

# Golden Samples for Counterfeit Mitigation

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# Purpose

To provide exceptional engineering services in preventing and mitigating counterfeit electronic components throughout **the entire process of part selection, and also aims to create a golden samples database** for all Original Equipment Manufacturers (OEMs). This will enable them to maintain inspection control down to the die level and ensure the quality and authenticity of their components.

**Golden sample** is defined as known good device from Original Component Manufacturer (OCM) or authorized distributor with traceability documentation.

# Outline

- Key Reasons for Counterfeit Opportunities
- Why Do Counterfeit Parts Exist?
- Counterfeit Sophistication & Advancement
- Proprietary Methodology
- Proactive versus Reactive
- Let's Play a Game
- Lessons Learned from the Game
- Probability of Detection
- Conclusions
- Q&A

# Counterfeit Opportunities

Preventative / Resolution Steps for Obsolescence / Diminishing Manufacturing Sources (DMS)	Customer's Change Approval
Lifecycle Check during Part Selection	No
BOM Analysis Prior to Design Release	No
Monitor Product Change Notice (PCN)	No
Assess Last Time Buy (LTB) Opportunity	No
Locate Worldwide Inventory	No
Identify Form, Fit, Function	No
Identify Better Than Grade	No
Dead Bug /w Jumper Wire (non-complex ICs)	No Yes – Major Change
Redesign / Respin PWA	Yes
Locate Inventory from Brokers	No

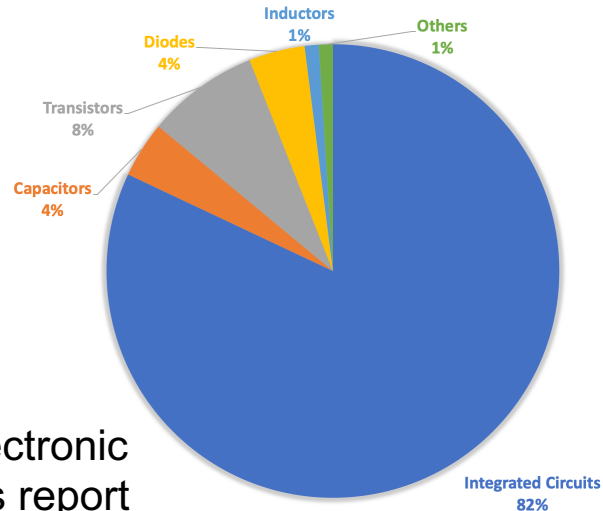
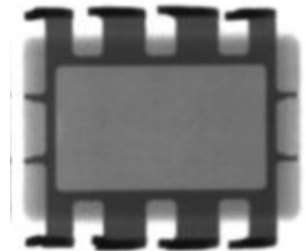
Resolution Steps for Material Shortages (MS)	Customer's Change Approval
Locate Worldwide Inventory	No
Identify Form, Fit, Function	No
Identify Better Than Grade	No
Dead Bug /w Jumper Wire (non-complex ICs)	No Yes – Major Change
Redesign / Respin PWA	Yes
Locate Inventory from Brokers	No

**Does Production Stop While DMSMS Being Addressed?**

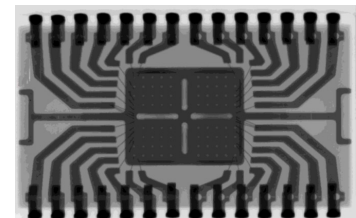
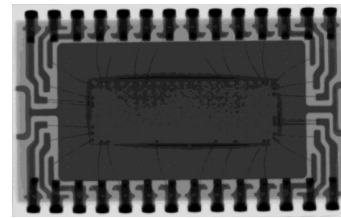


# Why Do Counterfeit Parts Exist?

- **Highly Profitable with Little Effort**
- **Examples:**
  - Used product remarked as higher grade via electronics recycling
  - Fake, non-working products, e.g., empty package without die
  - Defective scrap, usually from insider sources where they are supposed to destroy failed parts
  - Remarking on new products to address shortage or obsolescence
  - Highly sophisticated methods and accessible equipment available

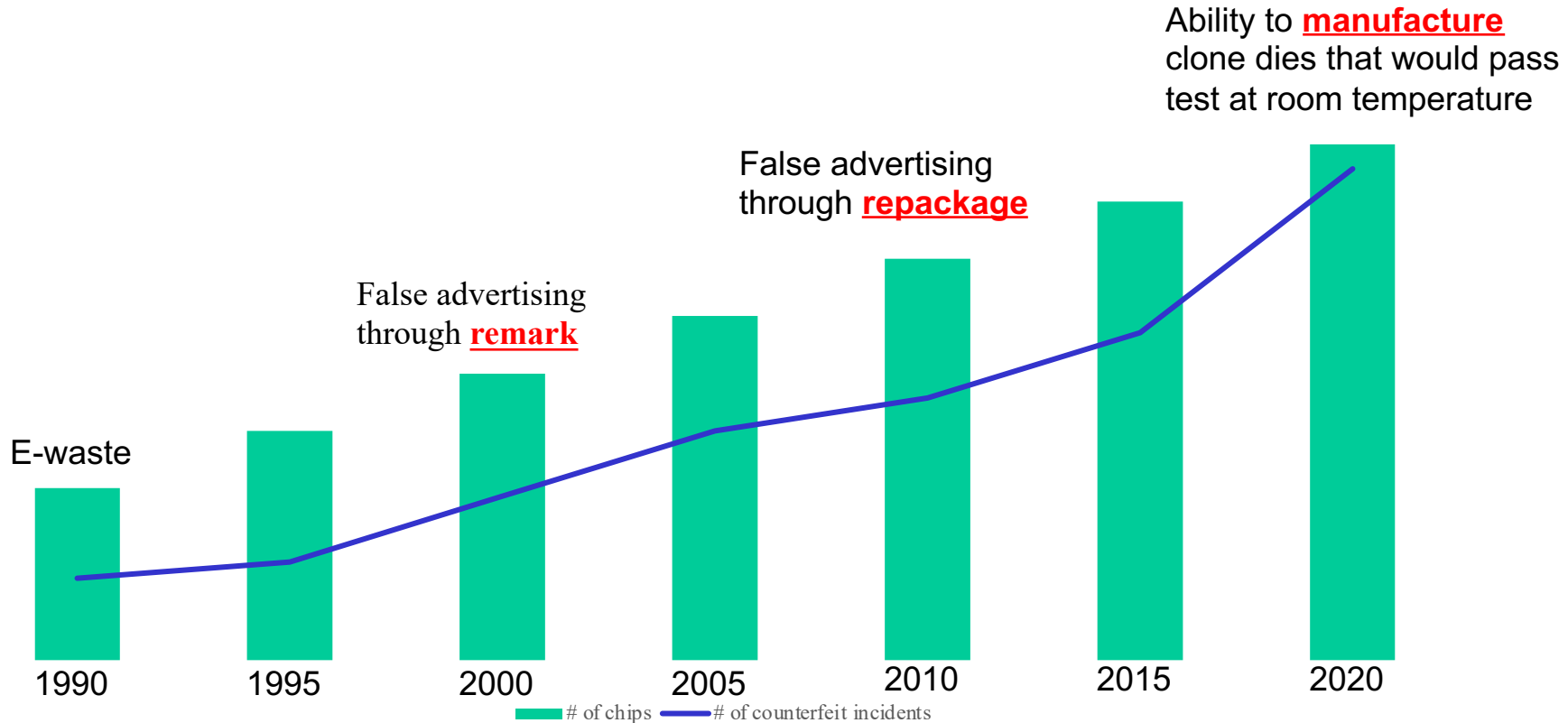


Targeted Counterfeit Electronic Commodities per ERAI's report



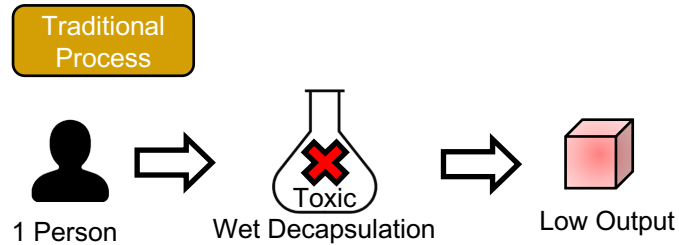
Photos Courtesy of: <https://mttc.jpl.nasa.gov>

# Counterfeit Sophistication and Advancement

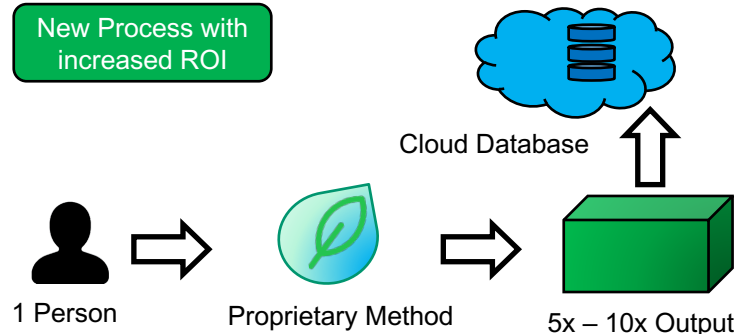


# Proprietary Methodology

- Fast, safe, and reliable decapsulation method using non-toxic chemical
- High resolution images
- Fastest growing online golden samples database



- Low dies and productivities output
- Lack of collaboration among peers and online database access
- Increase employees' health risk to toxic chemical(s)
- Increase toxic waste for the environment
- Increase risk for delivery of large quantities of toxic chemicals
- Increase company's liability costs for storing excessive hazardous chemicals and uncalculated costs



- 5-10x dies and productivities output
- Increase collaboration among peers and online database access
- Reduce employees' health risk to toxic chemical(s)
- Reduce toxic waste for the environment
- Reduce risk for delivery of large quantities of toxic chemical
- Reduce company's liability costs for storing excessive hazardous chemicals and uncalculated costs

# Proactive vs Reactive

When do companies implement counterfeit mitigation?

\$-\$\$

Design &  
Development

Proactive and preventative phase, minimizes potential damages that counterfeit parts cause for businesses operating on a just-in-time model.

\$\$\$ - \$\$\$\$

Production

Production delays/stop, engineering efforts to troubleshoot, cost of late delivery, and recall shipments recently delivered.

\$\$\$\$\$+

End of Life  
(EOL)

No golden sample guarantees risk in products. Immediate redesign efforts. Expensive resources attempting to address obsolete parts procured from open market.

Contractual fines, significant loss of business, and lawsuits.

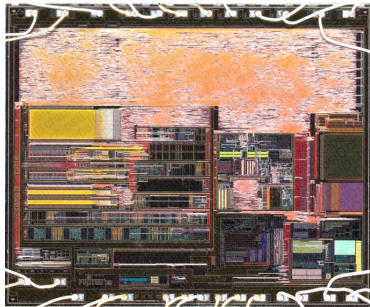
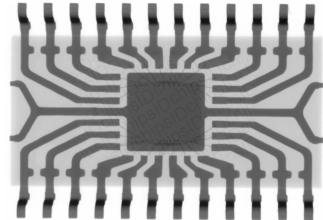
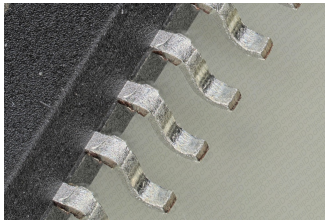
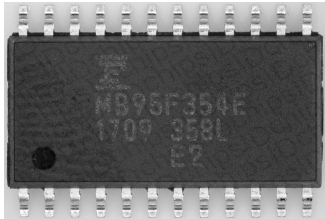
Note: Most companies implement counterfeit mitigation tasks during these last two phases!!!

**Let's Play a Game!**

# MB95F354EPF-G-SNE2 (Example #1)

**Manufacturer:** Fujitsu/Cypress/Infineon

**Description:** IC MCU 8BIT 20KB FLASH 24SOP



Cypress and Fujitsu Electronics  
Announce \$500 Million  
Distribution Agreement for  
Japan

Agreement Expands Distribution Partnership to Include All Cypress  
Products, Opening up New Opportunities for Growth in Japanese  
Market

NEWS PROVIDED BY  
Cypress Semiconductor Corp. →  
11 Sep. 2015, 08:00 ET

Infineon Technologies AG completes acquisition  
of Cypress Semiconductor Corporation

Apr 16, 2020 | Business & Financial Press

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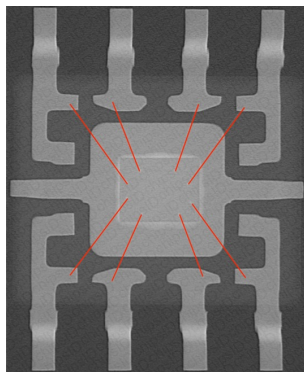
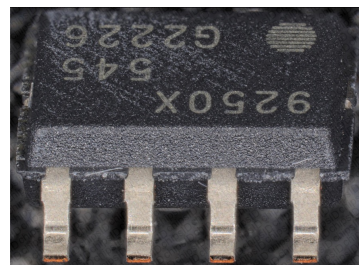
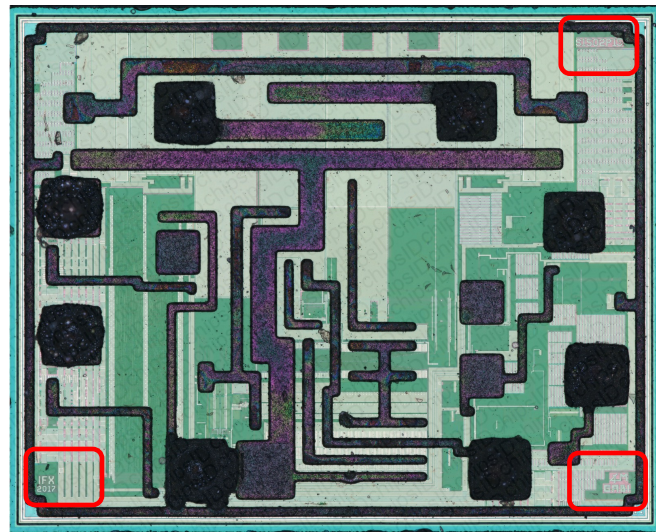
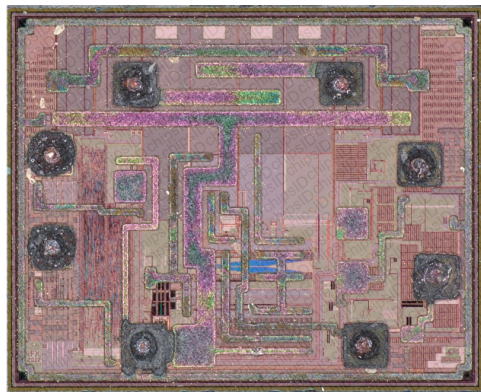
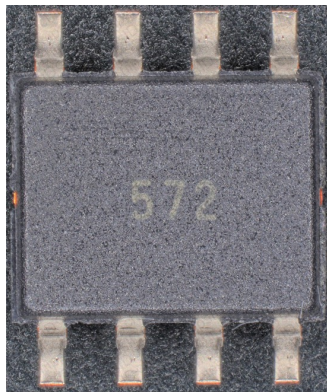
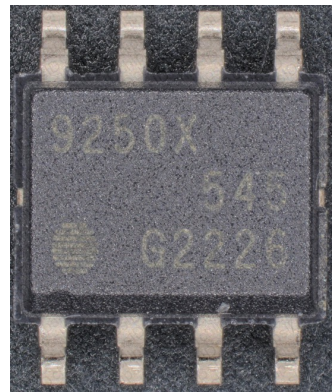
Munich, Germany, and San Jose, California - 16 April 2020 - Infineon Technologies AG (FSE:IFX / OTCQX:IFNNV) announced today the  
closing of the acquisition of Cypress Semiconductor Corporation. The San Jose-based company has become part of Infineon effective as  
of the closing.



# TLE9250XSJXUMA1 (Example #2)

**Manufacturer:** Infineon Technologies.

**Description:** IC TRANSCEIVER 1/1 8SOIC

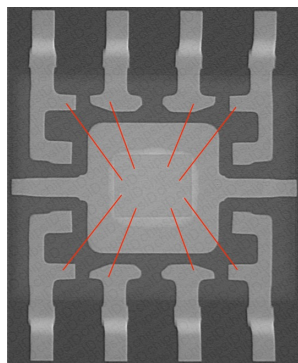
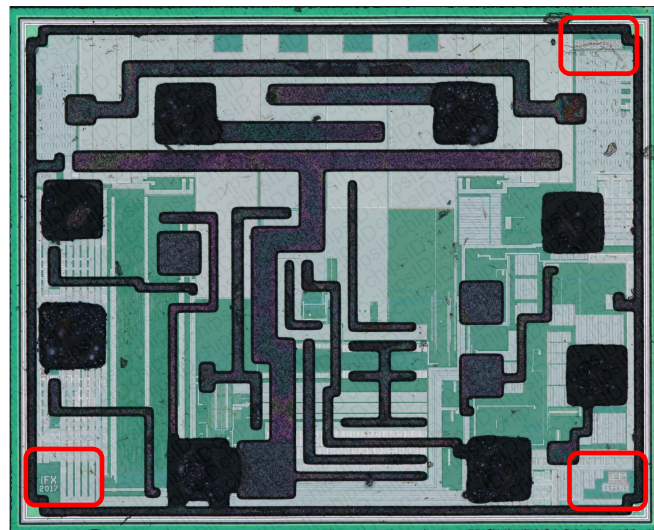
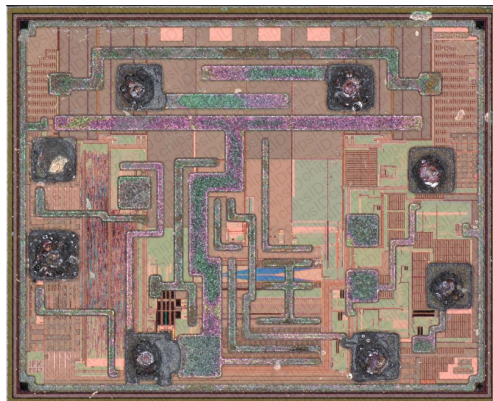
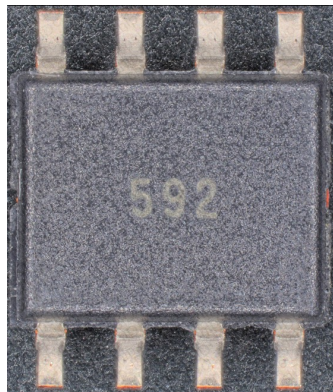
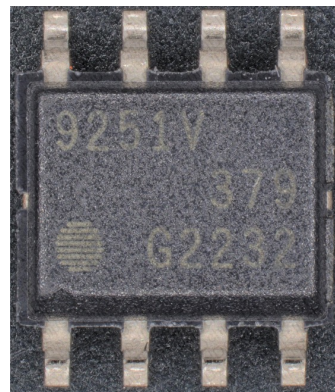




# TLE9251VSJXUMA1 (Example #3)

**Manufacturer:** Infineon Technologies.

**Description:** IC TRANSCEIVER 1/1 DSO-8

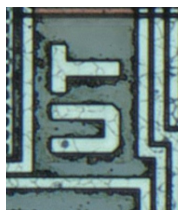
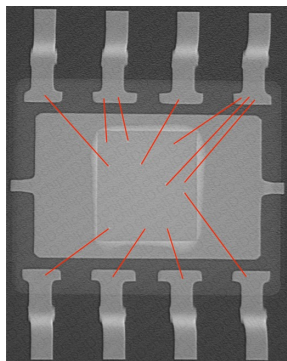
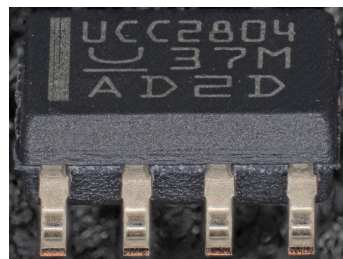
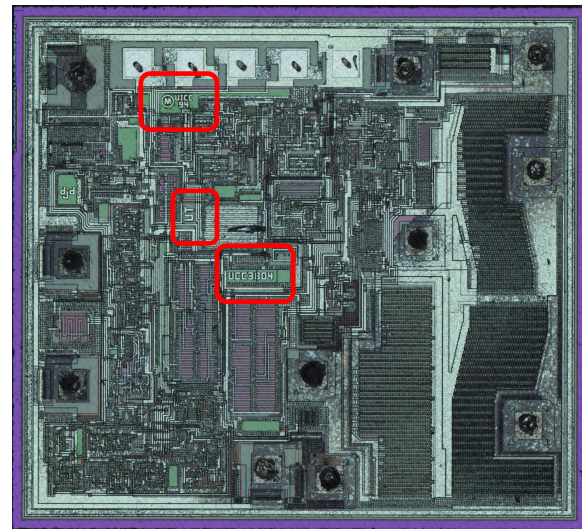
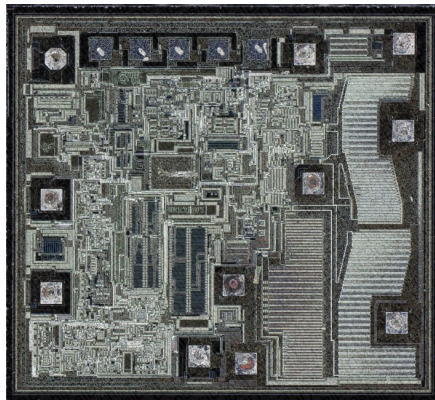
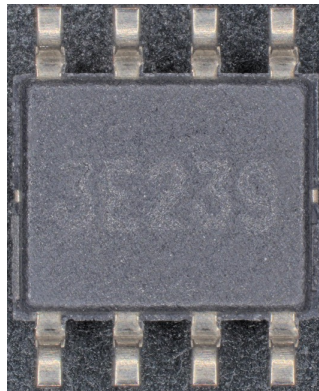
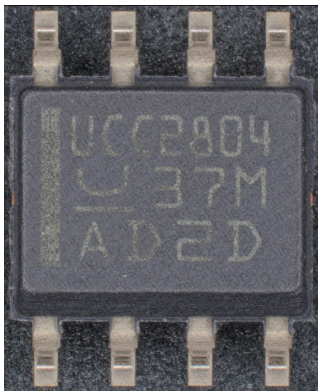




# UCC2804DTR (Example #4)

**Manufacturer:** Texas Instruments.

**Description:** IC OFFLINE SWITCH MULT TOP 8SOIC



UCC2804DTR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	UCC2804
UCC3804DTR	ACTIVE	SOIC	D	8	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	UCC3804

# TPS5461XXXX (Example #5)

**Part Number:** TPS54616PWPR      **Manufacturer:** Texas Instruments

**Description:** IC REG BUCK 3.3V 6A 28HTSSOP

**Part Number:** TPS54612PWPR      **Manufacturer:** Texas Instruments

**Description:** IC REG BUCK 1.2V 6A 28HTSSOP

## Device Information<sup>(1)</sup>

PART NUMBER	PACKAGE	OUTPUT VOLTAGE
TPS54611		0.9 V
TPS54612		1.2 V
TPS54613	HTSSOP (28)	1.5 V
TPS54614		1.8 V
TPS54615		2.5 V
TPS54616		3.3 V

(1) For all available packages, see the orderable addendum at the end of the datasheet.

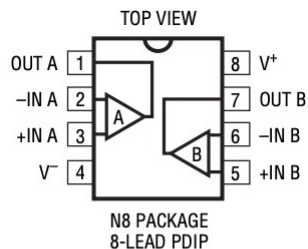
# LT112XMJ (Example #6)

**Part Number:** LT1125MJ      **Manufacturer:** Linear Technology

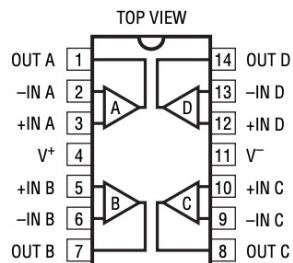
**Description:** IC QUAD OPAMP LOW NOISE DIP14

**Part Number:** LT1124MJ8      **Manufacturer:** Linear Technology

**Description:** IC DUAL OPAMP LOW NOISE DIP8



$T_{JMAX} = 140^{\circ}\text{C}$ ,  $\theta_{JA} = 130^{\circ}\text{C/W}$



$T_{JMAX} = 140^{\circ}\text{C}$ ,  $\theta_{JA} = 110^{\circ}\text{C/W}$  (N)

LT1124CJ8	LT1124CJ8#TR	LT1124CJ8	8-Lead CERAMIC DIP	0°C to 70°C
LT1124AMJ8	LT1124AMJ8#TR	LT1124AMJ8	8-Lead CERAMIC DIP	-55°C to 125°C
LT1124MJ8	LT1124MJ8#TR	LT1124MJ8	8-Lead CERAMIC DIP	-55°C to 125°C
LT1125CJ	LT1125CJ#TR	LT1125CJ	14-Lead CERAMIC DIP	0°C to 70°C
LT1125AMJ	LT1125AMJ#TR	LT1125AMJ	14-Lead CERAMIC DIP	-55°C to 125°C
LT1125MJ	LT1125MJ#TR	LT1125MJ	14-Lead CERAMIC DIP	-55°C to 125°C

**OBSOLETE PACKAGE**

J8 PACKAGE  
8-LEAD CERAMIC DIP

$T_{JMAX} = 160^{\circ}\text{C}$ ,  $\theta_{JA} = 100^{\circ}\text{C/W}$

**OBSOLETE PACKAGE**

Consider the N8 for Alternate Source

J PACKAGE  
14-LEAD CERAMIC DIP

$T_{JMAX} = 160^{\circ}\text{C}$ ,  $\theta_{JA} = 80^{\circ}\text{C/W}$

**OBSOLETE PACKAGE**

Consider the N for Alternate Source

# Multiple Dies (Example #7)

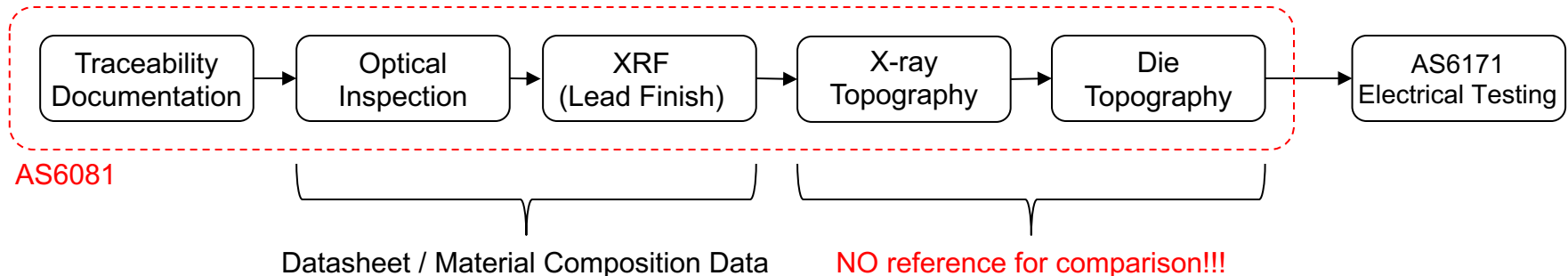
**Part Number:** ADUM1300BRWZ-RL      **Manufacturer:** Analog Devices      **3 DIES**  
**Description:** IC DGTL ISO 2500VRMS 3CH GP 16SOIC

**Part Number:** ADUM260N0BRIZ-RL      **Manufacturer:** Analog Devices      **4 DIES**  
**Description:** IC DGTL ISO 5000VRMS 6CH GP 16SOIC

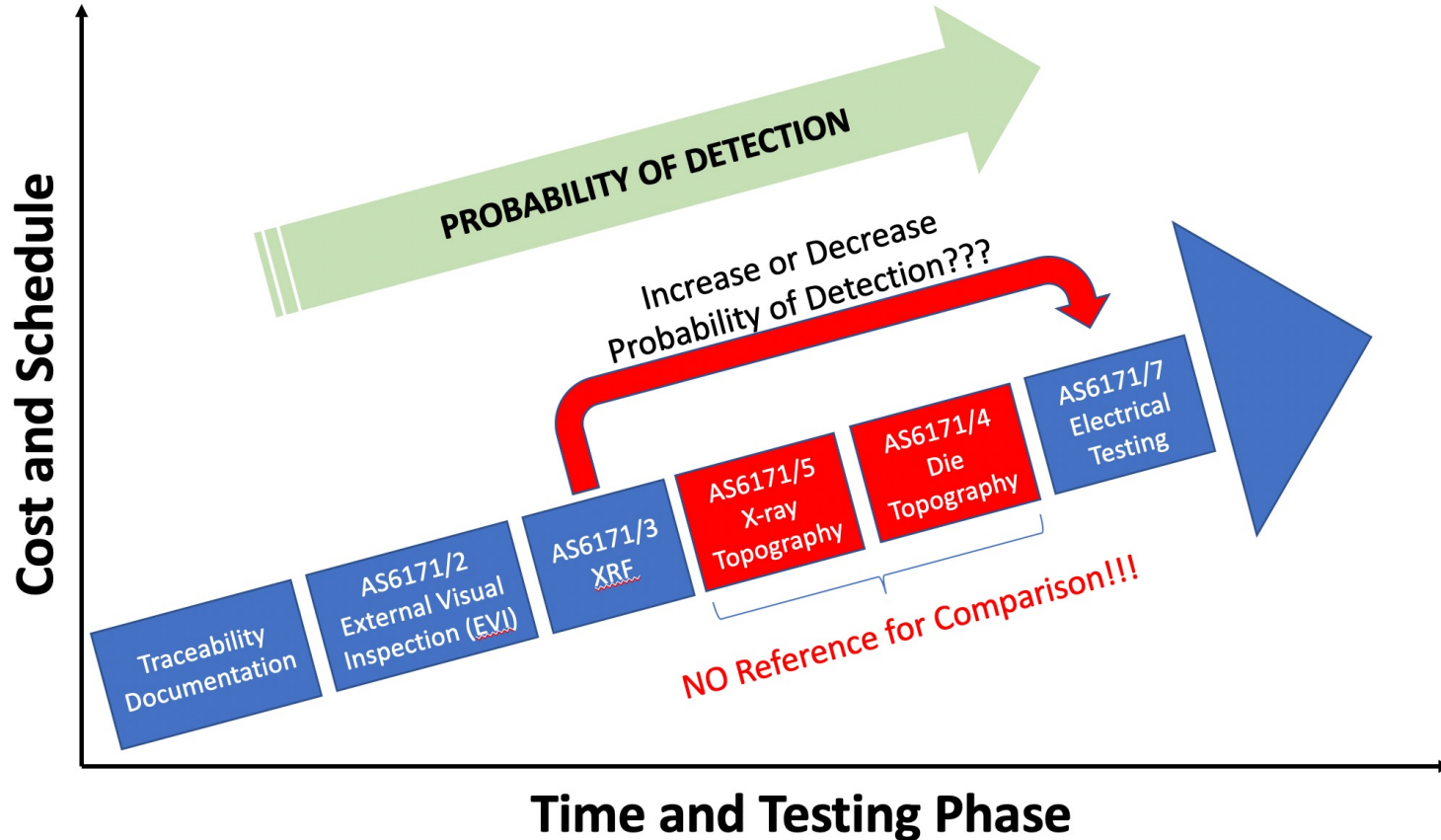
**Part Number:** ADM2587EBRWZ      **Manufacturer:** Analog Devices      **6 DIES**  
**Description:** IC DGT ISO 2.5KV RS422/RS485 20SOIC

# Lessons Learned from the Game

- 50% confidence level for authenticity without a reference die
- Many packages with similar external visual including X-ray topography
  - Extremely easy to remark
- Die's markings do not always correlate with the part info
  - Different logo due to acquisitions
  - Die mask number rather than part number
  - Multiple dies within a single package
- Spend unnecessary resources on electrical testing



# Probability of Detection



# Conclusions

- Game-Changing solution to mitigate risk of electronic counterfeits
- 24/7 access to best-in-class microscopy images of parts
  - Only searchable database of X-ray and die topographies for EOL components
- Start thinking about your company's parts that are obsolete, NFND, long lead time to catalog them proactively
- Complementary Services
  - chipsID will document 20 IC's free of charge (preferably 2x golden samples per part number with traceability docs.)
  - Free 1-Week Access to the Database

**“1N73LL1G3NC3  
15 7H3  
4B1L7Y  
70 4D4P7  
70 CH4NG3”**

**- 573PH3N H4WKING -**