Counterfeit Components..

Risk & Reality from

Counterfeit Presentation

Part 1: Major Source of Threat

Part 2: The Threat is Refined

Part 3: Threat Mitigation @ SMT

Part 1:

Major Source of Threat

China Trip 2008


Beijing
Shenzhen
Hong Kong
CHINA
GANSU
QINGHAI
NINGXIA HUI
SHAANXI
SHANXI
HEBEI
BEIJING
HENAN
SICHUAN
YUNNAN
GUIZHOU
HUNAN
JIANGXI
ANHUI
FUJIAN
MYANMAR
LAOS
THAILAND
VIETNAM
BHUTAN
BANGLADESH
ARUNACHAL PRADESH
N. KOREA
SOUTH KOREA
JAPAN
TAIWAN
East China Sea
Yellow Sea
Philippine Sea
Luzon Strait
Gulf of Tonkin
Paracel Islands (disputed)
300 miles

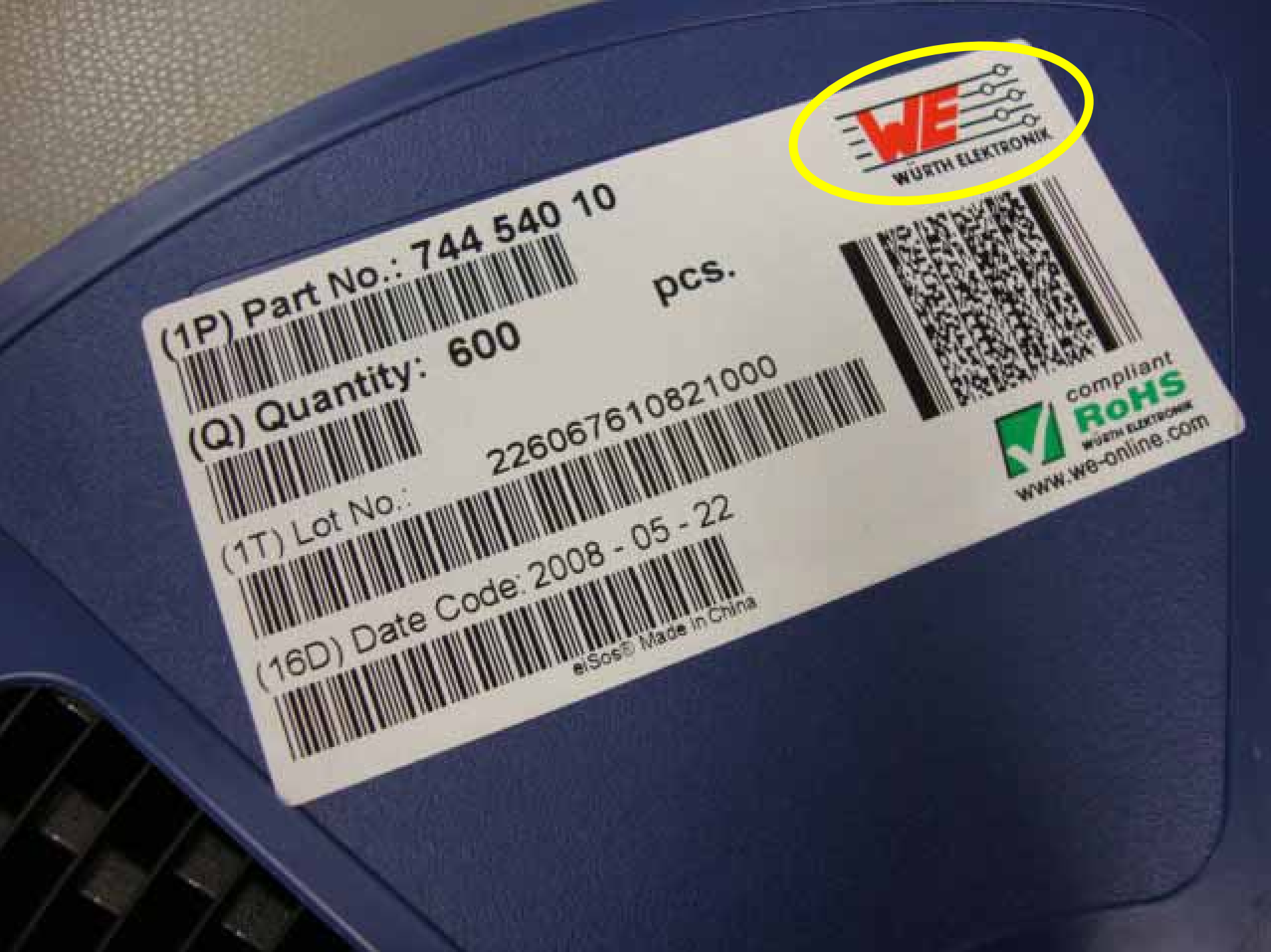
City of Shenzhen

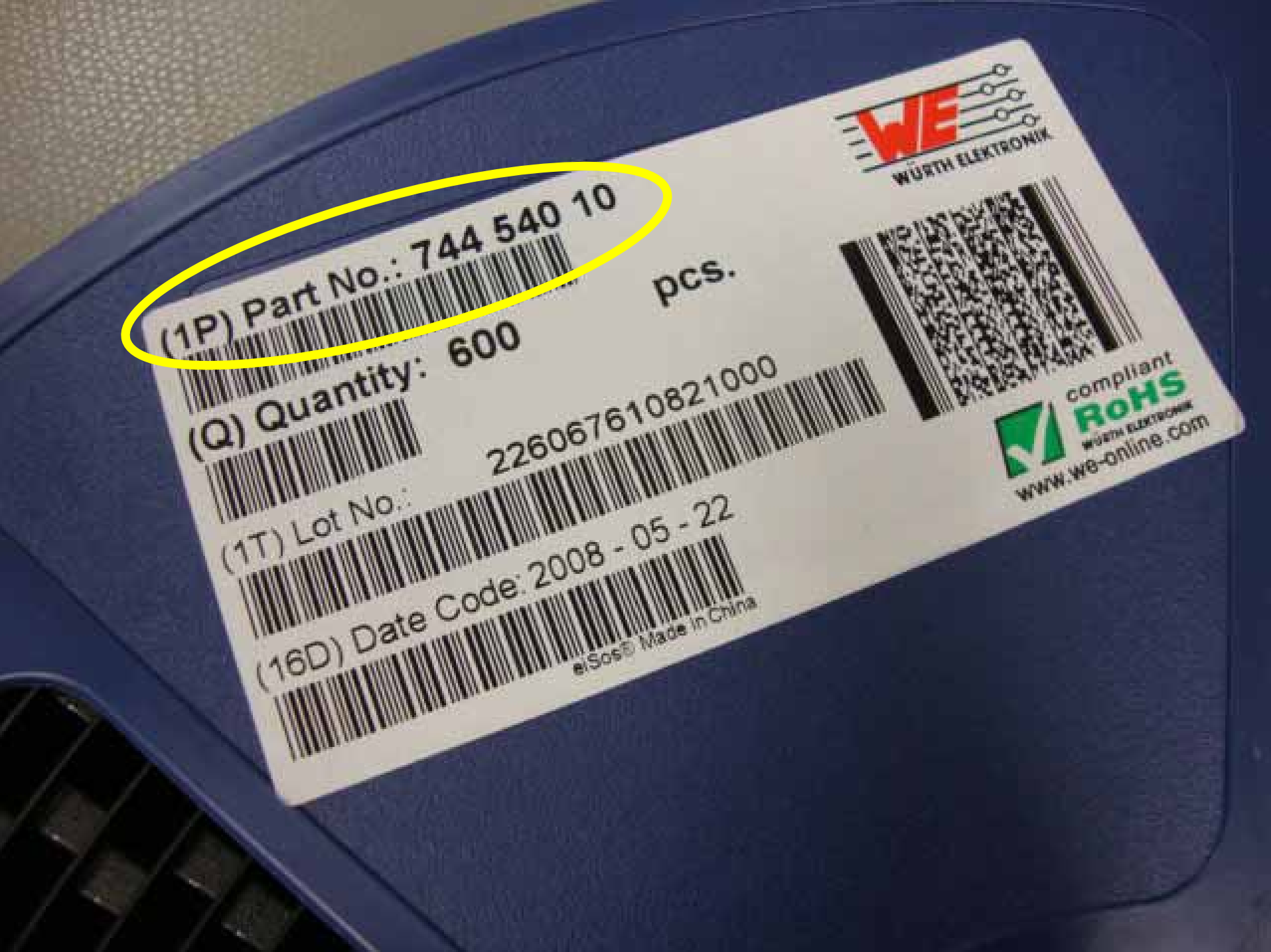
China's Main Entry Point of Counterfeit Electronics Into the Global Marketplace


intel
Centrino
英特尔 迅驰
鸿和多数码影贩
本商场三楼
itell易天
指定专营店
赛博数码广场
数码配件 耗材 数码维修 尽在
itell
易天
手机
Nikon
瞬间灵感，即刻成像
itell易天
三星 Anycall
SONY
减肥中
华强分
中国加油！
尼能机卖相机
索佳相CDMA专手机维修


深圳市科讯通电子有限公司
专营:DIP SMD IC 光藕 三端稳压
晶振系列
专营:石英 晶振 陶瓷晶振
贴片元件 振荡器 滤波器


FUJITSU
MAXIM
NEC
NOHM
AMD
ALTERA
MOTOROLA
Intel
ST
TOSHIBA
HARRIS
XILINX
HITACHI
ATMEL
LUCENT
MIEROCHP
IOR


WE
WÜRTH ELEKTRONIK
(1P) Part No.: 744 540 10
(Q) Quantity: 600
pcs.
(1T) Lot No.: 22606761082100O
(16D) Date Code: 2008 - 05 - 22
eiSos® Made in China
compliant
RoHS
WÜRTH ELEKTRONIK
www.we-online.com


(1P) Part No.: 744 540 10
(Q) Quantity: 600
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(1T) Lot No.: 22606761082100
(16D) Date Code: 2008 - 05 - 22
eiSos® Made in China
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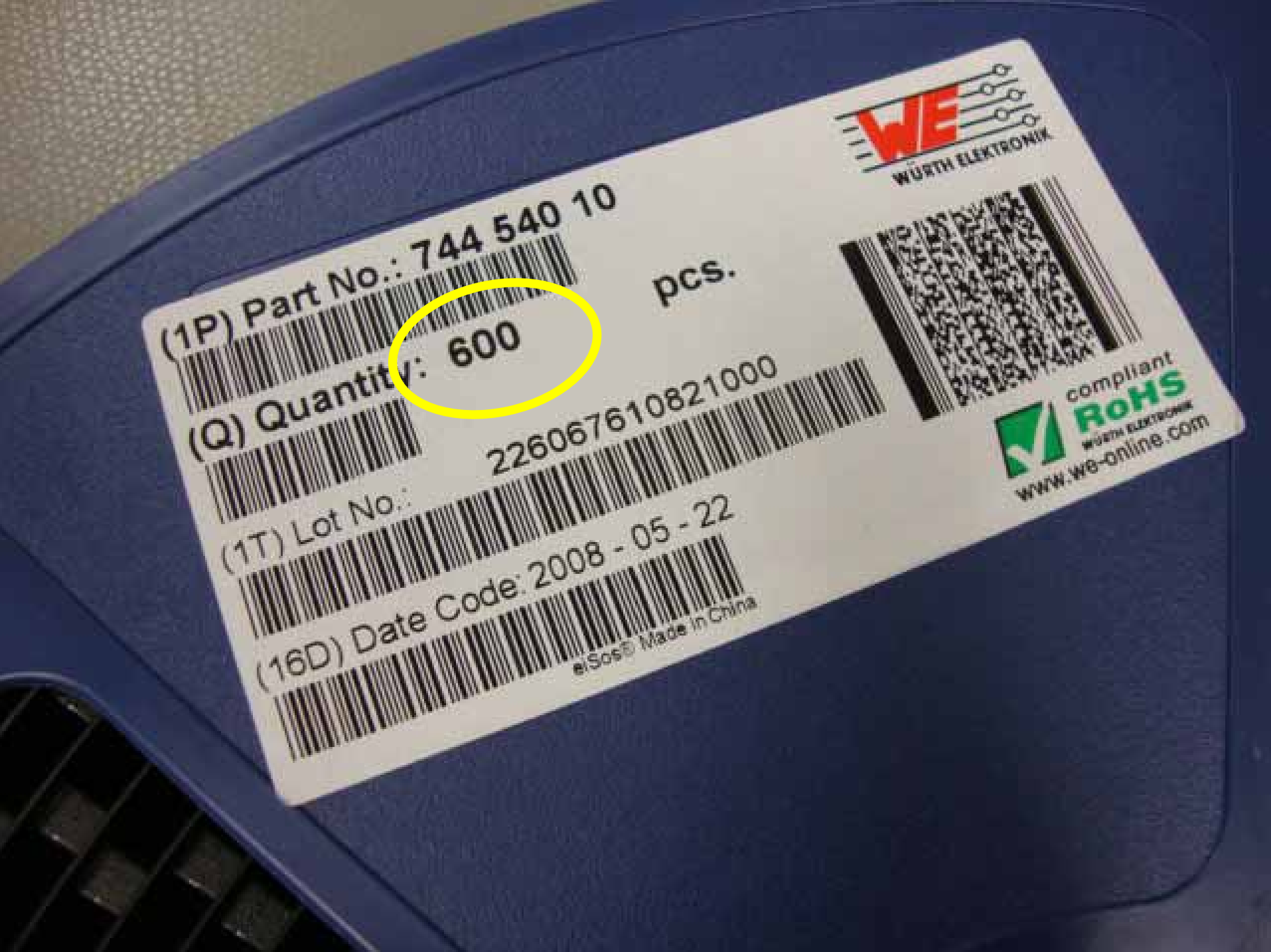
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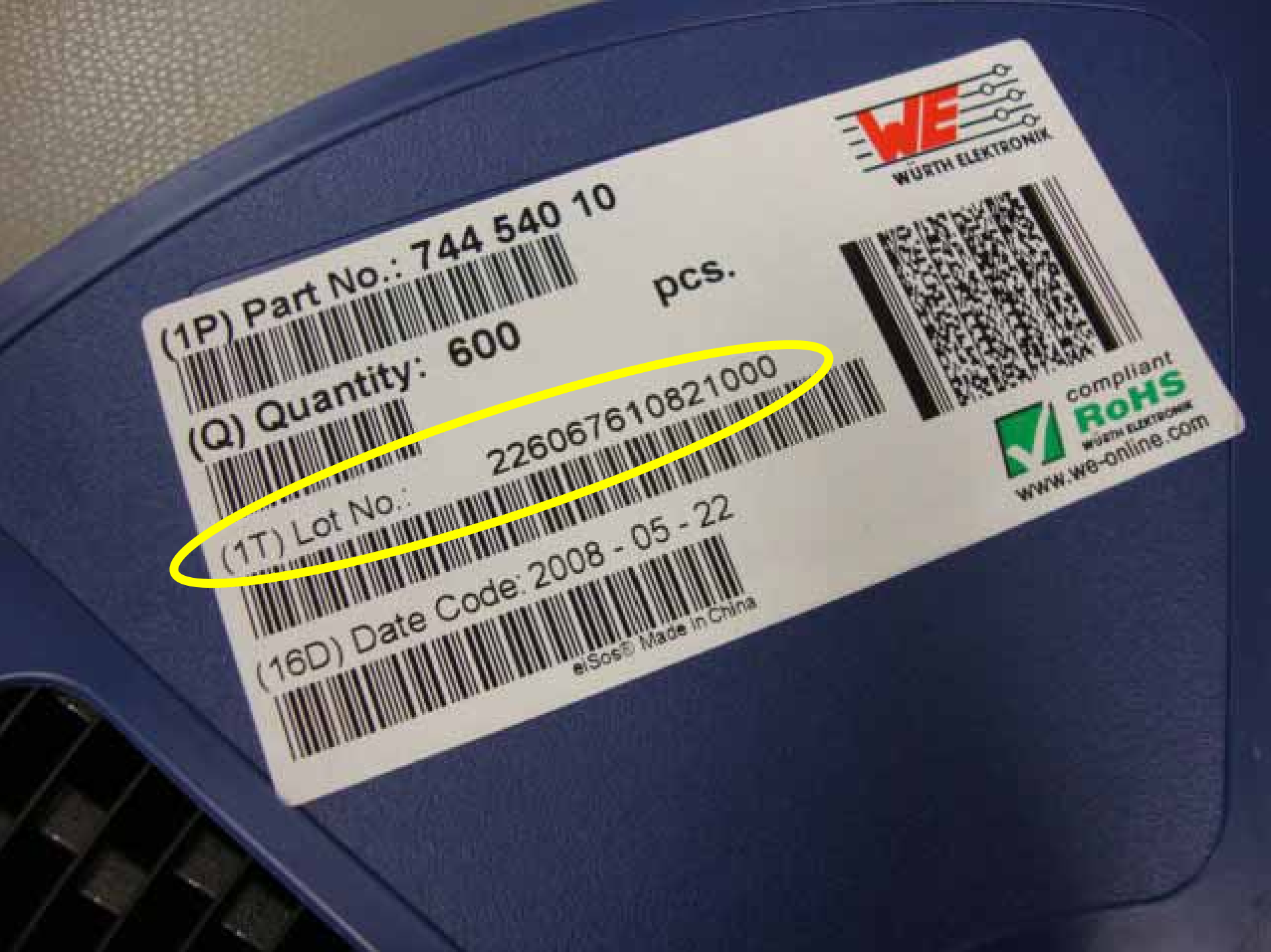
www.we-online.com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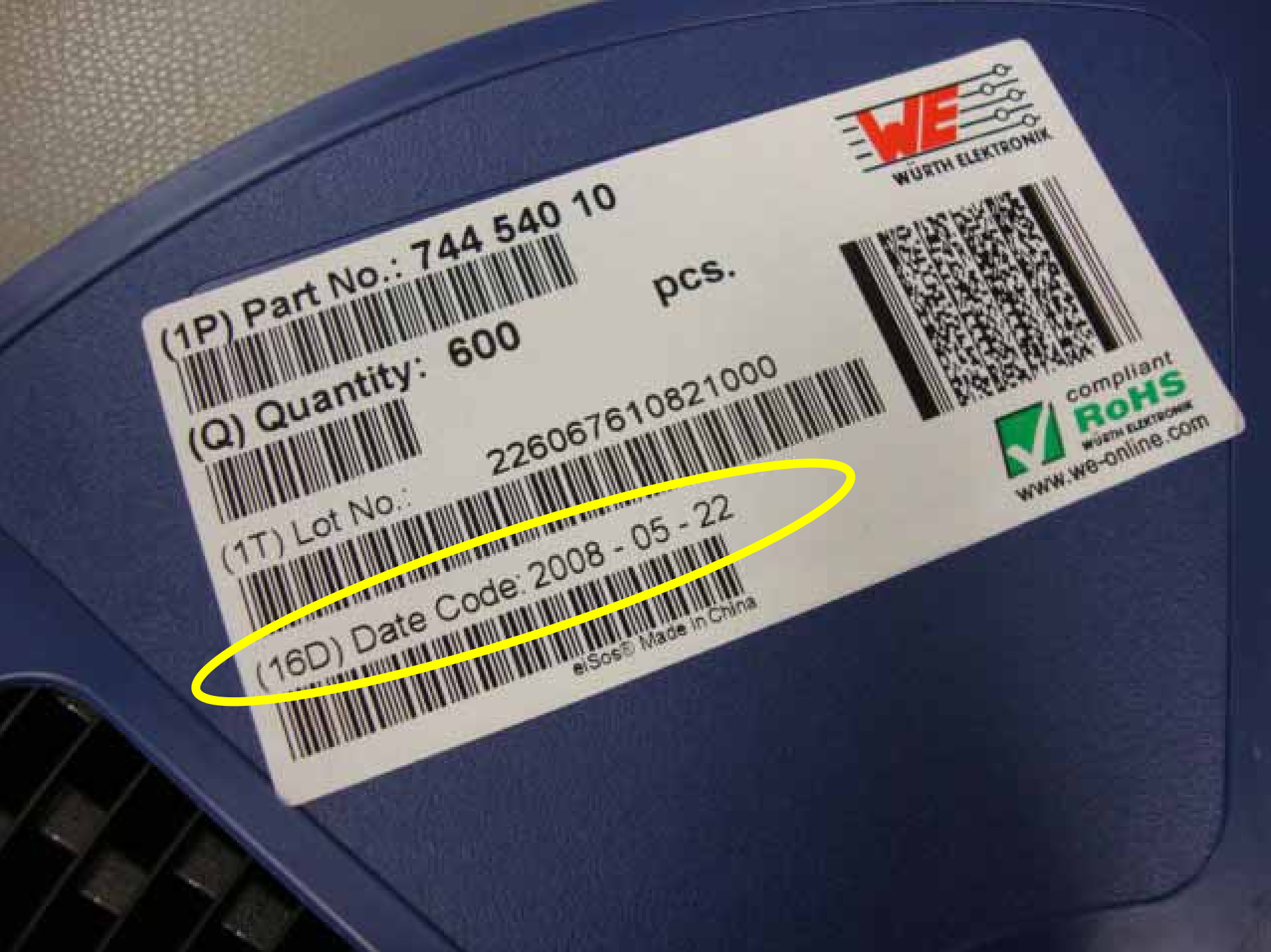
(Q) Quantity: 600
pcs.
(1T) Lot No.: 22606761082100O
(16D) Date Code: 2008 - 05 - 22
eiSos® Made in China
compliant
RoHS
WÜRTH ELEKTRONIK
www.we-online.com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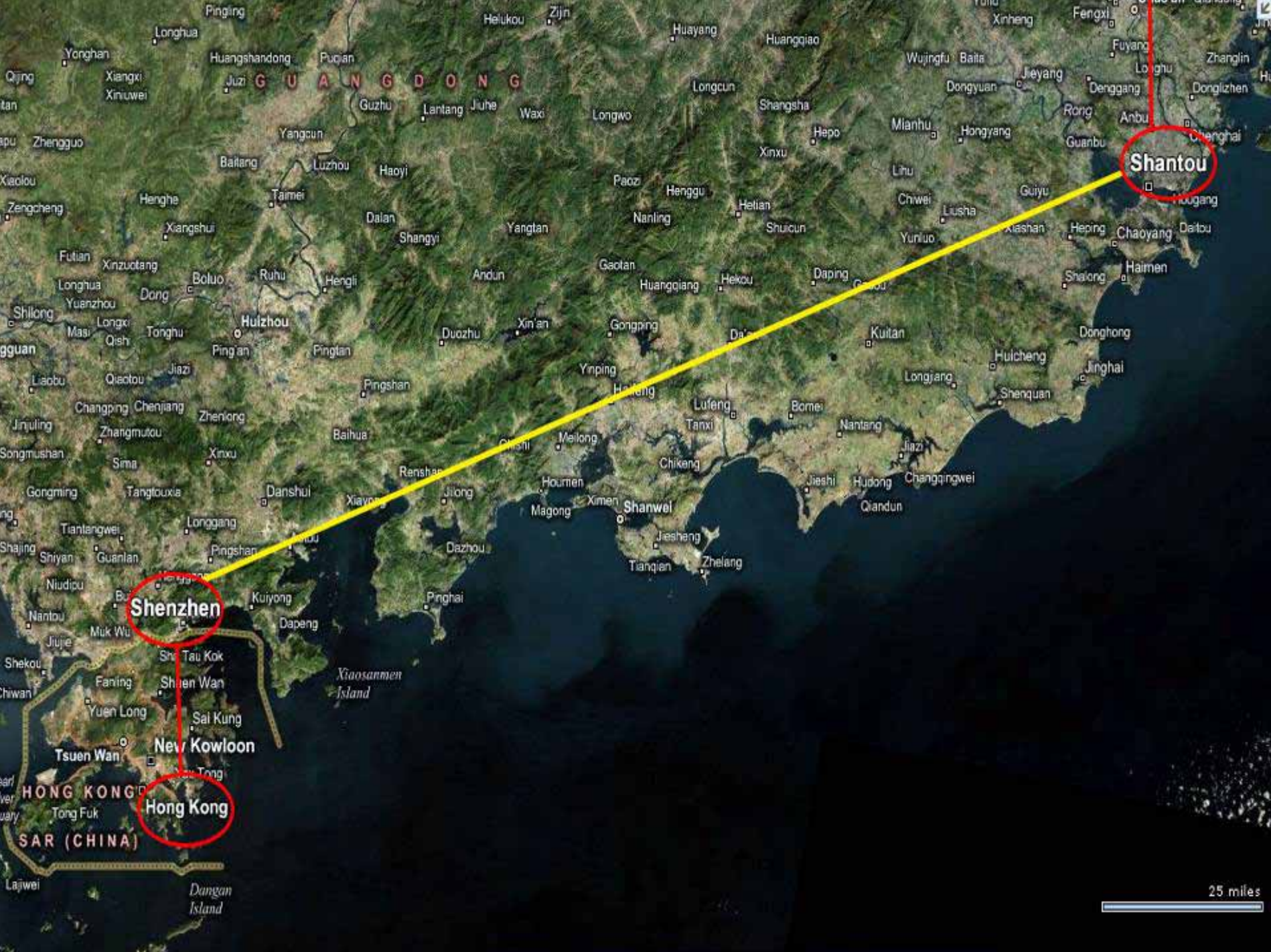
(Q) Quantity: 600
pcs.
(1T) Lot No.: 226067610821000
(16D) Date Code: 2008 - 05 - 22
eiSos® Made in China
compliant
RoHS
WÜRTH ELEKTRONIK
www.we-online.com


Reels of 0402
Case Size
Capacitors
松下电容大量现货
宇 阳 （EYANG）
电容 0603 / 0402
全系列大量现货
个体工商户营业执照


ATMEL
家电IC
MAXIM
74CD系列
HOLTEK
10A604
AT24C01
AT24C02
AT24C16
AT24C32
AT89C51-24PI
AT89C51-24PU
AT89S51-24PU
AT89S52-24PU
AT89C55WD
AT45DB041D
AT89C2051-24PU
ATMEGA8L-8PU
ATMEGA32L-8PU
TDA2003A
TDA2004
TDA2005R
TDA2025B
TDA2030A
TDA2822M
TDA7265
TDA7293
TDA7294
TDA7296
TDA7377
TDA7388
TDA8571J
MAX202CPE/EPE
MAX232CPE/EPE
MAX232ACWE/AEWE
MAX3232CPE/EPE
MAX483CPA/EPA
MAX485CPA/EPA
MAX487ECPA/EEPA
MAX813LCPA/LEPA
MAX1487CPA/EPA
MAX3082ESA
MAX809REUR-T
AL422B
SJA1000N
74HC00
74HC14
74HC595
74HCT02
74HCT245
74LS02
74LS126
CD4011
CD4013
CD4021
CD4060
CD4066
CD4069
HT1380B
HT1381B
HT9170B/D
HT9200A/B
HT1621B
HT46R47
HT6221
HT7022-1
HT7136-1
HT7330A-1
HT7533-1
HT7536-1
LM567
AMS1117-...
W77E058A40DL
W77E516A40DL
W78E058B40DL
W78E054B40PL
W78E052C40DL
DS18B20+
DS18S20+
DS12887
DS12C887
DS1302
DS1307
10A604
10A605


Shantou
Shenzhen
Hong Kong
Pingling
Helukou
Zijin
Huayang
Huangqiao
Fengxi
Xinheng
Longhua
Yonghan
Huangshandong
Puqian
Fuyang
Wujingfu
Baita
Zhanglin
Qijing
Xiangxi
Xiniuwei
Juzi
G U A N G D O N G
Jieyang
Longcun
Dongyuan
Denggang
Donglizhen
Guzhu
Lantang
Jiuhe
Waxi
Longwo
Shangsha
Rong
Anbu
Zhengguo
Yangcun
Hepo
Mianhu
Hongyang
Guanbu
Xinxu
Baitang
Luzhou
Haoyi
Paoz
Linu
Henghe
Taimei
Henggu
Chiwei
Guiyu
Zengcheng
Hetian
Liusha
Dalan
Nanling
Xiangshui
Yangtan
Shangyi
Shuicun
Yuniuo
Xiashan
Heping
Chaoyang
Daibu
Futian
Xinzuotang
Gaotan
Haimen
Boluo
Ruhu
Hengli
Andun
Huangqiang
Hekou
Daping
Shalong
Longhua
Dong
Yuanzhou
Shilong
Huizhou
Duozhu
Xin'an
Gongping
Kuitan
Donghong
Masi
Longxi
Qishi
Tonghu
Ping'an
Pingtan
Huicheng
Jinghai
Liaobu
Qiaotou
Jiazi
Yinping
Longjiang
Pingshan
Shenquan
Changping
Chenjiang
Zhenlong
Lufeng
Bomei
Jinjuling
Zhangmutou
Tanxi
Nantang
Baihua
Songmushan
Meilong
Jiazi
Sima
Xinxu
Chikeng
Renshan
Houmen
Jieshi
Hudong
Changqingwei
Gongming
Tangtouxia
Danshui
Jilong
Ximen
Shanwei
Magong
Qiandun
Tiantangwei
Longgang
Jieshang
Shajing
Shiyan
Guanlan
Pingshan
Dazhou
Tianqian
Zhelang
Niudipu
Kuiyong
Pinghai
Nantou
Muk Wu
Dapeng
Jiuje
Shekou
Tau Kok
Fanling
Shuen Wan
Xiaosanmen Island
Yuen Long
Sai Kung
New Kowloon
Tsuen Wan
Tong
HONG KONG
Tong Fuk
SAR (CHINA)
Lajiwei
Dangan Island
25 miles

Vehicle Inspection Point Just Outside City of Shantou

Electronic Debris Stored in Front and Back Yards Seen While Driving Through City Streets

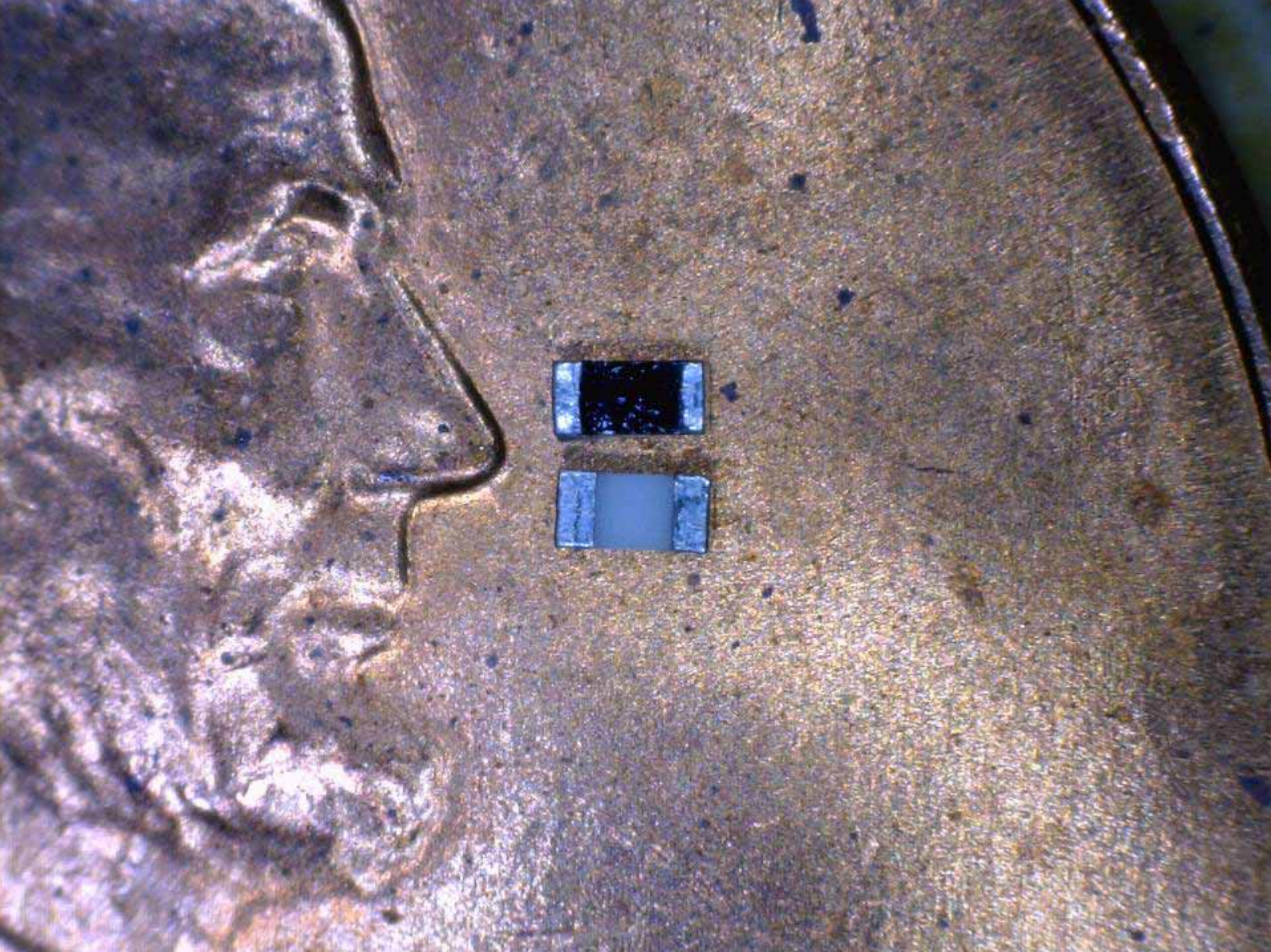
Components Being Washed in the River & Laid on Bank to Dry


Components on River Bank Drying


Washing Components in River

Pulled Components Drying on City Sidewalks, then Separated by Type


0402 Case Size Capacitors
($.0025 ea from Fran. Disty)



Pulled Components Stored in Bags, Being Delivered and Awaiting Processing


Floor #1

Pulled Components Sorted by Sifting

Shantou Warehouse: Boards Stacked, Waiting for Chip Removal

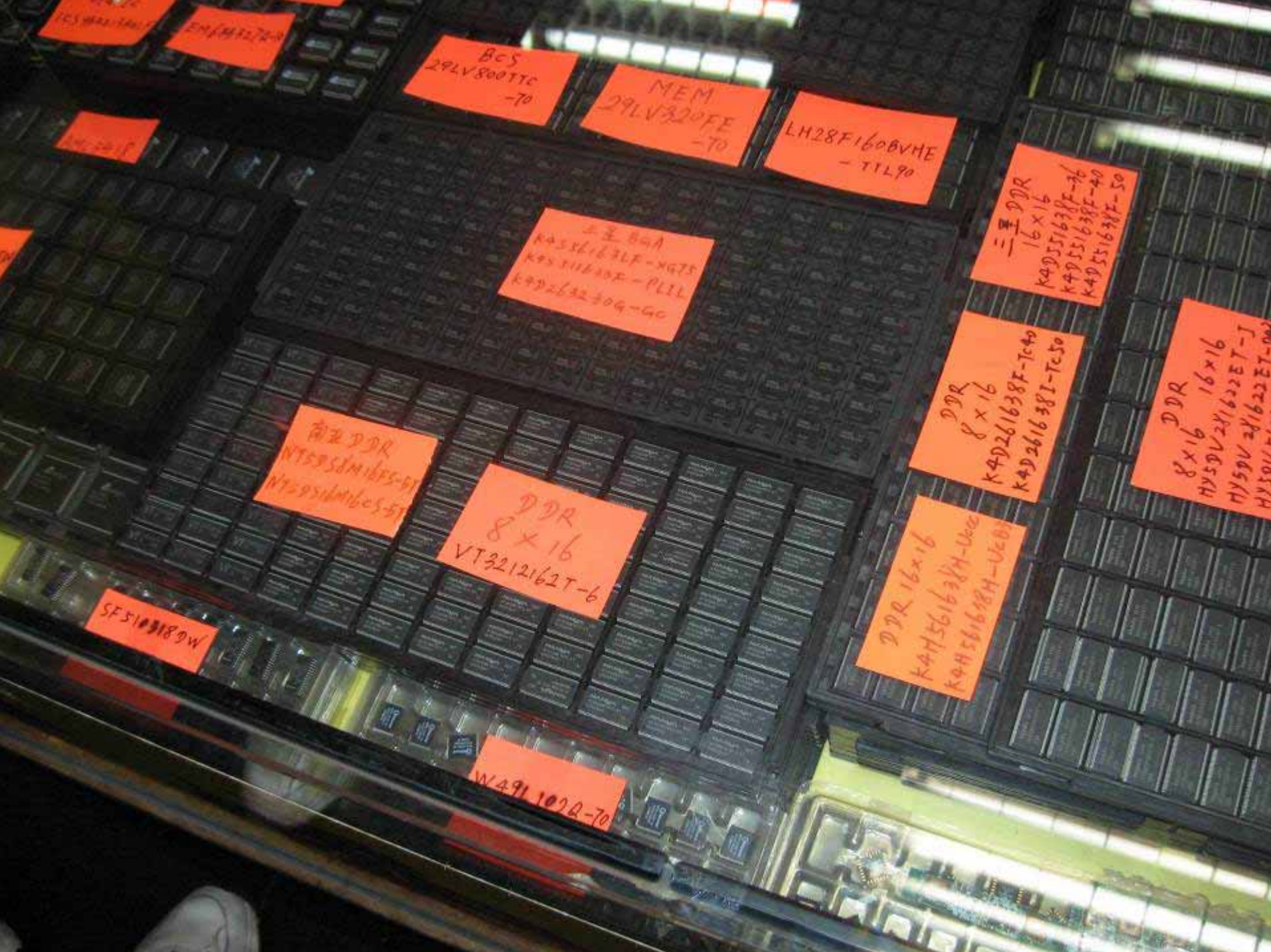

红玫
广东中烟工业公司出品

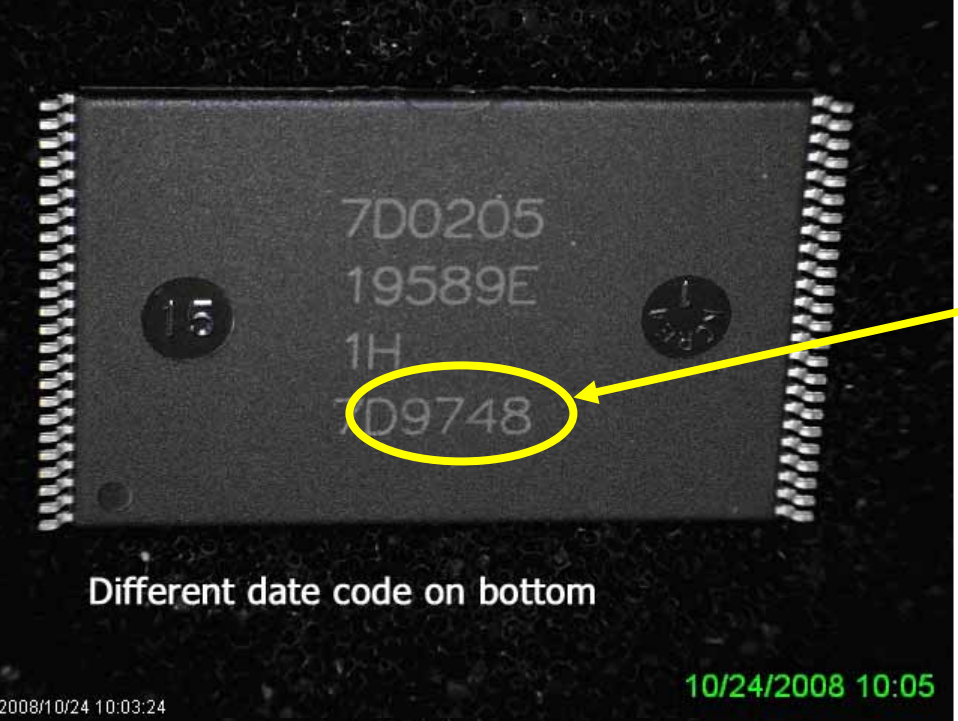
Targeted Components Have Already Been Removed

Pulled Components Prepared for Counterfeiting Process

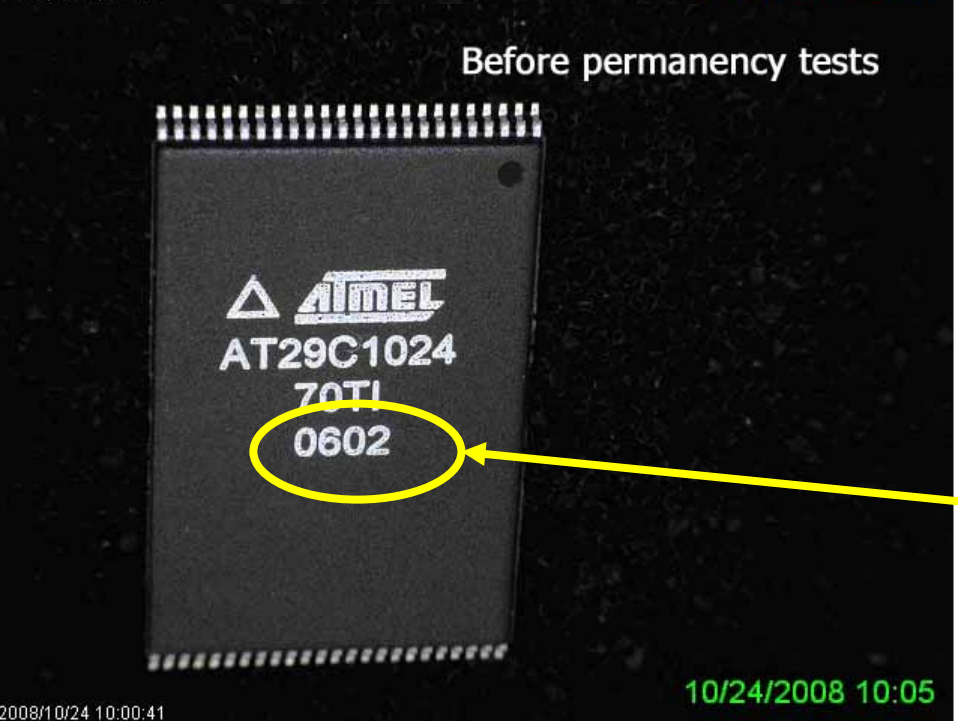

弘隆
0769-85167966
正承

Remarked Components Ready for Counterfeit Packaging and Distribution thru Shenzhen's Global Market


BCS
29LV800TTC
-70
MEM
29LV320FE
-70
LH28F160BVHE
-TTL90
三星 DDR
16×16
K4D551638F-TC40
K4D551638F-TC50
DDR
8×16
K4D26163SF-TC40
K4D26163SF-TC50
DDR
8×16
VT3212162T-6
DDR 16×16
K4H561638H-UCCC
K4H561638H-UCB3



1997 Parts Remarked as 2006: Nine Years Difference



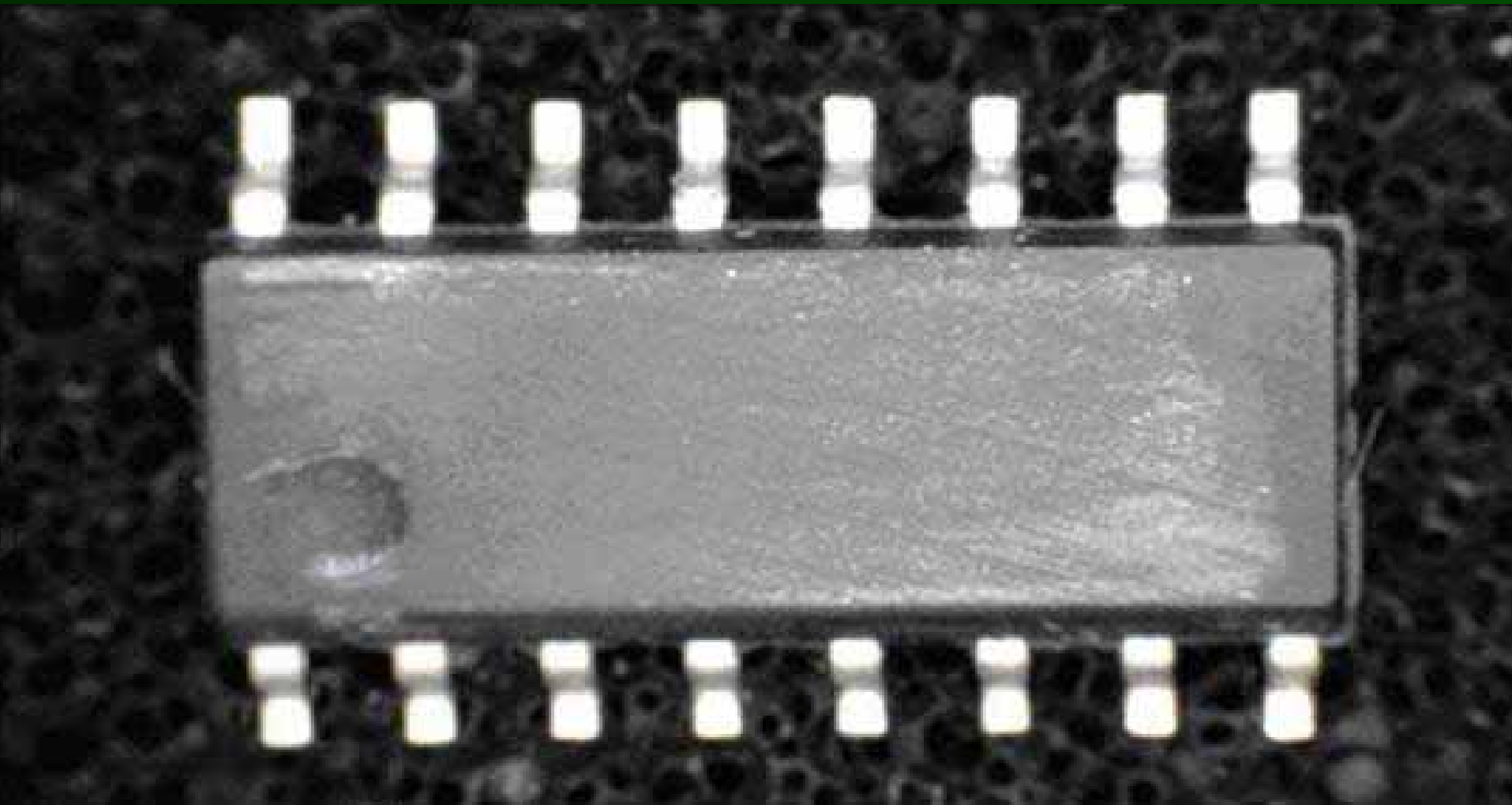
Counterfeit Cisco Card

Grim Reality of the Counterfeit Global Distribution Network

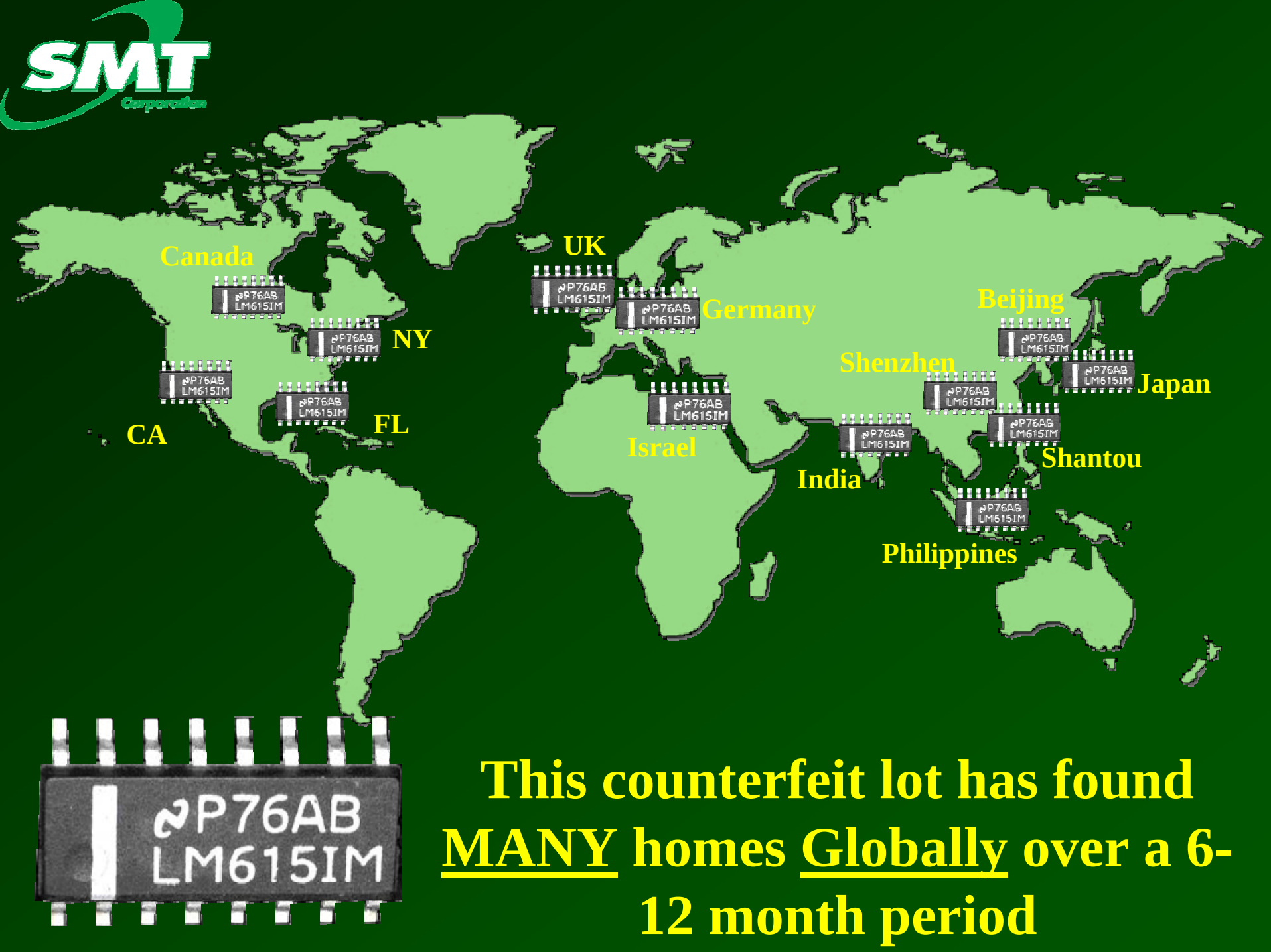
Life of a Counterfeit Component

- Created 1st week of August, 2010 in Shantou China
- 10,000 **Identical (lot/dc)** parts
- All were Immediately put up for sale
- Over next 6-12 months the 10,000 **Identical (lot/dc)** parts have been split up into smaller groups and found new homes around the world

Before



After



This counterfeit lot has found MANY homes Globally over a 6-12 month period

Life Span to Threaten Industry?

Indefinite!

Counterfeiting: Not Just Components


Micron
Technology , Inc
Counterfeit
factory box
ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING

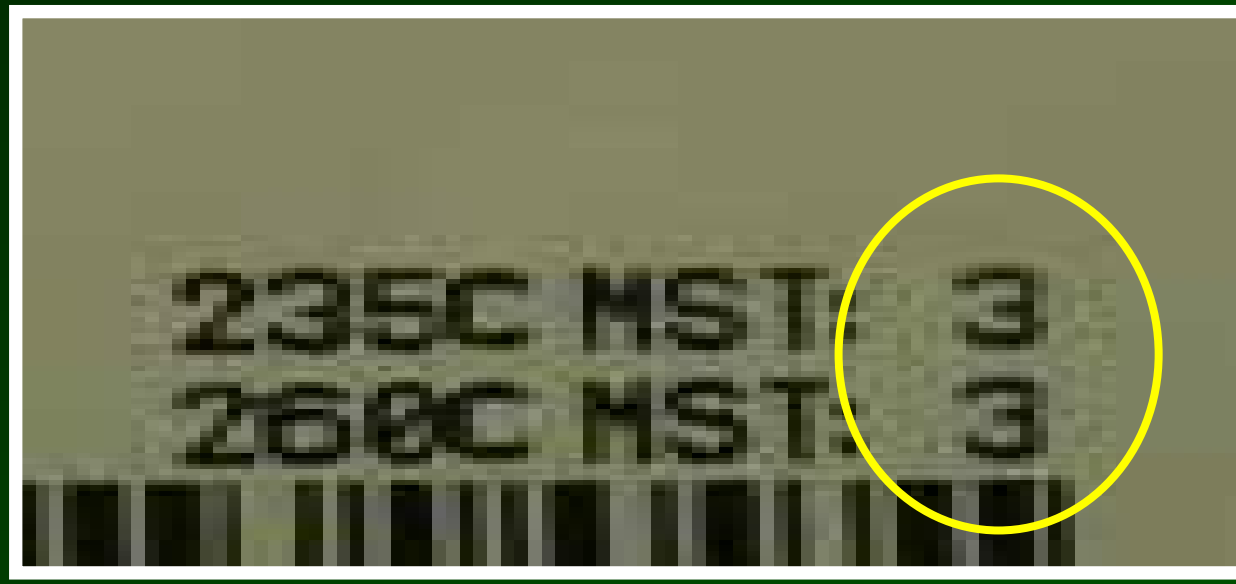
LOGO AUTHENTICATION

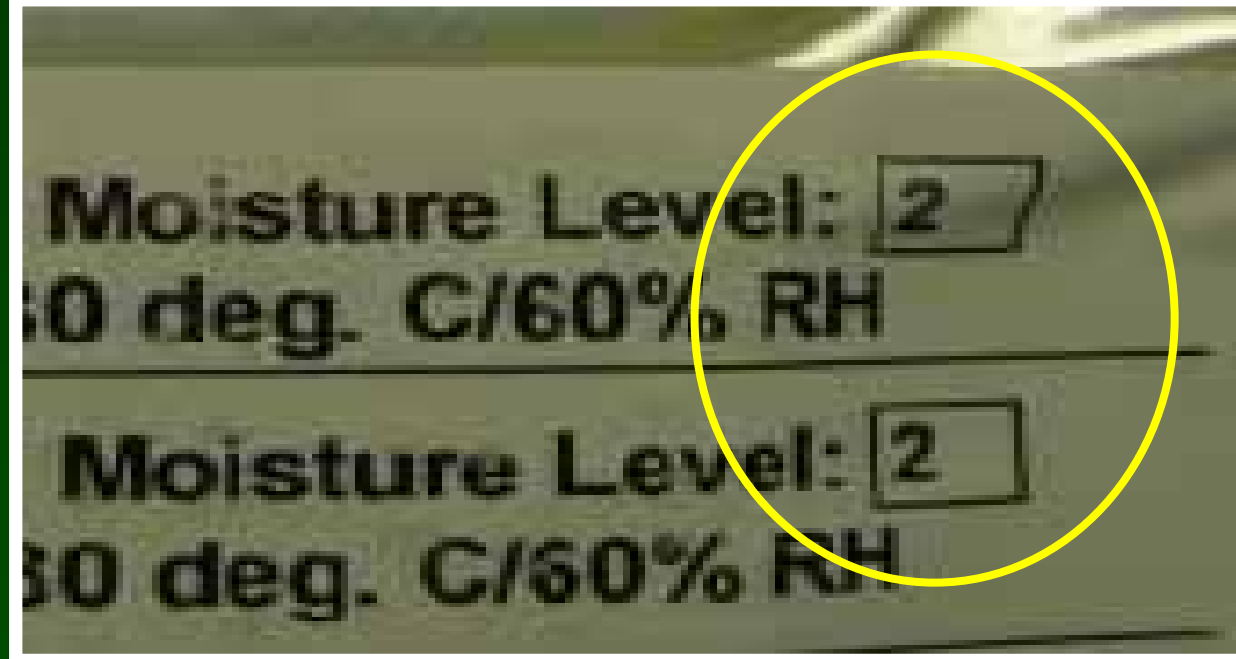
FAKE

REAL


Micron
PART NUMBER:(1P) MT28F004B5VG-6 B
QUANTITY: 1000 DATE:200548 235C MST: 3
(1T) BYKJ2N7.11 260C MST: 3
235C Peak Package Body Temp Moisture Level: 2
Floor Life: One Year Condition < = 30 deg. C/60% RH
260C Peak Package Body Temp Moisture Level: 2
Floor Life: One Year Condition < = 30 deg. C/60% RH
Package Seal Datl: Del 02 2005
Operator: JDOE

Moisture Level Inconsistency On “Factory” Labels





Spelling Errors

Date

Dec

John Doe??

Counterfeit OCM "Certificates of Compliance" (C of C)

SMT Corporation

MILITARY CERTIFICATE OF COMPLIANCE

I hereby certify that the products in this shipment are part of shipments covered by the manufacturer's certificates which are enclosed. All products have been received, stored, and shipped in accordance with JEDEC Standard 31, EIA625 and JEP 109.

5-23-04
Date

Authorized Signature
Military Product Controller
Title

Q Form 148 Rev 2 6/26/01

ANALOG DEVICES

MIL-STD 883 ATTRIBUTES TEST DATA

Customer	Special/Generic	QC Lot #
ETEC	AD590MF/883B 5962-8757104XA	F28542265

Date Code	Prepared By	QC Lot Size	Ship Qty:
0432	C. LEE	429	250

	Method	Screen (Mil.Std 883; Method 5004)	Cond.	Gross	Net	REJ. OTHER	Date	Comments
VISUAL/MECHANICAL/ELECTRICAL SCREENING		INTERNAL VISUAL	✓	604	600			
		TEMPERATURE CYCLE	✓	600	490			
		CONSTANT ACCELERATION	✓	490	490			
		HERMETICITY FINE LEAK	✓	490	431			
		PRE BURN-IN ELECTRICAL	✓	431	430			
	1015	BURN IN	✓	430	429			
		POST BURN-IN ELECTRICAL	✓	429	429			
	2009	EXTERNAL VISUAL	✓	429	429			
QUALITY CONFORMANCE INSPECTION	[illegible]005	GROUP A INSPECTION						100% TESTED
		PROGRAM NAMES		PROGRAM NAMES: A1348-2				

Generic P/N	FAB Date Code	Report #
AD590MF/883B 5962-8757104XA	0410	M26-452K

Approved By: Date: 05-28-04

MILITARY CERTIFICATE OF COMPLIANCE
I hereby certify that the products in this shipment are part of
which are enclosed. All products have been received, stored, and shipped in accordance with JEDEC Standard 31, EIA625 and JEP 109.
5-23-04
Date
Authorized Signature
Military Product Controller
Title
Q Form 148 Rev 2 6/26/01

ANALOG DEVICES

RT. 1 INDUSTRIAL PARK, NORWOOD, MA 02062

DATE _____ P.O. # _____ PART # _____

CUSTOMER: _____ SALES ORDER _____ DATE CODE _____

DOCUMENTS ENCLOSED _____

INCOMING QUALITY CONTROL INSPECTION DATA

THESE DOCUMENTS MUST

ACCOMPANY SHIPMENT

Counterfeit OCM Cert Envelope

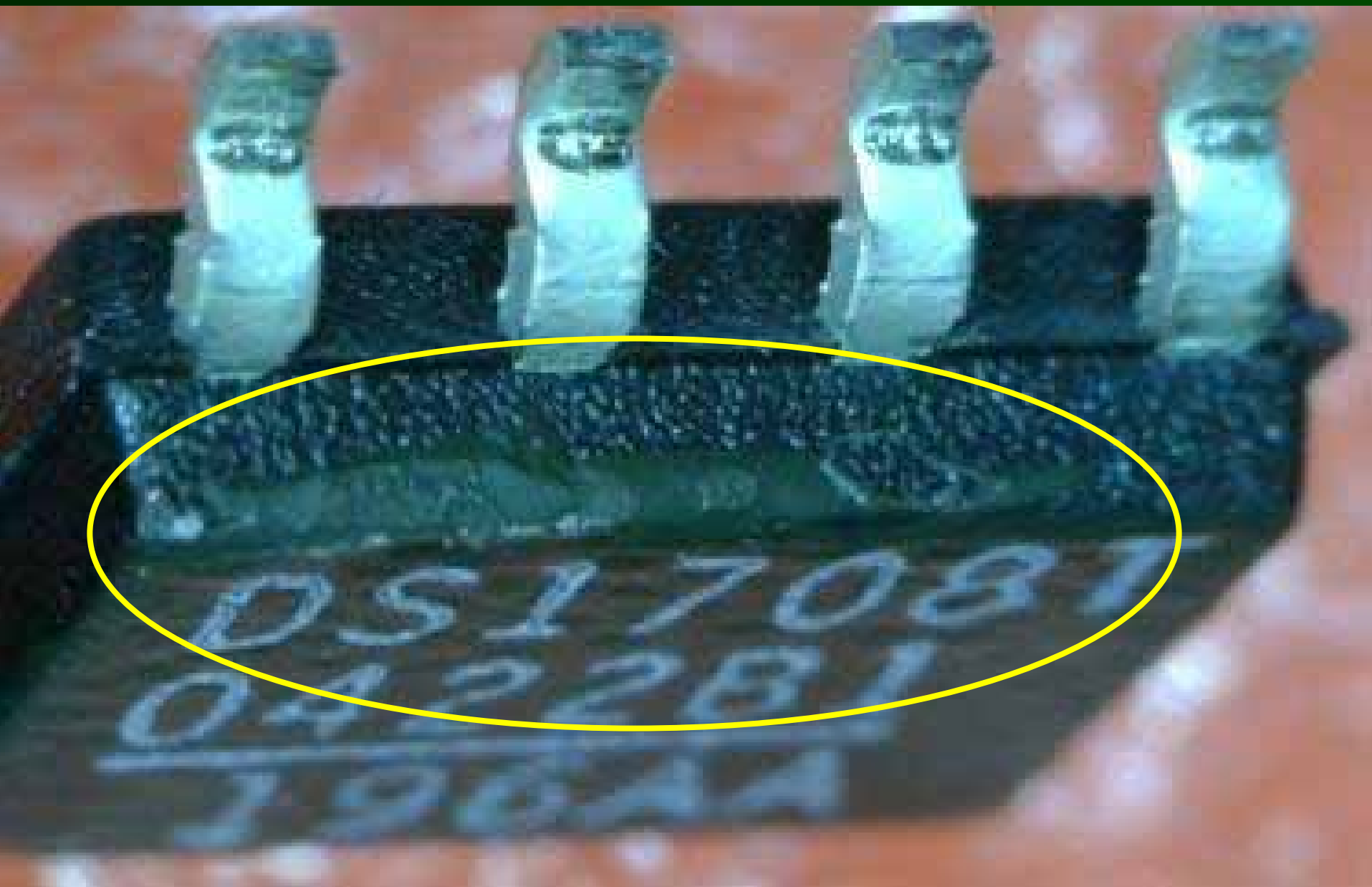

HUMIDITY INDICATOR
60%
50%
30%
20%
10%
READ AT LAVENDER
BETWEEN PINK & BLUE
HUMIDITY INDICATOR
ITEM
IF PINK
CHANGE
DESICCANT
IF PINK
40
WARNING
IF PINK
30
AVOID METAL CONTACT

Over 20 Years of Black-Topping and Remarking

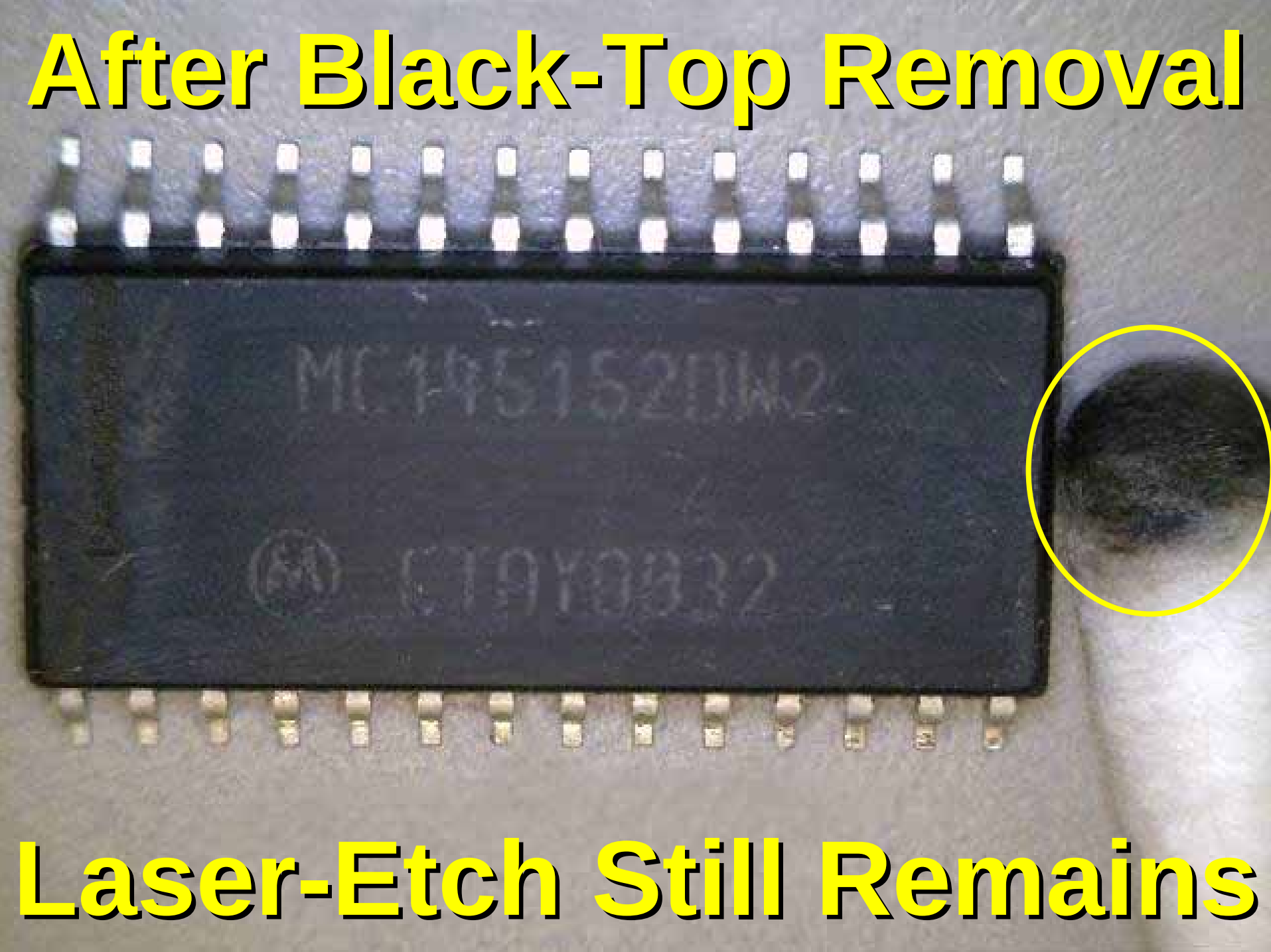
Original Date Code 8829

Remarked Date Code 9115

SLOPPY BLACK-TOPPING



Laser-Etch Remarking Still Visible After Black-Topping Has Been Removed

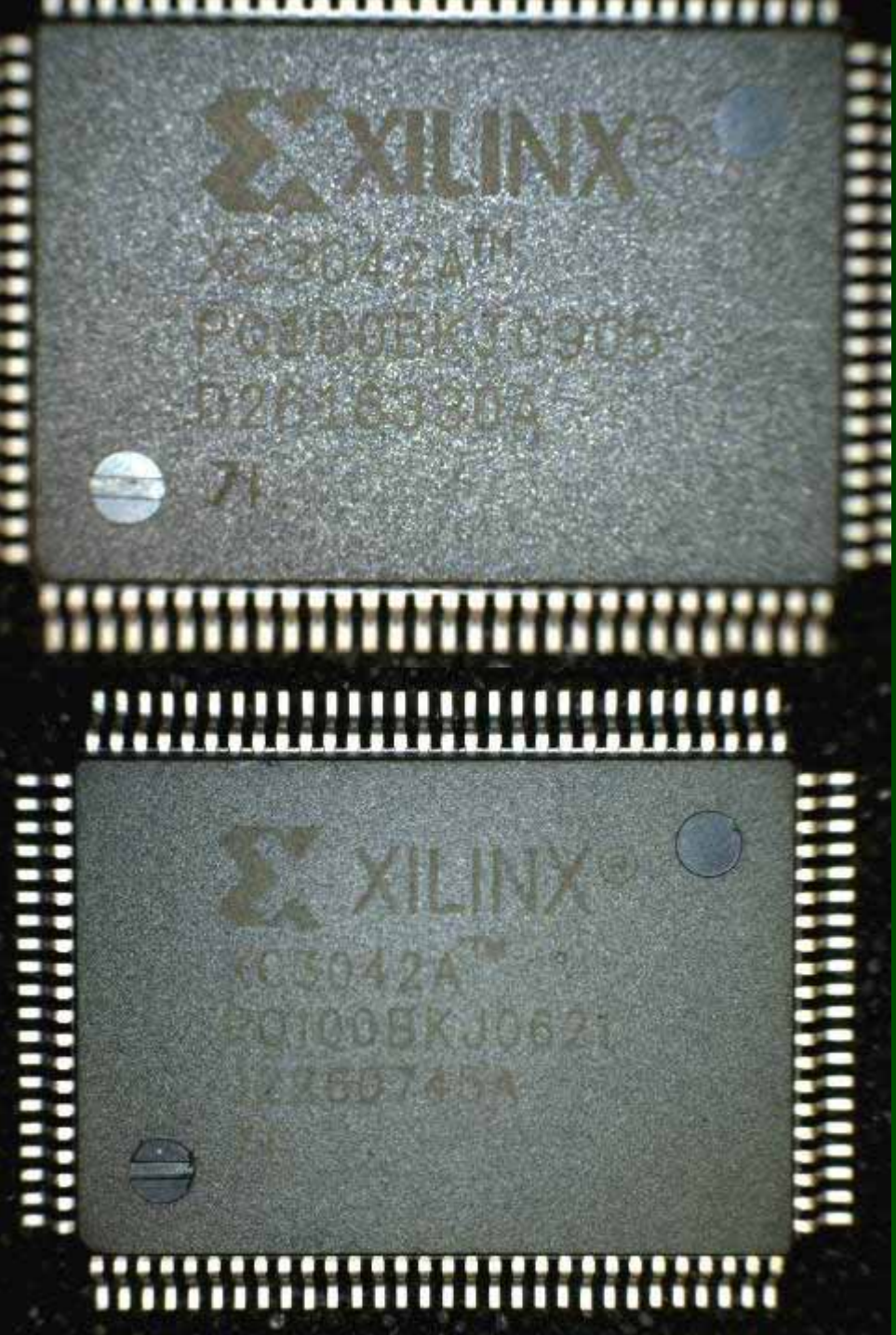

After Black-Top Removal
Laser-Etch Still Remains

Part 2:

The Threat is Refined

New Threat! (July 2009)

Highly-Engineered Black-Top Material Designed to Evade Detection on Counterfeited Plastic Encapsulated Microcircuits (PEMS)



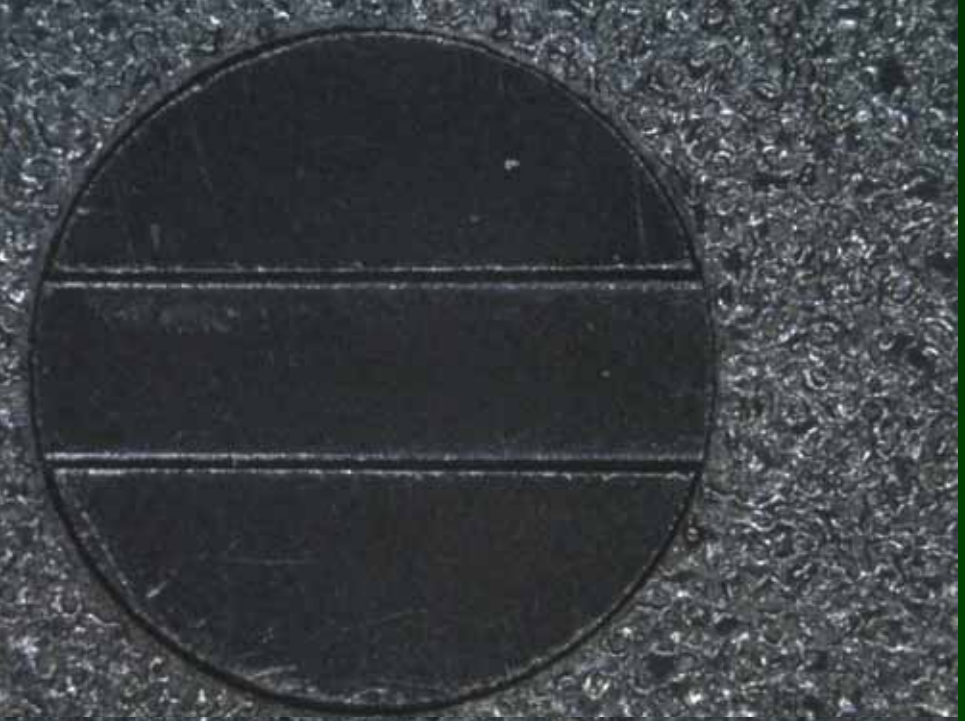
Exemplar
Top
Surface

Suspect
Top
Surface

Exemplar
Top
Surface

Virtually
Identical Surface
Features

Suspect
Top
Surface



Exemplar
Pin-One
Cavity

Suspect
Pin-One
Cavity


Suspect Pin-One
Cavity

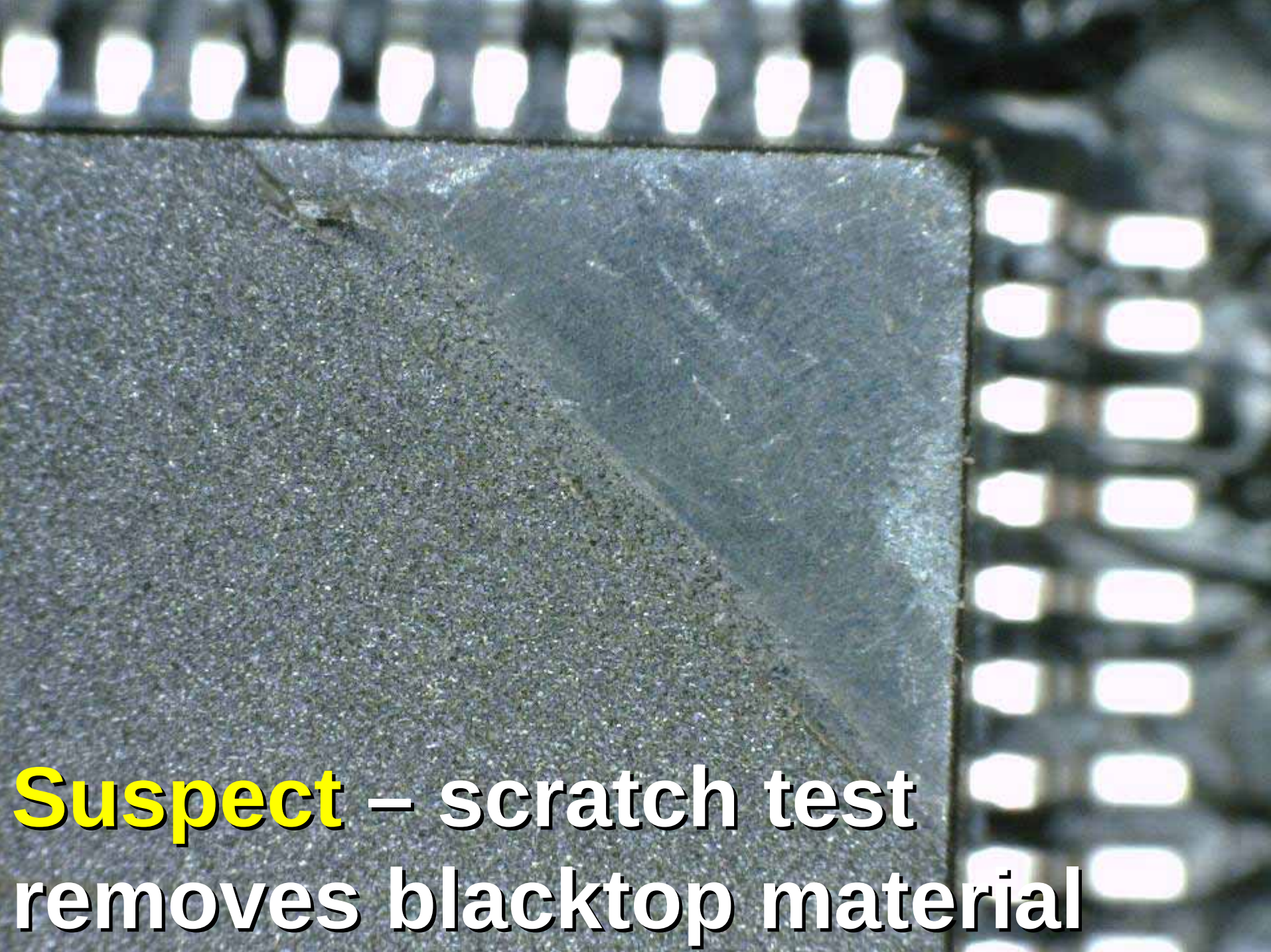

Suspect
XILINX
XC3042A
PQ100BKJ0621
J2260745A
7I
Pure Acetone – No Affect

Pure Acetone – 7 Day Soak

7 Day Soak – Wipe Test Has No Affect

Suspect

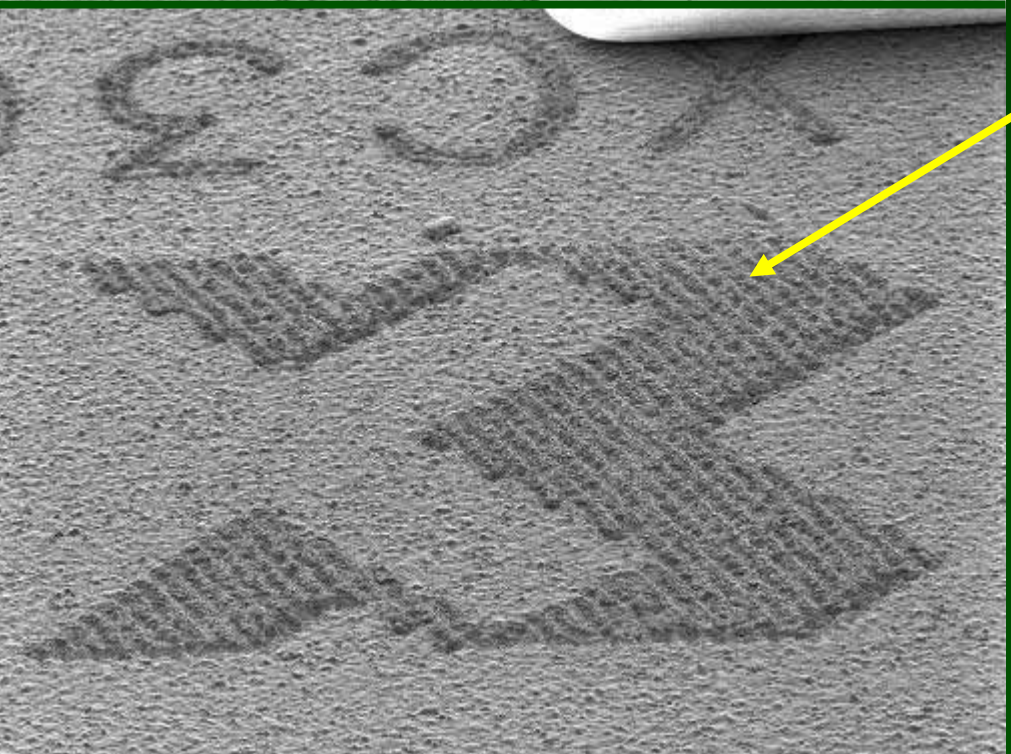
New Blacktop Material Could Only Be Removed With an X-acto Knife


Suspect – scratch test
removes blacktop material

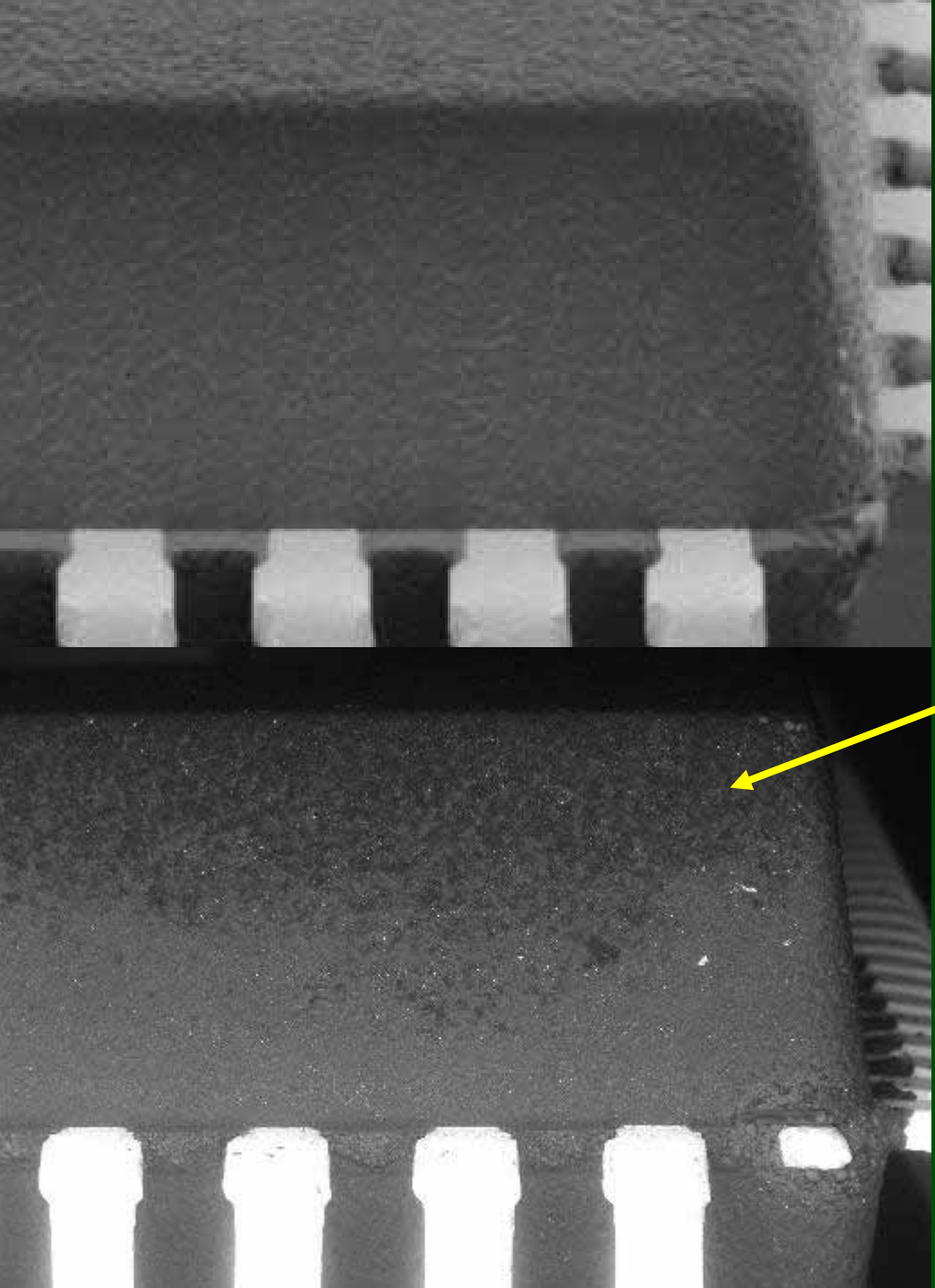
Scanning Electron Microscope (2 Systems)

Exemplar
Device
Top

“Cornrow”
Etch Process



Suspect
Device
Top

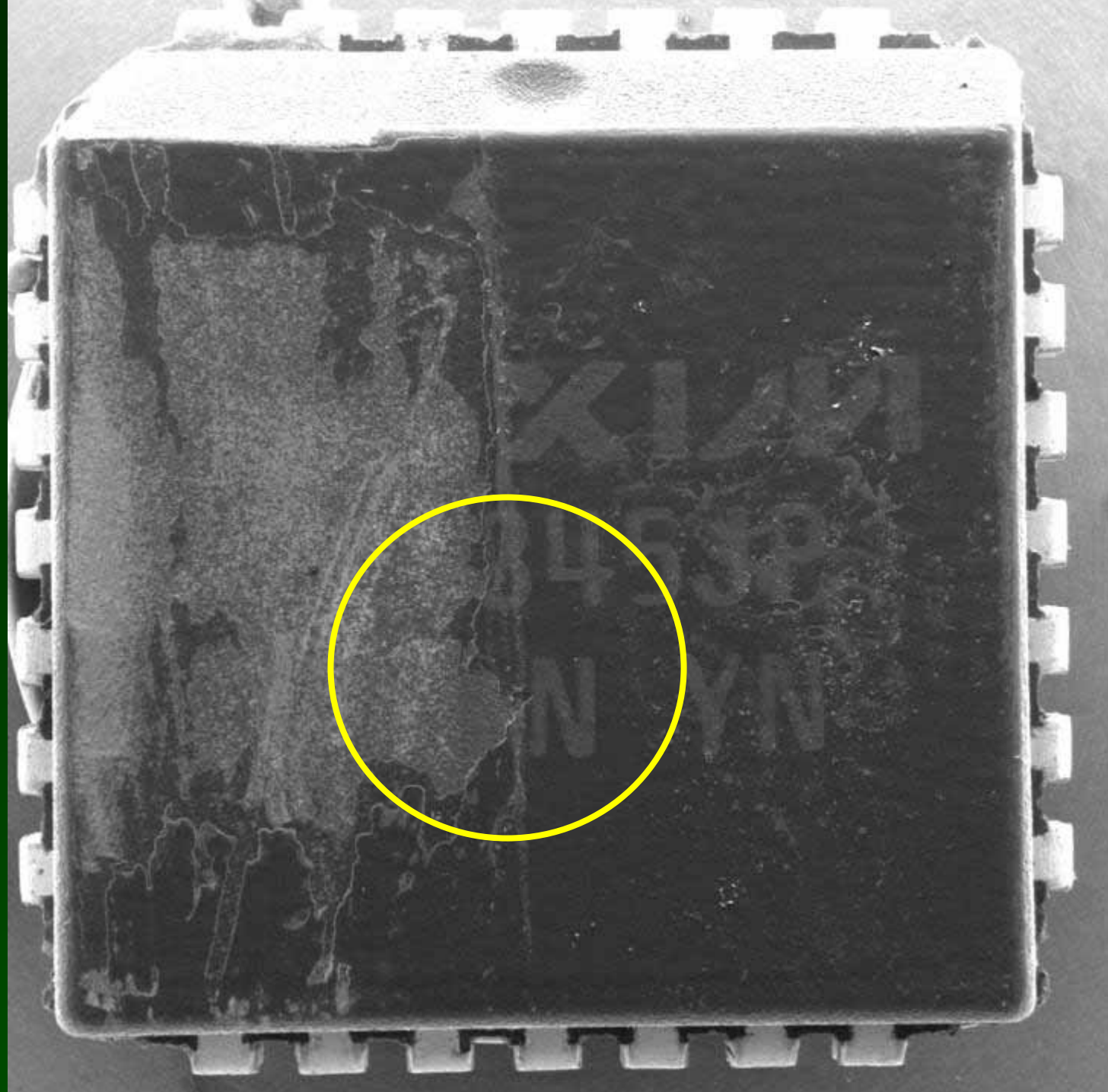


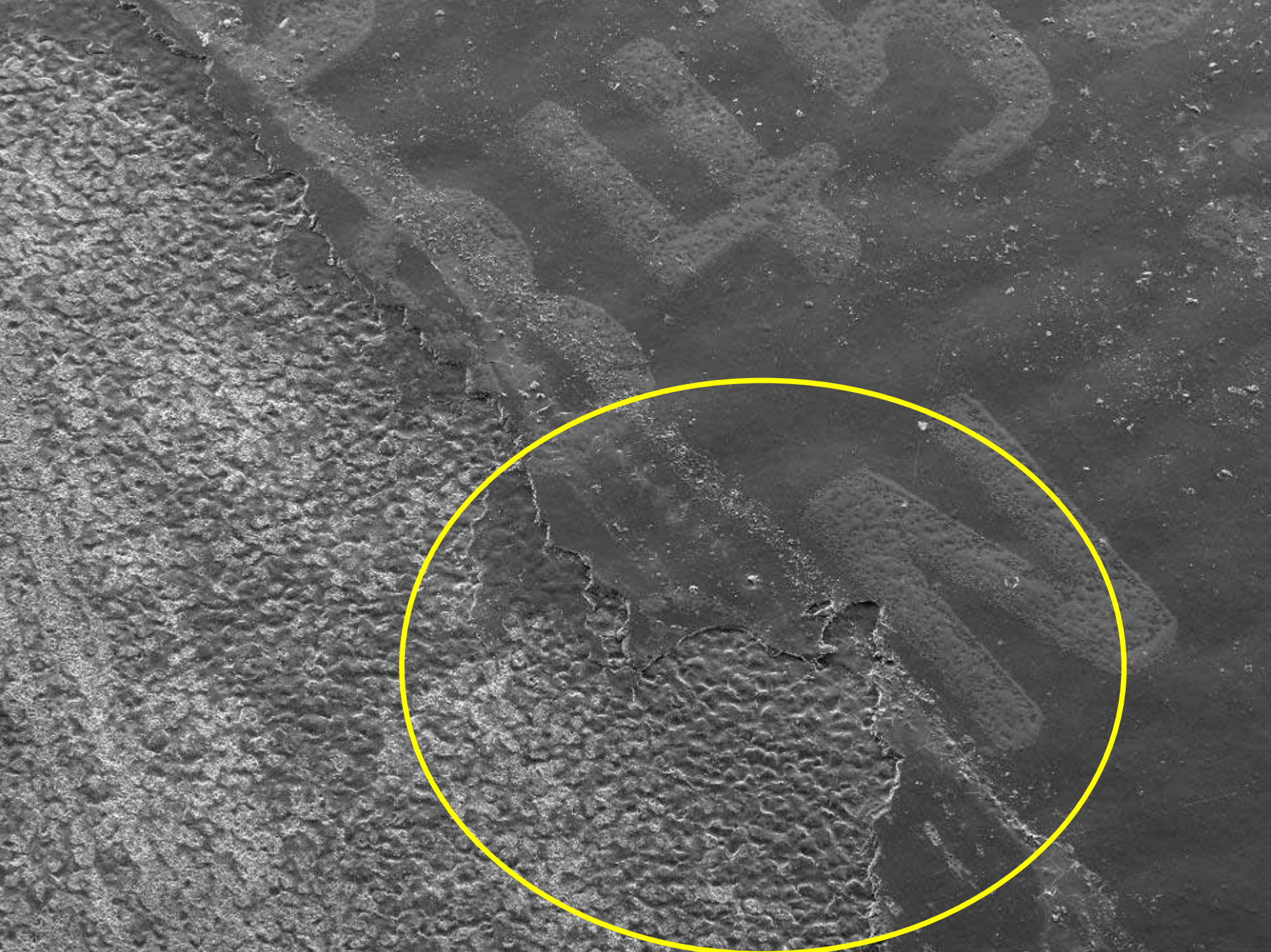
Exemplar
Device
Side

Overspray
Visible

Suspect
Device
Side

Energy Dispersive X-Ray (2 Systems)






Carbon Silicon Antimony Titanium

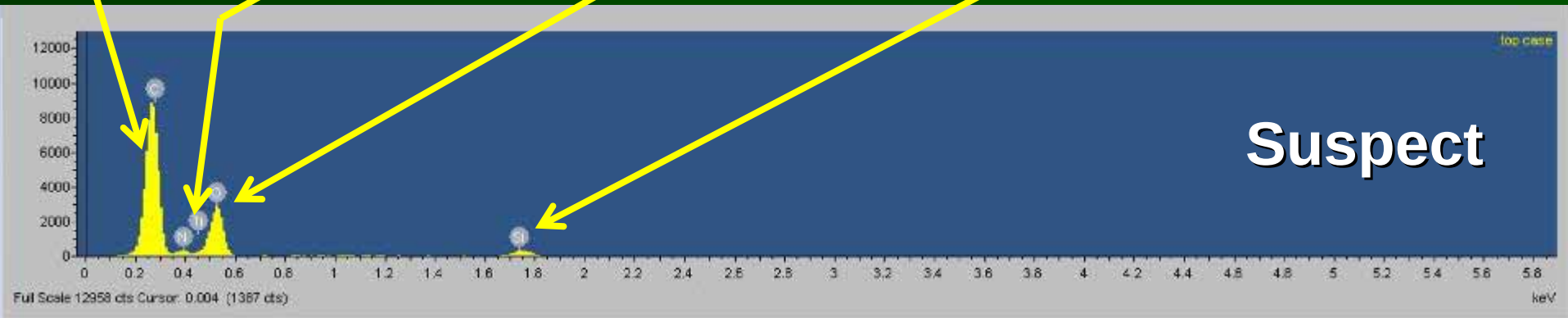
Spectrum Analysis of the Suspect Device Top Surface Area

Carbon

Titanium

Antimony

Silicon



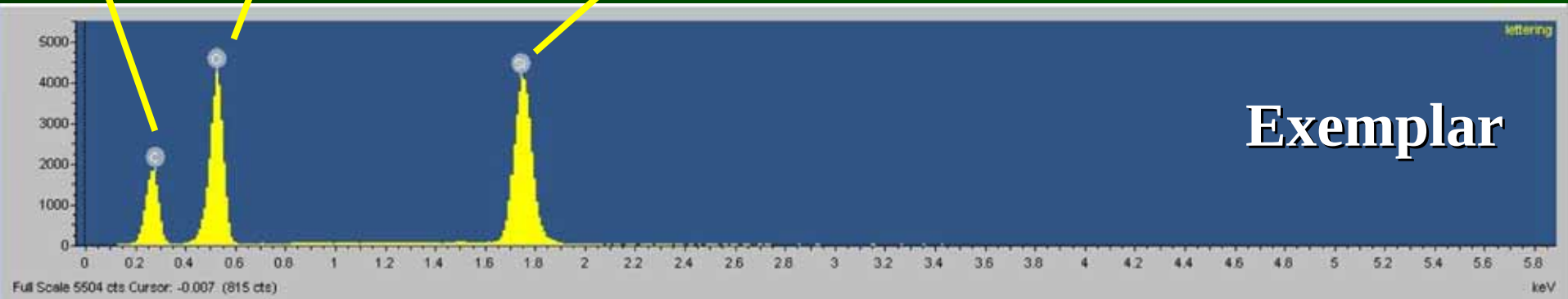
Energy Dispersive Spectroscopy (EDX) Test Results on New Blacktop Material

Spectrum Analysis of the Exemplar Device Top Surface

Carbon

Oxygen

Silicon



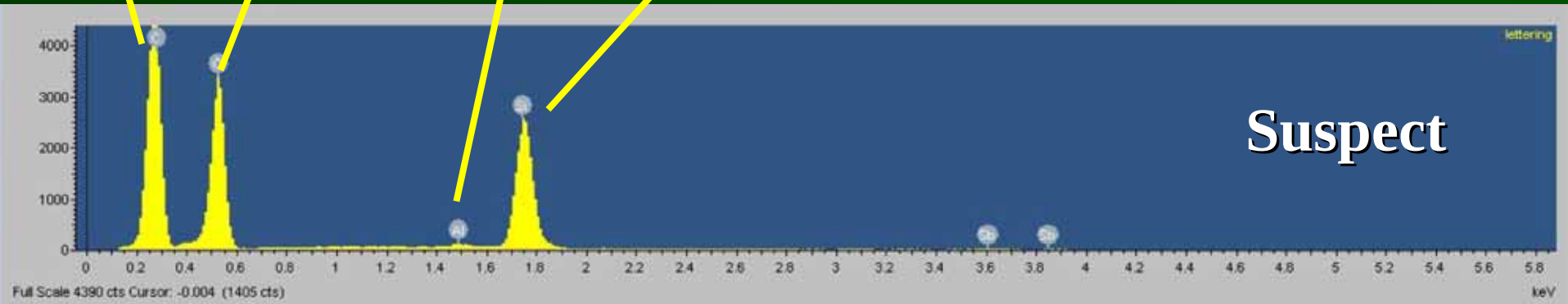
Spectrum Analysis of the Suspect Device Top Surface

Carbon

Oxygen

Aluminum

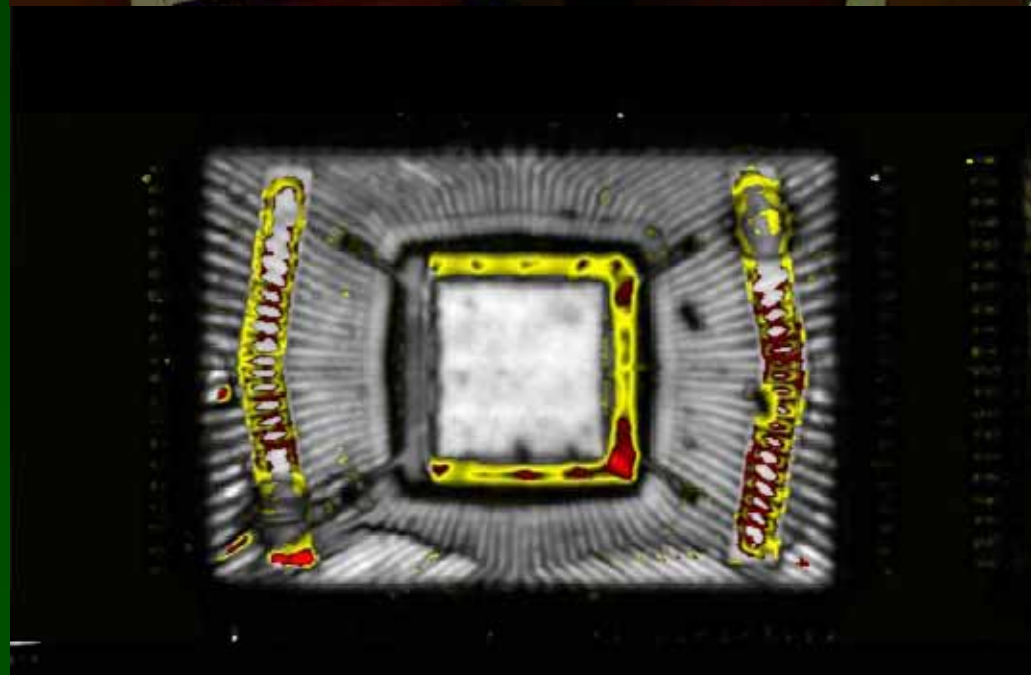
Silicon

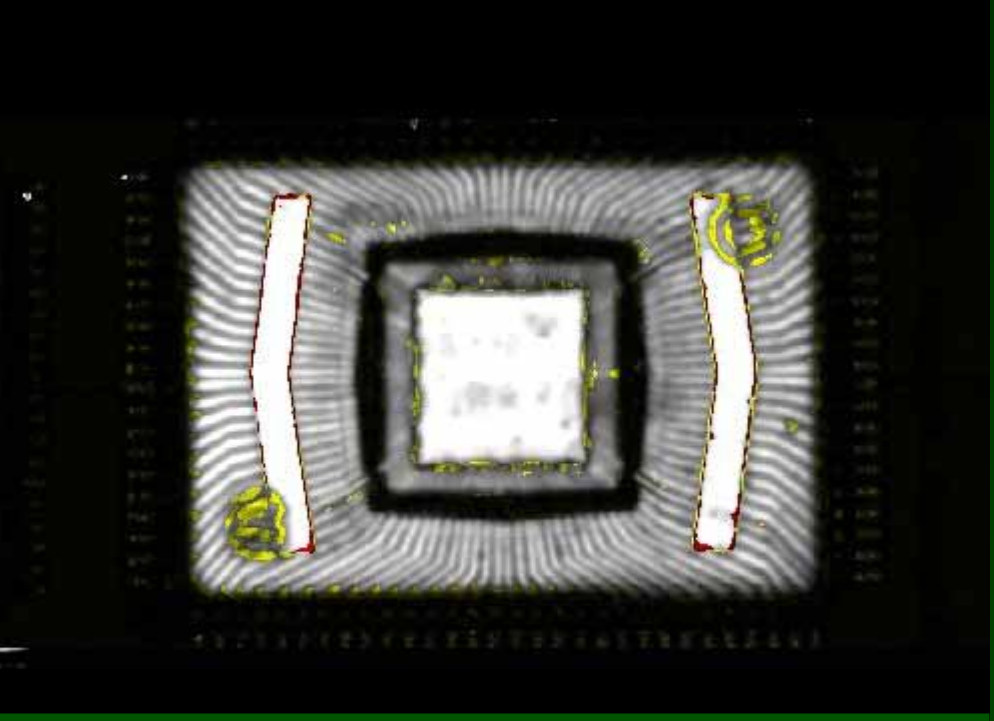


Scanning Acoustic Microscopy (SAM) Internal Imaging Results

Acoustic Microscopy

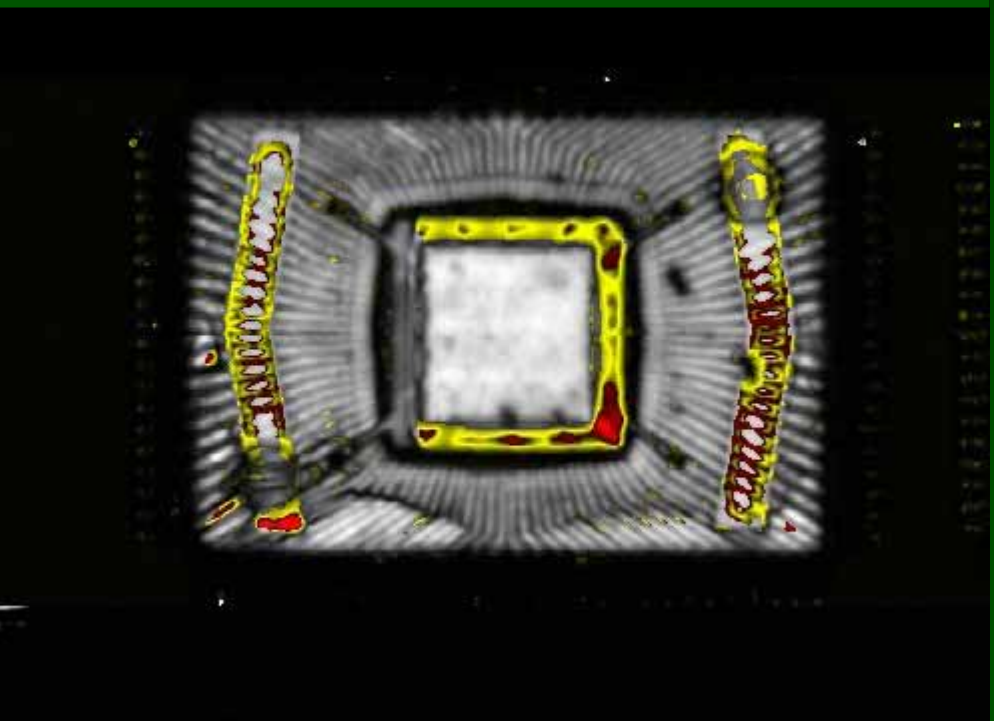
(1 System)



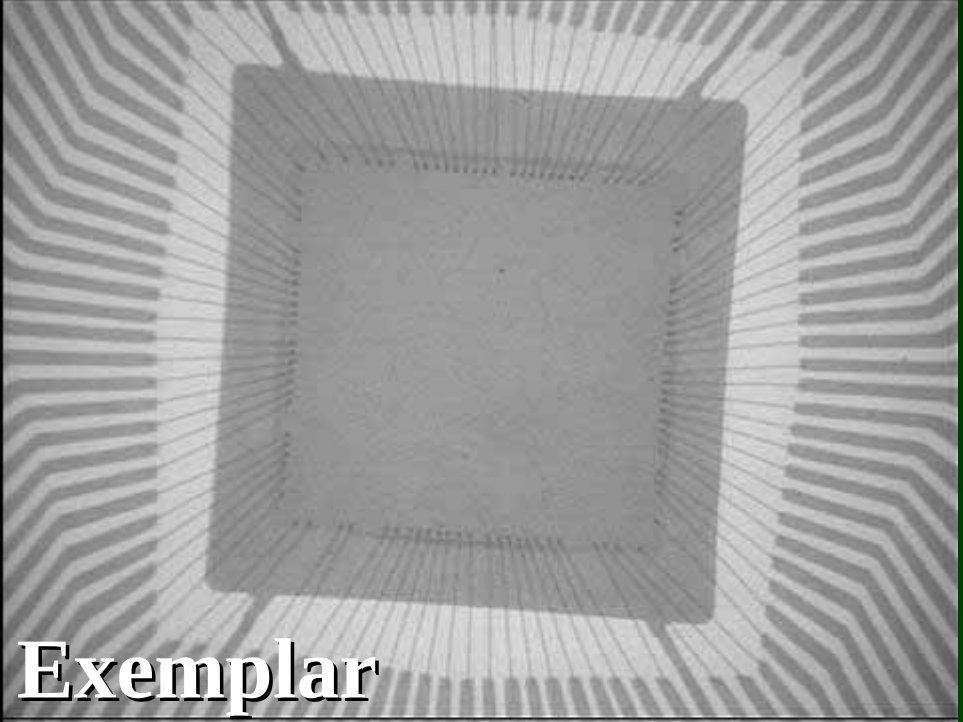


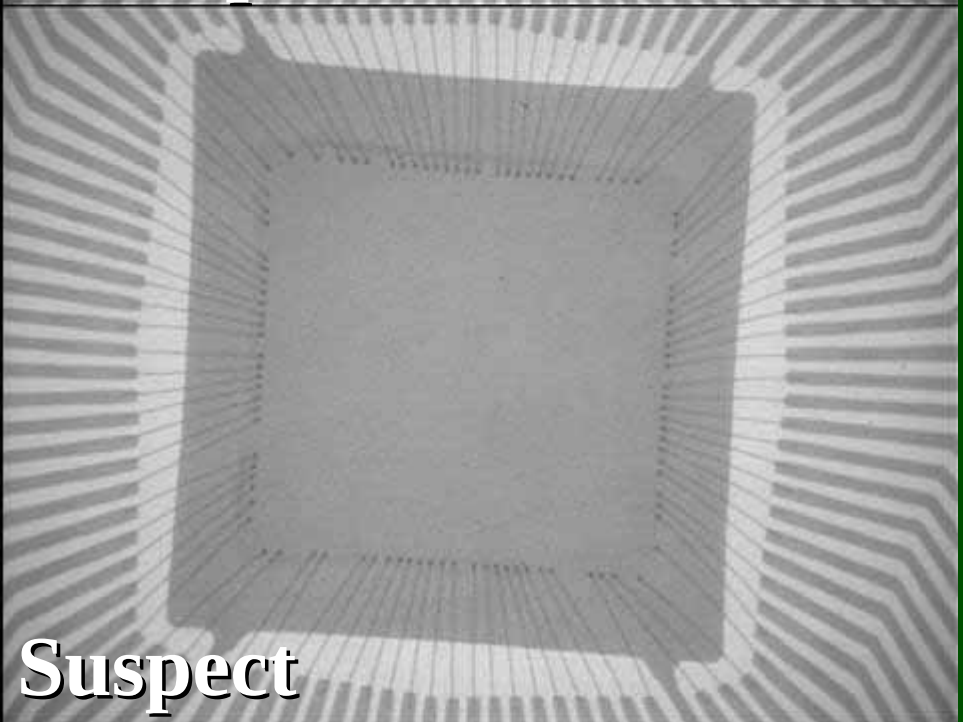
Exemplar Device

Topside Internal Image Scan

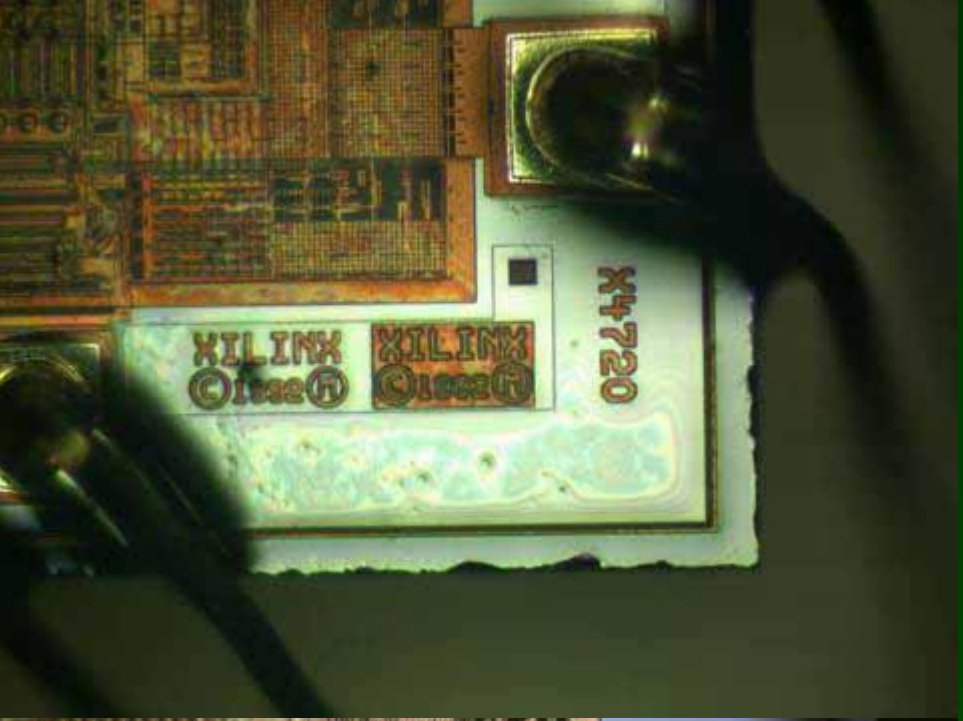


Suspect Device



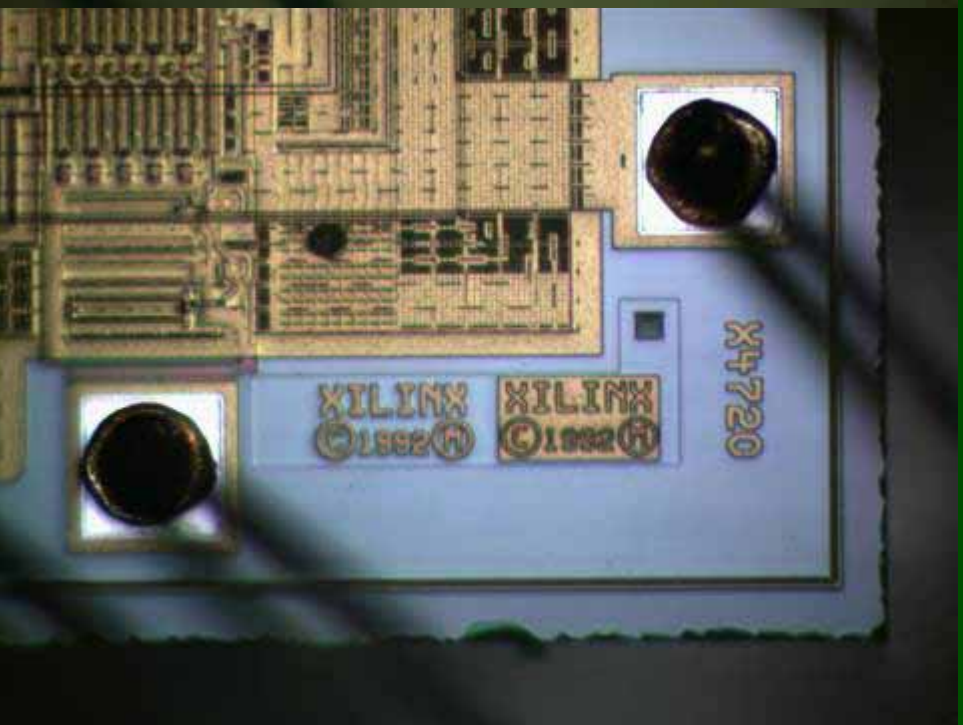


Side by Side Comparative Image Analysis would pass since the bonding layout and die features are identical.



Exemplar
Device Die

Identical Die



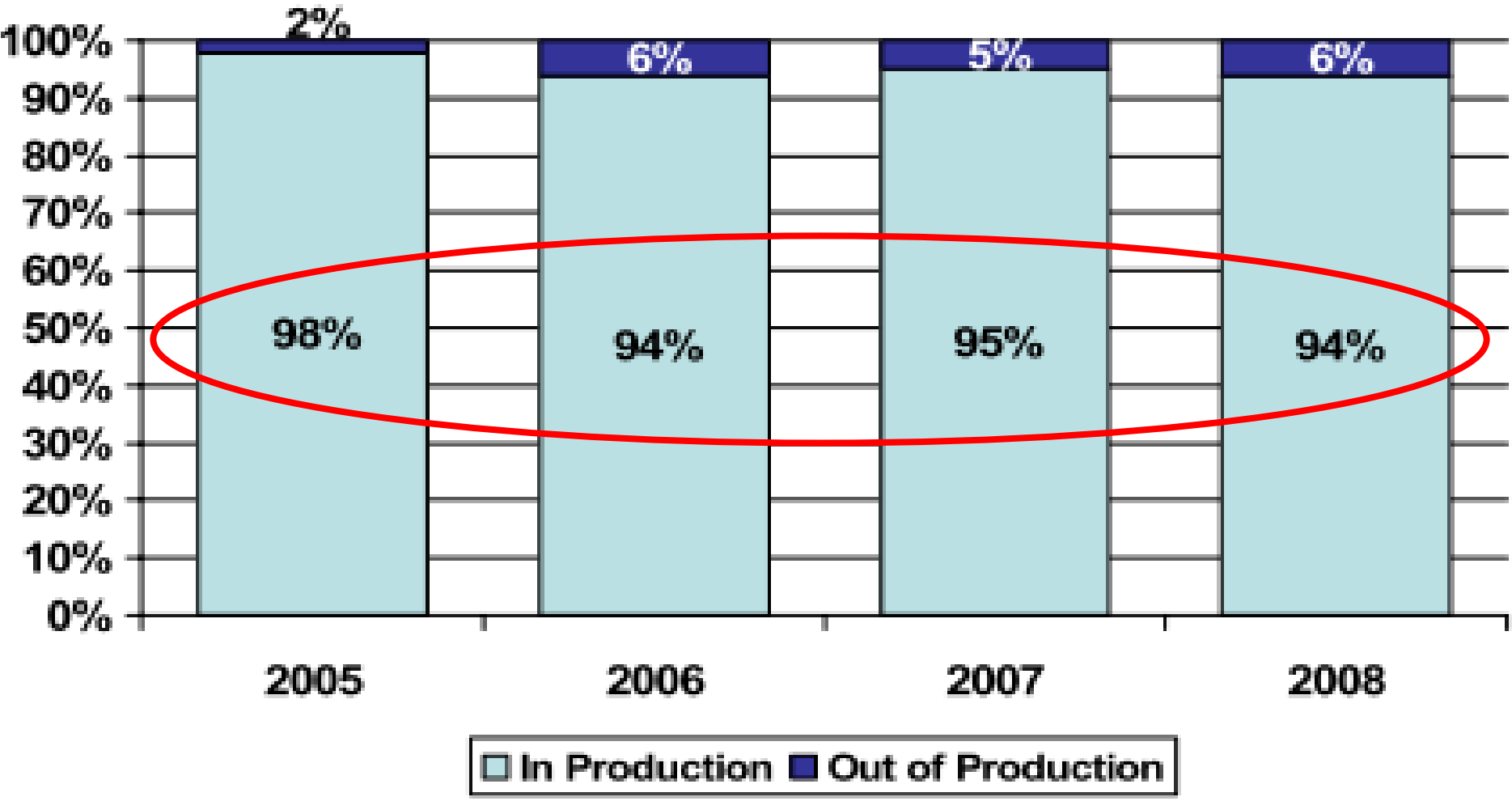
Suspect
Device Die

New Blacktop Threat- Recap

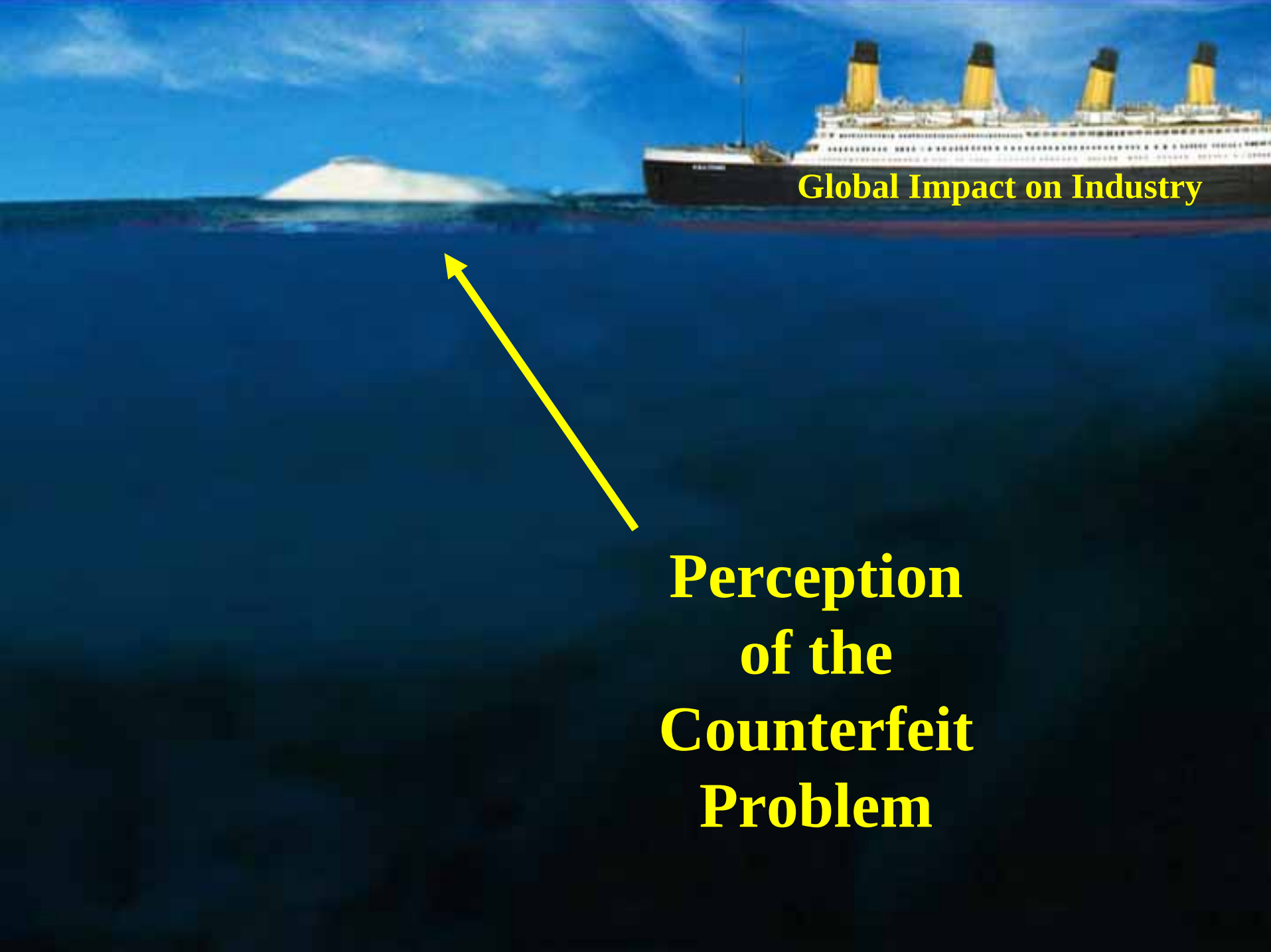
- Identical visual surface characteristics
- Impervious to Acetone (RTS)
- Identical surface element makeup
- Identical Real-Time X-Ray images
- Authentic die
- Will probably pass functionality

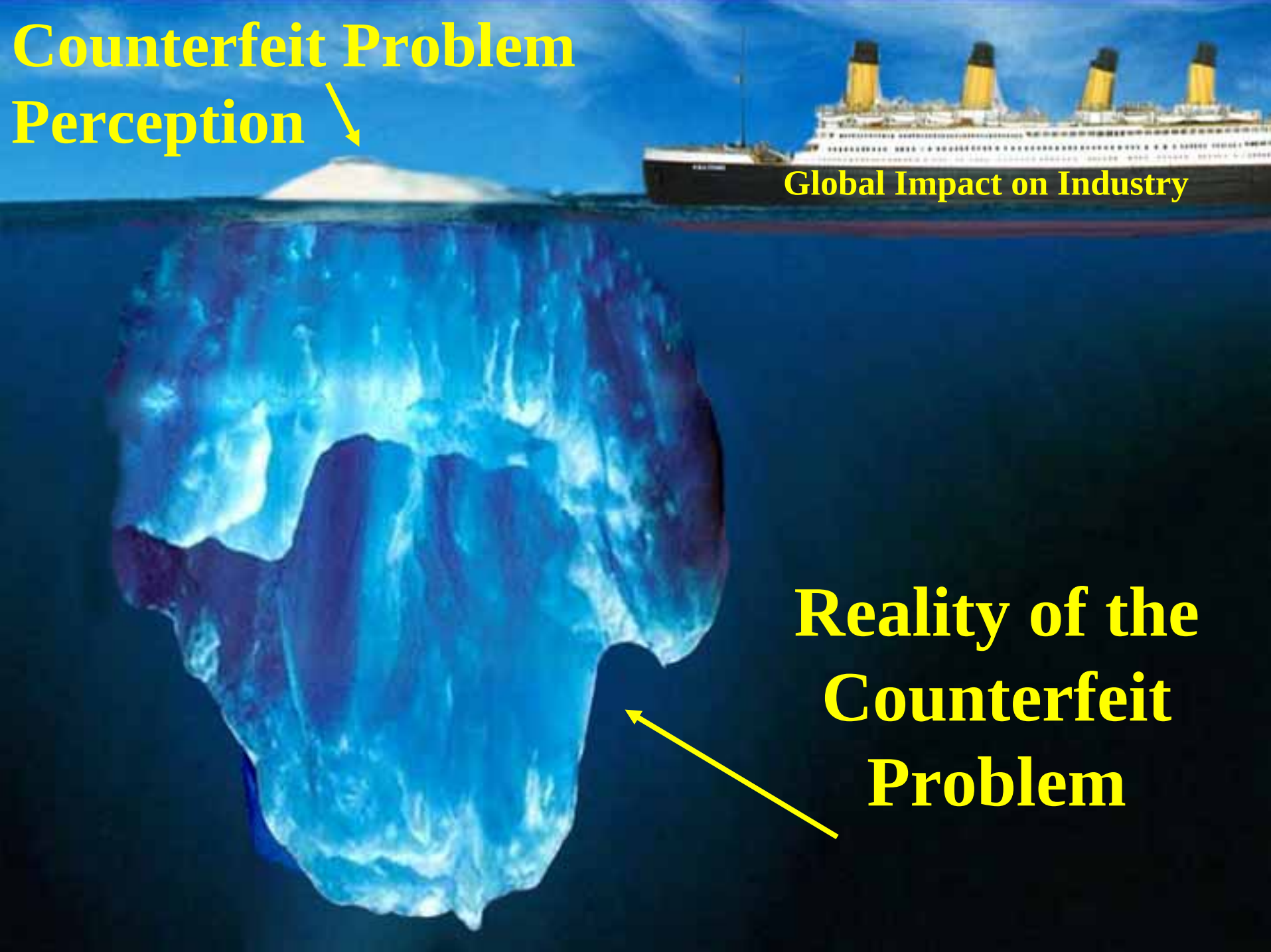
So how bad **IS** the **Counterfeit problem** we face?

Figure II-7: Percent of Counterfeit Incidents Involving In/Out of Production Parts – Discrete Manufacturers (2005-2008)



Source: U.S. Department of Commerce, Office of Technology Evaluation, *Counterfeit Electronics Survey*, November 2009.


Global Impact on Industry
Perception
of the
Counterfeit
Problem


Counterfeit Problem Perception
Global Impact on Industry
Reality of the Counterfeit Problem

SMT Purchase Order Terms & Conditions re: Counterfeit Product

SMT Corp. 14 High Bridge Road, Sandy Hook, CT USA 06482 • Tel: 203 270-4700 • Fax: 203 270-4799
www.smtcorp.com A stocking distributor of name brand electronic components

Terms & Conditions of this Purchase Order

By shipping against this Purchase Order, or any part thereof, Seller acknowledges and agrees to the following Terms and Conditions unless otherwise stated on the front of this Purchase Order:

1) All component products must be contained in the original manufacturer's packaging. All parts must be new, unused and in good condition. Refurbished parts, programmed parts, parts with bent, formed or oxidized leads, test dots or test markings will be rejected.
2) Unless otherwise stated on this Purchase Order, mixed date codes contained within individual reels, cut tape or tubes will not be accepted.
3) All parts supplied by Seller must meet original manufacturers' specifications for "fit, form and function" for a minimum of 60 days – otherwise Seller agrees to take parts back and issue a full refund to SMT Corporation. **There is no warranty time limit for product found to be counterfeit.**
4) No substitutions or changes allowed without prior written approval from SMT Corporation.
5) SMT reserves the right to cancel this order if shipment does not conform to the quantities, delivery method or delivery date indicated on this Purchase Order.
6) This purchase order number must appear on all boxes, packing slips and invoices.
7) Seller agrees to ship all exported products with accurate and full values on all pro forma invoices and shipping / customs documentation that corresponds to that which is indicated on the Purchase Order. Undervalued invoices will not be accepted.
8) SMT Corporation does not source products from China, India or Africa for its Defense & Aerospace customers. It is therefore understood and agreed that Seller has not sourced the products contained in this PO from China, India or Africa nor has knowledge that their source has obtained the products from these regions.
9) Supplier agrees that it has a component inspection system in place that will be used in filling this Purchase Order to prevent the shipment of counterfeit / suspect parts to SMT Corporation.
10) Do not insure this shipment – SMT Corporation has its own insurance. Binder available upon request.
11) If this is a COD shipment, please provide the COD amount by fax or e-mail so that payment can be prepared in time.
12) Seller grants SMT, their customer and regulatory authorities right of access to the applicable areas of all facilities, at any level of the supply chain, involved in the order and to all applicable records.

Counterfeit / Suspect Parts Policy:

SMT reserves the right to seize and quarantine any / all suspected counterfeit products it receives from seller on this Purchase Order. Suspect counterfeit products may be forwarded to the IP holder (Original Component Mfg) and / or the appropriate Federal or State authorities for final analysis, possible confiscation and / or destruction. If products furnished by the Seller are determined to be counterfeit, Seller agrees to reimburse SMT Corporation the full purchase price paid as well as any shipping or 3rd party testing charges incurred by SMT Corporation.

SMT Corporation defines Counterfeit / Suspect electronic parts as:

- Substitutes or unauthorized copies of a product.
- A product as defined by the manufacturers' part number identification, date code and manufacturers' identification (logo, trademark) in which the materials used or the performance of the product has changed without notice by someone other than the original manufacturer of the product.
- A substandard component misrepresented by the supplier.
- Products that have been re-topped (black-topped) remarked or otherwise fraudulently altered and / or misrepresented by a 3rd party.

IF YOU ARE NOT CONFIDENT THAT YOUR PRODUCTS ARE AUTHENTIC – DO NOT SHIP THEM TO SMT CORPORATION!

Part 3:

Counterfeit Threat Mitigation at SMT

SMT Overview

- Established in 1995.
- Independent Stocking Distributor
- Woman Owned Small Business
- Over 120,000 line items in-stock of obsolete & DMS-type component products
- 72,000 sf. facility specifically engineered for the proper storage, inspection, and distribution of ESD and humidity sensitive electronic components.

SMT Corporation
Certifications & Memberships

• AS9120:2002	CERTIFIED
• ISO9001:2000	CERTIFIED
• ISO14001:2004	CERTIFIED
• OHSAS 18001:2007	CERTIFIED
• ANSI/ESD-20.20:2007	CERTIFIED
• WBENC	CERTIFIED
• IDEA	MEMBER
• ERAI	MEMBER
• GIDEP	MEMBER
• AIA	MEMBER


SMT
Corporation
14 High Bridge Road

SMT 72,000 sq ft Facility & Property Holdings

Facility Relative Humidity Environmental Controls and Safeguards for Component Storage at SMT

Complete Warehouse Dehumidification System

Dehumidification System

Networked 60-ton “Desert Aire” System installed in critical component storage / handling areas – 45% Max RH allowed year-round.

Complete Warehouse Dehumidification System

45% RH Year Round

Humidification Systems

- Multiple networked units installed in critical component handling / inspection areas – 25% Min RH allowed year-round.
- All humidification systems are integrated with the associated facility HVAC systems.

Monitored Humidification Units (3 total)

Wall Humidistat (On Network)

60,000 SF ESD Floor Treatments

ESD Test Point all Employees must pass thru to reach component work areas.


SEMTRONICS
www.semtronics.com
ESD PERSONAL GROUNDING TEST STATION
Footwear/Wrist Strap Test
1. Step on the footplates (one foot on each footplate).
2. Plug the wrist strap cord into the appropriate jack located on the left side of the unit if the Wrist Strap Test is activated.
3. Press and HOLD the metal touchplate on the unit until the results of the test are displayed.
The results for each foot are displayed independently on either side of the touch plate. The results for the wirst strap test are displayed above the touchplate.
Green lights indicate a pass condition.
WRIST STRAP
HIGH
SAFE
LOW
SEMTRONICS


20,000 sf Blue Warehouse


30,000 sf Red Warehouse


MORE PRODUCTION
WITH LESS SCRAP

ESD treated floor area – 60,000 sq ft

Incoming Order Processing Area (10 Stations)

Outgoing Order Processing Area (12 Stations)

Tape & Reel
(9 Stations)

Baking & Dry Packing (4 Stations)

Analysis Labs #1 & 2 - (10 Stations)

X-Ray, SEM, EDX & AM Lab Area

Sample Preparation Lab Area

Minimum Inspection for Open-Market Product

- Visual Inspection - 100%
- X-Ray Inspection – 100%
- XRF Inspection – 2 / lotdc
- SEM Surface Inspection – 2 / lotdc
- RTS Inspection – 2 / lotdc
- Solderability – 2 / lotdc
- Scratch Test – 2 / lotdc
- Heated Solvent – 2 / lotdc
- Decap - Die Verification – 2 / lotdc

Product Inspection

SMT's In-House Component Quality & Authentication Analysis Process

EMPLOYEE TRAINING!

QC Lab Mgr: Jason Romano

Certificate of Completion

awarded to

Jason Romano

SMT Corporation

for attendance of

Counterfeit Components Avoidance Workshop

3 December, 2007

Boston, Massachusetts

Components T

President

www.cti-us.com

Independent Distributors of Electronics Association

IDEA

PROUDLY PRESENTS THIS PROFESSIONAL INSPECTOR CERTIFICATION

TO

JASON ROMANO

OF

SMT CORPORATION

FOR SUCCESSFULLY PASSING THE

IDEA-ICE-3000 PROFESSIONAL INSPECTOR CERTIFICATION EXAM

ON THIS DAY

AUGUST 26, 2009

THE INDIVIDUAL FOR WHOM THIS CERTIFICATE IS ASSIGNED HAS DEMONSTRATED INSPECTION KNOWLEDGE, EXPERIENCE, AND SPECIFICATION INFORMATION AS NEEDED TO NTS IN THE INDEPENDENT DISTRIBUTION MARKET.

Lia M. Powell

IDEA PROGRAM ADMINISTRATOR

SERIAL NO. ID03-09-91 NON-TRANSFERABLE

DM Data

HI-REL LABORATORIES

TECHNICAL TRAINING

This is to certify that

Jason Romano

Attended the Five Day Short Course

COMPONENTS ENGINEERING 101+

Including MIL 750-2072 & 883- 2010 & 2017 Inspection
Prohibited Materials EDS & XRF ; Recent DPA Experiences
Mil 883-2018 SEM Step Coverage Inspection

Concluded on the 30th day of July, 2010

DM Data, Inc.

Hi-Rel Laboratories, Inc.

QC Insp Mgr: Kimberly Costa

Certificate of Completion

awarded to

Kimberly Costa

SMT Corporation

for attendance of

Counterfeit Components Avoidance Workshop

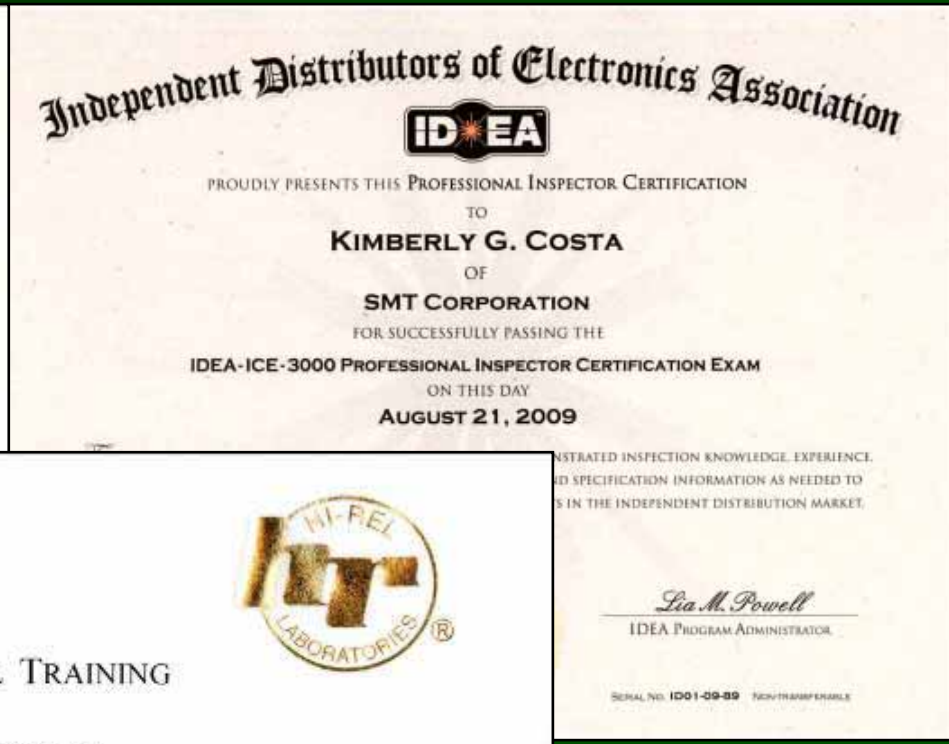
3 December, 2007

Boston

Components Te

President

www.cti-us.com



Independent Distributors of Electronics Association

IDEA

PROUDLY PRESENTS THIS PROFESSIONAL INSPECTOR CERTIFICATION

TO

KIMBERLY G. COSTA

OF

SMT CORPORATION

FOR SUCCESSFULLY PASSING THE

IDEA-ICE-3000 PROFESSIONAL INSPECTOR CERTIFICATION EXAM

ON THIS DAY

AUGUST 21, 2009

NSTRATED INSPECTION KNOWLEDGE, EXPERIENCE,

D SPECIFICATION INFORMATION AS NEEDED TO

S IN THE INDEPENDENT DISTRIBUTION MARKET.

Lia M. Powell

IDEA PROGRAM ADMINISTRATOR

SERIAL NO. ID01-09-89 NON-TRANSFERABLE

DM Data

HI-REL LABORATORIES

TECHNICAL TRAINING

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Kimberly Costa

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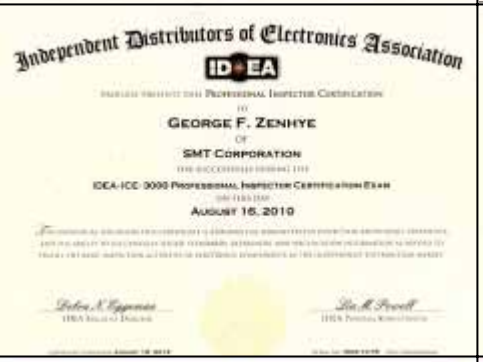
Independent Distributors of Electronics Association
IDEA
Jason Romano
SMT Corporation
IDEA-ICE-3000 Professional Inspector Certification Exam
August 26, 2009


Independent Distributors of Electronics Association
IDEA
Kimberly G. Costa
SMT Corporation
IDEA-ICE-3000 Professional Inspector Certification Exam
August 21, 2009


Independent Distributors of Electronics Association
IDEA
Julie LaPera
SMT Corporation
IDEA-ICE-3000 Professional Inspector Certification Exam
August 26, 2009


Independent Distributors of Electronics Association
IDEA
Nicholas Porzelt
SMT Corporation
IDEA-ICE-3000 Professional Inspector Certification Exam
April 9, 2010


Independent Distributors of Electronics Association
IDEA
George F. Zenhye
SMT Corporation
IDEA-ICE-3000 Professional Inspector Certification Exam
August 16, 2010


Independent Distributors of Electronics Association
IDEA
Neil A. Schultz
SMT Corporation
IDEA-ICE-3000 Professional Inspector Certification Exam
August 31, 2010


Independent Distributors of Electronics Association
IDEA
William E. Philipp
SMT Corporation
IDEA-ICE-3000 Professional Inspector Certification Exam
January 31, 2011


Independent Distributors of Electronics Association
IDEA
Jonathan D. Russell
SMT Corporation
IDEA-ICE-3000 Professional Inspector Certification Exam
January 31, 2011


Professional Inspector's Certificate
IDEA
Joseph Galle
SMT Corporation


Professional Inspector's Certificate
IDEA
Christopher Cummings
SMT Corporation


Professional Inspector's Certificate
IDEA
John Van Sant
SMT Corporation


Professional Inspector's Certificate
IDEA
Gretchen Tirrin
SMT Corp.


Professional Inspector's Certificate
IDEA
William Tunney
SMT Corporation


Professional Inspector's Certificate
IDEA
Andrew E. Yuskay
SMT Corporation


Professional Inspector's Certificate
IDEA
Christopher Dee Biens
SMT Corporation

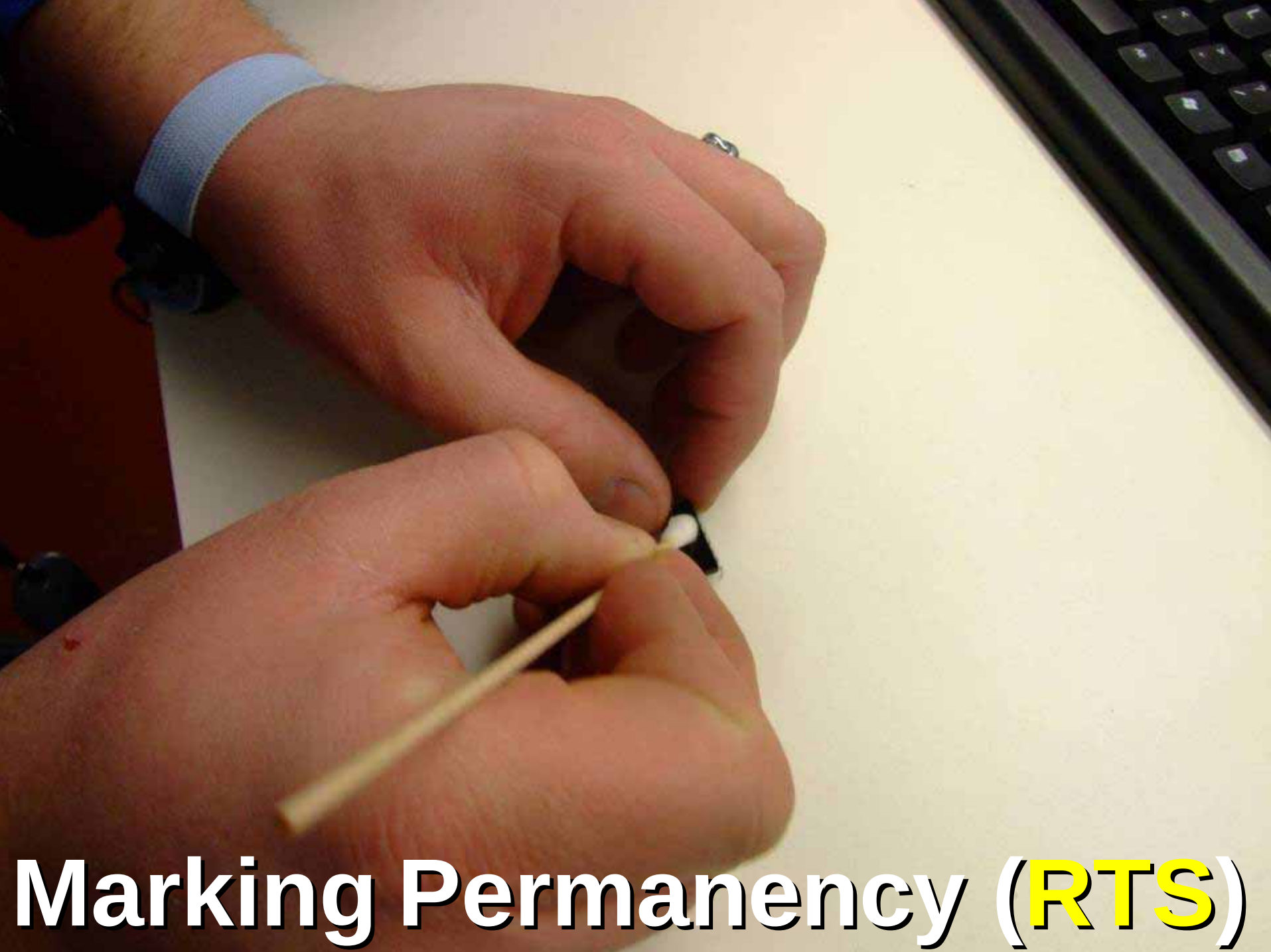

Professional Inspector's Certificate
IDEA
Rose DeSimone
SMT Corporation

Documented

Visual Inspection

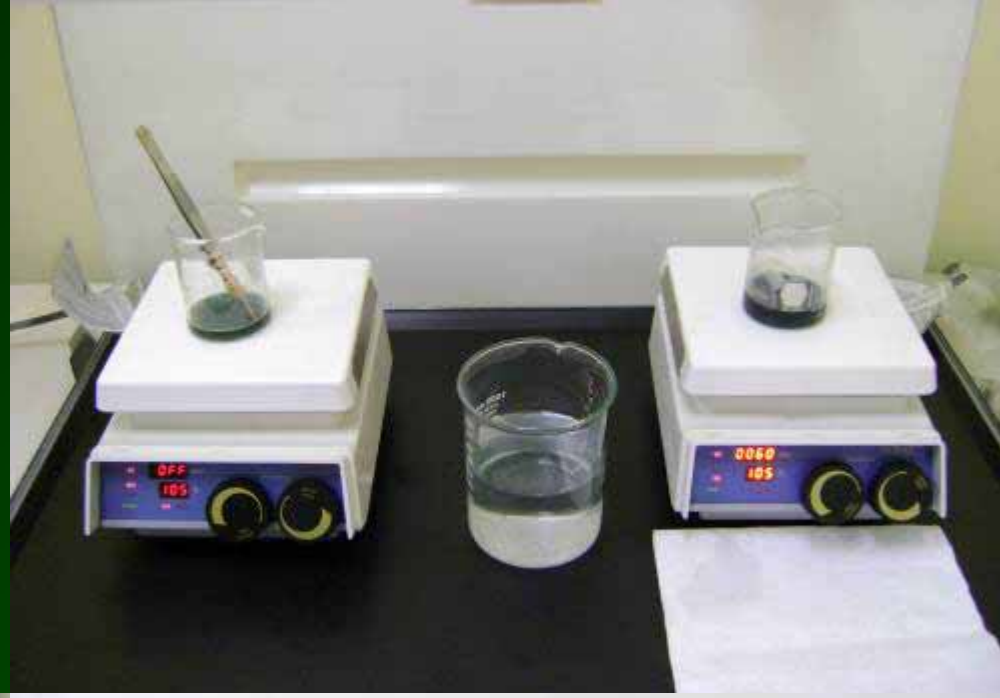
Packaging Inspection

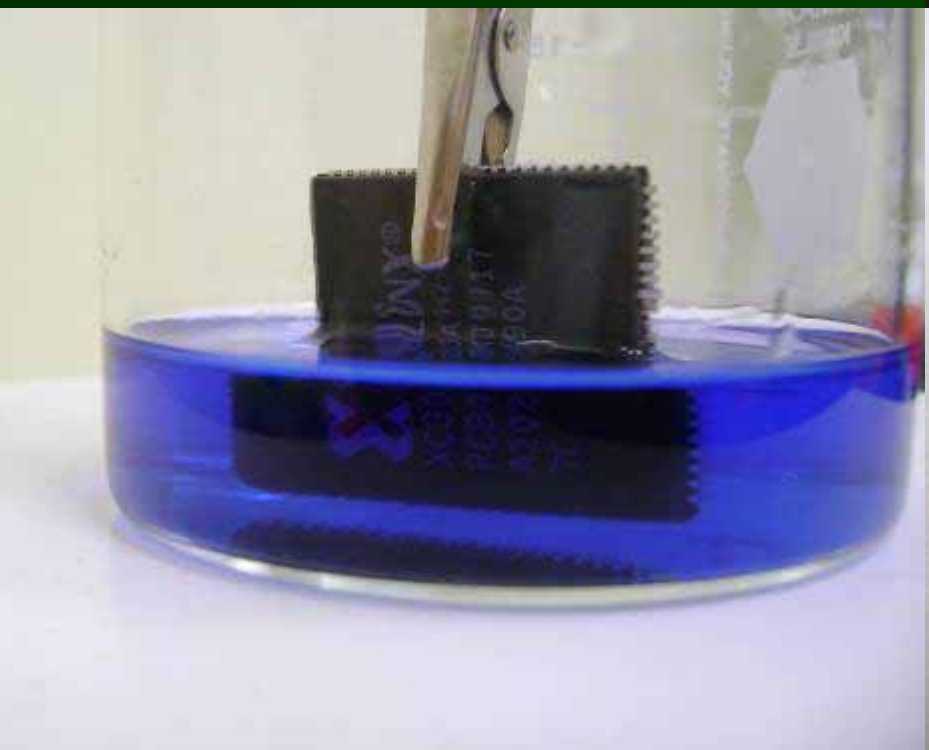

Package Verification & Condition



Marking Permanency (RTS)

Heated Solvent Testing (2 Systems)





Documented Visual Inspection Checklist

VISUAL INSPECTION CHECKLIST

Manufacturer	
Part Number	
Vendor/Customer	
PO/Order	

LEADED COMPONENT VISUAL INSPECTION CHECKLIST

Y	N	N/A	Check for:
			Leads
			Corrosion or solder on pins
			Pins have dissimilar gloss, shine, color, or texture
			Pin surface is inconsistent with date code
			Dirty pins or leads
			Dents in leads indicate used parts
			Leads are tinned/Refurbed BGA's
			Top Surface
			Parts appear to be resurfaced and remarked
			Surface cracks
			Directional scratches on top surface of part
			Markings
			Part numbers are blurry
			Inconsistent part marking font, color, or placement
			Inconsistent date and lot codes in the package
			Inconsistent country of origin within date/lot code
			Top and bottom markings are inconsistent
			Colored dots or ink marks on component top
			Component Case
			Top and bottom color inconsistent
			Tool pull marks
			Heat sink witness marks
			Burn marks
			Parts in package not all facing the same way
			Glue or adhesive
			Circles on part bottoms are inconsistent

MICROSCOPY/PHOTOS

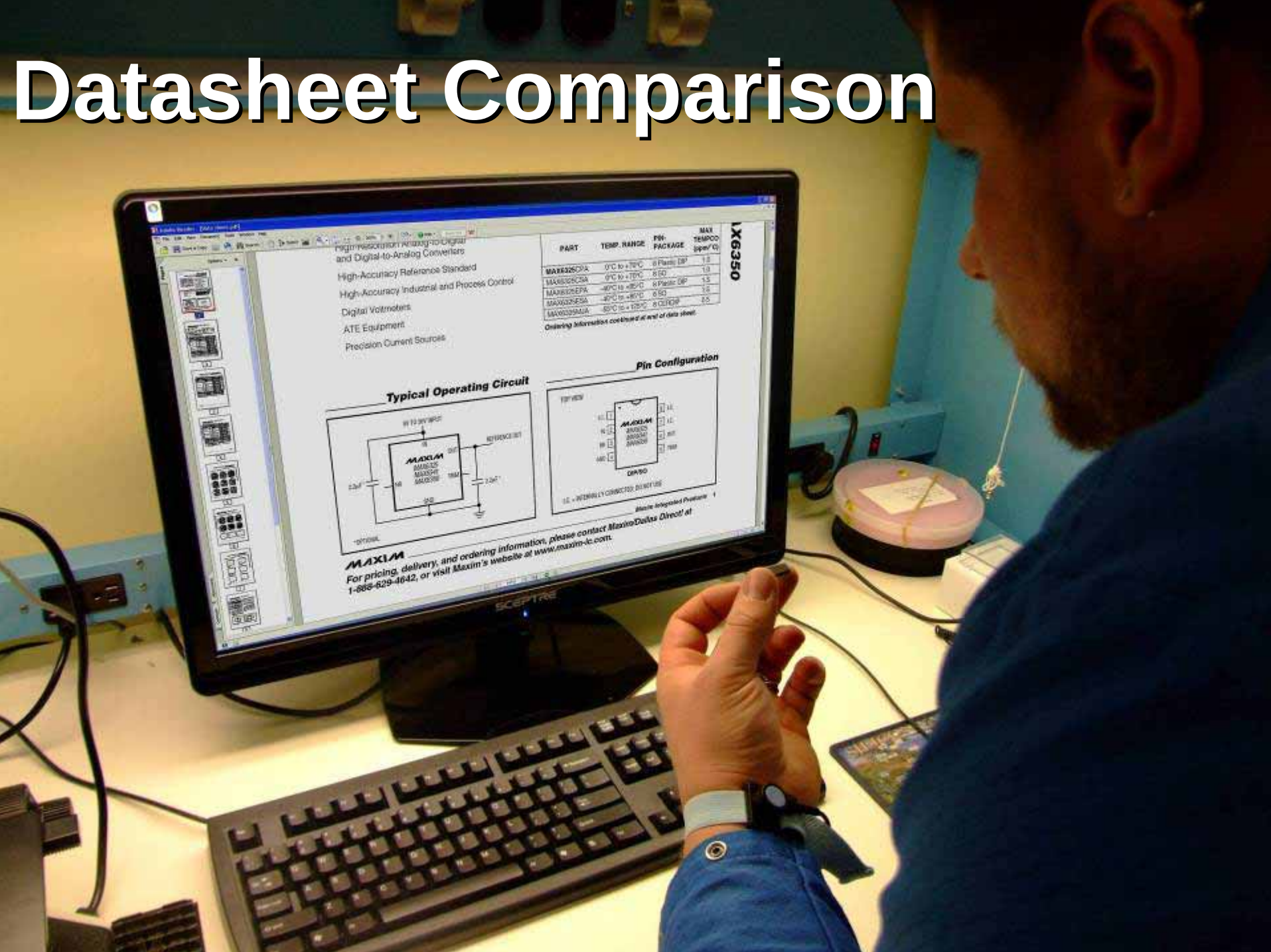
Top	Bottom	Country of Origin	Anomaly Close-ups

PART MARKING PERMANENCY TEST

OK	NG	N/A	Wipe test with:
			3 parts mineral spirits 1 part alcohol solution
			Acetone

Inspected by	Signature	Date

Datasheet Comparison



Mechanical Verification

Documented

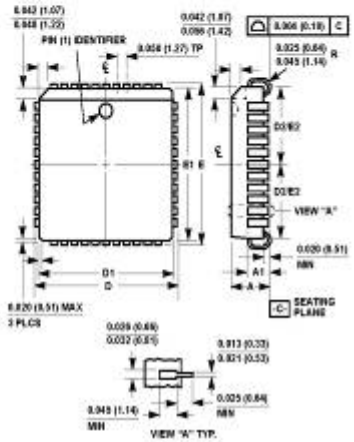
Datasheet Comparison Data

COMPONENT INSPECTION ANALYSIS

Manufacturer: INTERSIL
Part Number: CS82C55A
Date Code: 0214 Lot Code: P0214AQMX

MANUFACTURER'S SPEC SHEET COMPARISON

Plastic Leaded Chip Carrier Packages (PLCC)



N44.65 (JEDEC MS-018AC ISSUE A)
44 LEAD PLASTIC LEADED CHIP CARRIER PACKAGE

	INCHES		MILLIMETERS		
SYMBOL	MIN	MAX	MIN	MAX	NOTES
A	0.165	0.180	4.20	4.57	-
A1	0.090	0.120	2.29	3.04	-
D	0.685	0.695	17.40	17.65	-
D1	0.650	0.656	16.51	16.66	3
D2	0.291	0.319	7.40	8.10	4, 5
E	0.685	0.695	17.40	17.65	-
E1	0.650	0.656	16.51	16.66	3
E2	0.291	0.319	7.40	8.10	4, 5
N	44		44		6

Rev. 2 11/97

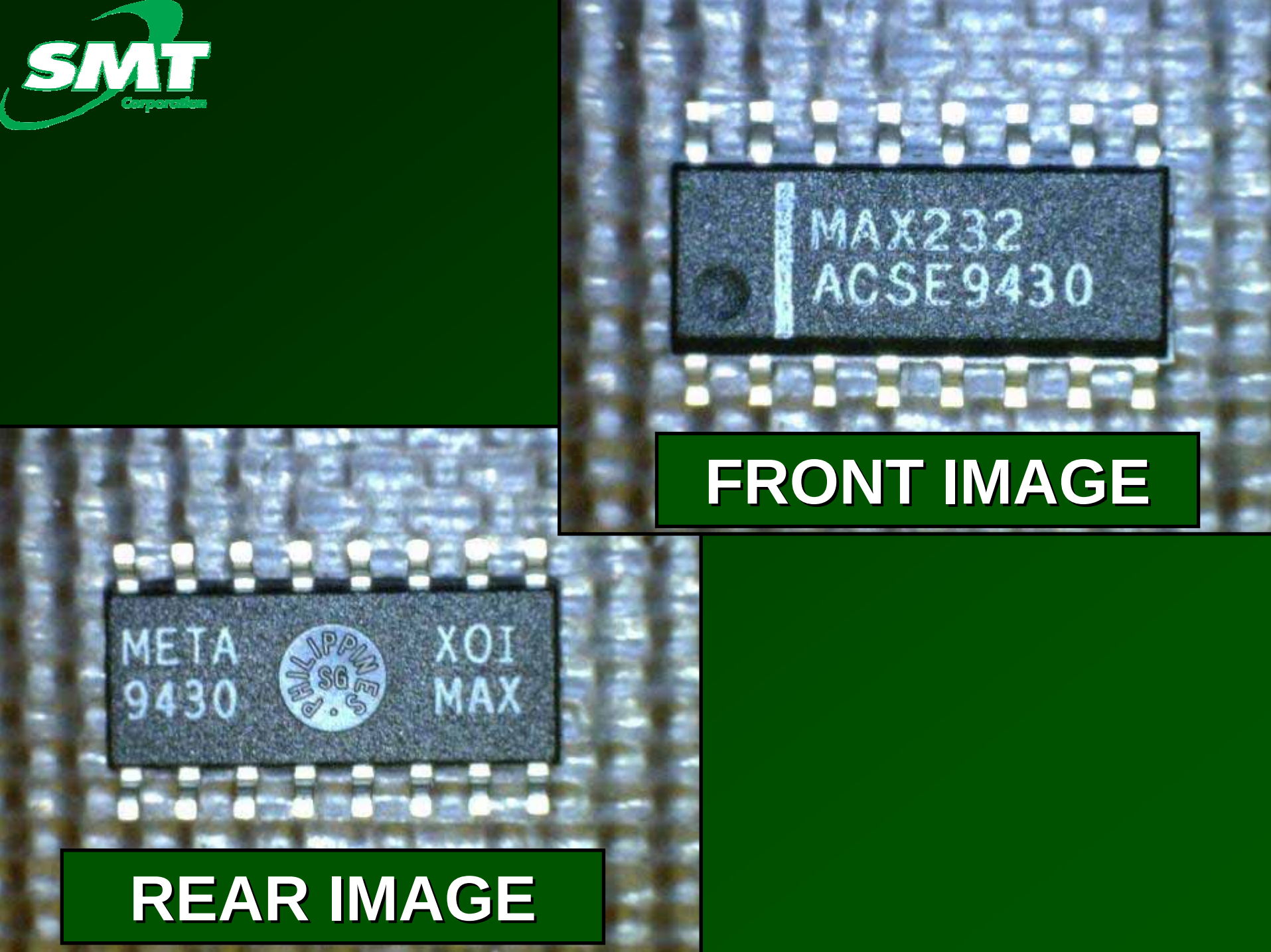
NOTES:
1. Controlling dimension: INCH. Converted millimeter dimensions are not necessarily exact.
2. Dimensions and tolerancing per ANSI Y14.5M-1982.
3. Dimensions D1 and E1 do not include mold protrusions. Allowable mold protrusion is 0.010 inch (0.25mm) per side. Dimensions D1 and E1 include mold mismatch and are measured at the extreme material condition at the body parting line.
4. To be measured at seating plane -C- contact point.
5. Centerline to be determined where center leads exit plastic body.
6. "N" is the number of terminal positions.

Measured Part dimensions (in mm)

Value	In Spec. (Y/N)	N/A	Measurement
44	Y		Number of pins
1.28		X	Pitch
4.45	Y		A
17.49	Y		D
16.56	Y		D1
17.54	Y		E
16.56	Y		E1

Documented

Component Photos


SMT
Corporation
MAX232
ACSE9430
FRONT IMAGE
META
9430
PHILIPPINES
SGS
XOI
MAX
REAR IMAGE

Documented

Photo Inspection Data

COMPONENT INSPECTION ANALYSIS

Manufacturer: INTERSIL
Part Number: CS82C55A
Date Code: 0214 Lot Code: P0214AQMX

RESEARCH CHECKLIST

Y	N	Check for:	Initials	Date
		SMT		
X		Same part number currently in stock	KC	1/23/09
	X	Inspection report for same part number on file	KC	1/23/09
		Manufacturer		
X		Data sheet found	KC	1/23/09
X		Metalization layer image or die photo found	KC	1/23/09

PART PHOTOS

Top part markings

Bottom part markings

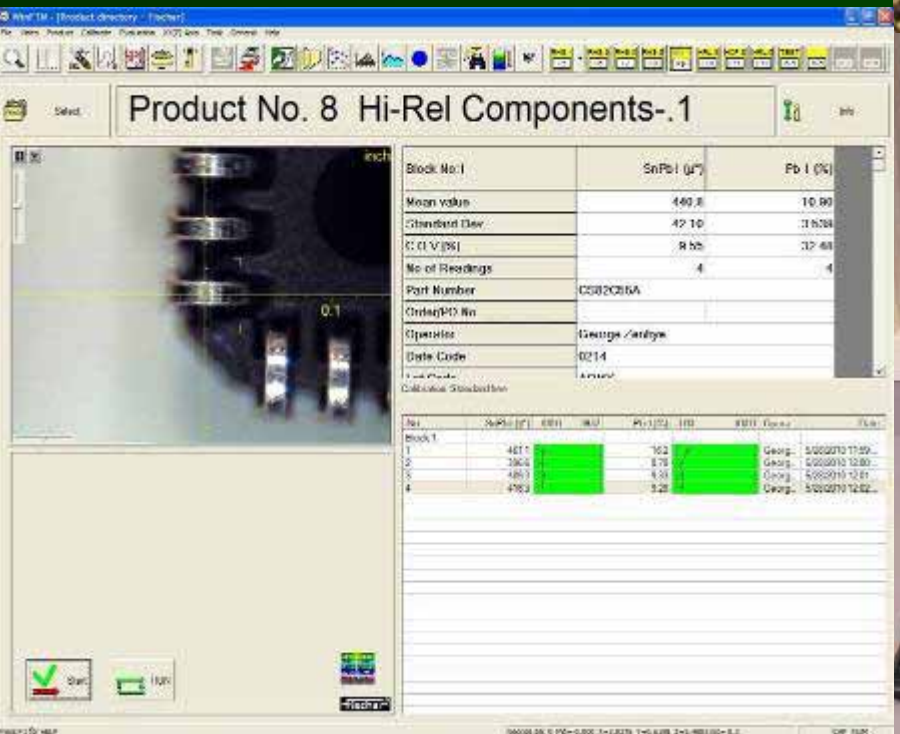
Logo, part number, date/lot code

Country of origin: CHINA

Documented

XRF RoHS Testing

X-Ray Fluorescence (2 Systems)



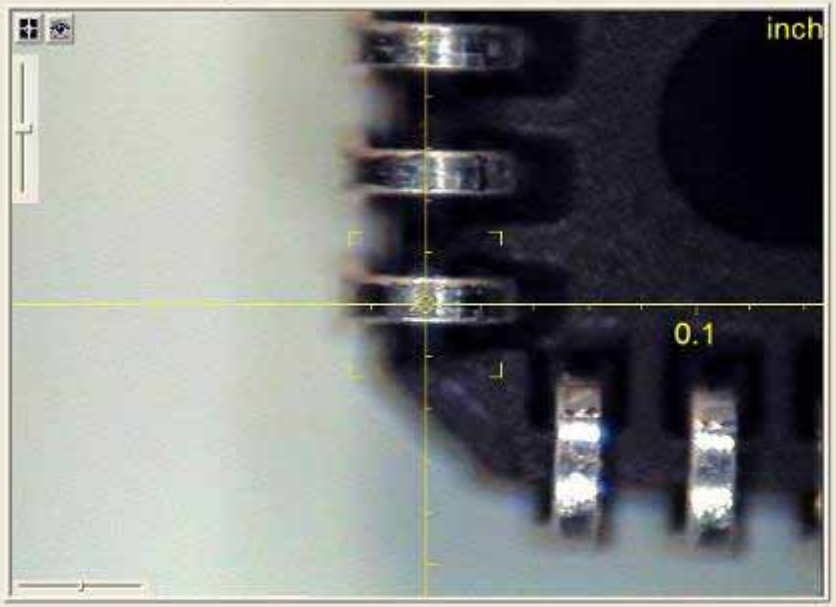
WinFTM - [Product directory = Fischer]

File Video Product Calibrate Evaluation XY(Z)-Axis Task General Help

Select

Product No. 8 Hi-Rel Components-.1

Info



Block No:1	SnPb1 (µ")	Pb 1 (%)
Mean value	440.8	10.90
Standard Dev.	42.10	3.539
C.O.V.[%]	9.55	32.48
No of Readings	4	4
Part Number	CS82C55A	
Order/PO No.		
Operator	George Zenhye	
Date Code	0214	
Lot Code	AQMX	

Calibration: Standard free

No	SnPb1 [µ"]	100.0 3937	Pb 1 [%]	3.00 100.0	Opera...	Date
Block 1						
1	461.1		16.2		Georg...	5/28/2010 11:59:...
2	396.6		8.78		Georg...	5/28/2010 12:00:...
3	489.3		9.33		Georg...	5/28/2010 12:01:...
4	416.3		9.28		Georg...	5/28/2010 12:02:...

Start

RUN

Fischer

Press F1 for HELP

George Zer 0 Md=-0.000 X=3.8276 Y=0.6198 Z=5.4803 mq=0.3

CAP NUM

Documented

XRF-RoHS Test Data

COMPONENT INSPECTION ANALYSIS

Manufacturer: INTERSIL
Part Number: CS82C55A
Date Code: 0214 Lot Code: P0214AQMX

FISCHERSCOPE XDAL XRF ANALYSIS

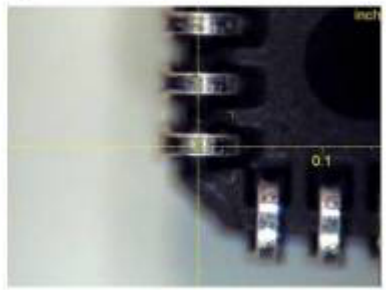
XRF test results

Y	N	N/A	Check for:
	X		Leads plating is RoHS compliant
X			Leads plating contains lead (Pb)
X			Results seem correct for part number and date code

Fischerscope® XRAY XDAL
Date: 5/28/2010 Time: 12:03:43 PM Operator: George Zenhye

Part Number: CS82C55A
Order/PO No:
Date Code: 0214
Lot Code: AQMX
Sample:

Application: 8 / Hi-Rel Components-.1 Calibration: Standard free



N	SnPb1[µ"] 100.0	3937	Pb 1[%] 118.1	3937
1	461.1		16.2	
2	396.6		8.78	
3	489.3		9.33	
4	416.3		9.28	

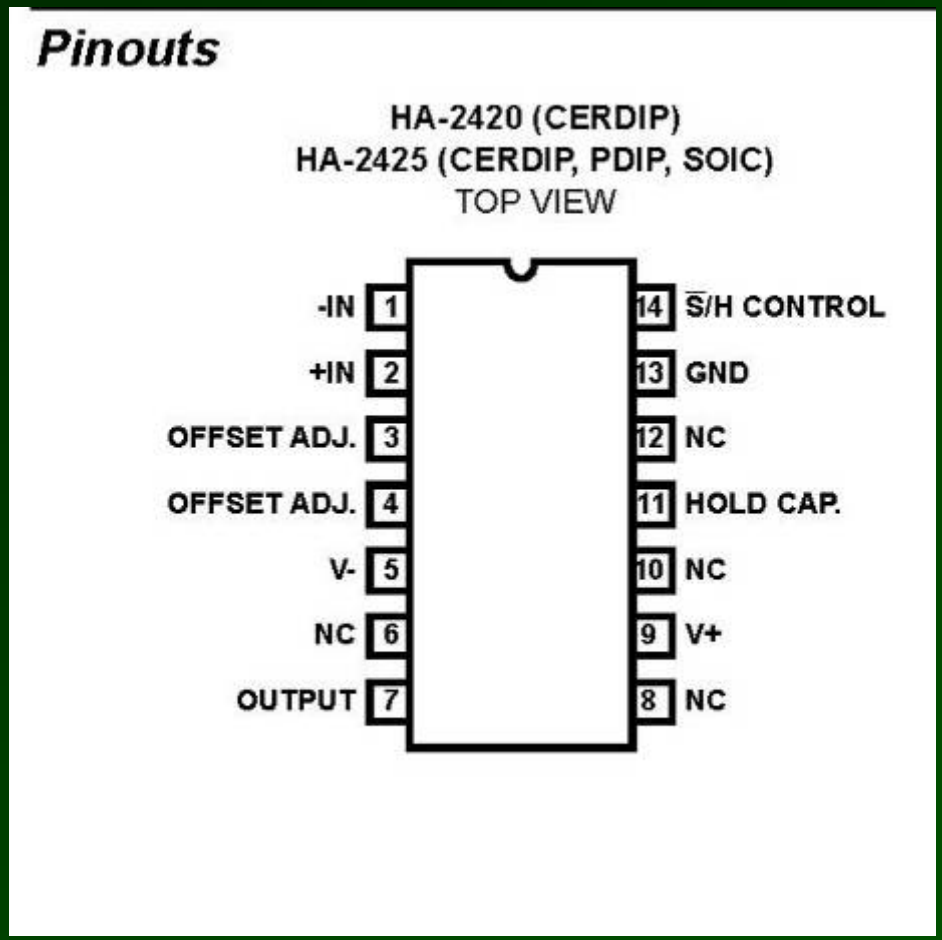
Element	SnPb1	Pb 1
Number of readings	4	4
Min. reading	396.6 µ"	8.78 %
Max. reading	489.3 µ"	16.2 %
Measuring time	45 sec	

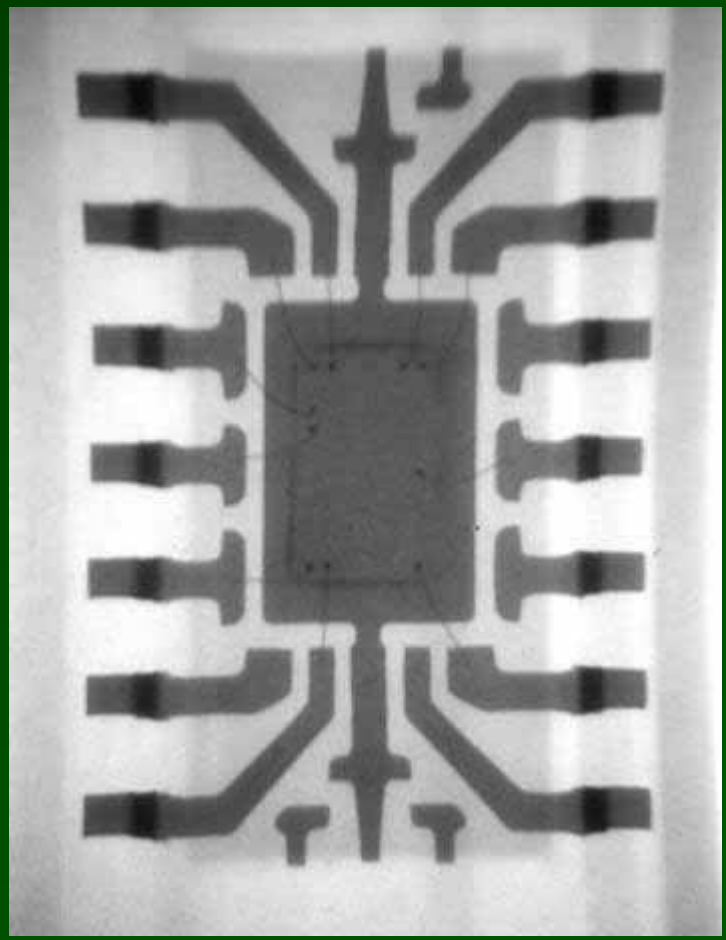
Documented

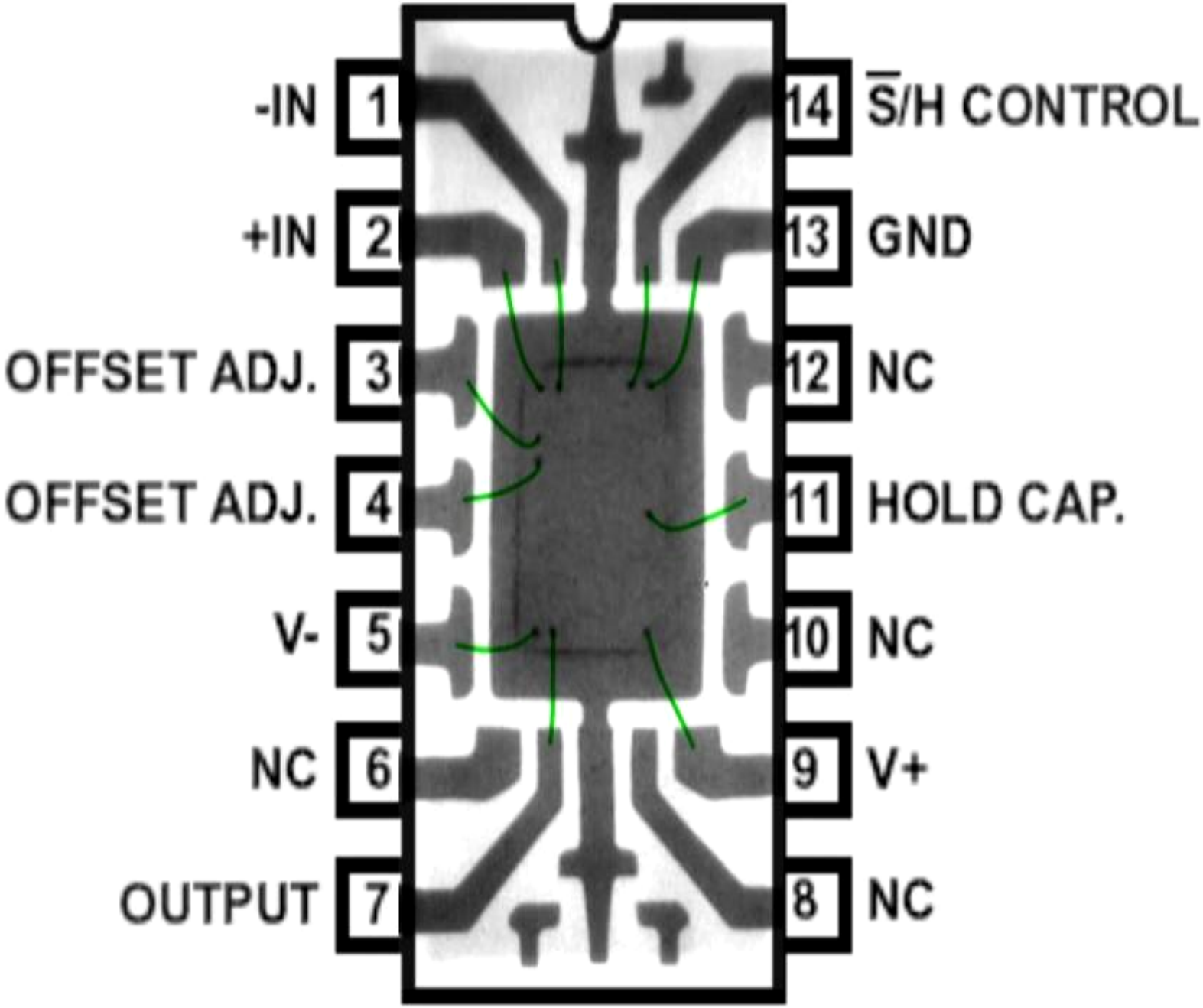
Real Time X-Ray Imaging

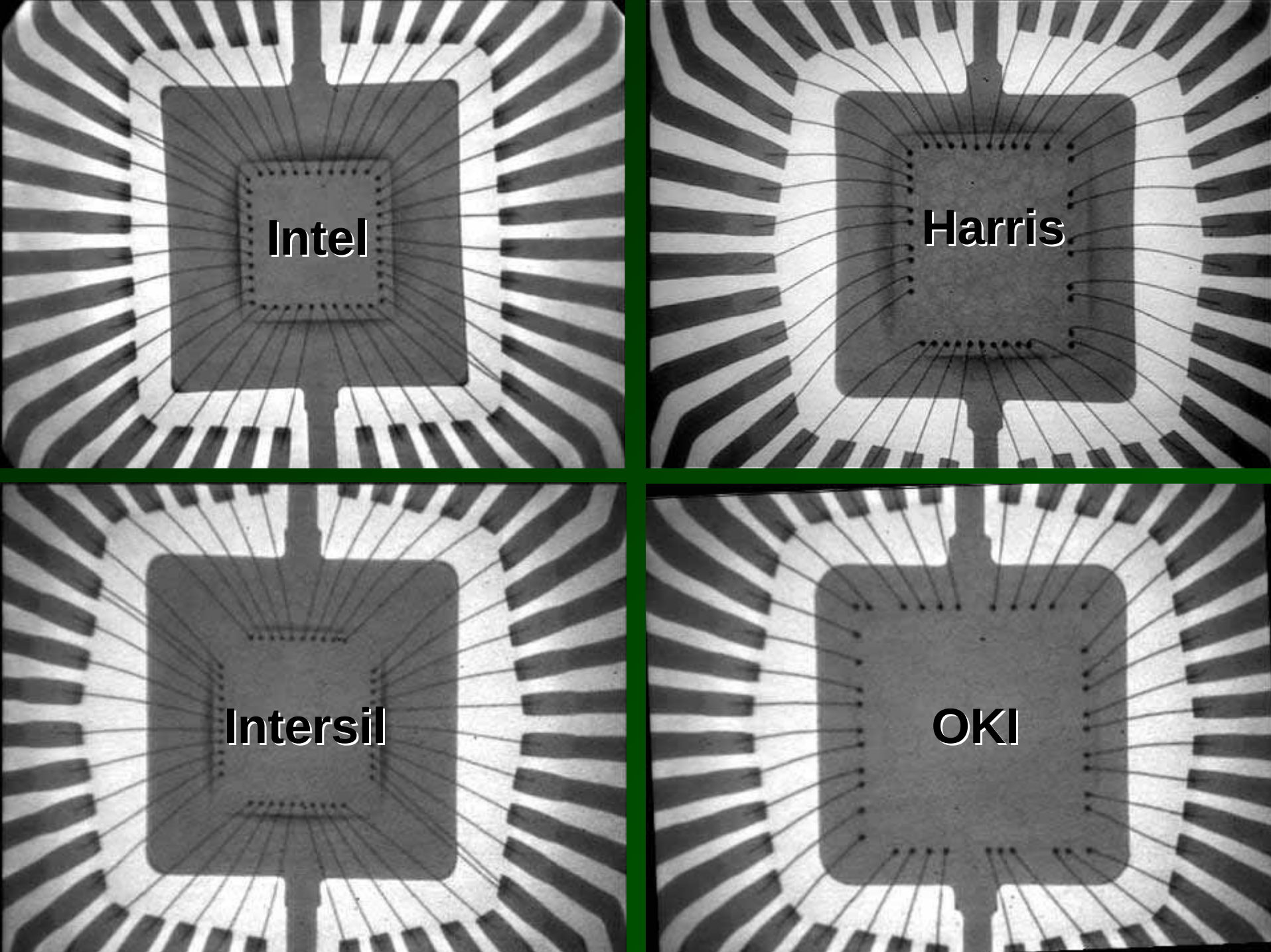
Real-Time X-Ray
(2 Systems)

Match Pin-Out to Datasheet



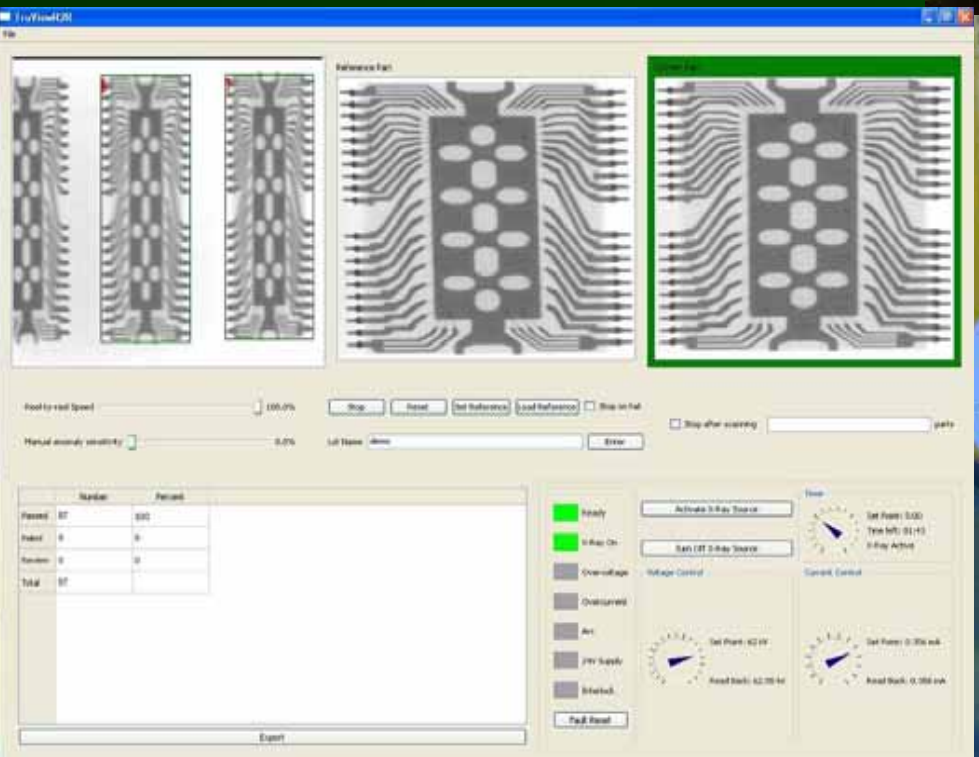


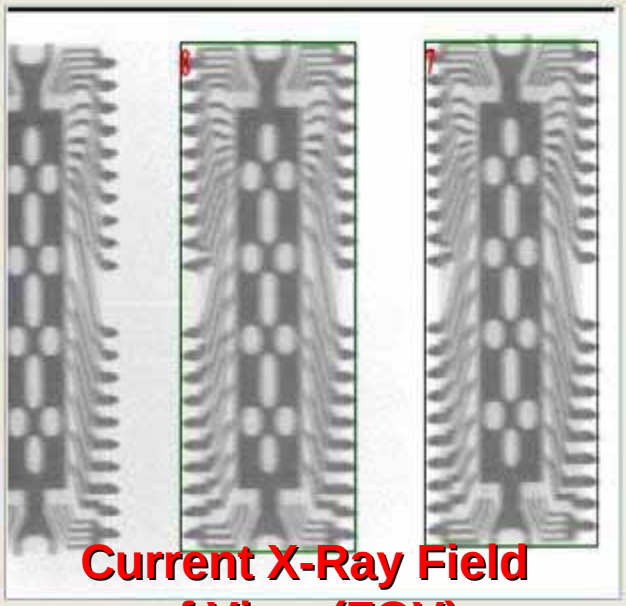

-IN
1
+IN
2
OFFSET ADJ.
3
OFFSET ADJ.
4
V-
5
NC
6
OUTPUT
7
14
S/H CONTROL
13
GND
12
NC
11
HOLD CAP.
10
NC
9
V+
8
NC


Intel
Harris
Intersil
OKI

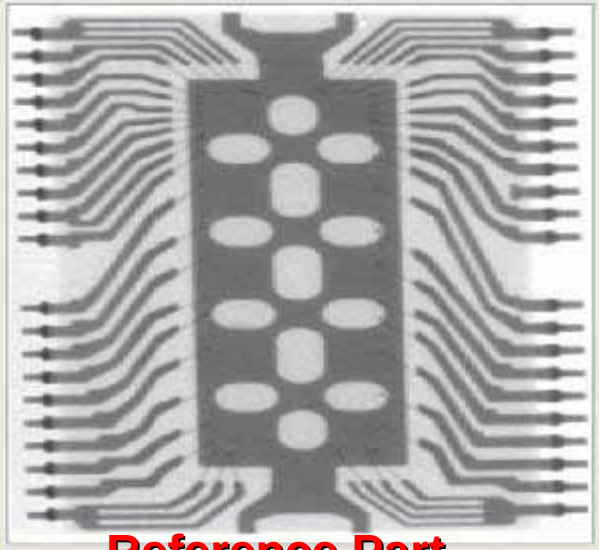
Automated Real-Time X-Ray for 100% inspection of parts on reels

Automated Real-Time X-Ray (2 Systems)

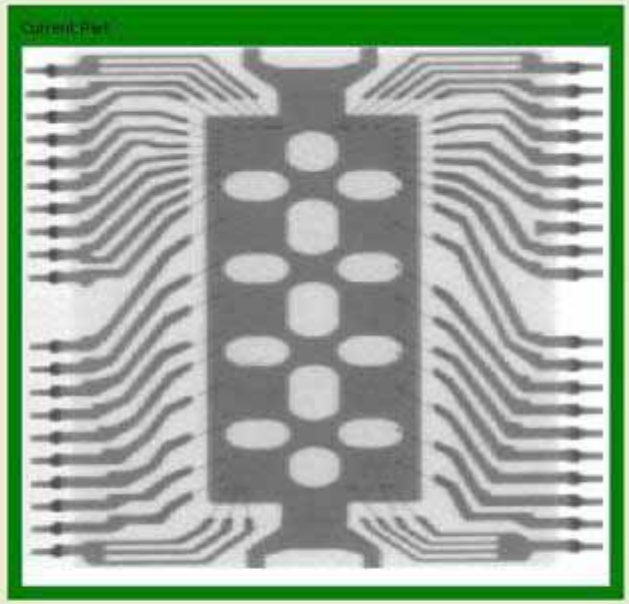




Current X-Ray Field of View (FOV)



Reference Part



Current Part

TruViewR2R

File

Reel-to-reel Speed 100.0%

Manual anomaly sensitivity 0.0%

Stop | Reset | Set Reference | Load Reference | Stop on fail

Lot Name demo | Enter

Stop after scanning parts

	Number	Percent
Passed	87	100
Failed	0	0
Review	0	0
Total	87	

Current Pass/Fail/Review Data

Export

Ready
X-Ray On
Overvoltage
Overcurrent
Arc
24V Supply
Interlock
Fault Reset

Activate X-Ray Source
Turn Off X-Ray Source

Timer
Set Point: 5:00
Time left: 01:43
X-Ray Active

Voltage Control
Set Point: 62 kV
Read Back: 62.55 kV

Current Control
Set Point: 0.356 mA
Read Back: 0.358 mA

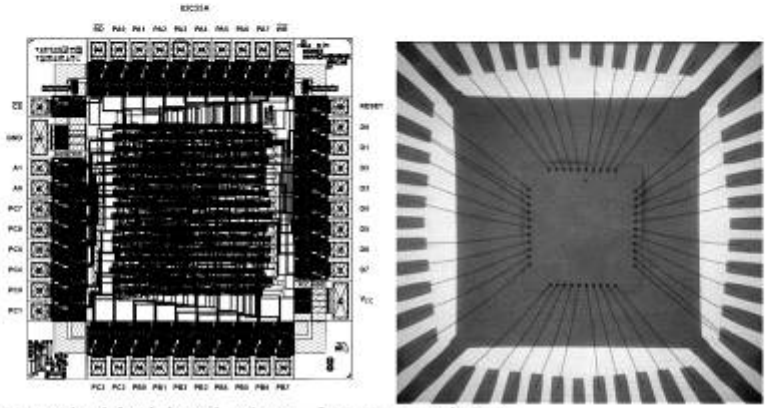
Documented X-Ray Inspection Data

COMPONENT INSPECTION ANALYSIS

Manufacturer: INTERSIL
Part Number: CS82C55A
Date Code: 0214 Lot Code: P0214AQMX

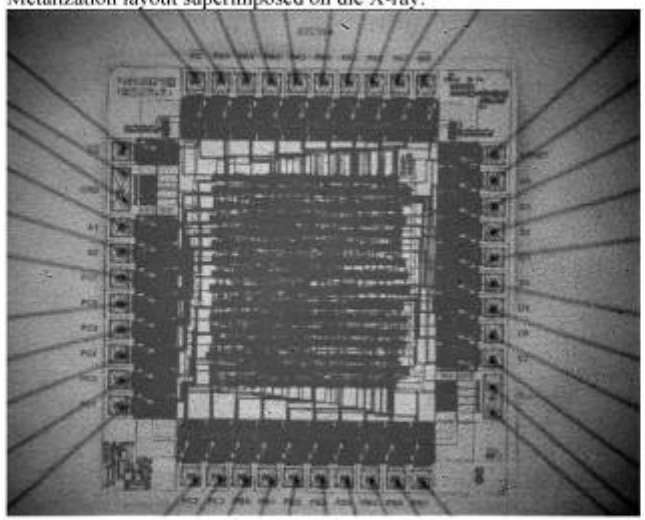
REAL-TIME X-RAY (continued)

Bondout match up (when metallization image is available)



Note doubled bond wires for Vcc and GND.

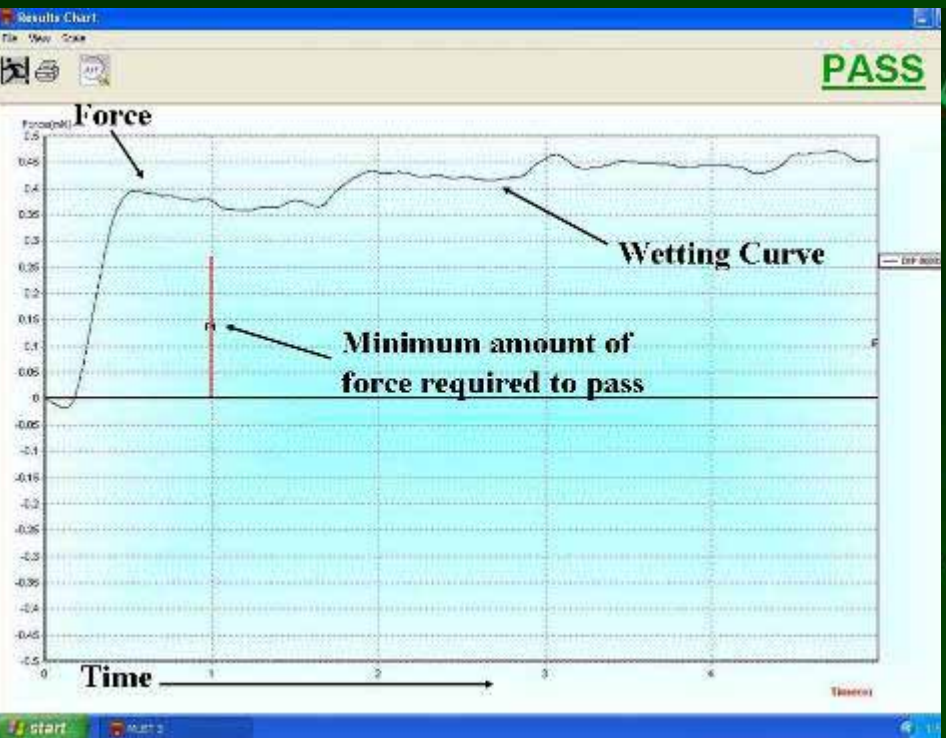
Metalization layout superimposed on die X-ray:

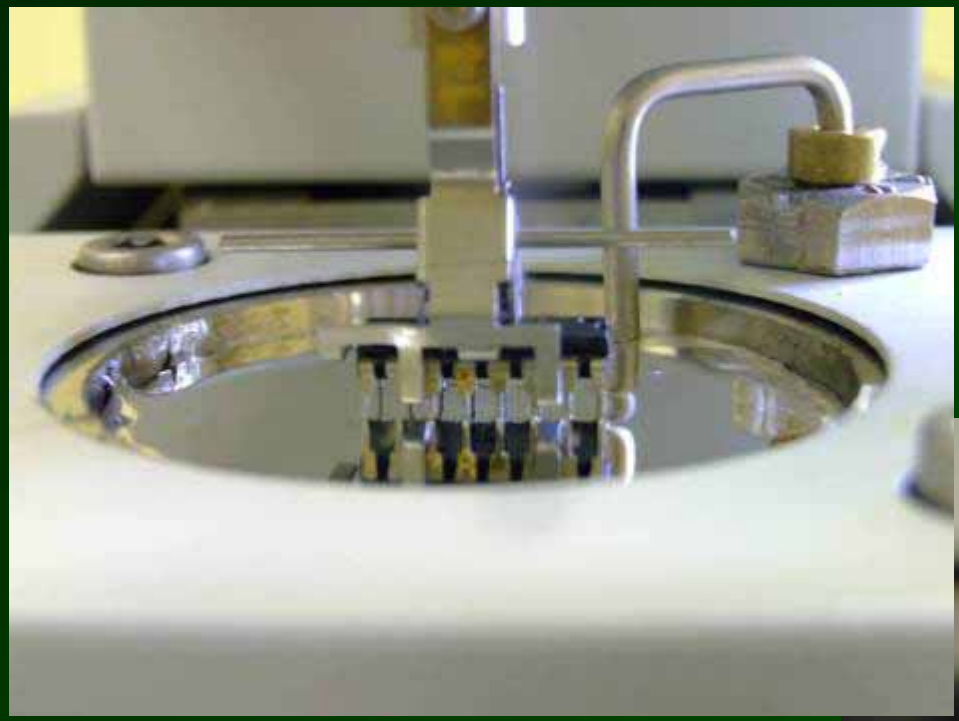


Documented

Solderability Testing

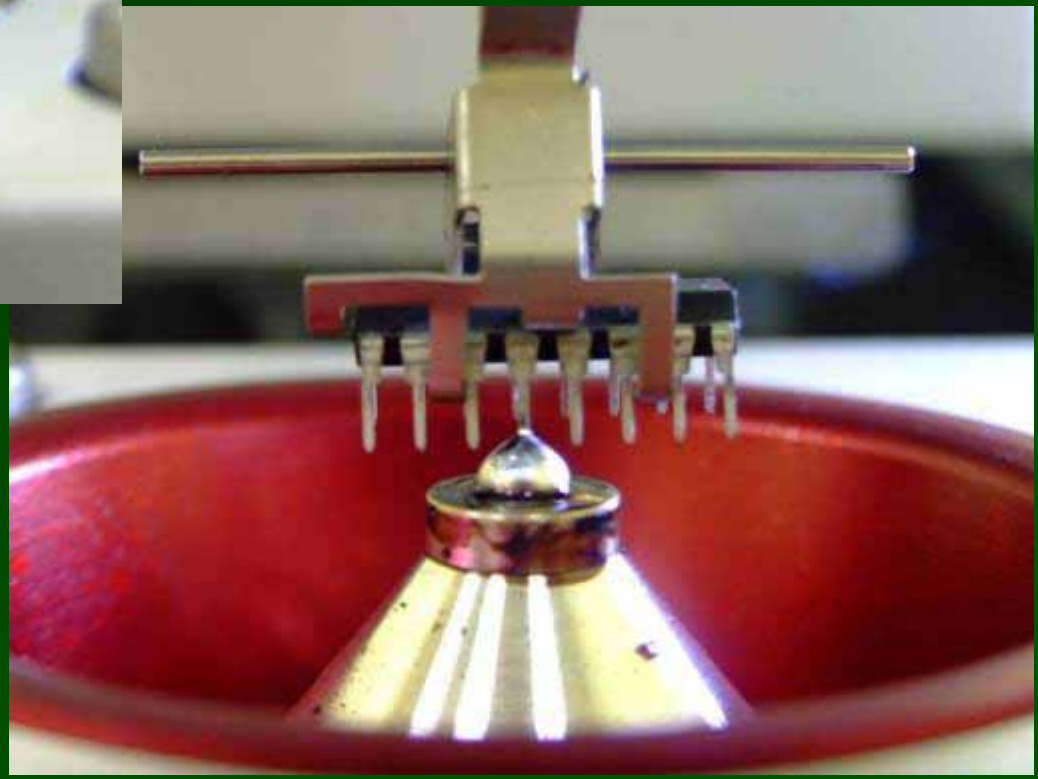
Automated Solderability (2 Systems)

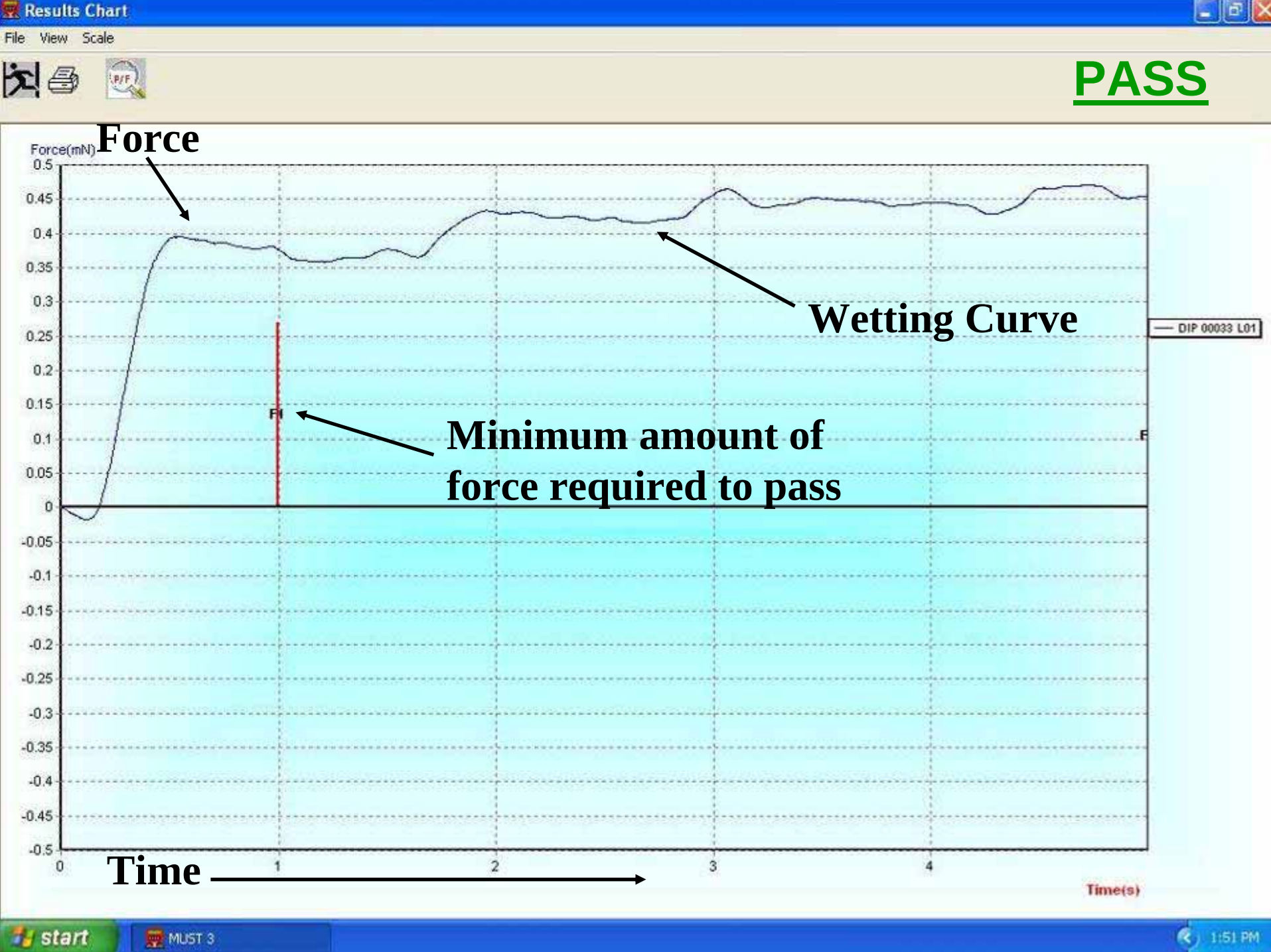




← Bath Test

Globule Test →




Results Chart
File View Scale
PASS
Force
Force(mN)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
-0.35
-0.4
-0.45
-0.5
Wetting Curve
DIP 00033 L01
FI
Minimum amount of
force required to pass
F
Time
0
1
2
3
4
Time(s)
start
MUST 3
1:51 PM

Documented Solderability Test Data

COMPONENT INSPECTION ANALYSIS

Manufacturer: INTERSIL
Part Number: CS82C55A
Date Code: 0214 Lot Code: P0214AQMX

SOLDERABILITY TEST

Parameter			Test setup
		X	Leaded solder
		25 mg	Ball size
		PLCC44	Program
Y	N	N/A	Test result
X			Pass
X			Report attached

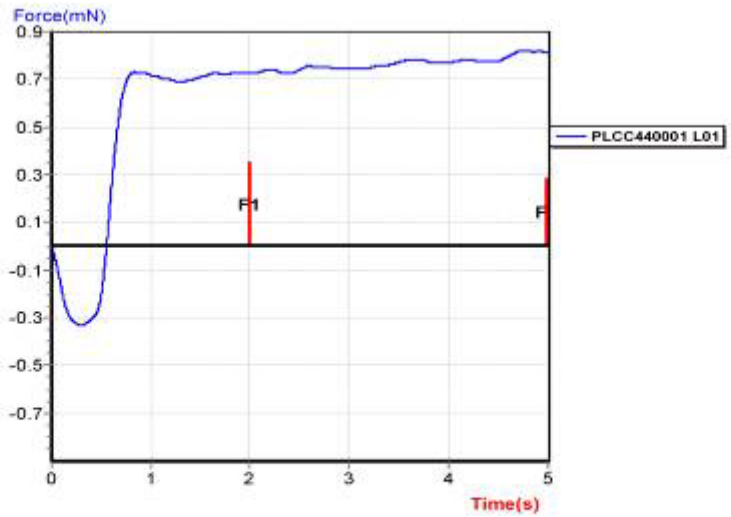
Must III Force Chart Test Date: Fri Jan 23 14:08:25 2009

Test Details
Component : PLCC44
Test parameter filename : Globule Parameters.vts Test parameter line : 3

Test Limits and Conditions

F1	= 0.35 mN @ 2.00 s	F2	= 0.20 mN @ 5.00 s
Tb	= 0.00 s	Time 2/3 Fmax	= 1.00 s
Immersion Speed	= 1.0 mm/s	Immersion Depth	= 0.10 mm
Test Time	= 5 s	Pre-heat Time	= 0 s
Test Temperature	= 235.0 °C	Flux	= Pure Rosin
Comment	:		

Description	Results Filename	Tb (s)	T2/3 (s)	F1 (mN)	F2 (mN)	A.U.C. (mN/s)	DeWet (%)	Fmax (mN)	TFmax (s)	Pass/Fail
PLCC44	PLCC440001 L01	0.555	0.670	0.728	0.814	3.150	0.0	0.822	4.793	pass

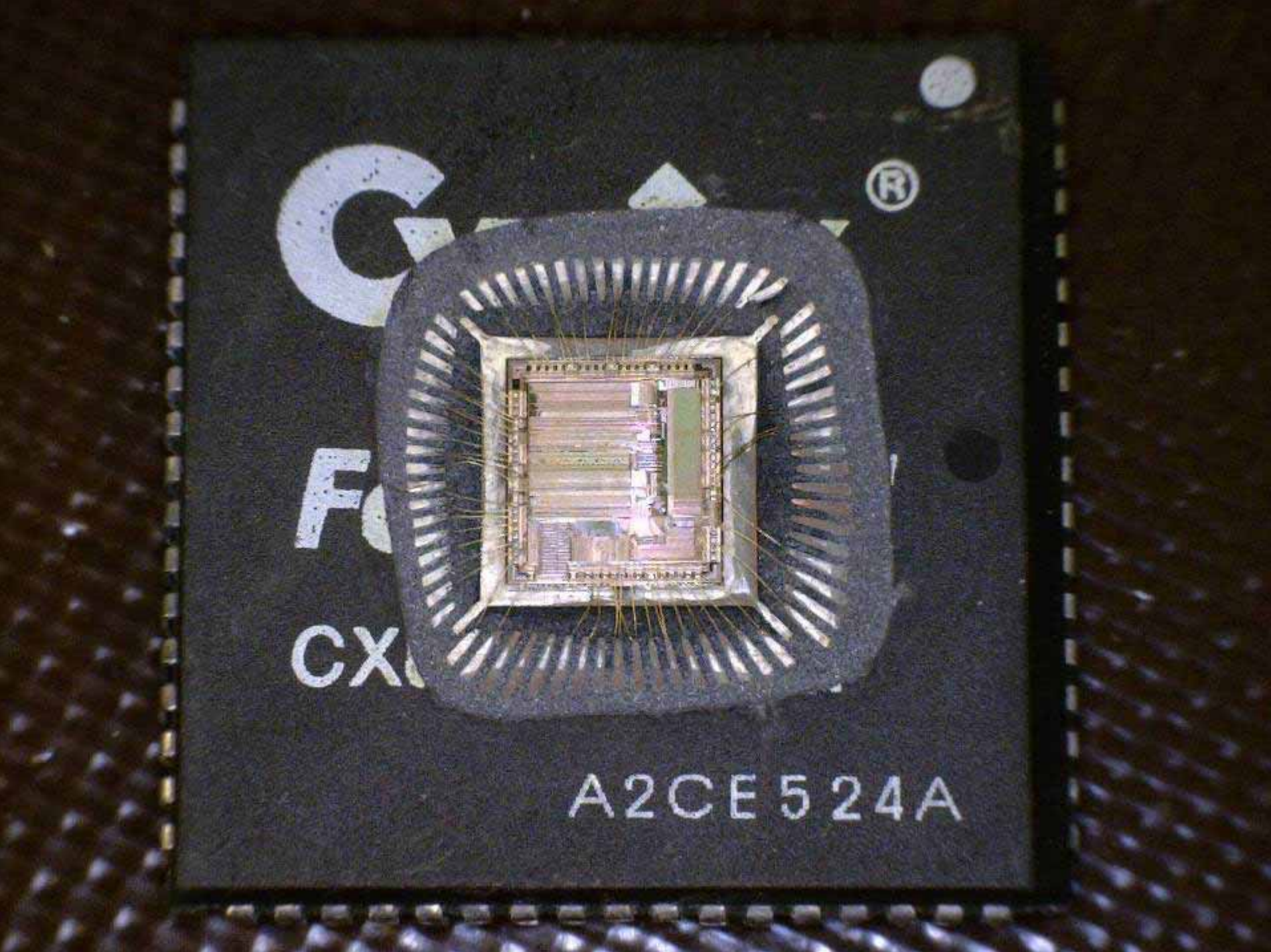


Documented

Acid-Etch Decapsulation & Die Verification

Acid-Etch Decapsulation (4 Systems)


Cyrix®
FasMath™
CX83S87-25-JP
A2CE524A


®
A2CE524A


CYRIX CRX-83D587
©1991
XXFX S
50
F
55
E

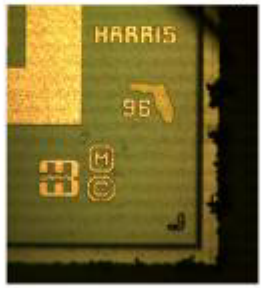
Documented

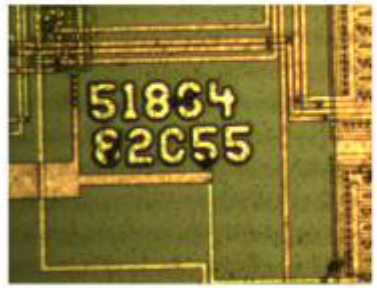
Die Inspection Data

COMPONENT INSPECTION ANALYSIS

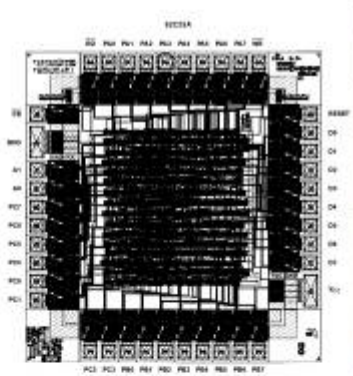
Manufacturer: INTERSIL
Part Number: CS82C55A
Date Code: 0214 Lot Code: P0214AQMX

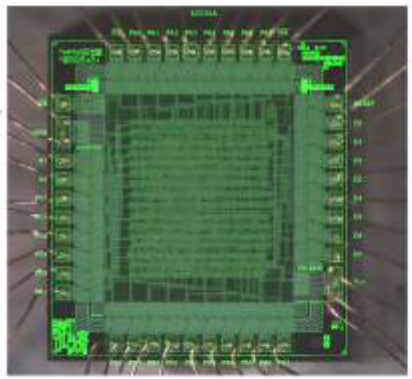
DIE MICROSCOPY (continued)





Die photo match up (when metallization image is available)





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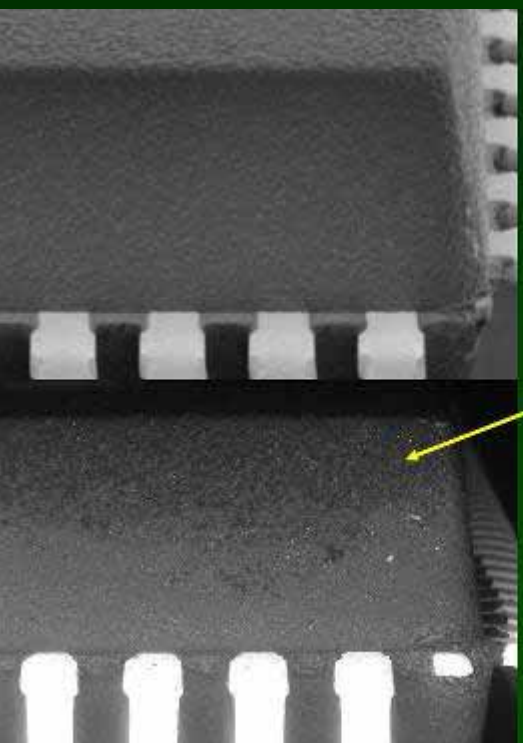
Scanning Electron Microscope (2 Systems)



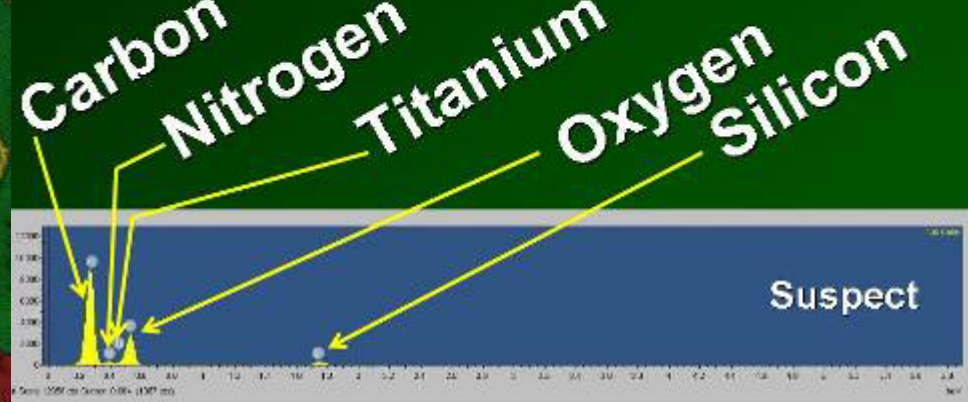
Exemplar Device Side

Overspray Visible

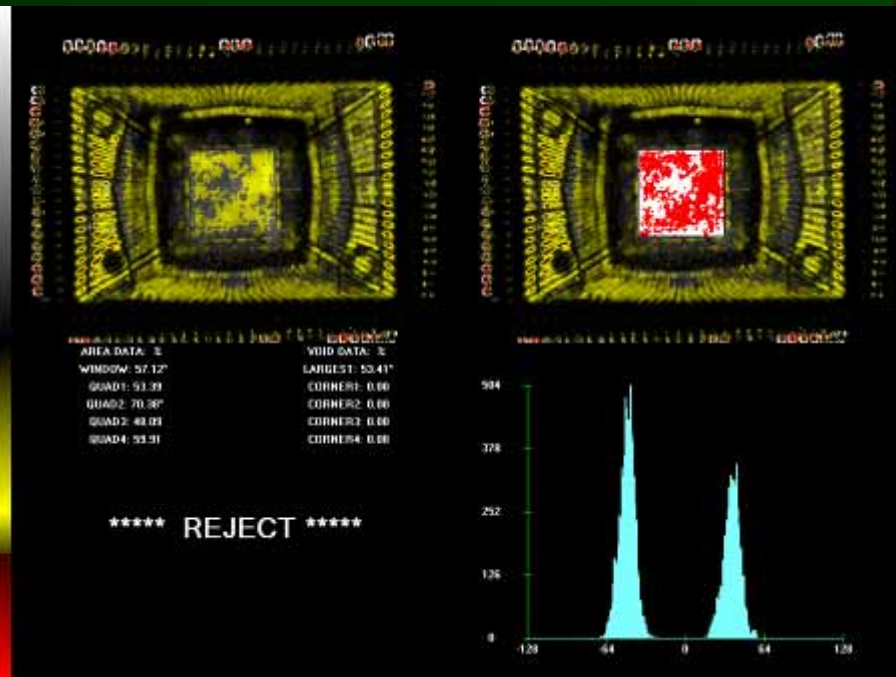
Suspect Device Side

Energy Dispersive X-Ray (2 Systems)

Spectrum Analysis of the Suspect Device Top Surface Area



Acoustic Microscopy (1 System)



A copy of the
"Certificate of Analysis"
document is shipped with order to verify quality and authentication inspection has taken place


COMPONENT INSPECTION ANALYSIS
SUMMARY
ATTENTION
OBSERVE PRECAUTIONS FOR HANDLING
ELECTROSTATIC SENSITIVE DEVICES

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Corporation

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