

INTRODUCTION

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~ 2300 €

FM QML-V qualified
Rad-hard data converter

INTRODUCTION

BUT...

~ 50 €

High performance
commercial equivalent

~ 2300 €

FM QML-V qualified
Rad-hard data converter

ALTER



ACCEDE | ESCCON

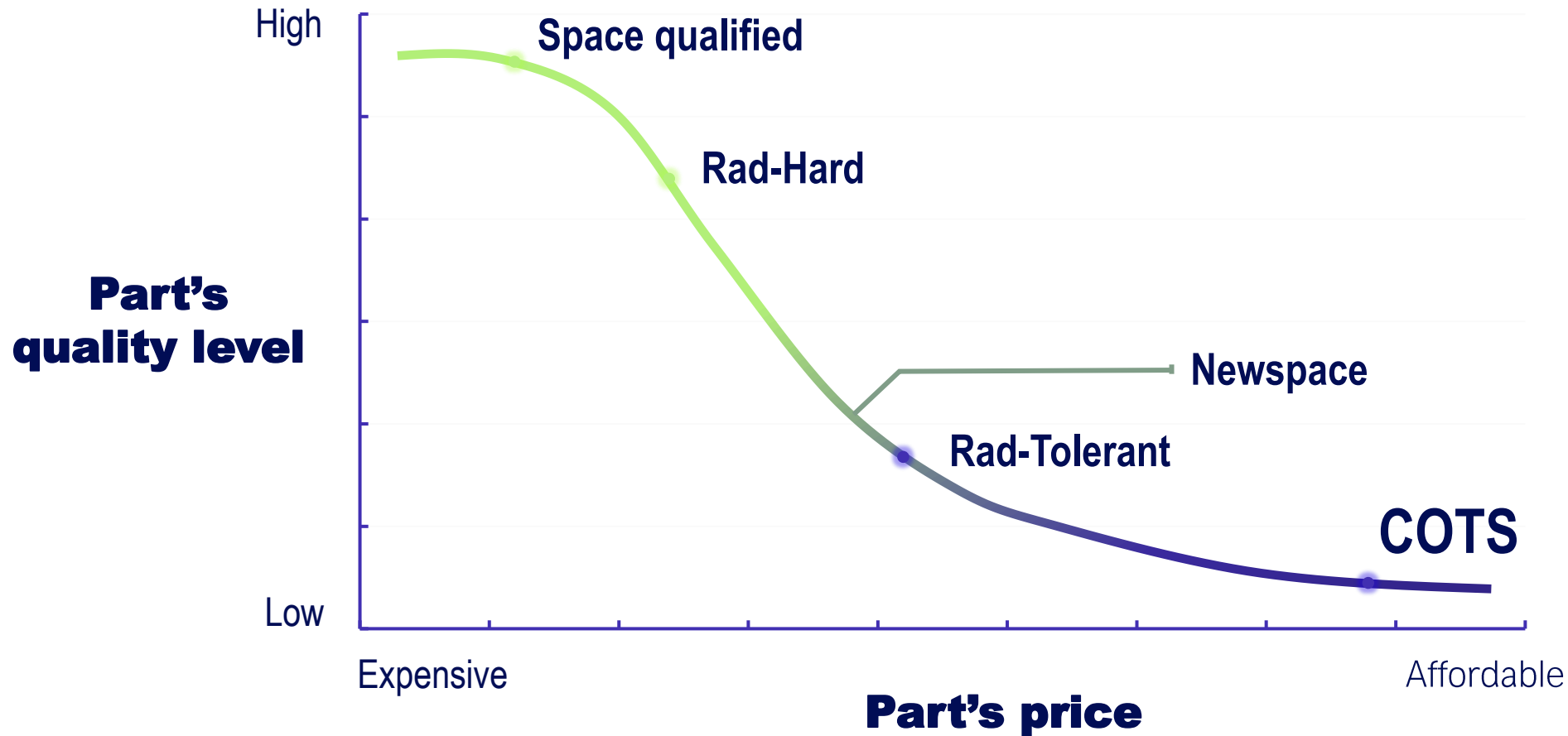
2025

Seville - Spain
25 to 27th March

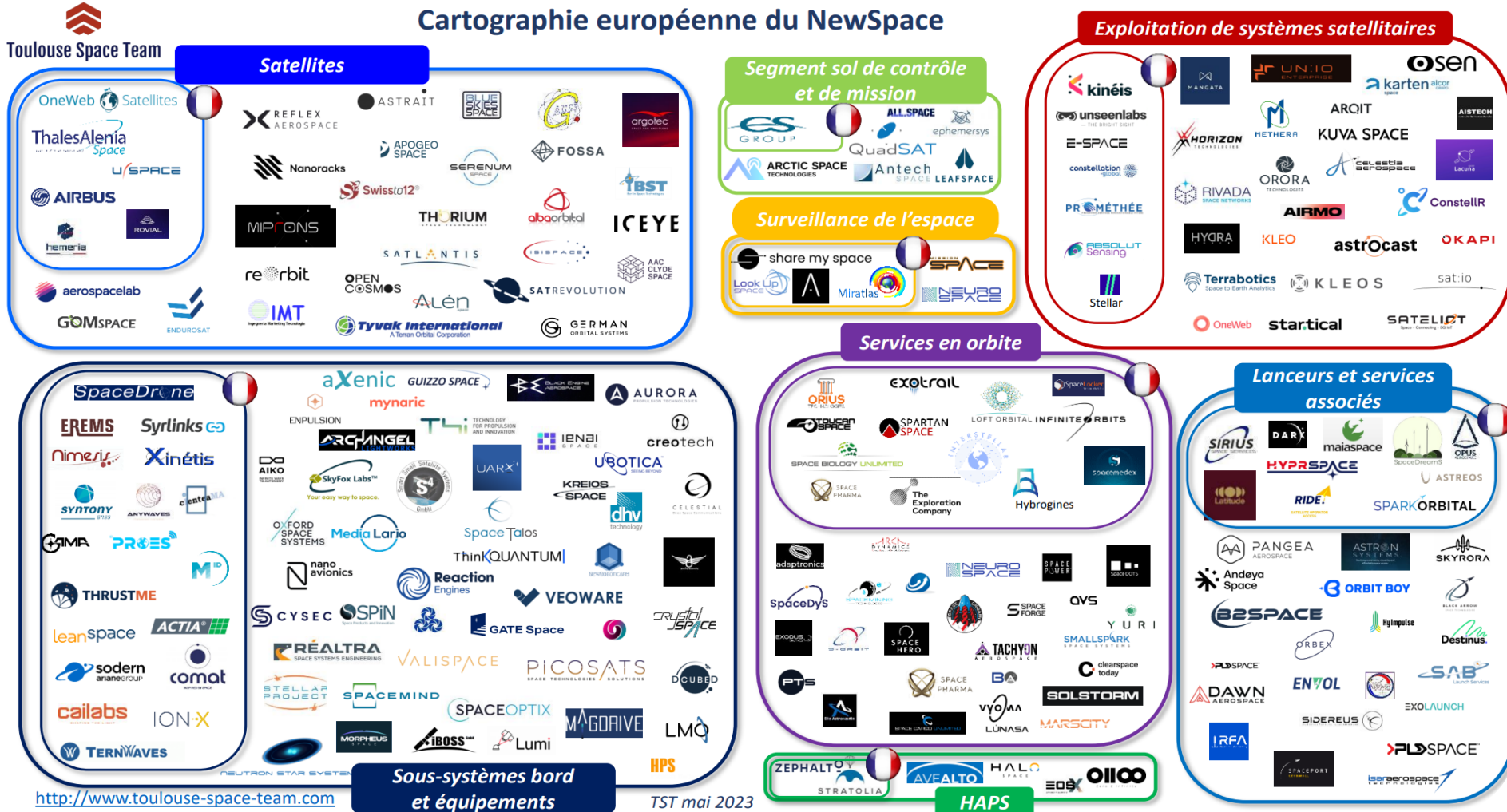
QUALIFICATION OF COTS FOR RADIATION :
WHY WE NEED TO
SHARE DATA AND HOW ?

Chloé Mamet
Components engineer

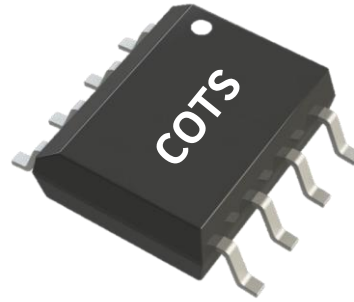
UNDERSTANDING THE RISE OF COTS IN TODAY'S SPACE INDUSTRY



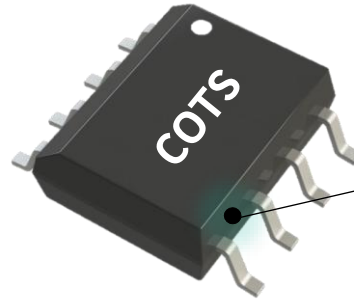
UNDERSTANDING THE RISE OF COTS IN TODAY'S SPACE INDUSTRY



WHEN TALKING ABOUT COTS, WE TALK ABOUT COST...



UNVEILING THE CONSIDERATIONS WITH THE USE OF COTS



RADIATIONS

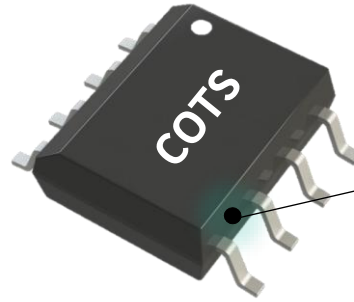
Expertise

- Vulnerabilities of each technologies
- Interpret test data



lavenir.net

UNVEILING THE CONSIDERATIONS WITH THE USE OF COTS



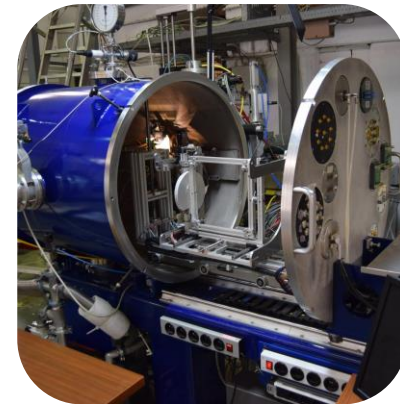
Budget

- TID : **15k €**
- SEE : **30k €**

RADIATIONS

Expertise

- Vulnerabilities of each technologies
- Interpret test data



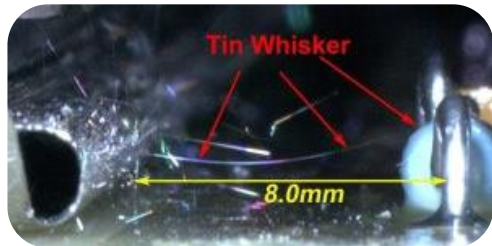
lavenir.net

UNVEILING THE CONSIDERATIONS WITH THE USE OF COTS

MOUNTING

COTS packages

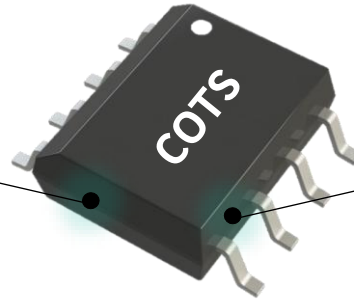
- Usually easy to qualify (plastic)
- Careful with new packages



leadertechinc.com

Pure-tin induced risks (ROHS)

- Heat treatment
- Coating



Budget

Complete mounting qualification : **50k €**

• TID : **15k €**

• SEE : **30k €**

RADIATIONS

Expertise

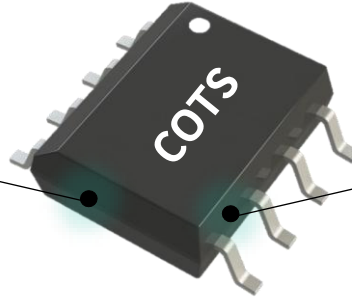
- Vulnerabilities of each technologies
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UNVEILING THE CONSIDERATIONS WITH THE USE OF COTS

MOUNTING



RADIATIONS

The lack of shared data hinders collective progress...

- Radiations
- Mounting

- Reliability ?
- Alerts on components ?

HOW TO BENEFIT FROM THE USE OF COTS : CNES INITIATIVE TO SUPPORT THE FRENCH ECOSYSTEM



Memory	Samsung	[2.6 - 62] MeV.cm ² /mg	13/12/2019	NON	Lien
Memory DDR4 8Gb	Micron	[2.6 - 60.88] MeV.cm ² /mg	12/12/2019	OUI	-
MOSFET Driver	Infineon	[32.4 - 97.2] MeV.cm ² /mg	12/12/2019	NON	Lien

- Tests conducted exclusively by CNES
- Access (only to French entities) to report and analysis by expert

HOW TO BENEFIT FROM THE USE OF COTS : CNES INITIATIVE TO SUPPORT THE FRENCH ECOSYSTEM



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First step toward informed data sharing...

...but not sufficient to address today's challenges

HOW TO BENEFIT FROM THE USE OF COTS : ANSWERING THE NEEDS OF OUR ECOSYSTEM



**Components available
Q4 2025**

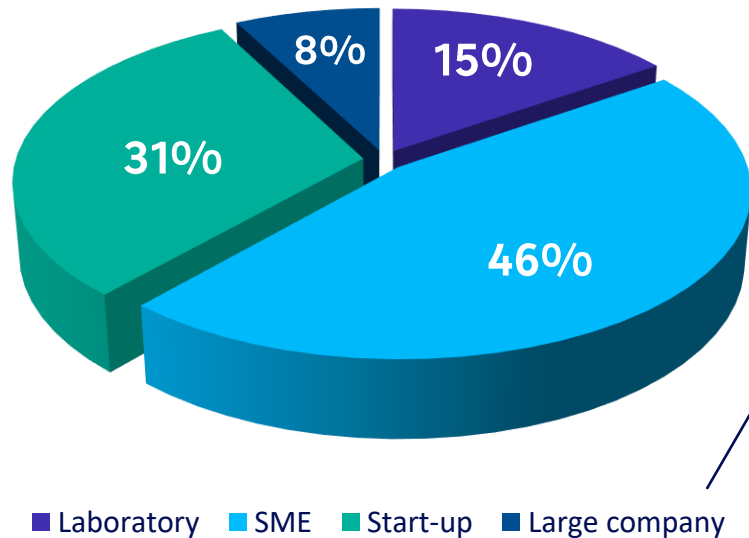
HOW TO BENEFIT FROM THE USE OF COTS : ANSWERING THE NEEDS OF OUR ECOSYSTEM



Components available
Q4 2025

200 REFERENCES

Analysis of our ecosystem needs :



« *Multipart* »

Data sharing
between CNES
and ADS, TAS,
SODERN and
TDMS

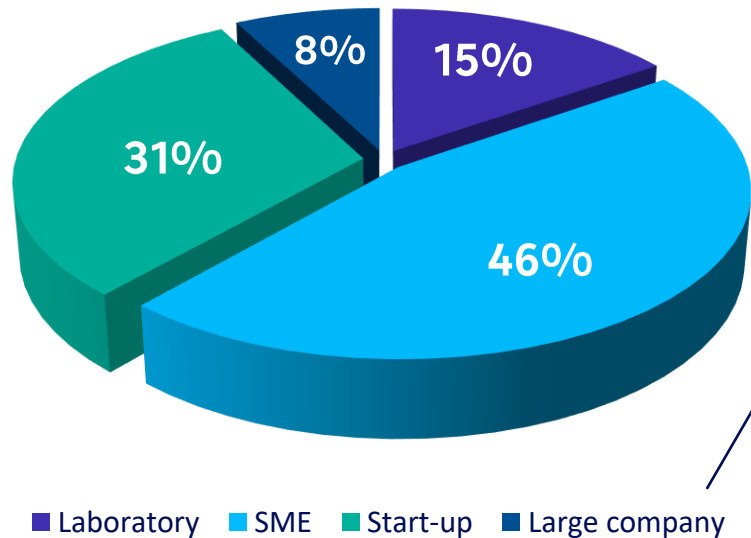
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Q4 2025

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Analysis of our ecosystem needs :



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between CNES
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Common interests :

- Isolated components
- Power management ICs
- ADC/ DAC
- Microcontroller

HOW TO BENEFIT FROM THE USE OF COTS : ANSWERING THE NEEDS OF OUR ECOSYSTEM

30 SELECTED REFERENCES

Transistor FET and drivers

- GaN FET N
- High power NPN
- High power PNP
- Driver GaN
- Isolated MOS Driver

Power management

- Linear switching regulator Boost
- Linear switching regulator
- Linear voltage regulator Positive Vout
- Linear voltage regulator Negative Vout
- DDR power supply

Logic

- Logic gate
- 8-Bit Addressable Latches
- Inverters Hex Schmitt-Trigger

Transceiver

- High Speed CAN Transceiver
- Isolated RS-485 Transceiver

Mux/Demux

- Decoder Demultiplexer

Supervisory circuits

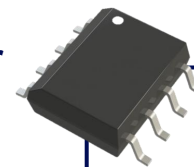
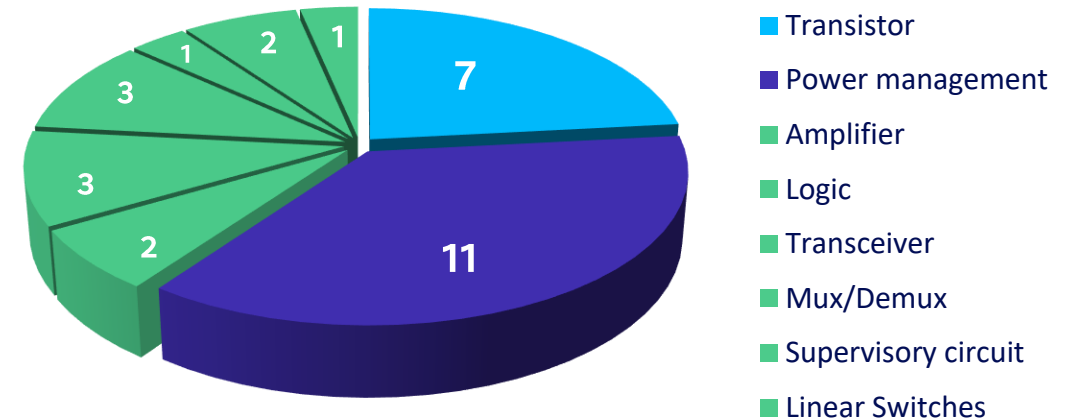
- Power and Current Limiting eFuse
- Programmable Current-Limit Switches

Linear Switches

- iCMOS Quad SPST Switches

Amplifier

- OPA /& Instrumentation Amplifier



Ex : SI8271AB-ISR
Isolated Gate Driver from Skyworks

AN OPTIMIZED TEST PLAN : MEETING NEEDS WHILE CONTROLLING COSTS

SCREENING

Cf-252

LET ~ 43 MeV.cm²/mg
(T°_{MAX}, VCC_{MAX})

AND/OR

Laser

E ~ 3 nJ/pulse
(T°_{MAX}, VCC_{MAX})



AN OPTIMIZED TEST PLAN : MEETING NEEDS WHILE CONTROLLING COSTS

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RADIATION QUALIFICATION

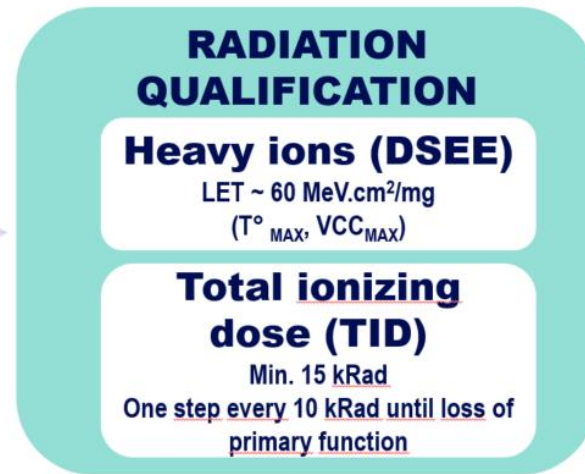
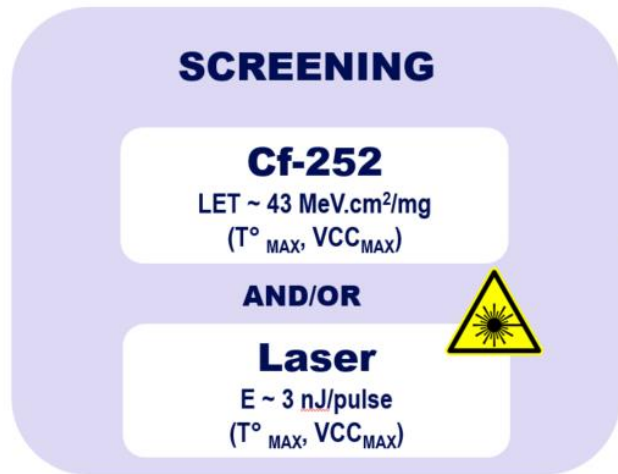
Heavy ions (DSEE)

LET ~ 60 MeV.cm²/mg
(T°_{MAX}, VCC_{MAX})

Total ionizing dose (TID)

Min. 15 kRad
One step every 10 kRad until loss of primary function

A RELIABLE SOURCING: ENSURING TRACEABILITY AT COMPETITIVE PRICES



PROVIDING COMPONENTS

Test reports and Justification document

Sourcing and storage

Components available on **R2COTS®**

WHY TRACEABILITY MATTERS: ENSURING QUALITY AND COMPLIANCE

COUNTERFEITING

15% of electronic components sold worldwide are counterfeit



linkhamson.com

RELIABILITY

ensuring suppliers and distributors comply with quality standards

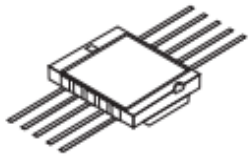


keyence.fr

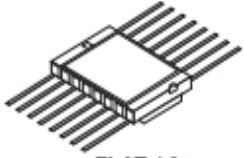
TRACKING

Radiation data are batch dependent

HOW TO BENEFIT FROM THE USE OF COTS : TAILORING SOLUTIONS TO EVERY PROJECTS



FLAT-10

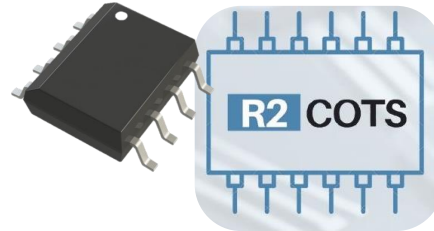


FLAT-16

RAD-HARD

Reference : Gate driver Rad hard, High reliability ESCC QML

Price (1 pc) : **~500 €**

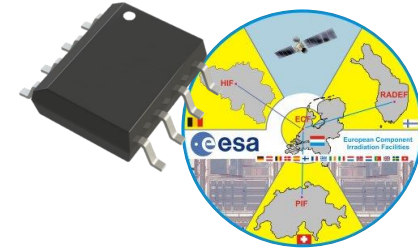


R2COTS® x CNES

Reference : SI8271AB-ISR

Manufacturer : Skyworks Solutions

Price (1 pc) : **7 €**



COTS + RAD CAMPAIGN

Reference : SI8271AB-ISR

Manufacturer : Skyworks Solutions

Price (1 pc) : **1,80 €**

Price (SEE + TID) : **30K €**

COLLECTIVE EFFORTS : SHARING DATA, COORDINATING RESOURCES, AND ENSURING THAT KNOWLEDGE BENEFITS THE ENTIRE ECOSYSTEM.



THANK YOU FOR YOUR LISTENING

SHOULD YOU HAVE ANY QUESTIONS, LET'S ASK !