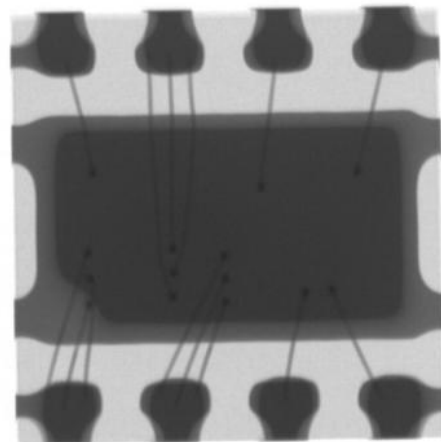
#1-Side View-All



#2-Top View-All



#3-Top View-All





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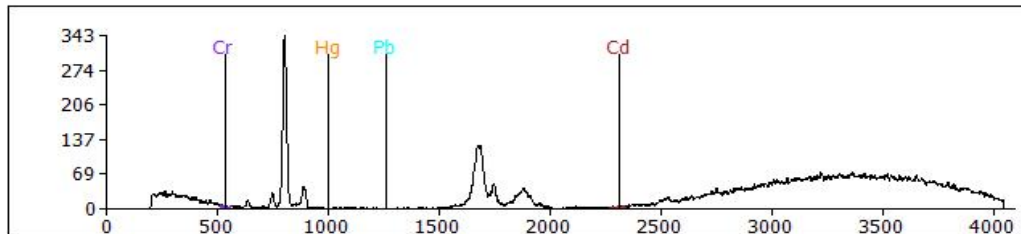
7.ROHS Testing:

Applicable Standard: GB/T 26125-2011.9

ROHS testing on 3 PCS samples. Cr (ppm), Cd (PPM), Hg(ppm) and Pb (ppm) tests comply with ROHS standards.All samples pass the test.

#1						
Element	Intensity	Content (ppm)	Equipment	Error (ppm)	Limits (ppm)	Result
Cr(ppm)	0	ND	ICP-OES	0.00	1000	Pass
Cd(ppm)	0	ND	ICP-OES	0.00	100	Pass
Hg(ppm)	0.00028	ND	ICP-OES	0.00	1000	Pass
Pb(ppm)	0	ND	ICP-OES	0.00	1000	Pass

Spectrogram-1



Spectrogram-2

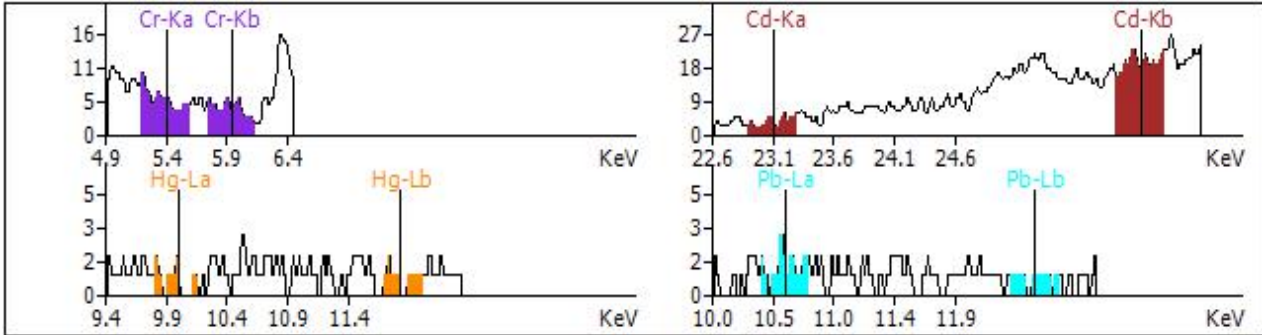


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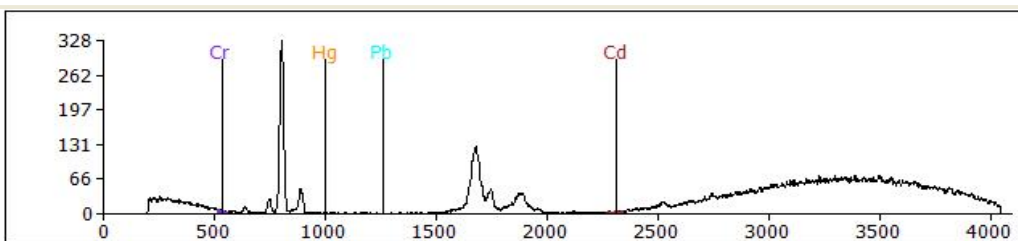
Note

ND is less than or equal to 2ppm.
 The data measured by XRF analyzer is surface test.
 Cr and Br are the total content of the element measured. If it exceeds the standard, it does not mean that the VI valence Cr, PBB and PBDE exceed the standard.

#2

Element	Intensity	Content (ppm)	Equipment	Error (ppm)	Limits (ppm)	Result
Cr(ppm)	0	ND	ICP-OES	0.00	1000	Pass
Cd(ppm)	0	ND	ICP-OES	0.00	100	Pass
Hg(ppm)	0	ND	ICP-OES	0.00	1000	Pass
Pb(ppm)	0	ND	ICP-OES	0.00	1000	Pass

Spectrogram-1



Spectrogram-2

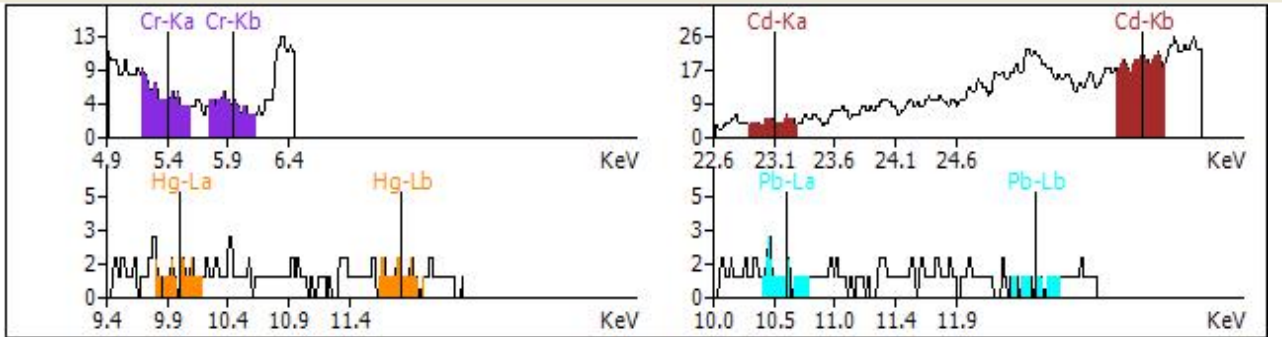


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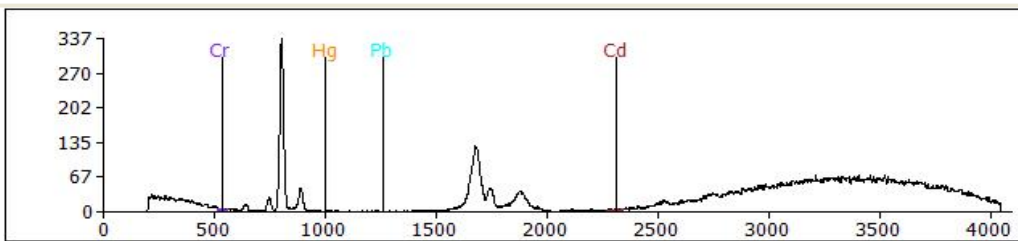


Note
 ND is less than or equal to 2ppm.
 The data measured by XRF analyzer is surface test.
 Cr and Br are the total content of the element measured. If it exceeds the standard, it does not mean that the VI valence Cr, PBB and PBDE exceed the standard.

#3

Element	Intensity	Content (ppm)	Equipment	Error (ppm)	Limits (ppm)	Result
Cr(ppm)	0.00017	185.05	ICP-OES	10.70	1000	Pass
Cd(ppm)	0	ND	ICP-OES	0.00	100	Pass
Hg(ppm)	0.00006	ND	ICP-OES	0.00	1000	Pass
Pb(ppm)	0.00001	ND	ICP-OES	0.16	1000	Pass

Spectrogram-1



Spectrogram-2

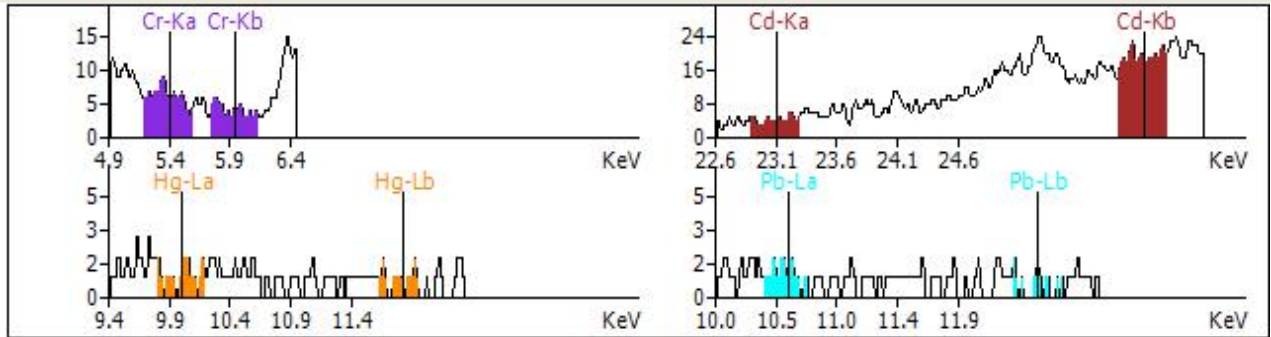


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Note

ND is less than or equal to 2ppm.
The data measured by XRF analyzer is surface test.
Cr and Br are the total content of the element measured. If it exceeds the standard, it does not mean that the VI valence Cr, PBB and PBDE exceed the standard.



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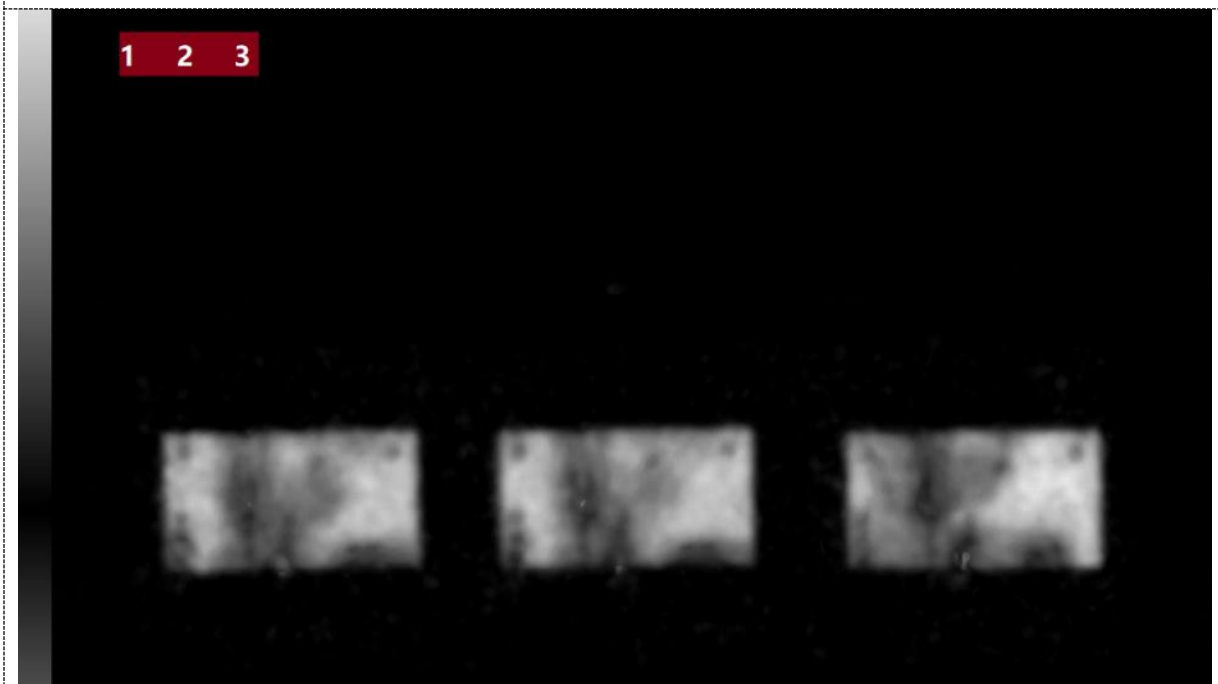
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8.Ultrasonic scanning microscope Analysis:

Applicable Standard: MIL-STD-883L-2019 2030.2

Ultrasonic scanning microscope Inspection on 3 PCS(#1-#3) samples marked with D/C2105. The Lead of #1-#3 is layered with the bonding surface of plastic sealing material, the Paddle of #1-#3 is layered with the bonding surface of plastic sealing material.

IC(#1-#3)-50MHz-Die-C





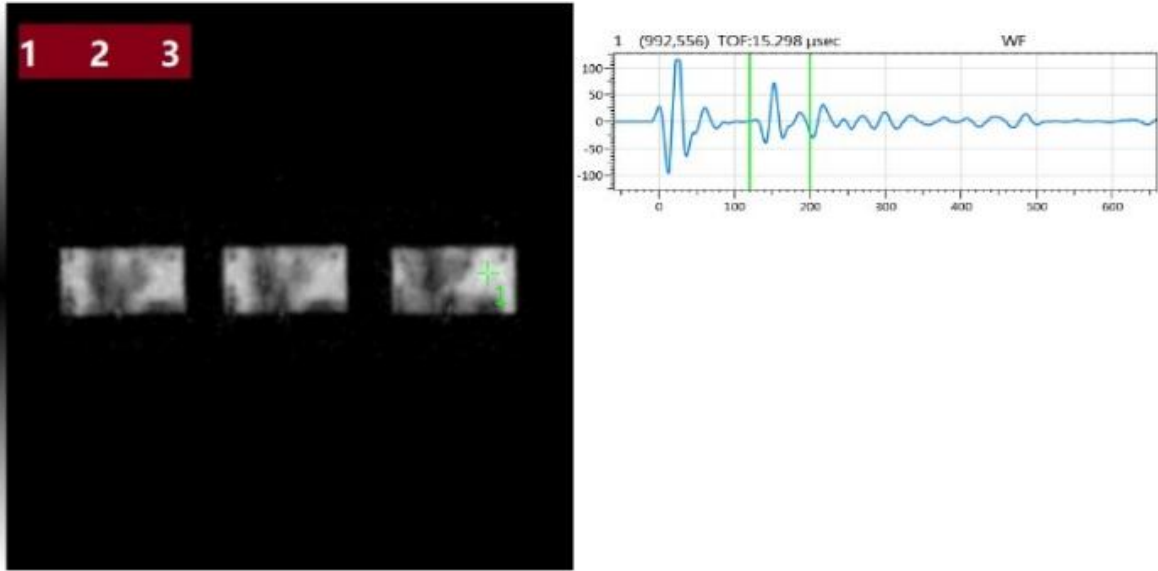
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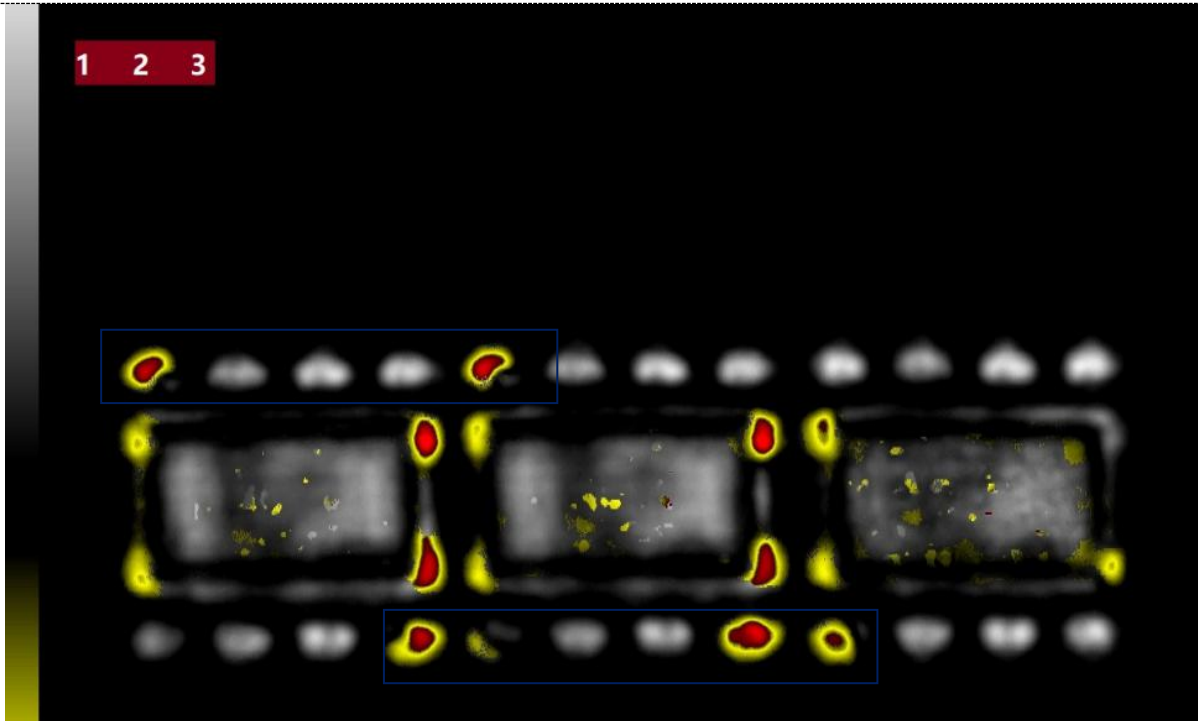


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IC(#1-#3)-50MHz-Die-A



IC(#1-#3)-50MHz-Lead-C(layered)



IC(#1-#3)-50MHz-Lead-A(layered)

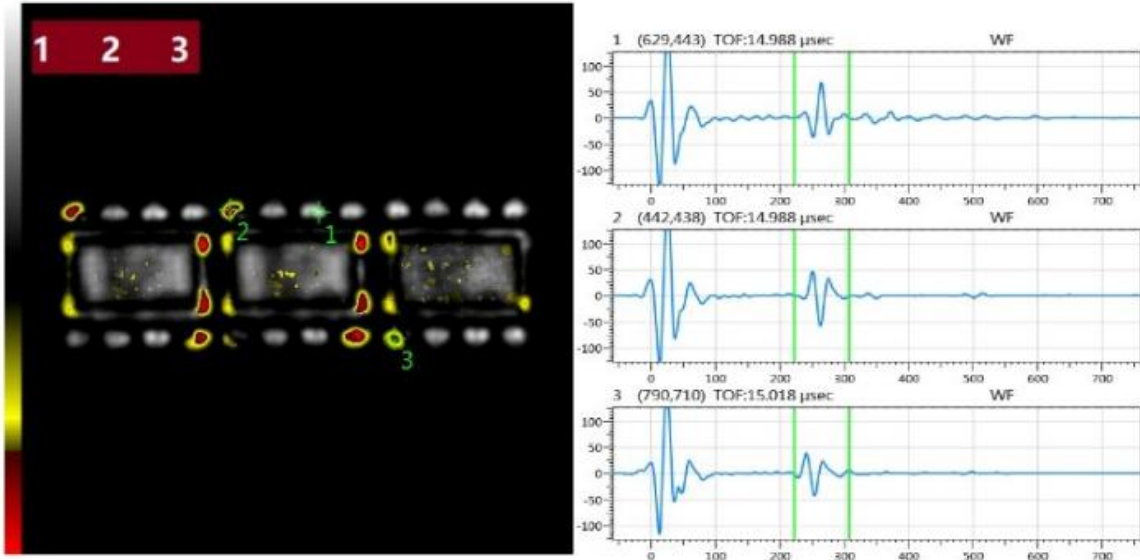


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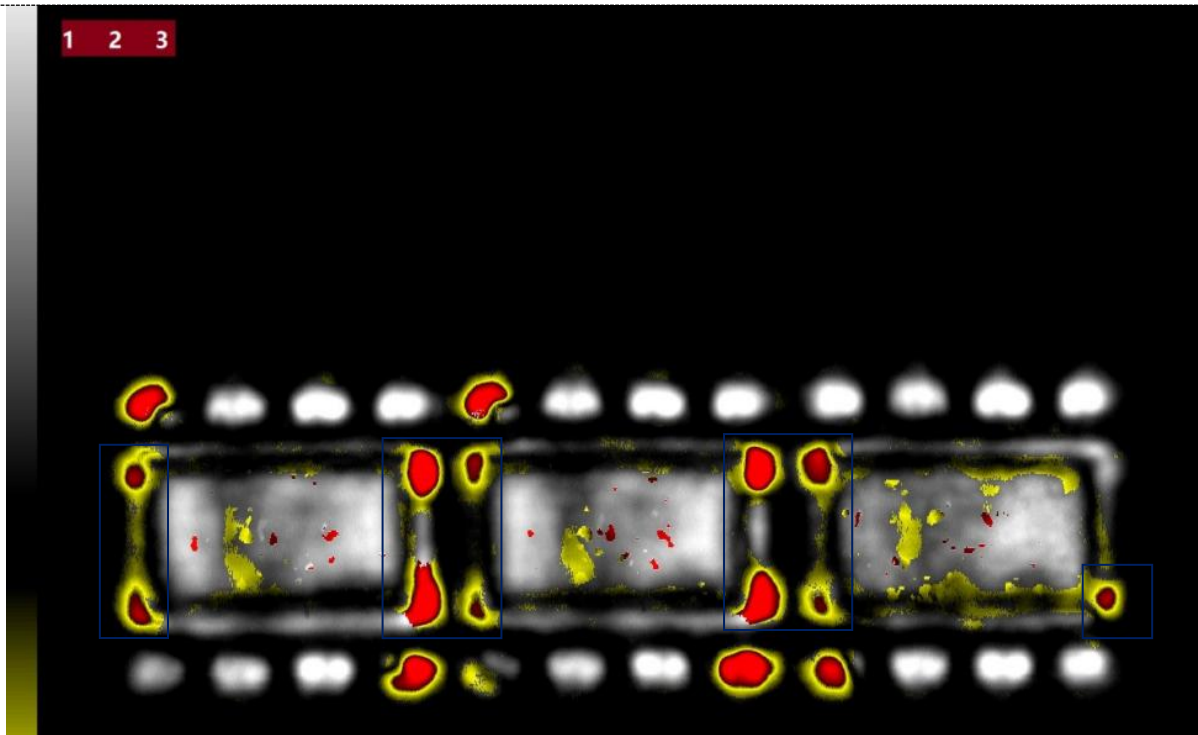
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IC(#1-#3)-50MHz-Paddle-C(layered)



IC(#1-#3)-50MHz-Paddle-A(layered)

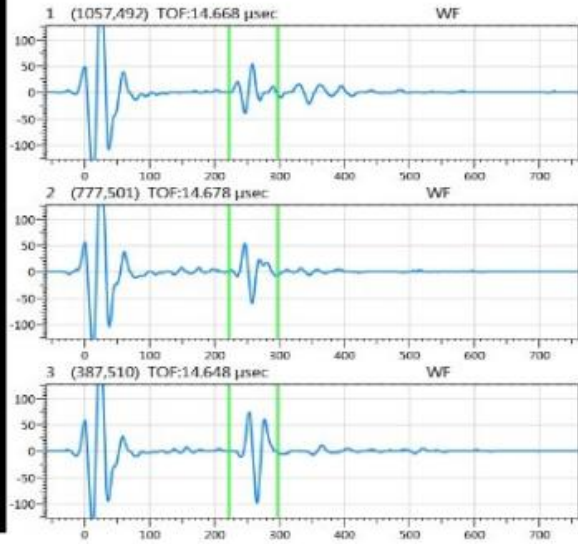
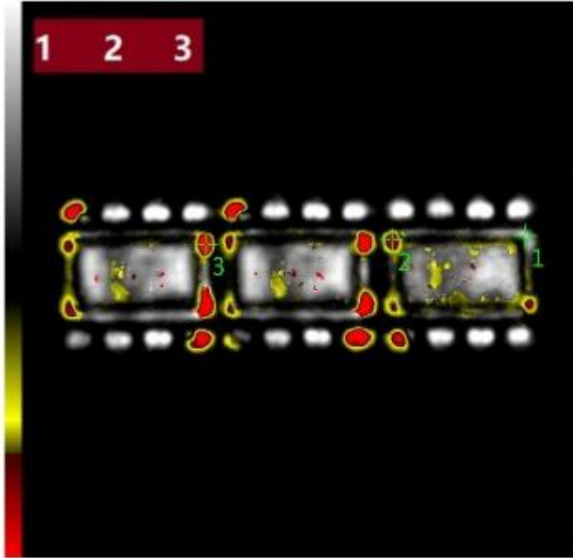


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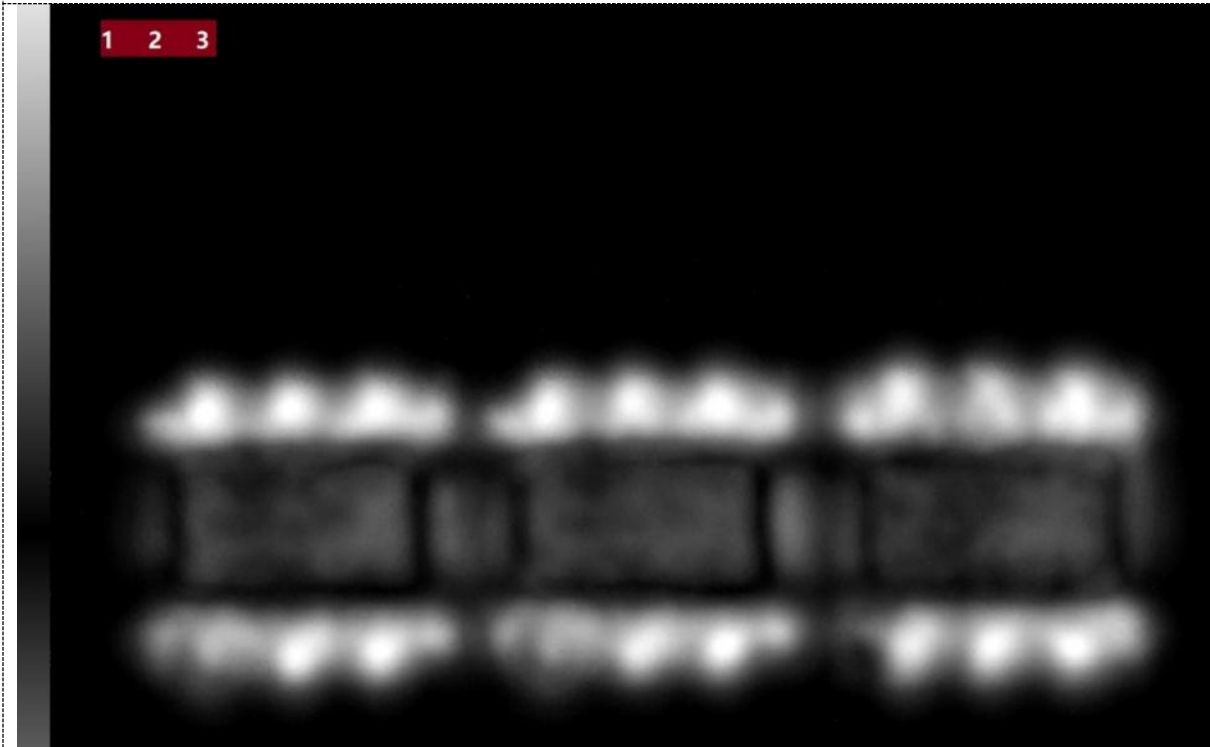
Add: F/r 401Building A, Ying Da Feng industrial No,393,Jihua Rd.LongGang
Dis. Shenzhen China
Tel: 0755-83765367 Email: engineer@iclab-cn.com



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IC(#1-#3)-50MHz-T





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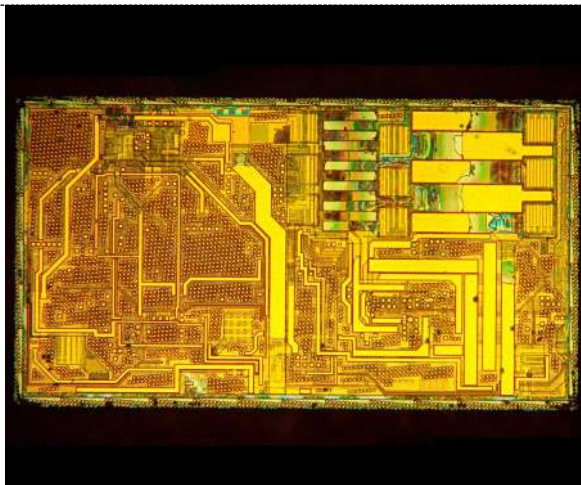
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9.Internal Visual Inspection:

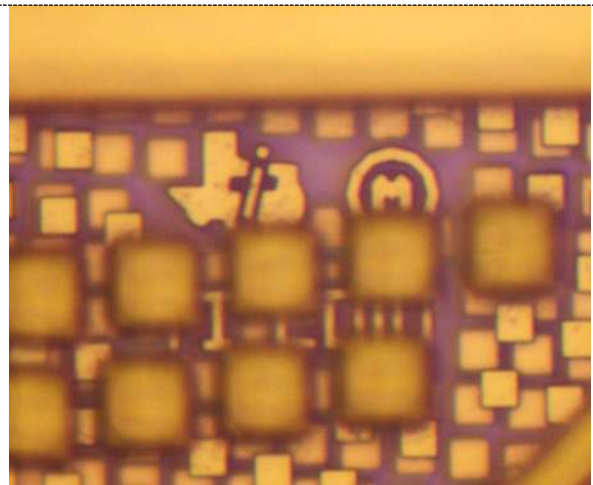
Applicable Standard: MIL-STD-883L-2019 2010.14

Internal Visual Inspection was verified on 1PCS sample. Manufacturer TI marking was found on the die surface. Die TPS62160D1 was also found on the die surface. Device confirmed to be a TI device.

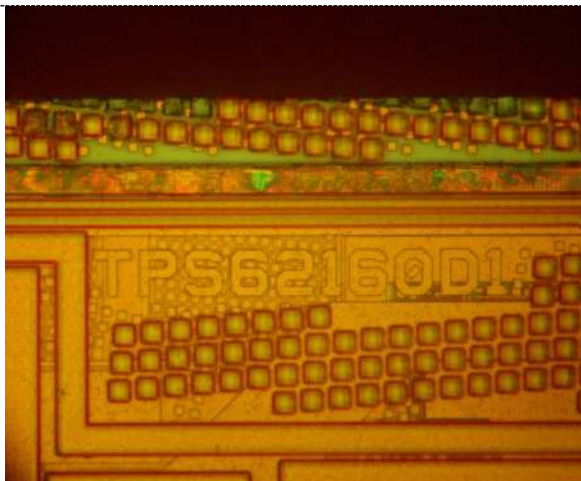
Die Topography



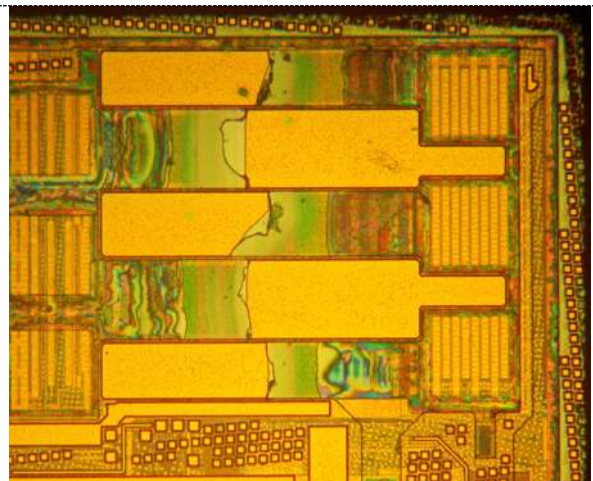
Die Logo



Die Marking



Die Corner-2





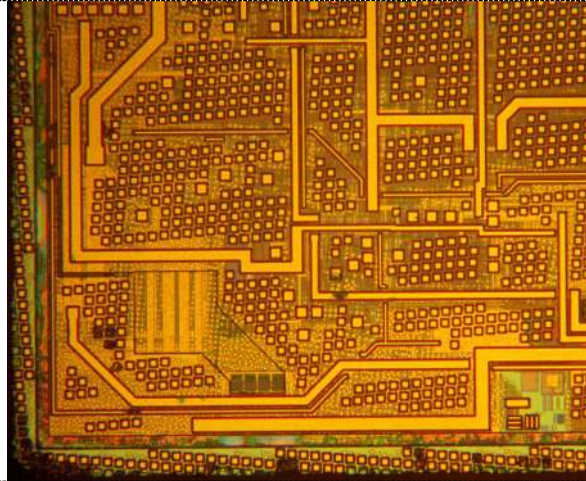
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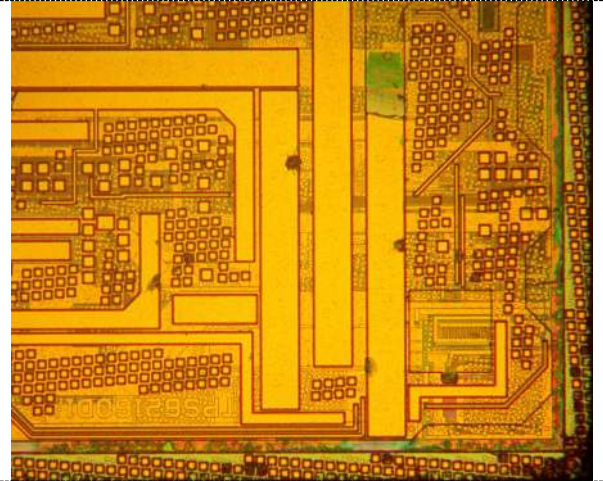


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Die Corner-3



Die Corner-4



End

For more information, please visit: <http://www.iclabcn.com>

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