

# **Infineon PowerMos Development within the scope of the ECI Program**

ECI Meeting Sept. 2016 Rome

**Wolfgang Kuebler**

Senior Marketing Manager HiRel Products



# **Agenda**

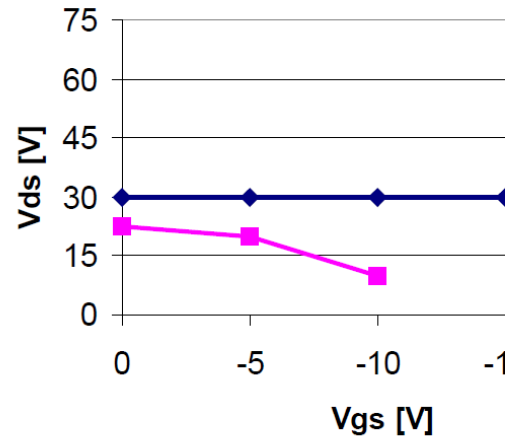
**Project European RH PowerMOS**

**RH PowerMOS Product Range**

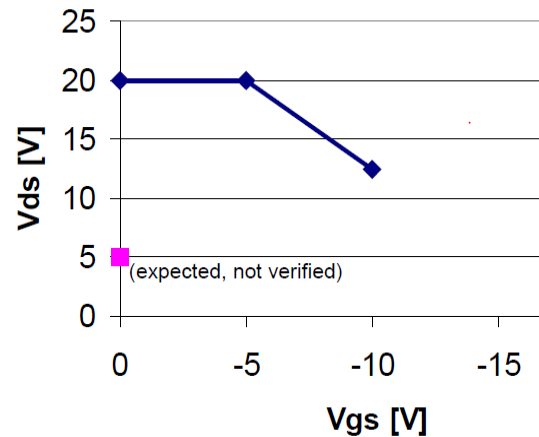
**RH PowerMOS Space Heritage**

# The Project Begnis: Historical Rad Test; SEE and TID Non Rad-Hard Standard Technologies

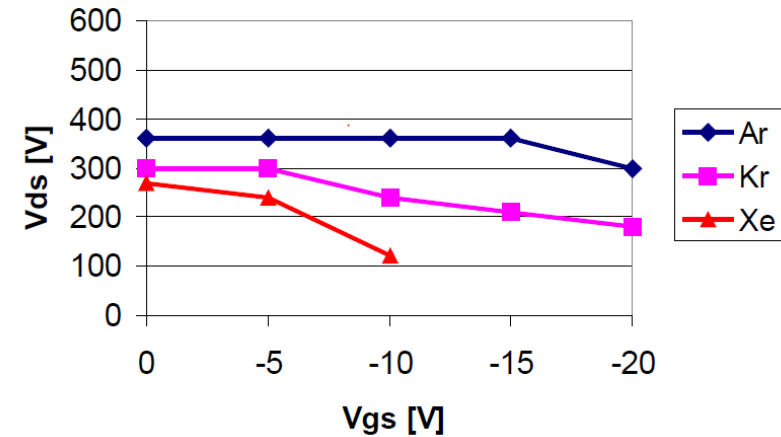
75V Planar MOS



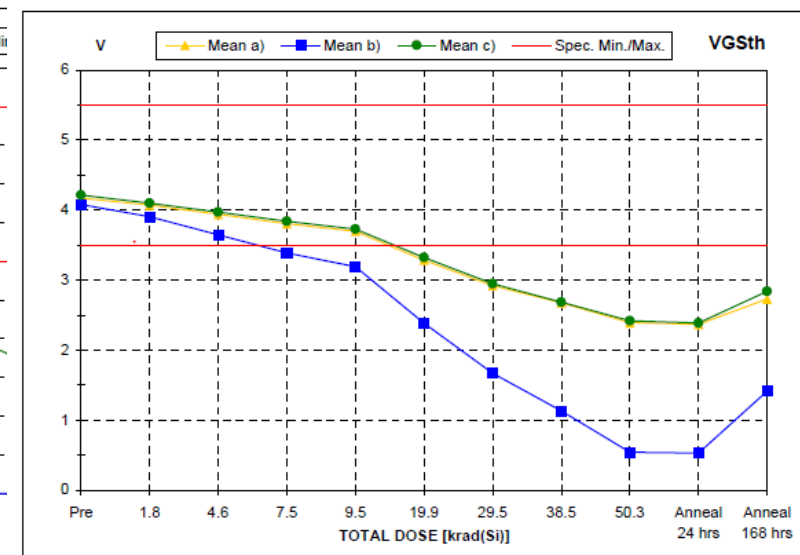
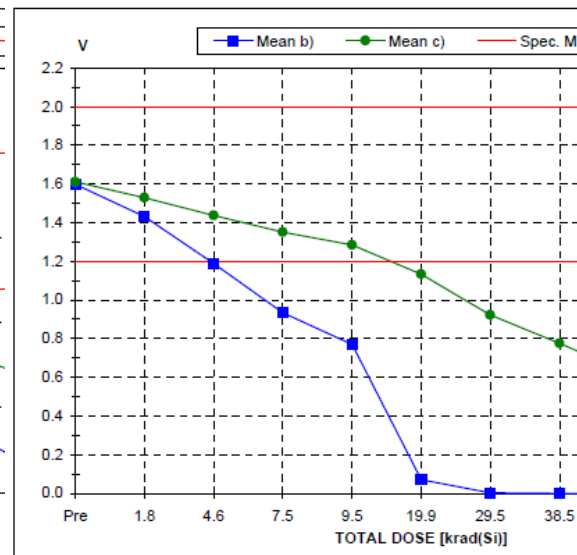
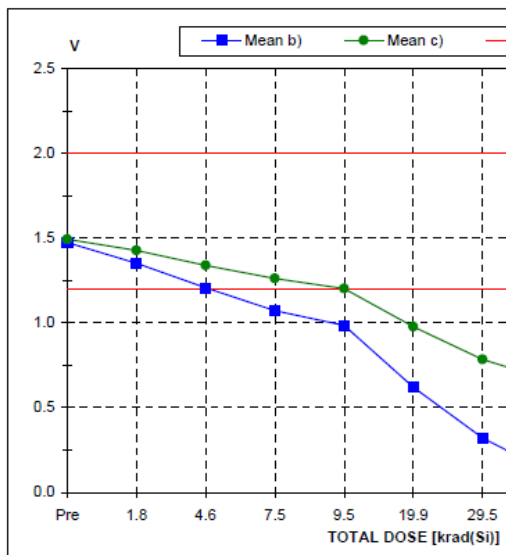
25V Trench MOS



600V Super-Junction MOS

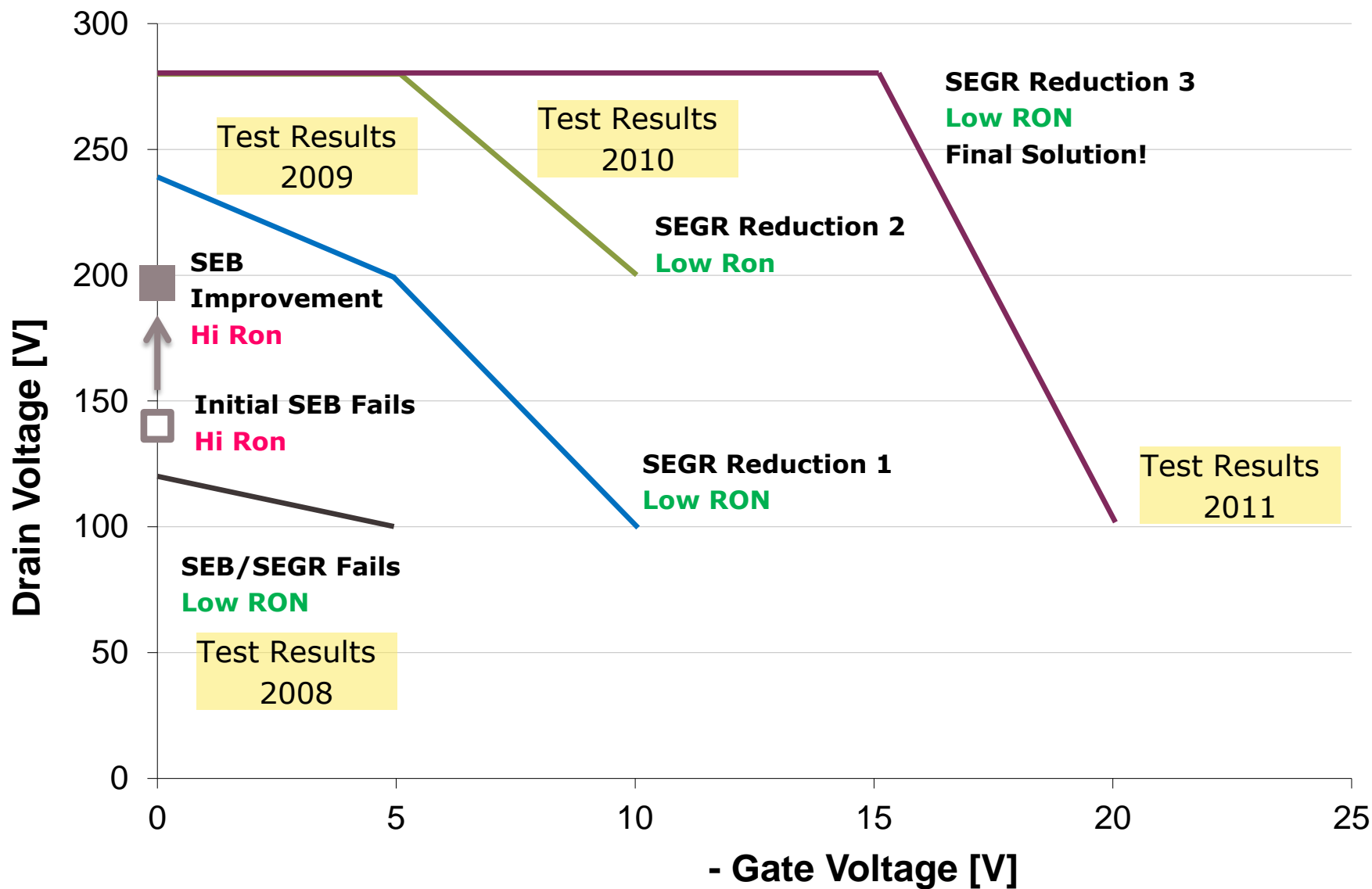


■ Ar=LET14MeVcm<sup>2</sup>/mg; ■ Kr=LET34MeVcm<sup>2</sup>/mg; ■ Xe = LET55MeVcm<sup>2</sup>/mg



# Radiation Hard PowerMOS

## SEE hardness development steps (250V)



# Radiation Hard PowerMOS

## Finally the qualification!

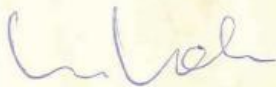


european space agency  
agence spatiale européenne

### Certificate of Qualification No. 319

This is to certify that INFINEON Technologies AG, Neubiberg, Germany has been qualified by ESA for the supply of Transistors, Power, MOSFET, N-Channel, Based on Type BUY\*\*CS\*\* for use in ESA space programmes, according to ESCC Generic Specification 5000 and associated Detail Specifications 5205/026, 5205/027 and 5205/028 as recommended by the Space Components Steering Board.

This certificate is valid until August 2014.



Head of the Product Assurance  
and Safety Department

Date  
21 August 2012



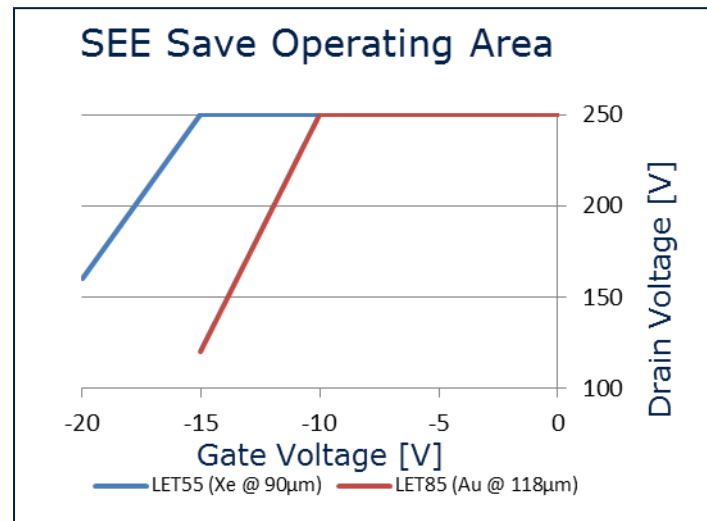
# Radiation Hard PowerMOS Products 250V N-Channel

## Radiation-hardened:

- › Total Ionization Dose (TID) 100krad
- › Single Event Effect (SEE):  
LET 85, Range: 118μm VGS = -10V, VDS = 250V;  
LET 55, Range: 90μm VGS = -15V, VDS = 250V;

Datasheet available at:

[WWW.Infineon.com/RadHardMOS](http://www.infineon.com/RadHardMOS)



Devices also available as qualified bare die (chip) on request

Type	ESCC Reference	RDSON max; 25°C	IDC	Umax	Package	ESA QPL
<b>BUY25CS12J-01</b>	5205/026	130mOhm	12A	250V	SMD0.5	yes
<b>BUY25CS54A-01</b>	5205/027	30mOhm	54A	250V	SMD2	yes
<b>BUY25CS12K-01</b>	5205/030/01	130mOhm	12A	250V	TO257AA	yes
<b>BUY25CS45B-01</b>	5205/030/03	50mOhm	45A	250V	TO254AA	yes



# Radiation Hard PowerMOS Products 150V N-Channel



## Radiation-hardened:

- › Total Ionization Dose TID 100krad
- › Single Event Effect (SEE):  
LET 73, Range: 253µm VGS = -10V, VDS = 150V;  
LET 55, Range: 95µm VGS = -15V, VDS = 150V;



ESA qualified Device!

Datasheet available at:

[WWW.Infineon.com/RadHardMOS](http://www.infineon.com/RadHardMOS)

Devices also available as qualified bare die (chip) on request

Type	ESCC Reference	RDSON max; 25°C	IDC	Uma x	Package	ESA QPL
<b>BUY15CS23J-01</b>	5205/031/01	60mOhm	23A	150V	SMD0.5	yes
<b>BUY15CS57A-01</b>	5205/031/02	11mOhm	57A	150V	SMD2	yes
<b>BUY15CS23K-01</b>	5205/031/03	60mOhm	23A	150V	TO257AA	yes
<b>BUY15CS45B-01</b>	5205/031/04	27mOhm	45A	150V	TO254AA	yes



# Radiation Hard PowerMOS Nomenclature

## BUY25CS12J-01(ES)

### Transistor Type:

BUY = N-Channel

### Voltage class:

25 = 250V

15 = 150V

### Technology:

CS = CS1 (First Gen)

### Current rating in Ampere:

e.g. 12 = 12A max DC current

### Quality Level:

SAM = electrical functional sample

P = Professional device for Engineering purpose (EM)

ES = Fully screened device according to ESCC5000 for Flight purpose (FM)

### Type Variant:

01 = Standard

11 = GDS output for TO packages

### Package designator:

J = SMD05

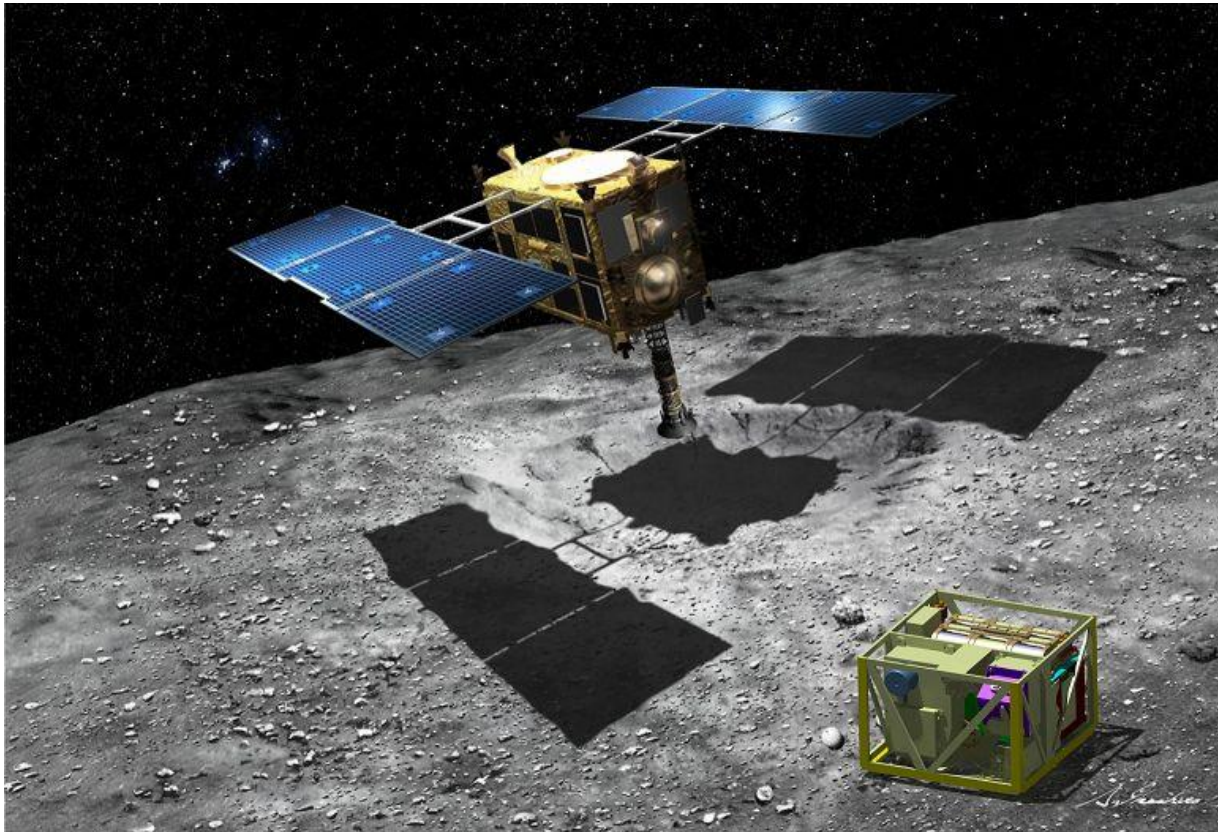
K = TO257AA

A = SMD2

B = TO254AA



# Radiation Hard PowerMOS Space Heritage



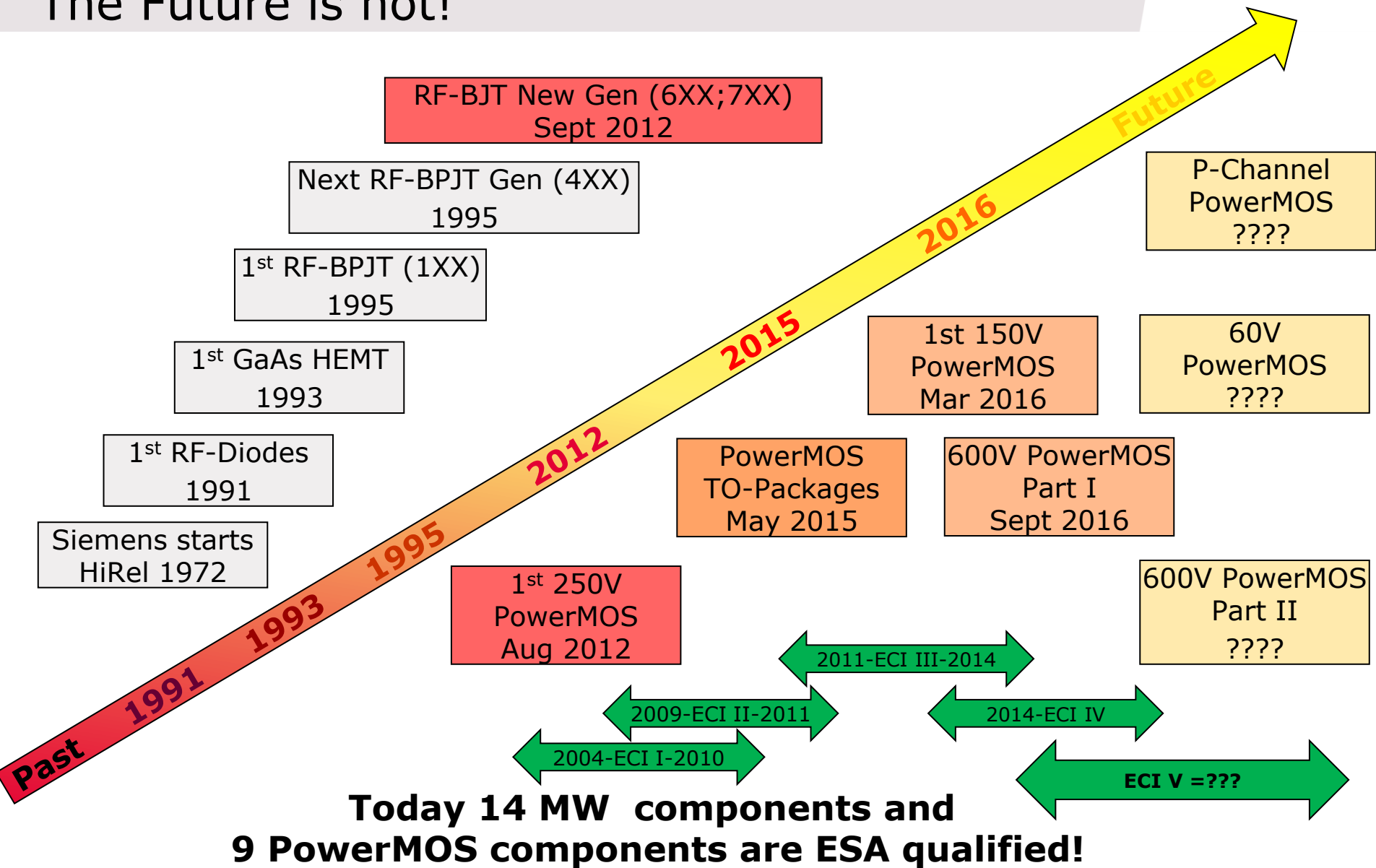
**JAXA Hayabusa II launched Dec 3. 2014!**

PowerMOS included in Mobil Asteroid Surface Scout (Mascot)

Regular function tests of RadHardMos running

# Infineon HiRel products for Space

## The Future is hot!



# Infineon HiRel products for Space



In every Project  
there are ups and downs!



But as a Team  
we can manage!

Thank you!

For the  
continuous  
support!







Part of your life. Part of tomorrow.

